

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



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Date Issued: 10/29/2015
Time: 2:00 p.m.

2016 BRISTOL BAY SOCKEYE SALMON FORECAST

The 2016 Bristol Bay sockeye salmon forecast and harvest projections are provided below.

FORECAST AREA: **Bristol Bay**

SPECIES: **Sockeye Salmon**

FORECAST OF THE 2016 RUN:

	Forecast	Forecast Range
TOTAL PRODUCTION:	(millions)	(millions)
Total Run	46.55	36.37–56.44
Escapement	15.31	
Commercial Common Property Harvest	31.24	
Bristol Bay Harvest	29.52	
South Peninsula Harvest	1.72	

METHODS

The 2016 Bristol Bay sockeye salmon forecast is the sum of individual predictions for nine river systems (Kvichak, Alagnak, Naknek, Egegik, Ugashik, Wood, Igushik, Nushagak, and Togiak rivers) and four age classes (ages 1.2, 1.3, 2.2, and 2.3, plus ages 0.3 and 1.4 for the Nushagak River). Adult escapement and return data from brood years 1972–2011 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. In general, models chosen were those with statistically significant parameters having the greatest past reliability (accuracy and precision) based on mean absolute deviation, mean absolute percent error, and mean percent error between forecasts and actual returns for two time periods, 2013 through 2015 and 2011 through 2015.

The forecast range is the upper and lower values of the 80% confidence interval for the total run forecast. The confidence bounds were calculated using deviations of actual runs from published predictions from 2001 through 2015.

RESULTS

A total of 46.55 million sockeye salmon (range 36.67–56.44 million) are expected to return to Bristol Bay in 2016. This prediction is 15% greater than the previous 10-year mean of total runs and 41% greater than the long-term mean of 32.94 million. All systems are expected to meet their spawning escapement goals.

A run of 46.55 million sockeye salmon can produce a potential total harvest of 31.24 million fish. The projected harvest includes 29.52 million fish in Bristol Bay and 1.72 million fish in the South Peninsula fisheries. A Bristol Bay harvest of 29.52 million would be 8% greater than the previous 10-year mean harvest (27.32 million; range of 15.42 million to 36.45 million), and 46% greater than the long-term mean harvest of 20.20 million.

The run forecast to each district and river system is as follows: 23.17 million to Naknek-Kvichak District (12.69 million to Kvichak River; 5.72 million to Alagnak River; 4.76 million to Naknek River); 7.41 million to Egegik District; 4.95 million to Ugashik District; 10.36 million to Nushagak District (7.53 million to Wood River; 1.74 million to Nushagak River; 1.09 million to Igushik River); and 0.66 million to Togiak District (Table 1).

The total run forecast of 46.55 million sockeye salmon is expected to be comprised of 16.28 million age-1.2 fish (35%) followed by 12.70 million age-1.3 fish (27%), 11.40 million age-2.2 fish (24%), and 6.05 million age-2.3 fish (13%), with minor age classes contributing to the remainder of the return (Table 1).

DISCUSSION

Forecasting future salmon returns is inherently difficult and uncertain. We have used similar methods since 2001 to produce the Bristol Bay sockeye salmon forecast. These methods have performed well when applied to Bristol Bay as a whole. Forecasts since 2001 have averaged 8.2% below the actual total run. Run forecast differences have ranged from 35.9% below actual run in 2014 to 20.6% above actual run in 2011. Forecasted harvests have averaged 1.8% below actual harvest since 2001 and harvest differences have ranged from 39% below actual harvest in 2014 to 35% above actual harvest in 2011.

Individual river forecasts have greater uncertainty compared to Baywide forecasts. Since 2001, on average, we have under-forecasted the returns to the Alagnak (-34%), Togiak (-14%), Kvichak (-11%), Wood (-6%), and Nushagak (-1%) rivers and over-forecasted returns to Igushik (48%), Egegik (31%), Ugashik (15%), and Naknek (8%) rivers.

The overall Bristol Bay forecasts have been fairly accurate since 2001 in spite of a large amount of individual river forecast variability. This is the result of over-forecasting returns to some rivers and under-forecasting returns to other rivers. The forecasts to individual rivers offset each other such that the overall Bristol Bay forecast has been more accurate than the individual forecasts.

Historically, total runs of sockeye salmon to Bristol Bay have been highly variable. The 2016 forecast of 46.55 million is above the long-term (1963–2015) average of 32.93 million, and above the most recent 10-year (2006–20015) average of 40.54 million.

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Table 1.—Forecast of total run, escapement, and harvest of major age classes of sockeye salmon returning to Bristol Bay river systems in 2016.

DISTRICT	River	Millions of Sockeye Salmon							South Peninsula ^a
		Forecasted Production by Age Class				Total	Forecasted		
		1.2	2.2	1.3	2.3		Escapement	Harvest	
NAKNEK-KVICHAK									
	Kvichak	4.30	6.09	1.25	1.06	12.69	6.34	5.87	0.47
	Alagnak	1.78	0.07	3.73	0.15	5.72	2.86 ^b	2.65	0.21
	Naknek	0.94	1.44	1.41	0.98	4.76	1.40	3.18	0.18
	Total	7.02	7.59	6.38	2.18	23.17	10.61	11.71	0.86
EGEGIK									
		0.30	3.12	0.50	3.49	7.41	1.40	5.74	0.27
UGASHIK									
		3.67	0.48	0.54	0.26	4.95	0.95	3.82	0.18
NUSHAGAK									
	Wood	4.91	0.16	2.38	0.08	7.53	1.25	6.00	0.28
	Igushik	0.13	0.02	0.93	0.01	1.09	0.28	0.77	0.04
	Nushagak	0.14	0.00	1.48	0.00	1.74 ^c	0.64	1.04	0.06
	Total	5.17	0.19	4.78	0.10	10.36	2.16	7.82	0.38
TOGIAK ^d									
		0.12	0.02	0.49	0.02	0.66	0.20	0.44	0.02
BRISTOL BAY									
		16.28	11.40	12.70	6.05	46.55	15.31	29.52	1.72
		35%	24%	27%	13%	100%			

Note: This table summarizes the forecast of sockeye salmon in millions of fish. Any differences in addition are due to rounding.

^a The projected harvest accounts for the harvest of Bristol Bay sockeye salmon in the South Peninsula commercial salmon fisheries. The South Peninsula harvest has averaged 3.7% of the total Bristol Bay sockeye salmon production during the last 5 years.

^b The projected escapement to the Alagnak River was estimated based on exploiting the Alagnak River at the same exploitation rate as the Kvichak River.

^c Nushagak River forecast includes age-0.3 (18,914) and age-1.4 (101,994) fish.

^d Forecasts for Kulukak, Kanik, Osviak, and Matogak river systems are not included. These systems contribute approximately 50,000 to Togiak District harvest each year.