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

Sam Cotten, Commissioner
Scott Kelley, Director

Contacts:
Greg Buck, Bristol Bay Area Research Biologist
Phone: (907) 267-2355
Fax: (907) 267-2442

Anchorage Office
333 Raspberry Road
Anchorage, AK 99518
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2017 BRISTOL BAY SOCKEYE SALMON FORECAST

FORECAST AREA: Bristol Bay

SPECIES: Sockeye Salmon

FORECAST OF THE 2017 RUN:

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

METHODS

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

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

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

RESULTS

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

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

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

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

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

DISCUSSION

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

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

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

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

Greg Buck
Bristol Bay Area Research Biologist

Table 1.–Forecast of total run, escapement, and harvest of major age classes of sockeye salmon returning to Bristol Bay river systems in 2017.

DISTRICT	Millions of Sockeye Salmon								
	Forecast Production by Age Class					Forecast		South	
River	1.2	2.2	1.3	2.3	Total	Escapement	Harvest	Peninsula [a]	BB Inshore
NAKNEK-KVICHAK									
Kvichak	2.42	2.92	2.00	0.42	7.76	4.00	3.47	0.29	7.47
Alagnak	1.43	0.81	1.61	0.20	4.04	2.09	1.81	0.15	3.89
Naknek	2.08	0.60	1.16	0.44	4.27	1.10	3.01	0.16	4.11
Total	5.92	4.33	4.77	1.05	16.07	7.19	8.29	0.59	15.48
EGEGIK	0.77	4.38	3.63	1.87	10.65	1.70	8.56	0.39	10.26
UGASHIK	1.69	0.45	2.86	0.47	5.46	1.18	4.09	0.20	5.26
NUSHAGAK									
Wood	2.97	0.15	2.33	0.05	5.50	1.53	3.77	0.20	5.29
Igushik	0.34	0.01	0.89	0.02	1.25	0.21	0.99	0.05	1.21
Nushagak	0.25	0.00	1.52	0.02	1.87 [b]	0.50	1.30	0.07	1.80
Total	3.55	0.16	4.74	0.09	8.62	2.24	6.06	0.32	8.30
TOGIAK	0.12	0.02	0.49	0.02	0.66	0.16	0.48 [c]	0.02	0.63
BRISTOL BAY	12.05	9.35	16.50	3.50	41.47	12.46	27.47	1.53	39.93
	29%	23%	40%	8%	100%				

Note: This table summarizes the forecast of sockeye salmon in millions of fish. Small differences may be observed 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] Nushagak River forecast includes age-0.3 (119) and age-1.4 (78,346) fish.

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

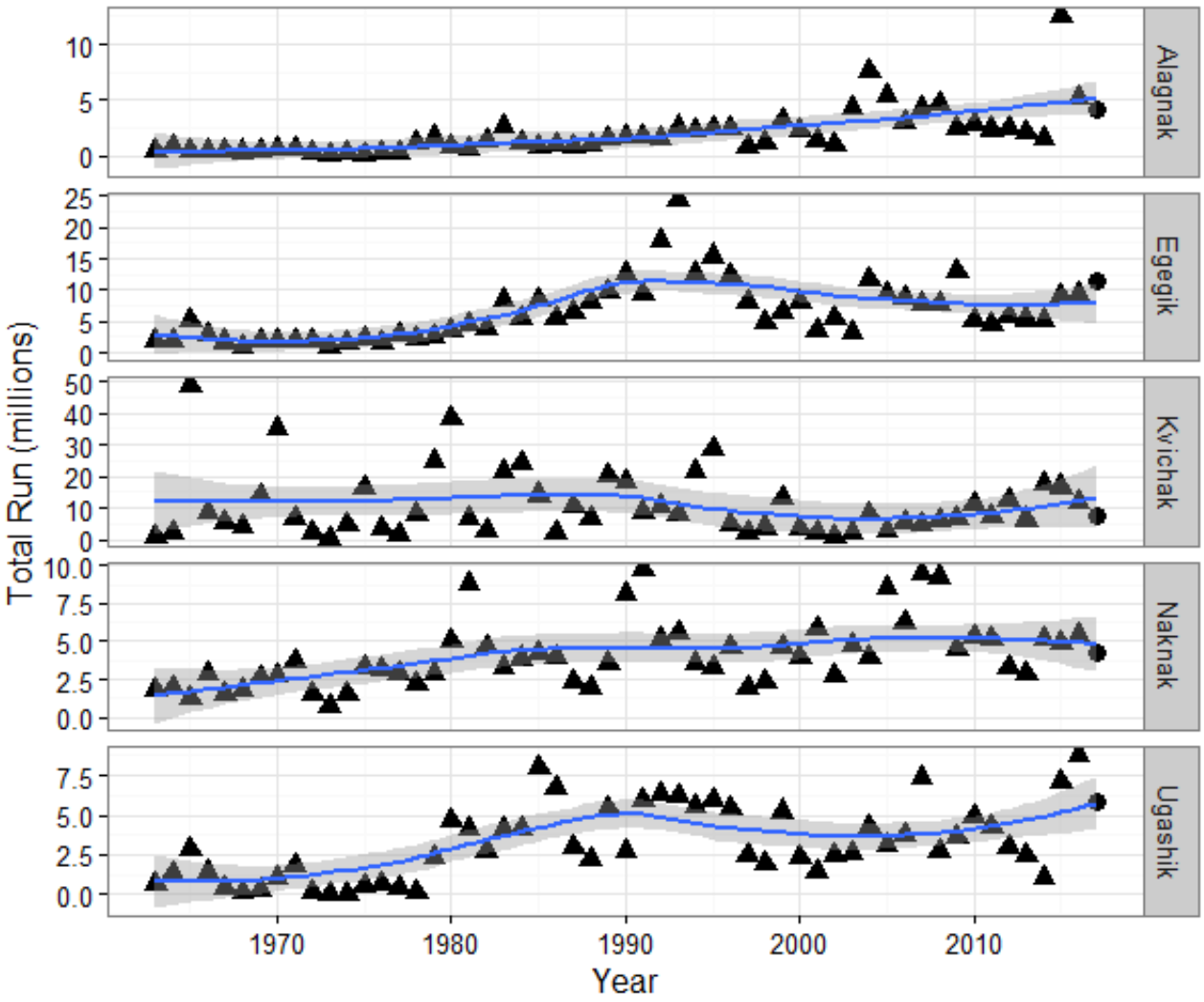

Figure 1. Historical total runs (triangles) and the 2017 forecast (circles) to eastside watersheds. Smoothed conditional mean trendline indicated by blue line and shaded grey area.

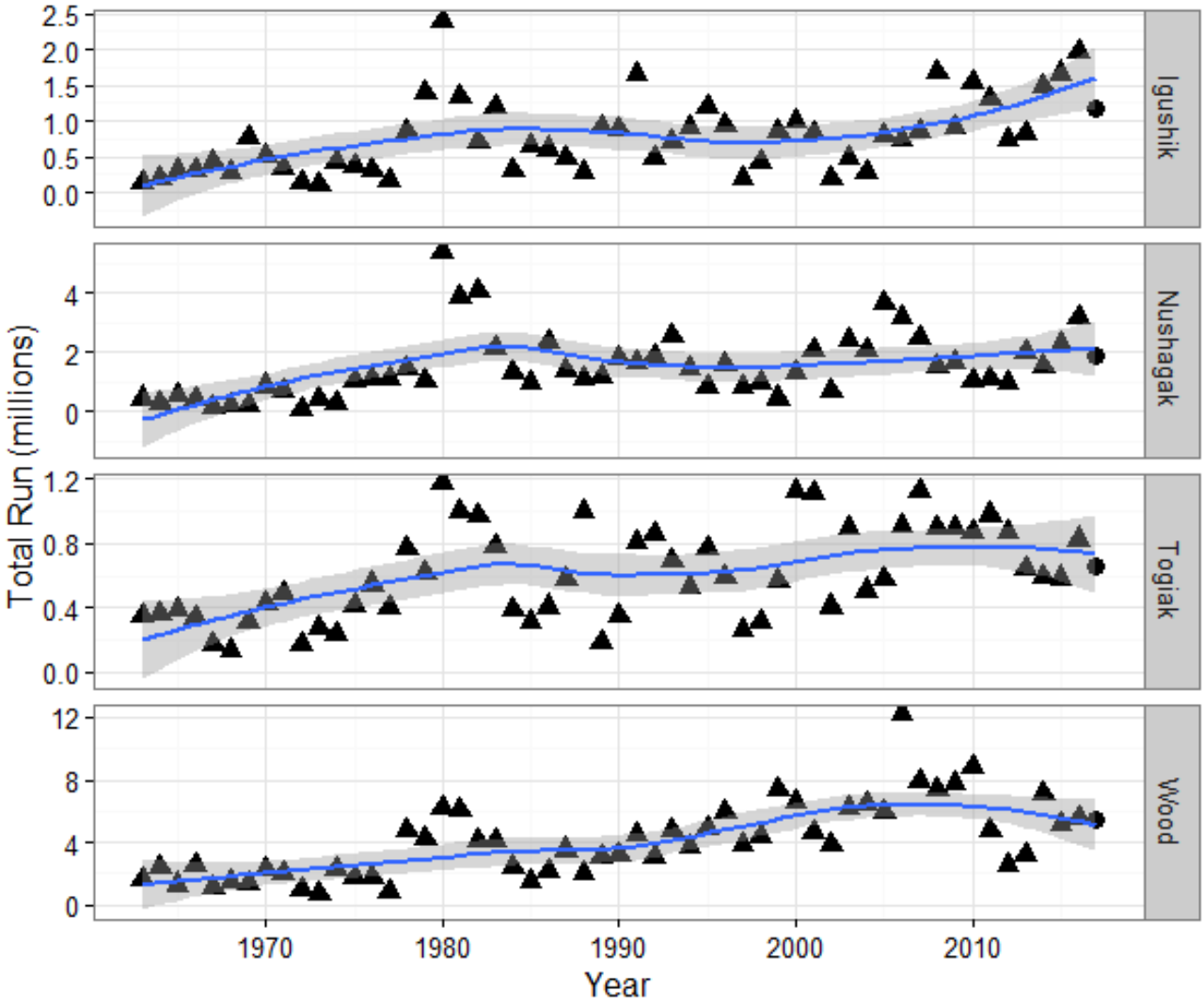

Figure 2. Historical total runs (triangles) and the 2017 forecast (circles) to westside watersheds. Smoothed conditional mean trendline indicated by blue line and shaded grey area.