



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

Department of Fish and Game

DIVISIONS OF SPORT FISH and COMMERCIAL FISHERIES

333 Raspberry Road
Anchorage, AK 99518-1565
Main: 907.267.2105
Fax: 907.267.2442

MEMORANDUM

TO: Scott Kelley, Director
Division of Commercial Fisheries

DATE: September 22, 2016

Thomas Brookover, Director
Division of Sport Fish

THRU: Tracy Lingnau, Regional Supervisor *TL*
Division of Commercial Fisheries, Region II

SUBJECT: Lower Cook Inlet
Escapement Goal
Memo

Thomas D. Vania, Regional Supervisor *TV*
Division of Sport Fish, Region II

FROM: Jack W. Erickson, Regional Research Coordinator *JWE*
Division of Commercial Fisheries, Region II

Tim McKinley, Regional Research Coordinator *TKM*
Division of Sport Fish, Region II

The purpose of this memo is to report our progress reviewing and recommending escapement goals for Lower Cook Inlet (LCI). Escapement goals in this management area have been set and evaluated at regular intervals since the 1970s (Fried 1994). This effort has resulted in many of the stocks having long-term historical databases. LCI escapement goals were last reviewed by the Alaska Department of Fish and Game (department) (Otis et al. 2013) during the 2013–2014 Alaska Board of Fisheries (board) cycle.

Between December 2015 and February 2016, an interdivisional salmon escapement goal review committee, including staff from the divisions of Commercial Fisheries and Sport Fish, reviewed existing salmon escapement goals in the LCI 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. Although the escapement goals for LCI have been reviewed numerous times in the past, Otis (2001); Otis and Hasbrouck (2004); Otis and Szarzi (2007); and Otis et al. (2010 and 2013), the committee elected to re-analyze all escapement goals in LCI in 2016.

There are currently 41 escapement goals in LCI (Table 1). The committee recommends most escapement goals be updated as a result of applying the updated percentile approach (Clark et al. 2014) for establishing sustainable escapement goals for stocks with limited productivity information. The data and methods used to evaluate the escapement goals and the rationale for making subsequent recommendations will be described in a published report (Otis et al. *In prep*) available prior to the November 2016 LCI board meeting.

Lower Cook Inlet chum, pink, and sockeye salmon

The majority of LCI chum, pink and sockeye salmon escapements are monitored by multiple aerial and/or foot surveys of stream reaches that can be monitored. The resulting escapement indices do not provide absolute abundance estimates suitable for estimating BEGs. The majority of the current escapement goals for these stocks were established in 2002 using the percentile-approach developed by Bue and Hasbrouck (*Unpublished*). For this review cycle, the time series for each stock was updated and the percentile-approach (Clark et al. 2014) was applied. The committee recommends the escapement goal ranges for all but four stocks (McNeil River chum salmon, Tutka Creek pink salmon, and English Bay and Bear Lake sockeye salmon) be changed to reflect the additional years of data and the newly published methodology (Otis et al. *In prep*).

Anchor River king salmon

The current SEG range (3,800–10,000 fish) was established in 2010. An updated stock-recruit analysis supported the existing lower bound of 3,800 fish, but provided evidence that the upper bound of 10,000 fish was too high. The committee recommends a new SEG range of 3,800–7,600 king salmon for the Anchor River.

Deep Creek king salmon

The current SEG range (350–800 fish) was updated using the percentile-approach and provided a very narrow goal range (374–559 fish). The committee recommends updating the goal to a lower bound SEG of 350 king salmon for Deep Creek.

Ninilchik River king salmon

The current SEG range is 550–1,300 fish as counted through a weir from July 3–31. Reanalyzing the data with the percentile-approach suggests a range of 550–900 fish is more appropriate. However, in 2016 the use of instream video equipment facilitated escapement monitoring of the entire run in a cost effective way. From 1999–2005, the Ninilchik River weir was operated to monitor the entire run from mid-May through early August. From 2006–2015, the weir was

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operated from late June into August to index escapement and for broodstock collection. By leveraging the 1999–2005 total run counts, the total runs from 2006–2015 were estimated. Annual total runs from 1999–2015 were then used to establish a total-run SEG using the percentile method (Clark et al. 2014). The committee recommends a new SEG range of 750–1,300 king salmon in the Ninilchik River; as assessed for the entire wild king salmon run.

In summary, the escapement goal committee reviewed 41 salmon escapement goals for the LCI management area with recommendations to update the range of the SEG for 37 of the goals.

An oral and written report (Otis et al. *In prep*) concerning escapement goals, with specific recommendations, will be presented to the board in November 2016. These reports will list all current and recommended escapement goals for LCI, as well as a detailed description of the methods used to reach recommendations. Subsequent to the board meeting, a follow-up memo will be prepared to include escapement goal recommendations to division directors for final approval.

Literature Cited

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Table 1–Summary of current escapement goals and recommended escapement goals for salmon stocks in Lower Cook Inlet.

System	Current Escapement Goal			Recommended Escapement Goal		
	Goal	Type	Year Adopted	Range	Escapement Data ^a	Action
King Salmon						
Anchor River	3,800–10,000	SEG	2010	3,800–7,600	Weir/Sonar	Change in Range
Deep Creek	350–800	SEG	1993	350	SAS	Change to Lower bound SEG
Ninilchik River	550–1,300	SEG	2008	750–1,300	Weir/Video	Change in Range
Chum Salmon						
Port Graham R.	1,450–4,800	SEG	2002	1,200–2,700	MFS	Change in Range
Dogfish Lagoon	3,350–9,150	SEG	2002	3,500–8,600	MFS	Change in Range
Rocky River	1,200–5,400	SEG	2002	1,500–4,400	MAS/MFS	Change in Range
Port Dick Creek	1,900–4,450	SEG	2002	1,900–4,300	MAS/MFS	Change in Range
Island Creek	6,400–15,600	SEG	2002	5,100–11,900	MAS/MFS	Change in Range
Big Kamishak R.	9,350–24,000	SEG	2002	6,800–15,600	MAS	Change in Range
Little Kamishak River	6,550–23,800	SEG	2002	8,000–16,800	MAS	Change in Range
McNeil River	24,000–48,000	SEG	2008	24,000–48,000	MAS	No Change
Bruin River	6,000–10,250	SEG	2002	5,200–10,000	MAS	Change in Range
Ursus Cove	6,050–9,850	SEG	2002	5,900–10,100	MAS	Change in Range
Cottonwood Cr.	5,750–12,000	SEG	2002	5,200–12,200	MAS	Change in Range
Iniskin Bay	7,850–13,700	SEG	2002	5,900–13,600	MAS	Change in Range
Pink Salmon						
Humpy Creek	21,650–85,550	SEG	2002	17,500–51,400	MFS	Change in Range
China Poot Creek	2,900–8,200	SEG	2002	2,500–6,300	MFS	Change in Range
Tutka Creek	6,500–17,000	SEG	2002	6,500–17,000	MFS	No Change
Barabara Creek	1,900–8,950	SEG	2002	2,000–5,600	MFS	Change in Range
Seldovia Creek	19,050–38,950	SEG	2002	21,800–37,400	MFS	Change in Range
Port Graham R.	7,700–19,850	SEG	2002	7,700–19,700	MFS	Change in Range
Dogfish Lagoon Creeks	1,200–8,400	SEG	2014	800–7,100	MAS/MFS	Change in Range
Port Chatham	7,800–21,000	SEG	2002	7,800–18,100	MAS/MFS	Change in Range
Windy Cr. Right	3,350–10,950	SEG	2002	3,400–11,200	MAS/MFS	Change in Range
Windy Cr. Left	3,650–29,950	SEG	2002	5,400–27,100	MAS/MFS	Change in Range

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System	Current Escapement Goal			Recommended Escapement Goal		
	Goal	Type	Year Adopted	Range	Escapement Data ^a	Action
Rocky River	9,350–54,250	SEG	2002	11,700–54,800	MAS/MFS	Change in Range
Port Dick Creek	18,550–58,300	SEG	2002	17,900–49,800	MAS/MFS	Change in Range
Island Creek	7,200–28,300	SEG	2002	9,600–32,500	MAS/MFS	Change in Range
S. Nuka Island Creek	2,700–14,250	SEG	2002	2,800–11,200	MAS/MFS	Change in Range
Desire Lake Cr.	1,900–20,200	SEG	2002	1,500–18,000	MAS	Change in Range
Bruin River	18,650–155,750	SEG	2002	17,800–103,000	MAS	Change in Range
Sunday Creek	4,850–28,850	SEG	2002	4,400–24,900	MAS	Change in Range
Brown's Peak Creek	2,450–18,800	SEG	2002	2,600–17,500	MAS	Change in Range
Sockeye Salmon						
English Bay	6,000–13,500	SEG	2002	6,000–13,500	PAS/Weir	No Change
Delight Lake	7,550–17,650	SEG	2011	5,100–10,600	PAS	Change in Range
Desire Lake	8,800–15,200	SEG	2002	4,800–11,900	PAS	Change in Range
Bear Lake	700–8,300	SEG	2002	700–8,300	Weir	No Change
Aialik Lake	3,700–8,000	SEG	2002	3,200–5,400	PAS	Change in Range
Mikfik Lake	3,400–13,000	SEG	2014	3,400–11,000	Video	Change in Range
Chenik Lake	3,500–14,000	SEG	2011	2,900–13,700	Video/Weir	Change in Range
Amakdedori Cr.	1,250–2,600	SEG	2002	1,200–2,600	PAS	Change in Range

^a SAS = Single Aerial Survey, MAS = Multiple Aerial Survey, PAS = Peak Aerial Survey, MFS = Multiple Foot Survey.