Fishery Management Report No. 17-27

2016 Bristol Bay Area Annual Management Report

by

Paul Salomone

Travis Elison

Tim Sands

Greg Buck

Terri Lemons

Fred West

and

Ted Krieg

May 2017

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

FISHERY MANAGEMENT REPORT NO. 17-27

2016 BRISTOL BAY AREA ANNUAL MANAGEMENT REPORT

by
Paul Salomone, Travis Elison, Greg Buck, and Fred West
Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage

Tim Sands
Alaska Department of Fish and Game, Division of Commercial Fisheries, Dillingham

Ted Krieg
Alaska Department of Fish and Game, Division of Subsistence, Dillingham

and

Terri Lemons
Alaska Department of Fish and Game, Division of Subsistence, Anchorage

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1565

May 2017

The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.adfg.alaska.gov/sf/publications/. This publication has undergone regional peer review.

Paul Salomone, Travis Elison, Greg Buck, and Fred West
Alaska Department of Fish and Game, Division of Commercial Fisheries,
333 Raspberry Road, Anchorage, AK, 99518, USA

Tim Sands
Alaska Department of Fish and Game, Division of Commercial Fisheries,
546 Kenny Wren Road, P.O. Box 230, Dillingham, AK 99576, USA

Ted Krieg and Terri Lemons
Alaska Department of Fish and Game, Division of Subsistence,
333 Raspberry Road, Anchorage, AK, 99518, USA

This document should be cited as follows:
Salomone P., T. Elison, T. Sands, G. Buck, T. Lemons, F. West, and T. Krieg. 2017. 2016 Bristol Bay area annual management report. Alaska Department of Fish and Game, Fishery Management Report No. 17-27, Anchorage.

TABLE OF CONTENTS

Page

LIST OF TABLES ii
LIST OF FIGURES iii
LIST OF APPENDICES iii
ABSTRACT 1
INTRODUCTION 1
Management Area Description 1
Overview of Bristol Bay Salmon Fisheries 1
2016 COMMERCIAL SALMON FISHERY 2
Run Strength Indicators 2
Preseason Forecasts 2
South Unimak/Shumagin Islands Fishery 3
Port Moller Test Fishery 3
Genetics 3
Economics and Market Production 4
Run and Harvest Performance by Species 4
Sockeye Salmon 4
Chinook Salmon 4
Chum Salmon 4
Pink Salmon 4
Coho Salmon 4
Season Summary by district 5
Naknek-Kvichak District 5
Egegik District 8
Ugashik District 11
Nushagak District 15
Togiak District 19
2016 BRISTOL BAY HERRING FISHERY 20
Stock Assessment 21
Sac Roe Herring Fishery Overview 22
Fishing and Industry Participation 22
2016 Season Summary 22
Biomass Estimation 22
Age Composition 22
Commercial Fishery 22
Purse Seine 23
Gillnet 23
Spawn on Kelp 24
Exploitation 24
Exvessel Value 24

TABLE OF CONTENTS (Continued)

Page

ACKNOWLEDGEMENTS....24
REFERENCES CITED....25
TABLES....27
FIGURES....65
APPENDIX A: SALMON....71
APPENDIX B: HERRING....105
APPENDIX C: 2016 BRISTOL BAY SALMON OUTLOOK....113
APPENDIX D: 2016 TOGIAK HERRING OUTLOOK....123

LIST OF TABLES

Table		Page
1	Comparison of inshore sockeye salmon forecast versus actual run, escapement goals versus actual escapements, and projected versus actual commercial catch, by river system and district, in thousands of fish, Bristol Bay, 2016.	28
2	Forecast of sockeye salmon returns by age class, river system, and district, in thousands of fish, Bristol Bay, 2016.	29
3	Mean round weight, price per pound, and total exvessel value of the commercial salmon catch, Bristol Bay, 2016.	29
4	Commercial salmon processors and buyers operating in Bristol Bay, 2016	30
5	Commercial salmon catch by district and species, in number of fish, Bristol Bay, 2016.	31
6	Final daily and cumulative escapement estimates by species, Nushagak River sonar project, Bristol Bay, 2016.	32
7	Daily sockeye salmon escapement tower counts by river system, east side Bristol Bay, 2016.	33
8	Commercial fishing emergency orders by period, district, and statistical area, Bristol Bay east side, 2016.	34
9	Commercial salmon catch by date and species, in numbers of fish, Naknek-Kvichak District, Bristol Bay, 2016.	38
10	Daily district registration of drift gillnet permit holders by district, Bristol Bay, 2016.	40
11	Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey estimate and river test fishing enumeration methods, Kvichak River, Bristol Bay, 2016.	41
12	Commercial salmon catch by date and species, in numbers of fish, Egegik District, Bristol Bay, 2016.	42
13	Comparison of daily sockeye salmon escapement estimates by tower count and river test fishing enumeration methods, Egegik River, Bristol Bay, 2016.	44
14	Inshore run of sockeye salmon by age class, river system, and district, in thousands of fish, Bristol Bay, 2016.	45
15	Commercial salmon catch by date and species, in numbers of fish, Ugashik District, Bristol Bay, 2016.	46
16	Comparison of daily sockeye salmon escapement estimates by tower count and river test fishing enumeration methods, Ugashik River, Bristol Bay, 2016.	48
17	Daily sockeye salmon escapement tower counts by river system, Bristol Bay west side, 2016.	49
18	Commercial salmon catch by date and species, in numbers of fish, Nushagak District, Bristol Bay, 2016.	51
19	Commercial fishing emergency orders, by district and statistical area, Bristol Bay west side, 2016.	53
20	Inshore commercial catch and escapement of sockeye salmon, in numbers of fish, Bristol Bay, 2016.	57
21	Commercial salmon catch by date and species, in numbers of fish, Togiak District, Bristol Bay, 2016.	58

LIST OF TABLES (Continued)

Table		Page
22	Commercial salmon catch by date and species, in numbers of fish, Togiak River Section, Bristol Bay, 2016.	60
23	Commercial herring sac roe and spawn-on-kelp buyers in Togiak District, 2016.	62
24	Daily observed estimates of spawn (in miles) and herring (in short tons) by index area, in the Togiak District, 2016.	62
25	Emergency order commercial fishing periods for herring sac roe and spawn-on-kelp in the Togiak District, 2016.	63

LIST OF FIGURES

Figure		Page
1	Bristol Bay area commercial fisheries salmon management districts.	66
2	Port Moller Test Fishery daily indices.	67
3	Stock composition estimates for sockeye salmon sampled from the Port Moller Test Fishery, 2016.	68
4	Togiak Herring District, Bristol Bay.	69

LIST OF APPENDICES

Appendix		Page
A1	Escapement goal ranges and actual counts of sockeye salmon by river system, in thousands of fish, Bristol Bay, 1996–2016.	72
A2	Salmon entry permit registration by gear and residency, Bristol Bay, 1996–2016.	74
A3	Sockeye salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.	75
A4	Chinook salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.	76
A5	Chum salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.	77
A6	Pink salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.	78
A7	Coho salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.	79
A8	Total salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.	80
A9	Commercial sockeye salmon catch, in percent, by gear type and district, Bristol Bay, 1996–2016.	81
A10	Sockeye salmon escapement by district, in numbers of fish, Bristol Bay, 1996–2016.	82
A11	Inshore total run of sockeye salmon by district, in numbers of fish, Bristol Bay, 1996–2016.	83
A12	Inshore commercial catch and escapement of sockeye salmon in the Naknek-Kvichak District by river system, in numbers of fish, Bristol Bay, 1996–2016.	84
A13	Inshore sockeye salmon total run by river system Naknek-Kvichak District, in thousands of fish, Bristol Bay, 1996–2016.	85
A14	Inshore commercial catch and escapement of sockeye salmon in the Egegik District by river system, in numbers of fish, Bristol Bay, 1996–2016.	86
A15	Inshore commercial catch and escapement of sockeye salmon in the Ugashik District by river system, in numbers of fish, Bristol Bay, 1996–2016.	87
A16	Inshore commercial catch and escapement of sockeye salmon in the Nushagak District by river system, in numbers of fish, Bristol Bay, 1996–2016.	88
A17	Inshore sockeye salmon total run by river system, in thousands of fish and percent of total district run, Nushagak District, Bristol Bay, 1996–2016.	89
A18	Inshore commercial catch and escapement of sockeye salmon in the Togiak District by river system, in numbers of fish, Bristol Bay, 1996–2016.	90
A19	Chinook salmon harvest, escapement and total runs in the Nushagak District, in numbers of fish, Bristol Bay, 1996–2016.	91
A20	Chinook salmon harvest, escapement and total runs in the Togiak River drainage, in numbers of fish, Bristol Bay, 1996–2016.	92

LIST OF APPENDICES (Continued)

Appendix		Page
A21	Inshore commercial catch and escapement of chum salmon in the Nushagak and Togiak Districts, in numbers of fish, 1996–2016.	93
A22	Average round weight of the commercial salmon catch by species, Bristol Bay, 1996–2016.	94
A23	Average price paid (in dollars/pound) for salmon, by species, Bristol Bay, 1996–2016.	95
A24	Estimated exvessel value of the commercial salmon catch by species, in thousands of dollars, Bristol Bay, 1996–2016.	96
A25	South Unimak and Shumigan Island preseason sockeye allocation and actual sockeye and chum salmon harvest in thousands of fish, Alaska Peninsula, 1996–2016.	97
A26	Subsistence salmon harvest by species, in numbers of fish, by district and location fished, Bristol Bay, 2016.	98
A27	Subsistence salmon harvest by district and species, Bristol Bay, 1996–2016	99
A28	Subsistence harvest of sockeye salmon by community, in numbers of fish, Kvichak River drainage, Bristol Bay, 1996–2016.	102
A29	Subsistence salmon harvest by community, Nushagak District, Bristol Bay, 1996–2016.	103
B1	Sac roe herring industry participation, fishing effort, and harvest, Togiak District, 1996–2016.	106
B2	Exploitation of Togiak herring stock, 1996–2016.	107
B3	Age composition, by weight, of total inshore herring run, Togiak District, 1996–2016	108
B4	Preseason forecast (in tons), aerial survey estimates of herring biomass (in tons), and spawn deposition (in miles), Togiak District, 1996–2016.	109
B5	Exvessel value of the commercial herring and spawn-on-kelp harvest, Togiak District, 1996–2016.	110
B6	Guideline and actual harvests of sac roe herring (tons) and spawn-on-kelp, Togiak District, 1996–2016.	111
C1	2016 Bristol Bay salmon outlook.	114
D1	2016 Togiak herring fishery information.	125

ABSTRACT

The *2016 Bristol Bay Area Annual Management Report* is the 55th consecutive annual volume reporting on management activities of the Alaska Department of Fish and Game, Division of Commercial Fisheries staff in Bristol Bay. The report emphasizes a descriptive account of the information, decisions, and rationale used to manage the annual Bristol Bay commercial salmon (sockeye *Oncorhynchus nerka*, Chinook *O. tshawytscha*, chum *O. keta*, pink *O. gorbuscha*, and coho *O. kisutch*) and Pacific herring (*Clupea pallasii*) fisheries. The 2016 inshore sockeye salmon run of 51.7 million fish was 11% above the preseason forecast of 46.6 million fish. Sockeye salmon dominated the inshore commercial harvest, totaling 37.6 million fish of the 39.5 million total commercial salmon harvest. Sockeye salmon escapement goals were met or exceeded in all systems where spawning requirements have been defined with a baywide escapement of 14.1 million fish. There was a total harvest of 33,000 Chinook; 969,000 chum; 769,000 pink; and 91,000 coho salmon. The 2016 Togiak District herring preseason biomass forecast was 162,244 short tons. The combined harvest was 14,879 short tons with an average roe percent of 12.3%. The Dutch Harbor food and bait fishery harvest was 208 short tons, bringing the total harvest for 2016 to 15,087 short tons. All 2016 harvest data are considered preliminary and are based on fish tickets.

Key words: Pacific salmon *Oncorhynchus* spp., sockeye salmon *Oncorhynchus nerka*, Chinook salmon *O. tshawytscha*, chum salmon *O. keta*, coho salmon *O. kisutch*, pink salmon *O. gorbuscha*, Pacific herring *Clupea pallasii*, commercial fisheries, Bristol Bay, Naknek, Kvichak, Egegik, Ugashik, Wood, Nushagak, Igushik, Togiak, Annual Management Report (AMR)

INTRODUCTION

MANAGEMENT AREA DESCRIPTION

The Bristol Bay management area includes all coastal and inland waters east of a line from Cape Newenham to Cape Menshikof (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 that return to Bristol Bay each year, but Chinook *O. tshawytscha*, chum *O. keta*, coho *O. kisutch*, and, in even years, pink salmon *O. gorbuscha* returns 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 escapement goal 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.

OVERVIEW OF BRISTOL BAY SALMON FISHERIES

The 5 species of Pacific salmon found in Bristol Bay are the focus of major commercial, subsistence, and sport fisheries. Annual commercial catches for the most recent 20-year span (1996–2015) averaged approximately 22.7 million sockeye, 52,000 Chinook, 943,000 chum, 415,000 (even-years only) pink, and 84,000 coho salmon (Appendices A3–A7). Since 1996, the value of the commercial salmon harvest in Bristol Bay has averaged approximately $109.0 million and sockeye salmon is the most valuable, averaging $106.9 million annually (Appendix A24). Subsistence catches are composed primarily of sockeye salmon and average approximately 100,000 fish (Appendix A27). Sport fisheries harvest all species of salmon, with most effort directed toward Chinook and coho salmon stocks.

Management of the commercial fishery in Bristol Bay is focused on discrete stocks with harvests directed at terminal areas around the mouths of major river systems. Each stock is managed to achieve a spawning escapement goal based on sustained yield. Escapement goals are achieved by

regulating fishing time and area by emergency order (EO) and/or adjusting weekly fishing schedules. Legal gear for the commercial salmon fishery includes both drift (150 fathoms) and set (50 fathoms) gillnets. However, the Alaska Board of Fisheries (BOF) passed a regulation in 2003 allowing 2 drift permit holders to concurrently fish from the same vessel and jointly operate up to 200 fathoms of drift gillnet gear. Drift gillnet permits are the most numerous with 1,864 in Bristol Bay (Area T) of which 1,732 registered to fish in 2016. There are a total of 973 set gillnet permits in Bristol Bay, and 858 made at least 1 delivery in 2016 (Appendix A2).

2016 COMMERCIAL SALMON FISHERY

RUN STRENGTH INDICATORS

Fishery managers in Bristol Bay have several early indicators of sockeye salmon run size, including the preseason forecast, the False Pass commercial fishery, an offshore test fishery operating from Port Moller, genetic stock identification, individual district test fishery programs, early performance of the commercial fishery, inriver test fishery programs, and timely escapement information from counting towers and a sonar project. Individually, these pieces of information may not give a correct assessment of run size, but collectively, they allow broad scale examination of inseason data such as relative strengths of year classes, discrepancies from the forecast (relative to expected year class contributions), or differences in run timing that can be important to successful management of the commercial fishery.

Similar to recent years, with community support and funding from Bristol Bay Regional Seafood Development Association (BBRSDA), tower projects in Naknek, Kvichak, Egegik, and Wood river systems started operations 5 days early in 2016 compared to traditional start dates for these enumeration projects. This was the last year of funding to start project operations early.

PRESEASON FORECASTS

Total inshore (excluding harvest in other areas) sockeye salmon production for Bristol Bay in 2016 was forecast to be 46.6 million (Table 1). The Bristol Bay sockeye salmon inshore harvest was predicted to reach 29.5 million fish. Runs were expected to be large enough to meet spawning escapement goals for all river systems in Bristol Bay.

The forecast for the sockeye salmon run to Bristol Bay in 2016 was the sum of individual predictions for 9 river systems (Kvichak, Alagnak, Naknek, Egegik, Ugashik, Wood, Igushik, Nushagak, and Togiak) and 4 major age classes (age 1.2, 1.3, 2.2, and 2.3, plus age 0.3 and 1.4 for Nushagak) (Table 2). Adult escapement and return data from brood years 1972 to 2011 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. All models were evaluated for time series trends. 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 2 time periods, 2013 through 2015 and 2011 through 2015.

SOUTH UNIMAK/SHUMAGIN ISLANDS FISHERY

From 1975 to 2000 these fisheries were managed under a guideline harvest level (GHL) based on a percentage of the Bristol Bay inshore sockeye salmon harvest. The original intent was to prevent overharvest of sockeye salmon runs bound for river systems in Bristol Bay. From 1986 to 2000, a chum salmon cap was implemented because of concerns about large chum salmon harvest and a weak Yukon River fall chum salmon run. In 2001, the BOF modified the *South Unimak/Shumagin Islands June Fishery Management Plan* (5 AAC 09.365) to eliminate the GHL and chum salmon cap and established a June fishing schedule. In 2004, the BOF established a fishing schedule that began at 6:00 AM on June 7 and ended at 10:00 PM on June 29 for all gear types. Fishing periods were 88 hours in duration interspersed by 32 hour closures (Poetter 2014a). In 2013, the BOF modified the fishing schedule for seine and drift gillnet gear by beginning the season at 6:00 AM on June 10 and ending at 10:00 PM on June 28, which reduced fishing time by 64 hours (Poetter 2014b). Preliminary 2016 catch information for these fisheries can be found in Appendix A25.

PORT MOLLER TEST FISHERY

From 1967 to 1985, the Alaska Department of Fish and Game (ADF&G) operated a test fishery program based near the community of Port Moller. A large vessel fished gillnets at specific coordinates on transect lines perpendicular to the migration path of sockeye salmon returning to Bristol Bay. Collected data were used to estimate strength, timing, age, and size composition of the run. Although forecasting performance of the project was often inaccurate, the project was very popular with salmon processors because it gave an additional indication of run size, which influenced production capacity and price paid to fishermen. The project did not operate in 1986, but through voluntary funding from industry and support from ADF&G and the Fisheries Research Institute (FRI), the Port Moller test fishery project operated from 1987 through 2003. Beginning in 2004, the Bristol Bay Science and Research Institute (BBSRI) has operated the project and performed the bulk of daily inseason analysis (Figure 2). The project is currently operated jointly by ADF&G, BBSRI, and LGL Alaska Research Associates staff.

GENETICS

Over the last 16 years, ADF&G has built and tested a genetic baseline capable of identifying stock compositions of mixed-fishery samples from within Bristol Bay. The genetics program has 2 primary objectives: 1) provide managers with a preliminary estimate of stock compositions of fish returning to Bristol Bay through the Port Moller test fishery; and 2) provide researchers with stock composition estimates by year within fishing districts for use in the estimates of total runs and development of brood tables.

Genetic sampling was added to the Port Moller test fishery project starting in 2004. The intent is to use inseason genetic analysis to identify components of the annual run in time to inform management decisions for individual stocks. ADF&G genetics can complete analysis and deliver results in 3 to 5 days depending on several factors (e.g., timing of airline flights, weather on the fishing grounds). The travel time for fish from Port Moller to Bristol Bay is approximately 7 days depending on several factors (e.g., district, water temperature, wind). Therefore, results from genetic sampling should be available before those fish reach the fishing districts of Bristol Bay (Figure 3).

ECONOMICS AND MARKET PRODUCTION

In 2016, exvessel value of the inshore commercial salmon harvest was estimated at $155.6 million (Table 3), 13% above the $138.3 million 10-year (2006–2015) average (Appendix A24). The 2016 average sockeye salmon price was $0.76/pound (Table 3).

During the 2016 season, a total of 40 processors/buyers reported that they processed fish from Bristol Bay (Table 4). Of those processors, 7 companies canned, 32 froze, 20 exported fresh, 1 cured salmon, and 12 extracted roe. Product was exported by air by 32 companies and exported by sea by 24 companies.

RUN AND HARVEST PERFORMANCE BY SPECIES

Sockeye Salmon

The 2016 inshore sockeye salmon run of 51.7 million fish was 11% above the preseason forecast of 46.6 million (Table 1). All districts except Naknek-Kvichak District had run sizes that were above forecast. Sockeye salmon dominated the inshore commercial harvest, totaling 37.6 million fish, which was the largest harvest since 1996 (Table 5 and Appendix A3). Sockeye salmon escapement goals were met or exceeded in all systems where spawning requirements have been defined. Most notable in 2016 was that the run was among the latest on record, approximately 6 days late, a market price that rose 50% from $0.50/pound in 2015 to $0.76/pound in 2016. Average fish weights were 5.4 pounds, still smaller across all age classes than the long-term average, but larger than 2015 (Appendix A22).

Chinook Salmon

The 2016 baywide commercial harvest of 32,990 Chinook salmon was 38% below the 20-year (1996–2015) average of 52,000 fish (Appendix A4). The Naknek-Kvichak, Egegik, and Ugashik Districts had harvests above the 20-year (1995–2015) averages and the Togiak District was below. The largest producer of Chinook salmon in the Bay, the Nushagak District, achieved a harvest of 23,783, below the 20-year (1996–2015) average of 44,000 fish (Appendix A4). The Nushagak River Chinook salmon escapement was 125,368, above the sustainable escapement goal range of 55,000–120,000 (Table 6).

Chum Salmon

In 2016, the commercial harvest of 969,479 million chum salmon was 3% above the 20-year (1996–2015) average of 943,000 fish. Chum salmon catches were above 20-year (1996–2016) averages in all districts except Nushagak (Appendix A5).

Pink Salmon

Bristol Bay has a dominant even-year pink salmon cycle. In 2016, an on-cycle year, the baywide pink salmon harvest was 768,614 fish. In even-years, the largest run is in the Nushagak District, whereas the 20 year (1996–2015) harvests averaged 359,000 pink salmon (Appendix A6).

Coho Salmon

Commercial harvest of coho salmon was 90,771 fish, 8% above the 20-year (1996–2015) average of 84,000. The largest commercial harvest was in the Nushagak District, where the 79,588 fish harvest was 62% higher than the 20-year (1996–2015) average of 49,000 coho salmon (Appendix A7). Nushagak River coho salmon escapement was not monitored in 2016.

SEASON SUMMARY BY DISTRICT

Naknek-Kvichak District

The 2016 inshore run forecast for the Naknek-Kvichak District was 23.2 million sockeye salmon composed of a projected 10.6 million for escapement and 11.7 million for harvest. The forecast by river system was 12.7 million for the Kvichak River, 5.7 million for the Alagnak River, and 4.8 million for the Naknek River (Table 1). The escapement goal for Naknek River is a range of 800,000–2.0 million. The escapement goal for the Kvichak River is a range of 2.0–10.0 million. The total inshore run to the district for 2016 was 21.4 million sockeye salmon; a commercial harvest of 13.5 million sockeye salmon and a total escapement of 7.9 million sockeye salmon (Table 1).

ADF&G does not forecast Chinook, chum, coho, or pink salmon for systems in Naknek-Kvichak District. Commercial harvest of Chinook salmon has remained relatively small because of current mesh size restrictions that have been in effect since the early 1990s. Mesh restrictions are set by EO and prohibit gillnets with a mesh size larger than 5.5 inches until July 25.

Escapement counting towers for Naknek and Kvichak rivers were operational during the 2016 season. In response to an early run in 2013, with strong community support and funding through the BBRSDA, the Naknek River tower began counting on June 14 and the Kvichak River tower began on June 16, which is 5 days earlier than normal for each project (Table 7). This was the last year of BBRSDA funding for early operation. The Naknek River escapement was 1.7 million sockeye salmon and the Kvichak River escapement was 4.5 million sockeye salmon, which was within the escapement goal ranges for each river (Appendix A1).

Fishing with drift gillnets was restricted to the Naknek Section during the early season schedule but both sections were open to the set gillnet fleet. Fishing periods were from 9:00 AM Monday until 9:00 AM Friday, beginning 9:00 AM Wednesday, June 1 and ending 9:00 AM Thursday, June 23 (Table 8). At the December 2015 meeting, the BOF reinstated the requirement for drift fishermen to register prior to fishing in any district in Bristol Bay. This allowed for a return to the traditional early season fishing schedule of 4 days a week from June 1 to June 23. In the previous 2 seasons, the early season schedule was more conservative due to increased participation and mobility of the fleet.

The Naknek-Kvichak District opened at 9:00 AM Monday, June 1; however, the first deliveries did not occur until June 13 (Table 9). The early season fishing schedule ended June 23 with a total harvest of 22,000 sockeye salmon. Following the closure on June 23, subsequent fishing periods were based on inseason indicators of abundance for the Naknek and Kvichak rivers.

The Kvichak River forecast was 12.7 million sockeye salmon and the Alagnak River forecast was 5.7 million sockeye salmon, which is above average for both of these systems. In 2015, the Kvichak River escapement was 7.4 million; the largest escapement in 20 years. The Alagnak River escapement was an estimated 5.8 million; the largest escapement on record. The preseason management strategy was to allow liberal fishing time in the Kvichak Section throughout the season in order to provide opportunity to harvest fish surplus to escapement needs on the Kvichak and Alagnak rivers.

There were only 254 permits registered as of June 23 (Table 10). From June 23 until June 29 the fleet was given daily updates of the run assessment. Through June 29 the Naknek River

cumulative escapement was 79,080 and the Kvichak River cumulative escapement was 13,908 (Table 7), which was 4 to 5 days behind the average run timing curves on both rivers.

The Port Moller test fishery began fishing on June 12. From June 12 to June 21 the mean daily catch index, which is the average catch per unit effort (CPUE) across Stations 2 to 10, ranged from 3 to 24which represent low numbers of fish. On June 22 the mean daily catch index increased to 36 and steadily climbed to 66 on June 26 (Figure 2). This indicated that a volume of fish was finally headed for somewhere in Bristol Bay. On June 29, Port Moller sockeye salmon stock compositions were available from the June 21 to the June 26 sampling dates. The most glaring results were the lack of Naknek River fish in the samples, which ranged from 0.9% on June 21-22 to 5.4% on June 25–26. At the same time, Kvichak River stock composition ranged from 5.8% to 15.7% and Alagnak River ranged from 0.1% to 11.7% (Figure 3).

District test fishing began on June 24, continued into June 25 through 2 flood tides and documented very few fish entering the district. Drifts were done from Johnson Hill to Middle Bluff and indices ranged from 0 to 370 fish per 100 fathom hours. On June 26, the district test boat fished through a full tide cycle from Johnson Hill down to Middle Bluff and indices ranged from 0 to 135. Seals were noted as an issue for most drifts. The test boat did not fish on June 27 because there had been such low volume the previous few days. On June 28 the test boat started fishing near Middle Bluff at the end of the ebb tide and indices ranged 0 to 17 on the first 4 drifts. On the fifth set, the test boat got an index of 318 about 1 mile south of Deadman Sands on the flood tide. They continued to make sets on the flood tide up to the Kvichak "Y" with consistent catches and indices ranged from 157 to 818. The last set was done inside the Naknek Section at high slack and the index was zero. Although these catches indicated that abundance in the district had increased, the decision was made to take these fish as escapement. On June 29 the test boat fished from Gravel Spit out to Johnson Hill on the ebb and fished back to Ships Anchorage on the flood. Indices ranged from 34 to 507 and the highest catches were consistently in the middle of the district, west of the Naknek Section boundary line (data on file with Bristol Bay Management Group, Division of Commercial Fisheries, ADF&G, Anchorage).

From 6:00 AM to 2:00 PM on June 30 the Naknek River escapement went from a cumulative of 79,994 to 130,794 sockeye salmon (Table 7). With the high passage rate, the escapement was quickly catching up to the anticipated escapement goal curve. At 3:00 PM June 30 an announcement was made to open the Naknek-Kvichak District to set gillnets for a 7.5 hour period starting at 8:30 AM July 1. The drift fleet was put on short notice for a possible 9:00 AM announcement and 10:00 AM opener on July 1. The announcement was made at 9:00 AM July 1 to open the Naknek-Kvichak District to drift gillnet gear for a 6 hour period. There were 4 reasons to open the entire district rather than just the Naknek Section. 1) Based on test fishing results most of the fish were moving through the Kvichak Section and not the Naknek Section. 2) The Port Moller genetic stock composition (Figure 3) indicated that there were relatively more Kvichak River bound fish than Naknek River bound fish. 3) The preseason management strategy was to be more aggressive in the Kvichak Section in order to take advantage of potential surplus in those systems. 4) There were only 384 permits registered to fish in the Naknek-Kvichak District (Table 10).

On July 1, the Kvichak inriver test fishery had an index of 1,729 on the morning tide which indicated an increasing abundance of fish moving into the river. A Kvichak River aerial survey was flown on July 1 and there were an estimated 160,000 fish in the river. At 3:00 PM July 1 there was an announcement made to open the Naknek-Kvichak District on July 2 to set gillnets at

9:30 AM for a 7.5 hour period and to drift gillnets at 10:30 AM for a 6.5 hour period. On July 2, the Naknek River escapement continued to be above expectations and there was a Kvichak inriver estimate of 300,000 based on the inriver test fishery (Table 11). Therefore, the period that began on July 2 for set gillnets was extended for 24.5 hours. The harvest from July 1 and July 2 was 236,000 and 267,000 fish, respectively.

On July 3 there were 483 permits registered and an expected 581 vessels in 48 hours (Table 10). The escapement on the Naknek River was following the expected curve. Kvichak River was 3 days behind the expected curve for the lower bound of the escapement goal; however the Port Moller test fishery genetic stock composition and the Kvichak inriver test fishery indicated that the abundance of Kvichak River fish would increase. There was an announcement at 9:00 AM to extend the set gillnet period until 7:00 PM July 4 and open the Naknek-Kvichak District to drift gillnets for 7.5 hours starting 11:00 AM July 3 followed by a Naknek Section only period for 7.5 hours starting at 1:00 AM July 4. The drift fleet continued to fish in the Naknek Section during each high tide through the morning tide on July 7 and the set gillnet fleet stayed in the water through the morning tide on July 7.

On the morning of July 7 cumulative catch was at 1.7 million sockeye salmon, which was far below the expected harvest. The harvest percentages were 13% Naknek Section set gillnets, 17% Kvichak Section set gillnets, and 70% for drift gillnets. The cumulative escapement on the Naknek River was at 641,244, which put it on track for reaching the middle of escapement goal range. The Kvichak River cumulative escapement was at 727,488, which put it on the curve for the lower bound of the escapement goal and the inriver estimate was only 200,000. More escapement was needed for the Kvichak River and the Kvichak Section set gillnet harvest percentage was more than twice the regulatory allocation. A break from fishing was needed to adjust the escapement and catch allocation trends without allowing too many fish to escape at one time. There was a lull in the Port Moller test fishery index on June 28 and June 29 (Figure 2). Travel time from the Port Moller test fishery to the Naknek-Kvichak District was estimated to be 7 to 8 days. Using this information the district was closed during the evening tide on July 7. During the morning tide on July 8 the Naknek Section was opened to both drift and set gillnets. The 9:00 AM announcement on July 8 extended the current period for Naknek Section set gillnets, opened the Naknek Section to drift gillnets, and opened the Kvichak Section to set gillnets beginning at 4:00 PM. Kvichak River cumulative escapement was 948,000 and 550,000 fish estimated inriver based on the test fishery (Table 11). An aerial survey was flown later in the day and estimated 750,000 fish inriver and another 112,000 past the tower by 2:00 PM. At 3:00 PM it was announced that the drift period starting at 4:00 PM would be expanded to the entire district. Harvest on July 8 was 858,000 sockeye salmon bringing the cumulative to 2.8 million (Table 9).

As of 6:00 AM on July 9 the Naknek River escapement was at 815,892, which was within the escapement goal range. The Kvichak River escapement was 1,301,640 and another 700,000 estimated inriver. This nearly assured that the lower bound of the escapement goal would be met within a couple of days. With improved escapement numbers the set gillnet fleet in both sections were given daily extensions to the fishing periods that began on July 8. The drift gillnet fleet fished both tides in the Naknek Section on July 9. On July 10 the Naknek-Kvichak District opened for 1 period followed by 2 periods in the Naknek Section. Beginning 7:00 PM July 11 the drift fleet fished each high tide in the Naknek-Kvichak District until the fall schedule went into effect on August 1 (Table 8).

The total inshore run to the district for 2016 was 21.4 million sockeye salmon with a commercial harvest of 13.5 million (Table 1). The escapements were 1,691,790 on the Naknek River and 4,462,728 on the Kvichak River (Table 7). An aerial survey estimate of 696,400 on the Alagnak River was expanded consistent with Clark (2005) and resulted in a total drainage escapement estimate of 1,775,820 (Appendix A12).

The total harvest of 13.5 million sockeye salmon was 82% above the 20-year (1996–2015) average of 7.4 million (Appendix A3). The sockeye salmon harvest percentages were 8% Naknek set, 9% Kvichak set, and 83% drift (Appendix A9). The allocation in regulation is 84% drift gillnet and 8% each for Kvichak and Nankek set gillnets.

The midpoint of the sockeye salmon run into the district was July 12, which was 7 days later than the historical average. This was 1 day later than the 2015 run timing and it was the second latest run timing on record. In 1956, midpoint of the run was July 13 (data on file with Bristol Bay Management Group, Division of Commercial Fisheries, ADF&G, Anchorage).

The Chinook salmon total harvest was 2,797 fish, which was above the 20-year (1996–2015) average of 1,944 fish (Appendix A4). The chum salmon harvest totaled 237,035 fish, which was above the 20-year (1996–2015) average of 177,841(Appendix A5). There was a commercial harvest of 12,058 pink salmon and 1,110 coho salmon (Appendices A6 and A7).

Egegik District

The 2016 Egegik District harvest of 8.7 million sockeye salmon was 52% above the projected harvest of 5.7 million sockeye salmon (Table 1) and ranks fourth in the last 20 years (Appendix A13). The sockeye salmon escapement of 1,837,260 million fish was within the newly adopted sustainable escapement goal (SEG) range of 800,000–2.0 million (Appendix A1). With an inshore total of approximately 10.6 million fish to the Egegik District, the 2016 run ranks fourth over the last 20 years and was 43% above the forecast of 7.4 million fish (Table 1; Appendix A14). Similar to 2015, in 2016, the midpoint of the sockeye salmon run was July 9, or 6 days later than the 20-year average of July 3 and again one of the latest on record.

The preseason projection for a Kvichak River run that would provide for the minimum escapement of 2.0 million sockeye salmon allowed commercial fishing to begin in the full Egegik District. The district opened to commercial salmon fishing for a set schedule of 3 days per week at 12:01 AM Wednesday, June 1. Fishing was permitted from 9:00 AM Monday to 9:00 AM Wednesday and 9:00 AM Thursday to 9:00 AM Friday until June 17 (Table 8). At the December 2015 meeting the BOF reinstated the requirement for drift fishermen to register prior to fishing in any district in Bristol Bay. Because of the registration requirement and anticipation the fleet would have a more measured response to early season fishing, the schedule was in place until June 17. After that date the district went to an active management scenario and additional fishing time was based on inseason indicators. First deliveries were recorded June 7 (Table 12). Catch was small through the end of the early season schedule. Through June 17, the total harvest was just over 51,000 fish.

In response to early run timing in 2013, with strong community support and funding through the BBRSDA, the Egegik counting tower was deployed and operational 6 days earlier than normal on June 12, 2016. This was the last year of funding for early operation. Estimated escapement for the first days of operation (June 12–17) totaled 37,344 fish, ahead of historical run-timing curves but suggesting low levels of abundance (Table 13).

Daily inriver test fishing, which provides estimates of sockeye salmon passage into the lower Egegik River, began on June 17 at established sites just upstream of Wolverine Creek (Table 13). Initial catches from the test fishery did not indicate large numbers of fish were moving into the Egegik River.

The district stayed closed on the weekend of June 18–19, but reopened to both gear groups for 8 hours on June 20 and again June 21 (Table 8). Combined harvest was over 90,000 fish. Cumulative catch through June 21 was 141,000 and cumulative escapement was 134,280 (Tables 12 and 13). The district stayed closed on June 22, but the inriver test fishery project detected a strong push of fish during the evening tide. With escapement occurring and tracking ahead of expected curves additional fishing time was justified and 8 hour periods were permitted June 23, 24, and 25 for the set gillnet group. The drift gillnet group was permitted to fish 8 hours on June 23, 9 hours on June 24 and 8 hours on June 25. Harvest first exceeded 100,000 fish on June 23 with a daily catch of 108,000, with another 47,000 on June 24 and 80,000 on June 25 bringing the cumulative catch to 378,000 fish. Over the same 3 day period escapement continued to build with a cumulative escapement of 254,310 sockeye salmon; roughly 3 days ahead of anticipated curves (Tables 12 and 13).

The harvest percentage favored the set gillnet group so with escapement progressing ahead of expectations the drift gillnet group was permitted to fish 11 hours on June 26 with a harvest of 115,000 (Table 12). The drift fleet fished 4 hours on June 28 and did not fish on June 29 to allow fish to redistribute within the district and to provide for escapement from this segment of the run. Through June 29 cumulative harvest was 778,000 fish and cumulative escapement was 368,000 sockeye salmon (Tables 12 and 13). Based on long-term averages the pace of escapement was tracking towards the upper end of the escapement goal range and several days ahead of anticipated levels.

Because escapement was pacing ahead of expectations, fishing was liberalized on June 30; the drift fleet was permitted to fish a 6 hour period and the set gillnet group was permitted an 8 hour period. Information from the inriver test fishery and the fishing grounds indicated a good volume of fish present in the district and because harvest percentage still favored the set gillnet fleet, the drift fleet was subsequently allowed an additional 4 hours on the evening tide. Harvest from the day was over 233,000 fish (Table 12), bringing the cumulative to 1.0 million and indicating an increase in abundance. Daily escapement on June 30 increased to 113,508 bringing the cumulative to 481,140 sockeye salmon, over halfway to the minimum escapement and still tracking ahead of expectations (Table 13).

On July 1, 8 hour periods were allowed for both gear groups, harvest was 234,000 fish and escapement was 69,626 sockeye salmon (Tables 12 and 13). Because of the pace of escapement and with the harvest percentage favoring the set gillnet group, the drift gear group was allowed to fish both tides for a total of 12 hours on July 2, and the set gillnet group was permitted to fish the day time tide for 8 hours (Table 8). Harvest increased to 330,000 fish and escapement decreased to 27,702 sockeye salmon, demonstrating the effect of the fishery. On July 3, single tide periods of 8 hours were permitted for both gear groups, harvest was 322,000 fish and escapement was 25,710 sockeye salmon. Through July 3, cumulative harvest was 1.9 million; cumulative escapement was 604,278 or roughly 75% of the lower end of the escapement goal, and tracking to fall within the escapement goal range. The harvest percentage was 83% drift gillnet and 17% set gillnet compared to 86% drift gillnet and 14% set gillnet specified in regulation (Tables 12 and 13).

A single tide was fished by both gear groups on July 4, to provide additional escapement from this segment of the run and to provide fish an opportunity to redistribute within the district. Harvest on July 4 was almost 390,000 fish and escapement was 55,416 sockeye salmon (Tables 12 and 13).

With harvest trends increasing, escapement pacing ahead of expectations, and harvest percentage favoring the set gillnet fleet, drift fishing was expanded to 2 tides on July 5 and the set gillnet fleet was allowed a single 8 hour period. Harvest dropped to 286,000 fish, but escapement increased to 94,674 sockeye salmon. Through July 5 cumulative harvest was 2.6 million and cumulative escapement was 754,368 sockeye salmon (Tables 12 and 13).

Inriver test fishery indices increased again on July 7 and 8 and the lower end of the escapement goal range was surpassed on July 7 when 36,768 sockeye salmon passed the tower (Table 13). On July 7 fishing was permitted for 2 tides for the drift fleet and a single tide for the set gillnet fleet followed by both gear groups fishing a single tide on July 8. The strategy was to alternate openings/closures in this fashion to allow for fish to redistribute throughout the district and achieve escapement from this run segment while maintaining a metered harvest of surplus fish. The highest daily harvest of the season occurring on July 7 with 640,000 fish harvested. Through July 8 harvest was 3.6 million fish and cumulative escapement was 998,362 sockeye salmon.

Because escapement was solidly within the established range, fishing was liberalized to 2 tides per day for both gear groups. High winds on July 10 and 11 kept some elements of the fleet from fishing and inriver indices climbed again as the fleet was unable to take full advantage of the available surplus (Table 12). Escapement continued to be strong through July 12 with the peak day for the season of 178,440 sockeye salmon occurring on July 11. Fishing continued at 2 tides per day for both gear groups and was permitted on a continuous basis beginning July 16. Beginning July 13 escapement dropped to under 35,000 fish per day and averaged 31,000 for the rest of the season. Through July 17, cumulative escapement was 1,629,762 million sockeye salmon and cumulative harvest was 7.2 million fish (Tables 12 and 13).

By regulation, the fall schedule of 9:00 AM Monday to 9:00 AM Friday begins on July 17. However, there was a harvestable surplus of fish so the fishery remained open on the weekends of July 16–17, and July 23–24 with the effect that fishing was allowed continuously from July 17 to July 29 (Table 8).

The late surge of fish for the second year was again unusual in magnitude and timing. The escapement project usually finishes around July 18, but is dependent on run entry for termination. In 2016, the project was extended until July 24, because of late run strength and escapements. Long term average cumulative escapement for the Egegik River between July 10 and July 20 is 339,117 sockeye salmon. In 2016 it was 625,746, with an additional 101,376 occurring between July 21 and July 24. The count on the last full day of operation was 29,830 sockeye salmon, approximately 1.5% of the cumulative escapement through that date and still very strong for the time of year (Table 13).

The 2016 Egegik run was above forecast and exhibited very late run timing; the midpoint was July 9 compared to the 20-year average of July 3. By July 17, cumulative catch was 7.6 million salmon. Final escapement was 1,837,260 sockeye salmon, within the escapement goal range, when the project ended on July 24 (Table 13).

The 2016 Egegik sockeye salmon run was composed of mostly 2- and 3-ocean fish, which came from the 2011 and 2012 escapements of 960,000 and 1.2 million sockeye salmon, respectively (Table 14 and Appendix A10). Based on scale data approximately 38% of the run was aged 2.2 fish from the 2011 brood year. These fish were among the smallest mature fish on record averaging between 4.75 and 5.25 lb for most of the season. However, the 2016 fish were slightly larger than the fish in 2015.

Commercial fishermen harvested approximately 82% of the Egegik 2016 inshore sockeye salmon run, compared to the average of 83% for the last 20 year period (Appendix A14). Peak tower counts occurred July 8 and 11 with 175,344 and 178,440 sockeye salmon counted, respectively (Table 12). During the period from June 16 to July 17 in 2016, a total of 327.25 hours were fished by the drift gillnet group (8 hours more than 2015) and 297.25 hours were fished by the set gillnet gear group (157 hours less than in 2015), equating to 43% and 39%, respectively, of the 753 available hours (Table 11). By the end of the allocation period on July 17, harvest percentages were 82% drift and 18% set gillnet (Appendix A9). The regulatory allocation is 86% drift and 14% set gillnet.

For the second consecutive year, the high harvest percentage for the set gillnet fleet is because the set gillnet fleet had a higher harvesting efficiency than the drift fleet. In 2014, fish size was small and, in 2015, much of the set gillnet fleet adjusted to add mesh size smaller than 4.75 inch mesh to their stock of nets to increase their harvesting options. The fish size was again below average in 2016 and the trend continued. The drifters were not as quick to react and add smaller mesh sizes to their net caches to the same extent the set gillnet fleet did, thus were not as effective at harvesting the small fish seen in 2016. Because managing the escapement is first priority, and the set gillnet fleet was more effective at harvesting the small fish available, they were allowed to continue fishing in spite of discrepancies in the allocation.

Commercial harvest of other salmon species in the Egegik District was 76,674 fish, or about 0.08% of the total (Table 12). The reported Chinook salmon harvest was 1,144 fish, 64% above the 20-year average of 697 fish (Appendix A4). The district chum salmon harvest of 74,641 fish was 13% above the 20-year average of 65,626 fish (Appendix A5). Reported pink salmon harvest was 343 (Appendix A6). The coho salmon harvest of 546 fish was 97% below the 20-year average of 16,122 fish (Appendix A7).

In summary, the 2016 harvest of 8.7 million sockeye salmon in the Egegik District ranked fourth out of the last 20 years, was 35% above the 20-year average of approximately 7.8 million fish, and was 43% above the preseason forecast (Table 1; Appendix A14). The fishery harvested 82% of the run into the district compared to the 20-year average of 83% (Appendix A14). The midpoint of the run was July 9, which was 6 days later than the 20-year average and tied for the latest run over that span. Peak harvest occurred on July 7 and July 10 with 639,000 and 516,000 fish harvested respectively. Peak escapement occurred on July 8 and July 11 with 175,344 and 178,440 sockeye salmon counted respectively. Peak effort occurred on June 30, when 403 drift gillnet vessels were registered in the district including 178 dual permits (Table 10). There were 14 processors registered to purchase fish in the Egegik District this season (Table 4).

Ugashik District

The 2016 inshore sockeye salmon run to the Ugashik District of 8.3 million was the largest run to the district according to records dating back to 1904, and was 67% above forecast (Table 1; Appendix A14). The midpoint of the run was July 13, compared to the 20-year average of July

10. The commercial sockeye salmon catch of approximately 6.6 million fish was 65% above the 20-year average and is the largest recorded in the district dating back to 1904 (Table 15; Appendix A15). Sockeye salmon escapement to the Ugashik River totaled 1,635,270 and was above the SEG range of 500,000–1.4 million fish (Table 16).

The district was opened by EO to a fishing schedule of 4 days per week (9:00 AM Monday to 9:00 AM Friday) beginning 12:01 AM Wednesday June 1 (Table 8). Initial landings occurred on June 13 (Table 15). Because the preseason forecast for the Kvichak River allowed all fishing districts to start the season in their full areas, and because of BOF action requiring district registration for drift gillnetters, the schedule of 4 days per week was continued until 11:59 PM Wednesday June 22 when fishery management switched to a tide-by-tide basis (Table 8). Fishermen were advised that additional fishing time would depend on inseason indicators of abundance.

Considering the district experienced good harvest rates in 2015; ADF&G anticipated a higher level of drift gillnet effort early in the season. As a result, after June 22 ADF&G was more attentive to levels of drift effort, because of the potential of a larger fleet to intercept non-local stocks. Fishermen were advised that ADF&G would consider fleet size and be cautious about allowing drift fishing time depending on the number of drift fishermen. Escapement levels, as indexed by the inriver test fishery, would play a prominent role in adjusting duration of fishing periods as the season progressed.

Catch through June 17 was well below the historical average for the first 3 weeks of June (Table 15). With no escapement assessment this early in the season and available indicators suggesting low levels of abundance, the district stayed closed the weekend of June 18–19.

Harvest increased on June 20–22 and averaged almost 20,000 compared to the historical average of 8,500 for the same period. Because of concern over intercept of non-local stocks and a lack of information about escapement, the drift fleet did not fish but the set gillnet fleet was permitted to fish for 10 hours on June 23. Harvest was 1,700 fish indicating low abundance and suggesting fish were not moving into the river system. However, it should be noted the effort for the set gillnet fleet was low (Table 15).

Initial information from the Ugashik inriver test fishery became available on June 25 (Table 16) and suggested that fish were passing into the river in low volume. Inriver test fishing, which occurs about 3 miles upstream of Ugashik Village, provided a daily estimate of sockeye salmon passage into the lower part of the Ugashik River.

The drift gillnet fleet was permitted to fish for 3 hours on June 24 to gauge abundance in the outer portion of the district and the set gillnet fleet was permitted to fish 10 hours. Harvest from this period was 43,000 fish (Table 15) compared to the long-term average of around 8,600. This was a fairly high catch considering the amount of time allowed.

Still cautious of interception, the set gillnet fleet was permitted to fish an 8 hour period on June 25 and 9 hours on June 26 with harvests of 7,200 and 10,000 (Table 16). These are strong harvests for set gillnet only fishing and indicative of fish committing to moving into the Ugashik River, which was subsequently confirmed by the inriver test fishery (Table 16).

The escapement tower project, operating about 24 miles upstream of Ugashik Village, started counting on June 26 and ended with a partial day estimated passage of 4,596 fish (Table 16). Considering that escapement was occurring as indexed by the inriver test fishery, a 4 hour drift

and 9 hour set gillnet period was permitted on June 27. Harvest from this period was 81,000 and large for the date factoring in the short duration of the drift gillnet period. On June 28 another 4 hour drift and 8 hour set gillnet period was allowed which resulted in another strong harvest of 73,000 fish. Escapements on June 27 and 28 were 13,080 and 18,828 (Table 15) and about average for the date, but it is important to account for travel time from the district to the tower project, typically 5–7 days. Travel time is important because it can take the fish 3–7 days to reach the tower after passing the inriver test fishery, thus providing additional uncounted escapement above the commercial fishery. Through June 28 cumulative escapement was 36,504 sockeye salmon and near anticipated levels for the date, but with only 1 partial and 2 full days of counting. Cumulative harvest was 278,000 fish and pacing ahead of long-term averages (Tables 15 and 16).

The tower counts continued to be near average, but the inriver estimate of 35,000 put the escapement ahead of expectations (Table 16). Therefore another 4 hour drift and 9 hour set gillnet period was permitted on June 29. The district remained closed on June 30 to allow for escapement and for fish to redistribute within the district. The pattern of 4 hour drift and 9 hour set gillnet periods continued through July 2. Inriver test fishery indices remained steady indicating that fish were still entering the river in spite of the fishing time permitted. Through July 2 cumulative harvest was 626,000; cumulative escapement was 106,158 and still ahead of expectations (Tables 15 and 16).

Information from the inriver test fishery project on July 3–4 suggested strong passage into the Ugashik River which prompted an 8 hour period for the drift fleet and a 9 hour period for the set gillnet fleet on July 3. Genetic information from the Port Moller test fishery from the July 3–4 samples showed that Ugashik was the largest component of the samples for that period, a very unusual circumstance because Ugashik typically represents 10–15% of the samples from the project. During the July 3–4 sample period the Ugashik stock was roughly 27% of the samples collected, suggesting a large Ugashik component for at least that sample (Figure 3). Travel time from the Port Moller test fishery to the Ugashik District can be from 5 to 7 days.

Considering the genetic information from the Port Moller project and that escapement was ahead of expectations, fishing time was expanded, beginning with a 7 hour drift and 9 hour set gillnet period on July 5, followed by an 8 hour drift and 9 hour set gillnet period on July 6. Catches from these 2 days were 246,000 and 383,000 respectively, both large catches for the district and bringing the cumulative harvest to 1.6 million fish. Through July 6, cumulative escapement was 233,130 sockeye and still pacing towards the upper end of the escapement goal range.

On July 7 inriver test fishery indices increased and fishing was further liberalized and both gear groups were allowed a 10 hour period. Harvest from this period was 313,000 fish. Escapement on July 7 was 27,390 bringing the cumulative to 260,520 sockeye salmon and slightly over halfway to the lower end of the escapement goal range.

The Port Moller test fishery continued to show a strong genetic signal for Ugashik which, factoring in travel time would roughly correspond to the traditional peak days of the Ugashik run of around July 10. With escapement pacing towards the upper end of the escapement goal range additional time was allowed for both gear groups. On July 8 both groups were allowed 11 hours and on July 9, because harvest percentages were favoring the set gillnet group, the drift fleet was allowed to fish 13.5 hours and the set gillnet fleet was permitted 11.5 hours. Through July 9 cumulative harvest was 2.4 million fish and cumulative escapement was 374,898 sockeye

salmon. The long-term average escapement through July 9 is 217,414. The inriver test fishery project had strong indices July 7, 8 and 9 indicating that fish passage into the Ugashik River was continuing at elevated levels (Tables 15 and 16).

Up until this point in the season escapement was pacing towards the upper end of the escapement goal range with indications of a large run to the system. Management was controlling escapement at an acceptable pace, but on July 10 heavy weather impacted fishing effort and thus ADF&G's ability to control escapement via fishing time. Harvest on July 9 was near 300,000 and represents the first of 11 consecutive days where harvest was near or exceeded 300,000 fish (averaging 359,000 for the 11 days, Table 15). Several days over the next week had associated weather issues that hampered or reduced fleet participation leading to increased escapement. Strong westerly winds intermittently reduced the set gillnet fleet's effectiveness during fishing periods over the next week, yet overall catches remained high supporting the assessment of a large run.

Inriver indices remained strong on July 10 and 11 primarily because of diminished effort due to stormy conditions (Table 16). On July 11, fishing opportunity was increased to 18 hours per day for both gear groups. One long period was preferred by industry as opposed to 2 shorter tidally based fishing periods because it simplified tender rotation schedules so that industry could cover the tendering needs of the fishery.

On July 13 inriver indices remained high, but on July 14 they began to taper sharply. Meanwhile the impacts of the weather issues began to be seen in escapement with 139,398 fish counted at the tower on July 13, the first of 6 consecutive days where escapement averaged 109,115 sockeye salmon. Between July 11 and July 17 the commercial harvest was 2.7 million fish and escapement was 726,204 sockeye salmon (Tables 15 and 16) In most years this would represent average numbers for the annual Ugashik run (Appendices A8 and A10).

Between July 11 and July 16 the drift fleet was allowed to fish 1 long period per day, and on July 17 the fall schedule began, which essentially permitted both fleets to fish continuously. By regulation the fall schedule of 9:00 AM Monday to 9:00 AM Friday begins on July 17. However, because there was a harvestable surplus, the fishery was allowed to remain open on the weekends of July 16–17, July 23–24, and July 30–31. On August 1 the fall schedule changes in the Ugashik District from a Monday–Friday schedule to 9:00 AM Thursday to 9:00 AM Monday, the overall effect was that fishing was allowed continuously from July 17 to August 1 (Table 8).

Through August 1, cumulative harvest was 6.7 million fish (Table 15). Cumulative escapement was 1,635,270 sockeye when the tower project ended for the season on July 27, which is above the upper end of the escapement goal range 1,400,000 (Table 16).

By the end of the allocation period (July 17), set gillnet fishermen caught approximately 9% of the sockeye salmon harvested and drift gillnet fishermen caught 91%; the allocation specified in regulation is 10% set gillnet and 90% drift gillnet (Appendix A9). Between June 23 and July 17, set gillnet permit holders were permitted to fish a total of 307.5 hours, or 8 hours less fishing time than in 2015, and drift gillnet permit holders were permitted to fish a total of 223.5 hours, or 17.5 hours less than in 2015 (Table 15).

The reported harvest of 1,435 Chinook salmon is 62% above the 20-year average of 885 (Appendix A4). Chinook and chum salmon escapement is assessed by aerial surveys in the Dog Salmon and King Salmon rivers, major tributaries of the Ugashik River and the biggest

producers of these species in the district. In 2016, no escapement surveys were flown in the Ugashik drainages because of budget constraints. The chum salmon harvest of 72,534 fish is 10% above the 20-year average of 65,905 (Appendix A5). Reported pink salmon harvest was 1,498 fish and incidental to directed sockeye salmon fishing (Appendix A6). There was little directed commercial effort for Ugashik coho salmon in 2016; reported harvest was 171 fish and is roughly 5% of the 20-year average of 3,800 (Appendix A7).

The Ugashik District had several unique aspects during the 2016 season. First, in late spring several thousand Pacific walrus *Odobenus rosmarus* divergens began using a beach at the northern end of Cape Greig as a resting area. It is believed the animals were feeding in the nearshore area and using the beach to rest between feeding excursions. It is also believed that the animals had relocated from Cape Seniavin which is about 140 miles to the south. The beach at Seniavin is a recognized long term haul out for walrus, but lacked animals in 2016. Second, the 2016 run to the Ugashik District and the harvest, were the largest on record, dating back to 1904. Third, similar to 2015, the run timing was late.

The beach used by the walrus during the 2016 season is located about 0.5 miles north of the district boundary. After consultation with the U.S. Fish and Wildlife Service it was decided to use EO authority to move the district boundary 1 mile south from the location defined in regulation to provide an additional buffer space for the animals. Although it did not completely eliminate interactions between the drift gillnet fleet and walrus, the buffer zone seemed to work as intended. At this time it is unknown if the animals will continue using the beach in 2017, but ADF&G will monitor the situation and be prepared to keep the new boundary in place if necessary.

In summary, the 2016 Ugashik District fishery harvested approximately 81% of the sockeye salmon run to the district, compared to the 20-year average harvest rate of 69% (Appendix A14). Days of peak catch occurred on July 14 and 16 when 463,000 and 403,000 fish were harvested, respectively (Table 15). The midpoint of the run was July 13 compared with the 20-year average of July 9. Days of peak escapement were, July 12, 13, and 14 when 139,398 129,684; and 122,874 sockeye salmon, respectively, passed the counting tower (Table 16). Peak effort occurred on July 12 when 297 drift gillnet permits, including 134 dual permits, registered to fish in the district (Table 10). There were 11 processors registered to purchase fish in the Ugashik District this season (Table 4).

Nushagak District

The 2016 Nushagak District total inshore sockeye salmon run was 10.4 million fish, 2% above the preseason forecast of 10.3 million fish (Table 1). Commercial sockeye salmon harvest in Nushagak District reached 8.1 million fish, 4% above the preseason projected harvest of 7.8 million fish and 38% above the 1996–2015 average harvest of 5.8 million sockeye salmon (Table 1 and Appendices A3 and A16). Escapement in the district's 3 major river systems was: 1,309,707 for Wood River, 469,230 for Igushik River, and 680,513 sockeye salmon for Nushagak River (Tables 17 and 18). Wood and Nushagak river's sockeye salmon escapement fell within their escapement goal ranges and Igushik River sockeye salmon escapement exceeded the upper end of the escapement goal range (Appendix A1). Chinook salmon escapement into Nushagak River was 125,368, 4% above the 120,000 fish upper end of the escapement goal range, and harvest was 23,783 Chinook salmon in Nushagak District (Tables 5 and 18).

In 2016, there was no forecast for Nushagak District Chinook salmon. The preseason plan for Chinook salmon management was to have directed openings if and when escapement warranted such openings. This decision was based on the lower than average Chinook salmon runs in recent years and the lack of a forecast for the 2016 season (Appendix A19).

The sonar escapement enumeration project at Portage Creek was fully operational on June 6 (Table 6). ADF&G began the season with the idea of being very conservative in regards to directed Chinook salmon openings. This was partly based on the 2014 experience of a strong early showing and then a very poor second half of the season. Nushagak Chinook salmon escapement was above average early in the season with 2 very strong days on June 17 and 18. Escapement decreased to a slow but steady pace by June 21 with an average daily escapement of approximately 2,500 Chinook salmon passing the counters from June 21 until July 9.

There were no directed Chinook salmon openings in the Nushagak District in 2016. The harvest of 23,783 Chinook salmon (Table 18) occurred during fishing periods targeting sockeye salmon, and was 54% of the 1996–2015 average harvest of 44,721 fish for the Nushagak District (Appendix A4).

Sockeye salmon enumeration on the Wood River began June 14, 4 days earlier than usual due to support from BBRSDA. In the past, ADF&G has used 100,000 sockeye salmon escapement at the Wood River tower as a threshold to begin fishing in the district. Because of a large baywide sockeye forecast and specifically large forecasts for the Wood and Nushagak rivers, in 2016 managers were looking for an escapement of between 30,000 and 40,000 sockeye salmon at the Wood River tower as a threshold to consider commercial fishing. A lower starting threshold allowed fishing for sockeye salmon to begin earlier than usual which would spread the harvest and allow processing operations to start running. The early start would, in theory expand the season for processors by giving them additional days to harvest and process fish early in the season. Fishing earlier would also keep escapement lower early in the season so if harvest was subsequently reduced by capacity issues there would be less chance of exceeding the upper ends of escapement goal ranges. The 100,000 fish threshold has been used to minimize incidental harvest of Chinook salmon in the district and to aid with early sockeye salmon escapement into the Nushagak River.

Fish passage was slow but steady for the first several days of counting. By June 17 cumulative escapement was approaching the 30,000–40,000 fish that ADF&G wanted before announcing the first opening (Table 17). With escapement of sockeye salmon increasing on both the Nushagak and Wood rivers, Nushagak Chinook salmon escapement above expectations, the first Nushagak Section set gillnet opening was announced for the morning of June 19 (Table 19). However, with increasing escapement and a strong wind forecast there was the distinct possibility of a large push of fish into the district. Despite reports of slow fishing from the set gillnet opening, ADF&G opted to extend set gillnet fishing and open fishing with drift gillnets on the afternoon of June 19 (Tables 17 and 18). This was due primarily to the weather forecast for strong winds and previous experience. Strong winds can often result in dramatically decreased fishing effort and efficiency as well as significant increases in fish movement. Providing fishing opportunity during these wind events helps control escapement. Harvest was just over 28,000 sockeye salmon. Fishing opportunities for the drift gillnet fleet continued with 1 opening a day until June 24. On June 24 and 25 drift gillnet openings were limited to Igushik Section only. This was because Wood River sockeye salmon escapement was not surging as it had in previous years and set gillnet catch at Igushik Beach was on a record breaking pace. Wood River escapement was

steady, but on the lower end of expectations for this point in the run (Table 17). After 2 days of holding the drift fleet out of the Nushagak Section, the fishing area was expanded to the entire Nushagak District for 1 opening on June 26. Fish passage through the district to the enumeration stations can take 48 hours so it was prudent to resume fishing effort in the Nushagak Section and evaluate the impacts of the reduced fishing interval. On June 27, fishing increased to 2 drift gillnet openings a day for the rest of the season, because escapement increased sufficiently on the Wood River. For the most part, openings were between 4 and 9 hours with 1 shorter and 1 longer opening each day. This is a typical mid- to late season schedule in the Nushagak District. Escapement was tracking as expected and breaking up the day into 2 openings with most of the ebb tide being fished and an hour at least of the end of the flood. This schedule allows for unfished flood tide for fish to push into the district getting fish to the set gillnet fleet and minimizing the line fishery. Harvest increased steadily until July 2 when it plateaued, between July 2 and July 15, only 1 day was below 300,000 fish harvest. The 2 best days were July 4, and July 10, with 487,000 and 440,000 sockeye salmon, harvested, respectively (Table 18).

Nushagak District set gillnets started fishing on June 19. Fishing continued on a daily basis with some extensions and some closures for the first week of the season. By the second week of the season a more consistent schedule of 2 openings per day was implemented. In most years the set gillnet fleet would have been extended until further notice by the end of June. However 2016 was different because the set gillnet fleet in the Nushagak Section was ahead of the harvest percentages set out in the allocation plan. In order to meet the goals of the allocation plan, instead of allowing continuous fishing, ADF&G continued to alternate openings and closures for the set gillnet fleet and in some cases allowed the drift fleet longer fishing periods than the set gillnet fleet. This strategy was effective and the harvest percentages were equalizing to meet the Nushagak set gillnet fleet goal of 20%. On July 9, the set gillnet fishery was extended until further notice. By July 12, the Nushagak set gillnet harvest percentage was 21%, just over the 20% goal. The harvest percentages diverged again from that point, decreasing drift gillnet effort as permit holders transferred to other districts or quit fishing altogether and strong set gillnet harvests combined to make the set gillnet harvest percentage in the Nushagak Section 21.9% by the end of the accounting period on July 17 (Appendix A9).

Early season Wood River sockeye salmon escapement was relatively slow compared to most years between June 21 and July 2. It increased on July 3 and peaked at 112,590 on July 4. Escapement after July 5 was again slower than expected for several days but as the run continued daily escapement surpassed expectations starting on July 12. This continued to be the case until enumeration ceased on July 21, 4 days later than normal (Table 17). The final escapement of 1,309,707 is within the escapement goal range (700,000–1.8 million) and above the 1,250,000 midpoint. The larger than normal escapement after July 12 was probably due to later run timing and decreased drift gillnet effort in the district as permit holders transferred to other districts or ceased fishing.

Nushagak sockeye salmon escapement was consistently strong and steady throughout the season. A strong push on June 18 doubled the escapement from 35,000 to 70,000. Continued steady escapement to the peak of 79,110 on July 4 pushed escapement past the 370,000 lower end of the escapement goal range (Table 6). Escapement continued to be above expectations through July 18 when enumeration ceased. The final count of 680,513 sockeye salmon was within the 370,000–900,000 escapement goal range.

Commercial fishing with set gillnets in the Igushik Section of the Nushagak District began on June 13 (Tables 18 and 19) with 8 hour openings daily. The Igushik set gillnet harvest was strong from the beginning. ADF&G extended fishing for the Igushik Section set gillnet fishery until further notice on June 20. The harvest continued at an above average pace all season and resulted in the largest harvest ever recorded for the Igushik Section set gillnet fleet.

Participation by drift gillnet fishermen in the Igushik Section has often been low which leads to difficulty controlling escapement into the Igushik River system. Through time ADF&G tried various strategies to increase drift gillnet effort in the Igushik Section. Among these were longer drift gillnet openings in the Igushik Section than the Nushagak Section and 2 days of Igushik only openings. In 2016, despite these efforts the Igushik River sockeye escapement again exceeded the upper end of the escapement goal range of 400,000. The final escapement count of 469,230 is a minimum because the project ceased operation despite counting 11,826 fish on the final day of operation (Table 17). The lack of drift gillnet effort in the Igushik Section also makes achieving allocation goals difficult. The set gillnet harvest percentage was 11%, nearly double the 6% called for in the allocation plan.

Escapement past the Igushik Tower was very low for the first 2 weeks of enumeration. Typically, a large set gillnet harvest indicates increased abundance in the section, which in turn is also reflected in the escapement. ADF&G considered closing fishing completely in the Igushik Section because of poor escapement and very little indication of fish in the river from aerial surveys, but since the set gillnet fleet does not have enough harvesting power to impact a large push of fish and with indications of increased abundance within the section, set gillnets were allowed to continue fishing. Ultimately, escapement increased and the final escapement exceeded the upper end of the escapement goal range (Tables 17 and 20).

Pink salmon occur in significant numbers in even years in Nushagak District streams. Because of late run timing for sockeye salmon, fishing remained open past the normal July 23 date when ADF&G usually evaluates the switch to pink and coho salmon management. Although there were markets for pink and coho salmon, effort was low. This was in part due to the late run timing and continued fishing effort for sockeye salmon in east side districts and in part due to low prices for pink salmon ($0.10–0.23 per pound). In 2014, the price had been $0.24 per pound and $0.39 per pound in 2012. There was also no escapement enumeration in 2016 because budget cuts forced the Nushagak River counting project to cease operations on July 18. The final pink salmon harvest was 537,525 (Tables 5 and 18, Appendix A6). The final chum salmon harvest was 397,761 (Tables 5, 18, Appendix A5). The final coho salmon harvest was 79,538 (Tables 5 and 18, Appendix A7).

The 2016 run was unusual in several ways. Similar to 2015, run timing seemed late or at least more drawn out than usual with harvest peaks on July 4 as well as July 10. The most frequent comment heard from fisherman was how tight the fish stayed to the east shore of the district. Numerous comments about only jet boats getting fish and the shallow draft boats being more successful than the deeper draft vessels were heard. It also seems like the exploitation rate in 2016 (approximately 78%) was higher than usual. Although this is not a statistic that we usually track, the 1.3 million escapement of Wood River sockeye salmon is certainly low relative to the harvest and compared with a stronger than expected Nushagak sockeye salmon escapement. The harvest of just over 8.0 million sockeye salmon in the Nushagak District is the fourth largest harvest on record. This could be a result of a higher efficiency by the fleet or an indication of

more liberal fishing because there were no concerns for Nushagak River sockeye salmon and so fishing was not constrained as much as in other years with large runs.

Togiak District

The 2016 inshore sockeye salmon run of nearly 846,000 fish was the tenth largest run to Togiak District in the last 20 years and exceeded the preseason forecast of 660,000 (Table 1; Appendix A17). The harvest for the Togiak District was approximately 646,000 sockeye salmon, the eighth largest since 1996 (Table 21; Appendices A3 and A18). Escapement into Togiak Lake was 200,046 sockeye salmon, within the escapement goal range of 120,000 to 270,000 fish (Table 17; Appendix A1).

The Togiak District is managed differently than other districts in Bristol Bay. This district uses a fixed fishing schedule of 60 hours per week in Kulukak Section, 4 days per week in Togiak River Section except for a peak fishing schedule of 5.5 days per week from July 1 to July 15, and 5 days per week in Osviak, Matogak, and Cape Peirce Sections. This schedule is adjusted by EO, as necessary, to achieve escapement objectives. In addition, transferring into Togiak District prior to July 27 is prohibited by regulation if the permit or vessel has been registered in any of the other 4 Bristol Bay districts. Conversely, permit holders and vessels that have fished in Togiak District are prohibited from fishing in any other Bristol Bay district until July 27.

The 2016 Togiak River inshore run forecast was 660,000 sockeye salmon, of which 79% were projected to be 3-ocean fish and 21% were projected to be 2-ocean fish (Table 2). Achieving the escapement goal range of 120,000–270,000 sockeye salmon for Togiak Lake would leave approximately 440,000 fish available for harvest in Togiak River Section (Table 1). Smaller sockeye salmon runs to other drainages in the district (primarily the Kulukak River) occur, but these are not included in the preseason forecast because age composition and escapement data are not complete. A contribution of 50,000 sockeye salmon to the district harvest was projected from drainages other than Togiak River.

Based on recent year harvests, the Chinook salmon run was again anticipated to be below average. In 2016, the weekly fishing schedule in Togiak River Section was reduced by 24 hours in the third and fourth weeks of June for Chinook salmon conservation (Table 19). Kulukak and Western sections (Cape Peirce, Osviak, and Matogak) remained open for regularly scheduled periods throughout the season. Although the *Togiak District Salmon Management Plan* provides for a directed Chinook salmon fishery if run strength is adequate, effort largely focuses on sockeye salmon for the entire season. In an effort to reduce the targeting of Togiak River Chinook salmon, a regulation was passed in December 2012. The regulation moved the drift gillnet boundary away from the Togiak River mouth from June 1 through July 15. Total Chinook salmon harvest for Togiak River Section was 3,449 fish, and an additional 381 caught in the remainder of Togiak District (Tables 21, 22; Appendix A20).

Commercial fishing for sockeye salmon opened by regulation on Monday, June 1, but the first deliveries of the season did not occur until June 14 (Table 21). Fishing continued through the end of June and participation levels were low early in the season. Cumulative harvests were 1,049 Chinook salmon and 32,554 sockeye salmon at the close of fishing on June 30 (Table 21). Beginning Friday July 1, management turned from Chinook salmon to sockeye salmon management and the peak season weekly fishing schedule began. This year that resulted in the fishery closing on Wednesday June 29 and reopening at 9:00 AM Friday, July 1, until 9:00 PM July 2.

The escapement enumeration project on Togiak River began on July 2 and a count of 306 sockeye salmon (Table 17). Escapement continued to be below average early, reaching 4,698 sockeye salmon after 6 days of counting compared to an expected cumulative of 10,043. Leading up to the start of the enumeration project, the cumulative catch of 11,938 sockeye salmon in the Togiak River Section through June 30 was well below the expectation of 28,210 for this date (Table 22). However, this did not take into account the possibility of late run timing and the low effort because of the closures for Chinook salmon conservation at the end of June.

Based on the late run timing of the 2015 season in Togiak and throughout Bristol Bay and a very similar run timing pattern emerging in 2016 ADF&G took a wait and see approach to restrictions and let fishing occur according to the weekly schedules in regulation. ADF&G flew aerial surveys of the Togiak River on several occasions to assess run entry below the counting tower. Surveyors observed numbers of fish in the river but they did not appear to be moving upstream and tower counts did not increase as expected. This pattern continued for most of the season. Tower counts were below expectation but aerial surveys indicated fish were moving into the river and harvest was above expectation. Managers stuck with the regulatory schedule neither adding nor reducing fishing time. Then on July 26, escapement spiked 4 straight days. When escapement historically starts to decline and 10 days after the usual peak, escapement surged by 59,000 over 4 days and remained above expected levels until counting operations ceased on August 7 (Table 17).

The Togiak River final escapement of 200,046 was within the escapement goal range of 120,000 to 270,000 sockeye salmon (Appendix A1). Because of changes made at the BOF meeting in December of 2015 there was not an influx of fishing effort into the Togiak District prior to the end of the transfer restriction period on July 27. Fishing continued until the last buyer ceased operations on August 26. The season total sockeye salmon harvest was 645,797 (Table 21). Although escapement information to parts of the Togiak River drainage is incomplete, the total 2016 sockeye salmon run ranked tenth among the most recent 20 years and the largest since 2011 (Appendix A18).

There was some interest in pink and coho salmon fishing after the sockeye salmon harvest dropped off. Harvest for coho salmon totaled 9,345, approximately 31% below the 20-year average (1996–2015) of 13,593 (Appendix A7). The 2016 commercial Chinook salmon harvest of 3,831 fish represented only 58% of the 20-year (1996–2015) average, and the chum salmon harvest of 187,508 fish was 129% of the 20-year average (Appendices A4, A5, and A21). The pink salmon harvest was 217,190 fish. This is by far the largest pink salmon harvest in the last 20 years and more than double the average harvest over that time period (Appendix A6).

2016 BRISTOL BAY HERRING FISHERY

The Bristol Bay area includes all waters south of a line, extending west from Cape Newenham, east of the International Date Line in the Bering Sea and north of a line extending west from Cape Menshikof. The Bristol Bay area is divided into 3 herring fishing districts: the Bay District, including all waters east of the longitude of Cape Constantine, the Togiak District, including all waters between the longitude of Cape Newenham and the longitude of Cape Constantine, and the General District, including all waters west of the longitude of Cape Newenham. Togiak District spans approximately 192 kilometers (Figure 2). Togiak village lies at the center of the district, 108 kilometers west of Dillingham.

Pacific herring (*Clupea pallasii*) have been documented throughout Bristol Bay, but the major concentration returns to the Togiak area each spring to spawn and is the focus of herring sac roe and spawn-on-kelp fisheries. In the Togiak District, herring are commercially harvested for sac roe using gillnets and purse seines whereas herring spawn on rockweed kelp *(Fucus* spp.) is harvested by hand.

The herring sac roe fishery began in the Togiak District in 1967, followed by the first fishery for spawn-on-kelp in 1968. Effort and harvest levels remained low for the first 10 years of the fishery. Increased interest, favorable market conditions, and additional incentives provided by the Fishery Conservation and Management Act of 1976 (later becoming the Magnusson-Stevens Act) resulted in a rapid expansion of the Togiak herring fishery in 1977.

The Togiak herring fishery is the largest in Alaska. From 1996 to 2015, sac roe harvests averaged 21,405 short tons, worth an average of $3.87 million annually (Appendices B2 and B5). Given the volatile nature of the herring sac roe market, historic harvests and value are of limited utility when contemplating future harvest or value. In 2016, sac roe harvests brought $1.52 million to permit holders, well below the most recent 10-year average of $2.66 million (Appendix B5). This value represents the grounds price and doesn't necessarily include post season adjustments. No spawn-on-kelp fishery has occurred since 2003 (Appendix B2).

STOCK ASSESSMENT

Since 1978, ADF&G has conducted aerial surveys throughout the herring spawning migration to estimate abundance, timing, and distribution of Pacific herring in the Togiak District. Surveys are conducted after there is a reasonable expectation that herring might be present in the Togiak area. Surveys occur several times a week after threshold biomass has been documented. Surveys are performed as weather, pilot availability, and funding allow.

Fundamental aerial survey techniques used in Togiak have remained largely unchanged since 1978 and are described in Lebida and Whitmore (1985). Herring school surface area is estimated through a handheld tube with a measured grid and a known focal length from a known altitude. Standard conversion factors of 1.52 short tons (water depths of 16 ft or less), 2.58 short tons (water depths between 16 and 26 ft), and 2.83 short tons (water depths greater than 26 ft) per 538 ft^2 of surface area is applied to herring school surface areas to estimate the total biomass observed during each flight. Over the last 10 years, ADF&G has transitioned to aerial survey data collection methods that use Geographic Information Systems (GIS), allowing "real-time" data entry and analysis. The new GIS-based program, among other improvements, allows observers to use the survey aircraft to estimate length and width dimensions of very large herring schools, providing a more objective and reliable estimate.

Herring ages 2 through 20 have been observed in the Togiak District, but herring are generally considered to begin recruiting into the fishery at age-4 and to be fully recruited at age-9. Herring abundance is related to year class survival and is strongly driven by large recruitment events that occur approximately every 8-10 years. This biomass is considered healthy and stable. The 2016 spawning biomass was not sampled for age and size because of budget cuts (Appendix B3).

SAC ROE HERRING FISHERY OVERVIEW

Fishing and Industry Participation

Unlike most herring fisheries in Alaska, the Togiak sac roe fishery is not a limited entry fishery. Gillnets, purse seines, and hand purse seines are legal gear. Because fishing effort is not limited, effort levels can vary substantially from year to year. Herring market conditions are one of the leading factors influencing effort in a given year, but other factors also influence fleet size. Because the majority of herring permit holders in Togiak participate in other fisheries, like Bristol Bay salmon, the health of the salmon market and markets for other fish indirectly affect effort in the herring fishery. Herring prices paid to permit holders the prior year and run timing also affect effort. For over a decade processors have utilized cooperative fleets for the purse seine fishery. Under limited markets, processors choose the makeup of their fishing fleets to maximize their efficiency, thereby influencing the number of participants.

Fishing effort in the sac roe fishery increased through the late 1980s, decreased early in the 1990s, increased again to a peak in 1996, and has generally declined since that time (Appendix B1). Since 1994, gillnet effort has increased from 146 vessels, to a peak of 461 in 1996, followed by a general decline to an all-time low of 6 in 2015 (Appendix B1). Purse seine participation fluctuated between 100 and 300 vessels from 1994 to 1998, before a general decline to an all-time low in 2012 of 16 vessels (Appendix B1). The 2016 participation of 17 purse seine vessels was up from 16 in 2015. In 2016, gillnet participation decreased from 6 to 3 vessels (Appendix B1).

Industry participation in the fishery peaked between 1979 and 1982, when 33 processors participated in the herring fishery. From 1994 through 1997, 16 to 22 companies purchased herring in Togiak (Appendix B1). Since 1998, industry participation has steadily declined to a low in 2012, 2015 and again in 2016 of 4 companies (Appendix B1). In 2016, processor participation involved 4 companies (Table 23). Processing capacity on the grounds has also declined from a high of 4,850 short tons per day in 1996, to a low in 2007 of 1,420 short tons per day, to 2,530 short tons per day in 2016 (Appendix B1).

2016 SEASON SUMMARY

Biomass Estimation

Togiak District aerial surveys began April 17, 2016 after fish were reported in the district by a local pilot on April 14. ADF&G staff observed over 3,000 short tons of herring under very poor conditions on April 17. Staff also observed 37 miles of spawn (Table 24) on April 17. A second survey on April 24 was the peak survey for the season with 73,000 short tons of herring documented. The last survey was flown on May 2 and there were 56,000 short tons of herring still on the grounds. Poor survey conditions and budget cuts reduced ADF&G's ability to conduct surveys in 2016.

AGE COMPOSITION

Herring were not sampled for age and sex composition during 2016 due to lack of funding.

COMMERCIAL FISHERY

Togiak District herring fisheries are managed in accordance with the *Bristol Bay Herring Management Plan* (5 AAC 27.865), which specifies a maximum allowable exploitation rate of

20% and allocates the harvestable surplus among all the fisheries harvesting the Togiak herring stock. The 2016 preseason biomass forecast was 162,244 short tons. The projected harvest guideline for each fishery was as follows: 1,500 short tons herring equivalent or 350,000 lb of product for the spawn-on-kelp fishery, 2,166 short tons for the Dutch Harbor food and bait fishery, and the remaining 28,782 short tons for the sac roe fishery. The management plan further specifies that ADF&G will manage the sac roe fishery so that 70% of the harvest is taken by purse seine (20,148 short tons in 2016) and 30% of the harvest is taken by gillnet (8,635 short tons in 2016).

The *Bristol Bay Herring Management Plan* and other regulations direct ADF&G to conduct an orderly, manageable fishery and strive for the highest level of product quality with a minimum of waste. In recent years, the seine fleet has been comprised of processor-organized cooperatives. For the 2016 season, ADF&G management staff allowed long duration seine openings over a large area of the district and let processors limit harvest for their individual fleets based on processing capacity.

ADF&G staff polled processing companies prior to the 2016 season to assess processing capacity and to inquire about additional concerns or issues. The poll indicated that 4 companies intended to participate in the 2016 Togiak herring fishery. One company indicated they planned to buy both gillnet and purse seine fish and 3 companies planned to buy only purse seine fish. The processing capacity for 2016 was estimated to be 2,530 short tons per day.

Purse Seine

The Togiak purse seine fishery opened at 6:00 PM on April 17 until further notice (Table 25). This is the earliest the Togiak herring fishery has ever opened and is 10 days earlier than it opened in 2015. Because of the unprecedentedly early opening of the fishery industry was not immediately ready to prosecute the fishery. The first commercial harvest occurred on April 19. The industry was not up to full capacity until April 21. The fishery continued with a few adjustments to the open area until April 30. After closely monitoring the size of harvested herring reported by processors ADF&G decided to close the fishery on April 30. The average size indicated by processing data was approaching 322 grams which ADF&G staff had previously discussed as an average size that would be a trigger for closing the fishery to protect younger age class fish. The fishery was unusual in 2016 in that fishing started several days after significant spawn was documented. A larger than usual percentage of herring were harvested on the Hagemeister Island side of the Hagemeister Straits and for the first time in at least 17 years there was purse seine harvest in Kulukak Bay. The final harvest for 2016 was 14,799 tons of herring represents 73% of the 20,148 ton quota. Purse seine participation was documented at 17 vessels, up from 16 in 2015 (Appendix B1).

Gillnet

The Togiak gillnet fishery opened at 6:00 PM April 17 until further notice with no prior test fishing (Table 25). In 2016, 1 company and 3 permit holders participated in the Togiak sac roe gillnet fishery, a decrease from 2 and 6 in 2015. With only 1 company and 3 permit holders participating all harvest information is confidential. Weather as well as the late start were significant factors in the prosecution of the gillnet fishery and the total harvest was less than 100 tons.

Spawn on Kelp

No companies registered to buy herring spawn-on-kelp in 2016, therefore there were no openings and no commercial harvest.

EXPLOITATION

The 2016 Togiak herring fisheries were managed for a maximum exploitation rate of 20% of the preseason biomass estimate. The purse seine harvest was 14,799 short tons with a reported average weight of 380 grams and an average roe percentage of 12.3%. The gillnet harvest was <100 short tons with a reported average weight of 413 grams and an average roe percentage of 12.2%, making the combined harvest approximately 15,800 short tons with an average weight of 380 grams and an average roe percentage of 12.3%. The Dutch Harbor food and bait fishery harvested 208 short tons, resulting in a total harvest for 2016 would be estimated at 16,000 short tons. Based on the preseason biomass estimate of 162,244 short tons, the 2016 exploitation rate would be approximately 9.9% (Appendix B2).

EXVESSEL VALUE

The projected exvessel value of the 2016 Togiak herring fishery is approximately $1.5 million. This is based on a grounds price estimate of $100 per short ton for seine caught fish and $100 per short ton for gillnet caught fish and does not include any postseason adjustments.

ACKNOWLEDGEMENTS

In 2016, Alaska Department of Fish and Game Bristol Bay Commercial Fishery Management activities were funded by a combination of State of Alaska General Funds, Dingle-Johnson Funds, Bristol Bay Regional Seafood Development Association funds, contributions by Trident Seafoods, North Pacific Seafoods, Copper River Seafoods, Peter Pan Seafoods, the Bristol Bay Economic Development Corporation, Dylan Braund, Bristol Bay Native Association, The Bristol Bay Science and Research Institute, Bristol Bay Native Association, Native Village of Manokotak, the Traditional Council of Togiak, and Twin Hills Village Council.

The authors gratefully acknowledge the Commercial and Subsistence Division's staff of the Dillingham, King Salmon, and Anchorage offices of the Alaska Department of Fish and Game for their contributions to this report.

Permanent Employees with the Division of Commercial Fisheries

Dillingham: Tim Sands, Nushagak Biologist; Phil Carpenter, Facilities and Equipment Maintenance; Karen Brito, Program Technician.

King Salmon: Carol Klutsch, Program Technician.

Anchorage: Travis Elison, Naknek-Kvichak Biologist; Paul Salomone, Egegik and Ugashik Biologist; Greg Buck, Area Research Biologist; Fred West, Research Biologist; Katie Sechrist, Information Officer; Shannon Royse, Publication Specialist.

Seasonal Employees with the Division of Commercial Fisheries

West Side: Jamie Westnedge, Tower Coordinator; Melissa Isaacs, Office Staff; Chloe George, BBEDC Intern; **Wood River Tower**: Bryan Peters; Kim Powell, Anthony Reynolds;

East Side: Mary Emery, Seafood Industry Coordinator/Office Manager; Rob Regnart, Field Camp Coordinator; Cathy Tilly, Scale Reader; Diana Merlino, Scale Reader; Charlette Fullinck, Camp Supply Coordinator; **Naknek River Tower:** Kenneth Lowney, Clay Kurtz, Gage Nehila; **Kvichak River test fishery**: Emory Cole, Neccia Porter; **Egegik River Test fishery:** Dirk Middleton, Sihaya Meijer; **Ugashik River Test fishery:** Ben Dunaway, Luis Nieves; **Kvichak River Tower**: Dustin Capik, Kristopher Butler; Todd Derks,; **Ugashik River Tower** Morgan Hartley, Zane Mileur, Jonathan Shabat,; **Egegik River Tower:** Wenona Stafford, Zach Goedon, John Miller, **Catch Samplers**; Renee John, Helen Wonhola, Brenetta BeltzSampler.

Permanent Employees with the Division of Subsistence

Ted Krieg, Subsistence Resource Specialist, Sarah Evans, Fish and Wildlife Technician, Terri Lemons, Research Analyst.

Gene Conservation Laboratory, Division of Commercial Fisheries

Tyler Dann and Kyle Shedd, Project Geneticists; Bill Templin, Program Leader; Chris Habicht, Statewide Stock Status Geneticist; Jim Jasper, Biometrician; Eric Lardizabal, Analyst Programmer; Judy Berger, Field Coordinator and Tissue Archivist; Heather Hoyt, Laboratory Supervisor; Heather Liller, Erica Chenoweth, and Serena Rogers Olive, Genotypers; Christy Cupp and Zach Pechacek, Sample Coordinators and DNA Extractors.

Non-ADFG entities contributing to project operations

Operated by Bristol Bay Science and Research Institute and Bristol Bay Native Association

Igushik River Tower: Katie Menke (crew leader) Wyatt Stein, Cavelila Wonhola, Jace Burres, Cody Larsen.

Operated by Bristol Bay Science and Research Institute

Togiak River Tower: Justin Priest Project leader, Clint Sejkora (crew leader), Tess Hostettter, Stevie Goetz.

REFERENCES CITED

Buck, G. B., C. B. Brazil, F. West, L. F. Fair, X. Zhang, and S. L. Maxwell. 2012. Stock assessment of Chinook, sockeye, and chum salmon in the Nushagak River. Alaska Department of Fish and Game, Fishery Manuscript Series No. 12-05, Anchorage.

Clark, J H. 2005. Abundance of sockeye salmon in the Alagnak River system of Bristol Bay Alaska. Alaska Department of Fish and Game, Fishery Manuscript No. 05-01, Anchorage.

Lebida, R. C., and D. C. Whitmore. 1985. Bering Sea herring aerial survey manual. Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development, Bristol Bay Data Report 85-2, Anchorage.

Poetter, A. D., and N. W. Nichols. 2014a. South Alaska Peninsula salmon annual management report, 2013. Alaska Department of Fish and Game, Fishery Management Report No. 14-15, Anchorage.

Poetter, A. D., and N. W. Nichols. 2014b. South Alaska Peninsula salmon management strategy, 2014. Alaska Department of Fish and Game, Fishery Management Report No. 14-18, Anchorage.

TABLES

Table 1.–Comparison of inshore sockeye salmon forecast versus actual run, escapement goals versus actual escapements, and projected versus actual commercial catch, by river system and district, in thousands of fish, Bristol Bay, 2016.

District and River System [a]		Inshore Run			Escapement		Inshore Catch		
		Forecast [b]	Actual	Percent Deviation [c]	Range	Actual	Projected Harvest [b]	Actual	Percent Deviation [c]
Naknek-Kvichak District									
Kvichak River		12,690	11,615	-8	2,000–10,000	4,463	5,870	7,152	22
Alagnak River		5,720	4,857	-15	320 minimum	1,776	2,650	3,081	16
Naknek River		4,760	4,925	3	800–2,000	1,692	3,180	3,233	2
	Total	23,170	21,397	-8	3,120–12,320	7,931	11,700	13,466	15
Egegik District		7,410	10,576	43	800–2,000	1,837	5,740	8,739	52
Ugashik District		4,950	8,265	67	500–1,400	1,635	3,820	6,630	74
Nushagak District									
Wood River		7,530	5,487	-27	700–1,800	1,310	6,000	4,177	-30
Igushik River		1,090	1,964	80	150–400	469	770	1,495	94
Nushagak-Mulchatna		1,740	3,119	79	370–900	681	1,040	2,438	134
	Total	10,360	10,570	2	1,220–3,100	2,460	7,810	8,110	4
Togiak District		660	846	28	120–270	200	440	646	47
Total Bristol Bay [d]		46,550	51,654	11	5,760–19,090	14,063	29,510	37,591	27

[a] The Bristol Bay inshore forecast does not include several minor river systems, including the Snake River drainage in Nushagak District, and the Kulukak, Osviak, Matogak and Slug River systems in Togiak District. Catches, escapements, and total runs for these smaller systems are not included in this table so that forecast efficacy may be gauged. Totals may not equal column sums because of rounding.

[b] Does not include South Peninsula projected harvest.

[c] Percent deviation = (Actual - Forecast) / Forecast.

[d] Total may not equal some of all districts due to rounding.

Table 2.–Forecast of sockeye salmon returns by age class, river system, and district, in thousands of fish, Bristol Bay, 2016.

	2-Ocean			3-Ocean			
District and River System	1.2 (2012)	2.2 (2011)	Total	1.3 (2011)	2.3 (2010)	Total	Total
Naknek-Kvichak District							
Kvichak River	4,300	6,090	10,390	1,250	1,060	2,310	12,700
Alagnak River	1,780	70	1,850	3,730	150	3,880	5,730
Naknek River	940	1,440	2,380	1,410	980	2,390	4,770
Total	7,020	7,600	14,620	6,390	2,190	8,580	23,200
Egegik District	300	3,120	3,420	500	3,490	3,990	7,410
Ugashik District	3,670	480	4,150	540	260	800	4,950
Nushagak District							
Wood River	4,910	160	5,070	2,380	80	2,460	7,530
Igushik River	130	20	150	930	10	940	1,090
Nushagak River [a]	140	0	140	1,480	0	1,480	1,740
Total	5,180	180	5,360	4,790	90	4,880	10,360
Togiak District [b]	120	20	140	490	20	510	650
Total Bristol Bay [c]							
Number	16,290	11,400	27,690	12,710	6,050	18,760	46,570
Percent	35%	24%	59%	27%	13%	40%	100%

[a] Nushagak River forecast total includes age-0.3 (16,756) and age-1.4 (101,994) fish.

[b] Kulukak, Kanik, Osviak, and Matogak River systems are not forecast. These systems contribute approximately 50,000 sockeye salmon to Togiak District harvest each year.

[c] Sockeye salmon of several minor age classes are expected to contribute an additional 1–2% to the total return.

Table 3.–Mean round weight, price per pound, and total exvessel value of the commercial salmon catch, Bristol Bay, 2016.

Species	Total Catch (lb)	Mean Weight (lb)	Mean Price ($/lb)	Exvessel Value ($)
Sockeye	200,987,537	5.3	0.76	152,750,528
Chinook	437,710	13.5	0.67	293,265
Chum	5,903,795	6.1	0.32	1,889,214
Pink	3,010,658	3.9	0.15	451,599
Coho	538,903	5.9	0.49	264,062
Total	210,878,602			155,648,669

Table 4.–Commercial salmon processors and buyers operating in Bristol Bay, 2016

	Name of Operator/Buyer	Base of Operations	District[a]	Method[b]	Export
1	Alaska's Best Seafood,LLC.	Dillingham, AK	N	EF, F, RE	AIR, SEA
2	Alaska General Seafoods	Kenmore, WA	K,E,	C,EF,F,RE	AIR,SEA
3	Alaska Salmon Wild	Ruidoso, NM	K	F	AIR
4	Anthony Wood	King Salmon, AK	K	EF, F	AIR, SEA
5	Big Creek Fisheries	Everett, WA	E,U	F	AIR,SEA
6	Cape Greig	Seattle, WA	E,U	EF	AIR
7	Coffee Point Seafoods	Seattle, WA	E	EF,F,RE	AIR,SEA
8	Copper River Seafoods	Anchorage, AK	K,N,T	EF	AIR
9	Ekuk Fisheries	Seattle, WA	N	F	SEA
10	Freedom Fish	South Naknek, AK	K	F	AIR
11	Friedman Family Fisheries	Baltimore, MD	N	F	SEA
12	Great Ruby Fish Company	Anchorage, AK	K	EF,F,RE	AIR
13	Icicle Seafoods	Seattle, WA	E,K,N,U	C,EF,F,RE	AIR,SEA
14	Leader Creek Fisheries	Seattle, WA	E,K,N,U	F,RE	SEA
15	Jojo's Wild Alaskan Salmon	Dillingham, AK	N	EF, F, RE	AIR, SEA
16	My Girl (Randy Alvarez)	Igiugig, AK	K	F	AIR
17	Matt Beck	Gunnison, CO	N	C	AIR
18	Nakeem Homepack	King Salmon, AK	K	EF,F,RE	AIR,SEA
19	Naknek Family Fisheries	Naknek, AK	K	F	AIR,SEA
20	North Pacific Seafoods (Togiak Fisheries)	Seattle, WA	T	F	SEA
21	North Pacific Seafoods (Red Salmon Cannery)	Seattle, WA	E,K,N,U	C,F,RE	SEA
22	North Pacific Seafoods (Pederson Point)	Seattle, WA	E,K,N,U	F,RE	SEA
23	Ocean Beauty Seafoods	Seattle, WA	E,K,N,U	C,EF,F,RE	AIR,SEA
24	Peter Crimp (Small Boat Salmon)	Anchorage, AK	N	EF	AIR
25	Peter Pan Seafoods	Seattle, WA	E,K,N,T,U	C,EF,F,RE,S	AIR,SEA
26	Shannon Ford	Federal Way, WA	K	F	AIR
27	Small Boat Wild Fish Co.	Cordova, AK	N	F	AIR
28	Silver Bay Seafoods	Sitka, AK	E,K,N,T,U	F,EF,RE	AIR,SEA
29	Sunrise Salmon	Fergus Falls, MN	K	F	AIR
30	Terpening Fishing LLC	Homer, AK	U	F	AIR
31	Three Tough Mothers	Anchorage, AK	K	F	AIR
32	Trident Seafoods	Seattle, WA	E,K,N,T,U	C,EF,F	AIR,SEA
33	Tulchina Fisheries	Naknek, AK	K	F	AIR
34	Victor Popa	Fallbrook, CA	E	EF	SEA
35	Wild Alaska Salmon and Seafood	King Salmon, AK	K	EF, F	AIR,SEA
36	Wild Premium Salmon	Vista, CA	E	EF,F	AIR
37	Whiz Bang Fisheries, Inc.	Friday Harbor, WA	K	EF, F	AIR, SEA
38	Favco	Anchorage, AK	N	EF	AIR
39	Wild Legacy Seafoods	Homer, AK	K	F	SEA
40	Alfonso Palma	Wasilla, AK	N	EF	AIR

[a] E = Egegik; K = Naknek-Kvichak; N = Nushagak; T = Togiak; U = Ugashik.

[b] Type of processing: C = canned; EF = export fresh; F = frozen; RE = roe extraction; S = cured.

Table 5.–Commercial salmon catch by district and species, in number of fish, Bristol Bay, 2016.

District and River System		Sockeye	Chinook	Chum	Pink	Coho	Total
Naknek-Kvichak District							
Kvichak River		7,152,363					7,152,363
Alagnak River		3,080,649					3,080,649
Naknek River		3,233,234					3,233,234
	Total	13,466,245	2,797	237,035	12,058	1,110	13,719,245
Egegik District		8,739,699	1,144	74,641	343	546	8,816,373
Ugashik District		6,630,231	1,435	72,534	1,498	171	6,705,869
Nushagak District							
Wood River		1,494,664					1,494,664
Igushik River		4,177,432					4,177,432
Nushagak River		2,437,701					2,437,701
	Total	8,109,797	23,783	397,761	537,525	79,538	9,148,404
Togiak District		645,797	3,831	187,508	217,190	9,346	1,063,672
Total Bristol Bay	Total	37,591,769	32,990	969,479	768,614	90,711	39,453,563

Note: Species other than sockeye salmon are not apportioned to individual rivers.

Table 6.–Final daily and cumulative escapement estimates by species, Nushagak River sonar project, Bristol Bay, 2016.

	Chinook		Sockeye		Chum	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/6	39	39	83	83	236	236
6/7	250	289	267	350	917	1,152
6/8	187	475	405	755	814	1,966
6/9	242	717	467	1,222	805	2,771
6/10	1,667	2,384	1,092	2,314	1,933	4,705
6/11	3,153	5,536	1,988	4,302	6,888	11,593
6/12	1,144	6,680	511	4,813	3,145	14,738
6/13	1,456	8,136	1,186	5,998	2,081	16,819
6/14	8,506	16,642	2,369	8,368	15,710	32,529
6/15	2,151	18,793	9,549	17,917	5,268	37,797
6/16	1,109	19,902	7,342	25,259	998	38,795
6/17	16,476	36,378	10,578	35,838	23,508	62,303
6/18	20,930	57,309	34,329	70,166	32,857	95,160
6/19	5,568	62,877	15,641	85,807	15,349	110,509
6/20	7,886	70,763	22,039	107,846	28,239	138,748
6/21	3,499	74,262	13,610	121,456	14,271	153,019
6/22	2,039	76,301	12,246	133,703	19,122	172,141
6/23	2,004	78,305	7,539	141,241	5,397	177,538
6/24	2,924	81,229	8,732	149,974	11,732	189,270
6/25	4,256	85,485	22,748	172,721	6,051	195,321
6/26	1,552	87,036	10,226	182,947	5,148	200,469
6/27	2,805	89,842	9,515	192,462	4,218	204,688
6/28	1,947	91,789	17,839	210,301	9,630	214,318
6/29	414	92,203	14,252	224,553	8,764	223,082
6/30	2,517	94,720	17,718	242,270	2,904	225,986
7/1	1,951	96,671	24,753	267,023	7,166	233,152
7/2	2,373	99,044	19,033	286,055	17,194	250,346
7/3	6,107	105,151	36,799	322,855	33,845	284,191
7/4	5,028	110,179	79,110	401,965	17,130	301,321
7/5	2,243	112,422	50,031	451,996	19,636	320,957
7/6	2,036	114,458	28,457	480,453	9,664	330,621
7/7	821	115,280	25,213	505,667	7,765	338,386
7/8	1,599	116,879	20,538	526,205	15,017	353,404
7/9	1,306	118,185	13,602	539,807	3,731	357,135
7/10	265	118,450	13,968	553,775	8,163	365,298
7/11	520	118,970	28,600	582,375	8,765	374,063
7/12	181	119,151	15,150	597,526	5,464	379,527
7/13	644	119,794	16,055	613,581	3,622	383,149
7/14	746	120,540	14,022	627,603	10,028	393,177
7/15	946	121,487	12,674	640,277	5,568	398,746
7/16	1,435	122,922	15,828	656,105	7,484	406,229
7/17	1,268	124,190	11,196	667,301	6,489	412,718
7/18	1,178	125,368	13,212	680,513	7,092	419,810

Table 7.–Daily sockeye salmon escapement tower counts by river system, east side Bristol Bay, 2016.

	Kvichak River		Naknek River		Egegik River		Ugashik River	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/12					390	390		
6/13					6,852	7,242		
6/14			144	144	1,698	8,940		
6/15			186	330	1,662	10,602		
6/16	258	258	942	1,272	18,822	29,424		
6/17	210	468	1,506	2,778	7,920	37,344		
6/18	102	570	3,618	6,396	11,718	49,062		
6/19	78	648	2,304	8,700	47,172	96,234		
6/20	162	810	6,366	15,066	24,582	120,816		
6/21	276	1,086	2,412	17,478	13,464	134,280		
6/22	1,206	2,292	1,680	19,158	7,260	141,540		
6/23	1,524	3,816	2,670	21,828	34,068	175,608		
6/24	2,280	6,096	16,434	38,262	68,874	244,482		
6/25	1,746	7,842	12,462	50,724	9,828	254,310		
6/26	2,538	10,380	5,988	56,712	8,256	262,566	4,596	4,596
6/27	2,154	12,534	2,922	59,634	15,684	278,250	13,080	17,676
6/28	840	13,374	5,706	65,340	16,734	294,984	18,828	36,504
6/29	534	13,908	13,740	79,080	72,648	367,632	16,206	52,710
6/30	684	14,592	107,866	186,946	113,508	481,140	24,114	76,824
7/1	14,280	28,872	109,104	296,050	69,726	550,866	17,022	93,846
7/2	105,540	134,412	73,830	369,880	27,702	578,568	12,312	106,158
7/3	96,300	230,712	97,188	467,068	25,710	604,278	25,686	131,844
7/4	114,594	345,306	97,350	564,418	55,416	659,694	27,744	159,588
7/5	232,314	577,620	33,966	598,384	94,674	754,368	33,342	192,930
7/6	149,868	727,488	42,840	641,224	31,902	786,270	40,200	233,130
7/7	150,024	877,512	66,372	707,596	36,768	823,038	27,390	260,520
7/8	340,548	1,218,060	100,880	808,476	175,344	998,382	50,886	311,406
7/9	409,956	1,628,016	46,170	854,646	111,756	1,110,138	63,492	374,898
7/10	258,462	1,886,478	57,900	912,546	68,094	1,178,232	62,154	437,052
7/11	190,566	2,077,044	83,436	995,982	178,440	1,356,672	71,514	508,566
7/12	650,634	2,727,678	61,674	1,057,656	105,672	1,462,344	139,398	647,964
7/13	269,292	2,996,970	99,624	1,157,280	32,268	1,494,612	129,684	777,648
7/14	114,432	3,111,402	76,110	1,233,390	28,866	1,523,478	122,874	900,522
7/15	173,748	3,285,150	61,368	1,294,758	36,084	1,559,562	70,236	970,758
7/16	163,374	3,448,524	88,524	1,383,282	32,034	1,591,596	84,078	1,054,836
7/17	247,650	3,696,174	60,930	1,444,212	38,166	1,629,762	108,420	1,163,256
7/18	135,684	3,831,858	57,120	1,501,332	42,702	1,672,464	52,566	1,215,822
7/19	143,370	3,975,228	42,216	1,543,548	30,660	1,703,124	85,638	1,301,460
7/20	158,484	4,133,712	29,268	1,572,816	32,760	1,735,884	58,986	1,360,446
7/21	87,564	4,221,276	33,624	1,606,440	25,362	1,761,246	68,706	1,429,152
7/22	74,508	4,295,784	23,202	1,629,642	16,998	1,778,244	29,580	1,458,732
7/23	89,406	4,385,190	17,592	1,647,234	29,196	1,807,440	24,678	1,483,410
7/24	28,188	4,413,378	20,706	1,667,940	29,820	1,837,260	31,152	1,514,562
7/25	29,100	4,442,478	14,172	1,682,112			44,490	1,559,052
7/26	20,250	4,462,728	9,678	1,691,790			50,682	1,609,734
7/27							25,536	1,635,270

Table 8.–Commercial fishing emergency orders by period, district, and statistical area, Bristol Bay east side, 2016.

Number	Start Date	Start Time		End Date	End Time	Effective time	
Naknek/Kvichak District							
Driftnet							
AKN.27	1 Jul	10:00 AM		1 Jul	4:00 PM	6.0 hours	
AKN.30	2 Jul	10:30 AM		2 Jul	5:00 PM	6.5 hours	
AKN.35	3 Jul	11:00 AM		3 Jul	5:00 PM	6.5 hours	
AKN.54	8 Jul	4:00 PM		8 Jul	11:00 PM	7.0 hours	
AKN.55	10 Jul	5:00 AM		10 Jul	1:30 PM	8.5 hours	
AKN.61	12 Jul	6:30 AM		12 Jul	2:30 PM	8.0 hours	
AKN.64	11 Jul	7:00 PM		12 Jul	2:30 AM	7.5 hours	
AKN.65	12 Jul	7:30 PM		13 Jul	3:30 AM	7.5 hours	
AKN.65	13 Jul	7:30 AM		13 Jul	3:30 PM	7.5 hours	
AKN.68	13 Jul	8:30 PM		14 Jul	4:30 AM	8.0 hours	
AKN.68	14 Jul	8:00 AM		14 Jul	3:30 PM	7.5 hours	
AKN.73	15 Jul	10:00 PM		16 Jul	5:00 AM	19.0 hours	
AKN.73	16 Jul	10:30 PM		1 Aug	9:00 AM	370.5 hours	
							fall schedule
Setnet							
AKN.01	1 Jun	9:00 AM	to	23 Jun	9:00 AM		[a,b]
AKN.26	1 Jul	8:30 AM		1 Jul	4:30 PM	7.5 hours	
AKN.30	2 Jul	9:30 AM		2 Jul	5:00 PM	7.5 hours	
AKN.33	2 Jul	5:00 PM		3 Jul	5:30 PM	24.5 hours	[c]
AKN.35	3 Jul	5:30 PM		4 Jul	7:00 PM	25.5 hours	[c]
AKN.38	4 Jul	7:00 PM		5 Jul	7:30 PM	24.5 hours	[c]
AKN.41	5 Jul	7:30 PM		6 Jul	9:00 PM	25.5 hours	[c]
AKN.55	9 Jul	12:30 PM		10 Jul	1:30 PM	25.0 hours	[c]
AKN.58	10 Jul	1:30 PM		11 Jul	2:00 PM	24.5 hours	[c]
AKN.61	11 Jul	2:00 PM		12 Jul	2:30 PM	24.5 hours	[c]
AKN.65	12 Jul	2:30 PM		13 Jul	3:00 PM	24.5 hours	[c]
AKN.68	13 Jul	3:00 PM			Further notice		[c]
AKN.68	15 Jul	9:00 AM		1 Aug	9:00 AM		
Naknek Section							fall schedule
Driftnet							
AKN.01	1 Jun	9:00 AM	to	23 Jun	9:00 AM		[a,b]
AKN.35	4 Jul	1:00 AM		4 Jul	8:30 AM	7.5 hours	
AKN.38	4 Jul	12:00 PM		4 Jul	7:00 PM	7.0 hours	
AKN.38	5 Jul	1:00 AM		5 Jul	9:30 AM	8.5 hours	
AKN.41	5 Jul	1:30 PM		5 Jul	7:30 PM	6.0 hours	
AKN.41	6 Jul	2:00 AM		6 Jul	10:00 AM	6.0 hours	
AKN.45	6 Jul	2:30 PM		6 Jul	9:00 PM	6.5 hours	
AKN.45	7 Jul	3:00 AM		7 Jul	10:30 AM	7.5 hours	
AKN.48	8 Jul	3:30 AM		8 Jul	12:00 AM	8.0 hours	
AKN.51	8 Jul	4:00 PM		8 Jul	11:00 PM	7.0 hours	
AKN.51	9 Jul	4:30 AM		9 Jul	12:30 PM	8.0 hours	
AKN.55	9 Jul	5:00 AM		9 Jul	11:00 PM	7.0 hours	
AKN.58	10 Jul	6:00 PM		11 Jul	1:00 AM	7.0 hours	
AKN.58	11 Jul	6:00 AM		11 Jul	2:00 PM	8.0 hours	
AKN.61	11 Jul	7:00 PM		12 Jul	2:30 AM	7.5 hours	
Setnet							
AKN.48	8 Jul	3:30 AM		8 Jul	12:00 PM	8.0 hours	
AKN.51	8 Jul	12:00 PM		9 Jul	12:30 PM	24.5 hours	[c]

-continued-

Table 8.–Page 2 of 4.

Number	Start Date	Start Time	End Date	End Time	Effective time	
Kvichak Section						
Driftnet						
Setnet						
AKN.51	8 Jul	4:00 PM	9 Jul	12:30 PM	20.5 hours	
Egegik District						
Driftnet						
AKN.02	1 Jun	12:01 AM	17 Jun	9:00 AM		d
AKN.07	20 Jun	11:15 AM	20 Jun	7:15 PM	8.0 hours	
AKN.08	21 Jun	12:00 PM	21 Jun	8:00 PM	8.0 hours	
AKN.09	24 Jun	6:00 AM	24 Jun	10:00 AM	4.0 hours	
AKN.11	24 Jun	2:45 PM	24 Jun	7:45 PM	5.0 hours	
AKN.13	25 Jun	3:30 PM	25 Jun	11:30 PM	8.0 hours	
AKN.13	26 Jun	7:00 AM	26 Jun	11:00 AM	4.0 hours	
AKN.15	26 Jun	3:00 PM	26 Jun	10:00 PM	7.0 hours	
AKN.15	27 Jun	7:00 AM	27 Jun	11:00 AM	4.0 hours	
AKN.17	27 Jun	5:15 PM	27 Jun	10:15 PM	5.0 hours	
AKN.19	28 Jun	6:00 PM	28 Jun	10:00 PM	4.0 hours	
AKN.21	30 Jun	7:00 AM	30 Jun	1:00 PM	6.0 hours	
AKN.23	1 Jul	7:30 AM	1 Jul	1:30 PM	6.0 hours	
AKN.23	1 Jul	8:00 PM	1 Jul	11:59 PM	4.0 hours	
AKN.25	30 Jun	7:00 PM	30 Jun	11:00 PM	4.0 hours	
AKN.28	2 Jul	8:30 AM	2 Jul	4:30 PM	8.0 hours	
AKN.31	2 Jul	8:00 PM	2 Jul	11:59 PM	4.0 hours	
AKN.31	3 Jul	10:00 AM	3 Jul	6:00 PM	8.0 hours	
AKN.36	4 Jul	11:00 AM	4 Jul	7:00 PM	8.0 hours	
AKN.39	4 Jul	11:00 PM	5 Jul	4:00 AM	5.0 hours	
AKN.39	5 Jul	12:00 PM	5 Jul	8:00 PM	8.0 hours	
AKN.42	6 Jul	2:00 PM	6 Jul	8:00 PM	6.0 hours	
AKN.44	5 Jul	8:00 PM	5 Jul	10:00 PM	2.0 hours	c
AKN.44	6 Jul	12:45 PM	6 Jul	8:45 PM	8.0 hours	e
AKN.46	7 Jul	5:00 AM	7 Jul	9:00 PM	4.0 hours	
AKN.46	7 Jul	2:00 PM	7 Jul	10:00 PM	8.0 hours	
AKN.49	8 Jul	2:15 PM	8 Jul	10:15 PM	8.0 hours	
AKN.52	9 Jul	3:00 AM	9 Jul	11:00 AM	8.0 hours	
AKN.52	9 Jul	3:45 PM	9 Jul	11:45 AM	8.0 hours	
AKN.56	10 Jul	8:00 AM	10 Jul	12:00 PM	4.0 hours	
AKN.56	10 Jul	4:30 PM	11 Jul	12:30 AM	8.0 hours	
AKN.59	11 Jul	6:00 AM	11 Jul	12:00 PM	6.0 hours	
AKN.59	11 Jul	5:15 PM	12 Jul	1:15 AM	8.0 hours	
AKN.62	12 Jul	5:15 AM	12 Jul	1:15 PM	8.0 hours	
AKN.62	12 Jul	6:00 PM	13 Jul	2:00 AM	8.0 hours	
AKN.66	13 Jul	6:00 AM	13 Jul	2:00 PM	8.0 hours	
AKN.66	13 Jul	6:45 PM	14 Jul	2:45 AM	8.0 hours	f
AKN.69	14 Jul	6:30 AM	14 Jul	2:30 PM	8.0 hours	
AKN.69	14 Jul	7:45 PM	15 Jul	3:45 AM	8.0 hours	
AKN.69	15 Jul	7:15 AM	15 Jul	3:15 PM	8.0 hours	
AKN.74	15 Jul	3:15 PM	25 Jul	9:00 AM	234.45 hours	c
AKN.76	29 Jul	9:00 AM	1 Aug	9:00 AM	66.0 hours	c

-continued-

Table 8.–Page 3 of 4.

Number	Start Date	Start Time	End Date	End Time	Effective time	
Setnet						fall schedule
AKN.02	1 Jun	12:01 AM	17 Jun	9:00 AM		[d]
AKN.07	20 Jun	11:15 AM	20 Jun	7:15 PM	8.0 hours	
AKN.08	21 Jun	12:00 PM	21 Jun	8:00 PM	8.0 hours	
AKN.09	23 Jun	1:30 PM	23 Jun	9:30 PM	8.0 hours	
AKN.11	24 Jun	2:45 PM	24 Jun	10:45 PM	8.0 hours	
AKN.13	25 Jun	3:30 PM	25 Jun	11:30 PM	8.0 hours	
AKN.17	27 Jun	5:15 PM	28 Jun	1:15 AM	8.0 hours	
AKN.19	29 Jun	6:00 AM	29 Jun	2:00 PM	8.0 hours	
AKN.21	30 Jun	7:00 AM	30 Jun	3:00 PM	8.0 hours	
AKN.23	1 Jul	7:30 AM	1 Jul	3:30 PM	8.0 hours	
AKN.28	2 Jul	8:30 AM	2 Jul	4:30 PM	8.0 hours	
AKN.31	3 Jul	10:00 AM	3 Jul	6:00 PM	8.0 hours	
AKN.36	4 Jul	11:00 AM	4 Jul	7:00 PM	8.0 hours	
AKN.39	5 Jul	12:00 PM	5 Jul	8:00 PM	8.0 hours	
AKN.42	6 Jul	12:45 PM	6 Jul	8:45 PM	8.0 hours	
AKN.46	7 Jul	2:00 PM	7 Jul	10:00 PM	8.0 hours	
AKN.49	8 Jul	2:15 PM	8 Jul	10:15 PM	8.0 hours	
AKN.52	9 Jul	3:00 AM	9 Jul	11:00 AM	8.0 hours	
AKN.52	9 Jul	3:45 PM	9 Jul	11:45 PM	8.0 hours	
AKN.56	10 Jul	4:30 PM	11 Jul	12:30 AM	8.0 hours	
AKN.59	11 Jul	5:15 PM	12 Jul	1:15 AM	8.0 hours	
AKN.59	11 Jul	5:15 PM	12 Jul	1:15 AM	8.0 hours	
AKN.62	12 Jul	5:15 AM	12 Jul	1:15 PM	8.0 hours	
AKN.62	12 Jul	6:00 PM	13 Jul	2:00 AM	8.0 hours	
AKN.66	13 Jul	6:00 AM	13 Jul	2:00 PM	8.0 hours	
AKN.66	13 Jul	6:45 PM	14 Jul	2:45 AM	8.0 hours	[f]
AKN.69	14 Jul	6:30 AM	14 Jul	2:30 PM	8.0 hours	
AKN.69	14 Jul	7:45 PM	15 Jul	3:45 AM	8.0 hours	
AKN.69	15 Jul	7:15 AM	15 Jul	3:15 PM	8.0 hours	
AKN.74	15 Jul	3:15 PM	25 Jul	9:00 AM	234.45 hours	[c]
AKN.76	29 Jul	9:00 AM	1 Aug	9:00 AM	66.0 hours	[c]
Ugashik District						fall schedule
Driftnet						
AKN.03	1 Jun	12:01 AM	22 Jun	11:59 PM		[a]
AKN.06	10 Jun	12:00 PM	30 Sep	11:59 PM	Line Change	
AKN.12	24 Jun	2:00 PM	24 Jun	5:00 PM	3.0 hours	
AKN.18	27 Jun	4:00 PM	27 Jun	8:00 PM	4.0 hours	
AKN.20	28 Jun	5:00 PM	28 Jun	9:00 PM	4.0 hours	
AKN.22	29 Jun	6:00 PM	29 Jun	10:00 PM	4.0 hours	
AKN.24	1 Jul	7:00 AM	1 Jul	11:00 AM	4.0 hours	
AKN.29	2 Jul	8:00 AM	2 Jul	12:00 PM	4.0 hours	
AKN.32	3 Jul	9:00 AM	3 Jul	1:00 PM	4.0 hours	
AKN.34	3 Jul	1:00 PM	3 Jul	5:00 PM	4.0 hours	[c]
AKN.37	4 Jul	12:00 PM	4 Jul	4:00 PM	4.0 hours	
AKN.40	5 Jul	1:00 PM	5 Jul	5:00 PM	4.0 hours	
AKN.42	5 Jul	5:00 PM	5 Jul	8:00 PM	3.0 hours	[c]
AKN.42	6 Jul	12:00 PM	6 Jul	5:00 PM	5.0 hours	
AKN.47	6 Jul	5:00 PM	6 Jul	8:00 PM	3.0 hours	[c]
AKN.47	6 Jul	5:00 PM	6 Jul	8:00 PM	3.0 hours	[c]
AKN.47	7 Jul	12:00 PM	7 Jul	10:00 PM	10.0 hours	
AKN.50	8 Jul	1:00 PM	9 Jul	1:00 AM	12.0 hours	
AKN.53	9 Jul	9:00 AM	9 Jul	9:00 PM	12.0 hours	

-continued-

Table 8.–Page 4 of 4.

Number	Start Date	Start Time	End Date	End Time	Effective time	
AKN.53	9 Jul	1:30 AM	10 Jul	1:30 AM	12.0 hours	
AKN.57	10 Jul	2:00 PM	10 Jul	10:00 PM	8.0 hours	
AKN.60	11 Jul	4:00 AM	11 Jul	4:00 PM	12.0 hours	
AKN.63	11 Jul	4:00 PM	11 Jul	10:00 PM	6.0 hours	[c]
AKN.63	12 Jul	3:30 PM	12 Jul	4:00 PM	12.5 hours	
AKN.67	12 Jul	4:00 PM	12 Jul	10:00 PM	6.0 hours	[c]
AKN.67	13 Jul	4:00 AM	13 Jul	4:00 PM	12.0 hours	
AKN.70	13 Jul	4:00 PM	13 Jul	10:00 PM	6.0 hours	[c]
AKN.70	14 Jul	5:00 AM	14 Jul	11:00 PM	18.0 hours	
AKN.72	15 Jul	6:00 AM	14 Jul	11:59 PM	18.0 hours	
AKN.72	16 Jul	7:00 AM	25 Jul	9:00 AM	216.0 hours	[c]
AKN.75	15 Jul	12:00 PM	30 Sep	11:59 PM		[f]
AKN.75	29 Jul	9:00 AM	4 Aug	9:00 AM	72.0 hours	[c]
						fall schedule
Setnet						
AKN.03	1 Jun	12:01 AM	22 Jun	11:59 PM		[a]
AKN.06	10 Jun	12:00 PM	30 Sep	11:59 PM	Line Change	
AKN.10	22 Jun	12:00 PM	23 Jun	10:00 PM	10.0 hours	
AKN.12	24 Jun	2:00 PM	24 Jun	11:59 PM	10.0 hours	
AKN.14	25 Jun	2:30 PM	25 Jun	10:30 PM	8.0 hours	
AKN.16	26 Jun	2:00 PM	26 Jun	11:00 PM	9.0 hours	
AKN.18	27 Jun	3:00 PM	27 Jun	11:59 PM	9.0 hours	
AKN.20	28 Jun	4:00 PM	29 Jun	1:00 AM	9.0 hours	
AKN.22	29 Jun	5:00 PM	30 Jun	2:00 AM	9.0 hours	
AKN.24	1 Jul	6:00 AM	1 Jul	3:00 PM	9.0 hours	
AKN.29	2 Jul	7:00 AM	2 Jul	4:00 PM	9.0 hours	
AKN.29	2 Jul	8:00 AM	2 Jul	5:00 PM	9.0 hours	
AKN.32	3 Jul	8:00 AM	3 Jul	5:00 PM	9.0 hours	
AKN.37	4 Jul	10:00 PM	4 Jul	7:00 PM	9.0 hours	
AKN.40	5 Jul	11:00 AM	5 Jul	8:00 PM	9.0 hours	
AKN.42	6 Jul	11:00 PM	6 Jul	8:00 PM	9.0 hours	
AKN.47	7 Jul	12:00 PM	7 Jul	10:00 PM	10.0 hours	
AKN.50	8 Jul	1:00 PM	9 Jul	1:00 AM	12.0 hours	
AKN.53	9 Jul	1:30 AM	10 Jul	1:30 AM	12.0 hours	
AKN.57	10 Jul	2:00 PM	11 Jul	2:00 PM	12.0 hours	
AKN.60	11 Jul	2:00 AM	11 Jul	4:00 PM	14.0 hours	[c]
AKN.63	11 Jul	4:00 PM	11 Jul	10:00 PM	6.0 hours	[c]
AKN.63	12 Jul	3:30 PM	12 Jul	4:00 PM	12.5 hours	
AKN.67	12 Jul	4:00 PM	12 Jul	10:00 PM	6.0 hours	[c]
AKN.67	13 Jul	4:00 AM	13 Jul	4:00 PM	12.0 hours	
AKN.70	13 Jul	4:00 PM	25 Jul	9:00 AM	216.0 hours	[c]
AKN.75	15 Jul	12:00 PM	30 Sep	11:59 PM		[f]
AKN.75	29 Jul	9:00 AM	4 Aug	9:00 AM	72.0 hours	[c]

[a] Weekly schedule: 9:00 AM Monday until 9:00 AM Friday.

[b] Gillnet mesh size is restricted to 5.5 inches or less.

[c] Extends current fishing period.

[d] Weekly schedule: 9:00 AM Monday to 9:00 AM Wednesday, and 9:00 AM Thursday to 9:00 AM Friday.

[e] Supersedes AKN.42

[f] Midpoint of escapement reached, transfer waiting period waived.

Table 9.–Commercial salmon catch by date and species, in numbers of fish, Naknek-Kvichak District, Bristol Bay, 2016.

Date		Hours fished		Deliveries		Sockeye	Chinook	Chum	Pink	Coho	Total
		Drift	Set	Drift	Set						
6/13	[a]	15	15	7	4	162	6	5	0	0	173
6/14	[a]	24	24	0	6	43	0	1	0	0	44
6/15	[a]	24	24	11	36	1,285	18	66	0	0	1,369
6/16	[a]	24	24	18	13	842	96	22	0	0	960
6/17	[a]	9	9	4	4	367	5	6	0	0	378
6/18											
6/19											
6/20											
6/20	[a]	15	15	96	126	9,854	36	165	0	0	10,055
6/21	[a]	24	24	27	60	2,120	6	50	0	0	2,176
6/22	[a]	24	24	62	86	6,173	4	317	0	0	6,494
6/23	[a]	9	9	19	13	2,336	11	241	0	0	2,588
6/24	[b]	0	0	1	0	268	0	0	0	0	268
6/26	[b]	0	0	1	0	307	0	5	0	0	312
6/27											
6/28	[b]	0	0	1	0	2,186	0	33	0	0	2,219
6/29	[b]	0	0	2	0	2,015	16	35	0	0	2,066
6/30	[b]	0	0	1	0	562	0	0	0	0	562
7/1		6	7.5	379	278	237,046	287	3,945	1	0	241,279
7/2		6.5	7.5	372	242	289,296	168	2,689	1	0	292,154
7/3		6.5	24	438	487	457,921	67	3,505	0	0	461,493
7/4	[a]	15.5	24	657	370	156,187	72	1,394	1	0	157,654
7/5	[a]	14.5	24	685	460	210,393	116	1,694	0	0	212,203
7/6	[a]	14.5	24	689	397	314,281	63	1,729	0	0	316,073
7/7	[a]	7.5	10.5	353	235	209,906	39	1,025	0	0	210,970
7/8	[c,d]	15.5	21.5	950	466	857,688	150	6,962	0	0	864,800
7/9	[a]	15	24	810	432	445,756	107	3,204	0	0	449,067
7/10	[d]	14.5	24	869	722	992,927	128	6,526	0	0	999,581
7/11	[d]	14	24	859	419	898,342	77	6,529	0	0	904,948
7/12		14.5	24	944	535	1,022,743	125	8,569	0	0	1,031,437
7/13		15.5	24	943	520	934,215	110	11,803	1	0	946,129
7/14		14.5	24	1,010	435	845,941	107	10,239	0	0	856,287
7/15		14	24	1,346	575	1,305,588	165	16,625	0	0	1,322,378
7/16		18.5	24	729	470	661,380	104	7,874	0	0	669,358
7/17		24	24	795	397	728,658	120	14,288	0	0	743,066
7/18		24	24	702	315	730,495	74	20,644	1	0	751,214
7/19		24	24	665	189	522,621	110	16,420	2	0	539,153
7/20		24	24	712	252	574,402	99	21,005	234	0	595,740

-continued-

Table 9.–Page 2 of 2.

Date		Hours fished		Deliveries		Sockeye	Chinook	Chum	Pink	Coho	Total
		Drift	Set	Drift	Set						
7/21		24	24	401	166	290,770	38	10,500	61	0	301,369
7/22		24	24	454	108	208,097	42	9,933	361	3	218,436
7/23		24	24	231	75	156,752	31	6,542	314	2	163,641
7/24		24	24	215	66	104,577	35	8,584	556	1	113,753
7/25		24	24	204	81	82,343	40	8,700	420	0	91,503
7/26		24	24	199	65	76,125	43	9,421	895	6	86,490
7/27		24	24	85	65	41,834	18	5,182	626	0	47,660
7/28		24	24	94	67	38,362	19	4,086	727	28	43,222
7/29		24	24	43	52	17,437	10	2,425	288	36	20,196
7/30		24	24	14	38	9,806	8	1,420	390	54	11,678
7/31		24	24	6	40	4,016	6	544	247	12	4,825
8/1		24	24	11	32	3,658	5	1,197	1,151	137	6,148
8/2		24	24	2	28	1,890	2	191	540	137	2,760
8/3		24	24	4	27	2,455	8	358	1,520	123	4,464
8/4		24	24	1	18	1,292	2	134	922	76	2,426
8/5	[e]	9	9	0	3						
8/8		15	15	3	3	594	3	137	475	16	1,225
8/9		24	24	2	18	677	0	29	686	187	1,579
8/10		24	24	2	19	400	0	12	568	104	1,084
8/11		24	24	0	18	406	1	18	643	101	1,169
8/12		9	9	0	5	132	0	3	89	43	267
8/15	[e]	15	15	0	2						
Total				16,727	9,374	13,466,245	2,797	237,035	12,058	1,110	13,719,245

Note: Unless otherwise noted, blank cells represent days with no data.

[a] Fishery was restricted to the Naknek Section only for drift gillnet gear.

[b] Test fish catch.

[c] Set gillnet gear was only open in Naknek Section.

[d] Fishery was restricted to the Naknek Section only for drift gillnet gear during 1 of 2 periods.

[e] Fewer than 4 permits; records are confidential.

Table 10.–Daily district registration of drift gillnet permit holders by district, Bristol Bay, 2016.

	Naknek-Kvichak		Egegik		Ugashik		Nushagak		Togiak[a]	
Date	Total	Dual	Total	Dual	Total	Dual	Total	Dual	Total	Total
6/1	1	2	5	0	0	0	1	0	0	7
6/2	2	2	5	0	0	0	2	0	0	9
6/3	2	2	7	0	0	0	2	0	0	11
6/4	2	2	8	0	1	0	2	0	0	13
6/5	2	2	8	0	1	0	2	0	0	13
6/6	2	2	8	0	1	0	2	0	0	13
6/7	2	2	15	4	1	0	5	0	1	24
6/8	6	2	18	4	1	0	5	0	1	31
6/9	8	2	24	4	4	0	10	0	1	47
6/10	9	4	26	4	4	0	11	0	2	52
6/11	16	2	40	10	10	0	12	0	4	82
6/12	16	2	37	8	10	0	12	0	4	79
6/13	20	4	43	12	19	6	12	0	4	98
6/14	57	30	108	72	34	32	19	2	5	223
6/15	72	0	116	0	45	0	26	0	5	264
6/16	87	22	139	54	53	28	34	2	6	319
6/17	104	26	164	62	52	26	43	4	6	369
6/18	119	34	156	54	49	24	86	26	8	418
6/19	128	38	159	58	53	26	175	74	9	524
6/20	159	52	189	78	59	26	291	134	9	707
6/21	231	78	258	102	95	46	335	154	12	931
6/22	248	78	305	128	142	72	404	186	15	1,114
6/23	254	82	309	128	156	76	452	206	16	1,187
6/24	275	86	357	148	167	80	474	216	24	1,297
6/25	287	92	370	162	197	94	492	228	26	1,372
6/26	297	94	379	168	202	96	490	228	28	1,396
6/27	308	94	390	172	205	96	506	240	28	1,437
6/28	312	96	399	178	231	106	518	244	30	1,490
6/29	318	102	401	176	238	110	508	238	34	1,499
6/30	327	108	403	178	242	114	515	244	34	1,521
7/01	384	136	401	176	245	116	510	242	34	1,574
7/02	467	160	388	168	252	120	462	210	35	1,604
7/03	483	168	383	166	251	118	429	204	38	1,584
7/04	550	212	368	158	245	114	409	196	39	1,611
7/05	581	220	355	146	259	118	406	194	42	1,643
7/06	619	238	356	144	263	118	396	186	42	1,676
7/07	625	246	357	146	264	118	390	182	43	1,679
7/08	625	246	357	146	262	116	385	178	43	1,672
7/09	622	246	366	150	267	118	368	166	43	1,666
7/10	627	248	353	148	278	126	341	154	43	1,642
7/11	646	262	352	148	281	126	341	154	43	1,663
7/12	675	272	336	142	297	134	329	152	43	1,680
7/13	681	272	302	124	295	132	306	138	43	1,627
7/14	708	280	290	118	291	132	301	134	43	1,633
7/15	767	312	290	118	292	134	300	134	43	1,692
7/16	790	324	281	112	292	134	289	130	43	1,695
Average[b]	429	159	320	134	209	97	364	167	30	1,352

Note: Total permit sum includes dual boat registrations.

[a] Dual boat registration is not permitted by regulation in Togiak District.

[b] Seasonal averages calculated for June 16 to July 16.

Table 11.–Comparison of daily sockeye salmon escapement estimates by tower count, aerial survey estimate and river test fishing enumeration methods, Kvichak River, Bristol Bay, 2016.

	Tower Count		River Test Fishing				
				Index Points			
Date	Daily	Cum.	Fish per Index Pt.[a]	Daily	Cum.	Cumulative Escapement	Estimated River Fish[b]
6/16	258	258					
6/17	210	468					
6/18	102	570					
6/19	78	648					
6/20	162	810					
6/21	276	1,086					
6/22	1,206	2,292	140	0	0		
6/23	1,524	3,816	140	6	6	771	
6/24	2,280	6,096	140	0	6	771	
6/25	1,746	7,842	140	33	38	5,350	
6/26	2,538	10,380	140	6	44	6,139	
6/27	2,154	12,534	140	3	47	6,579	
6/28	840	13,374	140	0	47	6,579	
6/29	534	13,908	140	6	53	7,354	
6/30	684	14,592	140	1,436	1,488	208,368	150,000
7/01	14,280	28,872	140	1,447	2,935	410,940	300,000
7/02	105,540	134,412	140	322	3,257	456,016	150,000
7/03	96,300	230,712	79	2,061	5,318	420,148	200,000
7/04	114,594	345,306	85	549	5,867	498,730	250,000
7/05	232,314	577,620	143	635	6,502	929,805	300,000
7/06	149,868	727,488	130	797	7,299	948,866	200,000
7/07	150,024	877,512	142	2,923	10,222	1,451,518	550,000
7/08	340,548	1,218,060	143	3,169	13,391	1,914,878	700,000
7/09	409,956	1,628,016	143	416	13,807	1,974,379	350,000
7/10	258,462	1,886,478	139	3,316	17,123	2,380,093	450,000
7/11	190,566	2,077,044	136	3,804	20,927	2,846,030	800,000
7/12	650,634	2,727,678	145	2,462	23,389	3,391,429	900,000
7/13	269,292	2,996,970	136	510	23,899	3,250,258	250,000
7/14	114,432	3,111,402	132	1,267	25,165	3,321,841	250,000
7/15	173,748	3,285,150	134	204	25,369	3,399,459	150,000
7/16	163,374	3,448,524	141	530	25,899	3,651,805	200,000
7/17	247,650	3,696,174					
7/18	135,684	3,831,858					
7/19	143,370	3,975,228					
7/20	158,484	4,133,712					
7/21	87,564	4,221,276					
7/22	74,508	4,295,784					
7/23	89,406	4,385,190					
7/24	28,188	4,413,378					
7/25	29,100	4,442,478					
7/26	20,250	4,462,728					

[a] The FPI used to estimate the daily ERFs prior to using lag time relationships was calculated using the 5-year average of median FPIs. This method was used through June 27 when FPIs were based on lag time relationships.

[b] Estimated river fish (ERF) was based on the river test fishery cumulative escapement estimate less the cumulative tower count. On occasion, ADF&G staff adjusted the ERF based on catchability and other factors.

Table 12.–Commercial salmon catch by date and species, in numbers of fish, Egegik District, Bristol Bay, 2016.

	Hours fished		Deliveries							
Date	Drift	Set	Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
6/1	9	9								0
6/2	15	15								0
6/3	9	9								0
6/4										0
6/5										0
6/6	15	15								0
6/7 [a]										90
6/8	9	9								0
6/9	15	15		9	1,017	17	7	0	0	1,041
6/10	9	9								0
6/11										0
6/12										0
6/13	15	15	46	75	9,312	36	229	0	0	9,577
6/14	24	24	36	67	10,937	20	77	0	0	11,034
6/15	9	9	11	12	1,177	0	14	0	0	1,191
6/16	15	15	97	107	25,755	33	384	0	0	26,172
6/17	9	9	17	10	1,976	1	28	0	0	2,005
6/18										0
6/19										0
6/20	8	8	158	128	44,184	82	1,602	0	0	45,868
6/21	8	8	209	132	43,288	28	1,121	0	0	44,437
6/22										0
6/23	8	8	274	174	106,562	136	1,644	0	0	108,342
6/24	9	8	477	137	46,317	73	941	0	0	47,331
6/25	8	8	279	146	79,865	83	828	0	0	80,776
6/26	11		490	159	114,582	29	1,714	0	0	116,325
6/27	9	6.75	554	177	141,169	59	1,544	0	0	142,772
6/28	4	7.25	312	202	115,552	29	1,440	0	0	117,021
6/29		2	2	170	24,176	49	273	0	0	24,498
6/30	10	8	639	163	230,810	56	2,566	0	0	233,432
7/1	10	8	567	191	234,095	45	2,902	0	0	237,042

-continued-

Table 12.–Page 2 of 2.

	Hours fished			Deliveries							
Date	Drift	Set		Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
7/2	12	8		505	251	327,534	32	2,814	0	0	330,380
7/3	8	8		296	159	322,003	48	2,711	0	0	324,762
7/4	9	8		408	176	386,472	44	3,278	0	0	389,794
7/5	14	8		313	241	281,573	17	4,637	0	0	286,227
7/6	8	8		279	219	395,929	16	2,627	0	276	398,848
7/7	12	8		505	290	636,512	17	3,069	0	0	639,598
7/8	8	8		313	223	378,017	16	2,093	0	0	380,126
7/9	16	16		494	378	463,001	15	2,395	0	0	465,411
7/10	11.5	7.5		513	310	513,155	20	3,129	0	270	516,574
7/11	13.25	15.25		475	299	428,746	25	2,475	2	0	431,248
7/12	15.25	15.25		455	283	326,704	10	1,857	0	0	328,571
7/13	15.25	15.25		430	245	317,287	8	1,585	0	0	318,880
7/14	15	15		416	167	355,219	16	2,231	0	0	357,466
7/15	13	13		441	251	471,487	17	4,140	0	0	475,644
7/16	24	24		345	157	310,346	10	2,087	0	0	312,443
7/17	24	24		331	161	361,382	7	2,445	0	0	363,834
7/18	24	24		120	153	159,808	9	1,314	0	0	161,131
7/19	24	24		202	116	250,833	5	2,161	0	0	252,999
7/20	24	24		139	119	165,844	4	1,380	0	0	167,228
7/21	24	24		127	77	146,939	5	1,539	45	0	148,528
7/22	24	24		78	84	118,415	4	1,120	48	0	119,587
7/23	24	24		73	59	72,752	6	719	0	0	73,477
7/24	24	24		61	56	70,170	2	1,860	146	0	72,178
7/25	24	24		62	50	46,705	2	552	0	0	47,259
7/26	24	24		49	44	36,872	1	474	38	0	37,385
7/27	24	24		36	43	47,863	0	616	64	0	48,543
7/28	24	24		44	35	36,599	5	369	0	0	36,973
7/29	24	24		19	18	16981	0	274	0	0	17,255
7/30	24	24		22	17	23019	0	307	0	0	23,326
7/31	24	24		18	14	11468	2	265	0	0	11,735
8/1	24	24		13	8	10361	2	275	0	0	10,638
8/2	24	24		16	15	8259	1	234	0	0	8,494
8/3	24	24		10		5361	2	151	0	0	5,514
8/4	24	24		7		4324	0	143	0	0	4,467
8/5	9	9									0
Total	921	891	0	11,783	6,780	8,738,803	1,144	74,641	343	546	8,815,477

[a] Fewer than 4 permits; records are confidential.

Table 13.–Comparison of daily sockeye salmon escapement estimates by tower count and river test fishing enumeration methods, Egegik River, Bristol Bay, 2016.

	Tower Count		River Test Fishing				
				Index Points		Estimated Cumulative	
Date	Daily	Cum.	Fish per Index Pt.[a]	Daily	Cum.	Escapement	Estimated River Fish[b]
6/12	390	390					
6/13	6,852	7,242					
6/14	1,698	8,940					
6/15	1,662	10,602					
6/16	18,822	29,424					
6/17	7,920	37,344					
6/18	11,718	49,062					
6/19	47,172	96,234					
6/20	24,582	120,816					
6/21	13,464	134,280	82	91	91	7,446	
6/22	7,260	141,540	82	55	146	11,957	
6/23	34,068	175,608	82	1,094	1,240	101,704	
6/24	68,874	244,482	82	117	1,357	111,296	25,000
6/25	9,828	254,310	82	74	1,431	117,335	15,000
6/26	8,256	262,566	82	214	1,645	134,853	15,000
6/27	15,684	278,250	82	169	1,813	148,702	15,000
6/28	16,734	294,984	186	163	1,977	179,087	35,000
6/29	72,648	367,632	118	449	2,426	232,078	30,000
6/30	113,508	481,140	105	1,634	4,060	403,647	50,000
7/1	69,726	550,866	103	323	4,383	436,908	70,000
7/2	27,702	578,568	101	453	4,835	482,627	30,000
7/3	25,710	604,278	102	254	5,089	508,504	30,000
7/4	55,416	659,694	103	328	5,417	542,237	30,000
7/5	94,674	754,368	119	276	5,692	575,027	60,000
7/6	31,902	786,270	117	101	5,793	586,874	50,000
7/7	36,768	823,038	119	1,119	6,912	720,016	30,000
7/8	175,344	998,382	140	1,088	8,000	872,272	130,000
7/9	111,756	1,110,138	123	295	8,295	908,554	100,000
7/10	68,094	1,178,232	126	1,480	9,775	1,095,030	40,000
7/11	178,440	1,356,672	123	881	10,656	1,203,388	150,000
7/12	105,672	1,462,344	118	632	11,288	1,278,000	100,000
7/13	32,268	1,494,612					
7/14	28,866	1,523,478					
7/15	36,084	1,559,562					
7/16	32,034	1,591,596					
7/17	38,166	1,629,762					
7/18	42,702	1,672,464					
7/19	30,660	1,703,124					
7/20	32,760	1,735,884					
7/21	25,362	1,761,246					
7/22	16,998	1,778,244					
7/23	29,196	1,807,440					
7/24	29,820	1,837,260					

[a] The FPI used to estimate the daily ERFs prior to using lag time relationships was calculated using the 2009–2013 mean of median FPIs. This method was used Until June 21 when FPIs were based on lag time relationships.

[b] Estimated river fish (ERF) was based on the river test fishery cumulative escapement estimate less the cumulative tower count. On occasion, ADF&G staff adjusted the ERF based on catchability and other factors.

Table 14.–Inshore run of sockeye salmon by age class, river system, and district, in thousands of fish, Bristol Bay, 2016.

District and River System [a]		1.2	2.2	2-Ocean	1.3	2.3	3-Ocean	1.4	Total [b]
Naknek-Kvichak District									
Kvichak River									
	Number	7,991	2,102	10,093	1,103	407	1,510	0	11,615
	Percent	68.8	18.1	87	9.5	3.5	13	0.0	99.9
Alagnak River									
	Number	2,186	1,447	3,633	889	306	1,195	0	4,857
	Percent	45.1	29.8	75	18.3	6.3	25	0.0	99.5
Naknek River									
	Number	2,660	921	3,580	891	266	1,182	5	4,925
	Percent	54.0	18.7	73	18.1	5.4	24	0.1	96.3
Total	Number	12,836	4,471	17,307	2,884	978	3,887	5	21,397
	Percent	52.5	17.3	69.8	22.2	7.6	29.8	0.0	99.6
Egegik District									
	Number	2,485	4,029	6,515	1,449	2,031	3,480	11	10,576
	Percent	23.5	38.1	62	13.7	19.2	33	0.1	94.5
Ugashik District									
	Number	3,215	1,959	5,174	2,256	793	3,050	0	8,265
	Percent	38.9	23.7	63	27.3	9.6	37	0.0	99.5
Nushagak District									
Wood River									
	Number	3,781	5	3,786	807	1	807	5	5,487
	Percent	68.9	1.0	70	14.7	0.1	15	0.1	84.8
Igushik River									
	Number	122	8	130	1,803	29	1,832	0	1,964
	Percent	6.2	0.4	7	91.8	1.5	93	0.0	99.9
Nushagak River									
	Number	1,073	6	1,079	1,990	3	1,993	19	3,119
	Percent	34.4	0.2	35	63.8	0.1	64	0.6	99.1
Total	Number	4,975	20	4,995	4,599	33	4,633	24	9,652
	Percent	36.5	0.5	37.0	56.8	0.6	57.3	0.2	94.6
Togiak District [c]									
	Number	203	19	222	618	3	621	2	846
	Percent	22.0	3.4	25	73.8	0.5	74.3	0.1	99.8
Total Bristol Bay [d]									
	Number	23,715	10,497	34,212	11,806	3,839	15,670	41	50,736
	Percent	0.4	0.2	0.6	0.2	0.1	0.3	0.0	0.860

[a] Does not include the South Peninsula catch of Bristol Bay sockeye salmon or immature high seas bycatch.

[b] Totals do not include minor age classes, therefore totals are greater than the sum of age classes listed.

[c] Does not include rivers other than Togiak River.

[d] Totals may not equal column sums because of rounding.

Table 15.–Commercial salmon catch by date and species, in numbers of fish, Ugashik District, Bristol Bay, 2016.

	Hours fished		Deliveries							
Date	Drift	Set	Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
6/12										
6/13	15	15	13	1	1,352	17	28	0	0	1,397
6/14	24	24	14		1,336	7	52	0	0	1,395
6/15	24	24	25	1	1,301	35	27	0	0	1,363
6/16	24	24	22		940	5	19	0	0	964
6/17 [a]										8
6/18										
6/19										
6/20	15	15	73	13	22,882	36	723	0	0	23,641
6/21	24	24	51	10	10,301	59	156	0	0	10,516
6/22	24	24	106	15	24,378	146	474	0	0	24,998
6/23		10		15	1,621	43	0	0	0	1,664
6/24	3	10	147	34	42,892	64	540	0	0	43,496
6/25		8		37	6,448	60	0	0	0	6,508
6/26		9	2	47	9878	86	0	0	0	9,964
6/27	4	9	175	42	80,150	76	1,234	0	0	81,460
6/28	4	8	181	45	71,428	59	1,352	0	0	72,839
6/29	4	7	181	48	80,795	59	1,460	0	0	82,314
6/30 [a]										543
7/1	4	9	188	67	142,124	140	1,913	0	0	144,177
7/2	4	9	160	23	117,290	34	1,463	0	0	118,787
7/3	8	9	186	55	238,669	70	1,681	0	0	240,420
7/4	4	9	186	65	77,415	44	544	0	0	78,003
7/5	7	9	201	56	243,951	37	1,857	0	0	245,845
7/6	8	9	204	68	380,069	29	2,592	0	0	382,690
7/7	10	10	191	82	311,609	49	1,323	0	0	312,981
7/8	11	11	212	71	248,155	39	1,756	0	0	249,950
7/9	13	11.5	213	35	298,349	20	2,349	0	0	300,718
7/10	8	13.5	193	55	321,020	17	2,662	0	0	323,699
7/11	18	16	268	64	333,543	42	2,914	55	0	336,554
7/12	18.5	12.5	227	90	310,362	26	2,416	0	0	312,804
7/13	18	20	272	91	366,566	20	2,871	0	0	369,457
7/14	18	24	286	72	459,578	22	3,671	0	0	463,271
7/15	18	24	306	77	391,034	8	3,600	0	0	394,642
7/16	17	24	281	63	397,643	9	5,489	3	0	403,144
7/17	24	24	243	69	323,109	8	4,824	0	0	327,941
7/18	24	24	205	16	291,207	10	3,141	0	0	294,358
7/19	24	24	235	29	294,699	8	3,686	126	0	298,519

-continued-

Table 15.–Page 2 of 2.

Date	Hours fished		Deliveries		Sockeye	Chinook	Chum	Pink	Coho	Total
	Drift	Set	Drift	Set						
7/20	24	24	184	37	161,309	11	1,992	127	0	163,439
7/21	24	24	152	23	154,244	14	2,452	102	0	156,812
7/22	24	24	102	6	89,115	3	1,941	280	0	91,339
7/23	24	24	55	3	53,985	1	1,072	84	0	55,142
7/24	24	24	103	18	73,289	6	2,020	86	0	75,401
7/25	24	24	79	23	50,105	4	1,323	50	0	51,482
7/26	24	24	98	8	59,586	6	2,311	58	0	61,961
7/27	24	24	37	5	22,123	3	410	51	0	22,587
7/28	24	24	25	2	16,215	0	686	87	0	16,988
7/29	24	24	25	2	16,103	0	312	18	0	16,433
7/30	24	24	15	1	8,170	0	368	52	63	8,653
7/31	24	24	9	1	3,560	0	148	32	37	3,777
8/1	24	24	10	1	4,747	1	156	0	2	4,906
8/2	24	24	7	1	4,312	0	153	52	0	4,517
8/3	24	24	17	1	7,509	1	266	177	0	7,953
8/4 [a]										122
8/5	24	24	4		1,680	0	56	31	2	1,769
8/6	24	24	4		1,401	0	50	27	0	1,478
8/7	24	24								0
8/8 [a]										80
Total	872	956	5,992	1,554	6,468,922	1,424	70,542	1,371	171	6,542,430

Note: Unless otherwise noted, blank cells represent days with no data. Due to rounding, totals may not equal column sums.

[a] Fewer than 4 permits; records are confidential.

Table 16.–Comparison of daily sockeye salmon escapement estimates by tower count and river test fishing enumeration methods, Ugashik River, Bristol Bay, 2016.

	Tower Count		River Test Fishing				
				Index Points		Estimated Cumulative	Estimated
Date	Daily	Cum.	Fish per Index Pt.[a]	Daily	Cum.	Escapement	River Fish[b]
6/23							
6/24							
6/25			83	206	206	17,130	20,000
6/26	4,596	4,596	83	295	502	41,656	20,000
6/27	13,080	17,676	81	402	904	74,233	30,000
6/28	18,828	36,504	83	346	1,250	102,930	35,000
6/29	16,206	52,710	83	351	1,601	132,047	40,000
6/30	24,114	76,824	58	273	1,874	147,907	40,000
7/1	17,022	93,846	61	522	2,396	179,722	50,000
7/2	12,312	106,158	59	635	3,031	217,199	70,000
7/3	25,686	131,844	60	1,293	4,324	294,779	100,000
7/4	27,744	159,588	64	836	5,159	348,261	100,000
7/5	33,342	192,930	60	673	5,833	388,647	130,000
7/6	40,200	233,130	54	673	6,505	424,982	120,000
7/7	27,390	260,520	54	937	7,442	475,561	100,000
7/8	50,886	311,406	48	1,132	8,574	529,909	150,000
7/9	63,492	374,898	48	2,331	10,905	641,790	200,000
7/10	62,154	437,052	53	1,420	12,326	717,071	175,000
7/11	71,514	508,566	51	1,143	13,468	775,349	175,000
7/12	139,398	647,964	63	1,052	14,521	841,649	200,000
7/13	129,684	777,648	67	1,297	15,818	928,552	175,000
7/14	122,874	900,522	60	402	16,219	952,654	175,000
7/15	70,236	970,758	67	391	16,610	978,824	100,000
7/16	84,078	1,054,836	70	423	17,033	1,008,419	140,000
7/17	108,420	1,163,256	67	1,060	18,092	1,079,411	200,000
7/18	52,566	1,215,822					
7/19	85,638	1,301,460					
7/20	58,986	1,360,446					
7/21	68,706	1,429,152					
7/22	29,580	1,458,732					
7/23	24,678	1,483,410					
7/24	31,152	1,514,562					
7/25	44,490	1,559,052					
7/26	50,682	1,609,734					
7/27	25,536	1,635,270					
7/28							
7/29							

Note: Blank cells represent days when no data were collected.

[a] The FPI used to estimate the daily ERFs prior to using lag time relationships was calculated using the 2009–2013 mean of median FPIs. This method was used until June 30 when FPIs were based on lag time relationships.

[b] Estimated river fish (ERF) was based on the river test fishery cumulative escapement estimate less the cumulative tower count. On occasion, ADF&G staff adjusted the ERF based on catchability and other factors.

Table 17.–Daily sockeye salmon escapement tower counts by river system, Bristol Bay west side, 2016.

	Wood River		Igushik River		Togiak River	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.
6/14	2,031	2,031				
6/15	4,734	6,765				
6/16	6,738	13,503				
6/17	17,274	30,777				
6/18	10,842	41,619				
6/19	13,986	55,605				
6/20	33,870	89,475				
6/21	24,078	113,553				
6/22	14,172	127,725				
6/23	8,124	135,849	2,040	2,040		
6/24	29,160	165,009	2,808	4,848		
6/25	20,376	185,385	1,968	6,816		
6/26	11,046	196,431	2,346	9,162		
6/27	24,606	221,037	1,878	11,040		
6/28	16,176	237,213	1,206	12,246		
6/29	16,614	253,827	1,530	13,776		
6/30	19,074	272,901	1,230	15,006		
7/1	27,144	300,045	1,932	16,938		
7/2	36,012	336,057	894	17,832	306	306
7/3	75,324	411,381	3,234	21,066	762	1,068
7/4	112,590	523,971	12,438	33,504	372	1,440
7/5	98,586	622,557	19,662	53,166	534	1,974
7/6	78,708	701,265	14,676	67,842	570	2,544
7/7	49,344	750,609	16,188	84,030	2,154	4,698
7/8	44,538	795,147	15,738	99,768	4,092	8,790
7/9	40,470	835,617	25,068	124,836	2,196	10,986
7/10	46,938	882,555	17,862	142,698	3,342	14,328
7/11	53,778	936,333	18,768	161,466	4,140	18,468
7/12	64,782	1,001,115	19,566	181,032	4,476	22,944
7/13	44,046	1,045,161	17,874	198,906	4,854	27,798
7/14	32,178	1,077,339	17,988	216,894	5,430	33,228
7/15	31,404	1,108,743	21,816	238,710	4,494	37,722
7/16	40,758	1,149,501	22,752	261,462	3,654	41,376
7/17	44,136	1,193,637	31,020	292,482	4,014	45,390
7/18	40,266	1,233,903	26,796	319,278	3,204	48,594
7/19	41,820	1,275,723	33,174	352,452	4,020	52,614
7/20	27,276	1,302,999	33,162	385,614	8,406	61,020
7/21	6,708	1,309,707	23,322	408,936	5,970	66,990
7/22			21,354	430,290	2,124	69,114

-continued-

Table 17.–Page 2 of 2.

	Wood River		Igushik River		Togiak River	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.
7/23			14,130	444,420	5,406	74,520
7/24			12,984	457,404	3,894	78,414
7/25			11,826	469,230	4,926	83,340
7/26					11,688	95,028
7/27					16,662	111,690
7/28					17,544	129,234
7/29					13,452	142,686
7/30					6,726	149,412
7/31					8,694	158,106
8/1					7,560	165,666
8/2					7,218	172,884
8/3					8,370	181,254
8/4					6,234	187,488
8/5					7,110	194,598
8/6					3,018	197,616
8/7					2,430	200,046

Note: Blank cells represent days when escapement projects were not in operation.

Table 18.–Commercial salmon catch by date and species, in numbers of fish, Nushagak District, Bristol Bay, 2016.

	Hours fished (drift/set)		Deliveries							
Date	Nushagak	Igushik	Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
6/13	0/0	0/8 [a]	0	22	1,456	0	24	0	0	1,480
6/14	0/0	0/8 [a]	0	25	2,131	3	31	0	0	2,165
6/15	0/0	0/8 [a]	0	37	4,065	1	147	0	0	4,213
6/16	0/0	0/8 [a]	0	17	2,701	0	134	0	0	2,835
6/17	0/0	0/8 [a]	0	37	3,602	0	236	0	0	3,838
6/18	0/0	0/12.5 [a]	0	27	5,950	91	260	0	0	6,301
6/19	8/23	8/24 [b]	97	100	28,448	455	7,549	0	0	36,452
6/20	5/11	5/24	75	134	24,186	260	4,133	0	0	28,579
6/21	6/22	8/24	248	304	87,439	911	15,229	4	0	103,583
6/22	6/11.5	8/24	309	276	125,279	1,350	19,958	16	0	146,603
6/23	6/19	8/24	322	374	119,955	1,333	17,959	11	0	139,258
6/24	0/10	7/24	236	194	49,695	160	3,101	15	1	52,972
6/25	0/8	6/24	179	218	37,547	270	1,112	1	1	38,931
6/26	5/18.75	6.5/24	362	447	254,707	2,464	49,441	185	1	306,798
6/27	9/13	9/24	649	460	227,444	2,507	34,330	188	0	264,469
6/28	12/12.5	13/24	694	426	226,919	2,834	36,591	214	0	266,558
6/29	9/17.5	10/24	723	363	232,815	1,989	26,746	202	0	261,752
6/30	9.5/12.5	9.5/24	632	489	284,387	2,349	20,448	67	3	307,254
7/1	8/12.75	8/24	658	379	313,934	1,354	19,134	125	0	334,547
7/2	8.5/11.75	8.5/24	357	382	281,006	569	14,878	95	1	296,549
7/3	12/13.5	12/24	351	395	380,503	290	11,973	52	0	392,818
7/4	12/14	12/24	517	516	486,559	367	10,901	129	0	497,956
7/5	18/14	18/24	520	465	417,575	377	9,454	130	0	427,536
7/6	18.5/14.25	18.5/24	501	427	381,636	312	7,385	101	0	389,434
7/7	17/13.5	17/24	423	442	417,134	311	6,753	90	0	424,288
7/8	16/14	16/24	492	451	409,281	347	7,133	98	1	416,860
7/9	15.5/14.25	15.5/24	457	358	381,017	398	9,590	307	0	391,312
7/10	24/24 [b]	24/24	317	393	439,054	264	7,264	250	0	446,832
7/11	19.5/24	19.5/24	388	488	375,538	348	5,453	407	0	381,746
7/12	16/24	16/24	435	336	332,753	335	7,522	458	2	341,070
7/13	15.5/24	15.5/24	364	483	309,019	289	6,982	764	5	317,059
7/14	15.5/24	15.5/24	363	324	330,048	313	7,423	887	3	338,674
7/15	17.5/24	17.5/24	182	409	228,156	214	4,570	1,649	25	234,614
7/16	24/24 [b]	24/24 [b]	339	388	241,011	221	6,388	2,564	368	250,552
7/17	24/24	24/24	143	295	147,961	109	3,257	2,451	19	153,797
7/18	24/24	24/24	46	250	87,187	28	1,498	1,159	15	89,887
7/19	24/24	24/24	72	286	141,722	68	2,637	3,087	83	147,597
7/20	24/24	24/24	78	234	102,275	69	1,844	3,632	70	107,890
7/21	24/24	24/24	38	183	50,989	15	2,989	2,944	258	57,195
7/22	24/24	24/24	23	163	41,037	18	1,493	6,194	231	48,973
7/23	24/24	24/24	8	108	24,481	15	321	5,112	772	30,701
7/24	24/24	24/24	4	113	18,617	17	364	5,244	684	24,926

-continued-

Table 18.–Page 2 of 2.

	Hours fished (drift/set)		Deliveries							
Date	Nushagak	Igushik	Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
7/25	24/24	24/24	26	86	16,367	39	400	16,593	642	34,041
7/26	24/24	24/24	29	73	11,026	31	303	19,283	2,638	33,281
7/27	24/24	24/24	29	82	5,929	20	366	33,226	2,748	42,289
7/28	24/24	24/24	26	24	3,114	7	501	15,711	2,530	21,863
7/29	24/24	24/24	12	17	1,411	6	93	6,334	963	8,807
7/30	24/24	24/24	7	15	1,570	2	107	5,441	690	7,810
7/31	24/24	24/24	9	38	1,764	5	48	13,468	997	16,282
8/1	24/24	24/24	20	47	1,484	8	117	32,015	2,348	35,972
8/2	24/24	24/24	56	45	1,615	7	259	46,715	6,141	54,737
8/3	24/24	24/24	49	51	1,535	11	131	51,033	3,197	55,907
8/4	24/24	24/24	100	52	2,809	6	202	91,779	8,543	103,339
8/5	24/24	24/24	23	19	410	0	20	19,577	2,960	22,967
8/6	24/24	24/24	51	27	1,153	4	401	42,713	6,415	50,686
8/7	24/24	24/24	23	17	442	5	40	22,315	3,594	26,396
8/8	24/24	24/24	38	3	326	1	41	15,364	4,484	20,216
8/9	24/24	24/24	54	0	769	1	52	23,189	5,949	29,960
8/10	24/24	24/24	29	0	163	3	12	13,763	3,851	17,792
8/11	24/24	24/24	25	6	330	2	7	16,126	3,208	19,673
8/12	24/24	24/24	17	4	91	0	2	6,872	4,855	6,965
8/13	24/24	24/24	17	2	113	0	0	3,460	2,815	6,388
8/14	24/24	24/24	16	3	105	0	21	2,753	1,558	4,437
8/15	24/24	24/24 [a]	5	1	35	0	0	933	204	1,172
8/16	24/24	24/24 [a]	1	1	6	0	0	0	601	607
8/17	24/24	24/24 [a]	0	1	0	0	0	0	105	105
8/18	24/24	24/24 [a]	2	1	6	0	3	30	619	658
8/19	24/24	24/24 [a]	0	2	0	0	0	0	129	129
8/20	24/24	24/24 [a]	0	1	0	0	0	0	70	70
8/21										
8/22	24/24	24/24 [a]	3	1	2	0	0	0	309	311
8/23	24/24	24/24 [a]	1	1	1	0	0	0	105	106
8/24	24/24	24/24 [a]	2	0	1	0	0	0	174	175
8/25	24/24	24/24 [a]	1	0	0	0	0	0	56	56
8/26	24/24	24/24 [a]	2	1	0	0	0	0	584	584
8/27	24/24	24/24 [a]	1	1	1	0	0	0	193	194
8/28										
8/29	24/24	24/24 [a]	0	1	0	0	0	0	49	49
8/30	24/24	24/24 [a]	3	1	0	0	0	0	663	663
8/31	24/24	24/24 [a]	1	0	0	0	0	0	136	136
9/1	24/24	24/24 [a]	3	1	0	0	0	0	387	387
9/2	24/24	24/24 [a]	3		0	0	0	0	481	481
9/3	24/24	24/24 [a]	0	1	0	0	0	0	76	76
9/4										
9/5	24/24	24/24 [a]	3		0	0	0	0	252	252
9/6	24/24	24/24 [a]	1		0	0	0	0	139	139
9/7	24/24	24/24 [a]	2		0	0	0	0	56	56
9/8	24/24	24/24 [a]	3		0	0	0	0	206	206
9/9	24/24	24/24 [a]	4		0	0	0	0	257	257
9/12	24/24	24/24 [a]	2		0	0	0	0	18	18
Total	1,082/1,145.5	1,204/1,418	12,301	12,844	8,109,797	23,783	397,761	537,525	79,538	9,143,549

[a] Less than 4 permits involved in fishery; records are confidential.

Table 19.–Commercial fishing emergency orders, by district and statistical area, Bristol Bay west side, 2016.

Number[a]	Start Date	Start Time		End Date	End Time	Effective time	
Nushagak District							
Nushagak Section							
Driftnet							
DLG.6	19 Jun	12:00 p.m.	to	19 Jun	8:00 p.m.	8.0 hours	
DLG.6	20 Jun	3:00 a.m.	to	20 Jun	8:00 a.m.	5.0 hours	
DLG.8	21 Jun	3:00 p.m.	to	21 Jun	9:00 p.m.	6.0 hours	
DLG.9	22 Jun	4:00 p.m.	to	22 Jun	10:00 p.m.	6.0 hours	
DLG.10	23 Jun	4:00 p.m.	to	23 Jun	10:00 p.m.	6.0 hours	
DLG.14	26 Jun	6:30 p.m.	to	26 Jun	11:30 p.m.	5.0 hours	
DLG.14	27 Jun	7:30 a.m.	to	27 Jun	1:00 p.m.	5.5 hours	
DLG.15	27 Jun	8:30 p.m.	to	28 Jun	12:30 a.m.	4.0 hours	
DLG.15	28 Jun	8:00 a.m.	to	28 Jun	5:00 p.m.	9.0 hours	
DLG.16	28 Jun	9:30 p.m.	to	29 Jun	1:30 a.m.	4.0 hours	
DLG.16	29 Jun	10:00 a.m.	to	29 Jun	2:00 p.m.	4.0 hours	
DLG.17	29 Jun	8:30 p.m.	to	30 Jun	2:00 a.m.	5.5 hours	
DLG.17	30 Jun	9:30 a.m.	to	30 Jun	3:30 p.m.	6.0 hours	
DLG.18	30 Jun	10:30 p.m.	to	1 Jul	2:30 a.m.	4.0 hours	
DLG.18	1 Jul	10:30 a.m.	to	1 Jul	3:30 p.m.	5.0 hours	
DLG.19	1 Jul	11:30 p.m.	to	2 Jul	3:30 a.m.	4.0 hours	
DLG.19	2 Jul	11:00 a.m.	to	2 Jul	4:00 p.m.	5.0 hours	
DLG.21	3 Jul	12:30 a.m.	to	3 Jul	5:30 a.m.	5.0 hours	
DLG.21	3 Jul	12:00 p.m.	to	3 Jul	7:00 p.m.	7.0 hours	
DLG.22	4 Jul	1:30 a.m.	to	4 Jul	6:30 a.m.	5.0 hours	
DLG.22	4 Jul	1:00 p.m.	to	4 Jul	8:00 p.m.	7.0 hours	
DLG.23	5 Jul	1:30 a.m.	to	5 Jul	9:30 a.m.	8.0 hours	
DLG.23	5 Jul	2:00 p.m.	to	5 Jul	11:00 p.m.	9.0 hours	
DLG.24	5 Jul	1:00 p.m.	to	5 Jul	11:00 p.m.	10.0 hours	[b]
DLG.24	6 Jul	2:30 a.m.	to	6 Jul	12:00 p.m.	9.5 hours	
DLG.24	6 Jul	2:30 p.m.	to	6 Jul	11:30 p.m.	9.0 hours	
DLG.25	7 Jul	2:30 a.m.	to	7 Jul	11:30 a.m.	9.0 hours	
DLG.25	7 Jul	3:30 p.m.	to	7 Jul	11:30 p.m.	8.0 hours	
DLG.26	8 Jul	3:30 a.m.	to	8 Jul	12:30 p.m.	9.0 hours	
DLG.26	8 Jul	4:30 p.m.	to	8 Jul	11:30 p.m.	7.0 hours	
DLG.28	9 Jul	4:30 a.m.	to	9 Jul	1:30 p.m.	9.0 hours	
DLG.29	9 Jul	5:30 p.m.	to	11 Jul	3:30 p.m.	46.0 hours	
DLG.30	11 Jul	8:00 p.m.	to	12 Jul	4:00 a.m.	8.0 hours	
DLG.30	12 Jul	8:00 a.m.	to	12 Jul	5:00 p.m.	9.0 hours	
DLG.31	12 Jul	9:00 p.m.	to	13 Jul	5:00 a.m.	8.0 hours	
DLG.31	13 Jul	9:00 a.m.	to	13 Jul	5:30 p.m.	8.5 hours	
DLG.32	13 Jul	10:00 p.m.	to	14 Jul	6:00 a.m.	8.0 hours	
DLG.32	14 Jul	9:30 a.m.	to	14 Jul	6:00 p.m.	8.5 hours	
DLG.33	14 Jul	11:00 p.m.	to	15 Jul	7:30 a.m.	8.5 hours	
DLG.33	15 Jul	10:00 a.m.	to	15 Jul	8:00 p.m.	10.0 hours	[c]
DLG.34	16 Jul	12:00 a.m.	to				

-continued-

Table 19.–Page 2 of 4.

Number[a]	Start Date	Start Time		End Date	End Time	Effective time	
Nushagak District							
Nushagak Section							
Setnet							
DLG.05	19 Jun	1:00 a.m.	to	19 Jun	10:00 a.m.	9.0 hours	
DLG.06	19 Jun	10:00 a.m.	to	20 Jun	11:00 a.m.	25.0 hours	[d]
DLG.7	21 Jun	2:00 a.m.	to	21 Jun	10:00 a.m.	8.0 hours	
DLG.8	21 Jun	10:00 a.m.	to	22 Jun	2:00 a.m.	16.0 hours	[d]
DLG.8	22 Jun	2:30 p.m.	to	22 Jun	10:00 p.m.	7.5 hours	
DLG.9	22 Jun	10:00 p.m.	to	23 Jun	10:00 a.m.	12.0 hours	
DLG.10	23 Jun	3:00 p.m.	to	24 Jun	10:00 a.m.	19.0 hours	
DLG.11	25 Jun	4:00 a.m.	to	25 Jun	12:00 p.m.	8.0 hours	[d]
DLG.13	26 Jun	4:45 a.m.	to	26 Jun	12:30 p.m.	7.75 hours	
DLG.14	26 Jun	12:30 p.m.	to	26 Jun	11:30 p.m.	11.0 hours	
DLG.14	27 Jun	5:30 a.m.	to	27 Jun	1:00 p.m.	7.5 hours	
DLG.15	27 Jun	6:30 p.m.	to	28 Jun	12:30 a.m.	6.0 hours	
DLG.15	28 Jun	6:00 a.m.	to	28 Jun	1:30 p.m.	7.5 hours	
DLG.16	28 Jun	7:30 p.m.	to	29 Jun	2:00 p.m.	18.5 hours	
DLG.17	29 Jun	8:30 p.m.	to	30 Jun	3:30 a.m.	7.0 hours	
DLG.17	30 Jun	8:00 p.m.	to	30 Jun	2:30 p.m.	6.5 hours	
DLG.18	30 Jun	9:30 p.m.	to	1 Jul	4:30 a.m.	7.0 hours	
DLG.18	1 Jul	8:45 a.m.	to	1 Jul	3:30 p.m.	6.75 hours	
DLG.19	1 Jul	10:30 p.m.	to	2 Jul	6:00 a.m.	7.5 hours	
DLG.19	2 Jul	11:00 a.m.	to	2 Jul	4:15 p.m.	5.25 hours	
DLG.21	2 Jul	11:30 p.m.	to	3 Jul	7:00 a.m.	7.5 hours	
DLG.21	3 Jul	11:00 a.m.	to	3 Jul	5:30 p.m.	6.5 hours	
DLG.22	4 Jul	12:00 a.m.	to	4 Jul	8:00 a.m.	8.0 hours	
DLG.22	4 Jul	12:00 p.m.	to	4 Jul	6:00 p.m.	6.0 hours	
DLG.23	5 Jul	1:00 a.m.	to	5 Jul	9:00 a.m.	8.0 hours	
DLG.23	5 Jul	1:00 p.m.	to	5 Jul	7:00 p.m.	6.0 hours	
DLG.24	6 Jul	2:00 a.m.	to	6 Jul	10:00 a.m.	8.0 hours	
DLG.24	6 Jul	2:15 p.m.	to	6 Jul	8:00 p.m.	6.25 hours	
DLG.25	7 Jul	2:30 a.m.	to	7 Jul	10:30 a.m.	8.0 hours	
DLG.25	7 Jul	3:30 p.m.	to	7 Jul	21:00 p.m.	5.5 hours	
DLG.26	8 Jul	3:30 a.m.	to	8 Jul	11:30 a.m.	8.0 hours	
DLG.26	8 Jul	4:30 p.m.	to	8 Jul	10:30 p.m.	6.0 hours	
DLG.28	9 Jul	4:15 a.m.	to	9 Jul	12:00 p.m.	7.75 hours	
DLG.28	9 Jul	5:30 p.m.	to				[c]
Nushagak District							
Igushik Section							
Driftnet							
DLG.6	19 Jun	12:00 p.m.	to	19 Jun	8:00 p.m.	8.0 hours	
DLG.6	20 Jun	3:00 a.m.	to	20 Jun	8:00 a.m.	5.0 hours	
DLG.8	21 Jun	1:00 p.m.	to	21 Jun	9:00 p.m.	8.0 hours	

-continued-

Table 19.–Page 3 of 4.

Number[a]	Start Date	Start Time		End Date	End Time	Effective time	
DLG.9	22 Jun	2:00 p.m.	to	22 Jun	10:00 p.m.	8.0 hours	
DLG.10	23 Jun	2:00 p.m.	to	23 Jun	10:00 p.m.	8.0 hours	
DLG.11	24 Jun	3:00 p.m.	to	24 Jun	10:00 p.m.	7.0 hours	
DLG.13	25 Jun	4:00 p.m.	to	25 Jun	10:00 p.m.	6.0 hours	
DLG.14	26 Jun	5:00 p.m.	to	26 Jun	11:30 p.m.	6.5 hours	
DLG.14	27 Jun	7:30 a.m.	to	27 Jun	1:00 p.m.	5.5 hours	
DLG.15	27 Jun	8:30 p.m.	to	28 Jun	12:30 a.m.	4.0 hours	
DLG.15	28 Jun	7:00 a.m.	to	28 Jun	5:00 p.m.	10.0 hours	
DLG.16	28 Jun	9:30 p.m.	to	29 Jun	1:30 a.m.	4.0 hours	
DLG.16	29 Jun	9:00 a.m.	to	29 Jun	2:00 p.m.	5.0 hours	
DLG.17	29 Jun	8:30 p.m.	to	30 Jun	2:00 a.m.	5.5 hours	
DLG.17	30 Jun	9:30 a.m.	to	30 Jun	3:30 p.m.	6.0 hours	
DLG.18	30 Jun	10:30 p.m.	to	1 Jul	2:30 a.m.	4.0 hours	
DLG.18	1 Jul	10:30 a.m.	to	1 Jul	3:30 p.m.	5.0 hours	
DLG.19	1 Jul	11:30 p.m.	to	2 Jul	3:30 a.m.	4.0 hours	
DLG.19	2 Jul	11:00 a.m.	to	2 Jul	4:00 p.m.	5.0 hours	
DLG.21	3 Jul	12:30 a.m.	to	3 Jul	5:30 a.m.	5.0 hours	
DLG.21	3 Jul	12:00 p.m.	to	3 Jul	7:00 p.m.	7.0 hours	
DLG.22	4 Jul	1:30 a.m.	to	4 Jul	6:30 a.m.	5.0 hours	
DLG.22	4 Jul	1:00 p.m.	to	4 Jul	8:00 p.m.	7.0 hours	
DLG.23	5 Jul	1:30 a.m.	to	5 Jul	9:30 a.m.	8.0 hours	
DLG.23	5 Jul	2:00 p.m.	to	5 Jul	11:00 p.m.	9.0 hours	
DLG.24	5 Jul	1:00 p.m.	to	5 Jul	11:00 p.m.	10.0 hours	
DLG.24	6 Jul	2:30 a.m.	to	6 Jul	12:00 p.m.	5.5 hours	
DLG.24	6 Jul	2:30 p.m.	to	6 Jul	11:30 p.m.	9.0 hours	
DLG.25	7 Jul	2:30 a.m.	to	7 Jul	11:30 a.m.	9.0 hours	
DLG.25	7 Jul	3:30 p.m.	to	7 Jul	11:30 p.m.	8.0 hours	
DLG.26	8 Jul	3:30 a.m.	to	8 Jul	12:30 p.m.	9.0 hours	
DLG.26	8 Jul	4:30 p.m.	to	8 Jul	11:30 p.m.	7.0 hours	
DLG.28	9 Jul	4:30 a.m.	to	9 Jul	1:30 p.m.	9.0 hours	
DLG.29	9 Jul	5:30 p.m.	to	11 Jul	3:30 p.m.	46.0 hours	
DLG.30	11 Jul	8:00 p.m.	to	12 Jul	4:00 a.m.	8.0 hours	
DLG.30	12 Jul	8:00 a.m.	to	12 Jul	5:00 p.m.	9.0 hours	
DLG.31	12 Jul	9:00 p.m.	to	13 Jul	5:00 a.m.	8.0 hours	
DLG.31	13 Jul	9:00 a.m.	to	13 Jul	5:30 p.m.	8.5 hours	
DLG.32	13 Jul	10:00 p.m.	to	14 Jul	6:00 a.m.	8.0 hours	
DLG.32	14 Jul	9:30 a.m.	to	14 Jul	6:00 p.m.	8.5 hours	
DLG.33	14 Jul	11:00 p.m.	to	15 Jul	7:30 a.m.	8.5 hours	
DLG.33	15 Jul	10:00 a.m.	to	15 Jul	8:00 p.m.	10.0 hours	[c]
DLG.34	16 Jul	12:00 a.m.	to				

-continued-

Table 19.–Page 4 of 4.

Number[a]	Start Date	Start Time		End Date	End Time	Effective time	
Nushagak District							
Igushik Section							
Set Net							
DLG.02	13 Jun	8:00 a.m.	to	13 Jun	4:30 p.m.	8.0 hours	
DLG.02	14 Jun	8:30 a.m.	to	14 Jun	4:30 p.m.	8.0 hours	
DLG.02	15 Jun	9:30 a.m.	to	15 Jun	5:30 p.m.	8.0 hours	
DLG.03	16 Jun	10:00 a.m.	to	16 Jun	6:00 p.m.	8.0 hours	
DLG.03	17 Jun	10:30 a.m.	to	17 Jun	6:30 p.m.	8.0 hours	
DLG.03	18 Jun	11:30 a.m.	to	18 Jun	7:30 p.m.	8.0 hours	[d]
DLG.05	18 Jun	7:30 p.m.	to	20 Jun	9:30 p.m.	46 hours	[c]
DLG.07	20 Jun	9:30 p.m.	to				
Togiak District							
Drift and Set Net							
DLG.04	22 Jun	9:00 a.m.	to	24 Jun	9:00 a.m.	48.0 hours	[e]
DLG.12	29 Jun	9:00 a.m.	to	1 Jul	9:00 a.m.	48.0 hours	[e]

[a] Prefix code on emergency orders indicate where announcement originated ("DLG" for Dillingham field office).

[b] Gillnet mesh size 5.5 inches or less.

[c] Commercial fishing open until further notice.

[d] Extends current fishing period.

[e] Extends the weekly fishing schedule in Togiak River Section.

Table 20.–Inshore commercial catch and escapement of sockeye salmon, in numbers of fish, Bristol Bay, 2016.

District and River System		Catch	Escapement	Total Run
Naknek-Kvichak District				
Kvichak River		7,152,363	4,462,728	11,615,091
Alagnak River		3,233,234	1,775,820	5,009,054
Naknek River		3,080,649	1,691,910	4,772,559
	Total	13,466,246	7,930,458	21,396,704
Egegik District		8,739,699	1,837,260	10,576,959
Ugashik District [a]		6,630,231	1,635,270	8,265,501
Nushagak District				
Wood River		4,177,432	1,309,707	5,487,139
Igushik River		1,494,664	469,230	1,963,894
Nushagak River		2,437,701	680,513	3,118,214
	Total	8,109,797	2,459,450	10,569,247
Togiak District		645,797	200,046 [b]	845,843
Total Bristol Bay	Total	37,591,770	14,062,484	51,654,254

[a] Includes Ugashik River tower and aerial survey estimates from King Salmon and Dog Salmon rivers.

[b] Includes Negukthlik, Ungalikthluk, Osviak, Matogak, Quigmy, and Slug rivers.

Table 21.–Commercial salmon catch by date and species, in numbers of fish, Togiak District, Bristol Bay, 2016.

Date	Sockeye	Chinook	Chum	Pink	Coho	Total
6/14	6	2	12	0	0	20
6/15	48	0	8	0	0	56
6/16	180	2	25	0	0	207
6/17	39	2	14	0	0	55
6/18						
6/19						
6/20	601	15	133	0	0	749
6/21	1,953	109	533	0	0	2,595
6/22	2,187	97	656	0	0	2,940
6/23	40	5	94	1	0	140
6/24	153	6	400	3	0	[b]
6/25	48	0	23	0	0	71
6/26						
6/27	9,356	447	4,421	123	0	14,347
6/28	7,887	243	3,984	59	0	12,173
6/29	9,158	97	2,846	47	0	12,148
6/30	905	24	1,522	63	0	2,514
7/1	7,686	220	5,951	130	0	13,987
7/2	9,592	219	4,142	153	0	14,106
7/3						
7/4	36,869	377	15,173	651	0	53,070
7/5	20,934	253	8,325	252	0	29,764
7/6	26,294	220	10,058	361	0	36,933
7/7	15,599	133	4,953	350	0	21,035
7/8	27,304	241	10,161	550	0	38,256
7/9	16,206	114	5,489	326	0	22,135
7/10						
7/11	44,853	208	15,607	1,334	0	62,002
7/12	41,483	85	9,746	976	0	52,290
7/13	21,836	76	7,180	526	0	29,618
7/14	20,537	95	8,690	851	0	30,173
7/15	23,819	98	8,057	965	0	32,939
7/16	20,863	62	6,144	1,014	0	28,083
7/17						
7/18	23,601	50	7,571	1,977	0	33,199
7/19	24,014	32	4,731	1,693	0	30,470
7/20	28,916	61	7,683	3,473	3	40,136
7/21	23,945	32	6,221	4,188	0	34,386
7/22	7,351	15	1,779	1,973	0	11,118
7/23	877	4	180	544	0	[b]
7/24						

-continued-

Table 21.–Page 2 of 2.

Date	Sockeye	Chinook	Chum	Pink	Coho	Total
7/25	28,648	33	5,228	11,714	3	45,626
7/26	28,410	23	5,611	16,848	8	50,900
7/27	26,876	42	4,673	22,986	4	54,581
7/28	11,775	10	1,870	11,260	6	24,921
7/29	6,024	9	728	6,089	2	12,852
7/30						
7/31						
8/1	18,359	15	2,130	36,116	53	56,673
8/2	15,790	13	1,577	27,629	34	45,043
8/3	9,484	8	873	15,548	70	25,983
8/4	5,612	7	546	11,415	22	17,602
8/5	2,008	2	135	3,627	28	5,800
8/6						
8/7						
8/8	2,447	4	338	7,257	219	10,265
8/9	2,749	3	240	6,484	288	9,764
8/10	2,665	3	298	6,520	367	9,853
8/11	2,652	2	185	4,722	322	7,883
8/12	485	2	51	705	93	1,336
8/13	165	0	4	157	89	[a]
8/14						
8/15	930	1	130	1,220	587	2,868
8/16	1,295	2	101	1,275	856	3,529
8/17	717	1	39	936	276	1,969
8/18	685	2	49	519	770	2,025
8/19	428	0	37	465	564	1,494
8/20						
8/21						
8/22	418	0	28	204	1,133	1,783
8/23	815	1	59	484	1,523	2,882
8/24	599	0	32	186	981	1,798
8/25	378	1	17	162	476	1,034
8/26	243	3	17	79	569	911
Total	645,797	3,831	187,508	217,190	9,346	1,063,672

[a] Fewer than 4 permit holders involved in fishery; records are confidential.

Table 22.–Commercial salmon catch by date and species, in numbers of fish, Togiak River Section, Bristol Bay, 2016.

	Deliveries							
Date	Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
6/14	0	3	6	2	12	0	0	20
6/15	0	4	48	0	8	0	0	56
6/16	0	10	180	2	25	0	0	207
6/17	0	6	32	2	14	0	0	48
6/18								
6/19								
6/20	7	26	386	9	23	0	0	418
6/21	15	61	951	88	139	0	0	1,178
6/22	6	53	658	78	149	0	0	885
6/22								
6/23								
6/24								
6/25								
6/26								
6/27	79	142	3,415	264	2,237	42	0	5,958
6/28	79	211	3,972	298	2,769	68	0	7,107
6/29	29	138	2,290	118	1,221	44	0	3,673
6/30								
7/1	89	176	6,403	169	4,094	75	0	10,741
7/2	146	256	9,551	238	4,395	152	0	14,336
7/4	78	268	12,997	121	2,548	160	0	15,826
7/5	153	376	19,028	295	7,955	350	0	27,628
7/6	202	393	24,403	263	11,019	379	0	36,064
7/7	153	370	19,579	213	6,928	466	0	27,186
7/8	176	436	26,117	243	10,825	532	0	37,717
7/9	104	289	17,323	123	6,234	330	0	24,010
7/10								
7/11	136	293	19,886	98	7,089	528	0	27,601
7/12	176	317	25,227	100	8,847	760	0	34,934
7/13	157	397	27,059	116	9,126	902	0	37,203
7/14	154	429	25,368	109	9,761	898	0	36,136
7/15	123	375	21,188	94	7,446	734	0	29,462
7/16	113	346	20,919	63	6,256	956	0	28,194
7/17								
7/18	98	208	13,425	21	4,620	1,163	0	19,229
7/19	158	320	20,438	52	5,782	2,351	0	28,623
7/20	189	326	21,965	54	6,894	3,299	3	32,215
7/21	129	377	23,648	36	6,119	4,066	0	33,869
7/22	56	134	8,372	15	1,758	1,774	0	11,919

-continued-

Table 22.–Page 2 of 2.

	Deliveries							
Date	Drift	Set	Sockeye	Chinook	Chum	Pink	Coho	Total
7/23								
7/24								
7/25	143	337	23,047	26	4,337	9,301	3	36,714
7/26	154	345	20,146	17	4,024	12,118	7	36,312
7/27	117	326	13,981	19	2,658	12,824	1	29,483
7/28	164	466	19,268	27	3,157	17,200	6	39,658
7/29	41	133	5,801	6	698	4,722	0	11,227
7/30								
7/31								
8/1	80	276	11,992	10	1,462	22,398	15	35,877
8/2	109	353	15,476	12	1,577	25,964	30	43,059
8/3	78	299	9,892	11	875	19,224	42	30,044
8/4	44	217	7,147	7	646	13,083	21	20,904
8/5	5	53	1,777	1	144	2,581	5	4,508
8/6								
8/7								
8/8	59	114	1,924	3	279	6,094	187	8,487
8/9	18	173	2,519	2	216	5,074	111	7,922
8/10	16	143	2,467	2	254	6,612	386	9,721
8/11	11	117	2,232	3	185	4,254	278	6,952
8/12	3	58	1,037	2	85	1,636	165	2,925
8/13								
8/14								
8/15	26	70	615	1	58	704	374	1,752
8/16	28	117	1,500	1	160	1,509	687	3,857
8/17	20	59	795	2	52	1,201	650	2,700
8/18	23	59	717	2	49	536	778	2,082
8/19	15	37	414	0	29	465	524	1,432
8/20								
8/21								
8/22	29	71	418	0	28	204	1,133	1,783
8/23	32	124	815	1	59	484	1,523	2,882
8/24	20	99	598	0	32	186	955	1,771
8/25	11	62	379	1	17	162	502	1,061
8/26	4	33	243	3	17	79	569	911
Total	4,055	10,881	520,034	3,443	155,391	188,644	8,955	876,467

Table 23.–Commercial herring sac roe and spawn-on-kelp buyers in Togiak District, 2016.

		Sac Roe		
Operator/Buyer[a]	Base of Operation	Gillnet	Purse Seine	Spawn-on-Kelp
Icicle Seafoods	P/Vs R.M. Thorstensen, Gordon Jensen,	X	X	
North Pacific Seafoods	S/P Pedersen Pt., Red Salmon		X	
Silver Bay Seafoods	S/P Naknek		X	
Trident Seafoods	S/ P Naknek		X	

[a] Operators that registered in the Togiak District.

Table 24.–Daily observed estimates of spawn (in miles) and herring (in short tons) by index area, in the Togiak District, 2016.

				Estimated Biomass by Index Area [a]												
Date	Start Time	Survey Rating [b]	Miles of Spawn	NUS	KUK	MET	NVK	UGL	TOG	TNG	MTG	OSK	PYR	CPN	HAG	WAL	Daily Total
4/17	12:00	3.2	37.0				1,959	39	377		18	836					3,229
4/24	10:00	1.5	5.9	2,001	34,392	91	942	444	34,921	395	49	16					73,251
5/2	12:30	3.7	0.0	9,319	8,503	234	26	3,848	24,431	10,306	2						56,669
Total linear miles of spawn			42.9										Peak biomass estimate				73,251

Note: Blank cells represent days or sections where no biomass was observed.

[a] Index areas: NUS – Nushagak Peninsula; KUK – Kulukak; MET – Metervik; NVK – Nunavachak; UGL – Ungalikthluk; TOG – Togiak; TNG – Tongue Pt.; MTG – Matogak; OSK – Osviak; PYT – Pyrite Point; CPN – Cape Newenham; HAG – Hagemeister; WAL – Walrus Islands.

[b] Average survey rating for all sections surveyed: 1 = Excellent, 2 = Good, 3 = Fair, 4 = Poor, 5 = Unsatisfactory.

Table 25.–Emergency order commercial fishing periods for herring sac roe and spawn-on-kelp in the Togiak District, 2016.

EO #	Area [a]		Date and Time	
Herring Sac Roe Gillnet				
DLG-02	Egg Island Section		4/17	6:00 PM to end of season
DLG-03	Egg Island Section; Right Hand Point to 58° 50.50′	area change	4/24	2:00 PM
DLG-05	159° 47.25′ to 58° 50.50′	area change	4/24	8:00 PM
DLG-07	Egg Island Section; Right Hand Point to 58° 50.50′	area change	4/29	12:00 PM
DLG-09	159°30.00′ to and including Egg Island Section; Right Hand Point to 58° 50.50′	area change	4/30	12:00 PM
Herring Sac Roe Purse Seine				
DLG-01	Anchor Pt. to Right Hand Pt., Togiak Reef to Cape Newenham		4/17	6:00 PM to end of season
DLG-04	Anchor Pt. to 58° 50.50′, Togiak Reef to Cape Newenham	area change	4/24	2:00 PM
DLG-06	Anchor Pt. to 58° 50.50′, Togiak Reef to Cape Newenham, 159° 47.25′ eastward to longitude 159° 30.00′	area change	4/24	8:00 PM
DLG-08	Anchor Pt. to 58° 50.50′, Togiak Reef to Cape Newenham, east side of Egg Island Section to longitude 159° 30.00′	area change	4/29	12:00 PM
DLG-10	Anchor Pt. to 58° 50.50′, Togiak Reef to Cape Newenham	closure	4/30	12:00 PM
Herring Spawn on Kelp [b]				

[a] Area descriptions are approximate. Precise boundaries are described in emergency orders (EO).

[b] Fishery did not occur.

FIGURES

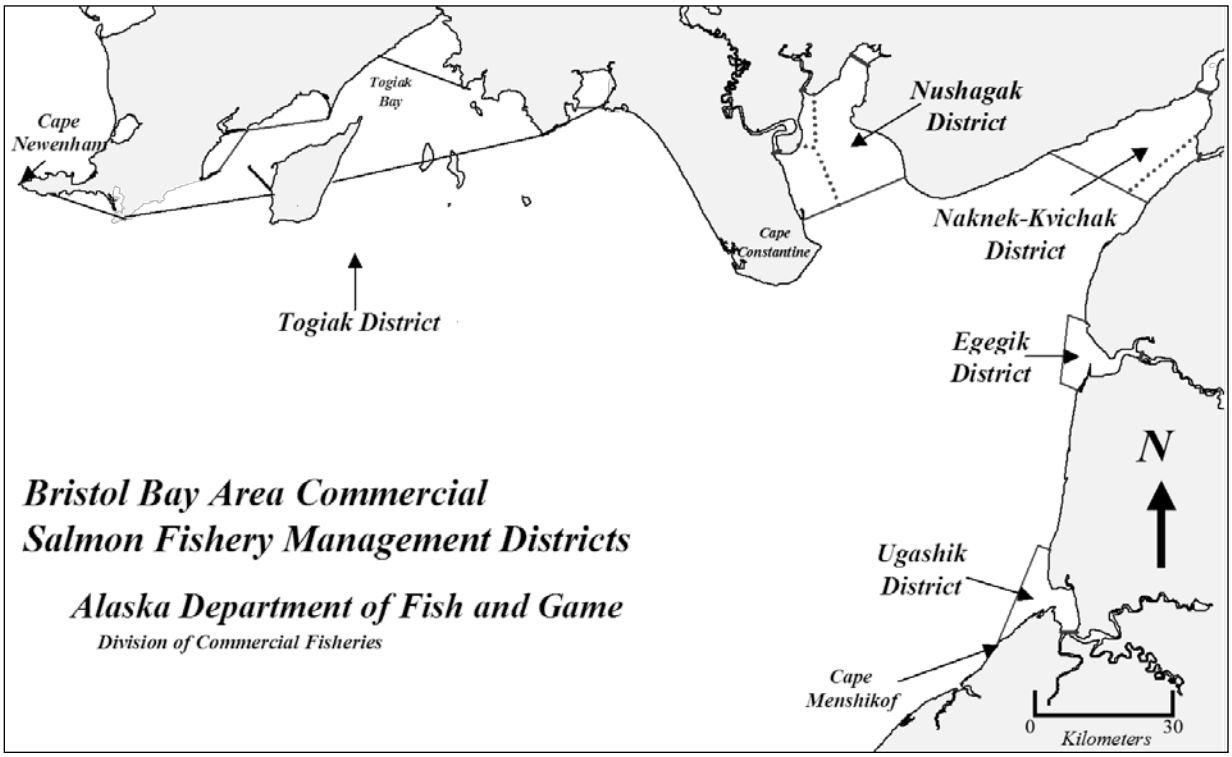


Figure 1.–Bristol Bay area commercial fisheries salmon management districts.

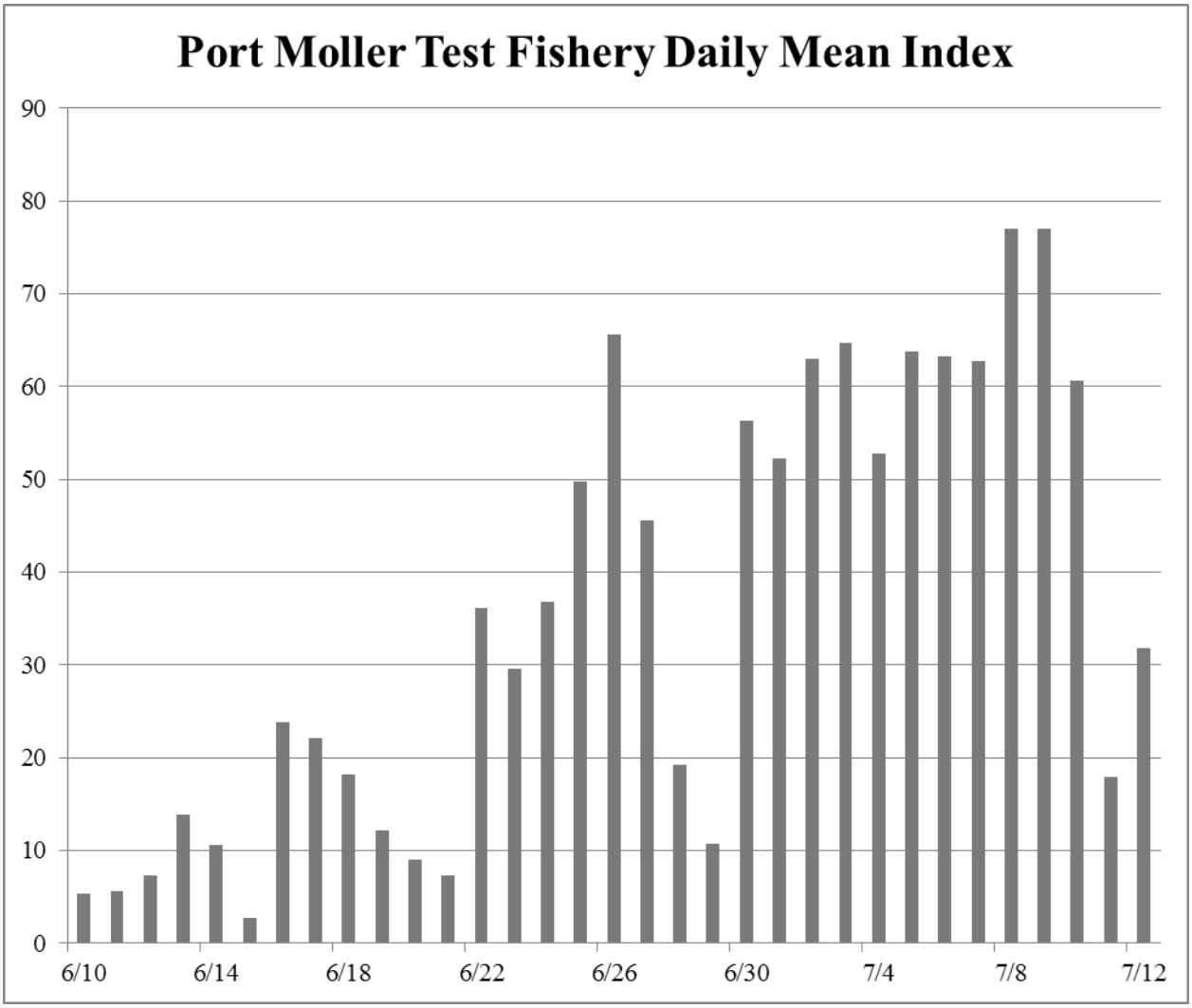


Figure 2.–Port Moller test fishery daily indices.

Note: Test fishery data from Scott Rayborn, BBSRI, Port Moller Project manager, Dillingham; personal communication.

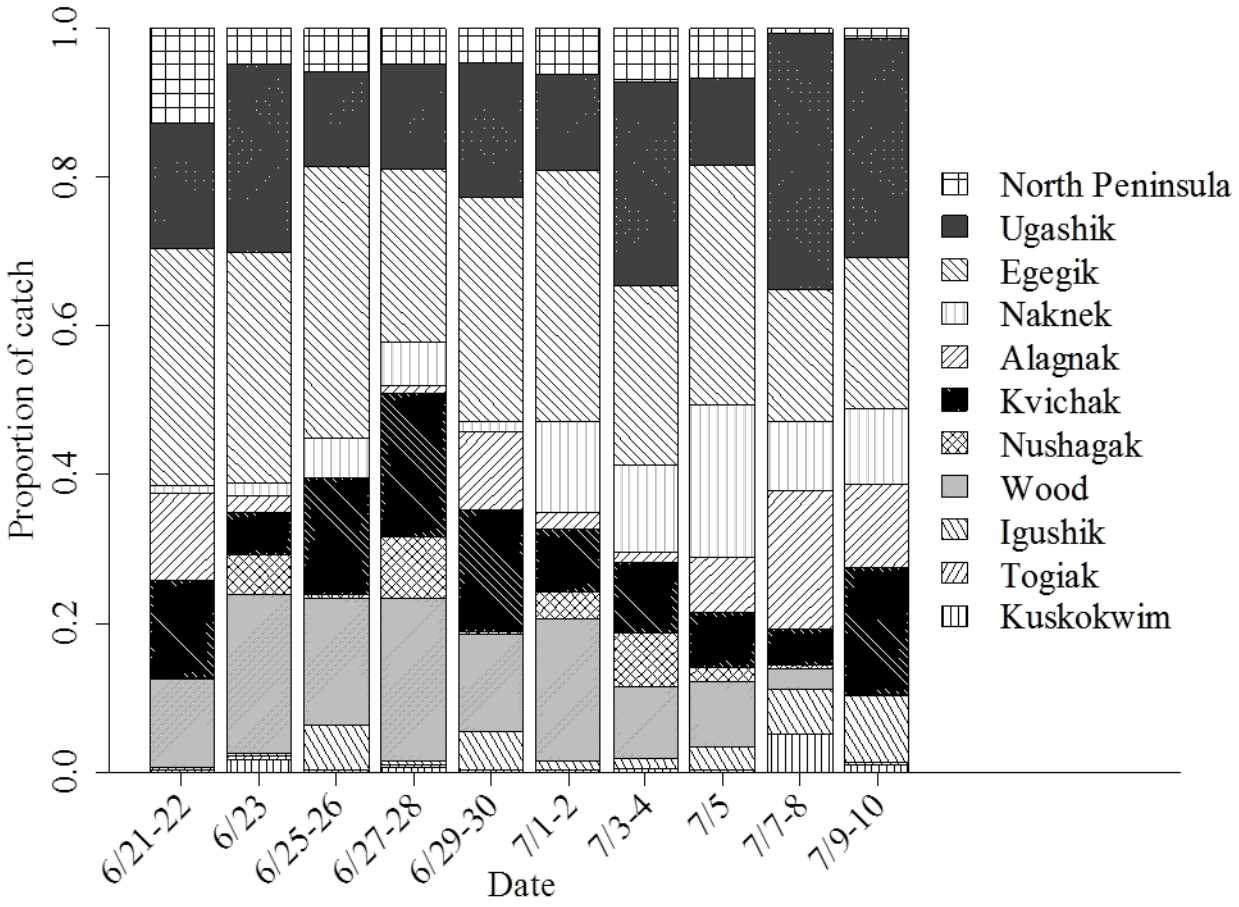


Figure 3.–Stock composition estimates for sockeye salmon sampled from the Port Moller Test Fishery, 2016.

Note: Mean stock composition estimates for the 11 reporting groups of the Bristol Bay baseline are depicted as stacked bar graphs for each of the 10 temporal periods analyzed in 2016. (Port Moller test fishery data available from ADF&G Gene Conservation Lab, Anchorage).

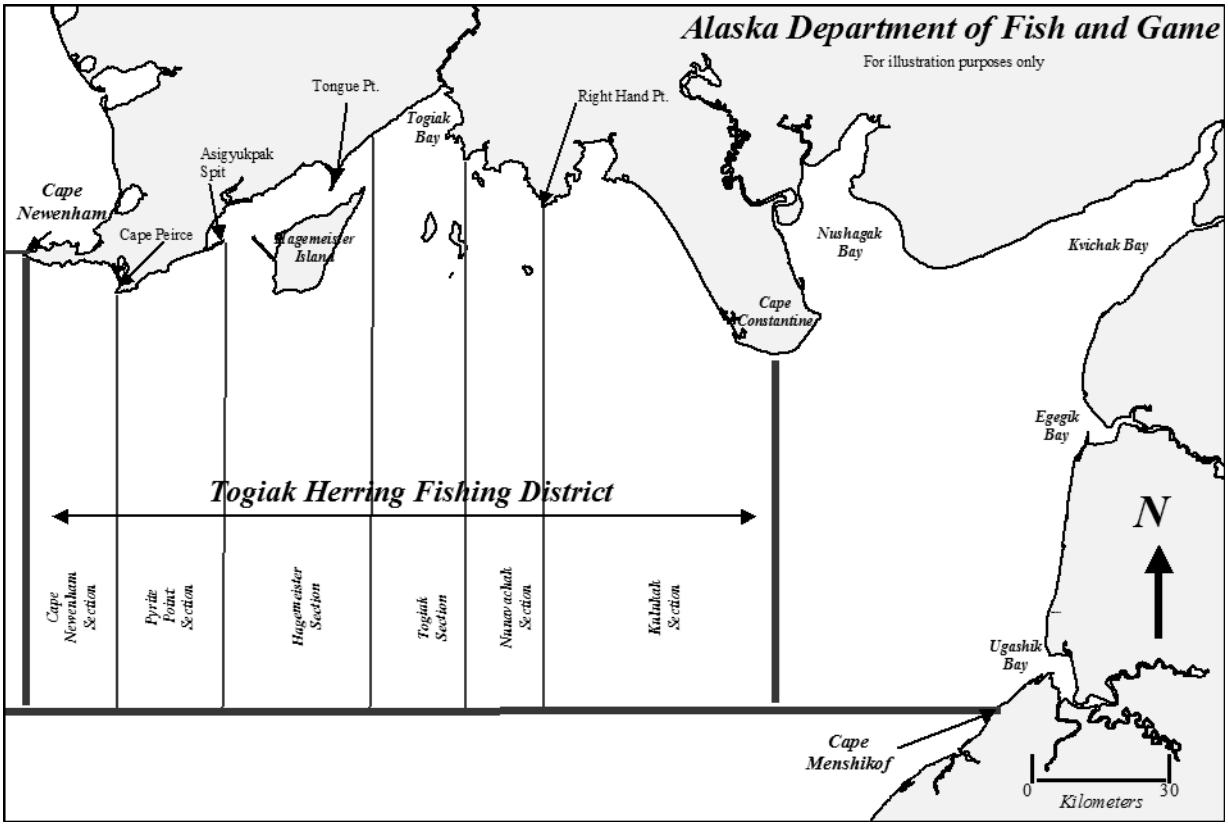


Figure 4.–Togiak Herring District, Bristol Bay.

APPENDIX A: SALMON

Appendix A1.–Escapement goal ranges and actual counts of sockeye salmon by river system, in thousands of fish, Bristol Bay, 1996–2016

	Kvichak River			Naknek River [a]		
	Range			Range		
Year	Lower	Upper	Actual	Lower	Upper	Actual
1996	4,000	6,000	1,451	800	1,400	1,078
1997	4,000	6,000	1,504	800	1,400	1,026
1998	2,000	10,000	2,296	800	1,400	1,202
1999	6,000	10,000	6,197	800	1,400	1,625
2000	6,000	10,000	1,828	800	1,400	1,375
2001	2,000	10,000	1,095	800	2,000	1,830
2002	2,000	10,000	704	800	2,000	1,264
2003	2,000	10,000	1,687	800	2,000	1,831
2004	2,000	10,000	5,500	800	2,000	1,939
2005	2,000	10,000	2,320	800	2,000	2,745
2006	2,000	10,000	3,068	800	2,000	1,953
2007	2,000	10,000	2,810	800	2,000	2,945
2008	2,000	10,000	2,758	800	1,400	2,473
2009	2,000	10,000	2,266	800	1,400	1,170
2010	2,000	10,000	4,207	800	1,400	1,464
2011	2,000	10,000	2,264	800	1,400	1,177
2012	2,000	10,000	4,164	800	1,400	900
2013	2,000	10,000	2,089	800	1,400	938
2014	2,800	10,000	4,459	800	1,400	1,474
2015	2,000	10,000	7,342	800	1,400	1,921
20-Year Avg.	2,640	9,600	3,000	800	1,610	1,617
1996-05 Avg.	3,200	9,200	2,458	800	1,700	1,592
2006-15 Avg.	2,080	10,000	3,543	800	1,520	1,642
2016	2,000	10,000	4,463	800	1,400	1,692

	Egegik River			Ugashik River		
	Range			Range		
Year	Lower	Upper	Actual	Lower	Upper	Actual
1996	800	1,400	1,076	500	1,200	668
1997	800	1,400	1,104	500	1,200	618
1998	800	1,400	1,111	500	1,200	891
1999	800	1,400	1,728	500	1,200	1,652
2000	800	1,400	1,032	500	1,200	620
2001	800	1,400	969	500	1,200	834
2002	800	1,400	1,036	500	1,200	892
2003	800	1,400	1,152	500	1,200	759
2004	800	1,400	1,290	500	1,200	776
2005	800	1,400	1,622	500	1,200	779
2006	800	1,400	1,465	500	1,200	978
2007	800	1,400	1,433	500	1,200	2,599
2008	800	1,400	1,260	500	1,200	569
2009	800	1,400	1,146	500	1,200	1,346
2010	800	1,400	927	500	1,200	805
2011	800	1,400	961	500	1,200	1,030
2012	800	1,400	1,234	500	1,200	671
2013	800	1,400	1,114	500	1,200	898
2014	800	1,400	1,382	500	1,200	640
2015	800	2,000	2,161	500	1,200	1,565
20-Year Avg.	800	1,430	1,260	500	1,200	980
1996-05 Avg.	800	1,400	1,212	500	1,200	849
2006-15 Avg.	800	1,460	1,308	500	1,200	1,110
2016	800	2,000	1,837	500	1,200	1,635

-continued-

Appendix A1.–Page 2 of 2.

	Wood River			Igushik River		
	Range			Range		
Year	Lower	Upper	Actual	Lower	Upper	Actual
1996	700	1,200	1,650	150	250	401
1997	700	1,200	1,512	150	250	128
1998	700	1,200	1,756	150	250	216
1999	700	1,200	1,512	150	250	446
2000	700	1,200	1,300	150	250	413
2001	700	1,500	1,459	150	300	410
2002	700	1,500	1,284	150	300	123
2003	700	1,500	1,460	150	300	194
2004	700	1,500	1,543	150	300	110
2005	700	1,500	1,497	150	300	366
2006	700	1,500	4,008	150	300	305
2007	700	1,500	1,528	150	300	415
2008	700	1,500	1,725	150	300	1,055
2009	700	1,500	1,319	150	300	514
2010	700	1,500	1,804	150	300	518
2011	700	1,500	1,098	150	300	421
2012	700	1,500	764	150	300	193
2013	700	1,500	1,183	150	300	387
2014	700	1,500	2,765	150	300	341
2015	700	1,800	1,941	150	400	651
20-Year Avg.	700	1,440	1,655	150	293	380
1996-05 Avg.	700	1,350	1,497	150	275	281
2006-15 Avg.	700	1,500	1,769	150	300	452
2016	700	1,800	1,310	150	400	469

	Nushagak River			Togiak River		
	Range			Range		
Year	Lower [b]	Upper	Actual [c]	Lower	Upper	Actual
1996	340	760	557	140	250	157
1997	340	760	413	100	200	132
1998	340	760	508	100	200	154
1999	235	760	345	100	200	156
2000	235	760	446	100	200	312
2001	340	760	897	100	200	297
2002	235	760	349	100	200	162
2003	340	760	642	100	200	232
2004	340	760	544	100	200	129
2005	340	760	1,107	100	200	149
2006	340	760	541	100	200	312
2007	340	760	518	120	270	270
2008	340	760	493	120	270	206
2009	340	760	484	120	270	314
2010	340	760	469	120	270	188
2011	340	760	428	120	270	191
2012	340	760	432	120	270	203
2013	370	840	895	120	270	128
2014	370	840	618	120	270	152
2015	370	900	797	120	270	219
20-Year Avg.	329	775	574	111	234	203
1996-05 Avg.	309	760	581	104	205	188
2006-15 Avg.	349	790	568	118	263	218
2016	370	900	1,226	120	270	200

[a] An optimal escapement goal of up to 2.0 million sockeye salmon was set by the Alaska Board of Fisheries (BOF) in 2001when fishing in the Naknek River special harvest area.

[b] An optimal escapement goal of 235,000 sockeye salmon was set by the BOF in 1999.

[c] Nushagak River sonar (at Portage Creek) escapement estimates prior to 2006 were adjusted after the 2012 season to account for a transition in sonar technology that occurred in 2006 (Buck et al. 2012).

Appendix A2.–Salmon entry permit registration by gear and residency, Bristol Bay, 1996–2016.

	Driftnet [a]						Setnet [a]						Total
Year	Resident	Non-Resident	Drift Total	Permits Fished	% Fished	Interim Use	Resident	Non-Resident	Set Total	Permits Fished	% Fished	Interim Use	Drift and Set [b]
1996	966	925	1,891	1,884	96%	70	760	257	1,017	941	92%	6	2,984
1997	959	940	1,899	1,875	95%	67	757	262	1,019	921	90%	7	2,992
1998	954	945	1,899	1,858	95%	55	756	259	1,015	901	88%	6	2,975
1999	937	961	1,898	1,847	95%	52	748	266	1,014	925	91%	6	2,970
2000	945	945	1,890	1,823	95%	38	735	277	1,012	921	90%	6	2,946
2001	958	925	1,883	1,566	82%	24	729	281	1,010	834	82%	2	2,919
2002	945	933	1,878	1,183	62%	16	717	289	1,006	680	67%	2	2,902
2003	923	944	1,867	1,389	74%	7	713	288	1,001	714	71%	1	2,876
2004	912	948	1,860	1,426	77%	3	703	286	989	797	81%	1	2,853
2005	895	967	1,862	1,526	82%	3	688	300	988	829	84%	1	2,854
2006	893	966	1,859	1,567	84%	1	683	302	985	844	86%	0	2,845
2007	881	981	1,862	1,621	87%	1	672	311	983	836	85%	0	2,846
2008	887	976	1,863	1,636	88%	0	678	302	980	850	87%	0	2,843
2009	864	999	1,863	1,642	88%	0	674	307	981	855	87%	0	2,844
2010	866	997	1,863	1,731	93%	0	672	311	983	861	88%	0	2,846
2011	1005	857	1,862	1,747	94%	0	660	321	981	878	90%	0	2,843
2012	849	1,013	1,862	1,740	93%	0	654	325	979	883	90%	0	2,841
2013	862	1,000	1,862	1,709	92%	0	646	332	978	854	87%	0	2,840
2014	848	1,015	1,863	1,751	94%	0	636	341	977	881	90%	0	2,840
2015	834	1,030	1,864	1,744	94%	0	639	336	975	885	91%	0	2,839
20-Year Avg.	909	963	1,873	1,663	88%	17	696	298	994	855	86%	2	2,885
1996-05 Avg.	939	943	1,883	1,638	85%	34	738	272	1,010	860	85%	5	2,931
2006-15 Avg.	879	983	1,862	1,689	91%	0	661	319	980	863	88%	0	2,843
2016	826	1,038	1,864	1,732	92%	0	637	336	973	858	88%	0	2,837

[a] Allowable gear per license/permit is measured in fathoms, 150 for drift and 50 for setnet.

[b] Includes interim use permits.

Appendix A3.–Sockeye salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1996	8,215,028	10,809,115	4,411,055	5,693,563	462,897	29,591,658
1997	589,311	7,517,389	1,402,690	2,506,818	142,569	12,158,777
1998	2,595,439	3,528,845	730,274	2,990,597	190,427	10,035,582
1999	9,452,972	7,388,080	2,256,007	6,175,419	385,411	25,657,889
2000	4,727,061	7,029,397	1,538,790	6,367,208	794,996	20,457,452
2001	5,280,538	2,872,662	480,509	4,734,800	810,096	14,178,605
2002	1,418,938	4,610,374	1,573,234	2,839,424	233,743	10,675,713
2003	3,348,504	2,291,502	1,748,934	6,665,965	706,008	14,760,913
2004	4,715,070	10,209,227	3,139,229	6,104,048	437,234	26,261,802[a]
2005	6,728,469	8,015,950	2,216,635	7,096,031	465,094	24,522,179
2006	7,151,741	7,408,983	2,429,637	10,876,552	626,442	28,493,355
2007	9,022,511	6,495,908	5,026,615	8,404,111	816,581	29,765,726
2008	10,381,844	7,403,885	2,334,022	6,903,157	651,315	27,674,223
2009	8,514,944	11,527,462	2,555,263	7,730,168	559,442	30,887,279
2010	10,858,209	5,070,816	4,031,832	8,424,030	667,850	29,052,737
2011	9,016,321	4,810,362	2,643,495	4,886,552	744,626	22,101,356
2012	10,152,917	5,062,390	2,418,653	2,663,014	622,909	20,919,883
2013	4,853,030	4,779,133	2,168,216	3,163,805	467,329	15,431,513
2014	13,791,290	6,928,621	1,511,416	6,448,463	443,287	29,127,035
2015	16,531,193	8,749,567	5,473,800	5,592,816	371,903	36,719,279
20-Year Avg.	7,367,267	6,625,483	2,504,515	5,813,327	530,008	22,747,955
1996-05 Avg.	4,707,133	6,427,254	1,949,736	5,117,387	462,848	18,004,308
2006-15 Avg.	10,027,400	6,823,713	3,059,295	6,509,267	597,168	27,017,239
2016	13,466,245	8,739,699	6,630,231	8,109,797	645,797	37,591,769

Appendix A4.–Chinook salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1996	4,273	1,012	596	72,123	8,603	86,607
1997	3,132	2,144	1,098	64,390	6,074	76,838
1998	2,722	795	347	117,820	14,132	135,816
1999	1,439	740	1,640	11,178	11,932	26,929
2000	1,077	1,067	893	12,120	7,862	23,019
2001	995	967	1,021	11,746	1,021	15,750
2002	1,002	284	623	40,039	2,801	44,749
2003	611	135	478	43,485	3,231	47,940
2004	1,496	1,632	891	96,759	9,310	114,280[a]
2005	1,458	486	1,818	62,764	10,759	77,285
2006	2,333	915	2,608	84,881	16,225	106,962
2007	1,520	528	1,473	51,831	7,769	63,121
2008	1,344	416	1,191	18,968	3,087	25,006
2009	1,026	308	948	24,693	4,602	31,577
2010	1,060	223	460	26,056	5,553	33,352
2011	1,962	567	372	26,927	6,731	36,559
2012	2,306	282	212	11,952	4,829	19,581
2013	1,360	144	52	10,213	2,718	14,487
2014	1,648	461	83	11,862	1,841	15,895
2015	2,926	753	226	49,945	2,663	56,513
20-Year Avg.	1,944	697	885	44,271	6,844	51,869
1996-05 Avg.	1,821	926	941	53,242	7,573	59,437
2006-15 Avg.	1,749	460	763	31,733	5,602	40,305
2016	2,797	1,144	1,435	23,783	3,831	32,990

[a] Total includes General District harvest of 4,624 fish.

Appendix A5.–Chum salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1996	97,582	85,153	106,169	331,494	206,233	826,631
1997	8,628	59,139	16,903	185,635	47,285	317,590
1998	82,281	29,405	8,088	208,551	67,345	395,670
1999	259,922	74,890	68,004	170,806	111,677	685,299
2000	68,218	38,777	36,349	114,456	140,175	397,975
2001	16,526	33,579	43,404	526,739	211,701	831,949
2002	19,189	23,516	35,792	276,787	112,987	468,271
2003	34,481	37,116	52,908	740,372	68,154	933,031
2004	29,972	75,061	49,358	458,916	94,025	732,481
2005	204,777	62,029	39,513	966,069	124,695	1,397,083
2006	457,855	153,777	168,428	1,240,235	223,364	2,243,659
2007	383,927	157,991	242,025	953,292	202,486	1,939,721
2008	237,260	92,901	135,292	492,341	301,967	1,259,761
2009	255,520	118,212	64,974	745,161	141,375	1,325,242
2010	337,911	57,324	62,987	424,234	118,767	1,001,223
2011	218,710	39,246	34,287	296,909	113,234	702,386
2012	133,959	35,375	31,352	272,163	206,614	679,463
2013	272,754	36,792	32,624	586,117	209,946	1,138,233
2014	87,188	33,173	19,677	242,261	100,195	482,531
2015	350,169	69,057	69,967	502,820	103,773	1,095,786
20-year Avg.	177,841	65,626	65,905	486,768	145,300	942,699
1996-05 Avg.	82,158	51,867	45,649	397,983	118,428	698,598
2006-15 Avg.	273,525	79,385	86,161	575,553	172,172	1,186,801
2016	237,035	74,641	72,534	397,761	187,508	969,479

Appendix A6.–Pink salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1996	4,590	22	21	2,681	30,308	37,622
1997	35	2	2	46	23	108
1998	11,317	674	247	6,787	6,406	25,431
1999	11	0	3	52	2	68
2000	19,659	32	4	38,309	695	58,699
2001	23	0	0	308	97	428
2002	10	1	1	204	311	527
2003	24	0	0	188	32	244
2004	7,749	0	187	26,150	18,293	52,380[a]
2005	32	0	1	554	2,108	2,695
2006	25,149	700	0	39,011	80,748	145,608
2007	9	9	2	384	533	937
2008	20,682	1,033	16	138,284	125,409	285,424
2009	23	0	1	320	544	888
2010	8,237	1,655	0	1,289,970	39,734	1,339,596
2011	13	0	5	257	352	627
2012	3,535	285	0	877,466	28,055	909,341
2013	467	0	0	208	187	862
2014	7,473	4,835	227	1,166,997	118,682	1,298,214
2015	112	0	2	807	1,219	2,140
20-Year Avg.	10,840	924	70	358,586	44,864	415,284
1996-05 Avg.	8,665	146	92	14,826	11,203	34,932
2006-15 Avg.	13,015	1,702	49	702,346	78,526	795,637
2016	12,058	343	1,498	537,525	217,190	768,614

Note: Averages include even-numbered years only.

Appendix A7.–Coho salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1996	3,601	38,156	13,163	11,401	58,978	125,299
1997	718	35,470	7,156	4,110	2,970	50,424
1998	1,587	29,856	13,007	22,703	58,688	125,841
1999	303	11,464	2,289	2,836	2,653	19,545
2000	952	13,166	1,269	112,852	2,758	130,997
2001	3	12,603	976	3,218	284	17,084
2002	0	7,099	464	93	754	8,410
2003	42	40,577	994	583	1,047	43,243
2004	2,142	2,324	4,744	47,706	15,463	72,379
2005	3,314	20,611	8,162	42,456	8	74,551
2006	5,163	26,788	3,087	44,385	449	79,872
2007	2,180	18,111	1,954	29,578	157	51,980
2008	7,059	29,682	2,220	76,932	1,159	117,052
2009	732	10,594	2,602	35,171	9,209	58,308
2010	901	9,984	407	72,909	24,065	108,266
2011	633	440	84	4,712	7,605	13,474
2012	431	2,493	0	97,382	15,977	116,283
2013	467	812	479	124,182	11,420	137,360
2014	646	11,473	435	242,604	32,134	287,292
2015	1,253	730	2,533	6,614	26,080	37,210
20-Year Avg.	1,606	16,122	3,301	49,121	13,593	83,744
1996-05 Avg.	1,637	23,466	7,077	21,480	20,711	74,371
2006-15 Avg.	1,947	11,111	1,380	73,447	12,826	100,710
2016	1,110	546	171	79,538	9,346	90,711

Appendix A8.–Total salmon commercial catch by district, in numbers of fish, Bristol Bay, 1996–2016.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak	Togiak	Total
1996	8,325,520	10,933,544	4,531,033	6,111,339	767,032	30,668,468
1997	602,061	7,614,359	1,427,849	2,761,086	198,926	12,604,281
1998	2,694,447	3,589,915	751,988	3,347,789	337,001	10,721,140
1999	9,715,807	7,475,451	2,328,047	6,360,934	511,689	26,391,928
2000	4,818,024	7,082,486	1,577,446	6,645,252	946,486	21,069,694
2001	5,299,384	2,919,874	526,114	5,277,729	1,032,116	15,055,217
2002	1,439,831	4,641,902	1,610,548	3,157,042	350,596	11,199,919
2003	3,385,814	2,369,459	1,804,199	7,452,178	778,472	15,790,122
2004	4,758,330	10,288,807	3,194,507	6,734,064	574,325	27,233,322
2005	6,940,395	8,099,368	2,266,400	8,168,138	602,660	26,076,961
2006	7,641,821	7,591,163	2,603,760	12,285,064	947,228	31,069,036
2007	9,414,797	6,674,941	5,272,187	9,440,219	1,027,528	31,829,672
2008	10,651,517	7,528,622	2,472,742	7,629,892	1,082,937	29,365,710
2009	8,774,759	11,658,846	2,623,819	8,774,759	714,804	32,546,987
2010	11,208,947	5,144,104	4,095,854	10,222,381	866,201	31,537,487
2011	9,240,963	4,853,480	2,678,405	5,216,149	872,551	22,403,764
2012	10,293,536	5,101,370	2,450,220	3,918,549	878,294	22,641,969
2013	5,127,632	4,816,881	2,201,371	3,884,525	691,600	16,722,009
2014	13,888,262	6,978,563	1,531,838	8,112,236	696,139	31,211,033
2015	16,885,517	8,819,956	5,546,460	6,152,464	505,638	37,910,035
20-Year Avg.	7,555,368	6,709,155	2,574,739	6,582,589	719,111	24,202,438
1996-05 Avg.	4,797,961	6,501,517	2,001,813	5,601,555	609,930	19,681,105
2006-15 Avg.	10,312,775	6,916,793	3,147,666	7,563,624	828,292	28,723,770
2016	13,719,245	8,816,373	6,705,869	9,148,404	1,062,091	39,453,563

Appendix A9.–Commercial sockeye salmon catch, in percent, by gear type and district, Bristol Bay, 1996–2016.

	Naknek-Kvichak										Nushagak								
		Setnet Sec.		NRSHA [a]		Egegik		Ugashik			Setnet Sec.			WRSHA[b]		Togiak		Total	
Year	Drift	Nak.	Kvi.	Drift	Set	Drift	Set	Drift	Set	Drift	Nush.	Igushik		Drift	Set	Drift	Set	Drift	Set
1996	83	17				90	10	95	5	81	19					52	55	88	12
1997	73	27				87	13	88	12	70	30					37	63	87	13
1998	84	8	8			86	14	85	15	72	24	4		76	24	43	57	86	14
1999	85	8	7			85	15	89	11	70	24	6		78	22	53	47	82	18
2000	84	11	5			84	16	87	13	77	17	6		68	32	57	43	80	20
2001	82	16	2	74 [c]	26 [c]	86	14	80	20	77	18	5				66	34	80	20
2002				64 [c]	36 [c]	85	15	88	12	77	22	1		67	33	62	38	79	21
2003	91	9	0	65 [c]	35 [c]	81	19	89	11	83	15	2				63	37	79	21
2004	79	11	10	88	12	86	14	88	12	84	15	1				55	45	79	21
2005				81	19	82	18	87	13	84	14	2				56	44	66	34
2006	86	8	5	81	19	84	16	88	12	87	11	2				53	47	85	15
2007	82	12	6	80	12	84	16	92	8	80	17	3				59	41	81	19
2008	81	12	7			85	15	92	8	79	16	5				60	40	82	18
2009	80	12	9			85	15	87	13	76	20	4				60	40	82	18
2010	81	10	9			84	16	90	10	78	17	6		71	29	61	39	82	18
2011	84	10	7			83	17	87	13	76	16	7				60	40	81	19
2012	85	7	8			83	17	90	10	67	27	6		45	55	67	33	73	27
2013	84	9	7			85	15	90	10	78	17	5				65	35	84	16
2014	83	9	8			89	11	82	18	73	16	7				58	42	82	18
2015	84	8	8			81	19	91	9	69	22	9				50	50	81	19
1996-05 Avg.	83	13	5	74	26	85	15	88	12	78	20	3		72	28	54	46	81	19
2006-15 Avg.	83	10	7	81	16	84	16	89	11	76	18	5		58	42	59	41	81	19
2016	83	8	9			82	18	91	9	67	22	11				50	50	81	19
Allocation [d]	84	8	8	84	16	86	14	90	10	74	20	6		74	26	NA	NA	NA	NA

Note: Blank cells indicate no data.

[a] Naknek River Special Harvest Area (NRSHA), Naknek-Kvichak District; allocation plan enacted in December 2003.

[b] Wood River Special Harvest Area (WRSHA), Nushagak District.

[c] NRSHA prior to allocation plan; fishing periods were alternated between gear types.

[d] The Alaska Board of Fisheries enacted allocation plan in 1998; reviewed in December 2003. Historical data prior to 1998 is based on postseason numbers. Inseason numbers are presented for 1998 to present because they were used to make management decisions regarding allocation.

Appendix A10.–Sockeye salmon escapement by district, in numbers of fish, Bristol Bay, 1996–2016.

Year	Naknek-Kvichak [a]	Egegik [b]	Ugashik [c]	Nushagak [d]	Togiak [e]	Total
1996	2,835,426	1,075,596	692,167	2,607,401 [f]	212,524	7,423,114
1997	2,747,511	1,104,004	656,641	2,061,085	171,373	6,740,614
1998	3,750,246	1,110,932	924,853	2,490,324	214,626	8,490,981
1999	8,303,878	1,727,772	1,662,042	2,302,934 [f]	231,196	14,227,822
2000	3,654,568	1,032,138	638,420	2,159,628 [f]	390,080	7,874,834
2001	3,194,708	968,872	866,368	2,765,440 [f]	338,616 [g]	9,102,876
2002	2,303,463	1,036,092	905,584	1,755,993 [f]	199,507	6,200,639
2003	5,627,974 [h]	1,152,120	790,202	2,295,963 [f]	261,851 [g]	10,128,110
2004	12,836,100 [h]	1,290,144	815,104	2,196,864 [f]	154,681 [g]	17,292,893
2005	9,283,980 [h]	1,621,734	799,612	2,968,962 [f]	155,778 [g]	14,830,066
2006	6,795,420 [h]	1,465,158	1,003,158	4,861,780 [f]	312,126 [i]	14,437,642
2007	8,221,926 [h]	1,432,500	2,599,186	2,461,579 [f]	269,646 [i]	14,984,837
2008	7,411,104 [h]	1,259,568	596,332	3,271,926 [f]	205,680 [i]	12,744,610
2009	4,406,424 [h]	1,146,276	1,364,338	2,317,569 [f]	313,946 [i]	9,548,553
2010	6,859,068 [h]	927,054	830,886	2,791,080 [f]	188,298 [i]	11,596,386
2011	4,325,220 [h]	961,200	1,029,853	1,947,577	190,970 [i]	8,454,820
2012	5,926,503	1,233,900	695,018	1,389,975	203,148 [i]	9,448,544
2013	4,122,686	1,113,630	898,110	2,465,791	128,118 [i]	8,728,335
2014	6,133,492	1,382,466	640,158	3,723,697	151,934 [i]	12,031,747
2015	15,033,216	2,160,792	1,564,638	3,389,330	218,700 [i]	22,366,676
20-Year Avg.	6,188,646	1,260,097	998,634	2,611,245	225,640	11,332,705
1996-05 Avg.	5,453,785	1,211,940	875,099	2,360,459	233,023	10,231,195
2006-15 Avg.	6,923,506	1,308,254	1,122,168	2,862,030	218,257	12,434,215
2016	7,930,458	1,837,260	1,635,270	2,459,450	200,046 [i]	14,062,484

[a] Includes counts from Kvichak tower, Alagnak aerial survey, and Naknek tower.

[b] Includes Egegik River. May include King Salmon River and Shosky Creek.

[c] Includes Ugashik River. Also includes Mother Goose River and Dog Salmon River systems in 1991–2004.

[d] Includes Wood, Igushik, Nuyakuk, Nushagak-Mulchatna, and Snake rivers. Nushagak River sonar escapement estimates prior to 2006 were adjusted after the 2012 season to account for a transition in sonar technology that occurred in 2006 (Buck et al. 2012).

[e] Includes aerial survey of Togiak River, Lake tributaries, Kulukak system, other miscellaneous river systems, and Togiak River tower count except where noted.

[f] Snake River not surveyed.

[g] Only partial and/or late aerial survey of Togiak streams.

[h] Includes Alagnak tower count.

[i] Togiak River tower count.

Appendix A11.–Inshore total run of sockeye salmon by district, in numbers of fish, Bristol Bay, 1996–2016.

Year	Naknek-Kvichak	Egegik	Ugashik	Nushagak [a]	Togiak	Total
1996	11,050,454	11,884,711	5,103,222	8,300,964	675,421	37,014,772
1997	3,336,822	8,621,393	2,059,331	4,567,903	313,942	18,899,391
1998	6,345,685	4,639,777	1,655,127	5,480,921	405,053	18,526,563
1999	17,756,850	9,115,852	3,918,049	8,478,353	616,607	39,885,711
2000	8,381,629	8,061,535	2,177,210	8,526,836	1,185,076	28,332,286
2001	8,475,246	3,841,534	1,346,877	7,500,240	1,148,712	22,312,609
2002	3,722,401	5,646,466	2,478,818	4,595,417	433,250	16,876,352
2003	8,976,478	3,443,622	2,539,136	8,961,928	967,859	24,889,023
2004	17,551,170	11,499,371	3,954,333	8,300,912	591,915	41,897,701
2005	16,012,449	9,637,684	3,016,247	10,064,993	620,872	39,352,245
2006	13,947,161	8,874,141	3,432,795	15,738,332	938,568	42,930,997
2007	17,244,437	7,928,408	7,625,801	10,865,690	1,086,227	44,750,563
2008	17,792,948	8,663,453	2,930,354	10,175,083	856,995	40,418,833
2009	12,921,368	12,673,738	3,919,601	10,047,737	873,388	40,435,832
2010	17,717,277	5,997,870	4,862,718	11,215,110	856,148	40,649,123
2011	13,341,541	5,771,562	3,673,348	6,834,129	935,596	30,556,176
2012	16,079,420	6,296,290	3,113,671	4,052,989	826,057	30,368,427
2013	9,148,587	5,950,083	3,070,893	5,648,098	621,670	24,439,331
2014	19,924,521	8,310,816	2,147,598	10,171,331	595,192	41,149,458
2015	31,565,141	10,631,593	7,038,933	8,983,050	590,604	58,809,321
20-Year Avg.	13,564,579	7,874,495	3,503,203	8,425,501	756,958	34,124,736
1996-05 Avg.	10,160,918	7,639,195	2,824,835	7,477,847	695,871	28,798,665
2006-15 Avg.	16,968,240	8,109,795	4,181,571	9,373,155	818,045	39,450,806
2016	21,396,703	10,576,959	8,265,501	10,569,247	845,843	51,654,253

[a] Reflects a 2012 adjustment of Nushagak River sonar escapement estimates prior to 2006 to account for a transition in sonar technology that occurred in 2006 (Buck et al. 2012).

Appendix A12.–Inshore commercial catch and escapement of sockeye salmon in the Naknek-Kvichak District by river system, in numbers of fish, Bristol Bay, 1996–2016.

		Escapement				
Year	Catch	Kvichak [a]	Alagnak		Naknek [a]	Total	Total Run
1996	8,215,474	1,450,578	306,750	[b]	1,078,098	2,835,426	11,047,409
1997	589,545	1,503,732	218,115	[b]	1,025,664	2,747,511	3,336,822
1998	2,596,490	2,296,074	252,200	[b]	1,202,172	3,750,446	6,345,885
1999	9,454,109	6,196,914	481,600	[b]	1,625,364	8,303,878	17,756,850
2000	4,728,095	1,827,780	451,300	[b]	1,375,488	3,654,568	8,381,629
2001	5,281,837	1,095,348	267,000	[b]	1,830,360	3,192,708	8,473,246
2002	1,419,630	703,884	335,661	[b]	1,263,918	2,303,463	3,722,401
2003	3,350,656	1,686,804	3,676,146	[a]	1,831,170	7,194,120	10,542,573
2004	4,716,715	5,500,134	5,396,592	[a]	1,939,374	12,836,100	17,551,170
2005	6,730,812	2,320,422	4,219,026	[a]	2,744,622	9,284,070	15,990,456
2006	7,151,741	3,068,226	1,773,966	[a]	1,953,228	6,795,420	13,949,170
2007	9,027,161	2,810,208	2,466,414	[a]	2,945,304	8,221,926	17,244,437
2008	10,385,172	2,757,912	2,180,502	[a]	2,472,690	7,411,104	17,792,948
2009	8,517,450	2,266,140	970,818	[a]	1,169,466	4,406,424	12,925,769
2010	10,861,016	4,207,410	1,187,730	[a]	1,463,928	6,859,068	17,720,084
2011	9,019,372	2,264,352	883,794	[a]	1,177,074	4,325,220	13,344,592
2012	10,152,917	4,164,444	861,747	[b]	900,312	5,926,503	16,079,420
2013	4,853,030	2,088,576	1,095,950	[b]	938,160	4,122,686	8,975,716
2014	13,791,053	4,458,540	200,500	[b]	1,474,428	6,133,468	19,924,521
2015	16,531,193	7,349,712	5,770,650	[b]	1,920,954	15,041,316	31,572,509
20-Year Avg.	7,368,673	3,000,860	1,649,823		1,616,589	6,267,271	13,633,880
1995-04 Avg.	4,708,336	2,458,167	1,560,439		1,591,623	5,610,229	10,314,844
2005-14 Avg.	10,029,011	3,543,552	1,739,207		1,641,554	6,924,314	16,952,917
2016	13,466,245	4,462,728	1,775,820		1,691,910	7,930,458	21,396,703

[a] Tower count.

[b] Aerial surveys estimates expanded by a factor of 2.55 (Clark 2005).

Appendix A13.–Inshore sockeye salmon total run by river system Naknek-Kvichak District, in thousands of fish, Bristol Bay, 1996–2016.

	Kvichak		Alagnak			Naknek		
Year	Number	%	Number	%		Number	%	Total Run [a]
1996	3,425	31	663	6	[b]	6,849	62	11,047
1997	1,669	50	234	7	[b]	1,402	42	3,337
1998	3,427	54	381	6	[b]	2,538	40	6,346
1999	12,963	73	1,065	6	[b]	3,729	21	17,757
2000	2,850	34	754	9	[b]	4,778	57	8,382
2001	1,440	17	424	5	[b]	6,609	78	8,473
2002	707	19	335	9	[b]	2,680	72	3,722
2003	2,003	19	2,530	24	[c]	6,010	57	10,543
2004	7,371	42	6,494	37	[c]	3,686	21	17,551
2005	2,878	18	5,277	33	[c]	7,835	49	15,990
2006	5,859	42	2,790	20	[c]	5,301	38	13,949
2007	4,311	25	4,311	25	[c]	8,794	51	17,244
2008	5,694	32	5,872	33	[c]	6,228	35	17,793
2009	5,558	43	2,714	21	[c]	4,653	36	12,926
2010	9,392	53	2,658	15	[c]	5,670	32	17,720
2011	7,073	53	2,002	15	[c]	4,270	32	13,345
2012	10,372	65	2,417	15	[b]	3,216	20	16,079
2013	4,587	51	2,377	26	[b]	2,249	25	8,976
2014	13,408	28	842	4	[b]	5,648	67	19,898
2015	15,466	49	11,629	37	[b]	4,471	14	31,566
20-Year Avg.	6,626	42	2,239	16		4,781	42	13,636
1995-04 Avg.	6,339	43	1,351	11		4,176	46	11,880
2005-14 Avg.	6,913	41	3,126	21		5,386	39	15,392
2016	11,615	54	4,857	23	[b]	4,925	23	21,397

[a] Due to rounding of river system total runs, district total run may not equal the sum of the rows.

[b] Total run is based on aerial survey estimate.

[c] Total run is based on tower count.

Appendix A14.–Inshore commercial catch and escapement of sockeye salmon in the Egegik District by river system, in numbers of fish, Bristol Bay, 1996–2016.

		Escapement			
Year	Catch	Egegik [a]	Shosky Cr. [b]	King Salmon River [b]	Total Run
1996	10,809,115	1,075,596			11,884,711
1997	7,461,533	1,103,964		40	8,565,537
1998	3,503,745	1,110,882		50	4,614,677
1999	7,383,750	1,727,772		625	9,112,147
2000	6,996,138	1,032,138			8,028,276
2001	2,836,555	968,862	10		3,805,427
2002	4,525,293	1,036,092			5,561,385
2003	2,253,721	1,152,030		90	3,405,841
2004	9,881,907	1,290,144			11,172,051
2005	8,015,950	1,621,584	0		9,637,534
2006	7,388,027	1,465,128	0		8,853,155
2007	6,474,027	1,432,500	0	1,500	7,908,027
2008	7,379,871	1,259,568	0	250	8,639,689
2009	11,527,282	1,146,276	0	4	12,673,562
2010	5,059,029	926,904		150	5,986,083
2011	4,806,939	961,200			5,768,139
2012	5,057,490	1,233,900		300	6,291,690
2013	4,779,133	1,113,630	[c]	[c]	5,892,763
2014	6,928,655	1,382,466	[c]	[c]	8,311,121
2015	8,325,956	2,160,792	[c]	[c]	10,486,748
20-Year Avg.	6,569,706	1,260,071	2	334	7,829,928
1996-05Avg.	6,366,771	1,211,906	5	201	7,578,759
2006-15 Avg.	6,772,641	1,308,236	0	441	8,081,098
2016	8,739,699	1,837,260	[c]	[c]	10,576,959

Note: Blank cells represent no survey conducted.

[a] Tower count.

[b] Aerial survey index count.

[c] No survey conducted.

Appendix A15.–Inshore commercial catch and escapement of sockeye salmon in the Ugashik District by river system, in numbers of fish, Bristol Bay, 1996–2016.

Year	Catch	Escapement			Total Run
		Ugashik [a]	King Salmon [b]	Dog Salmon [b]	
1996	4,411,084	667,518	7,230	17,419	5,103,251
1997	1,392,516	618,396	27,645	10,600	2,049,157
1998	716,814	890,508	27,425	6,920	1,641,667
1999	2,255,131	1,651,572	6,350	4,120	3,917,173
2000	1,517,236	620,040	12,900	5,480	2,155,656
2001	474,759	833,628	22,940	9,800	1,341,127
2002	1,570,418	892,104	11,460	2,020	2,476,002
2003	1,731,657	758,532	27,620	4,000	2,521,809
2004	3,077,745	776,364	22,850	15,890	3,892,849
2005	2,216,906	779,172	[c]	20,440	3,016,518
2006	2,428,334	978,718	[c]	24,440	3,431,492
2007	4,996,077	2,523,686	5,420	[c] 70,020	7,595,203
2008	2,319,790	588,632	[c]	7,700	2,916,122
2009	2,555,268	1,346,630	[c]	17,920	3,919,818
2010	4,031,625	805,686	[c]	25,200	4,862,511
2011	2,641,882	1,003,753	[c]	26,100	3,671,735
2012	2,415,580	670,578	8	24,432	3,110,598
2013	2,168,216	898,110	[c]	[c]	3,066,326
2014	1,507,440	640,158	[c]	[c]	2,147,598
2015	5,473,800	1,564,638	[c]	[c]	7,038,438
20-Year Avg.	2,495,114	975,421	15,623	17,206	3,493,753
1996-05 Avg.	1,936,427	848,783	18,491	9,669	2,811,521
2006-15 Avg.	3,053,801	1,102,059	2,714	27,973	4,175,984
2016	6,630,231	1,635,270	[c]	[c]	8,265,501

[a] Tower count plus aerial survey index count.

[b] Aerial survey index count.

[c] Not surveyed.

Appendix A16.–Inshore commercial catch and escapement of sockeye salmon in the Nushagak District by river system, in numbers of fish, Bristol Bay, 1996–2016.

		Escapement							
Year	Catch	Wood [a]	Igushik [a]	Nuyakuk [a]	Nush/Mul [b]	Nushagak [c]	Snake [d]	Total	Total Run
1996	5,693,594	1,649,598	400,746	250,692	306,365	557,057 [e]	[f]	2,607,401	8,300,995
1997	2,506,857	1,512,396	127,704	272,982	139,609	412,591 [e]	8,394	2,061,085	4,567,942
1998	2,991,841	1,755,768	215,904	146,250	361,282	507,532 [e]	11,120	2,490,324	5,482,165
1999	6,176,051	1,512,426	445,536	81,006	263,966	344,972 [e]	[f]	2,302,934	8,478,985
2000	6,367,502	1,300,026	413,316	129,468	316,818	446,286 [e]	[f]	2,159,628	8,527,130
2001	4,735,718	1,458,732	409,596	184,044	713,068	897,112 [e]	[f]	2,765,440	7,501,158
2002	2,839,918	1,283,682	123,156	68,928	280,227	349,155 [e]	[f]	1,755,993	4,595,911
2003	6,667,538	1,459,782	194,088	116,646	525,447	642,093 [e]	[f]	2,295,963	8,963,501
2004	6,104,492	1,543,342	109,650	77,406	466,466	543,872 [e]	[f]	2,196,864	8,301,356
2005	7,096,296	1,496,550	365,709	251,016	855,687	1,106,703 [e]	[f]	2,968,962	10,065,258
2006	10,876,552	4,008,102	305,268	170,760	377,650	548,410	[f]	4,861,780	15,738,332
2007	8,404,532	1,528,086	415,452	[g]	[g]	518,041	[f]	2,461,579	10,866,111
2008	6,903,367	1,724,676	1,054,704	[g]	[g]	492,546	[f]	3,271,926	10,175,293
2009	7,731,518	1,319,232	514,188	[g]	[g]	484,149	[f]	2,317,569	10,049,087
2010	8,424,702	1,804,344	518,040	[g]	[g]	468,696	27,135	2,818,215	11,242,917
2011	4,887,305	1,098,006	421,380	[g]	[g]	428,191	21,167	1,968,744	6,856,049
2012	2,663,014	764,211	193,326	[g]	[g]	432,438	2,000	1,391,975	4,054,989
2013	3,163,805	1,183,348	387,744	[g]	[g]	894,172	1,288	2,466,552	5,630,357
2014	6,447,650	2,764,614	340,590	[g]	[g]	618,477	[f]	3,723,681	10,171,331
2015	5,593,702	1,948,274	649,825	[g]	[g]	796,648	[f]	3,394,747	8,988,449
20-year Avg.	5,813,798	1,655,760	380,296	159,018	418,781	574,457	11,851	2,614,068	8,427,866
1996-05 Avg.	5,117,981	1,497,230	280,541	157,844	422,894	580,737	9,757	2,360,459	7,478,440
2006-15 Avg.	6,509,615	1,814,289	480,052	170,760	377,650	568,177	12,898	2,867,677	9,377,292
2016	8,109,797	1,309,707	469,230	[g]	[g]	680,513	[f]	2,459,450	10,569,247

Note: Blank cells represent no data.

[a] Tower count.

[b] Escapement estimates derived from the difference between Nushagak River sonar estimate and Nuyakuk tower count.

[c] Total escapements determined for the entire drainage using Nushagak River sonar estimate.

[d] Aerial survey estimate.

[e] No survey conducted.

[f] The Nuyakuk tower project was in operation from 1995 to 2006. There is no breakdown of Nuyakuk or Nush/Mul. River escapements outside of these years.

[g] Nushagak River sonar escapement estimates before 2006 were adjusted after 2012 to account for a transition in sonar technology occurring in 2006 (Buck et al. 2012).

Appendix A17.–Inshore sockeye salmon total run by river system, in thousands of fish and percent of total district run, Nushagak District, Bristol Bay, 1996–2016.

	Wood		Igushik		Nushagak[a,b]								Snake[c]		
	Total Run		Total Run		Nushagak Escapement					Catch	Total Run				
Year					Nuyakuk		Nush-Mul		Sonar	Total			Number	%	Total Run[d]
1996	5,007	60	1,481	18	251	45	306	55	557	1,256	1,813	22			8,301
1997	3,365	74	291	6	273	66	140	34	413	491	904	20	8	0.2	4,568
1998	3,901	71	571	10	146	29	362	71	508	490	998	18	11	0.2	5,481
1999	5,930	70	1,563	18	81	23	264	77	345	640	985	12			8,478
2000	5,278	62	1,748	21	129	29	317	71	446	1,054	1,500	18			8,526
2001	3,987	53	1,315	18	184	21	713	79	897	1,301	2,198	29			7,500
2002	3,715	81	207	5	69	20	280	80	349	325	674	15			4,596
2003	5,647	63	1,018	11	117	18	525	82	642	1,655	2,297	26			8,962
2004	5,375	65	564	7	77	14	467	86	544	1,801	2,345	28			8,284
2005	4,771	47	1,878	19	251	23	856	77	1,107	2,346	3,453	34			10,102
2006	11,064	70	1,435	9	171	31	377	69	548	2,690	3,238	21			15,737
2007	6,523	60	1,762	16					518	2,062	2,580	24			10,865
2008	5,236	56	2,394	26					493	1,152	1,645	18			9,275
2009	7,195	72	926	9					484	1,443	1,927	19			10,048
2010	7,698	66	1,365	12					469	2,153	2,622	22	27	0.2	11,712
2011	4,328	63	1,036	15					428	1,042	1,470	21	21	0.3	6,855
2012	2,449	60	703	17					432	469	901	22	2		4,055
2013	3,174	46	745	11					891	2,090	2,981	43			6,900
2014	7,521	74	992	10					618	1,040	1,658	16			10,171
2015	5,070	56	1,657	18					797	1,458	2,255	25			8,982
20-Year Avg.	5,362	64	1,183	14	159	29	419	71	574	1,348	1,922	23	14	0	8,470
1996-05 Avg.	4,698	65	1,064	13	158	29	423	71	581	1,136	1,717	22	10	0	7,480
2006-15 Avg.	6,026	62	1,302	14	171	31	377	69	568	1,560	2,128	23	17	0	9,460
2016	5,487	52	1,964	19					681	2,438	3,119	30			10,570

Note: Blank cells represent no data.

[a] The Nuyakuk Tower project was in operation from 1995 to 2006. There is no breakdown of Nuyakuk or Nush/Mul. River escapements outside of these years.

[b] Nushagak River sonar escapement estimates prior to 2006 were adjusted after the 2012 season to account for a transition in sonar technology that occurred in 2006 (Buck et al. 2012).

[c] Aerial survey count.

[d] Because of rounding, district total runs may not equal the sum of the rows. District total run is the sum of Wood, Igushik, Nushagak, and Snake River system total run numbers.

Appendix A18.–Inshore commercial catch and escapement of sockeye salmon in the Togiak District by river system, in numbers of fish, Bristol Bay, 1996–2016.

	Catch				Escapement						
					Togiak						
Year	Togiak	Kulukak	Os/Mat [a]	Total	Lake [b]	River [c]	Tributaries [d]	Kulukak [e]	Other [f]	Total	Total Run
1996	384,886	76,313	1,705	462,904	156,954	18,320	11,900	18,980	6,370	212,524	675,428
1997	91,639	47,979	2,951	142,569	131,682	12,300	8,325	7,950	11,116	171,373	313,942
1998	112,994	75,279	1,375	189,648	153,576	9,780	12,120	12,950	26,200	214,626	404,274
1999	346,750	38,662	0	385,412	155,898	10,800	29,438	12,300	22,760	231,196	616,608
2000	727,384	67,612	0	794,996	311,970	25,200	15,075	22,350	15,485	390,080	1,185,076
2002	214,240	19,032	471	233,743	162,402	4,100	12,075	8,500	12,430	199,507	433,250
2001 [g]	798,427	10,052	1,618	810,097	296,676	6,520	150	17,280	17,990	338,616	1,148,713
2003 [h]	650,066	55,081	861	706,008	232,302			8,004	21,545	261,851	967,859
2004 [g,h]	356,747	79,392	1,095	437,234	129,462	6,100	75		19,044	154,681	591,915
2005 [h]	411,042	54,052	0	465,094	149,178	5,580	1,020		3,713	159,491	624,585
2006 [i]	574,629	51,813	0	626,442	312,126					312,126	938,568
2007 [i]	758,736	57,845	0	816,581	269,646					269,646	1,086,227
2008 [i]	626,792	24,523	0	651,315	205,680					205,680	856,995
2009 [i]	516,955	42,504	0	559,459	313,946					313,946	873,388
2010 [i]	535,489	132,392	4	667,885	190,970					190,970	858,855
2011 [i]	625,423	118,664	547	744,634	188,298					188,298	932,932
2012 [i]	586,160	34,731	1,929	622,820	203,148					203,148	825,968
2013 [i]	425,407	34,692	7,230	467,329	128,118					128,118	595,447
2014 [i]	371,933	59,088	12,237	443,258	151,934					151,934	595,192
2015 [i]	313,200	45,331	13,372	371,903	218,700					218,700	590,603
20-Year Avg.	471,445	56,252	2,270	529,967	203,133	10,967	10,020	13,539	15,665	225,826	755,791
1996-05 Avg.	409,418	52,345	1,008	462,771	188,010	10,967	10,020	13,539	15,665	233,395	696,165
2006-15 Avg.	533,472	60,158	3,532	597,163	218,257					218,257	815,418
2016 [i]	522,187	101,554	22,056	645,797	200,046					200,046	845,843

Note: Blank cells represent no data.

[a] Catches in the Osviak and Matogak sections were combined.

[b] Tower count.

[c] Aerial survey estimate.

[d] Aerial survey estimate includes Gechiak, Pungokepuk, Kemuk, Nayorurun, and Ongivinuk river systems.

[e] Aerial survey estimate includes Kulukak River, Kulukak Lake, and Tithe Creek ponds.

[f] Aerial survey estimate includes Matogak, Osviak, Slug, Negukthlik, Ungalikthluk, and Quigmy rivers.

[g] Only the Ongivinuk River was surveyed in tributaries.

[h] Partial survey.

[i] No aerial surveys to assess sockeye salmon escapement conducted.

Appendix A19.–Chinook salmon harvest, escapement and total runs in the Nushagak District, in numbers of fish, Bristol Bay, 1996–2016.

	Harvests by Fishery				Inriver	Spawning	Total
Year	Commercial	Sport	Subsistence	Total	Abundance[a]	Escapement[b]	Run
1996	72,123	5,391	15,941	93,455	108,456	98,556	192,011
1997	64,390	3,497	15,318	83,205	170,610	82,000	165,205
1998	117,820	5,827	12,258	135,905	244,461	235,003	370,908
1999	11,178	4,237	10,057	25,472	129,686	122,059	147,531
2000	12,120	6,017	9,470	27,607	117,288	108,588	136,195
2001	11,746	5,899	11,760	29,405	191,988	182,632	212,037
2002	40,039	3,693	11,281	55,013	181,307	173,956	228,969
2003	43,485	5,590	18,686	67,761	166,507	155,085	222,846
2004	96,759	6,813	15,610	119,182	242,183	231,224	350,406
2005	62,764	8,565	12,529	83,858	234,123	223,034	306,892
2006	84,881	7,473	9,971	102,325	124,683	116,088	218,413
2007	51,831	9,669	13,330	74,830	60,464	48,644	123,474
2008	18,968	6,700	12,960	38,628	96,641	87,673	126,301
2009	24,693	6,354	12,737	43,784	81,480	72,100	115,884
2010	26,056	3,907	9,150	39,113	36,625 [c]	30,443	69,556
2011	26,927	4,844	12,461	44,232	59,728 [c]	51,068	95,300
2012	11,952	5,931	10,350	28,233	107,786 [c]	101,049	129,282
2013	10,213	6,685	11,602	28,500	113,709	104,746	133,246
2014	11,862	6,260	16,049	34,171	70,482	62,701	96,872
2015	50,675	7,234	12,117	70,026	98,019	89,286	159,312
20-Year Avg.	42,524	6,029	12,682	61,235	131,811	118,797	180,032
1996-05 Avg.	53,242	5,553	13,291	72,086	178,661	161,214	233,300
2006-15 Avg.	31,806	6,506	12,073	50,384	84,962	76,380	126,764
2016	23,783	6,191 [d]	12,516 [d]	42,490	125,368	116,195	158,685

[a] Inriver abundance estimated by sonar below the village of Portage Creek. Estimates prior to 2006 were adjusted after the 2012 season to account for a transition in sonar technology that occurred in 2006 (Buck et al. 2012).

[b] Spawning escapement estimated from the following: 1997 - from comprehensive aerial surveys; 1993–1996, 1998–2013 - from inriver abundance estimated by sonar minus inriver harvests.

[c] Inseason management count. Revised passage estimates for 2010, 2011, and 2012 are 60,185, 108,278, and 174,085, respectively.

[d] Data not available at the time of publication; 5-year average used.

Appendix A20.–Chinook salmon harvest, escapement and total runs in the Togiak River drainage, in numbers of fish, Bristol Bay, 1996–2016.

	Harvests by Fishery				Spawning		Total	
Year	Commercial	Sport [a]	Subsistence	Total	Escapement [b]		Run	
1996	8,114	790	471	9,375	8,299		17,674	
1997	5,365	1,165	667	7,197	10,300		17,497	
1998	12,867	763	782	14,412	9,856		24,268	
1999	10,830	644	1,244	12,718	9,520		22,238	
2000	7,258	470	1,116	8,844	11,813		20,657	
2001	9,518	1,006	1,612	12,136	13,110		25,246	
2002	2,682	76	703	3,461	9,515		12,976	
2003	3,078	706	1,208	4,992	3,050	[c]		[d]
2004	7,673	1,388	1,094	10,155	12,324		22,479	
2005	10,125	1,734	1,528	13,387	10,200		23,587	
2006	15,078	1,064	1,630	17,772		[e]		[d]
2007	7,142	1,501	1,234	9,877	0	[c]		[d]
2008	2,891	592	1,337	4,820	2,140	[c]		[d]
2009	4,429	606	827	5,862		[e]		[d]
2010	5,160	591	1,162	6,913	10,096	[f]	17,009	
2011	5,780	871	966	7,617	2,140		9,757	
2012	4,357	859	951	6,167	1,503		7,670	
2013	2,458	900	691	4,049		[e]		[d]
2014	1,477	2,166	607	4,250	3,994		8,244	
2015	2,448	983	815	4,246	2,922		7,168	
20-Year Avg.	6,853	924	1,014	8,790	7,674		18,121	
1995-04 Avg.	7,815	759	935	9,509	10,039		20,826	
2005-14 Avg.	5,890	1,088	1,093	8,071	4,296		13,253	
2016	3,831	1,156 [g]	806 [g]	5,793	2,922		8,715	

[a] Sport fish harvest estimate only includes the Togiak River section.

[b] Spawning escapement estimated from comprehensive aerial surveys.

[c] Partial survey.

[d] Total run size cannot be determined in the absence of complete escapement data.

[e] No survey conducted due to poor weather/pilot availability.

[f] USFWS radiotelemetry-derived escapement estimate.

[g] Data not available at the time of publication. 5-year average used.

Appendix A21.–Inshore commercial catch and escapement of chum salmon in the Nushagak and Togiak Districts, in numbers of fish, 1996–2016.

	Nushagak District			Togiak District		
Year	Catch	Escapement [a]	Total Run	Catch	Escapement [b]	Total Run
1996	331,494	285,648	617,142	206,233	117,240	323,473
1997	185,635	78,011	263,646	47,285	106,580	153,865
1998	208,551	379,818	588,369	67,345	102,455	169,800
1999	170,806	307,586	478,392	111,677	116,183	227,860
2000	114,456	179,394	293,850	140,175	80,860 [c]	[d]
2001	526,739	716,850	1,243,589	211,701	252,610	464,311
2002	276,787	533,095	809,882	112,987	154,360	267,347
2003	740,372	374,992	1,115,364	68,154	39,090 [c]	[d]
2004	458,916	360,265	819,181	94,025	103,810	197,835
2005	966,069	519,618	1,485,687	124,695	108,346	233,041
2006	1,240,235	661,003	1,901,238	223,364	26,900 [c]	[d]
2007	953,292	161,483	1,114,775	202,486	[e]	[d]
2008	492,341	326,300	818,641	301,967	279,580 [c]	[d]
2009	745,161	438,481	1,183,642	141,375	[e]	[d]
2010	424,234	273,914	698,148	118,767	[e]	[d]
2011	296,909	248,278	545,187	113,234	[e]	[d]
2012	272,163	364,499	636,662	206,614	[e]	[d]
2013	340,881	623,326	628,134	208,786	[e]	[d]
2014	242,261	552,797	795,058	100,195	[e]	[d]
2015	502,981	288,929	791,910	103,773	[e]	[d]
20-Year Avg.	474,514	383,714	841,425	145,242	124,001	101,877
1996-05 Avg.	397,983	373,528	771,510	118,428	118,153	203,753
2006-15 Avg.	551,046	393,901	911,340	172,056	153,240	0
2016	397,761	419,810	817,571	187,508	[e]	[d]

[a] Escapement based on estimates from the Nushagak River sonar project at Portage Creek. Estimates prior to 2006 were adjusted after the 2012 season to account for a transition in sonar technology that occurred in 2006 (Buck et al. 2012).

[b] Escapement estimates based on aerial surveys.

[c] Partial survey count.

[d] Total run cannot be determined; escapement information incomplete or unavailable.

[e] Chum salmon spawning escapement survey did not occur.

Appendix A22.–Average round weight (in pounds) of the commercial salmon catch by species, Bristol Bay, 1996–2016.

Year	Sockeye	Chinook	Chum	Pink	Coho
1996	6.3	18.0	7.3	3.5	6.8
1997	6.0	16.4	7.3	3.4	6.3
1998	5.7	17.7	6.4	3.3	8.4
1999	5.3	14.3	6.7	3.2	6.4
2000	6.1	15.7	6.9	3.7	7.6
2001	6.7	17.4	8.2	2.8	7.1
2002	6.1	18.2	7.1	3.8	6.8
2003	6.3	16.0	6.5	4.0	6.9
2004	5.8	15.4	6.6	4.1	6.8
2005	6.3	16.6	7.1	3.5	6.3
2006	5.7	17.0	7.7	3.7	6.4
2007	5.8	13.5	6.1	3.5	6.4
2008	5.8	15.5	6.5	3.6	6.5
2009	5.9	15.2	6.3	3.3	6.5
2010	5.5	14.7	6.4	3.2	8.9
2011	6.2	13.0	7.0	3.2	6.8
2012	5.7	13.9	6.7	3.1	5.4
2013	6.0	15.3	6.4	3.9	6.0
2014	5.6	15.4	6.1	3.7	6.4
2015	5.2	15.1	6.1	3.7	6.7
20-Year Avg.	5.9	15.7	6.8	3.5	6.8
1996-05 Avg.	6.1	16.6	7.0	3.5	6.9
2006-15 Avg.	5.7	14.9	6.5	3.5	6.6
2016	5.4	12.6	6.0	4.0	5.8

Appendix A23.–Average price paid (in dollars/pound) for salmon, by species, Bristol Bay, 1996–2016.

Year	Sockeye	Chinook	Chum	Pink	Coho
1996	0.81	0.51	0.11	0.05	0.31
1997	0.90	0.52	0.10	0.07	0.50
1998	1.22	0.62	0.10	0.08	0.48
1999	0.84	0.53	0.10	0.09	0.72
2000	0.67	0.46	0.09	0.08	0.41
2001	0.42	0.31	0.11	0.09	0.33
2002	0.49	0.33	0.09	0.06	0.32
2003	0.51	0.32	0.08	0.07	0.27
2004	0.51	0.37	0.09	0.09	0.31
2005	0.62	0.58	0.11	0.02	0.29
2006	0.66	0.71	0.12	0.03	0.38
2007	0.67	0.64	0.13	0.03	0.41
2008	0.75	0.83	0.17	0.17	0.55
2009	0.80	0.89	0.17	0.07	0.56
2010	1.07	1.18	0.28	0.36	0.66
2011	1.17	1.04	0.37	0.29	0.74
2012	0.97	1.31	0.34	0.39	0.55
2013	1.50	1.48	0.30	0.14	0.79
2014	1.34	1.32	0.41	0.24	0.84
2015	0.64	0.56	0.30	0.06	0.39
20-Year Avg.	0.83	0.73	0.18	0.12	0.49
1996-05 Avg.	0.70	0.46	0.10	0.07	0.39
2006-15 Avg.	0.96	1.00	0.26	0.18	0.59
2016 [a]	.0.76	0.67	0.32	0.15	0.49

Source: OCEANAK ADF&G Commercial Operators Annual Report (COAR) By Subject Area. ADF&G is not responsible for errors or deficiencies in reproduction, subsequent analysis, or interpretation.

Note: The exvessel value includes any postseason adjustments or bonuses paid after the fish was purchased. Prices represent a weighted average price per pound by species and area. Prices may reflect a mixture of gear types and delivery conditions.

[a] Price does not include postseason adjustments or bonuses.

Appendix A24.–Estimated exvessel value of the commercial salmon catch by species, in thousands of dollars, Bristol Bay, 1996–2016.

Year	Sockeye	Chinook	Chum	Pink [a]	Coho	Total [b]
1996	150,968	754	606	7	336	152,671
1997	65,743	652	198		183	66,777
1998	70,529	1,414	234	7	503	72,688
1999	114,504	207	407		97	115,215
2000	83,940	165	232	16	403	84,756
2001	40,395	132	679		40	41,246
2002	31,899	272	290	0	19	32,479
2003	47,993	249	482		77	48,801
2004	77,897	647	398	19	158	79,119
2005	96,650	738	962		154	98,503
2006	90,233	1,330	1,350	19	178	93,110
2007	119,196	542	1,583		120	121,441
2008	109,904	298	1,271	158	288	111,919
2009	127,615	400	1,291		162	129,468
2010	180,818	464	1,711	1,565	469	185,027
2011	135,655	430	1,604		37	137,726
2012	113,777	254	831	339	155	115,356
2013	138,884	327	2,185		653	142,049
2014	217,151	312	1,233	1,180	1,614	221,490
2015	123,328	332	1,993		101	125,754
20 Year Avg.	106,854	496	977	331	287	108,780
1996-05 Avg.	78,052	523	449	10	197	79,226
2006-15 Avg.	135,656	469	1,505	652	378	138,334
2016	152,751	293	1,889	452	264	155,649

Note: Value paid to fishermen is derived from price per pound multiplied by commercial catch.

[a] Includes even-numbered years only.

[b] Total may vary from actual sum because of rounding.

Appendix A25.–South Unimak and Shumigan Island preseason sockeye allocation and actual sockeye and chum salmon harvest in thousands of fish, Alaska Peninsula, 1996–2016.

	South Unimak			Shumigan Island			Total		
	Sockeye			Sockeye			Sockeye		
Year	Actual	Quota [a]	Chum	Actual	Quota [a]	Chum	Actual	Quota [a]	Chum
1996	572	2,564	129	446	566	228	1,018	3,130	357
1997	1,179	1,840	196	449	406	126	1,628	2,246	322
1998	975	1,529	195	314	336	50	1,289	1,865	245
1999	1,106	1,024	187	269	226	58	1,375	1,250	245
2000	892	1,650	169	359	363	70	1,251	2,013	239
2001	271		185	130		149	401		334
2002	356		201	235		178	591		379
2003	336		121	117		161	453		282
2004	532		131	816		357	1,348		488
2005	437		144	567		282	1,004		426
2006	491		96	441		204	932		300
2007	738		153	852		144	1,023		297
2008	1,064		285	650		126	1,714		411
2009	594		201	573		496	1,167		697
2010	488		100	331		171	819		271
2011	937		231	422		192	1,359		423
2012	900		212	628		181	1,528		393
2013	1,049		189	508		208	1,557		397
2014	413		208	252		181	665		389
2015	618		42	497		136	1,115		178
20-yr Avg.	697	1,721	169	443	379	185	1,112	2,101	354
1996-05 Avg.	666	1,721	166	370	379	166	1,036	2,101	332
2006-15 Avg.	729		172	515		204	1,188		376
2016	848		140	414		122	1,262		262

Note: Blank cells represent no data.

[a] Sockeye salmon quota management system used from 1992 to 2000. The system was based on 8.3% of the Bristol Bay projected inshore harvest and traditional harvest patterns.

Appendix A26.–Subsistence salmon harvest by species, in numbers of fish, by district and location fished, Bristol Bay, 2016.

Area and river system	Number of permits issued[a]	Estimated salmon harvest					
		Chinook	Sockeye	Coho	Chum	Pink	Total
Naknek-Kvichak District	486	678	69,720	796	263	126	71,583
Naknek River Subdistrict	286	604	30,305	792	234	126	32,062
Kvichak River/Iliamna Lake Subdistrict:	199	70	39,279	0	28	0	39,377
Igiugig	1	1	43	0	3	0	47
Iliamna Lake-General	39	0	5,570	0	0	0	5,570
Kijik	4	0	550	0	0	0	550
Kokhanok	18	57	6,416	0	25	0	6,498
Kvichak River	19	0	2,220	0	0	0	2,220
Lake Clark	62	0	6,111	0	0	0	6,111
Levelock	6	10	398	0	0	0	408
Newhalen River	39	0	10,974	0	0	0	10,974
Pedro Bay	17	0	2,419	0	0	0	2,419
Pile Bay	1	2	320	0	0	0	322
Six Mile Lake	14	0	4,258	0	0	0	4,258
Naknek or Kvichak (Site Unknown)	3	4	136	3	0	0	144
Egegik District	32	150	1,253	353	38	13	1,806
Ugashik District	20	53	935	217	8	0	1,214
Nushagak District	591	12,117	25,240	5,644	2,953	295	46,248
Igushik/Snake River	31	102	2,753	331	28	19	3,233
Nushagak Bay Commercial	56	767	1,857	555	281	13	3,473
Nushagak Bay Noncommercial	178	2,863	6,685	1,872	826	190	12,436
Nushagak River	127	4,651	4,247	1,307	1,072	56	11,333
Site Unknown	34	689	737	173	170	7	1,776
Wood River	206	3,046	8,960	1,405	576	10	13,997
Togiak District	48	876	2,387	650	312	23	4,249
Total	1,169	13,874	99,535	7,659	3,573	458	125,100

Source: ADF&G Division of Subsistence.

Note: Harvests are extrapolated for all permits issued, based on those returned and on the area fished as recorded on the permit. Because of rounding, the sum of columns and rows may not equal the estimated total. Of 1,158 permits issued for the management area, 1,031 were returned (89.0%).

[a] Sum of sites may exceed district totals, and sum of districts may exceed area total, because a permit holder may use more than 1 site.

Appendix A27.–Subsistence salmon harvest by district and species, Bristol Bay, 1996–2016

Year	Permits Issued	Sockeye	Chinook	Chum	Pink	Coho	Total
Naknek Kvichak District							
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
20-Year Avg.	493	69,259	1,022	452	511	906	72,151
1996-05 Avg.	514	70,860	1,428	621	641	1,061	74,611
2006-15 Avg.	471	67,658	616	283	382	752	69,692
2016 [a]	477	67,509	615	256	226	589	69,195
Egegik District							
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	2,265
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
20-Year Avg.	40	1,809	91	65	18	467	2,450
1996-05 Avg.	45	2,234	88	100	28	631	3,080
2006-15 Avg.	36	1,384	95	31	8	304	1,821
2016 [a]	37	1,455	95	20	6	272	1,848

-continued-

Year	Permits Issued	Sockeye	Chinook	Chum	Pink	Coho	Total
Ugashik District							
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
20-Year Avg.	21	1,150	48	21	14	277	1,509
1996-05 Avg.	25	1,379	60	25	12	352	1,829
2006-15 Avg.	18	920	35	17	15	202	1,189
2016 [a]	18	713	34	9	0	182	939
Nushagak District							
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	49,498
2012	517	20,587	10,350	3,072	1,309	2,642	37,960
2013	584	30,283	11,602	4,368	206	7,717	54,176
2014	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
20-Year Avg.	533	24,842	12,682	3,826	974	5,026	47,349
1996-05 Avg.	528	24,368	13,291	3,716	935	4,977	47,288
2006-15 Avg.	538	25,317	12,073	3,935	1,012	5,074	47,411
2016 [a]	560	26,238	12,516	3,836	830	5,842	49,261

-continued-

Year	Permits Issued	Sockeye	Chinook	Chum	Pink	Coho	Total
Togiak District							
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	2,576	1,612	367	61	388	6,590
2002	36	2,890	703	605	10	241	3,878
2003	92	2,357	1,208	483	451	883	7,428
2004	46	2,221	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	355	408	5,613
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
20-Year Avg.	56	2,868	1,034	480	97	368	4,980
1996-05 Avg.	53	2,345	1,042	426	97	334	4,508
2006-15 Avg.	60	3,392	1,026	533	98	403	5,452
2016 [a]	58	3,879	815	523	74	436	5,728
Total Bristol Bay Area							
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	1,062	107,778	15,484	3,972	796	4,870	132,901
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	1,129	100,935	14,083	3,793	332	7,494	126,637
2012	1,107	100,728	12,136	4,007	1,874	3,837	122,582
2013	1,162	98,765	12,858	5,173	333	8,635	125,764
2014	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
20-Year Avg.	1,138	100,644	14,926	4,831	1,568	7,063	129,032
1996-05 Avg.	1,163	101,450	15,923	4,890	1,712	7,355	131,329
2006-15 Avg.	1,116	99,493	13,849	4,797	1,513	6,741	126,393
2016 [a]	1,145	99,794	14,074	4,645	1,137	7,322	126,972

Note: The sum of columns and rows may not equal the estimated total because of rounding. Harvests extrapolated over areas based on permits returned.

[a] 5-year average was used because data were not available at the time of publication.

Appendix A28.–Subsistence harvest of sockeye salmon by community, in numbers of fish, Kvichak River drainage, Bristol Bay, 1996–2016.

Year	Levelock	Igiugig	Pedro Bay	Kokhanok	Iliamna-Newhalen [a]	Nondalton	Port Alsworth	Other [b]	Total
1996	1,120	2,309	5,219	14,011	14,787	11,856	3,263	2,307	54,872
1997	1,062	2,067	5,501	8,722	19,513	17,194	2,348	3,101	59,508
1998	2,454	1,659	3,511	10,418	16,165	13,136	2,678	3,635	53,656
1999	1,276	1,608	5,005	10,725	14,129	17,864	4,282	2,834	57,723
2000	1,467	1,981	1,815	7,175	6,679	11,953	3,200	2,720	36,990
2001	908	779	2,118	9,447	8,132	7,566	1,958	1,901	32,808
2002	625	2,138	2,687	9,847	9,417	5,508	1,201	1,578	33,001
2003	737	1,081	2,135	9,771	13,824	8,016	1,370	1,591	38,495
2004	1,000	1,026	4,803	11,869	21,652	8,789	2,455	1,631	53,225
2005	914	1,017	4,162	16,801	12,010	8,824	2,457	2,078	48,263
2006	0	1,252	4,319	19,028	11,487	8,885	2,418	2,461	49,850
2007	102	1,803	5,487	15,105	11,453	7,902	3,211	2,410	47,473
2008	30	1,558	4,884	14,755	13,569	8,916	3,307	2,544	49,563
2009	759	1,457	7,802	15,759	9,871	5,709	3,155	2,260	46,772
2010	940	2,901	5,609	13,973	8,815	3,185	3,250	2,015	40,688
2011	933	1,931	3,898	9,895	15,433	7,947	4,026	1,163	45,226
2012	750	2,608	4,028	16,530	12,933	9,247	4,420	1,855	52,370
2013	984	345	3,971	13,392	7,632	10,550	3,377	2,305	42,556
2014	1,170	513	3,999	6,440	11,388	9,004	4,296	4,206	41,016
2015	398	1,153	2,519	8,098	9,691	8,722	6,588	2,207	39,377
20-Yr. Avg	881	1,559	4,174	12,088	12,429	9,539	3,163	2,340	46,172
96-05 Avg.	1,156	1,567	3,696	10,879	13,631	11,071	2,521	2,338	46,854
06-15 Avg.	607	1,552	4,651	13,297	11,227	8,007	3,805	2,343	45,489
2016 [c]	847	1,310	3,683	10,871	11,415	9,094	4,541	2,347	44,109

Note: Harvests are extrapolated over areas for all permits issued, based on those returned. Harvest estimates based on community of residence and include fish caught only in the Naknek-Kvichak District.

[a] Includes Chekok.

[b] Subsistence harvests by non-Kvichak River watershed residents.

[c] 5-year average was used as 2015 data were not available at the time of publishing.

Appendix A29.–Subsistence salmon harvest by community, Nushagak District, Bristol Bay, 1996–2016.

Year	Dillingham[a]	Manokotak	Aleknagik	Ekwok	New Stuyahok	Koliganek	Other[b]	Total
1996	27,161	3,883	1,733	2,866	8,892	3,319	2,113	49,967
1997	23,255	3,988	1,989	1,797	6,427	4,179	4,598	46,233
1998	24,072	4,069	1,112	3,555	5,419	3,166	4,958	46,351
1999	26,502	3,413	1,532	1,805	4,556	2,772	5,389	45,969
2000	27,931	3,173	1,111	3,946	3,715	2,792	2,362	45,029
2001	26,435	3,700	2,129	2,218	7,294	2,209	4,096	48,080
2002	25,004	3,254	1,517	2,735	6,043	3,098	3,247	44,897
2003	26,955	4,214	2,044	2,291	10,817	5,721	3,034	55,076
2004	23,308	2,052	2,206	1,891	6,714	3,619	3,364	43,154
2005	21,898	1,576	1,795	1,388	9,673	8,422	3,088	47,841
2006	22,184	1,655	2,048	1,499	6,160	3,886	2,941	40,373
2007	25,237	2,442	1,382	1,267	8,284	3,054	3,278	44,944
2008	27,446	5,429	3,309	1,902	5,690	4,423	3,196	51,395
2009	30,184	2,068	2,646	2,345	6,855	3,700	3,502	51,300
2010	22,903	2,665	1,570	1,380	5,608	2,406	3,259	39,791
2011	26,850	1,433	3,016	1,805	7,980	3,539	4,875	49,498
2012	22,037	1,212	2,457	1,253	5,062	2,834	3,105	37,960
2013	26,302	1,375	2,368	2,448	11,104	7,290	3,290	54,176
2014	31,838	1,658	3,560	2,700	7,613	4,654	6,403	58,425
2015	26,049	2,946	2,186	1,618	2,860	2,085	8,504	46,248
20-Yr. Avg.	25,678	2,810	2,085	2,135	6,838	3,858	3,930	47,335
96-05 Avg.	25,252	3,332	1,717	2,449	6,955	3,930	3,625	47,260
06-15 Avg.	26,103	2,288	2,454	1,822	6,721	3,787	4,235	47,411
2016[c]	26,615	1,725	2,717	1,965	6,923	4,080	5,235	49,261

Note: Harvests are extrapolated over areas for all permits issued based on those returned. Harvest estimates are based on community of residence and include fish caught only in the Nushagak District.

[a] Includes Portage Creek, Clarks Point, and Ekuk.

[b] Subsistence harvests by non-watershed residents.

[c] A 5-year average was used because current data were not available at the time of publishing.

APPENDIX B: HERRING

Appendix B1.–Sac roe herring industry participation, fishing effort, and harvest, Togiak District, 1996–2016.

	Number	Daily	Gillnet					Purse Seine				
Year	of Buyers	Processing Capacity [a]	Fishery Dates	Effort [b]	Duration (hours)	Harvest [c]	Roe %	Effort [b]	Duration (hours)	Harvest [c]	Roe %	Total Harvest [c]
1996	19	4,850	5/3-5/8	461	18.0	6,863	11.1	268	2.4	18,008	9.0	24,871
1997	18	4,200	5/2-5/6	336	24.0	5,164	11.8	231	6.4	18,649	9.4	23,813
1998	15	2,475	4/29-5/10	152	46.0	5,952	12.5	123	16.5	16,824	9.6	22,776
1999	12	2,400	5/18-5/26	171	28.0	4,858	11.5	96	4.7	14,368	9.2	19,226
2000	12	2,100	5/6-5/14	227	67.0	5,464	10.6	90	15.8	14,957	10.1	20,421
2001	11	2,255	5/6-5/13	96	84.0	6,491	10.6	64	26.0	15,879	9.2	22,370
2002	8	1,920	5/3-5/13	82	102.0	5,216	10.9	37	57.5	11,833	9.3	17,049
2003	7	1,920	4/25-5/7	75	142.0	6,505	10.9	35	110.2	15,158	8.9	21,663
2004	6	2,150	4/29-5/9	54	162.0	4,980	10.4	31	78.0	13,888	9.5	18,868
2005	8	2,330	4/30-5/8	56	149.0	5,841	11.2	33	83.0	15,071	9.6	20,912
2006	7	2,060	5/12-5/21	49	143.9	7,132	10.8	28	113.0	16,821	9.2	23,953
2007	5	1,420	5/10-5/25	25	366.0	4,012	11.2	21	244.0	13,120	10.0	17,132
2008	7	1,950	5/16-5/31	27	312.0	4,832	11.4	28	292.0	15,691	8.4	20,523
2009	6	2,015	5/16-5/31	32	314.0	4,140	10.2	21	266.0	12,967	10.3	17,107
2010	6	2,690	5/11-5/27	35	338.0	7,540	10.1	26	266.0	18,816	9.7	26,356
2011	5	2,413	5/8-5/31	25	318.0	5,907	12.1	22	268.0	16,970	9.6	22,877
2012	4	1,970	5/14-6/1	18	534.0	4,027	12.1	16	328.0	12,994	9.4	17,021
2013	6	2,675	5/11-5/28	37	408.0	8,244	10.9	26	224.0	19,366	9.0	27,610
2014	6	3,065	4/27-5/13	24	412.0	6,016	11.9	17	412.0	19,544	9.7	25,560
2015	4	1,880	4/27-5/11	6	328.0	1,156	11.1	16	328.0	20,240	11.3	21,396
20-year Avg.	9	2,437		99	215	5,517	11	61	157	16,058	10	21,575
1996-05 Avg.	12	2,660		171	82	5,733	11	101	40	15,464	9	21,197
2006-15 Avg.	6	2,214		28	347	5,301	11	22	274	16,653	10	21,954
2016	4	2,530	4/17-5/2	3	366.0	80	12.2	17	306.0	14,799	12.3	14,879

[a] Number of tons per day based on companies registered.

[b] Total vessels fished.

[c] Harvest total includes dead loss and test fishery harvest.

Appendix B2.–Exploitation of Togiak herring stock, 1996–2016.

Year	Biomass Estimate[a] (short tons)	S-O-K Herring Equivalent	Dutch Harbor Food/Bait	Sac Roe				Total Harvest	Exploitation Rate
				Gillnet[b]	Purse Seine[c]	Waste[d]	Total[e]		
1996	135,585	1,899	2,239	6,863	18,008		24,871	29,009	21.4%
1997	125,000		1,950	5,164	18,298	350	23,462	25,412	20.3%
1998	121,000		1,994	5,952	16,424	400	22,376	24,370	20.1%
1999	124,946	1,605	2,398	4,858	14,170	198	19,028	23,031	18.4%
2000	130,904		2,014	5,464	14,857	100	20,321	22,335	17.1%
2001	119,818		1,439	6,491	15,660	219	22,151	23,590	19.7%
2002	120,196	260	2,846	5,216	11,793	40	17,009	20,115	16.7%
2003	126,213	55	1,487	6,505	14,778	380	21,283	22,825	18.1%
2004	143,124		1,258	4,980	13,785	103	18,765	20,023	14.0%
2005	108,585		1,154	5,841	14,287	784	20,128	21,282	19.6%
2006	129,976		953	7,132	16,321	500	23,453	24,406	18.8%
2007	134,566		1,214	4,012	12,800	320	16,812	18,026	13.4%
2008	136,495		1,536	4,832	15,691		20,523	22,059	16.2%
2009	121,800		1,941	4,140	12,967		17,107	19,048	15.6%
2010	146,775		1,938	7,540	18,816		26,356	28,294	19.3%
2011	140,860		1,795	5,907	16,970		22,877	24,672	17.5%
2012	123,745		1,807	4,027	12,994		17,021	18,828	15.2%
2013	169,020		1,764	8,243	19,366	1,593	27,609	29,373	17.4%
2014	157,448		1,645	6,016	19,544	54	25,560	27,205	17.3%
2015	163,480		1,972	1,156	20,240	500	21,396	23,368	14.3%
20-year Avg.	133,977	955	1,767	5,517	15,888	396	21,405	23,364	17.5%
1996-04 Avg.	125,537	955	1,878	5,733	15,206	286	20,939	23,199	18.5%
2006-15 Avg.	142,417		1,657	5,301	16,571	593	21,871	23,528	16.5%
2016	162,244		208	80	14,799		14,879	15,087	9.3%

Note: Blank cells represent no data. SOK = spawn-on-kelp.

[a] Preseason forecast unless peak biomass estimate inseason exceeded preseason forecast.

[b] Includes bait harvest.

[c] Includes test fishery harvest.

[d] Aerial survey estimated waste.

[e] Does not include waste.

Appendix B3.–Age composition, by weight, of total inshore herring run, Togiak District, 1996–2016

	Age Composition (%)						Spawning Biomass [a]
Year	≤ 4	5	6	7	8	≥ 9	(short tons)
1996	[b]	3	5	7	21	64	[c]
1997	7	5	12	11	10	55	144,887
1998	[b]	4	5	10	11	70	[c]
1999	[b]	1	13	9	12	65	157,028
2000	[b]	1	2	17	16	63	c
2001	5	21	5	4	27	39	115,155
2002	1	25	28	4	5	36	[c]
2003	[b]	3	37	25	4	31	[c]
2004	[b]	b	3.8	43.7	24.6	27.5	[c]
2005	[b]	b	0.8	11	41.4	46.4	156,727
2006	1.8	5.4	2.8	5.4	25.9	58.7	176,288
2007	0.7	7.3	15.5	5.5	9.4	61.7	134,221
2008	6.2	9	14.6	15.5	8.1	46.5	136,495
2009	9.4	14.7	14.5	14.9	12.2	34	142,133
2010	1.4	16.1	18.1	13.2	13.2	38.3	135,214
2011	[b]	4	25.3	21.7	15.7	33.3	[c]
2012	0.5	6.6	16.9	35.8	17.6	22.7	167,738
2013	0.1	2	9.6	24.7	28.8	34.8	169,020
2014	0.7	4.3	9.6	23.5	27.6	34.3	203,267
2015	1.0	4.0	12.8	11.4	24.7	46.1	228,807
2016	DATA NOT COLLECTED DUE TO BUDGET CUTS						

[a] Includes commercial catch, escapement, and documented waste.

[b] Contribution of age class is less than 0.5%.

[c] Age contribution of the commercial purse seine harvest (by weight) was used to represent the total run. Aerial surveys to determine abundance were hampered by poor weather conditions preventing estimation of total biomass estimate.

Appendix B4.–Preseason forecast (in tons), aerial survey estimates of herring biomass (in tons), and spawn deposition (in miles), Togiak District, 1996–2016.

Year	Preseason Forecast [a]	Biomass Estimate		Spawn Estimate
1996	135,585	135,585	[b]	73
1997	125,000	144,887		59
1998	121,000	121,000	[b]	33
1999	90,000	157,028		56
2000	130,904	130,904	[b]	46
2001	119,818	115,155	[b]	57
2002	120,196	120,196	[b]	32
2003	126,213	126,213	[b]	95
2004	143,124	143,124	[b]	36
2005	96,029	163,737		28
2006	129,976	179,580		18
2007	134,566	143,827		19
2008	134,516	136,839		49
2009	121,800	142,154		15
2010	146,775	146,913		8
2011	140,860	140,860	[b]	36
2012	123,745	167,738		31
2013	169,094	169,020		47
2014	157,448	203,267		92
2015	163,480	228,807		63
20-year Avg.	130,787	146,856		44
1995-04 Avg.	126,093	134,319		55
2005-14 Avg.	135,481	159,394		34
2016	164,247	NO DATA DUE TO BUDGET CUTS		

[a] Forecasts based on Age Structured Analysis.

[b] Peak biomass estimate could not be determined; therefore, preseason forecast was used for exploitation rate determination.

Appendix B5.–Exvessel value of the commercial herring and spawn-on-kelp harvest, in thousands of dollars, Togiak District, 1996–2016.

	Herring			
Year	Sac Roe	Food/Bait	Spawn-on-Kelp	Total
1996	17,658	1	511	18,170
1997	5,340	57	[a]	4,306
1998	5,352	0	[a]	3,986
1999	5,511	1,305	315	6,526
2000	3,718	0	[a]	4,000
2001	3,283	0	[a]	3,090
2002	2,264	228	[b]	1,900
2003	2,664	200	[b]	2,914
2004	2,077	582	[a]	2,659
2005	3,308	0	[a]	3,308
2006	3,168	0	[a]	3,168
2007	2,254	0	[a]	2,254
2008	2,748	0	[a]	2,748
2009	2,803	0	[a]	2,803
2010	3,481	0	[a]	3,481
2011	2,555	0	[a]	2,555
2012	2,611	0	[a]	2,611
2013	4,417	0	[a]	4,417
2014	1,278	0	[a]	1,278
2015	1,284	0	[a]	1,284
20-year Avg.	3,889	119	224	3,873
1996-05 Avg.	5,118	237	224	5,086
2006-15 Avg.	2,660	0		2,660
2016	1,520	0	[a]	1,520

Note: Exvessel value (value paid to the fishermen) is derived by multiplying price/ton by the commercial harvest. These estimates do not include any postseason adjustments to fishermen from processors and should therefore be treated as minimum estimates.

[a] Fishery not conducted.

Appendix B6.–Guideline and actual harvests of sac roe herring (tons) and spawn-on-kelp (pounds), Togiak District, 1996–2016.

	Gillnet Sac Roe			Purse Seine Sac Roe			Spawn-on-Kelp		
Year	Guideline[a]	Actual	% Difference[b]	Guideline[a]	Actual[c]	% Difference[b]	Guideline[a]	Actual	% Difference[b]
1996	5,956	6,863	15	17,868	18,008	1	350,000	455,800	30
1997	5,464	5,164	-5	16,391	18,593	13	350,000	[d]	
1998	5,280	5,952	13	15,840	16,824	6	350,000	[d]	
1999	6,914	4,858	-30	20,741	14,368	-31	350,000	419,563	20
2000	5,738	5,464	-5	17,215	14,957	-13	350,000	[d]	
2001	6,268	6,491	4	14,624	15,879	9	350,000	[d]	
2002	6,288	5,216	-17	14,673	11,833	-19	350,000	[e]	
2003	6,624	6,505	-2	15,457	15,158	-2	350,000	[e]	
2004	7,568	4,980	-34	17,658	13,888	-21	350,000	[d]	
2005	5,667	5,841	3	13,224	15,071	14	350,000	[d]	
2006	7,059	7,132	1	16,471	16,821	2	350,000	[d]	
2007	7,090	4,012	-43	16,544	13,120	-21	350,000	[d]	
2008	6,864	4,832	-30	16,017	15,602	-3	350,000	[d]	
2009	6,378	4,167	-35	14,882	12,404	-17	350,000	[d]	
2010	7,772	7,540	-3	18,134	18,816	4	350,000	[d]	
2011	7,442	5,907	-21	17,364	16,970	-2	350,000	[d]	
2012	6,487	4,027	-38	15,135	12,994	-14	350,000	[d]	
2013	9,017	8,244	-9	21,040	19,366	-9	350,000	[d]	
2014	8,367	6,468	-23	19,523	19,544	0	350,000	[d]	
2015	8,704	1,220	-86	20,309	20,374	0	350,000	[d]	
20-year Avg.	6,847	5,544	-17	16,956	16,030	-5	350,000	239,260	-32
1996-05 Avg.	6,177	5,733	-6	16,369	15,458	-4	350,000	239,260	-32
2006-15 Avg.	7,518	5,355	-29	17,542	16,601	-6	350,000		
2016	8,635	80	-99	20,148	14,799	-27	350,000	[d]	

[a] Harvest guideline derived from inseason biomass estimate when available, or preseason forecast if weather prevents an estimate.

[b] Actual minus guideline divided by guideline multiplied by 100.

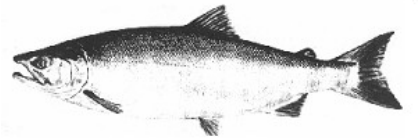
[c] Includes deadloss and test fishery harvest.

[d] No fishery conducted.

APPENDIX C: 2016 BRISTOL BAY SALMON OUTLOOK

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

Sam Cotten, Commissioner
Scott Kelley, Director



Travis Elison, Naknek-Kvichak Manager
Paul Salomone, Egegik and Ugashik Manager
Tim Sands, Nushagak Manager
Matt Jones, Togiak Manager
Date Issued: April 4, 2016
Time: 3:00 pm

King Salmon Office
P.O. Box 37 King Salmon, AK 99613
Phone: 246-3341 Fax: 246-3309
Dillingham Office
P.O. Box 230Dillingham, AK 99576
Phone: 842-5227 Fax: 842-5937

BRISTOL BAY
2016 OUTLOOK FOR COMMERCIAL SALMON FISHING

INTRODUCTION

This document provides general information to fishermen, processors, and the public, concerning the 2016 Bristol Bay salmon season. Included is the general framework for management of each of the five major districts and the 2016 salmon forecast.

During the season, Bristol Bay salmon fishing announcements are broadcast on marine VHF Channel 07A. Current fishing announcements are aired on local radio stations – KAKN and KDLG. As conditions in the fishery change, for the most current information, fishermen should stand by at regular announcement times: 9:00 a.m., 12:00 noon, 3:00 p.m., 6:00 p.m., and 8:00 p.m., unless otherwise stated. Information is also available via telephone; for east-side fisheries (Naknek-Kvichak, Egegik, and Ugashik), dial 246-INFO (4636), for west-side fisheries (Nushagak and Togiak) dial 842-5226. Fishermen are asked to note office hours at the Dillingham fish and game office will be 8:00 a.m. to 5:00 p.m. Monday thru Friday from June 2-June 17, and again beginning Monday July 25. From June 18 to July 22 weekday office hours will be the same as above, but weekend office hours will be from 8:00 a.m. until 12:00 noon. In King Salmon the office hours are as follows: June 1- 15 and after July 16: 8:00 a.m. to 12:00 p.m., and 1:00 p.m. to 4:30 p.m., closed for lunch and weekends. From June 16 to July 15: 8:00 a.m. to 4:30 p.m. 7 days per week.

Regarding district registration cards: **set gillnet** permit holders are only required to fill out and return set net registration cards if they fish in the Nushagak District. At the December 2015 Board of Fisheries meeting the regulation regarding registration for drift gillnet permit holders was changed.

-continued-

Drift gillnet permit holders must fill out and return district registration cards prior to commercial fishing in any district in Bristol Bay. District registration cards will be available at the Anchorage, King Salmon, and Dillingham offices beginning May 1. In addition, PDF files of district registration cards are posted on the ADF&G Bristol Bay homepage and can be printed, completed, mailed to the address on the printout, or submitted to Anchorage, King Salmon, or Dillingham office personnel. District registration can also be accomplished online. During the 2016 season, catch, escapement, and announcements will be available at the same site: http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.salmon.

New for 2016 Port Moller genetics data will be posted at the following web site: http://www.bbedc.com/?page_id=1405 once the project becomes operational.

Fishermen and processors should be aware of the reporting requirements in **5 AAC 06.377 (b)** that state:

"Each commercial fisherman shall report, on an ADF&G fish ticket, at the time of landing, the number of Chinook and coho salmon taken but not sold."

Additionally, new reporting requirements for 2016 found in **5 AAC 39.130 (c)(2) and (17)** require that **when fishing as a dual permit operation, both CFEC permit numbers and signatures of the permit holders will be recorded on fish tickets when fish are delivered.**

2016 Regulatory Changes

The following regulations were adopted or modified at the December 2015 and March 2016 Board of Fisheries meetings in Anchorage:

- Vessel registration- Beginning June 1 all drift gillnet permit holders must register before fishing in any district in Bristol Bay.
- An exemption for minimum distances between units of gear when one set gillnet is operated seaward of another set gillnet that is operated under the authority of the same CFEC permit.
- The board modified the language in the Alagnak River Sockeye Salmon Special Harvest Area (ARSHA) Management Plan that allows for fishing periods to occur concurrently in the ARSHA and the Naknek-Kvichak District after escapement goals for sockeye and Chinook salmon have been met on the Alagnak River. It is unlikely a fishery will occur in the ARSHA in 2016.
- Closed waters of the Kvichak Section (north line) is now defined by those waters northeast of a line from a point near Graveyard Point at **58°52.07' N lat., 157° 00.80' W. long.** to a point on the northwest shore of Kvichak Bay at 58° 53.37' N lat., 157° 04.26' W. long.
- In the Nushagak District the board adopted GPS coordinates for all boundaries in the district. Changes were also made to portions of the Togiak District. Fishermen are strongly encouraged to familiarize themselves with the GPS data points prior to fishing in 2016. District maps are available on the ADF&G website at http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.salmon#maps or at the Dillingham and King Salmon offices.

-continued-

- In the Clarks Point area, **set gillnets located in the area from 58° 50.10' N lat., 158° 33.52' W long. to 58° 49.29' N lat., 158° 33.10' W long. will be permitted a maximum of 750 feet from the mean high tide mark, or to the minus three foot low tide mark, whichever location is closer to the mean high tide mark.**
- Nushagak subsistence areas and boundaries have been clarified.
- Nushagak coho salmon management plan has been changed.
- Wood River SHA management plan has changed to include an option to open the Wood River to commercial fishing when the Nushagak District is limited to 4.75 inch mesh to protect Nushagak sockeye salmon.
- In the Togiak District- Both the permit and the vessel are now restricted from fishing in the Togiak District if they are registered for any other district, and permits and vessels are restricted to Togiak District if they register there.
- A regulation was adopted that continuously opens subsistence salmon fishing above the commercial districts in the Ugashik, Egegik, and Naknek rivers.
- Lawful gear, dates, and area descriptions were amended for the subsistence fishery targeting spawning sockeye salmon "redfish" on Naknek Lake.

Alaska Wildlife Troopers – Summer 2016 Outlook – Bristol Bay

During the last few commercial fishing seasons in Bristol Bay, Alaska Wildlife Troopers have investigated numerous complaints of assaults and vessel ramming on the fishing grounds. Several investigations have resulted in criminal charges. Because of this, during the 2016 season the Alaska Wildlife Troopers will monitor and aggressively pursue all complaints of assaultive behavior during the fishery. **Alaska Statute 11.41.220(a)** defines, "**Assault in the third degree**. (a) A person commits the crime of assault in the third degree if that person **recklessly** places another person in **fear** of imminent serious physical injury by means of a dangerous instrument." Assault in the third degree is a **FELONY**. A 32 foot boat, a pike pole, a Victrinox knife or a deck brush could be considered dangerous instruments. In order to avoid the possibility of physical injury, lost fishing time, criminal and/or civil liability, the Alaska Wildlife Troopers implore fishers to think "Safety First".

Enforcement Priorities:

- Continued strong focus on fishing district lines and open period enforcement, particularly in the Naknek-Kvichak and Egegik districts using all available assets to include aircraft, rotorcraft, large and small enforcement vessels, and undercover fishing vessels.
- Routine boarding of drift gillnet and processor vessels to verify licensing and permitting regulations are met. Fishermen and processors are reminded that at the time of delivery of fish, a fish ticket must be generated and must include the signature of a company representative and the full name and signature of the CFEC permit holder (**BOTH permits if dual operation**). The permit holder must be present at the time of delivery in order to sign the fish ticket. Crew members cannot sign fish tickets for permit holders.
- Increased enforcement of state boating safety laws in cooperation with the US Coast Guard.
- Increased Alaska Wildlife Troopers (AWT) presence in the Ugashik and Togiak Districts.

-continued-

Bristol Bay Test Fishery

The Bristol Bay Test Fishery was scheduled to operate in 2016 to generate funds that would pay for core management programs that were not otherwise funded by the State budget. The test fishery was expected to generate $250,000 from salmon harvests this season. A competitive bid process was underway when the Bristol Bay Regional Seafood Association (BBRSDA) elected to provide the total amount of funding. The department has suspended plans to conduct the test fishery this season and thanks BBRSDA for their support. District test fishing for run assessment is still likely, particularly in the Naknek-Kvichak District.

SALMON OUTLOOK

BAYWIDE

The forecasted Bristol Bay sockeye salmon run for 2016 is approximately 46.6 million fish. Based on the forecast and using the midpoints of escapement goal ranges, 29.5 million fish are potentially available for commercial harvest (Table 1). The department manages fisheries based on inseason information regarding abundance. The inseason management approach uses a suite of tools to provide information on abundance in each district as each run develops and that information is used by the department to determine fishing opportunity.

The commercial salmon season in Bristol Bay opens June 1 by regulation. Fishing in eastside districts will be allowed using a weekly schedule that will vary by district. The schedules are in place to balance fishing opportunity with escapement in the early part of the season (particularly for Chinook salmon). As each run develops and sockeye salmon run characteristics become defined within individual districts, fishing time will be adjusted accordingly. In the Nushagak District, management of the Chinook salmon fishery will govern fishing time in the early part of the season, followed by directed sockeye salmon management as abundance dictates.

NAKNEK-KVICHAK DISTRICT

A run of approximately 23.2 million sockeye salmon is expected for the Naknek-Kvichak District in 2016. Based on the forecast, the projected harvest in the Naknek-Kvichak District is approximately 11.7 million sockeye salmon: 5.9 million from the Kvichak River, 2.7 million from the Alagnak River and 3.2 million from the Naknek River. Sockeye salmon returning to the Naknek-Kvichak District are predicted to be 33% age-2.2, 30% age-1.2, 28% age-1.3, and 9% age-2.3 fish.

The Naknek River escapement goal range is 800,000 to 2.0 million sockeye salmon. The Kvichak River escapement goal range is 2.0 million to 10.0 million sockeye salmon. Escapements will be managed within the lower or upper portions of the escapement goals proportional to the run size based on the preseason forecast and inseason assessment of run size.

Fishing in the Naknek-Kvichak District will be open 4 days per week from 9:00 a.m. Mondays to 9:00 a.m. Fridays, beginning 9:00 a.m. Wednesday, June 1 and ending 9:00 a.m. Thursday, June 23. Drift gillnet gear will be restricted to fishing in the Naknek Section only, while set gillnet gear will be allowed to fish in the entire Naknek-Kvichak District.

-continued-

From June 23 until July 17 fishing periods will be based on sockeye salmon escapements, abundance in the district, and gear group catch allocations. District test fishing for inseason management may be conducted periodically depending on run characteristics. As in previous years, some openings could occur on short notice.

A mesh size restriction of 5.5 inches or less will be in effect beginning 9:00 a.m. Wednesday, June 1 until 9:00 a.m. Friday, July 22, to help in the conservation of Chinook salmon.

EGEGIK DISTRICT

A forecasted run of approximately 7.4 million sockeye salmon is expected for the Egegik River in 2016. The escapement goal range is 800,000 to 2.0 million sockeye. Based on the forecast, the expected surplus potentially available for harvest is 5.7 million fish. Approximately 47 % of the run is expected to be age-2.3 fish, followed by age-2.2 (42 %), age-1.3 (7%), and age 1.2 (4%).

In 2016, separate gear openings and extensions will be used to adjust harvest in an attempt to achieve allocation percentages. Fishermen are reminded that regulation directs the department to avoid "to the extent practicable", continuous fishing with set gillnet gear in the Egegik District, therefore Egegik set gillnet fishermen should expect breaks in fishing.

Based on the Kvichak River sockeye salmon forecast, fishing will begin in the full Egegik District. The season will start with a 3 day per week schedule that will be in effect through June 17. The primary reason for the 3 day per week schedule is to provide for Chinook salmon escapement. By emergency order (EO), commercial fishing will be allowed in the Egegik District from 9:00 a.m. Monday, until 9:00 a.m. Wednesday and from 9:00 a.m. Thursday until 9:00 a.m. Friday. This schedule will begin at 12:01 a.m. Wednesday June 1 and run through 9:00 a.m. Friday, June 17 for drift and set gillnet gear. After June 17, additional fishing time for both gear groups will be scheduled according to sockeye salmon run strength. As in previous years, some openings could occur on short notice. Periods will be adjusted to allocate harvest between drift and set gillnet gear groups.

In addition, subsistence fishing will be permitted in the waters of the Egegik commercial district from 12:01 a.m. Wednesday June 1 until 11:59 p.m. Friday, June 17. The department will consider additional directed subsistence openings, but will wait until inseason to announce the timing of those openings.

The department does not produce forecasts of the coho salmon run to the Egegik River. The parent year for the 2016 coho run was the 2012 escapement, however, because of weather conditions surveys were not flown so no assessment of coho escapement for that year is available. In 2016, management of the fall coho fishery will be based on fishery performance and run strength indicators.

UGASHIK DISTRICT

The forecasted Ugashik River sockeye salmon run in 2016 is 5.0 million fish. The escapement goal range is 500,000 to 1.4 million sockeye. Based on the forecast, 3.8 million fish are potentially available for harvest. Approximately 74% of the run is expected to be age-1.2 fish, 10% age-2.2, 11% age-1.3, and 5% age-2.3 fish.

-continued-

The Ugashik District allocation plan specifies 10% set gillnet and 90% for the drift gillnet group. As in previous years separate gear openings and adjusting length of commercial periods will be used to address allocation between gear groups in 2016. A mesh size restriction of 5.5 inches or less will be in effect beginning 12:01 a.m. Wednesday June 1 until 11:59 p.m. Friday July 22, to help in the conservation of Chinook salmon.

Beginning 12:01 a.m. Wednesday June 1, commercial fishing in the Ugashik District will be allowed on a 9:00 a.m. Monday to 9:00 a.m. Friday schedule through 11:59 p.m. Wednesday June 22. With an expected run to the Kvichak River that exceeds the minimum escapement goal stipulated in regulation, fishing will begin in the full Ugashik District. Additional fishing time after June 22 will depend on fishery performance and run strength indicators. Permit holders should note that the regulation restricting opportunity to no more than 48 hours between June 16 and June 23 will not be in effect in 2016.

Management of the fall coho fishery will be based on fishery performance and run strength indicators. Assessment of the escapement is done with aerial surveys. The parent year for the 2016 coho run was the 2012 escapement, however, because of weather conditions surveys were not flown so no assessment of the coho escapement for that year is available.

At the March 2013 meeting the board made changes to when Area T permit holders may fish in the inner portion of the Cinder River Section (river and lagoon) and Inner Port Heiden sections. The board adopted proposals that would allow Area T permit holders to fish within the inner portion of the Cinder River Section and Inner Port Heiden Section during all months when open by regulation. For further information contact ADF&G in Port Moller at 907-375-2716. Area T permit holders who fish the Cinder River and Port Heiden sections and deliver their catch in the Ugashik District are reminded to report the section of catch on the appropriate fish tickets and note that transporting fish from the sections mentioned above to deliver in the Ugashik District is not permitted during July.

NUSHAGAK DISTRICT

Nushagak River Chinook salmon are managed according to the *Nushagak-Mulchatna King Salmon Management Plan* (**5 AAC 06.361**). This plan directs the commercial fishery to be managed for an inriver goal of 95,000 Chinook salmon. The department will closely monitor Chinook salmon escapement but does not anticipate any directed Chinook salmon openings in 2016.

The 2016 forecast for sockeye salmon in the Nushagak District is 10.4 million fish; 2.2 million for escapement and 7.8 million potentially available for harvest in the Nushagak District commercial salmon fishery. The total run by river system is Wood River 7.5 million (escapement goal range 700,000 to 1.8 million), Igushik River 1.1 million (escapement goal range 150,000 to 400,000), and Nushagak River 1.7 million (escapement goal range of 370,000 to 900,000). Approximately 50% of the forecasted run is expected to be age-1.2 sockeye salmon, < 2% age-2.2, 46% age-1.3, and < 1% age-2.3 fish.

-continued-

Management strategies for 2016 include: 1) directed Chinook salmon openings only if warranted by escapement, 2) Igushik Section sockeye salmon openings are likely to begin in the second week of June and will likely be set gillnet only until escapement or strong harvests dictate otherwise, and 3) begin fishing in the regular district in the third week of June with short openings. Openings will be scheduled based on sockeye salmon escapement levels in the Nushagak and Wood rivers. Mesh size will be limited to 5.5 inches or smaller unless Chinook salmon escapement is above expectations. If the Nushagak River sockeye salmon escapement decreases relative to expected escapements the department may first warn and then impose the 4.75 inch mesh restriction in the Nushagak District. Based on changes made by the Board of Fisheries in December 2015 the department would also open the WRSHA at this time. Subsequently, if Nushagak River sockeye salmon escapement falls below the expected 370,000 fish curve, then the department may limit fishing to only the WRSHA to protect Nushagak River sockeye salmon. Commercial openings in the district may follow as allowed by escapement levels in the Nushagak River. With the large forecast this year the department will try to provide early season opportunity in the Nushagak District. Contingent upon sockeye and Chinook salmon escapement, the department plans to begin fishing once Wood River sockeye salmon escapement exceeds 30,000 fish. This is a notable change from previous years when the department waited to reach 100,000 fish escapement on the Wood River before opening directed sockeye fishing in the commercial district.

Permit holders are reminded that there were significant changes made to the WRSHA management plan at the December 2012 Board of Fisheries meeting. The changes require separate gear type openings, and allocation will be done by a ratio of openings (3:1) for the different gear types. Other changes include restrictions regarding where and how set gillnets may be fished and the amount of gear allowed on board set or drift gillnet vessels. Please be sure you understand all regulations before participating in any fishing activities. Additionally the board changed a boundary line above the Muklung River at the 2015 board meeting.

Igushik River sockeye salmon will be managed independently of the Nushagak-Wood River sockeye salmon stocks. Permit holders should be aware that because of budget cuts the Igushik Tower will not be operated this year. Set gillnet fishing will begin in the Igushik Section when there is a market available. Initial openings will be 8 hours per day and additional time will be added if large harvests or escapement information indicate more time is warranted. Drift gillnet openings in the Igushik Section will be added as needed to control sockeye salmon escapement. Igushik River sockeye salmon returns can be quite variable relative to forecasted run strength. Management will incorporate a readiness to respond with increasing early set gillnet openings, and an attempt to maintain the 6% sockeye harvest allocated to the Igushik Section set gillnet group by only adding drift gillnet openings as needed.

The department will switch to coho salmon management around July 23 when sockeye salmon harvest decreases. Fishery performance and run strength indicators will be used to make management decisions regarding pink and coho salmon fishing opportunity.

District test fishing for inseason management may be conducted periodically depending on run characteristics. Permit holders interested in test fishing in the Nushagak District should contact Tim Sands in Dillingham at (907) 842-5227.

-continued-

TOGIAK DISTRICT

The 2016 total run of Togiak River sockeye salmon is forecast at 660,000 fish, an increase from the 2015 forecast of 610,000. The *Togiak District Salmon Management Plan* (TDSMP**, 5 AAC 06.369**) calls for sockeye salmon escapement of 150,000 fish past the counting towers located at the outlet of Togiak Lake. Based on the forecast, approximately 440,000 sockeye salmon will potentially be available for commercial harvest. Approximately 21% of the run is expected to be 2-ocean fish and 79% is expected to be 3-ocean fish.

Unlike other fishing districts in Bristol Bay that require emergency orders to announce fishing periods, Togiak District follows a regular weekly schedule that allows fishing in: Togiak Bay four days per week, fishing in Kulukak Section two and a half days per week, and fishing in Matogak, Osviak, and Cape Peirce Sections five days per week. Following the TDSMP, permit holders are restricted from fishing in the Togiak District until July 27 if they have fished in any other district in Bristol Bay, and conversely, restricts permit holders from fishing in any other district until July 27 if they have fished in the Togiak District. As previously mentioned, 2015 Board of Fisheries action now requires vessel transfers to be restricted in Togiak District similarly to the restriction of permit transfers. Other recent regulation changes prevent drift gillnet fishing effort near the Togiak River mouth through July 15, and restrict mesh size to 5.5 inches or smaller between June 15 and July 15 for the conservation of Chinook salmon.

Chinook salmon run strength in the Togiak River has been considered below average for several years. Anticipating another poor Chinook salmon run, permit holders can expect emergency orders to reduce the weekly fishing schedule in the last two weeks of June and a mesh size restriction through all of July.

Harvest of coho and pink salmon will be dependent on market presence. If a market for coho salmon is present, a conservative harvest strategy will be utilized due to the lack of information about the returning coho salmon run.

-continued-

Table 1.-Forecast of total run, escapement, and harvest of sockeye salmon returning to Bristol Bay River systems in 2016.

Millions of Sockeye Salmon							
	Total Run Forecast by Age Class						
DISTRICT River	1.2	2.2	1.3	2.3	**Total**	**Escapement**	**Total Harvest** [a]
NAKNEK-KVICHAK:							
Kvichak	4.30	6.09	1.25	1.06	12.69	6.34	5.87
Alagnak	1.78	0.07	3.73	0.15	5.72	2.86[b]	2.65
Naknek	0.94	1.44	1.41	0.98	4.76	1.40	3.18
Total	**7.02**	**7.59**	**6.38**	**2.18**	**23.17**	**10.61**	**11.71**
EGEGIK	**0.30**	**3.12**	**0.50**	**3.49**	**7.41**	**1.40**	**5.74**
UGASHIK	**3.67**	**0.48**	**0.54**	**0.26**	**4.95**	**0.95**	**3.82**
NUSHAGAK							
Wood	4.91	0.16	2.38	0.08	7.53	1.25	6.00
Igushik	0.13	0.02	0.93	0.01	1.00	0.28	0.77
Nushagak	0.14	0.00	1.48	0.00	1.74	0.64	1.04
Total	**5.17**	**0.19**	**4.78**	**0.10**	**10.36**	**2.16**	**7.82**
TOGIAK	**0.12**	**0.02**	**0.49**	**0.02**	**0.66**	**0.20**	**0.44**
BRISTOL BAY	**16.28**	**11.47**	**12.70**	**6.05**	**46.55**	**15.31**	**29.52**

[a] The projected harvest accounts for the inshore run of Bristol Bay sockeye salmon, excluding harvest in the South Peninsula commercial salmon fisheries. The South Peninsula harvest has averaged 3.7% of the total Bristol Bay sockeye production during the last five years and is forecasted to be 1.72 million in 2016.

[b] The escapement to the Alagnak was estimated based on exploiting the Alagnak stock at the same level as the Kvichak River stock.

APPENDIX D: 2016 TOGIAK HERRING OUTLOOK

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

Sam Cotten, Commissioner
Scott Kelley, Director

Contact:
Tim Sands, Area Management Biologist
Matt Jones, Assistant Area Biologist
Phone: (907) 842-5227
Fax: (907) 842-5937

Dillingham Area Office
546 Kenny Wren Road
Dillingham, AK, 99576
Date Issued: March 16, 2016
Time: 11:00 a.m.

2016 TOGIAK HERRING OUTLOOK

The 2016 Togiak District herring biomass is forecast to be 162,244 tons, very similar to the recent 10 year average spawning biomass. This forecast is based on an age-structured analysis (ASA) model that has been used since 1993. Herring ages 4–8 are expected to comprise 44% of the projected biomass, ages 9–11 are expected to make up 48% while the remaining 8% will be age 12+ fish. Average weight for age–7 and older herring should exceed 300 grams. The forecasted individual average weight of herring in the harvested biomass is 350 grams.

The commercial fishery and spawn timing is largely related to water temperatures experienced by herring on the spawning grounds. Additional factors related to timing include sea surface temperature and sea ice trends across the southeastern Bering Sea in the weeks prior to spawning. We track the average sea surface temperature and Bering Sea ice coverage in February and March, as we consider these variables a useful index of timing for maturing herring ultimately bound for spawning grounds in and around the Togiak District. Currently sea surface temperatures are much higher than we would expect at this time of year and the region of the Bering Sea that we believe has predictive power is ice free. Currently these conditions are so far from normal, we have little confidence in our ability to accurately forecast timing this year.

The Bristol Bay Herring Management Plan (**5 AAC 27.865**) sets a maximum 20% exploitation rate for the Togiak District stock. Based on the forecast of 162,244 tons, 32,449 tons of herring will be available for harvest in 2016. Harvest allocation, in accordance with the management plan will be:

Fishery	Harvest Allocation
Spawn-on-Kelp	1,500 tons
Dutch Harbor Food and Bait	2,166 tons
Togiak Sac Roe	28,782 tons
Purse Seine (70%)	20,148 tons
Gillnet (30%)	8,635 tons

-continued-

SAC ROE FISHERY

The management strategy for the Togiak herring fishery is designed to provide for maximum sustained yield while affording the greatest economic benefit. In 2016, sac roe fisheries will again be managed to maximize product quality through long openings which allow permit holders to make smaller sets and harvest the highest quality fish. Long openings also allow processors to have flexible control of harvest volume so that holding time between harvest and processing is optimal. Based on a preseason poll processing capacity is expected to be approximately 2,330 tons per day. This represents a 5% increase from the 2015 daily capacity of 2,200 tons per day. The preseason poll also indicates that 4 processors will participate in the Togiak sac roe herring fishery with a fleet size of 3 gillnet and 21 purse seine vessels. For the last decade, the department has opened the herring fishery as soon as threshold biomass has been documented and anticipates using this strategy again in 2016 to maximize fishing time. The department believes this strategy allows individual companies to maximize their processing capacity and decide what quality is suitable for their individual market.

Purse Seine

For at least the last decade, the seine fishery has operated as individual processor controlled fleets. Indications are that this will be the case again in 2016 and therefore, fishing time and area will be very liberal. This should allow purse seine vessels to locate high quality herring and fill their company's daily needs. This approach should result in fresher, higher quality roe, thereby maximizing product quality and value. The department will not be coordinating any test fishing efforts. As always, the department will work with processors that want to make test sets to monitor roe quality prior to the threshold biomass being documented.

Gillnet

Management of the gillnet fishery will be similar to past years. Ample fishing time and area will be allowed in an effort to take as much gillnet herring as possible. With only 3 permit holders expected to participate in 2016 it is clear that the whole gillnet quota will not be harvested. At the December 2015 Alaska Board of Fisheries meeting the board removed language from the Togiak herring management plan that tied purse seine and gillnet harvest together for the first 50% of the quota. With that language removed each gear type will be able to fish freely until their respective quotas are harvested. In 2016, the department will primarily focus the gillnet fleet in the area east of Right Hand Point. The department will consider opening areas west of Right Hand Point to the gillnet fleet if weather conditions are unfavorable in the eastern section. As in past years, the plan is to open the gillnet area to fishing when threshold biomass is documented. Processors and fishermen may organize test fishing to monitor product quality once the area is open to determine when to begin fishing. Until it is determined that commercial quality fish are present, participants should test cautiously with a small portion of gear to reduce waste.

-continued-

ADF&G OPERATIONS 2016

Beginning in late April or early May, current fishery information will be available by calling the telephone recorder in Dillingham at (907) 842-5226. Recordings will be updated regularly throughout the season as information becomes available. The department will conduct aerial surveys of Togiak District beginning in late April or early May, depending on weather conditions. The department will monitor marine VHF channel 7 from Dillingham and be available at the phone number listed at the top of this document. Fishing announcements and regular fishery updates will be communicated directly to each processor, published on the web, and distributed by fax and email.

Visit http://www.adfg.alaska.gov/index.cfm?adfg=cfnews.main to subscribe to herring fax and/or email updates and announcements. Harvest and fishery opening information will also be available at the Commercial Fisheries website at http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.herring_announcements.

ADF&G OPERATIONS 2016

Beginning in late April or early May, current fishery information will be available by calling the telephone recorder in Dillingham at (907) 842-5226. Recordings will be updated regularly throughout the season as information becomes available. The department will conduct aerial surveys of Togiak District beginning in late April or early May, depending on weather conditions. The department will monitor marine VHF channel 7 from Dillingham and be available at the phone number listed at the top of this document. Fishing announcements and regular fishery updates will be communicated directly to each processor, published on the web, and distributed by fax and email.

Visit http://www.adfg.alaska.gov/index.cfm?adfg=cfnews.main to subscribe to herring fax and/or email updates and announcements. Harvest and fishery opening information will also be available at the Commercial Fisheries website at http://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareabristolbay.herring_announcements.