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of **ALASKA**  
GOVERNOR BILL WALKER

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MEMORANDUM

TO: Scott Kelley, Director  
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DATE: October 3, 2016

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THRU: Tracy Lingnau, Regional Supervisor  
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FROM: Jack W. Erickson, Regional Research Coordinator  
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SUBJECT: Upper Cook Inlet  
Escapement Goal  
Memo

The purpose of this memo is to report our progress reviewing and recommending escapement goals for Upper Cook Inlet (UCI). Escapement goals in this management area have been set and evaluated at regular intervals since statehood. This effort has resulted in many of the stocks having long-term historical databases. All UCI escapement goals were last reviewed by the Alaska Department of Fish and Game (department) (Fair et al. 2013) during the 2013–2014 Alaska Board of Fisheries (board) cycle.

Between December 2015 and September 2016, an interdivisional salmon escapement goal review committee, including staff from the divisions of Commercial Fisheries and Sport Fish, reviewed the 35 existing salmon escapement goals in the UCI management area. The review was based on the *Policy for the management of sustainable salmon fisheries* (5 AAC 39.222) and the *Policy for statewide salmon escapement goals* (5 AAC 39.223). Two important terms are:

5 AAC 39.222(f)(3) “biological escapement goal” or “(BEG)” means the escapement that provides the greatest potential for maximum sustained yield . . .;” and

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5 AAC 39.222(f)(36) “sustainable escapement goal” or “(SEG)” means a level of escapement, indicated by an index or an escapement estimate, that is known to provide for sustained yield over a 5 to 10 year period, used in situations where a BEG cannot be estimated or managed for . . .;”

The committee determined the appropriate goal type (BEG or SEG) for each salmon stock with an existing goal and considered other monitored, exploited stocks without an existing goal. Based on the quality and quantity of available data, the committee determined the most appropriate methods to evaluate the escapement goals. Due to the thoroughness of previous analyses by Bue and Hasbrouck (*Unpublished*), Clark et al. (2007), Hasbrouck and Edmundson (2007), and Fair et al. (2007, 2010, 2013), this review re-analyzed only those goals with recent (2010–2015) data that could potentially result in a substantially different escapement goal from the last review, or those that should be eliminated or established.

Escapement goals were evaluated for UCI stocks using a variety of methods: (1) spawner-recruit analyses; (2) yield analyses; (3) smolt/fry information; and/or (4) the recently updated percentile approach (Clark et al. 2014). The committee developed escapement goals for each stock, compared them with the current goal, and agreed on a recommendation to keep the current goal, change the goal, or eliminate the goal. The methods used to evaluate the escapement goals and the rationale for making subsequent recommendations will be described in a published report (Erickson et al. *In prep*) available prior to the February/March 2017 UCI board meeting.

### **Kenai River king salmon**

The department is currently finalizing run reconstructions and stock-recruit analyses for fish approximately 34 inches in length or greater for both Kenai River king salmon runs. Based on these analyses, recommendations for new SEGs for fish 34 inches in length or greater for the early run and late run will be selected. In the Kenai River, fish of this size can be assessed more simply, accurately, and timely. The recommendations for these two goals will be presented in an updated Upper Cook Inlet Escapement Goal Memo, at or prior to the Lower Cook Inlet board meeting in late November 2016. A written report describing the analyses and results will be presented at the UCI board meeting.

### **Little Susitna River king salmon**

The committee recommends a weir-based SEG of 2,300–3,900 king salmon be established for Little Susitna River. The proposed weir-based goal was developed using the percentile approach (Clark et al. 2014). A relationship developed between a long-term time series of aerial index counts and weir counts was used to leverage historical aerial survey data. The proposed weir-based escapement goal is considered the primary goal for escapement performance and management purposes, and the existing aerial-based SEG (900–1,800) will only be used to assess escapement performance if the weir becomes inoperable for a significant period of time.

### **Clearwater Creek chum salmon**

The current SEG (3,800–8,400) for Clearwater Creek was established in 2002. For this review, the committee updated the escapement time series through 2015 and applied the Clark et al. (2014) percentile approach to the data set. The committee recommends the SEG for Clearwater Creek chum salmon be updated to 3,500–8,000.

### **Deshka River coho salmon**

Currently there is no escapement goal for Deshka River coho salmon. A weir has been operated during the coho salmon run on the Deshka River since 1995. Although managing fisheries that harvest this stock is challenging due to the often pulse-like behavior of coho salmon passage (which is difficult to predict), and high water can render the weir inoperable during key passage times, the committee recommends an SEG of 10,200–24,100, derived using the Clark et al. (2014) percentile approach, be adopted for Deshka River coho salmon.

### **Kasilof and Kenai River sockeye salmon**

During this review the committee updated the escapement time series and stock-recruit analyses for Kasilof and Kenai river sockeye salmon. Incorporating recent production data (2011–2013) had little effect on estimates of escapements that produce maximum yields of the Kasilof River sockeye salmon, so the committee recommended no change to the current goal of 160,000–340,000. Similarly for Kenai River sockeye salmon, recent production data indicates that escapements that produce maximum yields continue to support the current goal of 700,000–1,200,000.

### **Fish Creek sockeye salmon**

The current SEG (20,000–70,000) for Fish Creek was established in 2002. For this review, the committee updated the escapement time series through 2015 and applied the percentile approach (Clark et al. 2014). The committee recommends the SEG range for Fish Creek sockeye salmon be updated to 15,000–45,000.

### **Chelatna, Judd, and Larson lakes sockeye salmon**

The SEGs for these three stocks were established in 2009 from limited times series of data. The current SEGs are Chelatna Lake 20,000–65,000; Judd Lake 25,000–55,000; and Larson Lake 15,000–50,000. With 7 additional years of escapement data since these goals were developed, coupled with an updated methodology (Clark et al. 2014), the committee recommends updating the SEGs as follows: Chelatna Lake 20,000–45,000; Judd Lake 15,000–40,000; and Larson Lake 15,000–35,000.

In summary, the escapement goal committee reviewed 35 salmon escapement goals for the UCI management area with recommendations to establish a weir-based SEG for Little Susitna king salmon, update the range of the SEG for Clearwater Creek chum salmon, establish a new SEG

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for Deshka River coho salmon, and update SEG ranges for four sockeye salmon stocks (Chelatna, Judd, and Larson Lakes, as well as Fish Creek).

An oral and written report concerning escapement goals with specific recommendations will be presented to the board in February/March 2017. These reports will list all current and recommended escapement goals for UCI, as well as a detailed description of the methods used to reach recommendations.

### Literature Cited

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Table 1.—Summary of current escapement goals and recommended escapement goals for salmon stocks in Upper Cook Inlet, 2016.

System	Current Escapement Goal			Recommended Escapement Goal			
	Goal	Type	Year Adopted	Range/Lower Bound	Type	Data <sup>a</sup>	Action
<b>King Salmon</b>							
Alexander Creek	2,100–6,000	SEG	2002	2,100–6,000	SEG	SAS	No Change
Campbell Creek	380	SEG	2011	380	SEG	SFS	No Change
Chuitna River	1,200–2,900	SEG	2002	1,200–2,900	SEG	SAS	No Change
Chulitna River	1,800–5,100	SEG	2002	1,800–5,100	SEG	SAS	No Change
Clear (Chunilna) Creek	950–3,400	SEG	2002	950–3,400	SEG	SAS	No Change
Crooked Creek	650–1,700	SEG	2002	650–1,700	SEG	Weir	No Change
Deshka River	13,000–28,000	SEG	2011	13,000–28,000	SEG	Weir	No Change
Goose Creek	250–650	SEG	2002	250–650	SEG	SAS	No Change
Kenai River - Early Run	3,800–8,500	SEG	2013	NA	SEG	Sonar	Change
Kenai River - Late Run	15,000–30,000	SEG	2013	NA	SEG	Sonar	Change
Lake Creek	2,500–7,100	SEG	2002	2,500–7,100	SEG	SAS	No Change
Lewis River	250–800	SEG	2002	250–800	SEG	SAS	No Change
Little Susitna River <sup>b</sup>				2,300–3,900	SEG	Weir	New Goal
Little Susitna River	900–1,800	SEG	2002	900–1,800	SEG	SAS	No Change
Little Willow Creek	450–1,800	SEG	2002	450–1,800	SEG	SAS	No Change

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System	Current Escapement Goal			Recommended Escapement Goal			
	Goal	Type	Year Adopted	Range/Lower Bound	Type	Data <sup>a</sup>	Action
Montana Creek	1,100–3,100	SEG	2002	1,100–3,100	SEG	SAS	No Change
Peters Creek	1,000–2,600	SEG	2002	1,000–2,600	SEG	SAS	No Change
Prairie Creek	3,100–9,200	SEG	2002	3,100–9,200	SEG	SAS	No Change
Sheep Creek	600–1,200	SEG	2002	600–1,200	SEG	SAS	No Change
Talachulitna River	2,200–5,000	SEG	2002	2,200–5,000	SEG	SAS	No Change
Theodore River	500–1,700	SEG	2002	500–1,700	SEG	SAS	No Change
Willow Creek	1,600–2,800	SEG	2002	1,600–2,800	SEG	SAS	No Change
<b>Chum Salmon</b>							
Clearwater Creek	3,800–8,400	SEG	2002	3,500–8,000	SEG	PAS	Change in Range
<b>Coho Salmon</b>							
Deshka River				10,200–24,100	SEG	Weir	New Goal
Fish Creek (Knik)	1,200–4,400	SEG	2011	1,200–4,400	SEG	Weir	No Change
Jim Creek	450–1,400	SEG	2014	450–1,400	SEG	SFS	No Change
Little Susitna River	10,100–17,700	SEG	2002	10,100–17,700	SEG	Weir	No Change
<b>Sockeye Salmon</b>							
Chelatna Lake	20,000–65,000	SEG	2009	20,000–45,000	SEG	Weir	Change in Range
Fish Creek (Knik)	20,000–70,000	SEG	2002	15,000–45,000	SEG	Weir	Change in Range
Judd Lake	25,000–55,000	SEG	2009	15,000–40,000	SEG	Weir	Change in Range

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System	Current Escapement Goal			Recommended Escapement Goal			
	Goal	Type	Year Adopted	Range/Lower Bound	Type	Data <sup>a</sup>	Action
Kasilof River	160,000– 340,000	BEG	2011	160,000– 340,000	BEG	Sonar	No Change
Kenai River	700,000– 1,200,000	SEG	2011	700,000– 1,200,000	SEG	Sonar	No Change
Larson Lake	15,000– 50,000	SEG	2009	15,000– 35,000	SEG	Weir	Change in Range
Packers Creek	15,000– 30,000	SEG	2008	15,000– 30,000	SEG	Weir	No Change
Russian River - Early Run	22,000– 42,000	BEG	2011	22,000– 42,000	BEG	Weir	No Change
Russian River - Late Run	30,000– 110,000	SEG	2002	30,000– 110,000	SEG	Weir	No Change

<sup>a</sup> PAS = Peak Aerial Survey, SAS = Single Aerial Survey, and SFS = Single Foot Survey.

<sup>b</sup> Little Susitna River has two goals. The Primary goal is the weir goal. The goal based on aerial surveys will only be used if the weir is not operated or is not operational for a significant portion of the season.

NA: Range not available at this time. The recommendations for these two goals will be presented in an updated Upper Cook Inlet Escapement Goal Memo, at or prior to the Lower Cook Inlet board meeting in late November 2016.