STATE OF ALASKA

SEAN PARNELL, GOVERNOR

1255 W. 8TH Street
P.O. BOX 115526
JUNEAU, AK 99811-5526

PHONE: (907) 465-4210
FAX: (907) 465-2604

DEPARTMENT OF FISH AND GAME

Division of Commercial Fisheries
Division of Sport Fish

MEMORANDUM

TO: John Hilsinger, Director
Division of Commercial Fisheries

Charles Swanton, Director
Division of Sport Fish

DATE: September 28, 2010

THRU: Steve Honnold, Regional Supervisor
Division of Commercial Fisheries, Region IV

James Hasbrouck, Regional Supervisor
Division of Sport Fish, Region II

SUBJECT: Kodiak and Chignik Escapement Goal Reports

FROM: Matt Nemeth, Regional Finfish Research Biologist
Division of Commercial Fisheries, Region IV

Jack Erickson, Regional Research Coordinator
Division of Sport Fish, Region II

The purpose of this memorandum is to inform you of our progress reviewing and recommending salmon escapement goals for the Chignik and Kodiak management areas (CMA and KMA), to be reported at the Board of Fisheries (board) meeting in January 2011. This is the third review of escapement goals in each area since goals began to be reviewed periodically as part of the implementation of the *Policy for Statewide Salmon Escapement Goals* (EGP; 5 AAC 39.223) and the *Policy for the Management of Sustainable Salmon Fisheries* (SSFP; 5 AAC 39.222) in 2001. Escapement goals for both areas were extensively reviewed and revised in 2004 (Nelson et al. 2005; Witteveen et al. 2005) and 2007 (Honnold et al. 2007; Witteveen et al. 2007).

In May 2010, an interdivisional team consisting of staff from the divisions of Commercial Fisheries and Sport Fish from the Alaska Department of Fish and Game (department) was formed to conduct the current review of salmon escapement goals in the CMA and KMA. The team's objectives were to review documented salmon escapement goals in each area and recommend either maintaining or changing them; to identify systems suitable for new goals; and

to document the review and recommendations in a report presented to the board. The review team determined the appropriate goal type for each salmon stock with an existing goal, based on the quantity and quality of the existing data, and then determined the most appropriate methods to evaluate the goals. Data were considered sufficient for a biological escapement goal (BEG) if escapements, total returns, return by age class (i.e., brood tables), and data quality were sufficient to provide a scientifically defensible estimate of the salmon escapement with the greatest potential to produce maximum sustained yield (S_{msy}). If data were not sufficient to credibly estimate S_{msy}, the goals were considered sustainable escapement goals (SEGs). The numerical range of each goal was assessed using several established methods as determined by the professional judgment of team members. This memorandum summarizes the team's review in 2010, its recommendations, and the methods used to assess goals recommended for change.

Chignik Management Area (CMA)

The previous escapement goal review in 2007 resulted in changes to four escapement goals in the CMA. The goal for late run sockeye salmon from the Chignik River changed from an SEG of 200,000–250,000 to an SEG of 200,000–400,000; the aggregate goal for odd-year pink salmon changed from a BEG of 541,000–1,177,000 to an SEG of 500,000–800,000; the aggregate goal for even-year pink salmon changed from a BEG of 327,000–737,000 to an SEG of 200,000–600,000; and the aggregate goal for chum salmon changed from a lower bound SEG of 50,400–57,400. There were no changes to the remaining goals for Chinook salmon and early-run sockeye salmon (Witteveen and Hasbrouck, *Chignik and Kodiak escapement goal recommendations,* unpublished ADF&G memorandum to directors Hilsinger and Swanton, May 13, 2009; hereafter, Witteveen and Hasbrouck 2009).

For the review in 2010, we added the last three years of data (2007 through 2009) to the data set for each of the six escapement goals (Table 1). If these three new years of data contained information that could potentially alter the existing goals, we then conducted a full analysis of the data and determined the correct goal classification and escapement goal range.

The team concluded that an additional three years of data would not affect the escapement goals for Chinook and chum salmon, which were thus not reevaluated. In each of the past three years (2007–2009), Chinook salmon escapement was within the BEG range of 1,300–1,700 fish and chum salmon escapement exceeded the lower bound SEG of 57,400 fish (Table 1). For the remaining four CMA escapement goals, the team conducted further analysis of each stock, made initial escapement goal recommendations, compared these recommendations with the existing goals, and then made a final recommendation. The analytical methods and additional rationale for each recommendation will be described in detail in a department Fishery Manuscript to be published prior to the CMA board meeting in January 2011. In total, the team recommended no changes to any of the six escapement goals in the CMA, and identified no other stocks suitable for adding as new goals. Results from the four goals analyzed are summarized below.

Sockeye salmon – early and late runs

The team recommended no change to the Chignik River early run sockeye salmon SEG of 350,000–400,000 (Table 1). The early run was assessed using the percentile method (Bue and Hasbrouck, *Unpublished*), as in 2007. Four different data sets were analyzed: 1952–2009,

1965–2009, 1977–2009, and 1980–2009. As in 2007, the latest three data sets produced an escapement range of approximately 350,000 to 750,000 fish; however, these results do not incorporate the need for progeny of early run fish to migrate to Chignik Lake and share rearing habitat with other species. Without additional productivity or carrying capacity data, the team agreed to leave the existing escapement goal range in place.

The team carefully considered other potential approaches as an alternative to the percentile analysis for the early run stock. In these, the team identified autocorrelation and nonstationarity of the return data, relatively low contrast in the most recent data sets (2.2), and the fact that most contrast is from escapements below the SEG range. It is possible that other approaches could add insight to the escapement goal determination, but these approaches would also have to consider rearing interactions between progeny of early and late run fish in Chignik Lake and evidence of food limitations in the system. The team agreed that such approaches should be revisited well in advance of the 2013 cycle, when it can also incorporate genetic data scheduled for analysis in 2012.

The team also recommended no change to the Chignik River late run sockeye salmon SEG of 200,000–400,000 fish (Table 1) because the updated spawner-recruit analysis corroborated the existing goal. The model was significant ($P<0.05$), with an S_{msy} of 355,000 fish and an (S_{eq}) of 974,000 fish.

Pink salmon – odd- and even-year goals

The team recommended no change to the existing Chignik River pink salmon SEGs of 200,000–600,000 fish in even years and 500,000–800,000 fish in odd years (Table 1). A yield analysis was conducted using different intervals of observed escapement for escapement goal estimates. Intervals which had fewer than four escapements within the interval were not considered to have reliable estimates of yield for that escapement interval. The escapement range for even-year escapements was assessed from 100,000 to 1,600,000 fish, with intervals of 400,000, 500,000, and 600,000 fish. The escapement range for odd-year escapements was assessed from 100,000 to 1,800,000 fish, with intervals of 300,000, 400,000; 500,000; and 600,000 fish. By assessing the amount of years in each range and the returns per spawner, returns minus parent escapement, and harvest in each scenario, it was determined that the best recommendations were the goal ranges already in existence.

Kodiak Management Area (KMA)

The previous escapement goal review in 2007 resulted in changes to 9 of the 26 goals then in existence, and the addition of three new goals (Witteveen and Hasbrouck 2009). Sockeye salmon goals were changed on Paul's Bay (goal eliminated), Little River (lower bound SEG of 3,000 fish established), Uganik Lake (lower bound SEG of 24,000 fish established), Frazer Lake (BEG changed from 70,000 to 150,000 to 75,000 to 170,000 fish), and for early-run Karluk Lake (BEG changed from 100,000 to 210,000 to 110,000 to 250,000 fish). Chum salmon goals were eliminated for five specific districts and replaced by one newly-created aggregate lower bound SEG of 151,000 fish for the Kodiak Archipelago. The chum salmon goal for the Mainland District was changed to a lower bound SEG of 104,000 fish. There were no changes to the remaining 17 goals.

For the review in 2010, we added the last three years of data (2007–2009) to the data set for each of the 23 current escapement goals (Table 2). If these three new years of data contained enough information to potentially alter the existing goals, we then conducted a full analysis of the data and determined the correct goal classification and escapement goal range.

The team concluded that an additional three years of data did not provide enough information to warrant further assessment of the chum salmon goals, which were therefore not reevaluated. For the remaining KMA escapement goals, the team conducted further analysis of each stock, made initial escapement goal recommendations, compared these recommendations with the existing goals, and then made a final recommendation. The analytical methods and additional rationale for each goal will be described in detail in a department Fishery Manuscript to be published prior to the KMA board meeting in January of 2011. In total, the team analyzed 18 of the 23 goals currently in existence. The team recommended changing twelve goals, two of which would be split into two new goals each. The team recommended no goals for elimination and identified no new systems suitable for adding as goals.

Sockeye salmon (13 existing goals)

The team recommended no change to the Afognak Lake sockeye salmon BEG of 20,000–50,000 fish (Table 2), based on the updated Ricker spawner-recruit curve (Ricker 1954) and corroborating euphotic volume and zooplankton biomass models. Returns from brood years fully recruited since the last escapement goal review had little effect on the existing escapement goal range. The Ricker spawner-recruit regression was significant ($P < 0.05$) and S_{msy} was estimated to be 39,000 with a 90% S_{msy} range of 29,000 to 56,000; the escapement data had sufficient contrast. The euphotic volume model estimated the optimal escapement to Afognak Lake to be 43,000 adult sockeye salmon. The zooplankton biomass model estimated the optimal escapement to Afognak Lake to be 24,000 adult sockeye salmon.

The team recommended that the Ayakulik River sockeye salmon SEG (200,000–500,000) be split into early and late runs to protect the different temporal components of the run, since it extends from May to September. An early run SEG of 140,000–280,000 fish by July 15th and a late run SEG of 60,000–120,000 fish after July 15th are recommended (Table 2) based on zooplankton biomass models and historical escapement goals. Historically, there were separate goals for early and late run components until 2004. The goals were combined into a single one in 2004, which was retained in the 2007 review. In the current review, a spawner-recruit model was not significant for the entire run when using datasets from various time periods. These new early and late run goals will be reinvestigated in 2013, after completion of run reconstructions and brood tables for the early and late segments.

The escapement goal team recommended the current Buskin River sockeye salmon SEG of 8,000–13,000 fish should be changed to a BEG of 5,000–8,000 fish (Table 2). Staff conducted a Bayesian spawner-recruit analysis (Schmidt and Evans 2010) which yielded a 90% credibility interval of S_{msy} of 4,950–8,700 fish and a probability of sustained yield being greater than 90% of S_{msy} occurring for an escapement range of 5,000–8,000 fish. The past decade has included record high and low returns of Buskin River sockeye salmon, with the low returns possibly related to overescapement.

The team recommended no change to the Frazer Lake sockeye salmon BEG of 75,000–170,000 fish (Table 2). The addition of three more years of spawner-recruit data yielded little change in the estimates of productivity. A zooplankton biomass model corroborated the current spawner-recruit analysis, whereas a euphotic volume model produced an optimum estimate over the upper range. The Ricker spawner-recruit analysis was performed using the Frazer Lake fully recruited brood year spawner-recruit data from 1966 to 2002, excluding the brood years of 1985 through 1991 when fertilization directly affected production. The multiplicative error model was significant ($P < 0.001$), the S_{msy} was estimated at 117,000 fish with a 90% S_{msy} range of 75,000–168,000 fish, and S_{eq} was estimated at 321,000 fish. The escapement data contrast was 30.7 and there was no autocorrelation detected in the residual plots.

The team recommended no change to the early and late run sockeye salmon BEGs for Karluk Lake (Table 2). For the early run BEG (110,000–250,000 fish, with an S_{msy} of 175,000 fish), the spawner-recruit estimate was similar to estimates made during the 2004 review and the committee agreed that small scale changes to this goal should not be made during every review. For the late run BEG (170,000–380,000 fish, with an S_{msy} of 270,000 fish), the updated spawner-recruit analysis was also similar to the previous estimate. Data contrast was acceptable for both the early (8.7) and late (19.9) runs, and neither run had autocorrelated residuals. Recent low returns of sockeye salmon with large parent-year escapements have caused some concerns regarding Karluk Lake sockeye salmon. The parent year escapements for recent runs, on average, were well above the escapement goals; however, the returns are not fully recruited at this time and were therefore not used in this analysis. Limnological analyses also indicate that the current escapement goals are appropriate; euphotic volume (593,000 fish) and zooplankton biomass (397,000 fish) models corroborate the combined total of the early- and late-run goals (280,000–630,000 fish).

The team recommended no change to the lower bound SEG of 3,000 sockeye salmon for Little River Lake sockeye salmon (Table 2). Since 1985, escapements have fallen above the current lower bound SEG in 22 years and have been below only three years; however, two of these years were 2008 and 2009, when aerial surveys appear of sufficient quality that the low escapement numbers are likely real and not a function of unusually low effort or poor survey conditions. The team had lengthy conversations about whether to keep the goal, given the difficulties in surveying and the lack of direct management of the stock, but ultimately elected to keep the goal.

The team recommended no change to the Malina Creek SEG of 1,000–10,000 sockeye salmon, based on results of the percentile method and corroborating results from limnological models (Table 2). The percentile algorithm yielded an escapement goal range of 1,000 to 7,000 fish, with a contrast of 31 in the peak aerial survey data. A euphotic volume model estimated the optimal escapement to be 10,900 adult sockeye salmon, and a zooplankton biomass model estimated the optimal escapement to be 5,900 adult sockeye salmon. Escapements have been within the SEG of 1,000–10,000 fish since 2005.

The team recommended changing the goal for Pasagshak River sockeye salmon to a lower bound SEG of 3,000 fish (Table 2) because escapements are not managed inseason, but instead, only quantified postseason (making this goal type consistent with the other two systems that have the same management strategy: Little River and Uganik Lake). The team used the percentile

method for the primary analysis, along with euphotic volume for secondary analyses. The percentile method used peak aerial survey data from 1968 to 2009; no age data are available for this stock. The euphotic volume model estimated the optimal escapement to Pasagshak River to be 4,500 fish.

The team recommended changing the upper range of the BEG for Saltery Lake sockeye salmon from 15,000–30,000 fish to 15,000–35,000 fish (Table 2). A spawner-recruit model was fit to the Saltery Lake fully recruited brood year spawner-recruit data from 1976 to 2003; the model was significant ($P < 0.001$), with an S_{msy} estimate of 23,600 fish, a 90% MSY range of 15,300–33,400 fish, and an S_{eq} of 61,000 fish. Contrast of the escapement data was 6.7, and no autocorrelation was detected in residual plots. A zooplankton biomass model estimated the optimal escapement to Saltery Lake to be between 23,000 and 35,000 adult sockeye salmon based on the 1997–2002 average smolt size of 2.1 grams; a euphotic volume model suggested a lower goal of 9,000 fish. Overall, the team agreed that results from the spawner-recruit and zooplankton biomass models warranted the change to the upper end of the goal.

The team recommended no change to the lower bound SEG of 24,000 sockeye salmon for Uganik Lake (Table 2). Analysis was performed using the percentile method; data contrast was 34, and the 25th percentile was 25,000 fish. The team had lengthy conversations about whether to keep the goal, given the difficulties in surveying and lack of direct management of the stock, but ultimately elected to retain the goal for the current cycle.

The team recommended changing the escapement goal for early-run sockeye salmon from Upper Station from an SEG of 30,000–65,000 to a BEG of 43,000–93,000 (Table 2). A Ricker spawner-recruit model was fit to the Upper Station early run fully recruited brood year spawner-recruit data from 1975 to 2003. The model was significant ($P < 0.05$), with an S_{msy} of 66,000 fish, a 90% MSY range of 43,000 to 93,000 fish, and an S_{eq} estimate of 165,000 fish. Data contrast was acceptable (16.5) and the residuals did not have significant autocorrelation. Upper Station also has an OEG of 25,000 fish, which was established by the board in 1999.

The team recommended no change to the late run Upper Station sockeye salmon BEG of 120,000–265,000 fish (Table 2). The model was fit to the fully recruited brood year spawner-recruit data from 1975 to 2003. The model was significant ($P < 0.05$), with an S_{msy} of 238,000, a 90% MSY range of 153,000 to 337,000, and an S_{eq} of 624,000 sockeye salmon. Data contrast was acceptable (10.7), but residuals had significant autocorrelation (lag-1) and serious non stationary processes affecting the time series of production. A combined early and late run spawner recruit model was not significant ($P > 0.05$).

Chinook salmon (two existing goals)

The escapement goal team reviewed weir and harvest data for the past three years (2007–2009) for the Chinook salmon goals on the Ayakulik and Karluk rivers. For both systems, the team concluded that recent low returns from large brood year escapements could improve the current spawner recruit analyses. Bayesian spawner-recruit analyses with AR(1) productivity terms to account for serial correlation between successive years were completed for each stock. The team recommended changing the BEG for Ayakulik River Chinook salmon from its current range of 4,800–9,600 fish to a range of 4,000–7,000 fish, and the BEG for Karluk River Chinook salmon

from its current range of 3,600–7,300 fish to a range of 3,000–6,000 fish (Table 2). The Karluk River stock has been below the escapement goal range in each of the last four years (2007–2010). ADF&G will request Karluk River Chinook salmon be designated a stock of management concern at the board work session in October 2010.

Coho salmon (four existing goals)

The escapement goal team recommended eliminating the upper bounds of coho salmon SEGs for the American, Olds, and Pasagshak rivers, and that the stocks be identified as lower bound SEGs because the upper ends of the goals are not managed for. The recommended lower bound SEGs are 400 fish for the American River, 1,000 fish for the Olds River, and 1,200 fish for the Pasagshak River (Table 2). The team examined stock assessment data from these three stocks, concluded that the three additional years of data would not affect the results of the previous analyses in 2007, and declined to evaluate them further. The team analyzed the Buskin River SEG and recommended it remain unchanged at 3,200–7,200 fish (Table 2).

Pink salmon (two existing goals)

The team recommended changing the Kodiak Archipelago pink salmon SEG of 2,000,000–5,000,000 fish to an odd year SEG range of 2,000,000– 6,000,000 fish and an even year SEG of 3,000,000–8,000,000 fish (Table 2). The difference in odd- and even-year SEGs is due more to differences in odd and even year pink salmon runs to the Karluk and Ayakulik rivers than to differences between odd and even years throughout the entire Kodiak Management Area.

The team recommended changing the Kodiak Mainland pink salmon SEG of 250,000–750,000 fish to an SEG range of 250,000–1,000,000 fish (Table 2). Although the current goal would likely ensure continued sustainability of the stock, increasing the upper goal to 1,000,000 is more likely to result in a range containing S_{msy}.

In summary, the review of CMA escapement goals recommended no changes after analyzing four of the six goals. The review of the KMA escapement goals recommended changes to 12 of the 23 existing goals, including the splitting of two goals (Ayakulik River sockeye salmon and Kodiak Archipelago pink salmon) into two goals each. All of the recommendations have gone through a three-step process thus far, consisting of initial recommendations by the lead analyst (completed in early July 2010), follow-up with the entire team in a dedicated meeting on August 25, 2010, and subsequent revisions and review completed on September 23, 2010.

The overall process is on course and similar to the timeline used in 2007. Staff are now preparing a draft report for team review and preparing for the October work session and the January 2011 board meeting. Escapement goal recommendations for each separate area will be presented to the board orally and in writing. These reports will list all current and recommended escapement goals, as shown in tables 1 and 2, and will provide detailed descriptions of the analyses performed. After the board meetings in January 2011, a memorandum to the division directors will be prepared that describes the final recommendations.

References

Bue, B. G., and J. J. Hasbrouck. *Unpublished.* Escapement goal review of salmon stocks of Upper Cook Inlet. Alaska Department of Fish and Game, Report to the Board of Fisheries, 2001, Anchorage.

Honnold, S. G., M. J. Witteveen, M. B. Foster , I. Vining, and J. J. Hasbrouck. 2007. Review of escapement goals for salmon stocks in the Kodiak Management Area, Alaska. Alaska Department of Fish and Game, Fishery Manuscript No. 07-10, Anchorage.

Nelson P. A., M. J. Witteveen, S. G. Honnold, I. Vining, and J. J. Hasbrouck. 2005. Review of salmon escapement goals in the Kodiak Management Area. Alaska Department of Fish and Game, Fishery Manuscript No. 05-05, Anchorage.

Ricker, W.E. 1954. Stock and recruitment. Journal of the Fisheries Research Board of Canada, 11: 559-623.

Schmidt, J. S. and D. Evans. 2010. Stock assessment of sockeye salmon in the Buskin River, 2007-2009. Alaska Department of Fish and Game, Fishery Data Series No. 10-29, Anchorage.

Witteveen, M. J., H. Finkle, P. A. Nelson, J. J. Hasbrouck, and I. Vining. 2005. Review of salmon escapement goals in the Chignik Management Area. Alaska Department of Fish and Game, Fishery Manuscript No. 05-06, Anchorage.

Witteveen, M. J., H. Finkle, J. J. Hasbrouck, and I. Vining. 2007. Review of salmon escapement goals in the Chignik Management Area. Alaska Department of Fish and Game, Fishery Manuscript No. 07-09, Anchorage.

cc: Members, Alaska Board of Fisheries

Table 1. Existing and recommended escapement goals for Chignik Management Area, based on results from the team meeting on 8/25/10.

Species	System	Escapement data[a]	Current escapement goal				Escapements			Preliminary 2010 recommendation
			Type	Lower	Point	Upper	2007	2008	2009	
Chinook										
	Chignik	WC	BEG	1,300	1,695	2,700	2,000	1,730	1,680	No change
Sockeye										
	Chignik									
	Early run	WC	SEG	350,000		400,000	361,091	377,579	391,476	No change
	Late run[b]	WC	SEG	200,000		400,000	293,883	328,479	328,586	No change
Pink										
	Chignik aggregate – odd years	PAS	SEG	500,000		800,000	1,217,064		869,063	No change
	Chignik aggregate – even years	PAS	SEG	200,000		600,000		863,031		No change
Chum										
	Chignik aggregate	PAS	Lower bound SEG	57,400			238,098	197,259	214,959	No change

[a] PAS = Peak Aerial Survey, WC= Weir Count

[b] The late-run escapement goal for Chignik River sockeye salmon includes the SEG range, plus an additional 50,000 sockeye salmon for an inriver run goal (25,000 in August and 25,000 in September) to meet late season subsistence needs.

Table 2. Existing and recommended escapement goals for Kodiak Management Area, based on results from the team meeting on 8/25/10.

Species	System	Escapement data[a]	Current escapement goal Type	Lower	Point	Upper	Escapements 2007	2008	2009	Preliminary 2010 recommendation
Chinook										
	Ayakulik	WC	BEG	4,800	6,638	9,600	6,410	3,071	2,615	Change to BEG 4,000-7,000
	Karluk	WC	BEG	3,600	4,492	7,300	1,554	752	1,308	Change to BEG 3,000-6,000
Sockeye										
	Afognak	WC	BEG	20,000	34,000	50,000	21,070	26,874	31,358	No change
	Ayakulik	WC	SEG	200,000		500,000	283,042	162,888	315,184	Change to early run SEG of 140,000-280,000 and late run SEG of 60,000-120,000
	Buskin	WC	SEG	8,000		13,000	16,502	5,900	7,757	Change to BEG of 5,000-8,000
	Frazer	WC	BEG	75,000	118,000	170,000	120,186	105,363	101,845	No change
	Karluk									
	Early run	WC	BEG	110,000	175,000	250,000	279,390	82,071	52,466	No change
	Late run	WC	BEG	170,000	270,000	380,000	267,185	164,419	277,611	No change
	Little River	PAS	Lower bound SEG	3,000			8,500	2,300	1,500	No change
	Malina	PAS	SEG	1,000		10,000	1,900	3,690	1,400	No change
	Pasagshak	FS	SEG	3,000		12,000	14,300	14,900	1,400	Change to lower bound SEG of 3,000
	Saltery	WC or PAS	BEG	15,000	23,000	30,000	17,200	49,266	46,591	Change to BEG 15,000 - 35,000
	Uganik Lake	PAS	Lower bound SEG	24,000			35,000	64,700	53,700	No change
	Upper Station									
	Early run[b]	WC	SEG	30,000		65,000	31,895	38,800	34,585	Change to BEG of 43,000 - 93,000
	Late run	WC	BEG	120,000	186,000	265,000	149,709	184,856	161,736	No change
Coho										
	Buskin	WC	BEG	3,200	5,000	7,200	9,001	9,028	10,624	No change
	American	FS	SEG	400		900	307	700	639	Change to lower bound SEG of 400
	Olds	FS	SEG	1000		2,200	868	697	656	Change to lower bound SEG of 1,000
	Pasagshak	FS	SEG	1200		3,300	1,896	3,875	2385	Change to lower bound SEG of 1,200
Pink										
	Kodiak Archipelago	PAS	SEG	2,000,000		5,000,000	2,208,678	2,924,708	4,711,087	Change to SEGs: even yr 3-8M, odd yr 2-6M
	Mainland District	PAS	SEG	250,000		750,000	315,300	236,500	430,100	Change to SEG of 250K-1M
Chum										
	Kodiak Archipelago	PAS	Lower bound SEG	151,000			206,983	101,482	202,039	No change
	Mainland District	PAS	Lower bound SEG	104,000			87,350	122,425	103,656	No change

[a] PAS = Peak Aerial Survey, WC= Weir Count, FS = Foot Survey

[b] Upper Station early run has the only optimal escapement goal (OEG; 25,000) in the KMA, established by the BOF in 1999.