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

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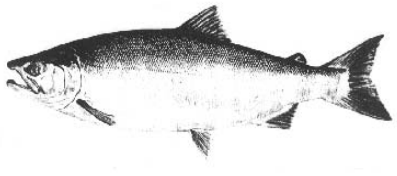

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2012 BRISTOL BAY SOCKEYE SALMON FORECAST

The 2012 Bristol Bay sockeye salmon forecast and harvest projection are provided below.

FORECAST AREA: **Bristol Bay**

SPECIES: **Sockeye Salmon**

FORECAST OF THE 2012 RUN:

TOTAL PRODUCTION:	Forecast (millions)	Forecast Range (millions)
Total Run	32.30	23.17–41.42
Escapement	9.47	
Commercial Common Property Harvest	22.83	
Bristol Bay Harvest	21.76	
South Peninsula Harvest	1.07	

METHODS

The forecast for the sockeye salmon run to Bristol Bay in 2012 is the sum of individual predictions for nine river systems (Kvichak, Alagnak, Naknek, Egegik, Ugashik, Wood, Igushik, Nushagak-Mulchatna, 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 Nushagak River). Adult escapement and return data from brood years 1976–2008 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 also 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 the years 2009 through 2011.

The forecast range was the upper and lower values of the 80% confidence bounds for the total run forecast. The confidence bounds were calculated using deviations of actual runs from published predictions from 2001 through 2011.

RESULTS

A total of 32.30 million sockeye salmon are expected to return to Bristol Bay in 2012. This prediction is 14% lower than the previous 10-year mean of total runs (37.61 million; range of 17.83 million to 46.04 million). The forecast range is from 23.17 million to 41.42 million. All systems are expected to meet their spawning escapement goals.

A run of 32.30 million sockeye salmon can potentially produce a total harvest of 22.83 million fish if escapement goals are met for managed stocks and industry is capable of taking the surplus fish. The projected harvest includes 21.76 million fish in Bristol Bay and 1.07 million fish in the South Peninsula fisheries. A Bristol Bay harvest of 21.76 million would be 11% lower than the previous 10-year mean harvest (24.33 million; range of 10.66 million to 30.89 million).

The run forecast to each district and river system is as follows: 14.96 million to Naknek-Kvichak District (6.84 million to Kvichak River; 1.90 million to Alagnak River; 6.22 million to Naknek River); 6.72 million to Egegik District; 3.09 million to Ugashik District; 6.76 million to Nushagak District (4.64 million to Wood River; 1.40 million to Nushagak River; 0.72 million to Igushik River); and 0.78 million to Togiak District (Table 1).

The total run forecast of 32.30 million sockeye salmon is expected to be comprised of 13.23 million age-1.3 fish (41%) followed by 8.50 million age-2.2 fish (26%), 6.22 million age-1.2 fish (19%), 4.26 million age-2.3 fish (13%), 0.067 million age-1.4 fish (<1%), and 0.021 million age-0.3 fish (<1%) (Table 1).

DISCUSSION

Prediction or forecasting is very difficult, especially if it is about future salmon returns. We have used similar methods since 2001 to produce the Bristol Bay sockeye salmon forecast. These forecast methods have performed fairly well when looking at the overall Baywide forecast. The forecast in 2011 was 22% above the total run and forecasts since 2001 have averaged 7% below the actual total run. Run forecast differences have ranged from 26% below actual run in 2007 to 22% above actual run in 2011. Forecasted harvests have averaged 3% below actual harvest since 2001 and harvest differences have ranged from 22% below actual harvest in 2009 to 36% above actual harvest in 2011.

There is a much greater amount of uncertainty in our forecasts of returns to individual rivers. Since 2001, on average, we have under-forecast the returns to the Alagnak (-30%), Togiak (-20%), Nushagak (-16%), Naknek (-7%), and Wood (-6%) rivers and over-forecast returns to Igushik (25%), Egegik (24%), and Kvichak (14%) rivers. An example of the large variability can be observed in the forecasts to the Kvichak. We over-forecast the returns to Kvichak by an average of 97% from 2001 through 2004 during an unusually unproductive period and under-forecast the returns to the Kvichak by an average of -32% from 2005 through 2010 during a higher period of

productivity. In large part, an individual river's forecast error is reflective of its current production as it relates to average historical production.

Even though there is large amount of variability around the forecasts to the individual rivers, the overall Baywide forecasts have been fairly accurate since 2001. This appears to have been the result of over-forecasting returns to some rivers and under-forecasting returns to other rivers. The forecasts to individual rivers have been offsetting each other such that the overall Baywide forecast has been more accurate than the individual forecasts.

We anticipate the 2012 run will be dominated by age-1.3 sockeye salmon (41%), followed by age-2.2 (26%), age-1.2 (19%), and age-2.3 (13%). There is always some uncertainty in our forecast of returns by age class. However, we expect the overall uncertainty in 2012 to be similar to what occurred in 2011. Our forecasts were close for age-1.2 (24% forecast compared to 21% observed) and age-1.3 (38% compared to 42% observed) sockeye salmon. We over-forecast age-2.2 (25% forecast compared to 16% observed) and under-forecast age-2.3 (13% forecast compared to 21% observed) sockeye salmon in 2011.

Historically, total runs of sockeye salmon to Bristol Bay have been highly variable. The 2012 forecast of 32.30 million is above the long-term historical average of 30.63 million from 1956 to 2011, but below the more recent historical average of 40.50 million from 2004 to 2011. We had seven consecutive years from 2004–2010 where total run was close to or exceeded 40 million sockeye salmon. In 2011, total run dropped to 31.68 million sockeye salmon. We expect the 2012 run to be similar to the total run in 2011.

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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 2012.

DISTRICT	Millions of Sockeye Salmon							
	Forecasted Production by Age Class					Forecasted		South
River	1.2	2.2	1.3	2.3	Total	Escapement	Harvest	Peninsula [a]
NAKNEK-KVICHAK								
Kvichak	1.72	3.17	1.52	0.43	6.84	3.42	3.19	0.23
Alagnak	0.48	0.20	1.13	0.09	1.90	0.95 [b]	0.89	0.06
Naknek	1.20	0.88	3.31	0.83	6.22	1.10	4.91	0.21
Total	3.40	4.25	5.96	1.35	14.96	5.47	8.99	0.49
EGEGIK	0.57	2.89	1.14	2.12	6.72	1.10	5.39	0.22
UGASHIK	0.51	1.10	0.86	0.62	3.09	0.85	2.14	0.10
NUSHAGAK [c]								
Wood	1.30	0.17	3.09	0.08	4.64	1.10	3.38	0.15
Igushik	0.11	0.03	0.56	0.03	0.72	0.23	0.47	0.02
Nushagak	0.18	0.02	1.09	0.03	1.40 [d]	0.55	0.80	0.05
Total	1.59	0.21	4.74	0.14	6.76	1.88	4.66	0.22
TOGIAK [e]	0.16	0.04	0.53	0.04	0.78	0.18	0.57	0.03
BRISTOL BAY	6.22	8.50	13.23	4.26	32.30	9.47	21.76	1.07
	19%	26%	41%	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 3.3% 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] Forecast for Snake River system was not included (1971–1991 average escapement was 18,000).

[d] Nushagak River forecast includes age-0.3 (21,000) and age-1.4 (67,000) fish.

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