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DIVISION OF COMMERCIAL FISHERIES
NEWS RELEASE

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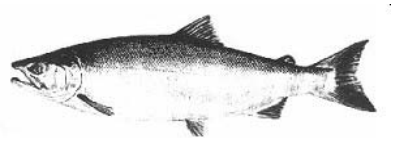

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2011 UPPER COOK INLET SOCKEYE SALMON FORECAST

The preliminary forecast of the 2011 Upper Cook Inlet sockeye salmon run is as follows:

	Forecast Estimate (millions)	Forecast Range (millions)
TOTAL PRODUCTION:		
Total Run	6.4	4.1–10.3
Escapement	1.6–2.0	
Harvest	4.4–4.8	

Forecast Methods

The major sockeye salmon systems in Upper Cook Inlet (UCI) are the Kenai, Kasilof, Susitna, and Crescent Rivers, and Fish Creek. Spawner, return, sibling, fry, and smolt data, if available, were examined for each system. Four models were used to forecast the run of sockeye salmon to UCI in 2011: (1) the relationship between adult returns and spawners, (2) the relationship between adult returns and fry, (3) the relationship between adult returns and smolts, and (4) the relationship between sibling adult returns. Several forecast models were evaluated for each stock and age class. Models providing the smallest mean absolute percent error (MAPE) between the forecasts and actual runs over the past 10 years were generally used. In most cases, these were sibling models. Forecast model predictions based on spawners, fry, smolt or siblings were compared to evaluate uncertainty.

The returns of ages 1.3, 2.2, and 2.3 sockeye salmon to the Kenai River in 2011 were forecast using sibling models. For example, the sibling-model prediction of the return of age 1.3 sockeye salmon was based on the abundance of age 1.2 sockeye salmon in 2010. A spawner-recruit model prediction of the age 1.2 sockeye salmon return was based upon spawner abundance in 2007. Smolt models were used to forecast the returns of age 1.2, 1.3, 2.2, and 2.3 sockeye salmon to the Kasilof River. The smolt model used to forecast the return of age 2.2 sockeye salmon to Kasilof River included smolt weight as a covariate.

The total escapement of sockeye salmon to the Susitna River was forecasted using the recent 5-year average aggregate escapement into Judd, Shell, Chelatna, and Larson lakes expanded to the entire Susitna River watershed using mark–recapture abundance estimates from 2006–2009. The total run of Susitna River sockeye salmon to UCI was forecasted using the escapement and the mean harvest rate estimated from genetic stock composition of the commercial harvest in 2007–2009.

The sockeye salmon forecast for unmonitored systems in UCI was estimated as 15% of the aggregate forecast for the 5 major stocks. The fraction of the total run destined for unmonitored systems was estimated using genetic estimates of the stock composition of offshore test fishery harvests.

An aggregate range of sockeye salmon escapements was calculated for this forecast due to uncertainty regarding actions that may be taken at the upcoming Alaska Board of Fisheries meeting. Aggregate escapements were estimated from the sum of the midpoints of the escapement goal ranges for each of the major sockeye salmon producing systems in UCI and the escapement into unmonitored systems (estimated as 15% of the aggregate escapement into monitored systems). Beginning in 2011, ADF&G will be counting sockeye salmon escapements on the Kenai and Kasilof rivers using new dual-frequency identification sonar (DIDSON). ADF&G has established new escapement goals for Kenai late-run sockeye salmon (700,000–1,200,000) and Kasilof sockeye salmon (160,000–340,000) based upon this new sonar system. The lower aggregate bound of sockeye salmon escapements was calculated using the midpoint (850,000) of the current Kenai late-run sockeye salmon inriver escapement goal (750,000–950,000) given the 2011 Kenai sockeye salmon forecast (3.9 million). The upper aggregate bound of escapements was calculated by applying the mean expansion factor (1.4) between historical Kenai Bendix and DIDSON sonar counts to the midpoint of the inriver goal (850,000). The total harvest by all user groups was estimated by subtracting the lower and upper bounds of the aggregate escapement range from the total run forecast for all stocks. The estimated sport harvest upstream of the sonar at river mile 19 on the Kenai River was subtracted from the aggregate escapement into monitored systems. The total run forecast range was calculated by multiplying the forecast times the upper and lower values of the percent error of the actual runs from published forecast runs from 2001 through 2010.

Forecast Discussion

In 2010, the harvest of sockeye salmon by all user groups in UCI was 3.6 million, while the preseason forecast was 2.3 million. The higher than expected harvest in 2010 was largely due to an above forecast run to the Kenai River. In 2010, the total run was 3.3 million to the Kenai River, 847,000 to the Kasilof River, 256,000 to the Susitna River, 131,000 to the Crescent River, and 209,000 to Fish Creek. The 2010 run forecast was 1.7 million to the Kenai River, 901,000 to the Kasilof River, 542,000 to the Susitna River, 148,000 to the Crescent River, and 142,000 to Fish Creek.

A run of 6.4 million sockeye salmon is forecasted to return to UCI in 2011 with a harvest by all user groups of 4.4–4.8 million. The forecasted harvest in 2011 is 0.6–1.0 million fish above the 20-year average harvest by all user groups of 3.8 million. The run forecast for the Kenai River is 3.9 million, which is 9% greater than the 20-year average run of 3.6 million. Age 1.3 sockeye salmon typically comprise about 64% of the run to the Kenai River. A sibling model based upon the return of age 1.2 sockeye salmon in 2010 (663,000; 20-year average: 373,000) predicted a

return of 3.0 million age 1.3 sockeye salmon. A fry model based upon the abundance of age-0 fry rearing in Skilak and Kenai lakes in the fall of 2007 (9.1 million; 20-year average: 17.8 million) predicted a return of 1.4 million age 1.3 sockeye salmon. The sibling model was used for this forecast, because the 10-year MAPE was lower for the sibling model (25%) than the fry model (62%). Age 2.3 sockeye salmon typically comprise about 17% of the run to the Kenai River. A sibling model based upon the return of age 2.2 sockeye salmon in 2010 (171,000; 20-year average: 248,000) predicted a return of 275,000 age 2.3 sockeye salmon in 2011. A fry model based upon the abundance of age-1 fry rearing in Skilak and Kenai lakes in the fall of 2007 (8.9 million; 20-year average: 1.6 million) predicted a return of 1.6 million age 2.3 sockeye salmon. The sibling model was used for this forecast because the 10-year MAPE was lower for the sibling model (28%) than the fry model (115%). The forecasted age 2.3 return is 56% less than the 20-year average return for this age class. The predominant age classes in the 2011 run should be age 1.3 (75%), age 1.2 (9%), and age 2.3 (7%). The 10-year MAPE for the set of models used for the 2011 Kenai sockeye salmon run forecast was 29%.

The sockeye salmon run forecast for the Kasilof River is 929,000, which is 3% greater than the 20-year average run of 902,000. Age 1.3 sockeye salmon typically comprise about 35% of the run to the Kasilof River. The forecast for age 1.3 sockeye salmon is 325,000, which is 3% greater than the 20-year average return (315,000) for this age class. A smolt model based upon the abundance of age-1 sockeye salmon smolts in 2008 was used to forecast the return of age 1.3 sockeye salmon in 2011. The abundance of age-1 smolts in 2008 was 4.3 million, which is equal to the 20-year average abundance for this age class. A sibling model predicted a return of 316,000 age 1.3 sockeye salmon. The smolt model was used for this forecast because the 10-year MAPE was lower for the smolt model (23%) than the sibling model (27%). Age 1.2 sockeye salmon typically comprise about 30% of the run. The forecast for age 1.2 sockeye salmon is 242,000, which is 12% less than the 20-year average return (274,000) for this age class. A smolt model based upon the abundance of age-1 smolts (2.1 million) in 2009 was used to forecast the return of age 1.2 sockeye salmon in 2011. A sibling model forecasted a return of 309,000 age 1.2 sockeye salmon. The smolt model was used for this forecast because the 10-year MAPE was lower for the smolt model (39%) than the sibling model (50%). Age 2.2 sockeye salmon typically comprise about 24% of the run. The forecast for age 2.2 sockeye salmon is 286,000, which is 34% greater than the 20-year average return (213,000) for this age class. A smolt model based upon the abundance and mean weight of age-2 smolts in 2009 was used to forecast the return of age 2.2 sockeye salmon in 2011. The abundance of age-2 smolts in 2009 was 1.5 million, which is 9% less than the 20-year average abundance (1.7 million) for this age class. The mean weight of age-2 smolts in 2009 was 6.8 g, which is 22% greater than the 20-yr average smolt weight (5.5 g). The predominant age classes in the 2011 run should be age 1.2 (26%), age 1.3 (35%), and age 2.2 (31%). The 10-year MAPE for the set of models used for the 2011 Kasilof sockeye salmon run forecast was 27%.

The sockeye salmon run forecast for the Susitna River is 463,000, which is 61% less than the 20-year average run of 780,000. This forecast was derived from historical aggregate weir counts rather than sonar and age composition catch allocation models, because recent mark–recapture studies have shown that the Yentna sonar project underestimated sockeye salmon escapement causing estimates of adult returns to also be underestimated. Since this is only the second year a weir-based method has been used, no MAPE can be estimated. However, the 2010 forecast was 112% greater than the estimated actual run. The 20-year average run was calculated by expanding sonar abundance estimates using mark–recapture and genetic stock composition estimates.

The sockeye salmon run forecast for Fish Creek is 105,000, which is 10% less than the 20-year average run of 116,000. Age 1.2 and 1.3 sockeye salmon typically comprise 78% of the run to Fish Creek. A fry model based upon the estimated abundance of age-0 fry entering Big Lake in 2008 (7.1 million; 15-year average: 13.7 million) predicted a return of 45,000 age 1.2 sockeye salmon. A sibling model based upon the abundance of age 1.2 sockeye salmon returning in 2010 predicted a return of 37,000 age 1.3 sockeye salmon in 2011. The age 1.2 forecast is 26% less than the 20-year average return (61,000) for this age class, while the age 1.3 forecast is 23% greater than the 20-year average return (30,000). The predominant age classes in the 2011 run should be age 1.2 (43%), age 1.3 (35%), and age 2.2 (12%).

The sockeye salmon run forecast for Crescent River is 131,000, which is 26% greater than the 20-year average run of 104,000. Age 1.3 and 2.3 sockeye salmon typically comprise 75% of the run to Crescent River. Sibling models based upon returns of age 1.2 and 2.2 sockeye salmon in 2010 were used to forecast returns of age 1.3 (75,000) and 2.3 (31,000) sockeye salmon in 2011. The predominant age classes in the 2011 run should be age 1.3 (58%) and age 2.3 (24%).

Run forecasts to individual freshwater systems are as follows:

System	Run	Goals
Crescent River	131,000	30,000–70,000
Fish Creek	105,000	20,000–70,000
Kasilof River	929,000	160,000–340,000
Kenai River[1]	3,941,000	?
Susitna River	463,000	
Larson Lake	NA	15,000–50,000
Chelatna Lake	NA	20,000–65,000
Judd Lake	NA	20,000–55,000
Unmonitored Systems	835,000	NA
Total	6,404,000	

OTHER SALMON SPECIES

The preliminary forecast of the 2011 commercial harvest of other salmon species is as follows:

	Commercial Harvest Forecasts
Natural Production:	
Pink Salmon	106,000
Chum Salmon	101,000
Coho Salmon	178,000
Chinook Salmon	14,000

Forecast Methods

[1] See methods section for explanation of Kenai late-run sockeye salmon goals.

The recent 5-year average commercial harvest was used to forecast the harvest of chum, coho, and Chinook salmon in 2011. The forecast for pink salmon was based upon the average harvest during the past 5 even-numbered years.

Forecast Discussion

The recent 5-year average commercial harvest was used in the forecast, because regulatory changes have substantially restricted harvests of these species in recent years.

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