ESCAPEMENT GOAL REVIEW OF SELECT AYK REGION SALMON STOCKS

By:

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Escapement goals suggested in this report are the products of several collaborative meetings of the AYK Escapement Goal Team. This group was co-chaired by Matt Evenson, Linda Brannian, and John Hilsinger and was comprised of ADF&G management and research staff. Commercial Fisheries contributing staff included: Dan Bergstrom, Bonnie Borba, Fred Bue, Drew Crawford, Jeff Estensen, Hamachan Hamazaki, Tracy Lingnau, Susan McNeil, Jim Menard, Doug Molyneaux, Gary Todd, and Craig Whitmore. Sport Fish contributing staff included: Audra Brase, John Burr, Dave Bemard, Bob Clark, Fred DeCicco, Mike Doxey, Steve Fleischman, Bob Lafferty, Fronty Parker and Brian Taras.

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INTRODUCTION

This report is a summary of analyses of escapement goals for the major salmon stocks of the Yukon River Management Area, Kuskokwim Management Area (Kuskokwim River and Kuskokwim Bay), Norton Sound District, Port Clarence District, and Kotzebue District. Escapement goals were evaluated and recommended based on the *Policy for the Management of Sustainable Salmon Fisheries* (Sustainable Salmon Policy: 5 AAC 39.222) and the *Policy for Statewide Salmon Escapement Goals* (Escapement Goal Policy: 5 AAC 39.223). An ADF&G interdivisional Escapement Goal Review Team was assigned to review escapement and other data and make escapement goal recommendations where appropriate. Formal meetings were conducted on December 2-3, 2002; February 10-11, 2003, February 26, 2003; September 3-5, 2003, and October 28-30, 2003 to discuss and develop recommendations Updates and preliminary recommendations were distributed through e-mail.

The Sustainable Salmon Policy defines three types of escapement goals:

> *Biological Escapement Goal* (BEG): means the escapement that provides the greatest potential for maximum sustained yield; BEG will be the primary management objective for the escapement unless an optimal escapement or inriver run goal has been adopted; BEG will be developed from the best available biological information, and should be scientifically defensible on the basis of available biological information; BEG will be determined by the department and will be expressed as a range based on factors such as salmon stock productivity and data uncertainty; the department will seek to maintain evenly distributed salmon escapements within the bounds of a BEG.
>
> *Sustainable Escapement Goal* (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 due to the absence of a stock specific catch estimate; the SEG is the primary management objective for the escapement, unless an optimal escapement or inriver run goal has been adopted by the board, and will be developed from the best available biological information; the SEG will be determined by the department and will be stated as a range that takes into account data uncertainty; the department will seek to maintain escapements within the bounds of the SEG.
>
> *Sustained Escapement Threshold* (SET): means a threshold level of escapement, below which the ability of the salmon stock to sustain itself is jeopardized; in practice, SET can be estimated based on lower ranges of historical escapement levels, for which the salmon stock has consistently demonstrated the ability to sustain itself; the SET is lower than the lower bound of the BEG and lower than the lower bound of the SEG; the SET is established by the department in consultation with the board, as needed for salmon stocks of management or conservation concern.

BEGs are set to provide levels of escapement that will produce large returns with large harvestable surpluses on average. Escapements above or below these levels may be sustainable, but will on average produce less fish for people to catch. SEGs are set to provide levels of escapement that will produce runs and harvests similar to what has occurred in the past. Most escapement goals in the AYK Region are sustainable escapement goals because inadequate data exists to determine total escapement or total return for a given stock. Great advances in stock assessment have been made in the AYK Region in recent years. More stocks have escapement assessed by weirs or towers, mark-recapture projects provide total abundance estimates for several stocks, and radiotelemetry provides valuable information on the distribution of salmon.

Many of these projects have operated less than 10 years and sufficient data does not yet exist to develop escapement goals, but over the next three to six years this data should significantly improve the ability to set scientifically defensible escapement goals in AYK Region that will provide for high levels of yield.

The escapement goal team focused on reviewing data to establish BEGs and SEGs. Only two stocks, Norton Sound Subdistrict One (Nome) chum salmon and Yukon River summer chum salmon, were recommended to the Alaska Board of Fisheries (board) as stocks of management concern by the department in November 2003. No SET was set for these stocks because the criteria for setting an SET suggest that it be estimated based on the lower ranges of historical escapement levels for which the stock has consistently demonstrated the ability to sustain itself. Because the lower escapement levels have been observed in recent years, full returns from these escapements will not be realized until at least 2004, when the 5-year old fish return from the 1999 escapement, and more reliably not until 2009 when all the six-year old fish will have returned from the 2003 escapement.

Before adoption of the regulatory Escapement Goal Policy in 2001, all escapement goals established by the department for stocks in these areas were termed biological escapement goals. However, most of these goals did not meet the criteria for a BEG under the new policy definition. At the 2001 board meeting, only select stocks were reviewed and goals were established consistent with the Escapement Goal Policy definitions. Goals not specifically reviewed in 2001 have remained as management targets, but their designation is undefined (referred to as escapement objectives (EO) throughout this report). The escapement goal team reviewed all such stocks and goals and provided recommendations for either establishing a new goal consistent with the Sustainable Salmon Policy or discontinuing the goal. At the 2001 Board of Fisheries meeting, the board approved 15 BEGs established by the Department for chinook and chum salmon stocks in the Yukon River and chum salmon stocks in Norton Sound (Clark 2001a, Clark 2001b, Clark 2001c, Clark and Sandone 2001, Eggers 2001, Evenson 2002). The team updated the original analyses for these stocks using data collected since 2000 to determine if a change in the BEG was warranted.

Many of stocks that now have recent towers or weirs have no escapement goal or the goal is based on a different enumeration procedure, such as aerial survey counts. The team reviewed escapement data from these stocks to determine if a goal could be developed based on the current escapement monitoring method. However, in most cases, the number of escapement estimates was insufficient to define a goal consistent with definitions in the Escapement Goal Policy. The team recognized the value of having a goal based on the more rigorous enumeration method, and strongly recommended that these enumeration projects continue and that the data be reviewed again during the next board cycle.

METHODS

The escapement goal team evaluated the type, quality, and amount of data for each stock to determine the appropriate type of escapement goal as defined in the Sustainable Salmon Policy. Available data on escapement, harvest, and age composition for each stock were compiled from research reports, management reports, and unpublished historical databases. The following methods were used to set BEGs and SEGs.

Methods for Setting Biological Escapement Goals

BEGs were established for 15 stocks in 2001. These included the Subdistrict One, Kwiniuk

River, and Tubutulik River chum salmon in Norton Sound; Anvik River and East and West Fork Andreafsky River summer chum salmon in the Yukon River; seven Yukon River fall chum salmon stocks; and, Chena River and Salcha River chinook salmon. No BEGs other than those 15 were recommended for any of the stocks in the Yukon, Kuskokwim, Norton Sound, or Kotzebue areas. The analyses used to develop the BEGs for the 15 stocks in 2001 were repeated with the inclusion of data collected since the last analysis. Although each of these analyses used different methods for reconstructing runs, all used Ricker two parameter spawner-recruit models to estimate the escapement that produces maximum sustained yield (MSY). A range of 0.8-1.6 times the escapement that produces MSY was used as the range for the BEG. For the remainder of stocks in the region, data were of insufficient quality or quantity to develop a BEG. In general, a relatively long series of escapement and total return estimates are needed. Optimal length of a data set can vary, but ideally, it would include several generations of fish, and variability in the numbers of spawners and the subsequent returns. Secondly, stock specific age composition and harvest data are necessary in order to develop a complete picture of the total annual returns. Because many of the salmon fisheries in the region are mixed stock fisheries, it is rare that the exact contribution of a specific stock to subsistence, commercial, or sport fisheries is known.

Methods for Setting Sustainable Escapement Goals

The majority of salmon stocks in the AYK Region do not have sufficient data to develop BEG recommendations. For those stocks that have sufficient escapement information, but lack the data to estimate total returns, sustainable escapement goals (SEG) may be developed. Bue and Hasbrouck (2001) suggested the following criteria for categorizing SEGs depending on the accuracy and amount of data available:

> Excellent: Escapement, harvest and age all estimated with relatively good accuracy and precision (e.g. escapement estimated by a weir or hydroacoustics, harvest estimated by Statewide Harvest Survey of Fish Tickets); escapement and return estimates can be derived for a sufficient time series to construct a brood table and estimate MSY.
>
> Good: Escapement, harvest and age all estimated with reasonably good accuracy and/or precision (e.g. escapement estimated by capture-recapture experiment or multiple foot/aerial surveys); no age data or data is of questionable accuracy and/or precision; data may allow construction of brood table; data time series relatively short to accurately estimate MSY.
>
> Fair: Escapement estimated or indexed and harvest estimated with reasonably good accuracy but precision lacking for one if not both; no age data; data insufficient to estimate total return and construct brood table.
>
> Poor: Escapement indexed (e.g. single foot/aerial survey) such that the index provides a fairly reliable measure of escapement; no harvest and age data.

In addition to these criteria, Bue and Hasbrouck (2001) suggested an algorithm to estimate sustainable escapement goals (SEGs) for Upper Cook Inlet salmon stocks:

Spawning Contrast [a]	SEG Range
Low (<4)	15th percentile - Maximum
Medium (4 – 8)	15th and 85th percentile
High (>8) and at most low exploitation	15th and 75th percentile
High (>8) and at least moderate exploitation	25th and 75th percentile

[a] Relative range of the entire time series of escapement data calculated by dividing the maximum observed escapement by the minimum observed escapement.

These criteria were used to assess the available salmon escapement data for all areas of the AYK Region and make recommendations for SEGs. For a few stocks, a minimum SEG point threshold was recommended rather than a range. Threshold SEG goals were only recommended in some situations where a stock is managed incidentally to a more abundant stock or in cases when a fishery has been prosecuted at very low levels such that there is no ability to "fish down" the stock to an optimal upper range.

There is still considerable debate within the department and within the advisors group as to methodologies for setting SEGs and what constitutes adequate justification for setting an SEG. The team agreed that while the methodology used in Cook Inlet in 2001 (Bue and Hasbrouck 2001) has a high probability of replicating the returns historically observed for a stock, it is a descriptive method not based on a determination of the relationship between spawners and recruitment.

The remainder of this report presents the department's determinations for escapement goals in each of the areas in the AYK Region.

YUKON RIVER MANAGEMENT AREA

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In the Yukon River Management Area (Yukon River area), a total of 17 escapement goals were established, seven for chinook salmon, two for summer chum salmon, seven for fall chum salmon, and one for coho salmon. Five escapement goals were discontinued.

Table 1 summarizes the number of stocks in the Yukon River area that were reviewed for escapement goals, the number and type of goals established, the number of stocks for which escapement goals were discontinued, and the number of stocks that had ins cient data to establish goals. Some stocks are enumerated by more than one method.

Table 2 lists all the stocks in the Yukon River area for which escapement goals were established and stocks for which goals were discontinued.

Table **3** lists all the stocks in the Yukon River area that were reviewed, but for which there was insufficient data to establish a goal at this time or for which a goal was established using a different enumeration method.

Appendices A.l – A.22 detail available data and analyses used to establish escapement goals in the Yukon River area.

Table 1. Yukon River area escapement goal review summary.

	Salmon Species			
	Chinook	Summer Chum	Fall Chum	Coho
Numher of stocks reviewed"	13"	19	7	3
Numher of escapement goals revised	4	1	0	1
Number of new goals established	1	0	0	0
Number of escapement goals not revised	2	1	7	0
Total number of escapement goals established	2 BEG 5 SEG	2 BEG 0 SEG	7 BEG 0 SEG	0 BEG 1 SEG
Number of escapement goals discontinued	2	3	0	0
Numher of stocks for which no escapement goal was established	5	14	0	2

[a] Stocks for which there are some escapement data. Some stocks have more than one enumeration method, and were tabulated as different stocks.

[b] Does not include Nulato River North and South fork chinook salmon aerial surveys added together (combined) as a separate stock.

Table 2. Summary of all Yukon Rivcr area salmon stocks for which escapement goals were determined or discontinued

Stock Unit	Enumeration Method	Previous Escapement Goal			Escapement Goal Determination		
		Goal	Type	Yr. Estab.	Action	Coal	Type
Chinook Salmon							
Eas: Fork Andreafsky River	Aerial Survey	>1,500	EO[a]	1992	Revise	960-1,700	SEG
West Fork Andreafsky River	Aerial Survey	21,400	EO	1992	Revise	640-1,600	SEG
Anvik River	Aerial Survey	>1,300	EO	1992	Revise	1,100-1,700	SEG
N. F. Nulato River	Aerial Survey	>800	EO	1992	Discontinue		
S. F. Nulato River	Aerial Survey	>500	EO	1992	Discontinue		
Nulato River (bath forb combined)	Aerial Survey	None			Establish	940-1,900	SEG
Gisasa River	Aerial Survey	>600	EO	1992	Revise	420-1.100	SEG
Chena River	Tower/M-R	2,800-5,700	BEG	2001	No Revision	2,800-5,700	BEG
Salcha River	Tower/M-R	3,300-6,500	BEG	2001	No Revision	3,300-6,500	BEG
Summer Chum Salmon							
Eas: Fork Andreafsky River	Weir	65,000-130,000	BEG	2001	No Revision	65,000-130,000	BEG
Eas: Fork Andreafsky River	Aerial Survey	35,000-70,000	BEG	2001	Discontinue		
West Fork Andreafsky River	Pop. Est	65,000-130,000	BEG	2001	Discontinue		
West Fork Andreafsky River	Aerial Survey	35,000-70.000	BEG	2001	Discontinue		
Anvik River	Sonar	400,000 - 800.000	BEG	2001	Revise	350.000 - 700,000	BEG

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Stock Unit	Enumeration Method	Previous Escapement Coal			Escapement Goal Determination		
		Coal	Type	Yr. Estab.	Action	Goal	Type
Fall Churn Salmon							
Yukon R Drainage	Multiple[b]	300,000-600,000	BEG	2001	No Revision	300,000-600,000	BEG
Yukon R. Mainstem (Canada)	M-R	>80,000	TO	1990	Negotiated	>65,000[d]	TO[f]
Tanana River	M-R	61.000-136,000	BEG	2001	No Revision	61,000-136,000	EEG
Delta River	Foot Survey	6,000-13,000	BEG	2001	No Revision	6,000-13,000	BEG
Toklat River	Foot Survey	15,000-33,000	BEG	2001	No Revision	15,000-33,000	BEG
Upper Yukon R. Trib.	Multiple	152,000 - 312,000	BEG	2001	No Revision	152,000 - 312,000[e]	BEG
Chandalar River	Sonar	74.000-152,000	BEG	2001	No Revision	74,000-152,000	EFG
Sheenjek River	Sonar	50.000-104,000	BEG	2001	No Revision	50,000-104.000	E EG
Fishing Branch River	Weir	50,000-120,000	TO'	1987	Negotiated	>15,000[e]	TO[f]
Coho Salmon							
Delta Clearwater River	Boat Survey	>9,000	SEG	1992	Revise	5.200-17,000	SEG

[a] EO refers to an escapement objective determined by the Department that has not been reviewed since adoption of the PMSSF.

[b] Based on Eggers (2001) recommended drainage-wide BEG. The drainage-wide BEG is the sum of the Tanana River drainage, the Upper Yukon River Tributaries, and the mainstem Yukon River in Canada BEGs, adjusted upwards by approximately 25.000 to provide a rough correction for unmonitored escapement within the Yukon River drainage. Actual management targets may change somewhat from year lo year depending on U.S./Canada Panel decisions on border passage.

Escapement or passage goal established as a treaty obligation (TO) by the U.S./Canada JTC, not ADF&G., and are included for clarification only.

[d] For 2003, the Yukon River Treaty Panel negotiated an annual goal of >65,000 fall chum salmon based on three cycle rebuilding to 80,000 fish.

[e] Based on Eggers (2001 recommended Upper Yukon Tributaries BEG of 152,000-312 fall chum salmon Actual management objective may be somewhat different due to the difference between the Eggers (2001) recommendation and the U.S./Canada JTC-established interim escapement goals for Canadian-origin fall chum salmon stocks in the Fishing Branch River.

[f] For 2003 the Yukon River Treaty Panel negotiated an annual goal of >15,000 chum salmon based on predicted returns from parent year escapements.

Table 3. Yukon River area stocks for which escapement goals were not established because of insufficient data or alternative enumeration methods.

Stock	Rationale for not Establishing an Escapement Goal
Chinook Salmon	
EF Andreafsky River (weir)	Insufficient number of escapement estimates.
Mainstem Nulato River (tower/weir)	Insufficient number of escapement estimates.
Gisasa River (weir)	Insufficient number of escapement estimates.
Chena River (aerial survey)	Goal established for Tower/M-R estimates.
Salcha River (aerial survey)	Goal established for Tower/M-R estimates.
Summer chum Salmon	
Kaltag River (aerial survey)	Lacks historical escapement and stock contribution data.
N.F. Nulato River (aerial survey)	Lacks historical escapement and stock contribution data.
S.F. Nulato River (aerial survey)	Lacks historical escapement and stock contribution data.
Mainstem Nulato River (towedweir)	Insufficient number of escapement estimates.
Gisasa River (weir)	Insufficient number of escapement estimates.
Gisasa River (aerial survey)	Lacks historical escapement and stock contribution data.
Clear/Caribou Creek (aerial survey)	Lacks historical escapement and stock contribution data.
Clear Creek (tower)	Insufficient number of escapement estimates.
Tozitna River (aerial survey)	Lacks historical escapement and stock contribution data.
Chena River (aerial survey)	Lacks historical escapement and stock contribution data.
Chena River (tower)	Counts are incomplete, no stock apportionment.
Salcha River (aerial survey)	Lacks historical escapement and stock contribution data.
Salcha River (tower)	Counts are incomplete, no stock apportionment.
Yukon mainstem (Pilot Station sonar)	This would essentially be a doubling of the Anvik R BEG.
Coho Salmon	
EF Andreafsky River (weir)	Insufficient number of escapement estimates.
Yukon mainstem (Pilot Station sonar)	Insufficient number of abundance estimates.

KUSKOKWIM MANAGEMENT AREA

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In the Kuskokwim Management Area (Kuskokwim area), which includes Kuskokwim River and Kuskokwim Bay, a total of 22 escapement goals were established, 12 for chinook salmon, 0 for fall chum salmon, 4 for summer chum salmon, 3 for coho salmon, and 3 for sockeye salmon. Eight escapement goals were discontinued because of poor data quality or the existence of more reliable data for the same river system, or an adjacent system.

Table 4 summarizes the number of stocks in the Kuskokwim area that were reviewed for escapement goals, the number and type of goals established, the number of stocks for which escapement goals were discontinued, and the number of stocks that had insufficient data to establish goals. Some stocks are enumerated by more than one method.

Table 5 lists all the stocks in the Kuskokwim area for which escapement goals were established and stocks for which goals were discontinued.

Table 6 lists all the stocks in the Kuskokwim area for which there was insufficient data to establish a goal at this time or stocks for which a goal has been established using some other enumeration method.

Appendices B.1 – B.30 detail available data and analyses used to establish escapement goals in the Kuskokwim area.

Table 4. Kuskokwim area escapement goal review summary.

	Chinook	Summer Chum	Fall Chum	Coho	Sockeye
Number of stocks reviewed[a]	25	19	0	12	6
Number of escapement goals revised	10	4	0	2	3
Number of new goals established	2	0	0	1	0
Number of escapement goals not revised	0	0	0	0	0
Total number of escapement goals established	0 BEG 12 SEG	0 BEG 4 SEG	0 BEG 0 SEG	0 BEG 3 SEG	0 BEG 3 SEG
Number of escapement goals discontinued	1	4	0	2	1
Number of stocks for which no escapement goal was established	12	11	0	7	2

[a] Stocks for which there are some escapement data. Some stocks have more than one enumeration method, and were tabulated as different stocks.

Table 5. Summary of all Kuskokwim area salmon stocks for which escapement goals were determined or discontinued.

Stock Unit	Enumeration Method	Previous Escapement Goal			Escapement Goal Determination		
		Goal	Type	Yr. Estab.	Action	Goal	Type
Chinook Salmon							
Kwethluk River	Aerial Survey	>1,200	SEG	2001	Revise	580-1,800	SEG
Kisaralik River	Aerial Survey	>1,000	SEG	2001	Revise	400-1,200	SEG
Arolak River	Aerial Survey	>1,500	SEG	2001	Revise	1,200-2,300	SEG
Salmon River (Aniak drainage)	Aerial Survey	>600	SEG	2001	Revise	330-1,200	SEG
Holitna River	Aerial Survey	>2,000	SEG	2001	Revise	970-2,100	SEG
Kogrukluk River	Weir	>10,000	SEG	2001	Revise	5,300-14,000	SEG
Cheneetnuk River	Aerial Survey	None			Establish	340-1,300	SEG
Gagaraya River	Aerial Survey	None			Establish	300-830	SEG
Pitka Fork Salmon River	Aerial Survey	>1,300	SEG	2001	Revise	470-1,600	SEG
Kanektok River	Aerial Survey	>5,800	EO[4]	1992	Revise	3,500-8,000	SEG
Goodnews River (Main Fork)	Aerial Survey	>1,600	EO	1992	Revise	640-3,300	SEG
Middle Fork Goodnews River	Aerial Survey	>800	EO	1992	Discontinue		
Middle Fork Goodnews River	Weir	>3,500	EO	1992	Revise	2,000-4,500	SEG

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Stock Unit	Enumeration Method	Previous Escapement Goal			Escapement Goal Determination		
		Goal	Type	Yr. Estab.	Action	Goal	Type
Chum Salmon							
Aniak River	Aerial Survey	>10,000	EO	1992	Discontinue		
Aniak River	Sonar	>250,000	EO	1992	Revise	210,000-370,000	SEG
Holitna River	Aerial Survey	12,000	EO	1992	Discontinue		
Kogrukluk River	Weir	>30,000	SEG	2001	Revise	15,000-49,000	SEG
Kanektok River	Aerial Survey	>30,500	EO	1992	Revise	>5,200	SEG
Main Fork Goodnews River	Aerial Survey	>12,000	EO	1992	Discontinue		
Middle Fork Goodnews River	Aerial Survey	>4,000	EO	1992	Discontinue		
Middle Fork Goodnews River	Weir	>15,000	EO	1992	Revise	>12,000	SEG

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Stock Unit	Enumeration Method	Previous Escapement Goal			Escapement Goal Determination		
		Goal	Type	Yr. Estab.	Action	Goal	Type
Coho Salmon							
Kognukluk River	Weir	25,000	SEG	2001	Revise	13,000-38,000	SEG
Kanektok River	Aerial Survey	25,000	EO	1992	Revise	7,700-36,000	SEG
Main Fork Goodnews River	Aerial Survey	15,000	EO	1992	Discontinue		
Middle Fork Goodnews River	Aerial Survey	2,000	EO	1992	Discontinue		
Middle Fork Goodnews River	Weir	None			Establish	>12,000	SEG
Sockeye Salmon							
Kanektok River	Aerial Survey	15,000	EO	1992	Revise	14,000-34,000	SEG
Mainstem Goodnews R. (and lakes)	Aerial Survey	15,000	EO	1992	Revise	5,500-19,500	SEG
Middle Fk. Goodnews R (and lakes)	Aerial Survey	5,000	EO	1992	Discontinue		
Middle Fk. Goodnews River	Weir	25,000	EO	1992	Revise	23,000-58,000	SEG

[a] EO refers to an escapement objective determined by the Department that has not been reviewed since adoption of the PMSSF.

Table 6. Kuskokwim area stocks for which escapement goals were not established because of insufficient data or alternative enumeration methods.

Stock	Rationale for not Establishing an Escapement Goal
Chinook Salmon	
Kwethluk River (weir)	Insufficient number of escapement estimates.
Tuluksak River (weir)	Insufficient number of escapement estimates.
Holokuk River (aerial survey)	Existing middle river escapement goals were considered adequate
Oskawalik River (aerial survey)	Existing middle river escapement goals were considered adequate
George River (weir)	Insufficient number of escapement estimates.
Tatlawiksuk River (weir)	Insufficient number of escapement estimates.
Tatlawiksuk River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Takotna River (weir)	Insufficient number of escapement estimates.
Tuluksak River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Eek River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Kipchuk River (aerial survey)	Existing middle river escapement goals were considered adequate
Arolik River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Chum Salmon	
Kwethluk River (weir)	Insufficient number of escapement estimates.
Tuluksak River (weir)	Insufficient number of escapement estimates.
George River (weir)	Insufficient number of escapement estimates.
Tatlawiksuk River (weir)	Insufficient number of escapement estimates.
Tatlawiksuk River (aerial survey)	Survey method inadequate for chum salmon in Kuskokwim River.
Takotna River (weir)	Insufficient number of escapement estimates.
Kwethluk River (aerial survey)	Survey method inadequate for chum salmon in Kuskokwim River.
Kisaralik River (aerial survey)	Survey method inadequate for chum salmon in Kuskokwim River.
Tuluksak River (aerial survey)	Survey method inadequate for chum salmon in Kuskokwim River.
Salmon River (Aniak) (aerial survey)	Survey method inadequate for chum salmon in Kuskokwim River.
Arolik River (aerial surveys)	Lacks sufficient historical escapement and stock contribution data.
Coho Salmon	
Kwethluk River (weir)	Insufficient number of escapement estimates.
Tuluksak River (weir)	Insufficient number of escapement estimates.
George River (weir)	Insufficient number of escapement estimates.
Tatlawiksuk River (weir)	Insufficient number of escapement estimates.

Table 6. Page 2 of 2.

Stock	Rationale for not Establishing an Escapement Goal
Coho Salmon (cont'd)	
Takotna River (weir)	Insufficient number of escapement estimates.
Middle Fork Goodnews R. (weir)	Insufficient number of escapement estimates.
Arolik River (aerial surveys)	Lacks sufficient historical escapement and stock contribution data.
Sockeye Salmon	
Kogrukluk River weir	Small sockeye system not representative of Kuskokwim River.
Arolik River (aerial surveys)	Lacks sufficient historical escapement and stock contribution data.

NORTON SOUND, PORT CLARENCE, AND KOTZEBUE DISTRICTS

NORTON SOUND, PORT CLARENCE, AND KOTZEBUE DISTRICTS

In the Norton Sound, Port Clarence, and Kotzebue Districts, a total of 29 escapement goals were established, 3 for chinook salmon, 16 for chum salmon, 2 for sockeye, 3 for coho salmon, and 5 for pink salmon. Six escapement goals were discontinued.

Table 7 summarizes the number of stocks in the Norton Sound Area that were reviewed for escapement goals, the number and type of goals established, the number of stocks for which escapement goals were discontinued, and the number of stocks that had insufficient data to establish goals. Some stocks are enumerated by more than one method.

Table 8 lists all the stocks in the Norton Sound Area for which escapement goals were established and stocks for which goals were discontinued.

Table 9 lists all the stocks in the Norton Sound Area for which there was insufficient data to establish a goal at this time or stocks for which a goal has been established using some other enumeration method.

Appendices C.1 – C. 35 detail available data and analyses used to establish escapement goals in the Norton Sound Area.

Table 7. Norton Sound, Port Clarence, and Kotzebue Districts escapement goal review summary.

	Salmon Species				
	Chinook	Chum	Sockeye	Coho	Pink
Number of stocks reviewed[a]	8	18	2	14	12
Number of escapement goals revised	2	7	0	0	2
Number of new goals established	0	1	0	0	2
Number of escapement goals not revised	1	8	2	3	1
Total number of escapement goals being proposed	0 BEG 3 SEG	3 BEG 13 SEG	0 BEG 2 SEG	0 BEG 3 SEG	0 BEG 5 SEG
Number of escapement goals discontinued	3	2	0	0	1
Number of stocks for which no escapement goal was established	2	0	0	11	6

[a] Stocks for which there are some escapement data. Some stocks have more than one enumeration method, and were tabulated as different stocks.

Table 8. Summary of all Norton Sound Area salmon stocks for which escapement goals were determined or discontinued.

Stock Unit	Enumeration Method	Previous Escapement Goal			Escapement Goal Determination		
		Goal	Type	Yr. Estab.	Action	Goal	Type
Chinook Salmon							
Fish R./Boson Cr.	Aerial Survey	100-250	EO[1]	1999	Revise	>100	SEG
Kwiniuk River	Tower	300-550	EO	1999	No Revision	300-550	SEG
Shaktoolik River	Aerial Survey	400-800	EO	1999	Discontinue		
Old Woman R. (Unalakleet R.)	Aerial Survey	550-1,100	EO	1999	Discontinue		
North River (Unalakleet R.)	Aerial Survey	250-500	EO	1999	Discontinue		
North River (Unalakleet R.)	Tower	1,200-2,400	EO	1999	Revise	1,200-2,600	SEG
Pink Salmon							
Nome (even year)	Weir	13,000	EO	1999	No Revision	>13,000	SEG
Nome River (odd year)	Weir	None			Establish	>3,200	SEG
Niukluk River (all years)	Tower	8,400	EO	1999	Establish	>10,500	SEG
Kwiniuk River (all years)	Tower	12,500	EO	1999	Revise	>8,400	SEG
Shaktoolik River	Tower	48,000	EO	1999	Discontinue		
North River (Unalak. R. all years)	Tower	8,500	EO	1999	Revise	>25,000	SEG
Sockeye Salmon							
Salmon Lake	Aerial Survey	4,000-8,000	EO	1999	No Revision	4,000-8,000	SEG
Glacial Lake	Aerial Survey	800-1,600	EO	1999	No Revision	800-1,600	SEG

-continued-

Table 8. Page 2 of 3

Stock Unit	Enumeration Method	Previous Escapement Goal			Escapement Goal Determination		
		Goal	Type	Yr. Estab.	Action	Goal	Type
Chum Salmon							
Nome Subdistrict One (all systems)	Multiple	23,000-35,000	BEG	2001	No Revision	23,000-35,000	BEG
Sinuk River	Exp Aerial Sur.	4,000-6,200	BEG[a]	2001	Revise	4,000-6,200	SEG
Nome River	Weir	2,900-4,300	BEG[a]	2001	Revise	2,900-4,300	SEG
Bonanza River	Exp Aerial Sur	2,300-3,400	BEG[a]	2001	Revise	2,300-3,400	SEG
Snake River	Tower/weir	1,600-2,500	BEG[a]	2001	Revise	1,600-2,500	SEG
Solomon River	Exp Aerial Sur.	1,100-1,600	BEG[a]	2001	Revise	1,100-1,600	SEG
Flambeau River	Exp Aerial Sur	4,100-6,300	BEG[a]	2001	Revise	4,100-6,300	SEG
Eldorado River	Exp Aerial Sur	6,000-9,200	BEG[a]	2001	Revise	6,000-9,200	SEG
Fish River	Aerial Survey	21,200-46,400	EO	1999	Discontinue		
Niukluk River (Fish R.)	Tower	None			Establish	>30,000	SEG
Kwiniuk River	Tower	10,000-20,000	BEG	2001	No Revision	10,000-20,000	BEG
Tubutulik River	Exp Aerial Sur.	6,000-16,000	BEG	2001	No Revision	8,000 – 16,000	BEG
Old Woman R. (Unalakleet R.)	Aerial Survey	2,400 – 4,800	EO	1999	Discontinue		
Kotzebue Area							
Noatak/Eli Rivers	Aerial Survey	64,000-128,000	EO	1999	No Revision	64,000-128,000	SEG
Upper Kobuk and Selby Rivers	Aerial Survey	8,000-16,000	EO	1999	No Revision	8,000-16,000	SEG
Salmon River (Kobuk R. drainage)	Aerial Survey	3,200-6,400	EO	1999	No Revision	3,200-6,400	SEG
Tutuksuk River (Kobuk R. drainage)	Aerial Survey	1,200-2,400	EO	1999	No Revision	1,200-2,400	SEG
Squirrel River (Kobuk R. drainage)	Aerial Survey	7,200-14,400	EO	1999	No Revision	7,200-14,400	SEG

-continued-

Table 8. Page 3 of 3.

Stock Unit	Enumeration Method	Previous Escapement Goal			Escapement Goal Determination		
		Goal	Type	Yr. Estab.	Action	Goal	Type
Coho Salmon							
Niukluk R./Ophir R.	Aerial Survey	950-1,900	EO	1999	No Revision	950-1,900	SEG
Kwiniuk River	Aerial Survey	650-1,300	EO	1999	No Revision	650-1,300	SEG
North River (Unalakleet R.)	Aerial Survey	550-1,100	EO	1999	No Revision	550-1,100	SEG

[a] EO refers to an escapement objective determined by the Department that has not been reviewed since adoption of the Sustainable Salmon Policy.
[b] There was some confusion about whether the 2001 goals were BEGs or SEGs. The Subdistrict One escapement goal report refers to them as "escapement targets". This table clarifies that they are SEGs.

Table 9. Norton Sound Area stocks for which escapement goals were not established because of insufficient data or alternative enumeration methods.

Stock	Rationale for not Establishing an Escapement Goal
Chinook Salmon	
Niukluk River (aerial)	Small chinook salmon system-not representative of Fish River drainage
Niukluk River (tower)	Small chinook salmon system-not representative of Fish River drainage
Chum Salmon	
None	
Sockeye Salmon	
None	
Pink Salmon	
Sinuk River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Bonanza River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Snake River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Solomon River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Eldorado River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Tubutulik River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Coho	
Sinuk River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Nome River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Bonanza River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Snake River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Solomon River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Flambeau River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Eldorado River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
Niukluk River (tower)	Lacks sufficient historical escapement and stock contribution data.
Kwiniuk River (tower)	Lacks sufficient historical escapement and stock contribution data.
Tubutulik River (aerial survey)	Lacks sufficient historical escapement and stock contribution data.
North River (tower)	Lacks sufficient historical escapement and stock contribution data.

LITERATURE CITED

Barton, L.H. 1999. State of Alaska Department of Fish and Game Memorandum Division of Commercial Fisheries. Fall Chum/Coho Salmon Escapement Goal Review.

Bue, B.G. and J.J. Hasbrouck. 2001. Escapement Goal Review of Salmon Stocks of Upper Cook Inlet. Alaska Department of Fish and Game, Report to the Board of Fisheries, Anchorage.

Buklis, L. S. 1993. Documentation of Arctic-Yukon-Kuskokwim Region Salmon escapement goals in effect as of the 1992 fishing season. Regional Informational Report No. 3A93-03. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

Clark, J. H. 2000. *In Draft.* Biological Escapement Goals for Kotzebue Chum Salmon. Information Report 3Axx-xx. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

Clark, J.H. 2001a. Biological Escapement Goals for Andreafsky River Chum Salmon. Regional Information Report 3A01-07. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

Clark, J.H. 2001b. Biological Escapement Goals for Kwiniuk and Tubutulik Chum Salmon. Regional Information Report 3A01-08. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

Clark, J.H. 2001c. Biological Escapement Goal for Chum Salmon in Subdistrict One of Norton Sound. Regional Information Report 3A01-09. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

Clark, J.H. and G.J. Sandone. 2001. Biological Escapement Goal for Anvik River Chum Salmon. Regional Information Report 3A01-06. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

Eggers, D.M. 2001. Biological Escapement Goals for Yukon River Fall Chum Salmon. Regional Information Report 3A-01-10. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage.

Evenson, M.J. 2002. Optimal Production of Chinook Salmon from the Chena and Salcha Rivers. Alaska Department of Fish and Game, Fishery Manuscript Series No. 02-01, Anchorage.

Fair, L., C. Lean, F. DeCicco, J. Magdanz, and R. McLean. 1999. State of Alaska Department of Fish and Game Memorandum. Proposed Salmon BEGs for Norton Sound and Kotzebue Sound.

APPENDIX A

YUKON RIVER MANAGEMENT AREA

Appendix A.1. - Escapement goal for East Fork Andreafsky chinook salmon (aerial).

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	>1,500 (1992) see Huttunen and Bergstrom (1999)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 960 - 1,700
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys
Summary:	
Data Quality	Fair
Data Type	Aerial surveys have occurred on the East and West Forks of the Andreafsky River regularly from 1961 - 2003.
Contrast	16
Criteria for SEG	high contrast and at least moderate exploitation
25th-75th Percentile	960 - 1,700
Years within recommended SEG	
Comments	

Appendix A.1. - Escapement goal for East Fork Andreafsky chinook salmon (aerial). (continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

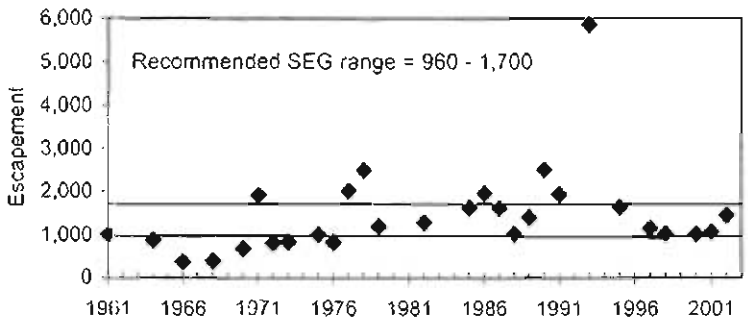
Data available for analysis of escapement goals.

Brood Year	Escapement
1961	1,003
1962	
1963	
1964	867
1965	
1966	361
1967	
1968	380
1969	
1970	665
1971	1,904
1972	798
1973	825
1974	
1975	993
1976	818
1977	2,008
1978	2,487
1979	1,180
1980	
1981	
1982	1,274
1983	
1984	
1985	1,617
1986	1,954
1987	1,608
1988	1,020
1989	1,399
1990	2,503
1991	1,938
1992	
1993	5,855
1994	
1995	1,635
1996	
1997	1,140
1998	1,027
1999	
2000	1,018
2001	1,065
2002	1,447
2003	

Appendix A.1. - Escapement goal for East Fork Andreafsky chinook salmon (aerial).
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix A.2. - Escapement goal for West Fork Andreafsky chinook salmon (aerial).

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence
Previous Escapement Goal:	>1,400 (1992) see Huttunen and Bergstrom (1999)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 640 - 1,600
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys
Summary:	
Data Quality	Fair
Data Type	Aerial surveys have occurred on the East and West Forks of the Andreafsky River regularly from 1961 - 2003.
Contrast	12
Criteria for SEG	high contrast and at least moderate exploitation
25th-75th Percentile	640 - 1,600
Years within recommended SEG	
Comments	

Appendix A.2. - Escapement goal for West Fork Andreafsky chinook salmon (aerial).
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

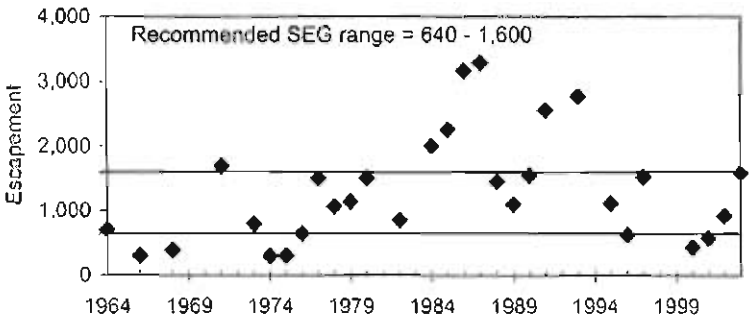
Data available for analysis of escapement goals.

Brood Year	Escapement	
1961		
1962		
1963		
1964	705	
1965		
1966	303	
1967		
1968	383	
1969		
1970		Shaded cells were not used
1971	,682	in the SEG analysis.
1972		
1973	788	
1974	285	
1975	301	
1976	643	
1977	,499	
1978	,062	
1979	,134	
1980	,500	
1981		
1982	851	
1983		
1984	,993	
1985	2,248	
1986	3,158	
1987	3,281	
1988	,448	
1989	,089	
1990	,545	
1991	2,544	
1992		
1993	2,765	
1994		
1995	,108	
1996	624	
1997	1,510	
1998		
1999		
2000	427	
2001	570	
2002	917	
2003	1,578	

Appendix A.2. - Escapement goal for West Fork Andreafsky chinook salmon (aerial). (continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix A.3. - Escapement goal for Anvik chinook salmon (aerial).

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence
Previous Escapement Goal:	>1,300 (1992) see Huttunen and Bergstrom (1999)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 1,100 - 1,700
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys
Summary:	
Data Quality	Fair
Data Type	
Contrast	11
Criteria for SEG	high contrast and at least moderate exploitation
25th-75th Percentile	1,100 - 1,700
Years within recommended SEG	
Comments	

Appendix A.3. - Escapement goal for Anvik chinook salmon (aerial). (continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

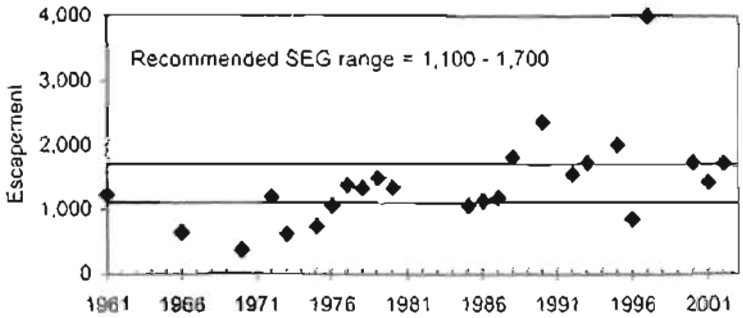
Data available for analysis of escapement goals.

Brood Year	Escapement
1961	1,226
1962	
1963	
1964	
1965	
1966	638
1967	
1968	
1969	
1970	368
1971	
1972	1,198
1973	613
1974	
1975	730
1976	1,053
1977	1,371
1978	1,324
1979	1,484
1980	1,330
1981	
1982	
1983	
1984	
1985	1,051
1986	1,118
1987	1,174
1988	1,805
1989	
1990	2,347
1991	
1992	1,536
1993	1,720
1994	
1995	1,996
1996	839
1997	3,979
1998	
1999	
2000	1,721
2001	1,420
2002	1,713
2003	

Appendix A.3. - Escapement goal for Anvik chinook salmon (aerial).
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix A.4. - Escapement goal for Nulato River chinook salmon (aerial).

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence
Previous Escapement Goal:	>1,300 (1992) see Huttunen and Bergstrom (1999)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 940 - 1,900 (combined N & S forks)
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys have been performed relatively consistently on the North and South Forks of the Nulato River since 1975.
Summary:	
Data Quality	
Data Type	Stock specific ASL data available 1971, 1976-78, 1980-81, 1986-88, 1992, 1994-99.
Contrast	30
Criteria for SEG	high contrast, at least moderate exploitation
25th-75th Percentile	940 - 1,900
Years within recommended SEG	
Comments	

Appendix A.4. - Escapement goal for Nulato River chinook salmon (aerial).
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

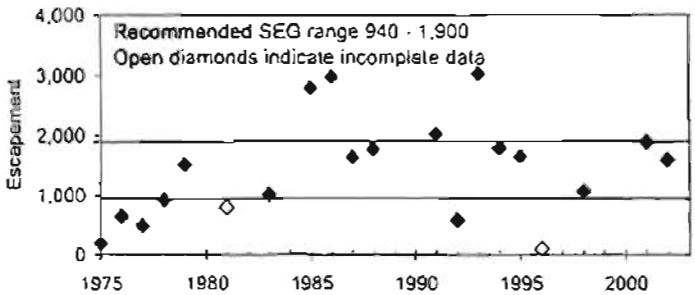
Brood Year	Nulato River North Fork	Nulato River South Fork	Sum of North & South Forks
1961		167	167
1962			
1963			
1964			
1965			
1966			
1967			
1968			
1969			
1970			
1971			
1972			
1973			
1974			
1975	123	81	204
1976	471	177	648
1977	286	201	487
1978	498	422	920
1979	1,093	414	1,507
1980			
1981		791	791
1982			
1983	526	480	1,006
1984			
1985	1,600	1,180	2,780
1986	1,452	1,522	2,974
1987	1,145	493	1,638
1988	1,061	714	1,775
1989			
1990			
1991	767	1,253	2,020
1992	348	231	579
1993	1,844	1,181	3,025
1994	843	952	1,795
1995	968	681	1,649
1996		100	100
1997			
1998	507	546	1,053
1999			
2000			
2001	1,116	768	1,884
2002	687	897	1,584
2003			

Shaded cells were not used in the SEG analysis.

Appendix A.4. - Escapement goal for Nulato River chinook salmon (aerial).
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix A.5. - Escapement goal for Gisasa River chinook salmon (aerial).

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	>600 (1992) see Hottunen and Bergstrom (1999)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 420-1,100
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	aerial surveys
Summary:	
Data Quality	
Data Type	Stock specific ASL available 1982, 1987-89, 1995-2002.
Contrast	17
Criteria for SEG	high contrast, at least moderate exploitation
25th-75th Percentile	420 - 1,100
Years within recommended SEG	
Comments	

Appendix A.5. - Escapement goal for Gisasa River chinook salmon (aerial).
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

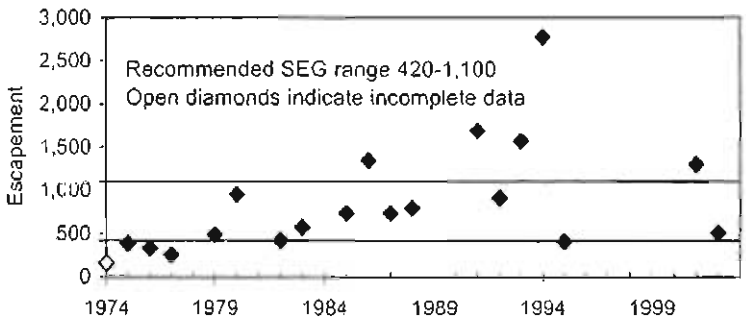
Data available for analysis of escapement goals.

Brood Year	Escapement
1974	161
1975	385
1976	332
1977	255
1978	
1979	484
1980	951
1981	
1982	421
1983	572
1984	
1985	735
1986	1,346
1987	731
1988	797
1989	
1990	
1991	1,690
1992	910
1993	1,573
1994	2,775
1995	410
1996	
1997	
1998	
1999	
2000	
2001	1,298
2002	506
2003	

Appendix A.5. - Escapement goal for Gisasa River chinook salmon (aerial).
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix A.6. - Escapement goal for Chena River chinook salmon.

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Yukon Area - District 6 - Tanana River
Management Division:	Sport Fish
Primary Fishery:	Recreational, although Chena River stock is harvested incidentally in Yukon Area commercial and subsistence fisheries
Previous Escapement Goal:	2,800 - 5,700 (2001) see Evenson (2002)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Inriver return was estimated by mark-recapture in 1986-92, 1995-97; and by counting tower in 1993-94, 1998-2003.
Summary:	
Data Quality	Good
Data Type	Mixed stock harvest data from comm, subs & test fisheries. Stock specific harvest data from recreational fishery. Stock specific ASL data available 1974-75, 1980-2002.
Contrast	N/A
Criteria for SEG	SEG not recommended
Years within recommended BEG	6 of 18 years within the BEG range, 11 years above and 1 year below range.
Comments	Stock specific harvest (commercial, subsistence) and age structure data are not available for all years, but may be extrapolated by estimating proportion of Chena River stock component in the Yukon Area common property fisheries

Appendix A.6. - Escapement goal for Chena River chinook salmon.
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

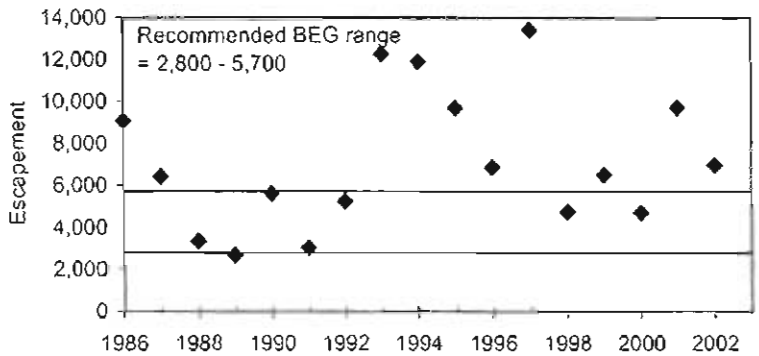
Data available for analysis of escapement goals.

Brood Year	Escapement
1986	9,065
1987	6,404
1988	3,346
1989	2,666
1990	5,603
1991	3,025
1992	5,231
1993	12,241
1994	11,876
1995	9,680
1996	6,833
1997	13,390
1998	4,745
1999	6,485
2000	4,694
2001	9,696
2002	6,967
2003	14,149

Appendix A.6. - Escapement goal for Chena River chinook salmon.
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix A.7. - Escapement goal for Salcha River chinook salmon.

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Yukon Area - District 6 - Tanana River
Management Division:	Sport Fish
Primary Fishery:	Recreational, although Salcha River stock is harvested incidentally in Yukon Area commercial and subsistence fisheries
Previous Escapement Goal:	3,300 - 6,500 (2001) see Evenson (2002)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	Inriver return was estimated by mark-recapture in 1987-92, 1996; and by counting tower in 1993-95, 1997-2003.
Summary:	
Data Quality	Good
Data Type	Counting tower and/or mark recapture. Stock specific ASL data available 1968, 70, 1972-2002
Criteria for SEG	SEG not recommended
Years within recommended BEG	4 of 17 years within the recommended BEG range, 11 years above and 2 year below range.
Comments	Stock specific harvest (commercial, subsistence) and age structure data are not available for all years, but may be extrapolated by estimating proportion of Salcha River stock component in the Yukon Area common property fisheries

Appendix A.7. - Escapement goal for Salcha River chinook salmon.
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

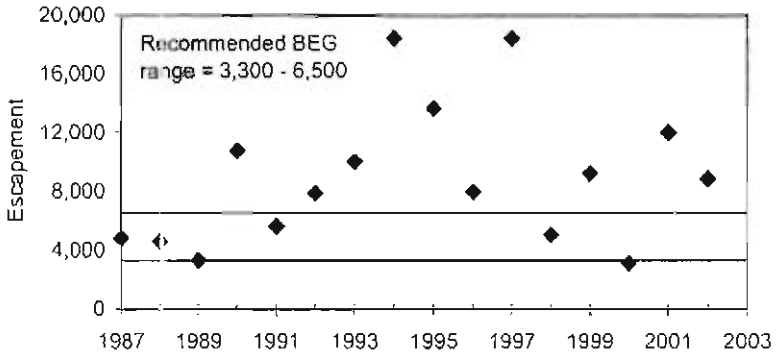
Data available for analysis of escapement goals.

Brood Year	Escapement
1987	4,771
1988	4,562
1989	3,294
1990	10,728
1991	5,608
1992	7,862
1993	10,007
1994	18,399
1995	13,643
1996	7,958
1997	18,396
1998	5,027
1999	9,198
2000	3,108
2001	11,980
2002	8,850
2003	20,148

Appendix A.7. - Escapement goal for Salcha River chinook salmon.
(continued)

System: Yukon Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix A.8. - Escapement goal for East Fork Andreafsky chum salmon (weir).

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	65,000 - 130,000 (2001) see Clark (2001a)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Sonar counts 1981-84, counting tower 1986-88, weir count 1995-2003
Summary:	
Data Quality	
Data Type	Stock specific ASL available 1981-2002.
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended BEG	
Comments	

Appendix A.8. - Escapement goal for East Fork Andreafsky chum salmon (weir). (continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

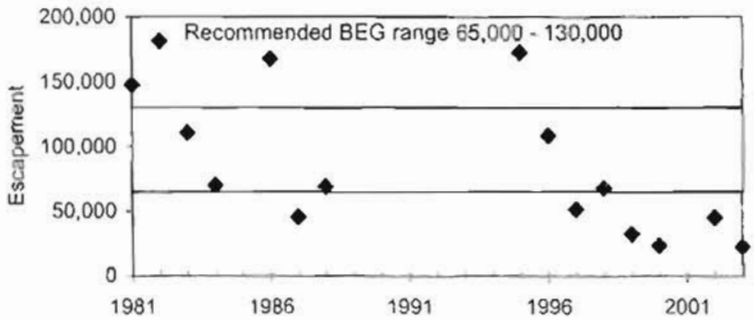
Data available for analysis of escapement goals.

Broud Year	Escapement
1981	147,312
1982	181,352
1983	110,608
1984	70,125
1985	
1986	167,614
1987	4[illegible],721
1988	68,937
1989	
1990	
1991	
1992	
1993	
1994	
1995	172,148
1996	108,450
1997	51,139
1998	67,591
1999	32,229
2000	23,349
2001	
2002	45,019
2003	22,603

Appendix A.8. - Escapement goal for East Fork Andreafsky chum salmon (weir).
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Observed escapement by year and recommended SEG range (solid line).



Appendix A.9. - Escapement goal for East Fork Andreafsky chum salmon (aerial).

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence
Previous Escapement Goal:	35,000 - 70,000 (2001) see Clark (2001a)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	discontinue in favor of weir based goal
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none

Escapement Enumeration:

Summary:

Data Quality	
Data Type	Stock specific ASL available 1981-2002.
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended SEG	N/A

Comments

Appendix A.9. - Escapement goal for East Fork Andreafsky chum salmon (aerial).
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Data available for analysis of escapement goals.

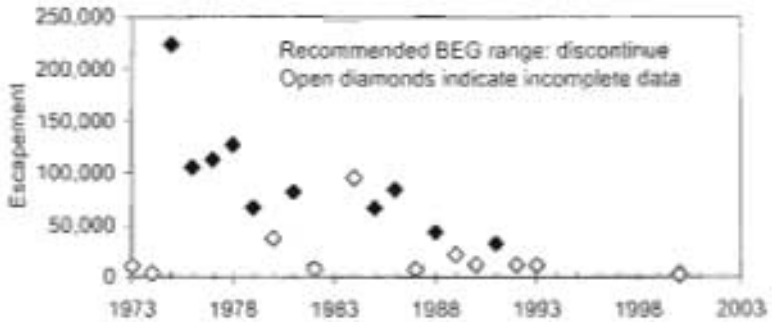
Brood Year	Escapement
1973	10,149
1974	3,215
1975	223,485
1976	105,347
1977	112,722
1978	127,050
1979	66,471
1980	36,823
1981	81,555
1982	7,501
1983	
1984	95,200
1985	66,146
1986	83,931
1987	6,687
1988	43,056
1989	21,460
1990	11,519
1991	31,886
1992	11,308
1993	10,935
1994	
1995	
1996	
1997	
1998	
1999	
2000	2,094
2001	
2002	
2003	

Shaded cells indicate incomplete survey and/or poor timing or conditions resulted in minimal or inaccurate count.

Appendix A.9. - Escapement goal for East Fork Andreafsky chum salmon (aerial).
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Observed escapement by year.



Appendix A.10. - Escapement goal for West Fork Andreafsky chum salmon (pop est).

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence
Previous Escapement Goal:	65,000 - 130,000 (2001) see Clark (2001a)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	discontinue
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	The total abundance of West Fork chum salmon was calculated using two different models: a regression between East and West Fork chum salmon abundance, or an aerial survey was expanded by 56% (a percentage determined by comparing on-the-ground surveys to aerial surveys). Clark (2001a)
Summary:	
Data Quality	
Data Type	ASL data available 1968, 82, 89-93, 2000
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended SEG	N/A
Comments	Discontinue BEG because no monitoring tool exists

expansion based on tower counts????

Appendix A.10. - Escapement goal for West Fork Andreafsky chum salmon (pop est).
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

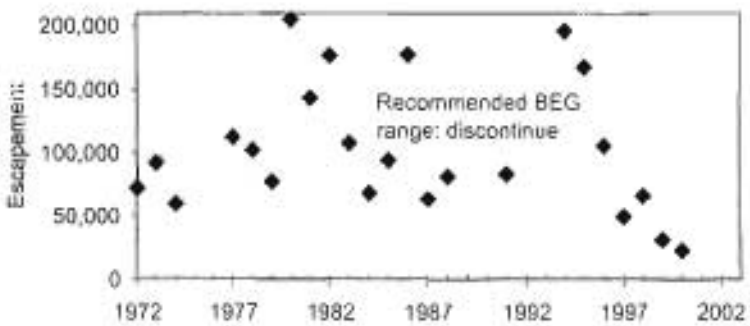
Data available for analysis of escapement goals.

Brood Year	Estimated total abundance of WF chum salmon
1972	72,255
1973	92,621
1974	59,999
1975	421,615
1976	211,599
1977	112,786
1978	102,424
1979	77,533
1980	205,057
1981	143,678
1982	176,878
1983	107,879
1984	68,395
1985	94,256
1986	177,565
1987	63,496
1988	81,180
1989	
1990	
1991	83,369
1992	
1993	
1994	196023
1995	167,901
1996	105,774
1997	49,877
1998	65,923
1999	31,434
2000	22,773
2001	
2002	
2003	

Appendix A.10. - Escapement goal for West Fork Andreafsky chum salmon (pop est).
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Observed escapement by year and recommended SEG range (solid line).



Appendix A.11. - Escapement goal for West Fork Andreafsky chum salmon (aerial).

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence
Previous Escapement Goal:	35,000 - 70,000 (2001) see Clark (2001a)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	discontinue
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	aerial surveys
Summary:	
Data Quality	
Data Type	ASL data available 1969, 82, 89-93, 2000
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended SEG	N/A
Comments	Discontinue BEG because there is insufficient quality data for setting and monitoring a goal.

Appendix A.11. - Escapement goal for West Fork Andreafsky chum salmon (aerial). (continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

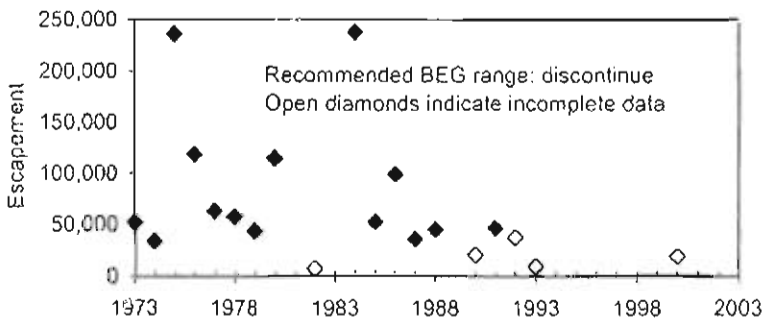
Data available for analysis of escapement goals.

Brood Year	Escapement	
1973	51,835	
1974	33,578	
1975	235,954	
1976	118,420	
1977	63,120	
1978	57,321	
1979	43,391	
1980	114,759	
1981		
1982	7,267	
1983		
1984	238,565	Shaded cells indicate
1985	52,750	incomplete survey and/or
1986	99,373	poor timing or conditions
1987	35,535	resulted in minimal or
1988	45,432	inaccurate count.
1989		
1990	20,426	
1991	46,657	
1992	37,808	
1993	9,113	
1994		
1995		
1996		
1997		
1998		
1999		
2000	18,989	
2001		
2002		
2003		

Appendix A.11. - Escapement goal for West Fork Andreafsky chum salmon (aerial).
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Observed escapement by year.



Appendix A.12. - Escapement goal for Anvik River chum salmon (sonar).

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence
Previous Escapement Goal:	400,000 - 800,000 (2001) see Clark and Sandone (2001)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	BEG range of 350,000 - 700,000
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Bendix sonar
Summary:	
Data Quality	
Data Type	Sonar counts. Stock specific ASL data available from 1968, 1972-2002.
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended BEG	
Comments	

Appendix A.12. - Escapement goal for Anvik River chum salmon (sonar).
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Data available for analysis of escapement goals.

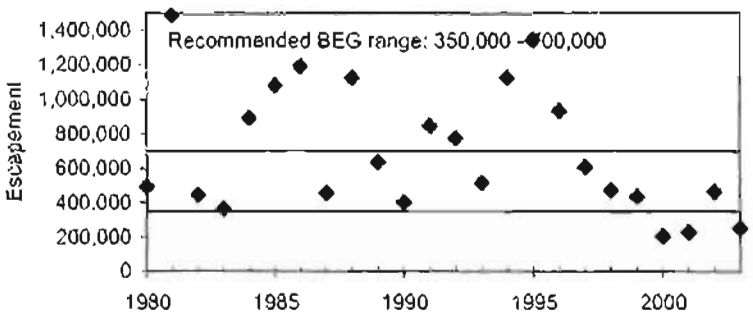
Brood Year	Escapement
1980	402,676
1981	1,486,182
1982	444,581
1983	362,912
1984	891,028
1985	1,080,243
1986	1,189,602
1987	455,876
1988	1,125,449
1989	636,906
1990	403,627
1991	847,772
1992	775,626
1993	517,409
1994	1,124,689
1995	1,339,418
1996	933,240
1997	609,118
1998	471,865
1999	437,631
2000	205,460
2001	227,451
2002	462,101
2003	251,358

shaded cells were not used in BEG analysis

Appendix A.12. - Escapement goal for Anvik River chum salmon (sonar).
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: summer chum

Observed escapement by year and recommended SEG range (solid line).



Appendix A.13. - Escapement goal for aggregate Yukon River fall chum salmon.

System: **Yukon Area**
Species: chum salmon
Stock Unit: fall chum salmon

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous **Escapement Goal:**	300,000 - 600,000 (2001) see Eggers (2001)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal **Escapement Goal:**	350,000 needs addressed in management plan.
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Run reconstruction.
Summary:	
Data Quality	Good
Data Type	Stock specific catch and escapement, by age, run reconstruction.
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended BEG	15 of 30 years. Made OEG 18 of 30 years. 7 were below and 8 were above range.
Comments	Eggers (2001) data was updated to include data through 2002 analysis using alternative methodolgies currently in development have only slightly increased the estimation of MSY, but not the BEG range.

Appendix A.13. - Escapement goal for aggregate Yukon River fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

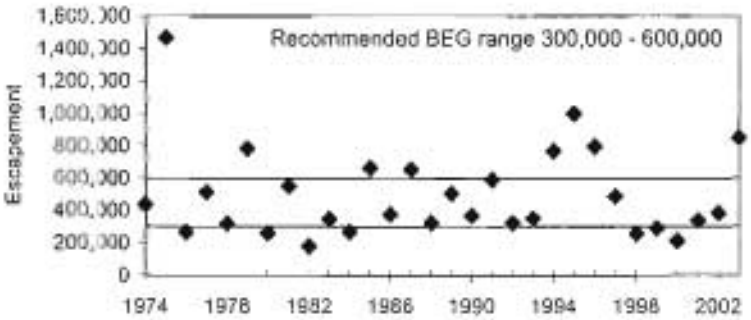
Data available for analysis of escapement goals.

Brood Year	Escapement	
1974	437,486	
1975	1,465,213	
1976	268,841	
1977	514,844	
1978	320,487	
1979	780,818	
1980	261,113	
1981	551,193	
1982	179,828	
1983	347,157	
1984	270,041	
1985	664,426	
1986	376,374	
1987	651,943	
1988	325,138	
1989	506,174	
1990	369,654	
1991	591,132	
1992	324,253	
1993	352,689	
1994	769,920	
1995	999,158	
1996	795,755	
1997	490,782	
1998	258,666	
1999	292,851	
2000	212,376	
2001	338,081	
2002	385,189	
2003	850,000	2003 data is preliminary.

Appendix A.13. - Escapement goal for aggregate Yukon River fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Observed escapement by year and recommended BEG range (solid line).



Appendix A.14. - Escapement goal for Upper Yukon River Mainstem fall chum salmon.

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	>80,000
Escapement Goal Type:	Negotiated through U.S./Canada JTC treaty process.
Recommended Escapement Goal:	Annual goal of 65,000 for first portion of three cycle rebuilding.
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Mark-recapture abundance estimate since 1980.
Summary:	
Data Quality	Good
Data Type	Escapement is based on DFO mark-recapture project at the U.S. Canada Border minus the Canadian harvests.
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within range	11 of 30 years for negotiated goal and 13 based on Eggers (2001). 18 years were below 80K and 3 yrs are above the upper end of the range
Comments	Eggers (2001) analysis indicated a BEG range from 60,000 to 129,100. Original negotiated goal based on 1980 to 1990. Estimates from 1974 to 1979 were based on expansions of the collective Sheenjek/Fishing Branch Rivers compared to the Upper Yukon River Tributaries.

Appendix A.14. - Escapement goal for Upper Yukon River Mainstem fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

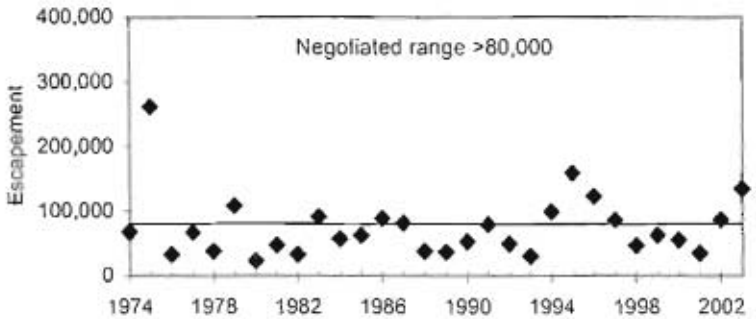
Data available for analysis of escapement goals.

Brood Year	Escapement	
1974	67,379	
1975	260,307	
1976	31,903	
1977	66,408	
1978	37,379	
1979	107,500	
1980	22,912	
1981	47,066	
1982	31,958	
1983	90,875	
1984	56,633	
1985	62,010	
1986	87,940	
1987	80,776	
1988	36,786	
1989	35,750	
1990	51,735	
1991	78,461	
1992	49,082	
1993	29,743	
1994	98,358	
1995	158,092	
1996	122,429	
1997	85,439	
1998	46,305	
1999	62,035	
2000	55,362	
2001	33,989	
2002	85,650	
2003	133,228	2003 data are preliminary.

Appendix A.14. - Escapement goal for Upper Yukon River Mainstem fall chum salmon. (continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Observed escapement by year and recommended BEG range (solid line).



Appendix A.15. - Escapement goal for Tanana River fall chum salmon.

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	61,000 - 136,000 (2001) see Eggers (2001)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Mark-recapture abundance estimate
Summary:	
Data Quality	Good
Data Type	Mark recapture estimates 1995-03. Stock specific ASL available 1974-2003. The historical estimates of Upper Tanana River are based on the expansion of the Delta River escapements. The estimate for the Tanana River as a whole includes the addition of the Toklat River
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended BEG	14 of 30 years. 2 years are below and 14 years are above range.
Comments	Additional years of the Kantishna River mark-recapture are required to evaluate the contribution of the Toklat River stocks. Currently the Toklat River stocks only represent a minimum for the Kantishna drainage when added to the Upper Tanana estimate.

Appendix A.15. - Escapement goal for Tanana River fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

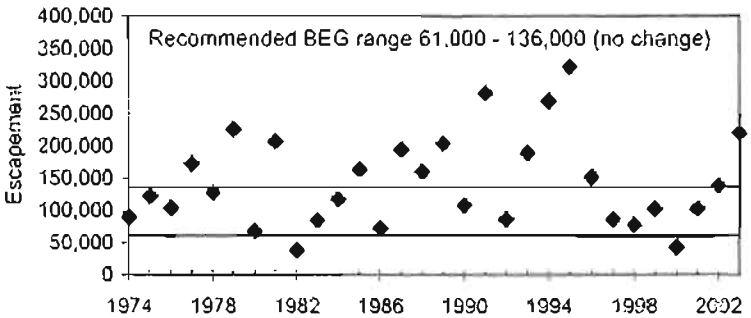
Data available for analysis of escapement goals.

Brood Year	Escapement	
1974	89,975	
1975	122,678	
1976	104,302	
1977	172,341	
1978	127,703	
1979	226,387	
1980	68,187	
1981	207,094	
1982	38,118	
1983	84,626	
1984	117,845	
1985	163,462	
1986	72,572	
1987	194,627	
1988	160,240	
1989	204,250	
1990	107,978	
1991	281,356	
1992	86,503	
1993	189,572	
1994	269,719	
1995	322,686	
1996	152,827	
1997	86,172	
1998	77,989	
1999	102,394	
2000	43,755	
2001	102,563	
2002	138,480	
2003	220,000	2003 data are preliminary.

Appendix A.15. - Escapement goal for Tanana River fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Observed escapement by year and recommended BEG range (solid line).



Appendix A.16. - Escapement goal for Delta River fall chum salmon.

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	6,000 - 13,000 (2001) see Eggers (2001)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Replicate ground surveys.
Summary:	
Data Quality	Good
Data Type	Aerial survey in 1974, foot surveys from 1975 to present. Foot surveys are expanded based on spawner abundance curves and estimates of stream life.
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended BEG	12 of 30 years. 5 years are below and 13 years are above the range.
Comments	The Delta River is one of the most consistently monitored with good estimates of peak spawning. Relationship to Tanana River mainstem spawning is improved with addition of Upper Tanana mark-recapture project.

Appendix A.16. - Escapement goal for Delta River fall chum salmon. (continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

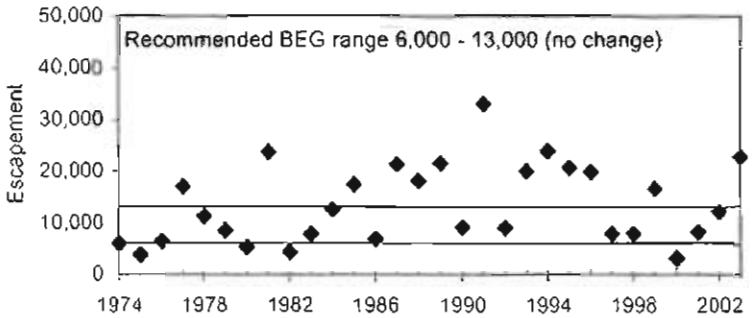
Data available for analysis of escapement goals.

Brood Year	Escapement
1974	5,915
1975	3,734
1976	6,312
1977	16,876
1978	11,136
1979	8,355
1980	5,137
1981	23,508
1982	4,235
1983	7,705
1984	12,411
1985	17,276
1986	6,703
1987	21,180
1988	18,024
1989	21,342
1990	8,992
1991	32,905
1992	8,893
1993	19,857
1994	23,777
1995	20,587
1996	19,758
1997	7,705
1998	7,804
1999	16,534
2000	3,001
2001	8,103
2002	11,992
2003	22,582

Appendix A.16. - Escapement goal for Delta River fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Observed escapement by year and recommended BEG range (solid line).



Appendix A.17. - Escapement goal for Toklat River fall chum salmon.

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	15,000 - 33,000 (2001) see Eggers (2001)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	33,000 recommend removing OEG
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Mostly ground surveys some aerial surveys.
Summary:	
Data Quality	Good
Data Type	Combination of peak aerial and ground surveys expanded using streamlife and migratory time density data.
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended BEG	13 of 30 years. 8 years are below and 9 years are above the range.
Comments	OEG of 33,000 was based on a 12 year trimmed average (minus 2 high and 2 low years) from 1974 to 1985. Eggers analysis added an additional 14 years of data from 1986 to 1999.

Appendix A.17. - Escapement goal for Toklat River fall chum salmon. (continued)

System: Yukon Area

Species: chum salmon

Stock Unit: fall chum salmon

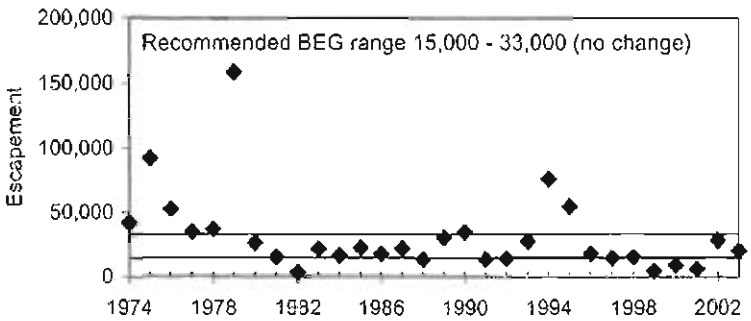
Data available for analysis of escapement goals.

Brood Year	Escapement	
1974	41,798	
1975	92,265	
1976	52,891	
1977	34,887	
1978	37,001	
1979	158,336	
1980	26,346	
1981	15,623	
1982	3,624	
1983	21,869	
1984	16,758	
1985	22,750	
1986	17,976	
1987	22,117	
1988	13,436	
1989	30,421	
1990	34,739	
1991	13,347	
1992	14,070	
1993	27,838	
1994	76,057	
1995	54,513	
1996	18,264	
1997	14,511	
1998	15,605	
1999	4,551	
2000	8,911	
2001	6,007	
2002	28,519	
2003	20,000	2003 data are preliminary.

Appendix A.17. - **Escapement goal for Toklat River fall chum salmon.**
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Observed escapement by year and recommended BEG range (solid line).



Appendix A.18. - Escapement goal for Upper Yukon River Tributaries fall chum salmon.

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	174,000 - 376,000
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Combination of sonar and weir data from individual tributaries.
Summary:	
Data Quality	As good as the individual escapement counts that they are based on.
Data Type	Eggers (2001) estimates were based on expansion of the respective year collective Sheenjek sonar and Fishing Branch Weir counts (1974 - 1994).
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within range	11 of 30 years. 12 years are below and 7 years are above the range.
Comments	Eggers (2001) analysis indicated a BEG range is 152,000 to 312,000 fall chum salmon. An additional 22,000 salmon was included on the low end and 64,000 to the high end to reflect established interim Fishing Branch River Goal.

Appendix A.18. - **Escapement goal for Upper Yukon River Tributaries fall chum salmon.**
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Data available for analysis of escapement goals.

Brood Year	Escapement	
1974	280,131	
1975	1,082,228	
1976	132,636	
1977	276,094	
1978	155,405	
1979	446,931	
1980	170,014	
1981	297,032	
1982	109,752	
1983	171,656	
1984	95,564	
1985	438,954	
1986	215,862	
1987	376,540	
1988	128,111	
1989	266,173	
1990	209,941	
1991	231,315	
1992	188,668	
1993	133,373	
1994	401,843	
1995	574,825	
1996	532,337	
1997	307,256	
1998	122,117	
1999	115,795	
2000	100,969	
2001	185,818	
2002	134,510	
2003	270,551	2003 data are preliminary

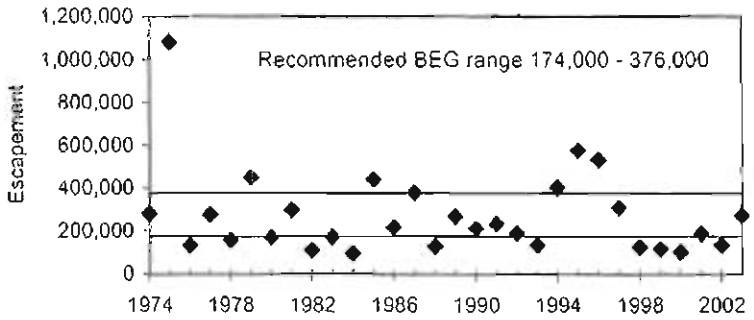
Appendix A.18. - Escapement goal for Upper Yukon River Tributaries fall chum salmon. (continued)

System: Yukon Area

Species: chum salmon

Stock Unit: fall chum salmon

Observed escapement by year and recommended BEG range (solid line).



Appendix A.19. - Escapement goal for Chandalar River fall chum salmon.

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	74,000 - 152,000 (2001) see Eggers (2001)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Split beam sonar.
Summary:	
Data Quality	Good
Data Type	Split beam sonar estimates of daily passage from 1995 to 2003.
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended BEG	14 of 30 years. 7 years are below and 9 years are above the range.
Comments	Chandalar expanded Eggers (2001) based on operations from 1995 to 1999.

Appendix A.19. - Escapement goal for Chandalar River fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

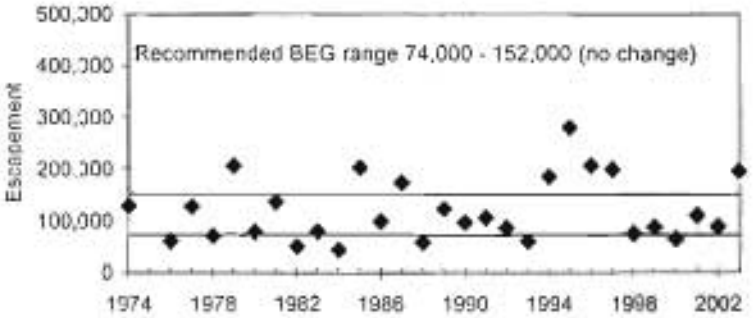
Data available for analysis of escapement goals.

Brood Year	Escapement	
1974	129,655	
1975	501,011	
1976	61,403	
1977	127,816	
1978	71,944	
1979	206,904	
1980	78,707	
1981	137,509	
1982	50,809	
1983	79,467	
1984	44,241	
1985	203,211	
1986	99,932	
1987	174,317	
1988	59,308	
1989	123,223	
1990	97,191	
1991	107,086	
1992	87,343	
1993	61,744	
1994	186,031	
1995	280,999	
1996	208,170	
1997	199,874	
1998	75,811	
1999	88,662	
2000	65,894	
2001	110,971	
2002	89,580	
2003	196,985	2003 data are preliminary.

Appendix A.19. - Escapement goal for Chandalar River fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Observed escapement by year and recommended BEG range (solid line).



Appendix A.20. - Escapement goal for Sheenjek River fall chum salmon.

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division:	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	50,000 - 104,000 (2001) see Eggers (2001)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Sonar with some early aerial surveys.
Summary:	
Data Quality	Good
Data Type	Bendix sonar daily estimates of passage with use of split beam technology in 2002 and 2003.
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended BEG	10 of 30 years. 12 years are below and 8 years are above the range.
Comments	Concerns for expansions based on aerial surveys from (1974 to 1980). And expansions for timing of sonar deployment (1981 to 1990).

Appendix A.20. - Escapement goal for Sheenjek River fall chum salmon. (continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

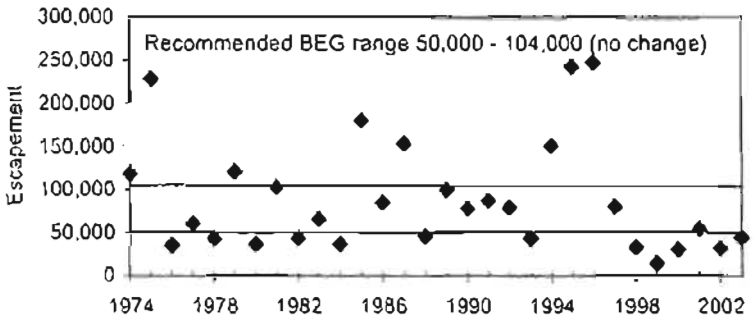
Data available for analysis of escapement goals.

Brood Year	Escapement	
1974	117,921	
1975	227,935	
1976	34,649	
1977	59,878	
1978	42,661	
1979	120,129	
1980	36,039	
1981	102,137	
1982	43,042	
1983	64,989	
1984	36,173	
1985	179,727	
1986	84,207	
1987	153,267	
1988	45,206	
1989	99,116	
1990	77,750	
1991	86,496	
1992	78,808	
1993	42,922	
1994	150,565	
1995	241,855	
1996	246,889	
1997	80,423	
1998	33,058	
1999	14,229	
2000	30,084	
2001	53,932	
2002	31,642	
2003	44,047	2003 data are preliminary.

Appendix A.20. - Escapement goal for Sheenjek River fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Observed escapement by year and recommended BEG range (solid line).



Appendix A.21. - Escapement goal for Fishing Branch River fall chum salmon.

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Description of stock and escapement goals.

Regulatory Area:	Yukon Area
Management Division	Commercial Fish
Primary Fishery:	Subsistence and commercial
Previous Escapement Goal:	50,000 - 120,000
Escapement Goal Type:	Negotiated through U.S./Canada JTC treaty process.
Recommended Escapement Goal:	Under review
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Weir counts
Summary:	
Data Quality	Good
Data Type	Weir counts (1974-1975 and 1985 to present); aerial surveys (1976 -1984)
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within range	8 of 30 years for negotiated goal and 13 of 30 based on Eggers (2001). 21 years are below and one year is above the negotiated range
Comments	Eggers (2001) analysis indicated a BEG range from 27,000 to 56,000. Original negotiated goal based on data from 1974 to 1986.

Appendix A.21. - Escapement goal for Fishing Branch River fall chum salmon. (continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

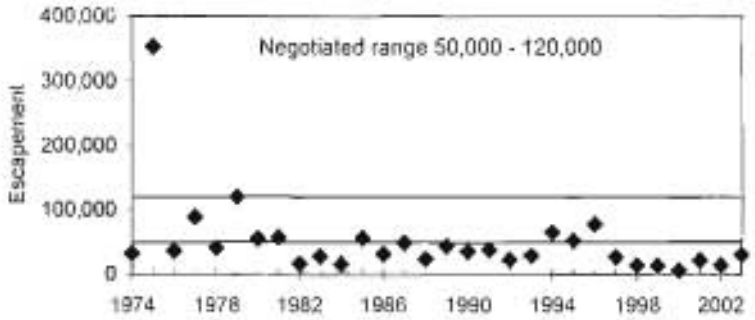
Data available for analysis of escapement goals.

Brood Year	Escapement	
1974	32,525	
1975	353,282	
1976	36,584	
1977	88,400	
1978	40,800	
1979	119,898	
1980	55,268	
1981	57,386	
1982	15,901	
1983	27,300	
1984	15,150	
1985	56,016	
1986	31,723	
1987	48,956	
1988	23,597	
1989	43,834	
1990	35,000	
1991	37,733	
1992	22,517	
1993	28,707	
1994	65,247	
1995	51,971	
1996	77,278	
1997	26,959	
1998	13,248	
1999	12,904	
2000	5,053	
2001	21,556	
2002	13,288	
2003	29,519	2003 data are preliminary.

Appendix A.21. - Escapement goal for Fishing Branch River fall chum salmon.
(continued)

System: Yukon Area
Species: chum salmon
Stock Unit: fall chum salmon

Observed escapement by year and recommended BEG range (solid line).



Appendix A.22. - Escapement goal for Delta Clearwater coho salmon.

System: Yukon Area
Species: coho salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Yukon Area - District 6 - Tanana River
Management Division:	Sport Fish
Primary Fishery:	Recreational, although DCR stock is harvested incidentally in Yukon Area commercial and subsistence fisheries
Previous Escapement Goal:	>9,000 (1993) see Barton (1999)
Escapement Goal Type:	EO (Escapement Objective)
Recommended Escapement Goal:	SEG range of 5,200 - 17,000
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Boat surveys since 1972
Summary:	
Data Quality	Good
Data Type	Boat surveys, mixed stock harvest and age data from commercial, subsistence, sport and test fisheries.
Contrast	33
Criteria for SEG	high contrast, at least moderate exploitation
25th-75th Percentile	5,200 - 17,000
Years within recommended SEG	15 of 31 complete years boat counts were within the recommended SEG range, 8 were above and 8 below.
Comments	Stock specific harvest (commercial, subsistence) and age structure data are not available for all years, but may be extrapolated by estimating proportion of DCR stock component in the Yukon Area common property fisheries

Appendix A.22. - Escapement goal for Delta Clearwater coho salmon. (continued)

System: **Yukon Area**
Species: **coho salmon**
Stock Unit: N/A

Data available for analysis of escapement goals.

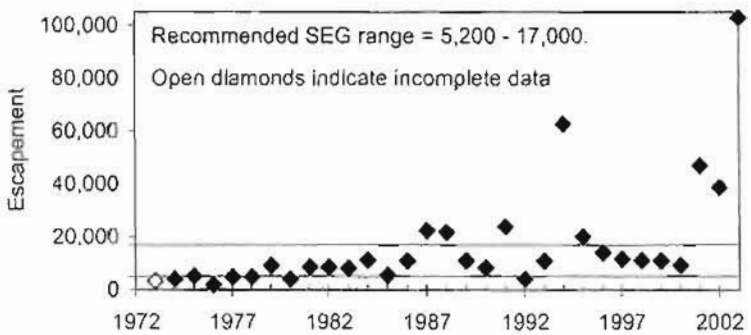
Brood Year	Escapement	
1972	632	
1973	3,322	
1974	3,954	
1975	5,100	
1976	1,920	
1977	4,793	
1978	4,798	
1979	8,970	
1980	3,946	
1981	8,563	
1982	8,365	
1983	8,019	
1984	11,061	
1985	5,358	
1986	10,857	
1987	22,300	
1988	21,600	
1989	11,000	
1990	8,325	
1991	23,900	
1992	3,963	
1993	10,875	
1994	62,675	
1995	20,100	
1996	14,075	
1997	11,525	
1998	11,100	
1999	10,975	
2000	9,225	shaded cell was excluded
2001	46,875	from SEG range
2002	38,625	recommendation due to
2003	102,800	incomplete count

[1] Mainstem only, these counts do not include the tributaries that were counted by helicopter or expanded for from 1994-2003

Appendix A.22. - Escapement goal for Delta Clearwater coho salmon.
(continued)

System: Yukon Area
Species: coho salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



APPENDIX B

KUSKOKWIM MANAGEMENT AREA

Appendix B.1. - Escapement goal for Kwethluk River chinook salmon (aerial survey).

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥1,200 aerial survey count (1983) (Buklis 1993, Burkey et al. 2000a)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	580 to 1,800
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	52
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	575 to 1,740
Years within recommended SEG:	7 of 12 years within SEG range, 3 years below and 2 years above.

Comments:

- 0 river miles from the enumeration point to the Kuskokwim River confluence.
- 98 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Kwethluk River is within the Yukon Delta National Wildlife Refuge.
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 102, 103 and 104.
  4) Counts include carcasses
- The Kwethluk River is a popular location for subsistence and recreational activity due in part close proximity of Bethel (population 5,471), plus the Yup'ik village of Kwethluk (population 693). The village is located about 1 mile upstream from the Kuskokwim River confluence. Subsistence fishers commonly deploy short gillnets within the lower few miles of the stream in order to harvest salmon and whitefish. Observes have reported as many as dozen gillnets in the lower Kwethluk River during the height of the chinook run. Subsistence and recreational fishers use rod and reel gear to harvest resident species including Arctic grayling, rainbow trout and Dolly Varden trout (personal observation; Brown 1983). Professional guides for sport fishing and rafting tours operate on the river.

- The lower Kwethluk River has a tidal influence.

Appendix B.1. - Escapement goal for Kwethluk River chinook salmon (aerial survey). (continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Data available for analysis of escapement goals.

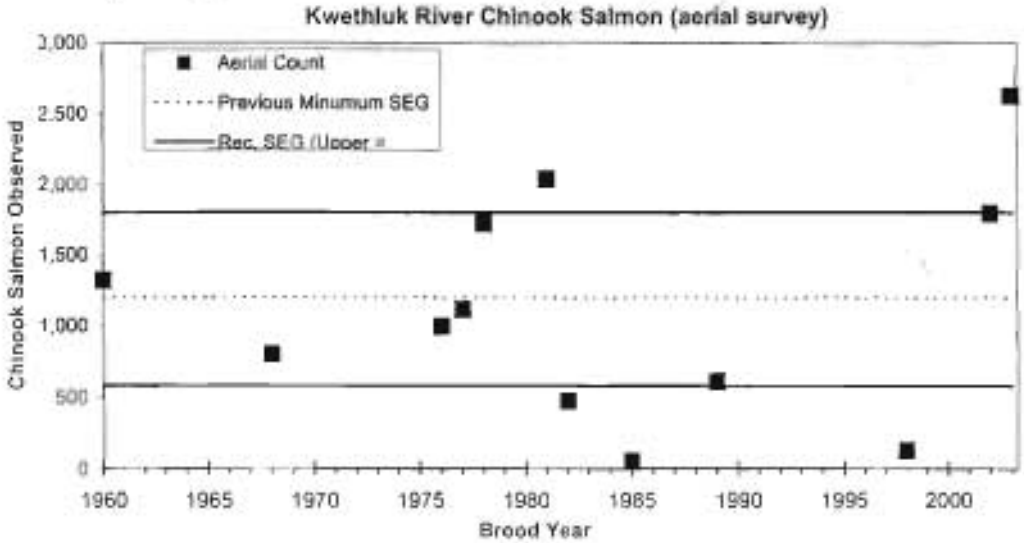
Brood Year	Survey Areas 101	102	103	104	Index Area Total	Rating	Date of Survey	Comments
1960					1,320		18-Jul	
1961								
1962								
1963								
1964								
1965								
1966				516		2	21-Jul	
1967								
1968					800	2	22-Jul	
1969								
1970								
1971								
1972								
1973								
1974								
1975								
1976					997	2	3-Aug	
1977		614	426	76	1,116	2	20-Jul	
1978		510	766	446	1,722	2	27-Jul	
1979								
1980								
1981		144	1,805	85	2,034	3	22-Jul	Rating overruled
1982		155	285	31	471	2	23-Jul	
1983								
1984								
1985		11	35	5	51	2	2-Aug	
1986								
1987								
1988		132	490			2	2-Aug	
1989		145	418	47	610	2	26-Jul	
1990		213	990			1	20-Jul	
1991		212	606			2	2-Aug	
1992								
1993								
1994								
1995								
1996								
1997								
1998		71	28	27	126			
1999								
2000								
2001								
2002		915	750	130	1,795	2	29-Jul	
2003		1,016	1,235	377	2,628	2	1-Aug	

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix B.1. - **Escapement goal for Kwethluk River chinook salmon (aerial survey).**
(continued)

System: **Kuskokwim Area**
Species: **chinook salmon**
Stock Unit: **not applicable**

Observed escapement by year and recommended SEG range (solid line).



Appendix B.2. - Escapement goal for Kisaralik River chinook salmon (aerial survey).

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	>1,000 aerial survey count (1983) (Buklis 1993, Burkey et al. 2000a)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	400 to 1,200
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	38
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	397 to 1,139
Years within recommended SEG:	8 of 16 years within SEG range, 4 years below and 4 years above.

Comments:

- 0 river miles from the enumeration point to the Kuskokwim River confluence.
- 114 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Kisaralik River is within the Yukon Delta National Wildlife Refuge.
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 102 and 103
  4) Counts include carcasses

- The Kisaralik River is a popular location for subsistence and recreational activity due in part close proximity of Bethel (population 5,471), plus the Yup'ik villages of Akiak (population 346) and Akiachak (population 622), which are located along the mainstem Kuskokwim River. Subsistence fishers commonly deploy short gillnets within the lower few miles of the stream in order to harvest salmon and whitefish. Subsistence and recreational fishers use rod and reel gear to harvest resident species including Arctic grayling, rainbow trout and Dolly Varden trout (personal observation; Brown 1983). Professional sport fish and rafting tour guides operate on the river.

Appendix B.2. - Escapement goal for Kisaralik River chinook salmon (aerial survey).

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

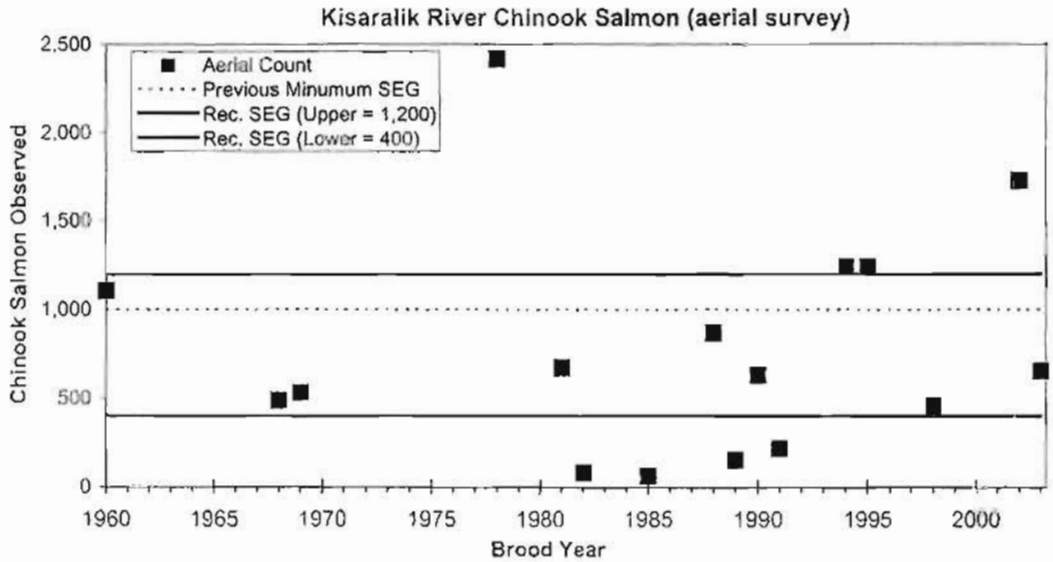
Data available for analysis of escapement goals.

Brood Year	Survey Areas 101	102	103	104	Index Area Total	Rating	Date of Survey	Comments
1960					1,104	2	17-Jul	
1961								
1962								
1963								
1964								
1965								
1966								
1967								
1968					487	2	22-Jul	
1969					531	2	24-Jul	
1970								
1971								
1972								
1973								
1974								
1975								
1976								
1977								
1978		1,090	1,327		2,417	2	22-Jul	
1979								
1980								
1981		612	60		672	2	22-Jul	
1982		33	48		81			
1983								
1984								
1985		45	18		63	2	31-Jul	
1986								
1987								
1988		813	56		869	2	2-Aug	
1989		91	61		152	2	27-Jul	
1990		246	385		631	1	18-Jul	
1991		145	72		[illegible]	1	5-Aug	
1992								
1993								
1994		943	300		1,243	2	27-Jul	
1995		305	938		1,243	1	28-Jul	
1996								
1997								
1998		438	19		457	2	23-Jul	
1999								
2000								
2001								
2002		1,181	546		1,727	1	29-Jul	
2003		480	174		654	2	28-Jul	

Appendix B.2. - Escapement goal for Kisaralik River chinook salmon (aerial survey).
(continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Observed escapement by year and recommended SEG range (solid line).



Appendix B.3. - Escapement goal for Aniak River chinook salmon (aerial survey).

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥1,500 aerial survey count (1983) (Buklis 1993, Burkey et al. 2000a)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	1,200 to 2,300
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	45
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	1,105 to 2,244
Years within recommended SEG:	10 of 19 years within SEG range, 5 years below and 4 years above

Comments:

- 0 river miles from the enumeration point to the Kuskokwim River confluence.
- 218 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Portions of the lower Aniak River are within the Yukon Delta National Wildlife Refuge.
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 102, 103 and 104.
  4) Counts include carcasses
- The Aniak River is a popular location for subsistence and recreational activity due in part close proximity of Aniak (population 539) which serves as a local hub for communities in the middle Kuskokwim basin. The village is located on the Kuskokwim River, about 1 mile from the mouth of the Aniak River. Subsistence and recreational fishers use rod and reel gear to harvest resident species including Arctic grayling, rainbow trout and Dolly Varden trout (personal observation; Brown 1983). Professional guides for sport fishing and rafting tours operate on the river.

Appendix B.3. - Escapement goal for Aniak River chinook salmon (aerial survey). (continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

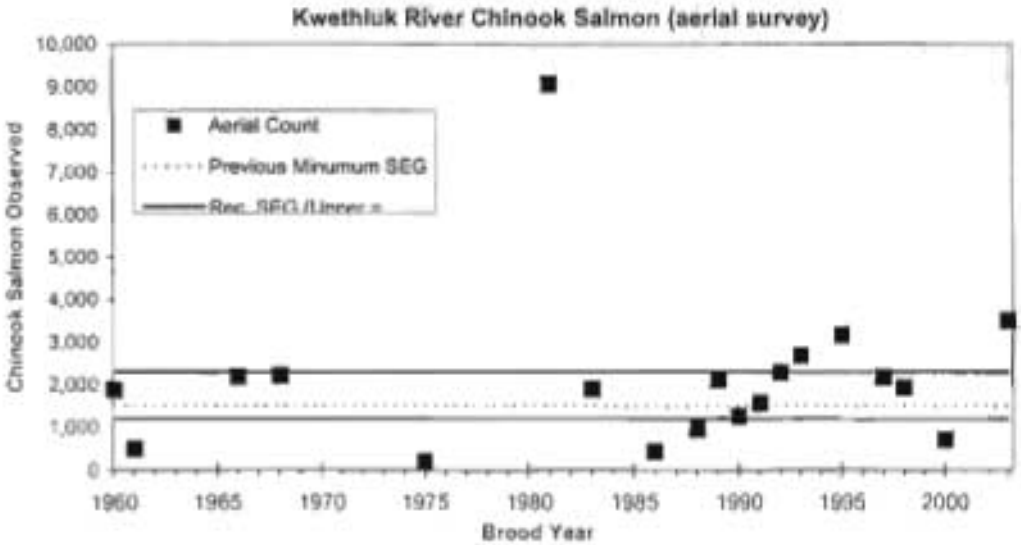
Data available for analysis of escapement goals.

Brood Year	Survey Areas 101	102	103	104	Index Area Total	Rating	Date of Survey	Comments
1960					1,881	2	18-Jul	
1961					497	2	29-Jul	
1962								
1963								
1964								
1965								
1966					2,184	2	24-Jul	
1967								
1968					2,203	2	23-Jul	
1969								
1970								
1971								
1972								
1973								
1974								
1975					202	2	31-Jul	
1976								
1977								
1978								
1979								
1980								
1981		6,840	2,104	130	9,074	3	4-Aug	Rating overrided
1982								
1983		1,251	624	34	1,909	2	30-Jul	
1984								
1985								
1986		17	359	48	424	2	28-Jul	
1987								
1988		538	300	116	954	2	24-Jul	
1989		1,211	766	132	2,109	2	26-Jul	
1990		309	872	74	1,255	1	19-Jul	
1991		918	408	238	1,564	2	23-Jul	
1992		1,155	1,046	83	2,284	2	20-Jul	
1993		1,057	1,499	131	2,687	1	21-Jul	
1994								
1995		1,005	1,972	194	3,171	1	20-Jul	
1996								
1997		800	1,256	131	2,187	2	22-Jul	
1998		643	1,169	118	1,930	2	1-Aug	
1999								
2000		364	315	35	714	2	27-Jul	
2001								
2002								
2003		1,255	2,024	235	3,514	1	25-Jul	

Appendix B.3. - Escapement goal for Aniak River chinook salmon (aerial survey).
[continued]

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Observed escapement by year and recommended SEG range (solid line).



Appendix B.4. - **Escapement goal for Salmon River (Aniak sub-basin) chinook salmon (aerial survey**

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥600 aerial survey count (1983) (Buklis 1993, Burkey et al. 2000a)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	330 to 1,200
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	83
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	329 to 1,134
Years within recommended SEG:	12 of 23 years within SEG range, 6 years below and 5 years above.

Comments:

- 54 river miles from the enumeration point to the Kuskokwim River confluence.
- 272 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Portions of the lower Aniak River are within the Yukon Delta National Wildlife Refuge.
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 101, 102 and 103.
  4) Counts include carcasses
- The Aniak River is a popular location for subsistence and recreational activity due in part close proximity of Aniak (population 539) which serves as a local hub for communities in the middle Kuskokwim basin. The village is located on the Kuskokwim River, about 1 mile from the mouth of the Aniak River. Subsistence and recreational fishers use rod and reel gear to harvest resident species including Arctic grayling, rainbow trout and Dolly Varden trout (personal observation; Brown 1983). Professional guides for sport fishing and rafting tours operate on the river.

Appendix B.4. - Escapement goal for Salmon River (Aniak sub-basin) chinook salmon - (continued)

System: Kuskokwim Area

Species: chinook salmon

Stock Unit: not applicable

Data available for analysis of escapement goals.

Brood	Survey Areas				Index Area	Rating	Date of	Comments
Year	101	102	103	104	Total		Survey	
1959					2,500	2	22-Jul	
1960					223	1	17-Jul	
1961								
1962								
1963								
1964								
1965								
1966								
1967								
1968					30	2	23-Jul	
1969								
1970								
1971								
1972								
1973								
1974								
1975								
1976								
1977								
1978	119	119	84		322	2	18-Jul	
1979								
1980	885	262	39		1,186	2	23-Jul	
1981								
1982								
1983	136	83	12		231	2	29-Jul	
1984								
1985								
1986	282	54	0		336	2	28-Jul	
1987	459	57	0		516	1	27-Jul	
1988	184	60	0		244	2	18-Jul	
1989	478	88	65		631	1	26-Jul	
1990	138	320	138		596	1	19-Jul	
1991	300	198	85		583	2	23-Jul	
1992	240	95	0		335	2	20-Jul	
1993	773	232	77		1,082	1	21-Jul	
1994	612	397	209		1,218	1	26-Jul	
1995	911	392	143		1,446	1	20-Jul	
1996	553	267	165		985	2	22-Jul	
1997	665	268	47		980	2	21-Jul	
1998	408	143	6		557	1	1-Aug	
1999								
2000	151	27	60		238	2	22-Jul	
2001	327	166	105		598	2	28-Jul	
2002	332	392	512		1,236	2	30-Jul	
2003	491	546	205		1,242	1	23-Jul	

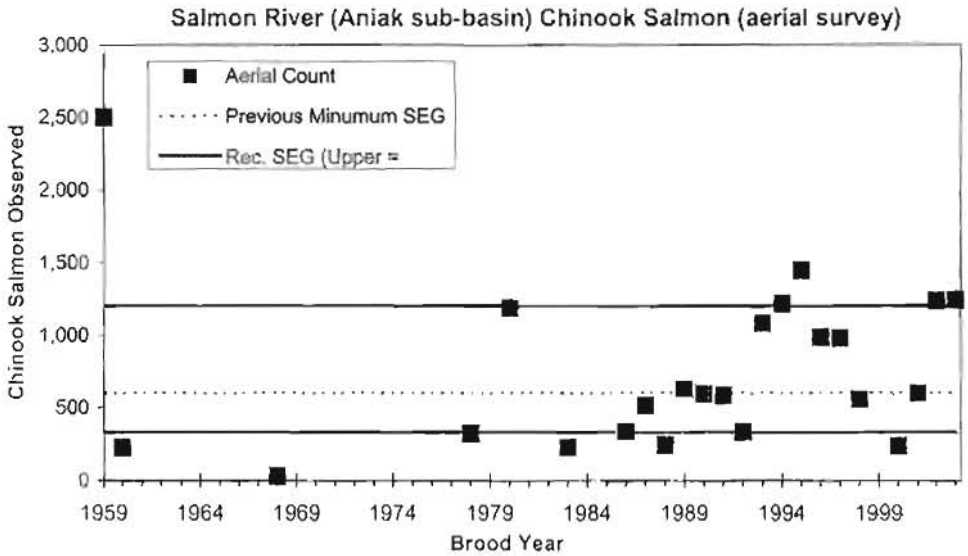
Appendix B.4. - **Escapement goal for Salmon River (Aniak sub-basin) chinook salmon (aerial survey).** (continued)

System: Kuskokwim Area

Species: chinook salmon

Stock Unit: not applicable

Observed escapement by year and recommended SEG range (solid line).



Appendix B.5. - Escapement goal for Holitna River chinook salmon (aerial survey).

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥2,000 aerial survey count (1983) (Buklis 1993, Burkey et al. 2000a)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	970 to 2,100
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	9
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	964 to 2,040
Years within recommended SEG:	7 of 12 years within SEG range, 3 years below and 2 years above

Comments:

- 0 river miles from the enumeration point to the Kuskokwim River confluence.
- 331 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 102 and 103.
  4) Counts include carcasses
- Chinook salmon spawn throughout much of the Holitna River, including areas upstream of the aerial survey area. The Kogrukluk River weir is located immediately upstream of the survey area.
- Beginning in the early 1900's a small number of prospectors explored the upper Holitna River, but found only limited amounts of gold (Brown 1983). The area has also supported mercury mines, particularly in the Chukowan River drainage. The upper Holitna River drainage, inclusive of the Kogrukluk River, is the current focus of new mineral extraction interests.
- The Holitna River is a popular subsistence and recreational location for residents throughout the Kuskokwim River drainage. There are local sport fish guiding services that operate in the sub-basin, as well as guides other areas. Recreational rod and reel fishing is expected to increase with the development of the Donlin Creek mine and the anticipated increase in human populations in nearby communities.

Appendix B.5. - **Escapement goal for Holitna River chinook salmon (aerial survey).** (continued)

System: Kuskokwim Area

Species: chinook salmon

Stock Unit: not applicable

Data available for analysis of escapement goals.

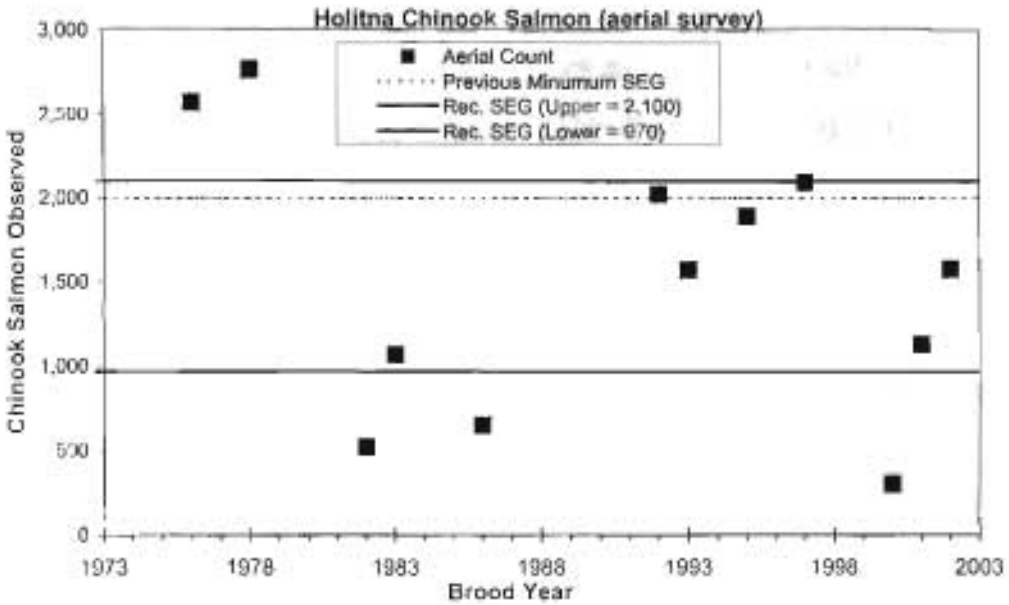
Brood Year	Survey Areas 101	102	103	104	Index Area Total	Rating	Date of Survey	Comments
1973							3-Aug	
1974								
1975								
1976	2,019	1,286	1,286	277	2,571	2	2-Aug	
1977								
1978	3,048	1,286	1,480	104	2,766	2	30-Jul	
1979								
1980								
1981								
1982	382	479	42	220	521	2	5-Aug	
1983	160	375	694	143	1,069	2	3-Aug	
1984								
1985								
1986		240	410		650	2	27-Jul	
1987								
1988								
1989								
1990								
1991								
1992		812	1,210		2,022	1	24-Jul	
1993		1,120	453	520	1,573	1	22-Jul	
1994								
1995		1,400	487	900	1,887	2	22-Jul	
1996								
1997		1,455	638		2,093	1	21-Jul	
1998								
1999		381	360			2	22-Jul	
2000		206	95	299	301	2	25-Jul	
2001	510	320	810	126	1,130	2	4-Aug	
2002		1,008	570	163	1,578	2	31-Jul	
2003								

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix B.5. - **Escapement goal for Holitna River chinook salmon (aerial survey).**
(continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Observed escapement by year and recommended SEG range (solid line).



Appendix B.6. - Escapement goal for Kogrukluk River chinook salmon (weir).

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥10,000 (1983) (Buklis 1993, Burkey et al. 2000a)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 5,300 to 14,000
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	Weir
Summary:	
Data Quality:	fair
Data Type:	weir counts; no estimates in 1977, 1980, 1983 and 1987.
Contrast:	6
Criteria for SEG:	medium contrast
15th to 85th Percentile:	5,277 to 13,960
Years within recommended SEG:	16 of 24 years within SEG range, 4 years below and 4 years above.

Comments:

- 135 river miles from the enumeration point to the Kuskokwim River confluence.
- 466 river miles from the enumeration point to the mouth of the Kuskokwim River.
- Kogrukluk River is a tributary of the upper Holitna River. Chinook salmon spawn throughout much of the Holitna River, including areas downstream of the Kogrukluk River weir.
- Beginning in the early 1900's a small number of prospectors explored the upper Holitna River, but found only limited amounts of gold (Brown 1983). The area has also supported mercury mines, particularly in the Chukowan River drainage. The upper Holitna River drainage, inclusive of the Kogrukluk River, is the current focus of new mineral extraction interests.
- The Holitna River is a popular subsistence and recreational location for residents throughout the Kuskokwim River drainage. There are local sport fish guiding services that operate in the sub-basin, as well as guides from other areas. Recreational rod and reel fishing is expected to increase with the development of the Donlin Creek mine and the anticipated increase in human populations in nearby communities.

Appendix B.6. - Escapement goal for Kogrukluk River chinook salmon (weir).
(continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

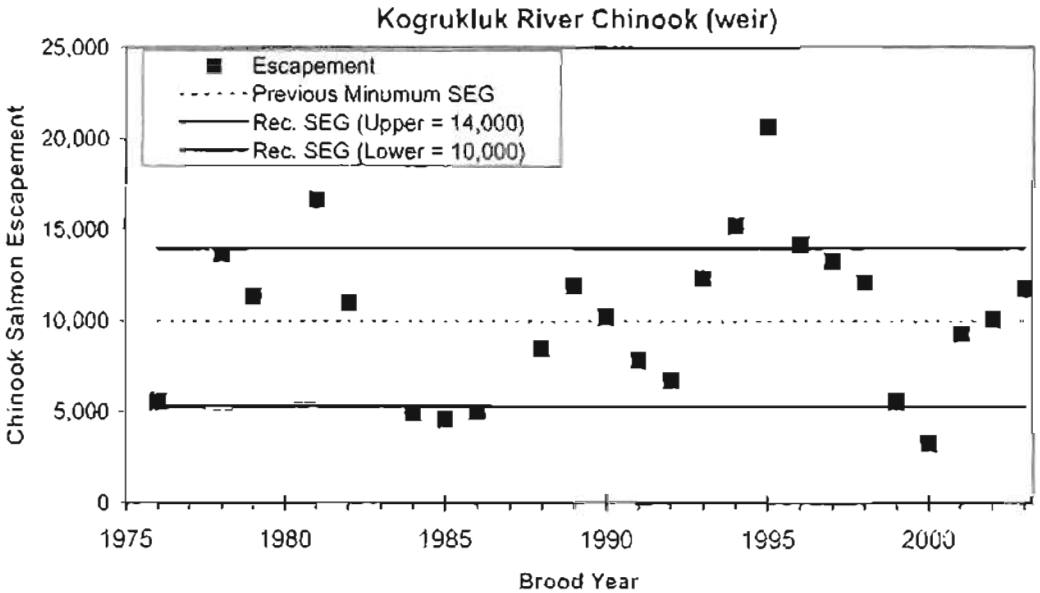
Data available for analysis of escapement goals.

Brood Year	Escapement
1976	5,579
1977	
1978	13,667
1979	11,338
1980	
1981	16,655
1982	10,993
1983	
1984	4,928
1985	4,619
1986	5,038
1987	
1988	8,505
1989	11,940
1990	10,218
1991	7,850
1992	6,755
1993	12,332
1994	15,227
1995	20,630
1996	14,199
1997	13,286
1998	12,107
1999	5,570
2000	3,310
2001	9,298
2002	10,104
2003	11,771

Appendix B.6. - Escapement goal for Kogrukluk River chinook salmon (weir).
(continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Observed escapement by year and recommended SEG range (solid line).



Appendix B.7. - Escapement goal for Cheeneetnuk River chinook salmon (aerial survey).

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	none
Escapement Goal Type:	N/A
Recommended Escapement Goal:	SEG range of 340 to 1,300
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	5
Criteria for SEG:	medium contrast
15th to 85th Percentile:	335 to 1,276
Years within recommended SEG:	8 of 12 years within SEG range, 2 years below and 2 years above.

Comments:

- 16 river miles from the enumeration point to the Kuskokwim River confluence.
- 390 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 101 and 102
  4) Counts include carcasses
- The Cheeneetnuk River chinook salmon escapement goal is being recommended in order to improve the geographic distribution of goals. In addition, chinook from this tributary are within a genetically distinct aggregate of spawning populations from the Stony River sub-basin (ADF&G, Gene Conservation Laboratory, unpublished data). Chinook of the Stony River sub-basin are not represented with any previous escapement goal.
- Stuby (2003) and Linderman et al. (2003) both report that upper Kuskokwim River salmon tend to have earlier run timings through the lower Kuskokwim River than stocks that spawn in tributaries farther down stream. Managers can take actions to ensure adequate geographic distribution of escapement by regulating the temporal distribution of harvest in the lower Kuskokwim River. Trends in the subsistence harvest suggest that earlier running stocks may have a higher exploitation rate in the subsistence chinook fishery (Clark and Molyneaux 2003).

Appendix B.7. - Escapement goal for Cheencetnuk River chinook salmon (aerial survey). (continued)

System: Kuskokwim Area

Species: chinook salmon

Stock Unit: not applicable

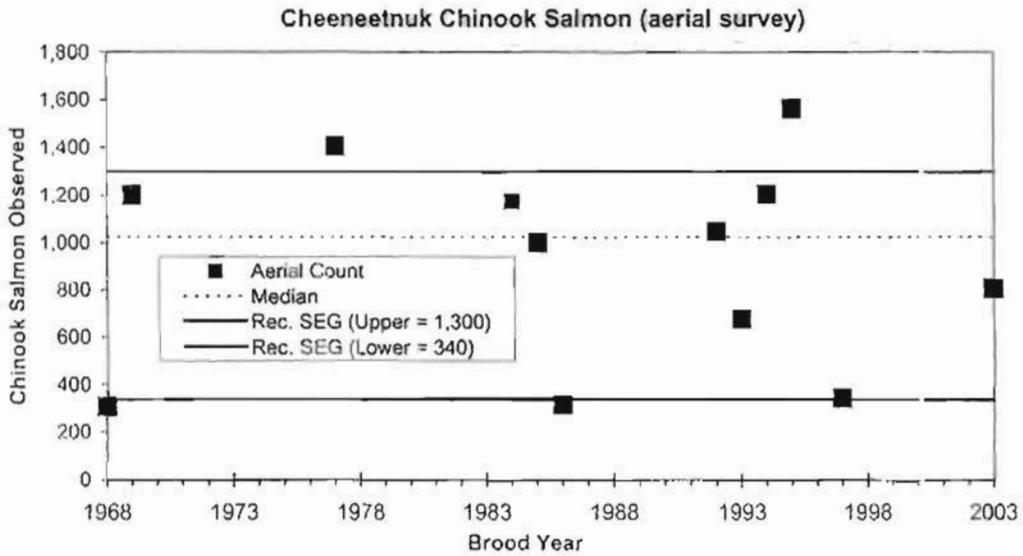
Data available for analysis of escapement goals.

Brood	Survey Areas				Index Area	Rating	Date of	Comments
Year	101	102	103	104	Total		Survey	
1968					309	2	24-Jul	
1969					1,201	2	25-Jul	
1970								
1971								
1972								
1973								
1974								
1975								
1976								
1977	1,150	257			1,407	2	22-Jul	
1978	180	88				2	29-Jul	
1979								
1980								
1981								
1982								
1983								
1984	511	666			1,177	1	23-Jul	
1985	927	75			1,002	2	26-Jul	
1986	289	28			317	2	26-Jul	
1987								
1988								
1989								
1990								
1991								
1992	529	521			1,050	1	27-Jul	
1993	338	340			678	1	29-Jul	
1994	610	596			1,206	1	29-Jul	
1995	909	656			1,565	1	26-Jul	
1996								
1997	173	172			345	2	30-Jul	
1998								
1999								
2000								
2001								
2002	442	288				1	25-Jul	
2003	307	503			810	1	22-Jul	

Appendix B.7. - **Escapement goal for Cheeneetnuk River chinook salmon (aerial survey).**
(continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Observed escapement by year and recommended SEG range (solid line).



Appendix B.8. - **Escapement goal for Gagaryah** River chinook salmon (aerial survey).

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	none
Escapement Goal Type:	N/A
Recommended Escapement Goal:	SEG range of 300 to 830
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	15
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	297 to 830
Years within recommended SEG:	6 of 12 years within SEG range, 3 years below and 3 years above.

Comments:

- 38 river miles from the enumeration point to the Kuskokwim River confluence.
- 412 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 101 and 102
  4) Counts include carcasses
- The Gagaryah River chinook salmon escapement goal is being recommended in order to improve the geographic distribution of goals. In addition, chinook from this tributary are likely within a genetically distinct aggregate of spawning populations from the Stony River sub-basin (ADF&G, Gene Conservation Laboratory, unpublished data). Chinook of the Stony River sub-basin are not represented with any previous escapement goal.
- Stuby (2003) and Linderman et al. (2003) both report that upper Kuskokwim River salmon tend to have earlier run timings through the lower Kuskokwim River than stocks that spawn in tributaries further down stream. Managers can take actions to ensure adequate geographic distribution of escapement by regulating the temporal distribution of harvest in the lower Kuskokwim River. Trends in the subsistence harvest suggest that earlier running stocks may have a higher exploitation rate in the subsistence chinook fishery (Clark and Molyneaux 2003).

Appendix B.8. - Escapement goal for Gagaryah River chinook salmon (aerial survey).
(continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

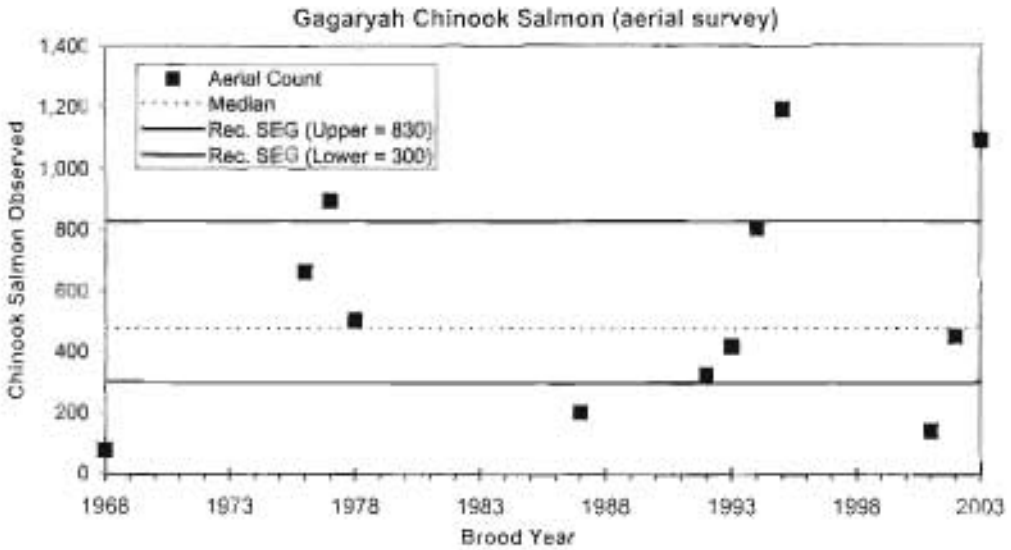
Data available for analysis of escapement goals.

Brood Year	Survey Areas 101	102	103	104	Index Area Total	Rating	Date of Survey	Comments
1968					78	2	24 Jul	
1969								
1970								
1971								
1972								
1973								
1974								
1975								
1976					663	1	25 Jul	
1977					897	1	23 Jul	
1978	423	81			504	1	29 Jul	
1979								
1980								
1981								
1982								
1983								
1984								
1985								
1986								
1987	205	0			205	1	26 Jul	
1988								
1989								
1990								
1991								
1992	279	49			328	1	27 Jul	
1993	363	56			419	1	29 Jul	
1994	597	210			807	1	29 Jul	
1995	823	370			1,193	1	26 Jul	
1996								
1997								
1998								
1999								
2000								
2001	132	11			143	1	29 Jul	
2002	310	142			452	1	25 Jul	
2003	821	274			1,095	1	22 Jul	

Appendix B.8. - Escapement goal for Gagaryah River chinook salmon (aerial survey).
(continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Observed escapement by year and recommended SEG range (solid line).



Appendix B.9. - **Escapement goal for Salmon River (Pitka Fork) chinook salmon (aerial survey).**

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥1,300 aerial survey count (1983) (Buklis 1993, Burkey et al. 2000a)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 470 to 1,600
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	7
Criteria for SEG:	medium contrast
15th to 85th Percentile:	467 to 1,588
Years within recommended SEG:	13 of 19 years within SEG range, 3 years below and 3 years above.

Comments:

- 38 river miles from the enumeration point to the Kuskokwim River confluence.
- 579 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 102, 103 and 104
  4) Counts include carcasses
- A weir was operated on the South Fork of the Salmon River in 1981 and 1982 from approximately mid June to late July. Most of the passage was composed of chinook salmon.
- The Salmon River is a popular subsistence and recreational location for residents of McGrath (population 407) and Nikolai (population 120). Subsistence fishers used fish fences on the river to harvest salmon until the early 1960's when the practice was banned. Most subsistence harvest is know taken with rod and reel gear.
- The Salmon River chinook salmon are within a genetically distinct aggregate of spawning populations from the upper Kuskokwim River (ADF&G, Gene Conservation Laboratory, unpublished data).
- Stuby (2003) and Linderman et al. (2003) both report that upper Kuskokwim River salmon tend to have earlier run timings through the lower Kuskokwim River than stocks that spawn in tributaries farther down stream. Managers can take actions to ensure adequate geographic distribution of escapement by regulating the temporal distribution of harvest in the lower Kuskokwim River. Trends in the subsistence harvest suggest that earlier running stocks may have a higher exploitation rate in the subsistence chinook fishery (Clark and Molyneaux 2003).

Appendix B.9. - Escapement goal for Salmon River (Pitka Fork) chinook salmon (aerial [illegible]

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Data available for analysis of escapement goals.

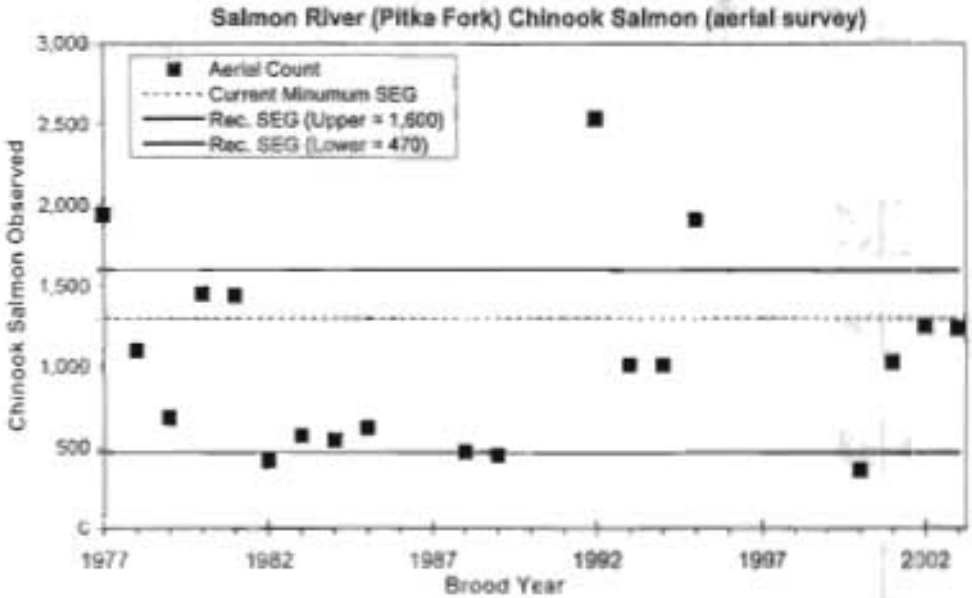
Brood Year	Survey Areas 101	102	103	104	Index Area Total	Rating	Date of Survey	Comments
1977		443	150	1,347	1,940	1	23-Jul	
1978		38	27	1,035	1,100	1	25-Jul	
1979		56	469	157	682	1	4-Aug	
1980					1,450			
1981	35	425	31	983	1,439	3	5-Aug	Rating overruled
1982	6	63	66	284	413	2	28-Jul	
1983		59	155	358	572			
1984	12	43	3	499	545	2	23-Jul	
1985	5	15	4	601	620	2	26-Jul	
1986								
1987								
1988	28	32	39	402	473	2	25-Jul	
1989	0	53	9	390	452	2	27-Jul	
1990								
1991								
1992	19	895	266	1,375	2,536	1	28-Jul	
1993	2	158	191	661	1,010	1	30-Jul	
1994	0	137	24	849	1,010	1	30-Jul	
1995	0	287	32	1,592	1,911	1	28-Jul	
1996								
1997								
1998								
1999								
2000	15	107	57	198	362	1	25-Jul	
2001	0	264	77	692	1,033	1	27-Jul	
2002	21	359	4	892	1,255	1	22-Jul	
2003	149	272	34	935	1,241	1	20-Jul	

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix B.9. - Escapement goal for Salmon River (Pitka Fork) chinook salmon (aerial survey).
(continued)

System: Kuskokwim Area
Species: chinook salmon
Stock Unit: not applicable

Observed escapement by year and recommended SEG range (solid line).



Appendix B.10. Escapement goal for Kanektok River chinook salmon

System: Kuskokwim Bay (Kanektok River drainage)
Species: Chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 5,800 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range: 3,500 – 8,000
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial survey
Summary:	
Data Quality [a]	Fair
Data Type	• Twenty-four fixed-wing aircraft aerial surveys since 1962, • escapement information from a counting tower 1997, from a weir in 2002 and 2003, • commercial harvest information since 1960, • commercial harvest age class information since 1990, • escapement age class information from 1997, 2002, and 2003.
Contrast:	24
Criteria for SEG [b]	High contrast with at least moderate exploitation
25th – 75th percentile	3,510 – 7,971
Years within recommended SEG	11 of 24
Comments	This goal represents an index, not an estimate of the actual number of spawners. District 4 is an intercept fishery. Commercially harvested salmon are bound for other drainages, such as the Kuskokwim River drainage (see Baxter 1970). As a result, commercial harvest information is not exclusive to Kanektok River stocks.

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.10. Continued

System: **Kuskokwim Bay (Kanektok River)**
Species: **Chinook salmon**
Stock Unit: **N/A**

Data available for analysis of escapement goals

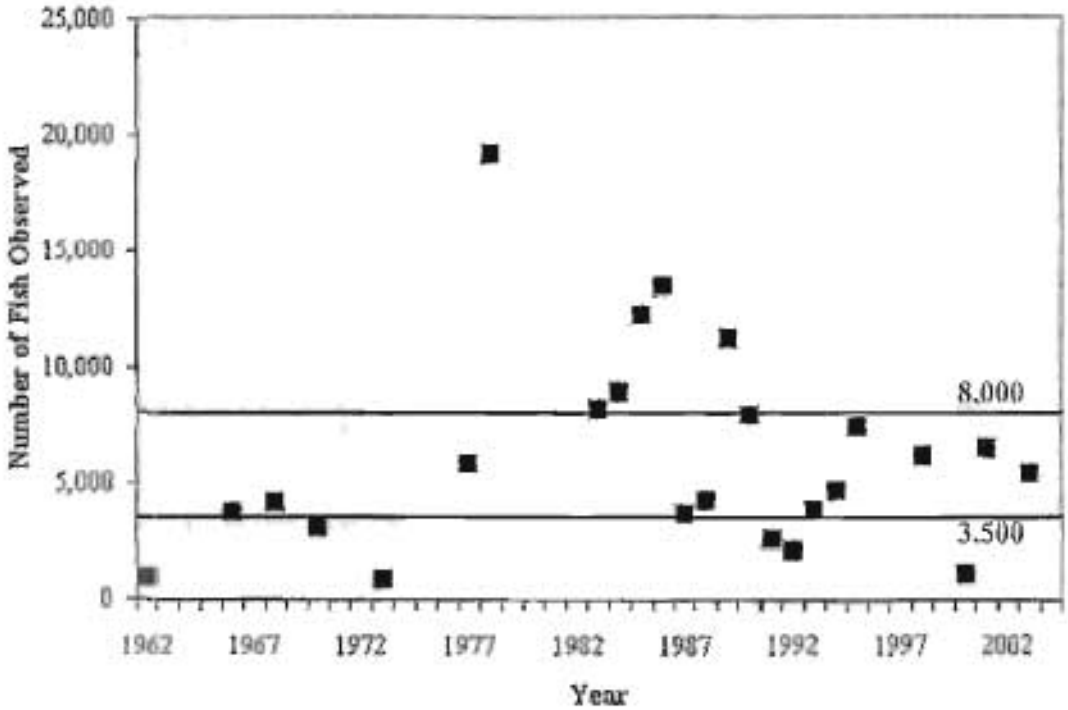
Year	aerial survey	tower/weir
1962	935	b
1963	a	b
1964	a	b
1965	a	b
1966	3,718	b
1967	a	b
1968	4,170	b
1969	a	b
1970	3,112	b
1971	a	b
1972	a	b
1973	814	b
1974	a	b
1975	a	b
1976	a	b
1977	5,787	b
1978	19,180	b
1979	a	b
1980	a	b
1981	a	b
1982	a	b
1983	8,142	b
1984	8,890	b
1985	12,182	b
1986	13,465	b
1987	3,643	b
1988	4,223	b
1989	11,180	b
1990	7,914	b
1991	2,563	b
1992	2,100	b
1993	3,856	b
1994	4,670	b
1995	7,386	b
1996	a	b
1997	a	16,731 c
1998	6,107	b
1999	a	b
2000	1,118	b
2001	6,483	b
2002	a	5,343 d
2003	5,430	8,231 d

a Aerial survey either not flown or was rated as unacceptable.
b Escapement project was not operated.
c Escapement project operated as counting tower.
d Escapement project operated as weir.

Appendix B.10. Continued

System: Kuskokwim Bay (Kanektok River drainage)
Species: Chinook salmon
Stock Unit: N/A

Aerial survey counts by year (squares) and recommended SEG range (solid lines).



Appendix B.11. Escapement goal for Goodnews River chinook salmon

System: **Kuskokwim Bay (Goodnews River)**
Species: **Chinook salmon**
Stock Unit: **N/A**

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 1,600 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range: 640 – 3,300
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial survey
Summary:	
Data Quality [a]	Fair
Data Type	• Seventeen fixed-wing aircraft aerial survey since 1980, • commercial harvest information since 1968, • commercial harvest age class information since 1990.
Contrast:	6
Criteria for SEG [b]	Medium
15th – 85th percentile	643 – 3,286
Years within recommended SEG	12 of 17
Comments	This goal represents an index, not an estimate of the actual number of spawners. Commercial harvest and age class information is for the entire drainage. It is not specific for stocks originating in the Goodnews River

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.11. Continued

System: Kuskokwim Bay (Goodnews River)
Species: Chinook salmon
Stock Unit: N/A

Data available for escapement goal analysis

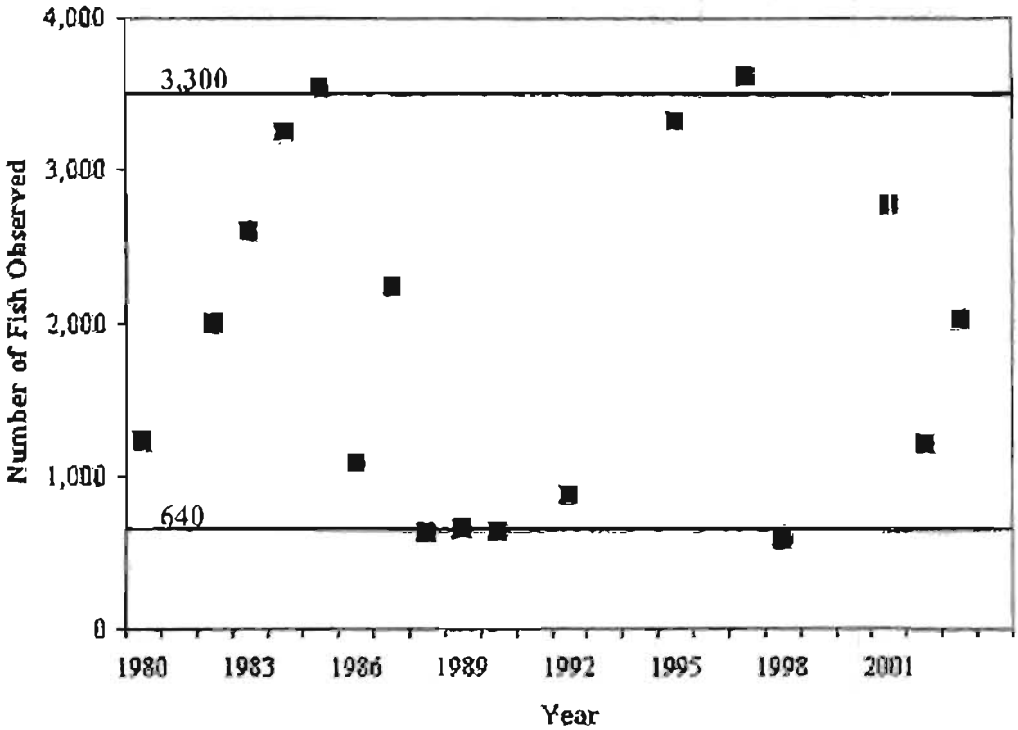
year	aerial survey
1980	1,228
1981	a
1982	1,990
1983	2,600
1984	3,245
1985	3,535
1986	1,068
1987	2,234
1988	637
1989	651
1990	626
1991	a
1992	875
1993	a
1994	a
1995	3,314
1996	a
1997	3,611
1998	578
1999	a
2000	a
2001	2,779
2002	1,195
2003	2,015

a Aerial survey either not flown or was rated as unacceptable.

Appendix B.11. Continued

System: Goodnews River
Species: Chinook salmon
Stock Unit: N/A

Aerial survey counts by year (squares) and recommended SEG range (solid lines).



Appendix B.12. Escapement goal for Middle Fork Goodnews River chinook salmon

System:	**Kuskokwim Bay (Middle Fork Goodnews River)**
Species:	Chinook salmon
Stock Unit:	N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 800 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	Discontinue
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial survey
Summary:	
Data Quality [a]	Good
Data Type	• Fourteen fixed wing aircraft aerial survey since 1980, • tower or weir escapement information since 1981, • commercial harvest information since 1968, • commercial harvest age class information since 1990, • escapement age class information since 1990.
Comments	Recommend this goal be discontinued in favor of an escapement goal at the Middle Fork Goodnews River weir.

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.12. Continued

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Chinook salmon
Stock Unit: N/A

Data available for escapement goal analysis

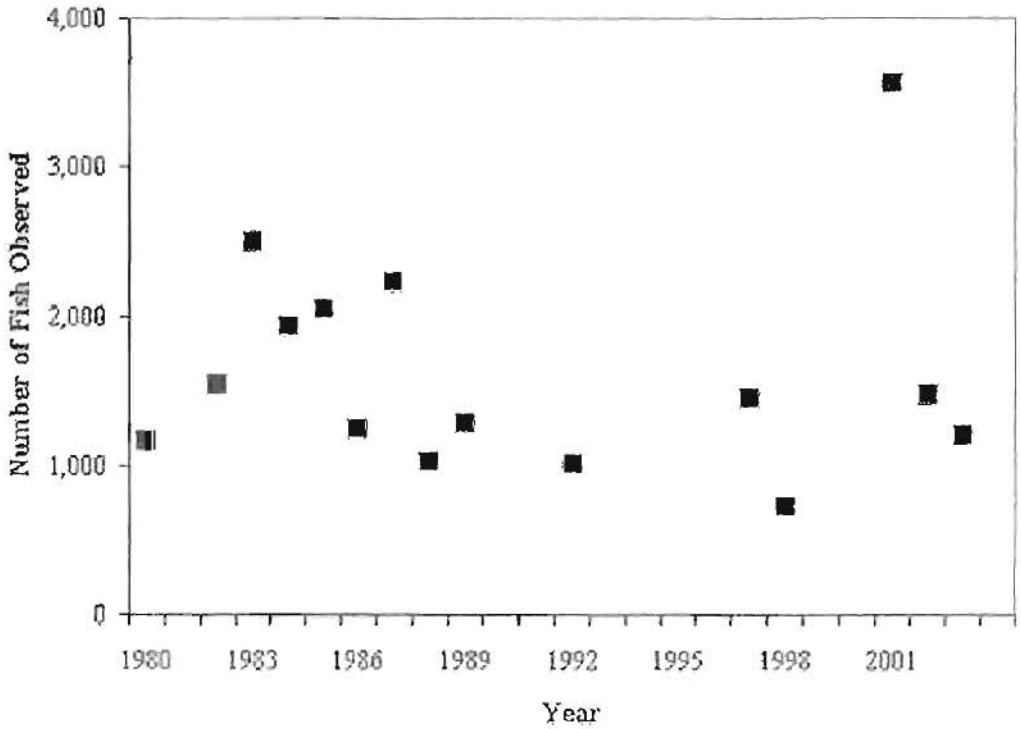
year	aerial survey
1980	1,164
1981	a
1982	1,546
1983	2,500
1984	1,930
1985	2,050
1986	1,249
1987	2,222
1988	1,024
1989	1,277
1990	a
1991	a
1992	1,012
1993	a
1994	a
1995	a
1996	a
1997	1,447
1998	731
1999	a
2000	a
2001	3,561
2002	1,470
2003	1,210

a Aerial survey either not flown or was rated as unacceptable.

Appendix B.12. Continued

System:	Kuskokwim Bay (Middle Fork Goodnews River)
Species:	Chinook salmon
Stock Unit:	N/A

Aerial survey counts by year (squares)



Appendix B.13. Escapement goal of Middle Fork Goodnews River chinook salmon.

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 3,500 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range: 2,000 – 4,500
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Tower/weir
Summary:	
Data Quality [a]	Good
Data Type	• Tower/weir counts since 1981, • commercial harvest information since 1968, • commercial harvest age class information since 1990, • escapement age class information since 1990
Contrast:	4
Criteria for SEG [b]	Medium
15th – 85th percentile	1,994 – 4,366
Years within recommended SEG	15 of 23
Comments	Commercial harvest and age class information represents the entire drainage. It is not specific for stocks originating in the Middle Fork Goodnews River

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.13. Continued

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Chinook salmon
Stock Unit: N/A

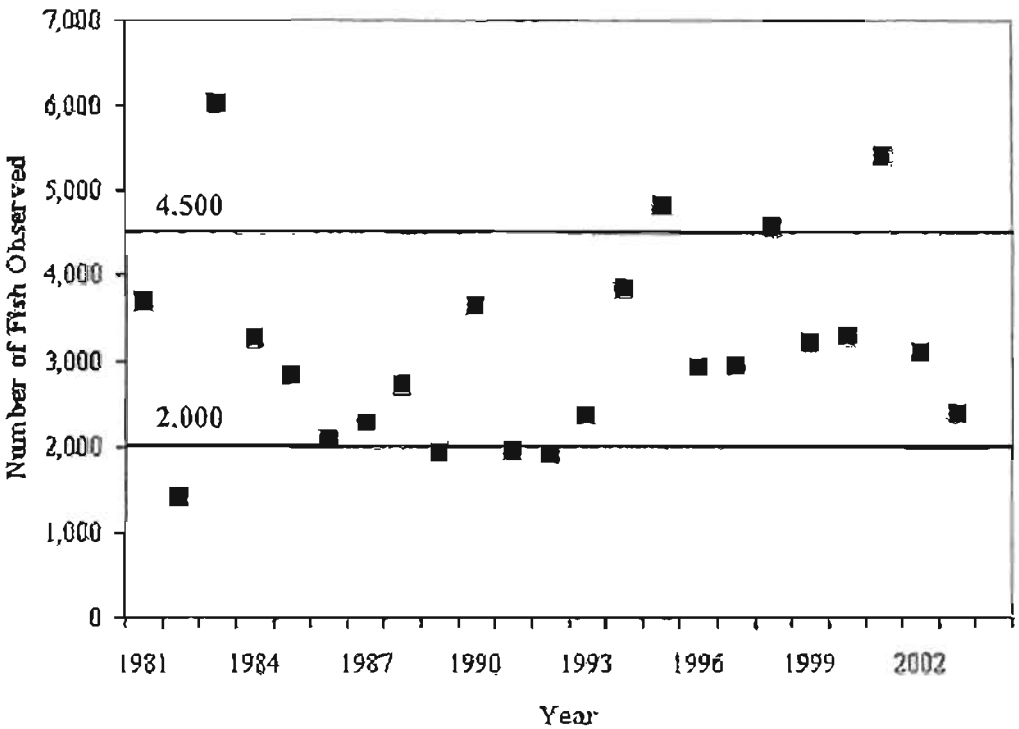
Data available for escapement goal analysis

year	tower/weir count
1981	3,688
1982	1,395
1983	6,022
1984	3,260
1985	2,831
1986	2,092
1987	2,272
1988	2,712
1989	1,915
1990	3,636
1991	1,952
1992	1,903
1993	2,349
1994	3,856
1995	4,836
1996	2,930
1997	2,937
1998	4,584
1999	3,221
2000	3,295
2001	5,404
2002	3,100
2003	2,389

Appendix B.13. Continued.

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Chinook salmon
Stock Unit: N/A

Tower/weir counts by year (squares) and recommended SEG range (solid lines).



Appendix B.14. - Escapement goal for Aniak River chum salmon (aerial survey).

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥10,000 aerial survey count (1983) (Buklis 1993, Burkey et al. 2000b)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	discontinue
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	83
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	5,643 to 10,580
Years within recommended SEG:	not applicable.

Comments:

- 0 river miles from the enumeration point to the Kuskokwim River confluence.
- 218 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Portions of the lower Aniak River are within the Yukon Delta National Wildlife Refuge
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 102.
  4) Counts include carcasses

- The Salmon River (Aniak) aerial survey escapement goal of 3,000 chum salmon reported by Buklis (1997) was discontinued as per Burkey et al (2000b).
- Discontinuation of this escapement goal is recommended because of low confidence in the reliability of survey counts for chum salmon in the Kuskokwim River and the availability of a preferred alternative. Chum salmon are difficult to distinguish from the stream substrate and observer variability in estimating the number of individual fish in large schools is disparity (Burkey et al 2002). Protracted run timing of chum salmon confounds the utility of a single annual aerial survey to index abundance. Chinook salmon are the primary focus of aerial surveys and surveyor notes suggest that attention to chum salmon may wane depending on the competing need to enumerate chinook salmon. The escapement monitoring provided by Aniak River sonar is the preferred alternative to aerial surveys. Paired sonar and aerial survey counts do not correlate well.

- The Aniak River is a popular location for subsistence and recreational activity due in part close proximity of Aniak (population 539) which serves as a local hub for communities in the middle Kuskokwim basin. The village is located on the Kuskokwim River, about 1 mile from the mouth of the Aniak River. Subsistence and recreational fishers use rod and reel gear to harvest resident species including Arctic grayling, rainbow trout and Dolly Varden trout (personal observation; Brown 1983) Professional guides for sport fishing and rafting tours operate on the river.

Appendix B.14. - Escapement goal for Aniak River chum salmon (aerial survey).
(continued)

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Data available for analysis of escapement goals.

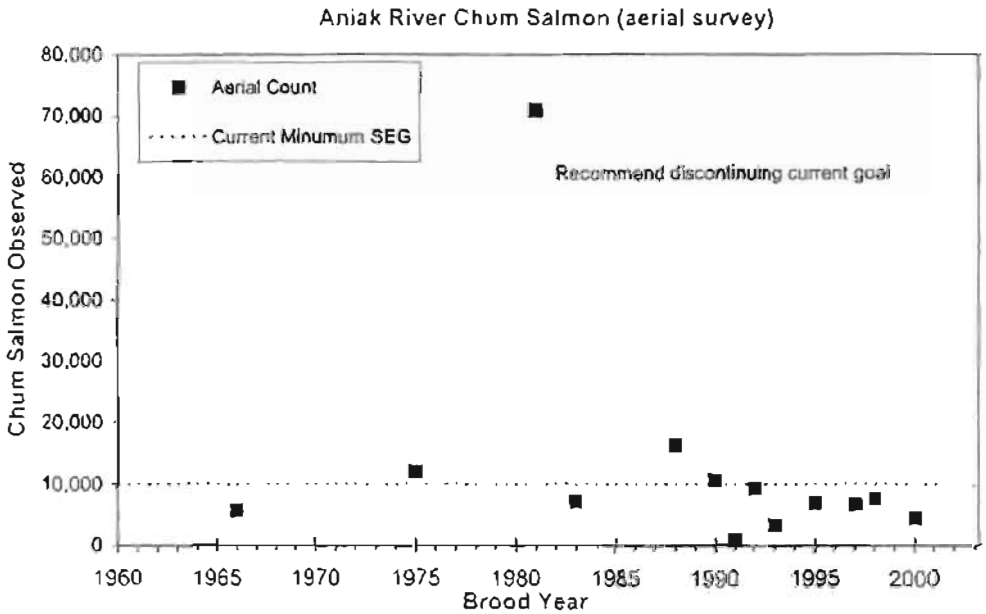
Brood	Survey Areas				Index Area	Rating	Date of	Comments
Year	101	102	103	104	Total		Survey	
1960								
1961								
1962								
1963								
1964								
1965								
1966		5,643			5,643			
1967								
1968								
1969								
1970								
1971								
1972								
1973								
1974								
1975		11,950			11,950	2	31-Jul	
1976								
1977								
1978								
1979								
1980								
1981	25,250	70,820	1,200	5	70,820	3	4-Aug	Rating overruled
1982								
1983	2,500	7,130	343	118	7,130	2	30-Jul	
1984								
1985								
1986								
1987								
1988	8,250	16,190	708		16,190	2	24-Jul	104 not surveyed?
1989								
1990	1,500	10,580	3,500	0	10,580	1	19-Jul	104 not surveyed?
1991		850			850	2	23-Jul	
1992		9,240	4,060	100	9,240	2	20-Jul	
1993	620	3,335	960	0	3,335	1	21-Jul	
1994								
1995		6,920	695	60	6,920	1	20-Jul	
1996			2,000	250		2	22-Jul	
1997		6,750	30	110	6,750	2	22-Jul	
1998		7,670	1,400	200	7,670	2	1-Aug	
1999								
2000		4,370	50	50	4,370	2	27-Jul	
2001								
2002								Did not survey 102
2003								

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix B.14. - Escapement goal for Aniak River chum salmon (aerial survey).
(continued)

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Observed escapement by year.



Appendix B.15. - Escapement goal for Aniak River chum salmon (sonar index).

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	>250,000 (1983) (Buklis 1993, Burkey et al. 2000b)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 210,000 to 370,000
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	sonar count unapportioned to species, but believed to be mainly chum salmon
Summary:	
Data Quality:	fair
Data Type:	Bendix sonar (1980 to 1994) and Biosonics sonar (1996 to 2003)
Contrast:	88
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	201,047 and 363,104
Years within recommended SEG:	12 of 23 years within SEG range, 7 years below and 5 years above.

Comments:

- 19 river miles from the enumeration point to the Kuskokwim River confluence.
- 237 river miles from the enumeration point to the mouth of the Kuskokwim River.
- The Aniak River sub-basin is a major chum salmon producer for the Kuskokwim River and the sonar counts are mostly chum salmon, but river also produces chinook, sockeye, pink and coho salmon as well as migrating populations of longnose suckers, Sheefish and various species of whitefish. Resident species include rainbow trout, grayling and northern pike.
- Future operation expected to transition to DIDSON technology, which allows partial speciation by coarse size categories (e.g., large chinook, medium size salmon, small fish).
- Linderman et al. (2003) reported that the run timing of Aniak River chum salmon through the Kalskag-Aniak portion of the Kuskokwim River was later than stock spawning farther upstream, which has implications in the temporal management of salmon harvest in the lower Kuskokwim River.

Appendix B.15. - Escapement goal for Aniak River chum salmon (sonar index).
(continued)

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

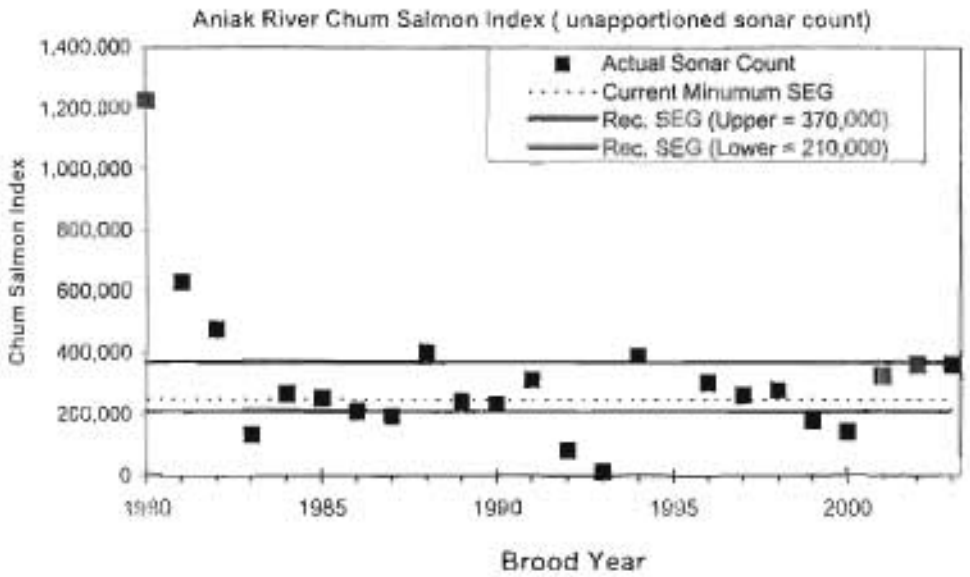
Data available for analysis of escapement goals.

Brood Year	Passage Index
1980	1,225,939
1981	631,346
1982	476,325
1983	134,278
1984	266,976
1985	253,051
1986	209,080
1987	193,013
1988	401,511
1989	243,922
1990	232,260
1991	314,166
1992	84,269
1993	13,870
1994	388,163
1995	
1996	302,106
1997	262,522
1998	279,430
1999	177,771
2000	144,157
2001	326,013
2002	362,812
2003	363,396

Appendix B.15. - Escapement goal for Aniak River chum salmon (sonar index).
(continued)

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Observed escapement by year and recommended SEG range (solid line).



Appendix B.16. - Escapement goal for Holitna River chum salmon (aerial survey).

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥12,000 (1992) (Francisco et al. 199), not well documented)
	≥49,000 (1983) (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	discontinue
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	peak aerial survey
Summary:	
Data Quality:	poor
Data Type:	peak aerial survey count with fixed winged aircraft; abundance index
Contrast:	0
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	7,125 to 10,337
Years within recommended SEG:	not applicable.

Comments:

- 0 river miles from the enumeration point to the Kuskokwim River confluence.
- 331 river miles from the enumeration point (stream mouth) to the mouth of the Kuskokwim River.
- Criteria for inclusion of aerial survey data points:
  1) Surveyor Rating of 1 or 2 (Fair to Good)
  2) Surveys must have been flown between July 17 and August 5 (inclusive)
  3) Must include Survey Areas 102 and 103.
  4) Counts include carcasses

Discontinuation of this escapement goal is recommended because of low confidence in the reliability of survey counts for chum salmon in the Kuskokwim River and the availability of a preferred alternative. Chum salmon are difficult to distinguish from the stream substrate and observer variability in estimating the number of individual fish in large schools is disparity (Burkey et al 2002). Protracted run timing of chum salmon confounds the utility of a single annual aerial survey to index abundance. Chinook salmon are the primary focus of aerial surveys and surveyor notes suggest due attention to chum salmon may wane depending on the competing need to enumerate chinook salmon. The escapement monitoring provided by Kogrukluk River weir is a preferred alternative to aerial surveys. Paired sonar and aerial survey counts do not correlate well.

- Beginning in the early 1900's a small number of prospectors explored the upper Holitna River, but found only limited amounts of gold (Brown 1983). The area has also supported mercury mines, particularly in the Chukowan River drainage. The upper Holitna River drainage, inclusive of the Kogrukluk River, is the current focus of new mineral extraction interests.
- The Holitna River is a popular subsistence and recreational location for residents throughout the Kuskokwim River drainage. There are local sport fish guiding services that operate in the sub-basin, as well as guides other areas. Recreational rod and reel fishing is expected to increase with the development of the Donlin Creek mine and the anticipated increase in human populations in nearby communities.

Appendix B.16. - Escapement goal for Holitna River chum salmon (aerial survey).
(continued)

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Data available for analysis of escapement goals.

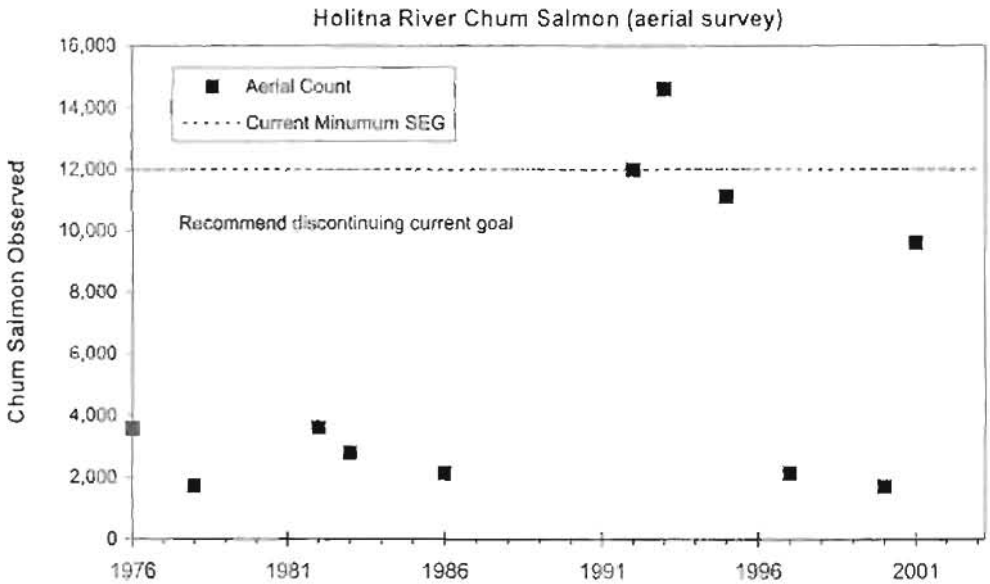
Brood Year	Survey Areas 101	102	103	104	Index Area Total	Rating	Date of Survey	Comments
1976	118,980	1,790	1,790	342	3,580	2	2-Aug	
1977								
1978	20,733	1,200	500		1,700	2	30-Jul	
1979								
1980								
1981								
1982	7,820	3,470	110	573	3,580	2	5-Aug	
1983	5,790	1,240	1,525	505	2,765	2	3-Aug	
1984								
1985								
1986		750	1,380		2,130	2	27-Jul	
1987								
1988								
1989								
1990								
1991								
1992		5,670	6,320		11,990	1	24-Jul	
1993		12,050	2,550	600	14,600	1	22-Jul	
1994								
1995		9,150	1,950	50	11,100	2	22-Jul	
1996								
1997		2,020	100		2,120	1	21-Jul	
1998								
1999		2,230	6,160			2	22-Jul	
2000		1,470	220	200	1,690	2	25-Jul	
2001	3,000	3,620	5,954	100	9,574	2	4-Aug	
2002								
2003								

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix B.16. - Escapement goal for Holitna River chum salmon (aerial survey).
(continued)

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Observed escapement by year.



Appendix B.17. - Escapement goal for Kogrukluk River chum salmon (weir).

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥30,000 (1983) (Buklis 1993, Buckey et al. 2000b)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 15,000 to 49,000
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	weir
Summary:	
Data Quality:	fair
Data Type:	weir counts; no estimates in 1977, 1980, 1983 and 1987.
Contrast:	8
Criteria for SEG:	medium contrast
15th to 85th Percentile:	14,213 to 48,329
Years within recommended SEG:	16 of 24 years within SEG range, 5 years below and 3 years above.

Comments:

- 135 river miles from the enumeration point to the Kuskokwim River confluence.
- 466 river miles from the enumeration point to the mouth of the Kuskokwim River.
- Kogrukluk River is a tributary of the upper Holitna River. Chum salmon spawn throughout much of the Holitna River, including areas downstream of the Kogrukluk River weir.
- Beginning in the early 1900's a small number of prospectors explored the upper Holitna River, but found only limited amounts of gold (Brown 1983). The area has also supported mercury mines, particularly in the Chukowan River drainage. The upper Holitna River drainage, inclusive of the Kogrukluk River, is the current focus of new mineral extraction interests.
- The Holitna River is a popular subsistence and recreational location for residents throughout the Kuskokwim River drainage. There are local sport fish guiding services that operate in the sub-basin, as well as guides from other areas. Recreational rod and reel fishing is expected to increase with the development of the Donlin Creek mine and the anticipated increase in human populations in nearby communities.
- Chum salmon age-sex-length composition in the Kogrukluk River is atypical of other monitored sites.
- Linderman et al. (2003) reported that the run timing of Kogrukluk River chum salmon through the Kalskag-Aniak portion of the Kuskokwim River earlier than nearly every other stock, which has implications in the temporal management of salmon harvest in the lower Kuskokwim River.

Appendix B.17. - Escapement goal for Kogrukluk River chum salmon (weir).
(continued)

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

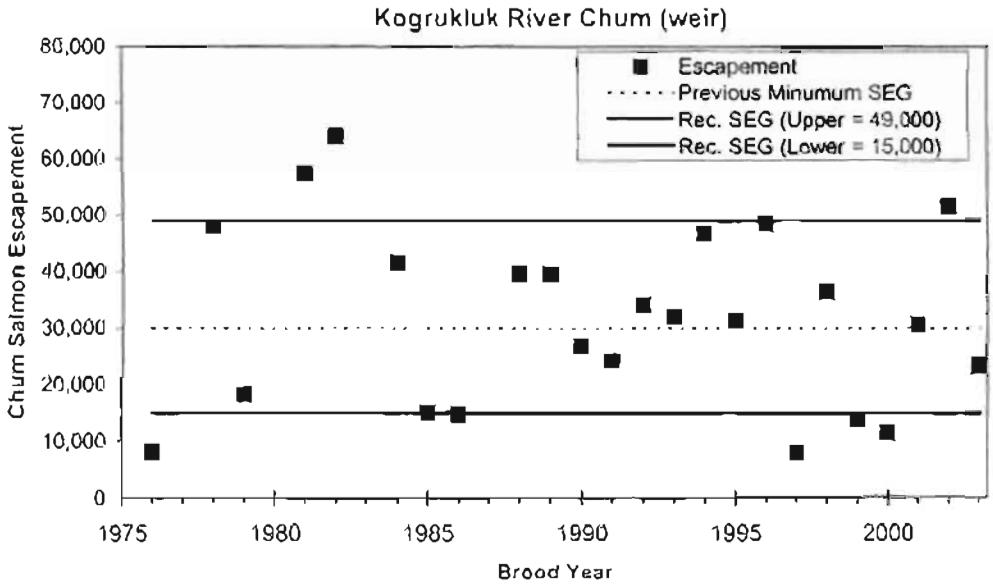
Data available for analysis of escapement goals.

Brood Year	Escapement
1976	8,117
1977	
1978	48,125
1979	18,198
1980	
1981	57,365
1982	64,063
1983	
1984	41,484
1985	15,005
1986	14,693
1987	
1988	39,540
1989	39,549
1990	26,765
1991	24,188
1992	34,105
1993	31,899
1994	46,635
1995	31,265
1996	48,495
1997	7,958
1998	36,442
1999	13,820
2000	11,491
2001	30,569
2002	51,570
2003	23,411

Appendix B.17. - Escapement goal for Kogrukluk River chum salmon (weir).
(continued)

System: Kuskokwim Area
Species: chum salmon
Stock Unit: summer

Observed escapement by year and recommended SEG range (solid line).



Appendix B.18. Escapement goal for Kanektok River chum salmon

System:	Kuskokwim Bay (Kanektok River drainage)
Species:	Chum salmon
Stock Unit:	N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 30,500 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG threshold: 5,200
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial survey
Summary:	
Data Quality [a]	Good
Data Type	• Nineteen fixed-wing aircraft aerial survey since 1966, • escapement information from a counting tower in 1997, and from a weir in 2002 and 2003, • commercial harvest information since 1960, • commercial harvest age class information since 1984, • escapement age class information from 1997, 2002, and 2003.
Contrast:	5n
Criteria for SEG [b]	High contrast with at least moderate exploitation
15th percentile	5,199
Years above recommended SEG threshold:	16of 19
Comments	A SEG threshold is recommended as chum salmon are not targeted in the District W-4 commercial fishery. Thus managing within a range is not practical. This goal represents an index, not an estimate of the actual number of spawners. District 4 is an intercept fishery. Commercially harvested salmon are bound for other drainages, such as the Kuskokwim River drainage (see Baxter 1970). As a result, commercial harvest information is not exclusive to Kanektok River stocks.

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.18. Continued

System: Kuskokwim Bay (Kanektok River)
Species: Chum salmon
Stock Unit: N/A

Data available for escapement goal analysis

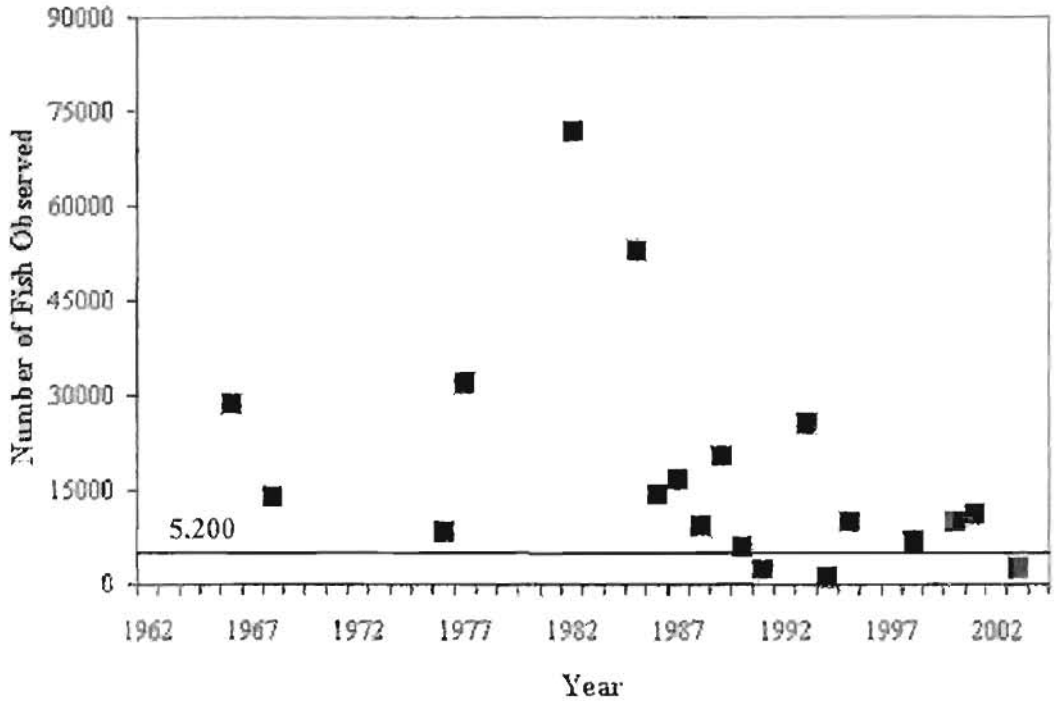
Year	aerial survey	tower/weir
1962	a	b
1963	a	b
1964	a	b
1965	a	b
1966	28,800	b
1967	a	b
1968	14,000	b
1969	a	b
1970	a	b
1971	a	b
1972	a	b
1973	a	b
1974	a	b
1975	a	b
1976	8,697	b
1977	32,157	b
1978	a	b
1979	a	b
1980	a	b
1981	a	b
1982	71,840	b
1983	a	b
1984	a	b
1985	53,060	b
1986	14,385	b
1987	16,790	b
1988	9,420	b
1989	20,583	b
1990	6,270	b
1991	2,475	b
1992	a	b
1993	25,675	b
1994	1,285	b
1995	10,000	b
1996	a	b
1997	a	51,180 c
1998	7,040	b
1999	a	b
2000	10,000	b
2001	11,440	b
2002	a	42,014 d
2003	2,700	40,066 d

a Aerial survey either not flown or was rated as unacceptable.
b Escapement project was not operated.
c Escapement project operated as counting tower.
d Escapement project operated as weir.

Appendix B.18. Continued

System:	Kanektok River
Species:	Chum salmon
Stock Unit:	N/A

Aerial survey counts by year (squares) and recommended SEG point (solid line).



Appendix B.19. Escapement goal for Goodnews River chum salmon

System:	Kuskokwim Bay (Goodnews River)
Species:	Chum salmon
Stock Unit:	N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 17,000 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	Discontinue
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial survey
Summary:	
Data Quality [a]	Poor
Data Type	• Twelve fixed-wing aircraft aerial survey since 1980, • commercial harvest information since 1968, • commercial harvest age information since 1984.
Comments	Aerial survey estimates for chum salmon in the Middle Fork Goodnews River are negatively correlated with weir counts. Chum salmon surveys are typically rated unsatisfactory because of the difficulties observing chum salmon during surveys. It is recommended that this goal be discontinued.

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.19. Continued

System: Goodnews River
Species: Chum salmon
Stock Unit: N/A

Information Available For Escapement Goal Analysis

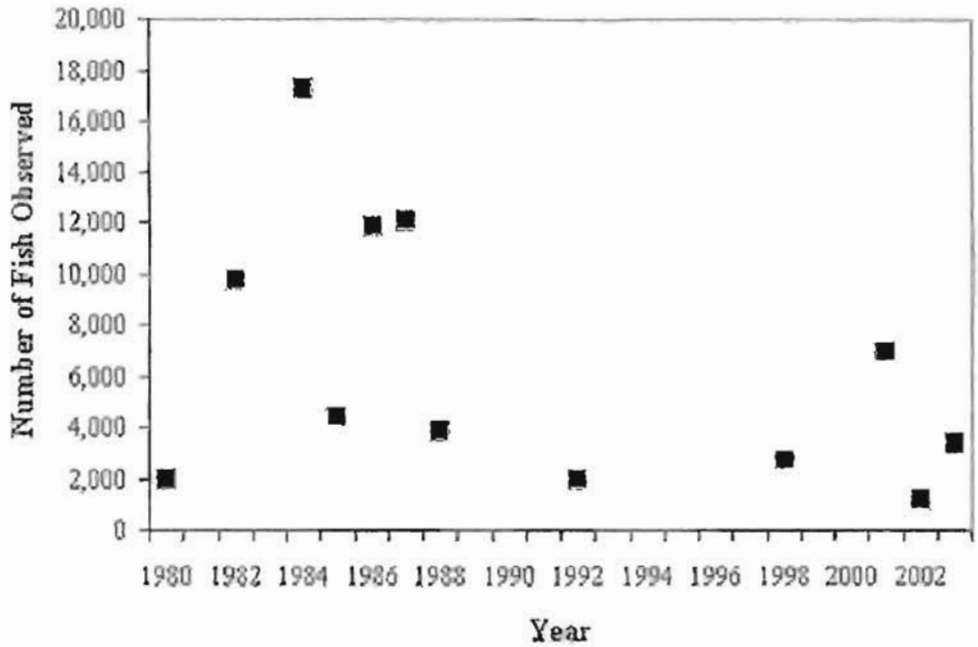
year	aerial survey
1980	1,975
1981	a
1982	9,700
1983	a
1984	17,250
1985	4,415
1986	11,850
1987	12,103
1988	3,846
1989	a
1990	a
1991	a
1992	1,950
1993	a
1994	a
1995	a
1996	a
1997	a
1998	2,743
1999	a
2000	a
2001	6,945
2002	1,208
2003	3,370

a Aerial survey either not flown or rated as unacceptable

Appendix B.19. Continued

System: Goodnews River
Species: Chum salmon
Stock Unit: N/A

Aerial survey counts by year (squares).



Appendix B.20. Escapement goal for Middle Fork Goodnews River chum salmon

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 4,000 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	Discontinue
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial Survey
Summary:	
Data Quality [a]	Good
Data Type	• Fifteen fixed wing aircraft aerial surveys since 1980, • tower or weir escapement information since 1981, • commercial harvest information since 1968, • commercial harvest age information since 1990, • escapement age class information since 1984.
Comments	Recommend this goal be discontinued in favor of an escapement goal at the Middle Fork Goodnews River weir.

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.20. Continued

System: Middle Fork Goodnews River
Species: Chum salmon
Stock Unit: N/A

Information Available For Escapement Goal Analysis

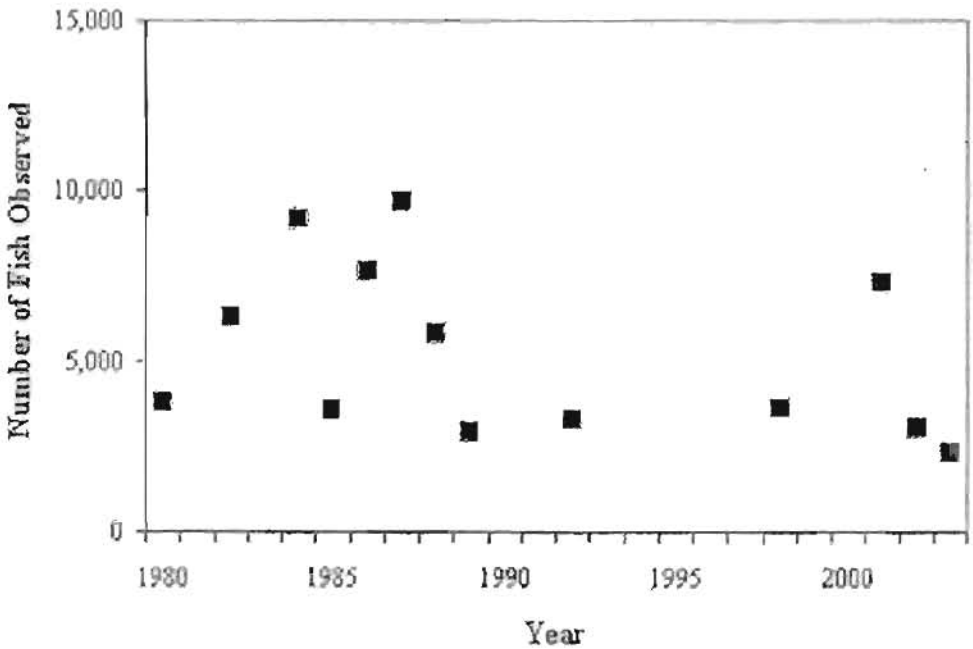
year	aerial survey
1980	3,782
1981	a
1982	6,300
1983	a
1984	9,172
1985	3,593
1986	7,645
1987	9,696
1988	5,814
1989	2,922
1990	a
1991	a
1992	3,270
1993	a
1994	a
1995	a
1996	a
1997	a
1998	3,619
1999	a
2000	a
2001	7,330
2002	3,075
2003	2,310

a Survey was either not flown or rated as unacceptable.

Appendix B.20. Continued

System:	Kuskokwim Bay (Middle Fork Goodnews River)
Species:	Chum salmon
Stock Unit:	N/A

Aerial survey counts by year (squares).



Appendix B.21. Escapement goal for Middle Fork Goodnews River chum salmon

System:	Kuskokwim Bay (Middle Fork Goodnews River)
Species:	Chum salmon
Stock Unit:	N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 15,000 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG threshold: 12,000
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Tower/weir
Summary:	
Data Quality [a]	Good
Data Type	• Tower/weir counts since 1981, • commercial harvest information since 1968, • commercial harvest age information since 1984, • escapement age class information since 1990.
Contrast:	6.3
Criteria for SEG [b]	Medium
15th percentile	11,630
Years above recommended SEG threshold	19 of 23
Comments	A SEG threshold is recommended as chum salmon are not targeted in the District W-4 commercial fishery, thus managing within a range is not practical. Commercial harvest and age class information is for the entire drainage. It is not specific for stocks originating in the Goodnews River

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.21. Continued

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Chum salmon
Stock Unit: N\A

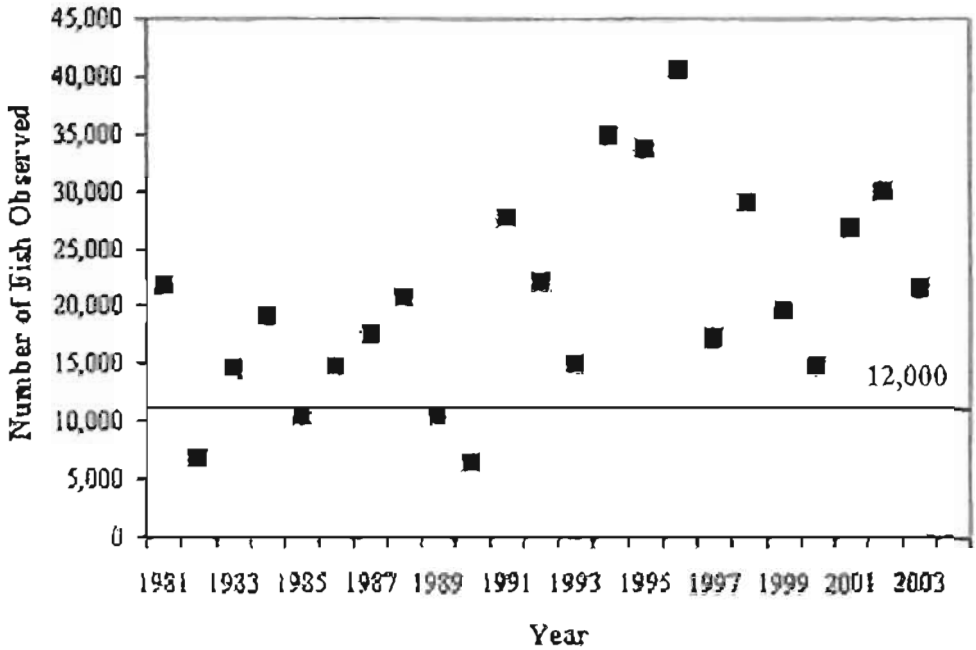
Data available for escapement goal analysis

year	tower/weir count
1981	21,827
1982	6,767
1983	14,548
1984	19,003
1985	10,367
1986	14,764
1987	17,517
1988	20,799
1989	10,380
1990	6,410
1991	27,525
1992	22,023
1993	14,952
1994	34,849
1995	33,699
1996	40,450
1997	17,296
1998	28,905
1999	19,533
2000	14,720
2001	26,829
2002	29,905
2003	21,637

Appendix B.21. Continued.

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Chum salmon
Stock Unit: N/A

Tower/weir counts by year (squares) and recommended SEG threshold (solid line).



Appendix B.22. - Escapement goal for Kogrukluk River coho salmon (weir).

System: Kuskokwim Area
Species: coho salmon
Stock Unit: not applicable

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fish
Primary Fishery:	commercial and subsistence
Previous Escapement Goal:	≥25,000 (1983) (Buklis 1993, Burkey et al. 2000b)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range of 13,000 to 28,000
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	weir
Summary:	
Data Quality:	fair
Data Type:	weir counts; no estimates in 1989.
Contrast:	12
Criteria for SEG:	high contrast with at least moderate exploitation
25th to 75th Percentile:	12,835 to 27,795
Years within recommended SEG:	11 of 22 years within SEG range, 6 years below and 5 years above.

Comments:

- 135 river miles from the enumeration point to the Kuskokwim River confluence.
- 466 river miles from the enumeration point to the mouth of the Kuskokwim River.
- Kogrukluk River is a tributary of the upper Holitna River. Coho salmon spawn throughout much of the Holitna River, including areas downstream of the Kogrukluk River weir.
- Beginning in the early 1900's a small number of prospectors explored the upper Holitna River, but found only limited amounts of gold (Brown 1983). The area has also supported mercury mines, particularly in the Chukowan River drainage. The upper Holitna River drainage, inclusive of the Kogrukluk River, is the current focus of new mineral extraction interests.
- The Holitna River is a popular subsistence and recreational location for residents throughout the Kuskokwim River drainage. There are local sport fish guiding services that operate in the sub-basin, as well as guides from other areas. Recreational rod and reel fishing is expected to increase with the development of the Donlin Creek mine and the anticipated increase in human populations in nearby communities.
- The escapement goal for Kogrukluk River coho salmon is the sole escapement goal for that species in the Kuskokwim Area.

Appendix B.22. - Escapement goal for Kogrukluk River coho salmon (weir).
(continued)

System: Kuskokwim Area
Species: coho salmon
Stock Unit: not applicable

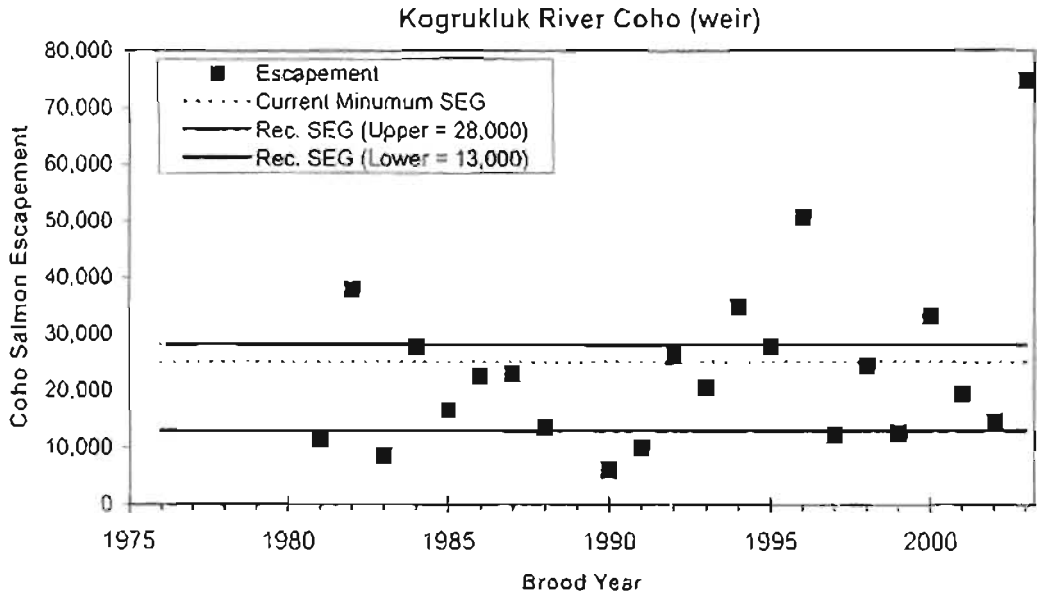
Data available for analysis of escapement goals.

Brood Year	Escapement
1976	
1977	
1978	
1979	
1980	
1981	11,455
1982	37,796
1983	8,538
1984	27,595
1985	16,441
1986	22,506
1987	22,821
1988	13,512
1989	
1990	6,132
1991	9,964
1992	26,057
1993	20,517
1994	34,695
1995	27,861
1996	50,555
1997	12,237
1998	24,348
1999	12,609
2000	33,135
2001	19,387
2002	14,516
2003	74,754

Appendix B.22. - Escapement goal for Kogrukluk River coho salmon (weir).
(Continued)

System: Kuskokwim Area
Species: coho salmon
Stock Unit: not applicable

Observed escapement by year and recommended SEG range (solid line).



Appendix B.23. Escapement goal for Kanektok River coho salmon.

System:	Kuskokwim Bay (Kanektok River drainage)
Species:	Coho salmon
Stock Unit:	N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 25,000 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range: 7,700 - 36,000
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial survey
Summary:	
Data Quality [a]	Good
Data Type	• Seven fixed-wing aircraft aerial surveys since 1981, • weir escapement information from 2001, 2002, and 2003, • commercial harvest information since 1960, • commercial harvest age information since 1990, • escapement age information from 1997, 2001, 2002, and 2003.
Contrast:	16
Criteria for SEG [b]	High contrast with at least moderate exploitation.
25th – 75th percentile	7,656– 35,243
Years within recommended SEG	3 of 7
Comments	This goal represents an index, not an estimate of the actual number of spawners. District 4 is an intercept fishery. Commercially harvested salmon are bound for other drainages, such as the Kuskokwim River drainage (see Baxter 1970). As a result, commercial harvest information is not exclusive to Kanektok River stocks.

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.23. Continued

System: Kuskokwim Bay (Kanektok River)
Species: Coho salmon
Stock Unit: N/A

Data available for escapement goal analysis

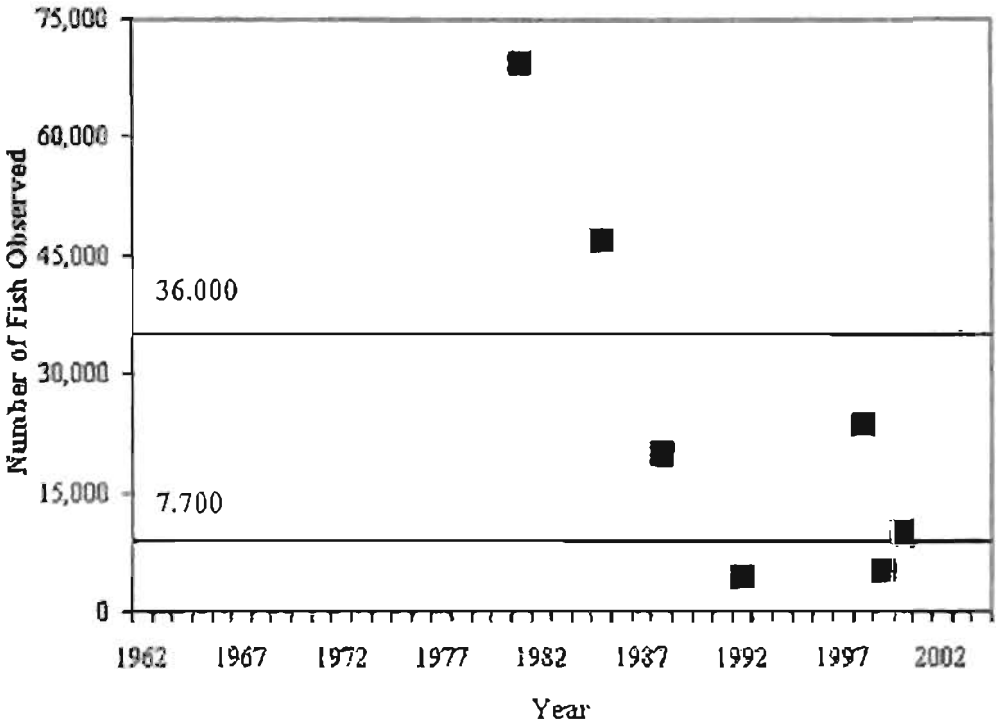
Year	aerial survey	tower/weir
1962	a	b
1963	a	b
1964	a	b
1965	a	b
1966	a	b
1967	a	b
1968	a	b
1969	a	b
1970	a	b
1971	a	b
1972	a	b
1973	a	b
1974	a	b
1975	a	b
1976	a	b
1977	a	b
1978	a	b
1979	a	b
1980	a	b
1981	69,325	b
1982	a	b
1983	a	b
1984	a	b
1985	46,830	b
1986	a	b
1987	a	b
1988	20,056	b
1989	a	b
1990	a	b
1991	a	b
1992	4,330	b
1993	a	b
1994	a	b
1995	a	b
1996	a	b
1997	a	b
1998	23,656	b
1999	5,192	b
2000	10,120	b
2001	a	35,650 c
2002	a	24,883 c
2003	a	72,448 c

a Aerial survey either not flown or was rated as unacceptable.
b Escapement project was not operated.
c Escapement project operated as a weir.

Appendix B.23. Continued

System: Kuskokwim Bay (Kanektok River drainage)
Species: Coho salmon
Stock Unit: N/A

Aerial survey counts by year (squares) and recommended SEG range (solid lines).



Appendix B.24. Escapement goal for Goodnews River coho salmon

System: Kuskokwim Bay (Goodnews River)
Species: Coho salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 15,000 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	Discontinue
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial survey
Summary:	
Data Quality [a]	Poor
Data Type	• Two years of fixed wing aircraft aerial surveys since 1980, • commercial harvest information since 1968, • commercial harvest age information since 1990.
Comments	Conducting aerial surveys for coho salmon in the Goodnews River is problematic because of poor weather inherent to the area in the fall. Since 1980, only two surveys have been flown. The goal should be discontinued because of the inability to monitor escapement.

[a] Algorithm used for assessing data quality from Bue et al (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002)

Appendix B.24. Continued

System: Kuskokwim Bay (Goodnews River)
Species: Coho salmon
Stock Unit: N/A

Information Available For Escapement Goal Analysis

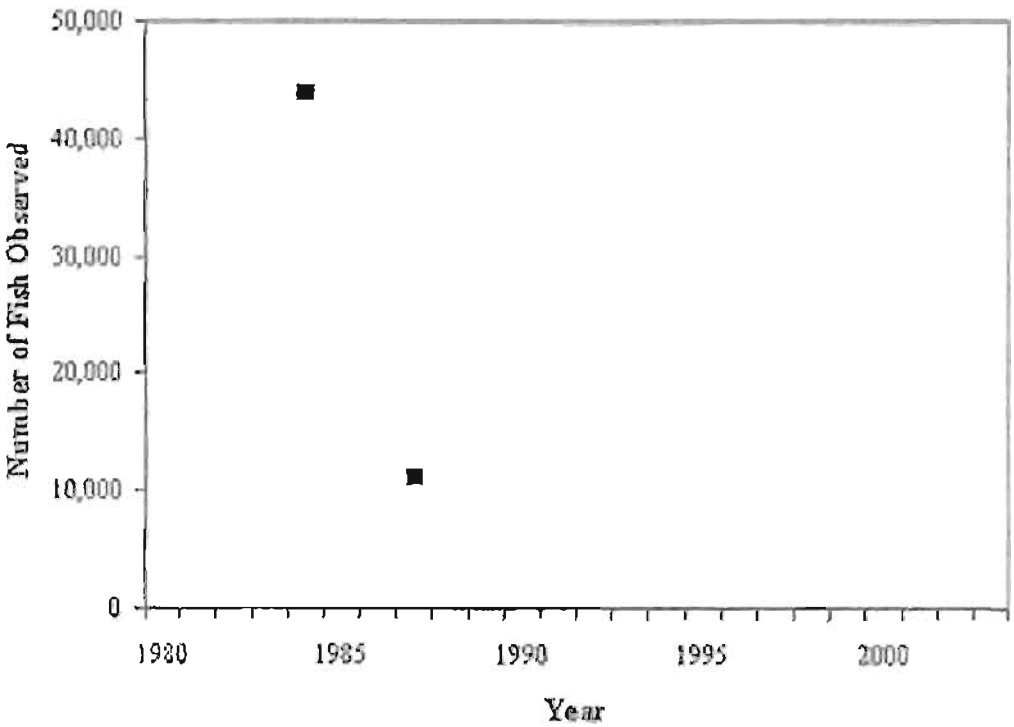
year	aerial survey
1980	a
1981	a
1982	a
1983	a
1984	43,925
1985	a
1986	a
1987	11,122
1988	a
1989	a
1990	a
1991	a
1992	a
1993	a
1994	a
1995	a
1996	a
1997	a
1998	a
1999	a
2000	a
2001	a
2002	a
2003	a

a Survey was either not flown or rated as unacceptable.

Appendix B.24. Continued

System: Kuskokwim Bay (Goodnews River)
Species: Coho salmon
Stock Unit: N/A

Aerial survey counts by year (squares).



Appendix B.25. Escapement goal for Middle Fork Goodnews River coho salmon

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Coho salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 2,000 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	Discontinue
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial Survey
Summary:	
Data Quality [a]	Poor
Data Type	• Thirteen fixed wing aircraft aerial surveys since 1980, • tower or weir escapement information since 1981, • commercial harvest information since 1968, • commercial harvest age information since 1984, • escapement age class information since 1990.
Comments	Conducting aerial surveys for coho salmon in the Middle Fork Goodnews River is problematic because of poor weather inherent to the area in the fall. Since 1980, no acceptable surveys have been flown. The goal should be dropped because of the inability to monitor escapement. Also, goal should be discontinued in favor of an escapement goal at the Middle Fork Goodnews River.

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix E.26. Escapement goal of Middle Fork Goodnews River coho salmon.

System:	**Kuskokwim Bay (Middle Fork Goodnews River)**
Species:	**Coho salmon**
Stock Unit:	**N/A**

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	none
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG threshold: 12,000
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Weir
Summary:	
Data Quality [a]	Good
Data Type	• Seven years of weir counts, • commercial harvest information since 1968, • commercial harvest age information since 1990, • escapement age class information since 1997.
Contrast:	3.6
Criteria for SEG [b]	Low
15th percentile	11,352
Years above recommended SEG threshold	6 of 7
Comments	The District W-5 commercial fishery typically finishes before the mid-point of the coho salmon run at the weir. Thus, managing for a range is not practical. With limited data, the threshold serves as lower bound until there is enough information to develop a range (next review in 2007).

Appendix B.27. Escapement goal for Kanektok River sockeye salmon.

System:	Kuskokwim Bay (Kanektok River drainage)
Species:	Sockeye salmon
Stock Unit:	N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 15,000 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range: 14,000 – 34,000
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial survey
Summary:	
Data Quality [a]	Good
Data Type	• Twenty-four fixed-wing aircraft aerial surveys since 1962, • escapement information from a counting tower in 1997, and from a weir in 2002 and 2003, • commercial harvest information since 1960, • commercial harvest age class information since 1990, • escapement age class information from 1997, 2002, and 2003.
Contrast:	24
Criteria for SEG [b]	High contrast, with at least moderate exploitation
25th – 75th percentile	13,969 – 33,714
Years within recommended SEG	12 of 23
Comments	This goal represents an index, not an estimate of the actual number of spawners. District 4 is an intercept fishery. Commercially harvested salmon are bound for other drainages, such as the Kuskokwim River drainage (see Baxter 1970). As a result, commercial harvest information is not exclusive to Kanektok River stocks.

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.27. Continued.

System: Kuskokwim Bay (Kanektok River)
Species: Sockeye salmon
Stock Unit: N/A

Data available for escapement goal analysis

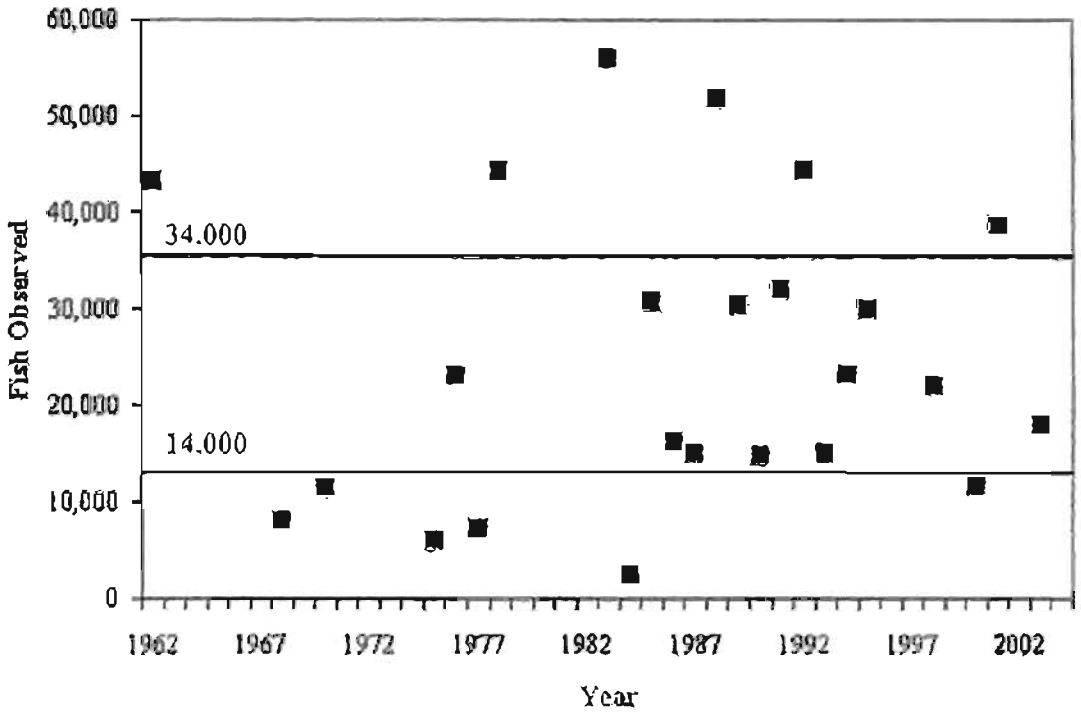
year	aerial survey	tower/weir
1962	43,108	b
1963	a	b
1964	a	b
1965	a	b
1966	a	b
1967	a	b
1968	8,000	b
1969	a	b
1970	11,375	b
1971	a	b
1972	a	b
1973	a	b
1974	a	b
1975	6,018	b
1976	22,936	b
1977	7,244	b
1978	44,215	b
1979	a	b
1980	a	b
1981	a	b
1982	a	b
1983	55,940	b
1984	2,340	b
1985	30,840	b
1986	37,270	b
1987	34,940	b
1988	51,753	b
1989	30,440	b
1990	14,715	b
1991	32,082	b
1992	44,436	b
1993	14,955	b
1994	23,128	b
1995	30,090	b
1996	a	b
1997	a	96,348 c
1998	22,020	b
1999	a	b
2000	11,670	b
2001	38,610	b
2002	a	58,367 d
2003	18,010	127,471 d

a Aerial survey either not flown or was rated as unacceptable.
b Escapement project was not operated
c Escapement project operated as counting tower.
d Escapement project operated as weir.

Appendix B.27. Continued

System: Kuskokwim Bay (Kanektok River drainage)
Species: Sockeye salmon
Stock Unit: N/A

Aerial survey counts by year (squares) and recommended SEG range (solid lines).



Appendix B.28. Escapement goal for Goodnews River sockeye salmon

System:	Kuskokwim Bay (Goodnews River)
Species:	Sockeye salmon
Stock Unit:	N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 15,000 (Buklis 1993)
Escapement Goal Type:	SEG range
Recommended Escapement Goal:	5,500 – 19,500
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial Survey
Summary:	
Data Quality [a]	Fair
Data Type	• Sixteen fixed wing aircraft aerial survey since 1980, • commercial harvest information since 1968, • commercial harvest age information since 1990
Contrast:	29
Criteria for SEG [b]	High contrast with at least moderate exploitation
25th – 75th percentile	5,266 – 19,317
years within recommended SEG	8 of 16
Comments	This goal represents an index, not an estimate of the actual number of spawners. Commercial harvest and age class information is for the entire drainage. It is not specific for stocks originating in the Goodnews River

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.28. Continued

System: Kuskokwim Bay (Goodnews River)
Species: Sockeye salmon
Stock Unit: N/A

Data available for escapement goal analysis

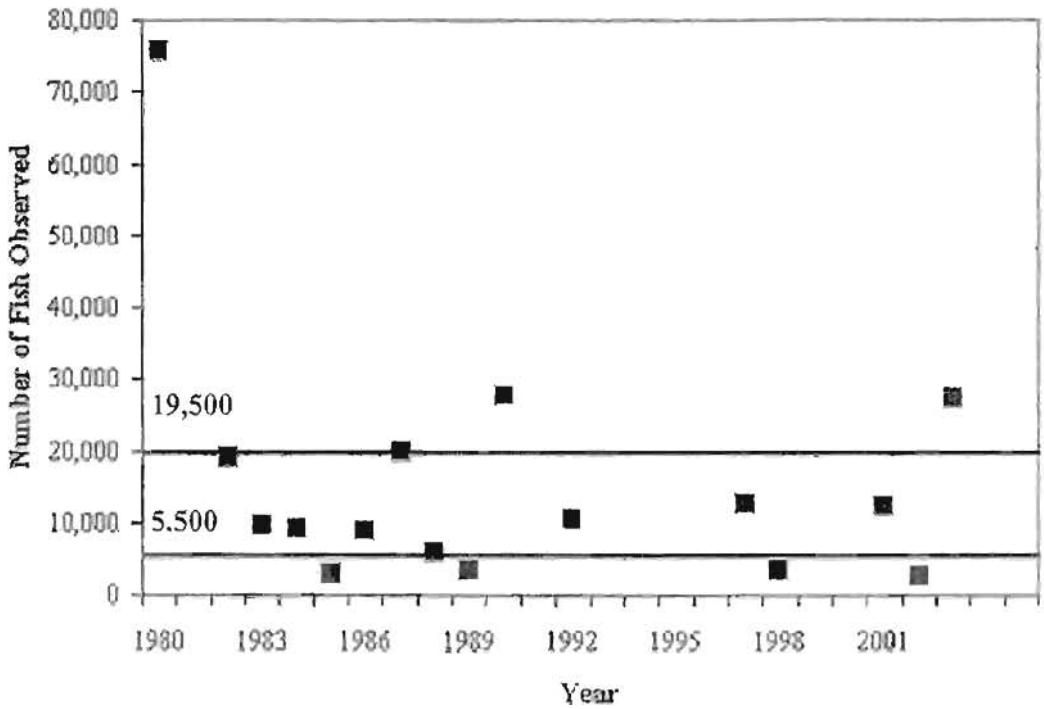
year	aerial survey
1980	75,639
1981	a
1982	19,160
1983	9,650
1984	9,240
1985	2,843
1986	8,960
1987	19,786
1988	5,820
1989	3,605
1990	27,689
1991	a
1992	10,397
1993	a
1994	a
1995	a
1996	a
1997	12,610
1998	3,497
1999	a
2000	a
2001	12,383
2002	2,626
2003	27,380

a Aerial survey either not flown or was rated as unacceptable.

Appendix B.28. Continued

System:	Kuskokwim Bay (Goodnews River)
Species:	Sockeye salmon
Stock Unit:	N/A

Aerial survey counts by year (squares) and recommended SEG range (solid lines).



Appendix B.29. Escapement goal for Middle Fork Goodnews River sockeye salmon

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Sockeye salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	≥ 5,000 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	Discontinue
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Aerial Survey
Summary:	
Data Quality [a]	Fair
Data Type	• Fifteen fixed wing aircraft aerial survey since 1980, • weir escapement information since 1981, • commercial harvest information since 1968, • commercial harvest age information since 1990.
Comments	Recommend this goal be dropped in favor of an escapement goal at the Middle Fork Goodnews River weir.

[a] Algorithm used for assessing data quality from Bue et al. (2002)
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.29. Continued

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Sockeye salmon
Stock Unit: N/A

Data available for escapement goal analysis

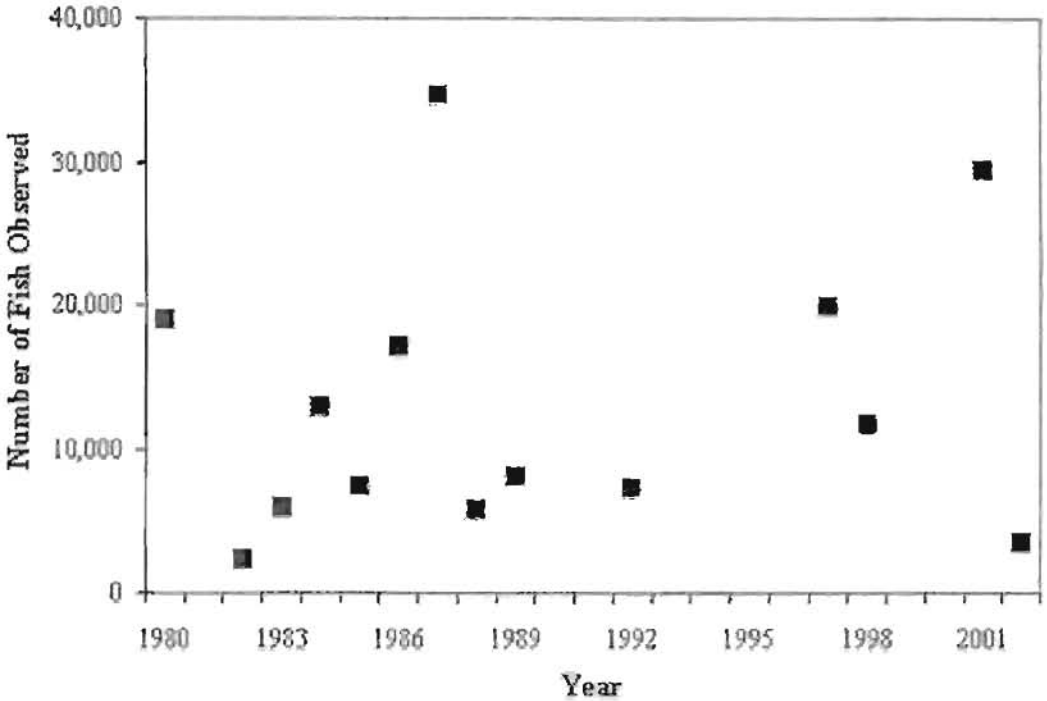
year	aerial survey
1980	18,926
1981	a
1982	2,327
1983	5,900
1984	12,897
1985	7,401
1986	16,990
1987	34,585
1988	5,831
1989	8,044
1990	a
1991	a
1992	7,200
1993	a
1994	a
1995	a
1996	a
1997	19,843
1998	11,632
1999	a
2000	a
2001	29,340
2002	3,475
2003	21,760

a Aerial survey either not flown or was rated as unacceptable.

Appendix B.29. Continued

System:	Kuskokwim Bay (Middle Fork Goodnews River)
Species:	Sockeye salmon
Stock Unit:	N/A

Aerial survey counts by year (squares).



Appendix B.30. Escapement goal for Middle Fork Goodnews River sockeye salmon

System:	Kuskokwim Bay (Middle Fork Goodnews River)
Species:	Sockeye salmon
Stock Unit:	N/A

Description of stock and escapement goals.

Regulatory Area:	Kuskokwim Area
Management Division:	Commercial Fisheries
Primary Fishery:	Subsistence and commercial gillnet
Previous Escapement Goal:	> 25,000 (Buklis 1993)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	SEG range: 23,000 – 58,000
Optimal Escapement Goal:	N/A
Inriver Goal:	N/A
Action Points:	N/A
Escapement Enumeration:	Tower/weir counts
Summary:	
Data Quality [a]	Good
Data Type	• Tower/weir counts since 1981, • commercial harvest information since 1968, • commercial harvest age information since 1990, • escapement age class information since 1984
Contrast	3.7
Criteria for SEG [b]	Low
15th percentile – maximum	22,986 – 58,264
years within recommended SEG	18 of 23
Comments	Commercial harvest and age class information represents the entire drainage. It is not specific for stocks originating in the Middle Fork Goodnews River

[a] Algorithm used for assessing data quality from Bue et al. (2002).
[b] Algorithm used to determine SEG from Bue et al. (2002).

Appendix B.30. Continued.

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Sockeye salmon
Stock Unit: N/A

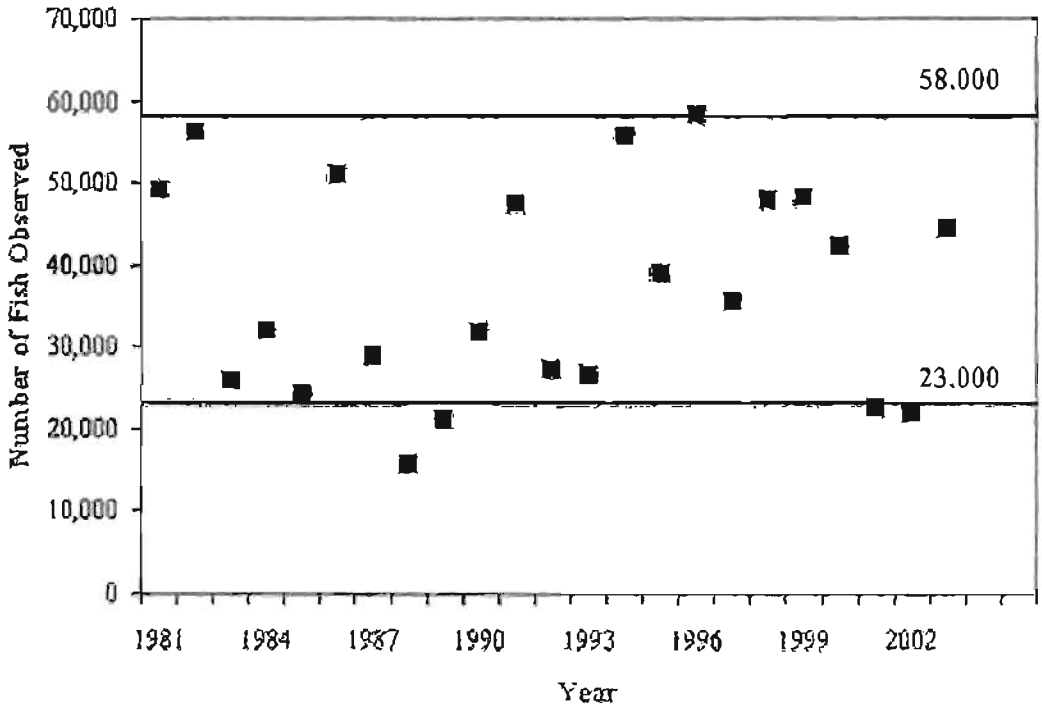
Data available for escapement goal analysis

year	tower/weir count
1981	49,108
1982	56,255
1983	25,813
1984	32,053
1985	24,131
1986	51,069
1987	28,871
1988	15,799
1989	21,186
1990	31,679
1991	47,397
1992	27,268
1993	26,452
1994	55,751
1995	39,009
1996	58,264
1997	35,530
1998	47,951
1999	48,205
2000	42,197
2001	22,495
2002	22,019
2003	44,390

Appendix B.30. Continued.

System: Kuskokwim Bay (Middle Fork Goodnews River)
Species: Sockeye salmon
Stock Unit: N/A

Aerial survey counts by year (squares) and recommended SEG range (solid lines).



APPENDIX C

NORTON SOUND, PORT CLARENCE, AND KOTZEBUE DISTRICTS

Appendix C.1. - Escapement goal for Fish and Boston rivers chinook salmon.

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	100 - 250 (Fish and Boston rivers combined) (Fair et al. 1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	SEG minimum threshold of 100
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Until recently aerial surveys were flown consistently for one or both of these systems.
Summary:	
Data Quality	Good
Data Type	Aerial survey. No stock specific ASL data available.
Contrast	43
Criteria for SEG	high contrast, at least moderate exploitation
25th Percentile	100
Years within recommended SEG	9 of 11 years of complete aerial surveys above the proposed SEG threshold and 2 years below.
Comments	•Because this stock is managed incidentally to the commercial chum salmon fishery we recommend establishing a SEG threshold of 100 chinook salmon. •Age composition data area available from the District 6 commercial and Unalakleet River test chinook and coho salmon fisheries from 1980 to 2003. •Boston River has better chinook spawning areas and flow than the Fish River.

Appendix C.1. - Escapement goal for Fish and Boston rivers chinook salmon.
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

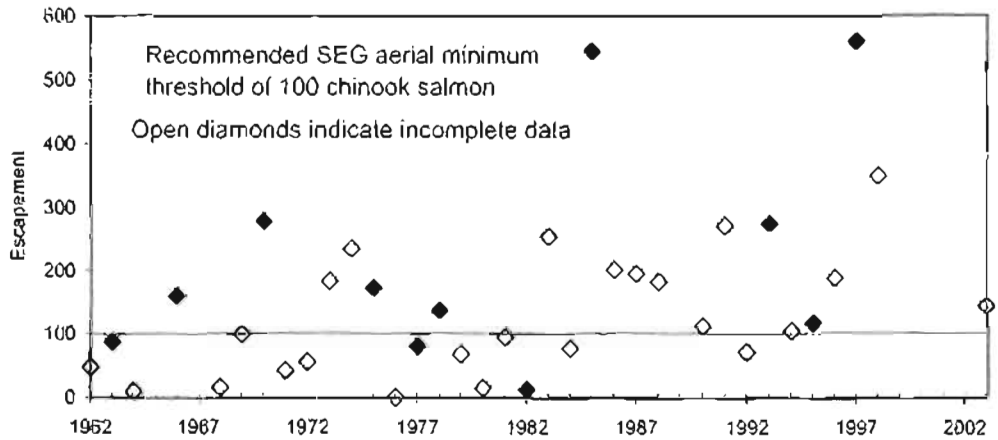
Brood Year	Boston Crk aerial survey	Fish River aerial survey	Sum of Boston and Fish rivers
1962		48	48
1963	67	21	88
1964	10		10
1965			
1966	153	7	160
1967			
1968	7	10	17
1969	100		100
1970	246	33	279
1971	42	1	43
1972	57		57
1973	153	31	184
1974	225	10	235
1975	147	26	173
1976		1	1
1977	76	5	81
1978	136	1	137
1979	58	11	69
1980	16		16
1981		95	95
1982	10	3	13
1983	154	100	254
1984	35	42	77
1985	243	303	546
1986	2	200	202
1987		196	196
1988	163	20	183
1989			
1990	112		112
1991	152	119	271
1992	68	4	72
1993	227	48	275
1994	95	10	105
1995	78	40	118
1996		189	189
1997	452	110	562
1998	255	96	351
1999			
2000			
2001			
2002			
2003	145		145

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix C.1. - Escapement goal for Fish and Boston rivers chinook salmon.
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG minimum threshold (solid line).



Appendix C.2. - Escapement goal for Kwiniuk River chinook salmon (tower).

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	300 - 550 (1999) see Fair et al. (1999)
Escapement Goal Type	EG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Counting tower and/or aerial survey
Summary:	
Data Quality	
Data Type	Counting tower 1981-2002, aerial surveys 1962-2002 (intermittent). No stock specific ASL data available
Contrast	N/A
Criteria for SEG	N/A
25th - 75th Percentile	N/A
Years within recommended EG	
Comments	1981-1984 tower counts not expanded.

Appendix C.2. - Escapement goal for Kwinjuk River chinook salmon (tower).
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

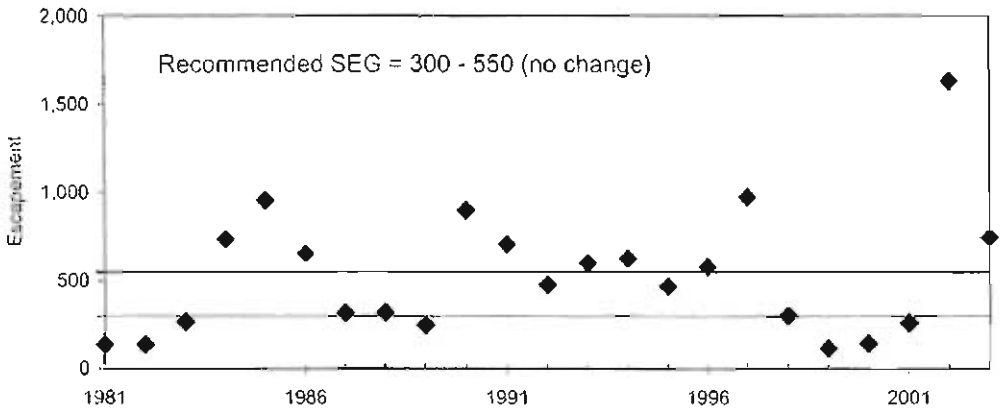
Brood Year	Tower Count	Estimated Total Escapement
1981	136	272
1982	138	290
1983	267	419
1984	736	736
1985	955	1,481
1986	654	1,014
1987	317	861
1988	321	719
1989	248	285
1990	900	1,021
1991	708	976
1992	479	534
1993	600	798
1994	625	802
1995	468	644
1996	578	806
1997	974	1,819
1998	303	587
1999	116	349
2000	144	286
2001	261	500
2002	1,632	778
2003	749	749

Shaded cells were not used when calculating SEG range due to incomplete count of

Appendix C.2. - Escapement goal for Kwiniuk River chinook salmon (tower).
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.3. - Escapement goal for Shaktoolik River chinook salmon (aerial).

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	400 - 800 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	Discontinue in favor of using North River tower goal as an index.
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Counting tower and/or aerial survey
Summary:	
Data Quality	
Data Type	Aerial surveys 1961-2002 (intermittent). Stock specific ASL data available 1983, 87, 94, 96, 98.
Contrast	N/A
Criteria for SEG	N/A
25th - 75th Percentile	N/A
Years within recommended EG	
Comments	Shaktoolik aerial survey data poor due to nature of river.

Appendix C.3. - Escapement goal for Shaktoolik River chinook salmon (aerial).
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

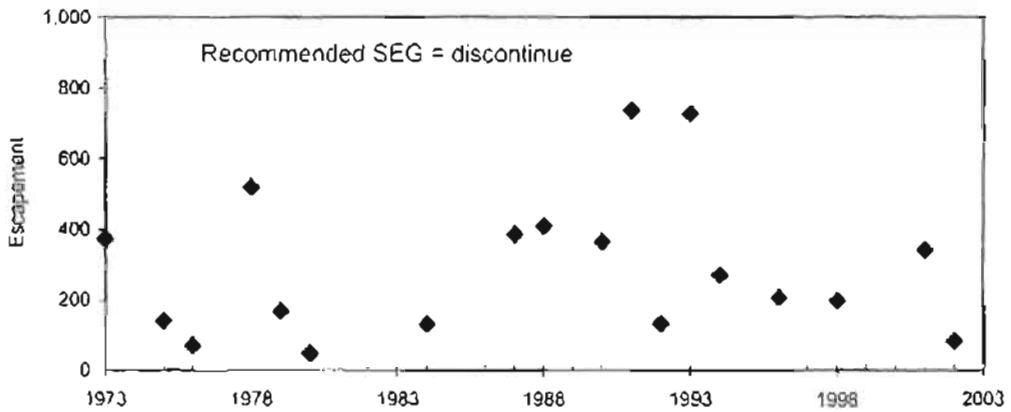
Data available for analysis of escapement goals.

Brood Year	Aerial survey	
1973	374	
1974		
1975	139	
1976	69	
1977	1,875	
1978	519	
1979	167	
1980	47	
1981		
1982		
1983	1,080	
1984	131	
1985	3,131	
1986		
1987	386	
1988	410	
1989		
1990	365	
1991	737	
1992	132	
1993	727	
1994	270	
1995		
1996	206	
1997	1,062	
1998	197	
1999		
2000		
2001	341	
2002	82	
2003		

Appendix C.3. - Escapement goal for Shaktoolik River chinook salmon (aerial).
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.4. - Escapement goal for Old Woman and Unalakleet rivers chinook salmon (aerial).

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	550 - 1100 (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	Discontinue in favor of North River tower estimate.
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Since 1978 aerial survey counts were performed 14 times on the Old Woman River. Since 1972 aerial survey counts were performed 22 times on the Unalakleet River.
Summary:	
Data Quality	Good
Data Type	Aerial survey. Stock specific ASL data available from 1975-2002 (intermittent).
Contrast	N/A
Criteria for SEG	N/A
25th-75th Percentile	N/A
Years within recommended SEG	N/A
Comments	Age composition data area available from the District 6 commercial and Unalakleet River test chinook and coho salmon fisheries from 1980 to 2003.

Appendix C.4. - Escapement goal for Old Woman and Unalakleet rivers chinook salmon (aerial). (continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

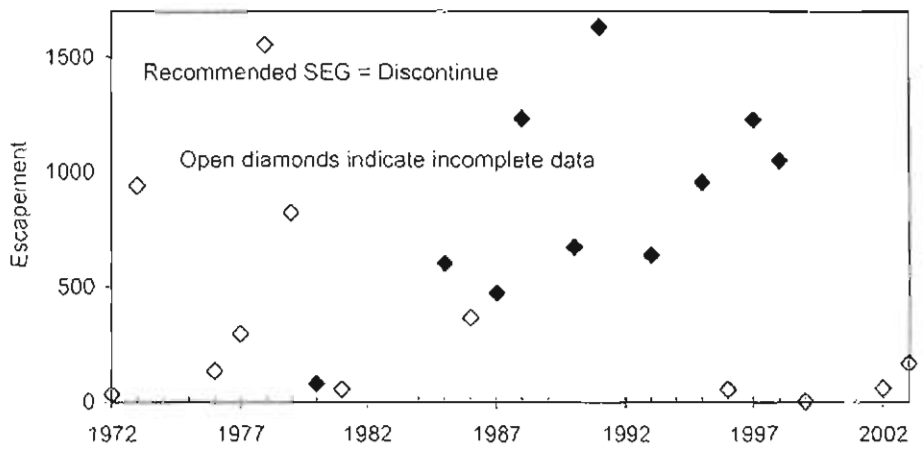
Brood Year	Old Woman River aerial survey	Unalakleet River aerial survey	Sum Unalakleet and Old Woman	Unalakleet River Sport Harvest	District 6 Commercial Harvest	District 6 Subsistence Harvest
1972		32	32			
1973		940	940			
1974						
1975						
1976		133	133			
1977		297	297			
1978	78	1,477	1,555			
1979		823	823			
1980	25	54	79			1046
1981	26	29	55			869
1982					3,768	913
1983					7,022	1,868
1984				39	6,804	4,650
1985	202	400	602	179	12,621	1,397
1986		367	367	850	4,494	
1987	130	343	473	-	3,246	
1988	311	923	1,234	-	2,218	
1989				49	4,402	
1990	211	464	675	276	5,998	2,476
1991	389	1,244	1,633	296	4,534	
1992				117	3,402	
1993	387	253	640	382	5,944	
1994				379	4,400	5,294
1995	424	532	956	259	7,617	5,049
1996	55		55	384	3,644	5,324
1997	246	984	1,230	842	9,067	6,325
1998	312	739	1,051	513	6,413	3,963
1999		3	3	415	1,927	2,691
2000				345	582	2,429
2001				250	116	2,810
2002	33	28	61		4	
2003		168	168			

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix C.4. - Escapement goal for Old Woman and Unalakleet rivers chinook salmon (aerial). (continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.5. - Escapement goal for North River chinook salmon (aerial).

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	250 - 500 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	Discontinue in favor of escapement estimates from counting tower
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Since 1980, aerial surveys conducted relatively consistently through entire drainage. Stock specific ASL available from 1983 & 1997.
Summary:	
Data Quality	Good
Data Type	Aerial surveys
Contrast	-
Criteria for SEG	-
25th-75th Percentile	-
Years within recommended SEG	-
Comments	Age composition data area available from the District 6 commercial and Unalakleet River test chinook and coho salmon fisheries from 1980 to 2003.

Appendix C.5. - Escapement goal for North River chinook salmon (aerial).
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

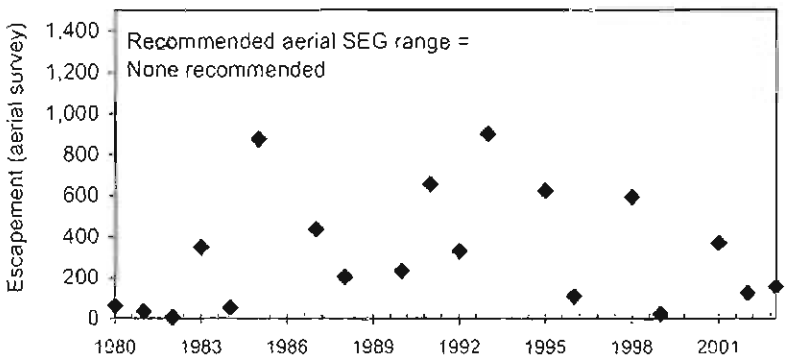
Data available for analysis of escapement goals.

Brood Year	Aerial survey counts
1980	61
1981	31
1982	4
1983	347
1984	51
1985	873
1986	
1987	432
1988	202
1989	
1990	231
1991	656
1992	329
1993	900
1994	
1995	622
1996	106
1997	1,585
1998	591
1999	20
2000	
2001	366
2002	122
2003	154

Appendix C.5. - Escapement goal for North River chinook salmon (aerial).
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year.



Appendix C.6. - Escapement goal for North River chinook salmon (lower).

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	1,200 - 2,400 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal	SEG range of 1,200 - 2,600
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Inriver escapement was estimated by counting tower from 1984-86 and 1996-2003.
Summary:	
Data Quality	Good
Data Type	Counting tower
Contrast	4
Criteria for SEG	medium contrast
15th-85th Percentile	1,200 - 2,600
Years within recommended SEG	6 of 10 complete years with SEG range, 2 years below and 2 years above
Comments	Age composition data area available from the District 6 commercial and Unalakleet River test chinook and coho salmon fisheries from 1980 to 2003.

Appendix C.6. - Escapement goal for North River chinook salmon (tower).
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

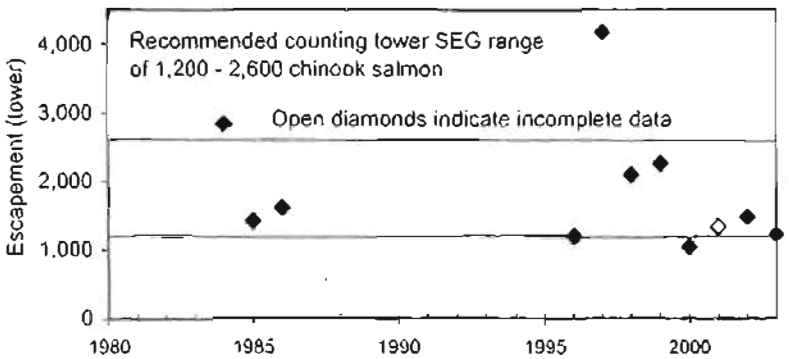
Brood Year	North River Tower Counts	First Day of Operation	Unalakleet River Sport Harvest	District 6 Commercial Harvest	District 6 Subsistence Harvest
1980					1046
1981					869
1982				3,768	913
1983				7,022	1,868
1984	2,844	unknown	39	6,804	4,650
1985	1,426	unknown	179	12,621	1,397
1986	1,613	unknown	850	4,494	
1987			-	3,246	
1988			-	2,218	
1989			49	4,402	
1990			276	5,998	2,476
1991			296	4,534	
1992			117	3,402	
1993			382	5,944	
1994			379	4,400	5,294
1995			259	7,617	5,049
1996	1,197	16-Jun	384	3,644	5,324
1997	4,185	16-Jun	842	9,067	6,325
1998	2,100	15-Jun	513	6,413	3,963
1999	2,263	30-Jun	415	1,927	2,691
2000	1,046	17-Jun	345	582	2,429
2001	1,337	5-Jul	250	116	2,810
2002	1,484	19-Jun		4	
2003	1,224	16-Jun			

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix C.6. - Escapement goal for North River chinook salmon (tower).
(continued)

System: Norton Sound Area
Species: chinook salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.7. - Escapement goal for Nome River pink salmon (weir).

System: Norton Sound Area
Species: pink salmon
Stock Unit: even year

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	13,000 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	aerial surveys, counting tower and/or weir 1993-03
Summary:	
Data Quality	
Data Type	Aerial surveys 1972-2001 (intermittent), counting tower 1993-95, weir 1996-2003.
Contrast	
Criteria for SEG	
15th - 75th Percentile	
Years within recommended EG	
Comments	1996 weir spacing too large, majority pinks passed un-enumerated

Appendix C.7. - Escapement goal for Nome River pink salmon (weir).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: even year

Data available for analysis of escapement goals.

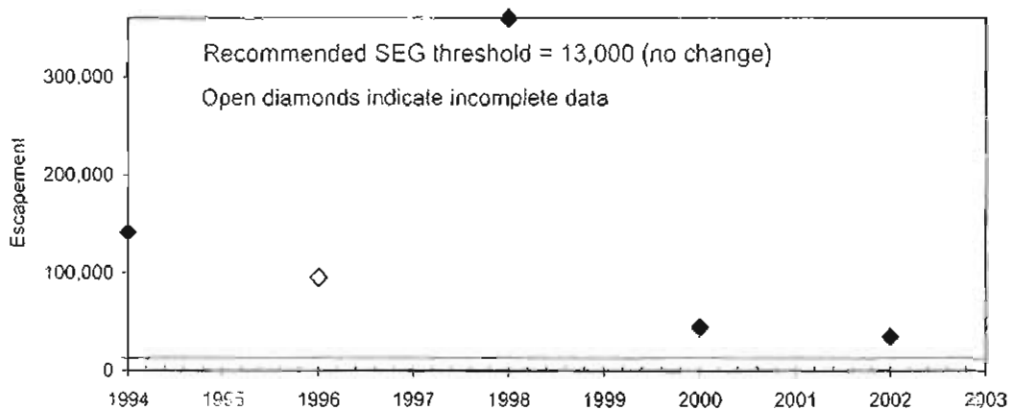
Brood Year	Tower/weir count
1994	141,246
1995	
1996	93,081
1997	
1998	359,469
1999	
2000	44,368
2001	
2002	35,067
2003	

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix C.7. - Escapement goal for Nome River pink salmon (weir).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: even year

Observed escapement by year and recommended EG threshold (solid line).



Appendix C.8. - Escapement goal for Nome River pink salmon (weir).

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd year

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	none
Escapement Goal Type:	N/A
Recommended Escapement Goal:	SEG threshold of 3,200
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	aerial surveys, counting tower and/or weir
Summary:	
Data Quality	
Data Type	Aerial surveys 1972-2001 (intermittent), counting tower 1993-95, weir 1996-2003.
Contrast	
Criteria for SEG	
15th - 85th Percentile	
Years within recommended EG	
Comments	Established from the 2001 escapement that the stock rebounded from.

Appendix C.8. - Escapement goal for Nome River pink salmon (weir).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd year

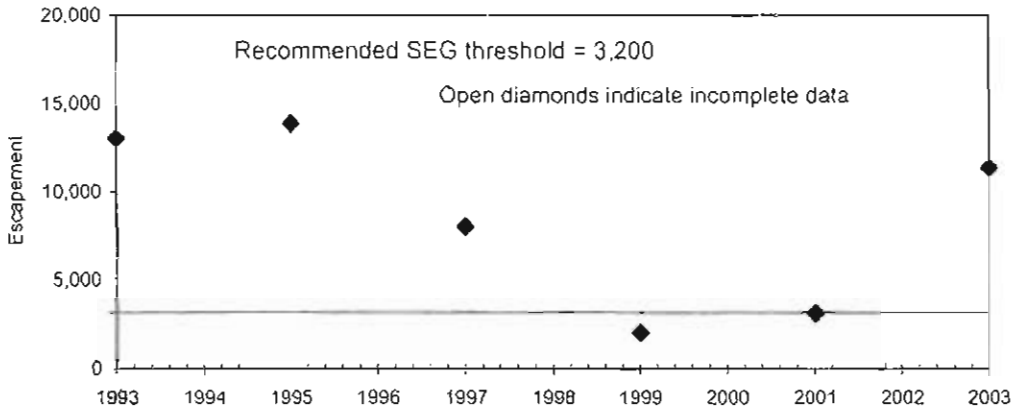
Data available for analysis of escapement goals.

Brood Year	Tower/weir count
1993	13,034
1994	
1995	13,890
1996	
1997	8,035
1998	
1999	2,033
2000	
2001	3,138
2002	
2003	11,367

Appendix C.8. - Escapement goal for Nome River pink salmon (weir).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd year

Observed escapement by year and recommended EG threshold (solid line).



Appendix C.9. - Escapement goal for Niukluk River pink salmon (tower).

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd and even

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	8,400 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	SEG Threshold >10,400
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Tower
Summary:	
Data Quality	Good
Data Type	Aerial surveys performed 1963-94 (intermittent). Counting tower 1995-03.
Contrast	
Criteria for SEG	
15th - 85th Percentile	
Years within recommended SEG	
Comments	Inadequate number of years for spawner-return analysis. Proposed goal is the lowest tower count escapement from which the stock has rebounded well.

Appendix C.9. - Escapement goal for Niukluk River pink salmon (tower).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd and even

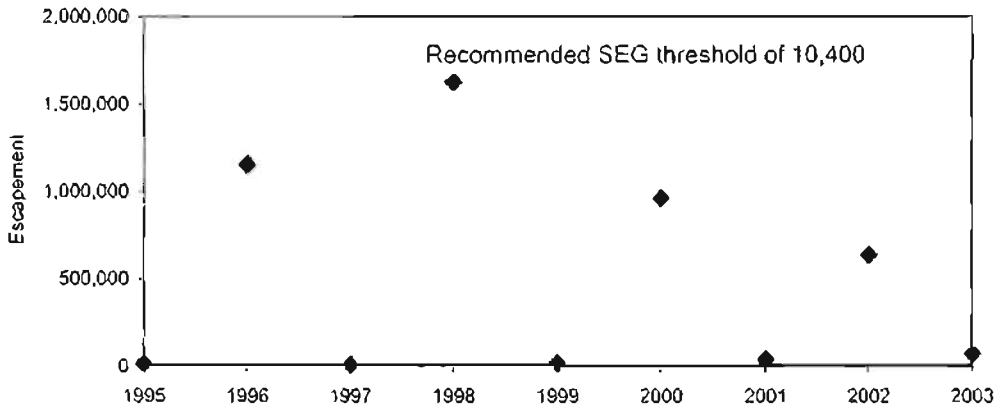
Data available for analysis of escapement goals.

Brood Year	Tower count
1995	17,088
1996	1,154,922
1997	10,468
1998	1,624,438
1999	20,351
2000	961,603
2001	41,625
2002	636,404
2003	75,111

Appendix C.9. - Escapement goal for Niukluk River pink salmon (tower).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd and even

Observed escapement by year.



Appendix C.10. - Escapement goal for Kwiniuk River pink salmon (tower).

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd year

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	12,500 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	SEG threshold of 8,400
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	aerial surveys, counting tower and/or weir
Summary:	
Data Quality	
Data Type	Aerial surveys 1963-2002 (intermittent), counting tower 1981-03.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended EG	
Comments	Established from the 2001 escapement that the stock rebounded from.

Appendix C.10. - Escapement goal for Kwiniuk River pink salmon (tower).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd year

Data available for analysis of escapement goals.

Brood Year	Tower count
1981	566,534
1982	469,674
1983	254,538
1984	663,533
1985	18,237
1986	241,446
1987	5,566
1988	187,991
1989	27,488
1990	416,512
1991	53,499
1992	1,464,716
1993	43,065
1994	2,296,957
1995	17,509
1996	907,894
1997	9,536
1998	655,933
1999	607
2000	750,173
2001	8,423
2002	1,114,616
2003	22,332

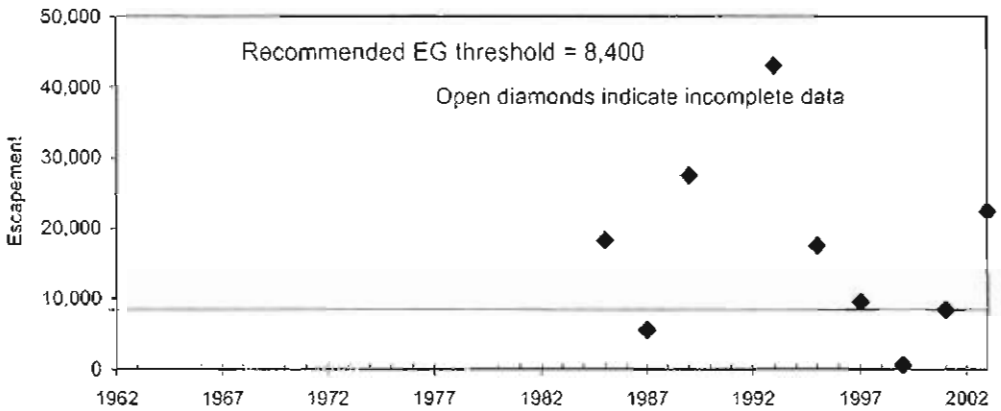
Appendix C.10. - Escapement goal for Kwiniuk River pink salmon (tower).
(continued)

System: Norton Sound Area

Species: pink salmon

Stock Unit: odd year

Observed escapement by year and recommended EG threshold (solid line).



Appendix C.11. - Escapement goal for Shaktoolik River pink salmon (tower).

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd and even

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	48,000 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	Discontinue
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Tower
Summary:	
Data Quality	
Data Type	Aerial surveys performed 1973-2002 (intermittent).
Contrast	N/A
Criteria for SEG	N/A
25th - 75th Percentile	N/A
Years within recommended SEG	N/A
Comments	Discontinue due to lack of data, tower project was discontinued in 1998, aerial surveys are not designed for pink salmon and there is a very low exploitation rate on this stock.

Appendix C.11. - Escapement goal for Shaktoolik River pink salmon (tower).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd and even

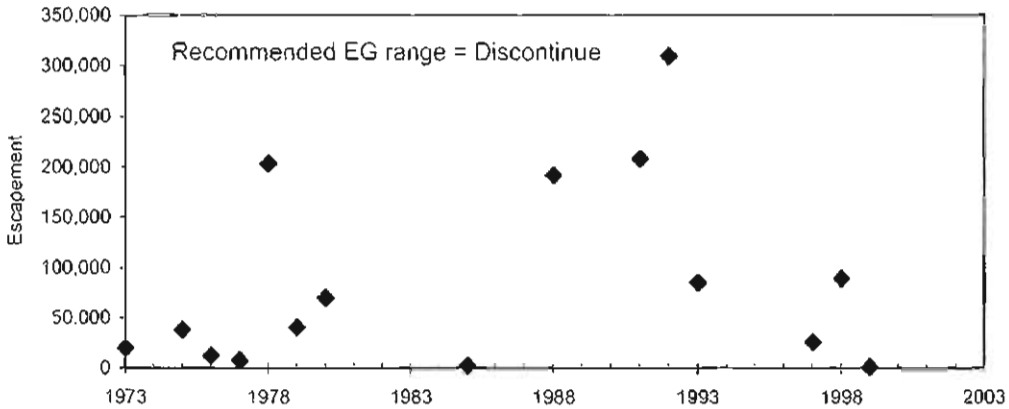
Data available for analysis of escapement goals.

Brood Year	Aerial survey	
1973	19,547	
1974		
1975	37,971	
1976	12,175	
1977	7,602	
1978	203,303	
1979	40,450	
1980	69,915	
1981		
1982		
1983		
1984		
1985	2,350	
1986		
1987		
1988	192,35	
1989		
1990		
1991	208,530	
1992	310,000	
1993	85,320	
1994		
1995		
1996		
1997	25,900	
1998	89,110	
1999	820	
2000		
2001		
2002		
2003		

Appendix C.11. - Escapement goal for Shaktoolik River pink salmon (tower).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd and even

Observed escapement by year.



Appendix C.12. - Escapement goal for Unalakleet and North rivers pink salmon (tower).

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	8,500 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	SEG threshold of 25,000
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Counting tower
Summary:	
Data Quality	
Data Type	Aerial surveys performed 1970-2002 (intermittent), counting tower 1972-74, 1984-86, 1995-2002.
Contrast	60
Criteria for SEG	high contrast at least moderate exploitation
25th - 75th Percentile	24,737 - 127,926
Years within recommended SEG	three of five - odd, (one year 24,700)
Comments	Established from the lowest observed escapement that the stock has rebounded from.

Appendix C.12. - Escapement goal for Unalakleet and North rivers pink salmon (tower).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd

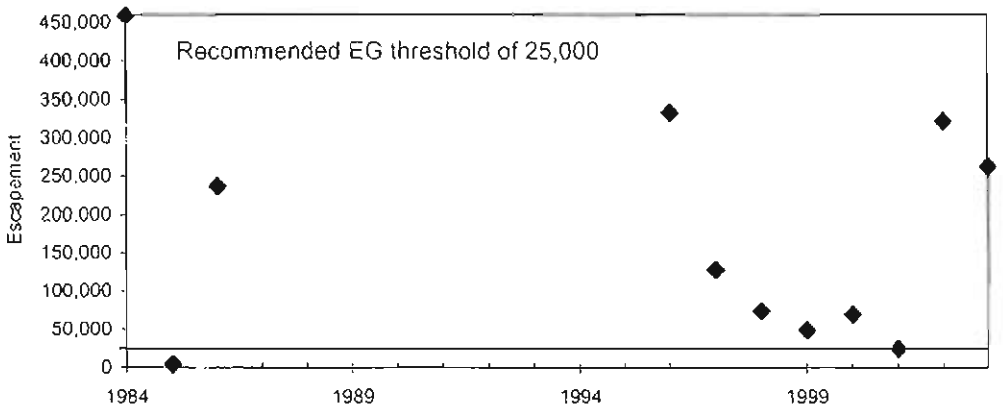
Data available for analysis of escapement goals.

Brood Year	Tower count
1984	458,387
1985	4,360
1986	236,487
1987	
1988	
1989	
1990	
1991	
1992	
1993	
1994	
1995	
1996	332,539
1997	127,926
1998	74,045
1999	48,993
2000	69,703
2001	24,737
2002	321,756
2003	262,320

Appendix C.12. - Escapement goal for Unalakleet and North rivers pink salmon (tower).
(continued)

System: Norton Sound Area
Species: pink salmon
Stock Unit: odd

Observed escapement by year and recommended EG threshold (solid line).



Appendix C.13. - Escapement goal for Salmon Lake/Grand Central River sockeye salmon (aerial).

System: Norton Sound Area
Species: sockeye salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	4,000 - 8,000 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys, counting tower, weir
Summary:	
Data Quality	Good
Data Type	Aerial surveys 1963-2003, weir 1995-96 and 03, counting tower 1999-2002. Stock specific ASL data available from 1995-96, 2001-02.
Contrast	-
Criteria for SEG	-
25th-75th Percentile	-
Years within recommended SEG	-
Comments	Need additional years of weir data and age composition to reevaluate goal in future.

Appendix C.13. - Escapement goal for Salmon Lake/Grand Central River sockeye salmon (aerial). (continued)

System: Norton Sound Area
Species: sockeye salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

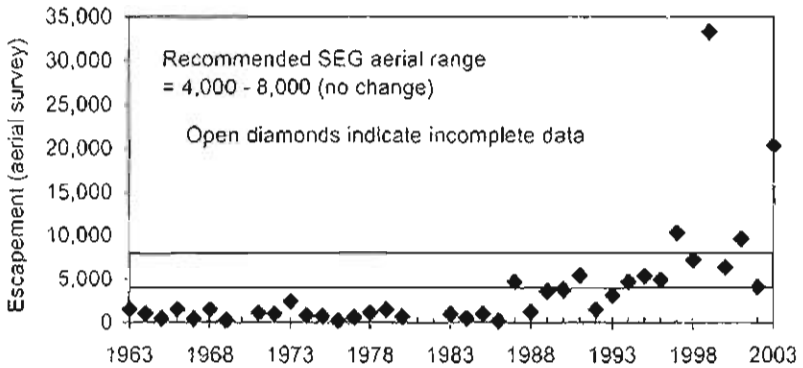
Brood Year	Aerial Counts	Tower Counts
1963	1,471	
1964	997	
1965	410	
1966	1,490	
1967	399	
1968	1,475	
1969	195	
1970		
1971	1,056	
1972	981	
1973	2,354	
1974	820	
1975	695	
1976	170	
1977	552	
1978	1,102	
1979	1,511	
1980	687	
1981		
1982		
1983	970	
1984	475	
1985	980	
1986	160	
1987	4,670	
1988	1,195	
1989	3,580	
1990	3,760	
1991	5,360	
1992	1,500	
1993	3,101	
1994	4,655	
1995	5,343	2,170
1996	4,880	10,845
1997	10,280	15,619
1998	7,187	
1999	33,300	4,650
2000	6,339	12,141
2001	9,555	
2002	4,043	3,888
2003	20,240	42,281

Shaded cells indicate incomplete count of run.

Appendix C.13. - Escapement goal for Salmon Lake/Grand Central River sockeye salmon (aerial). (continued)

System: Norton Sound Area
Species: sockeye salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.14. - Escapement goal for Glacial Lake sockeye salmon (aerial).

System: Norton Sound Area
Species: sockeye salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	800 - 1,600 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys, weir
Summary	
Data Quality	Good
Data Type	Aerial surveys 1977-2002 (intermittent), weir 1977, 79, 2001-02. Stock specific ASL data available from 1979, 2001-02
Contrast	-
Criteria for SEG	-
25th 75th Percentile	-
Years within recommended SEG	-
Comments	Need additional years of weir data and age composition to re-evaluate goal in future.

Appendix C.14. - Escapement goal for Glacial Lake sockeye salmon (aerial).
(continued)

System: Norton Sound Area
Species: sockeye salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

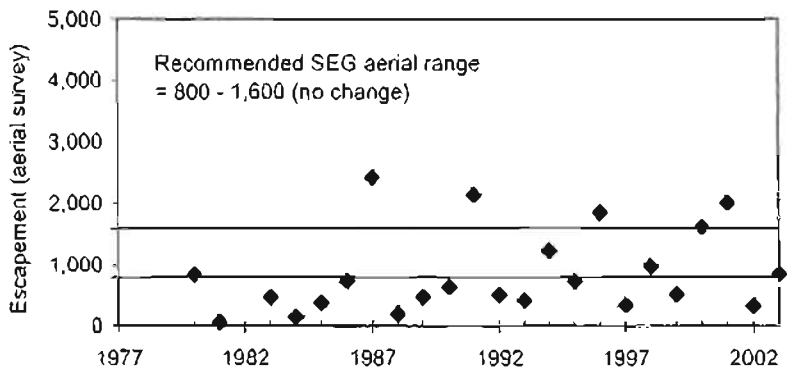
Brood Year	Glacial Lake Aerial Survey	Sinuk River Aerial Survey	Weir
1977			
1978			
1979			
1980	837	4	
1981	60		
1982			
1983	470		
1984	147		
1985	385	2	
1986	726		
1987	2,427	6	
1988	195	130	
1989	470		
1990	639	576	
1991	2,141	10	
1992	510		
1993	419	30	
1994	1,230		
1995	733		
1996	1,852	300	
1997	345		
1998	977	3	
1999	525	550	
2000	1,620	117	884
2001	2,020	15	2,487
2002	330	1,105	1,047
2003	865	22	2,004

Shaded cells indicate incomplete count of run.

Appendix C.14. - Escapement goal for Glacial Lake sockeye salmon (aerial).
(continued)

System: Norton Sound Area
Species: sockeye salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.15. - Escapement goal for Norton Sound Subdistrict 1 chum salmon.

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	23,000 - 35,000 (2001) see Clark (2001c)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Multiple methods
Summary:	
Data Quality	
Data Type	
Contrast	N/A
Criteria for SEG	N/A
25th - 75th Percentile	N/A
Years within recommended EG	
Comments	Updating data set with three more years of data produced same BEG result.

Appendix C.15. - Escapement goal for Norton Sound Subdistrict 1 chum salmon.
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

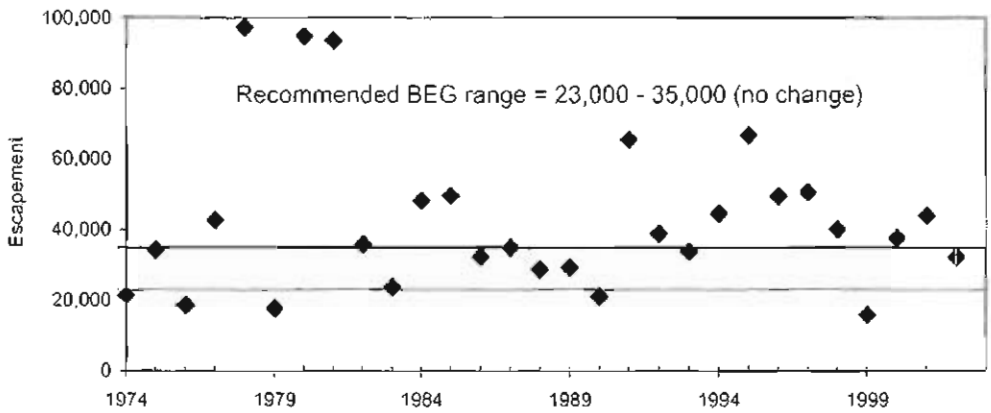
Data available for analysis of escapement goals.

Brood Year	Escapement
1974	21,412
1975	34,268
1976	18,597
1977	42,652
1978	97,258
1979	17,698
1980	94,761
1981	93,624
1982	35,805
1983	23,682
1984	48,123
1985	49,589
1986	32,379
1987	34,976
1988	28,721
1989	29,230
1990	20,935
1991	65,507
1992	38,857
1993	33,863
1994	44,480
1995	66,685
1996	49,447
1997	50,560
1998	40,049
1999	15,861
2000	37,607
2001	43,835
2002	32,073
2003	

Appendix C.15. - Escapement goal for Norton Sound Subdistrict 1 chum salmon.
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended BEG range (solid line).



Appendix C.16. - Escapement goal for Sinuk River chum salmon (aerial expansion).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	4,000 - 6,200 (2001) see Clark (2001c)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	SEG range of 4,000 - 6,200
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Expansion of aerial survey counts.
Summary:	
Data Quality	
Data Type	Stock specific ASL data available from 1978.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended SEG	
Comments	Change goal from a BEG to an SEG because system specific escapement goals developed by Clark (2001c) may not provide MSY from that individual river.

Appendix C.16. - Escapement goal for Sinuk River chum salmon (aerial expansion).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

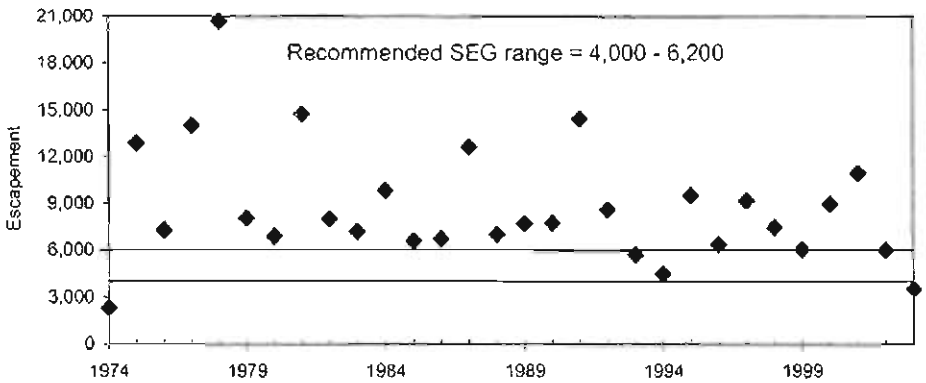
Brood Year	Aerial survey	Estimated total escapement
1974	463	2,260
1975	4,662	12,855
1976		7,276
1977	5,207	13,971
1978	8,756	20,660
1979		8,022
1980	2,022	6,854
1981	5,579	14,716
1982	638	7,962
1983	2,150	7,178
1984	493	9,804
1985	1,910	6,566
1986	1,960	6,695
1987	4,540	12,601
1988	2,070	6,976
1989	1,025	7,661
1990	95	7,707
1991	5,420	14,399
1992	470	8,586
1993	1,570	5,666
1994	1,140	4,453
1995	3,110	9,478
1996	1,815	6,319
1997	2,975	9,167
1998	630	7,420
1999	1,697	6,007
2000	10	8,922
2001	3,746	10,903
2002	1,682	5,967
2003	677	3,482

Shaded cells indicate incomplete count of run.

Appendix C.16. - Escapement goal for Sinuk River chum salmon (aerial expansion).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.17. - Escapement goal for Nome River chum salmon (tower).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	2,900 - 4,300 (2001) see Clark (2001c)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	SEG range of 2,900 - 4,300
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	weir or counting tower
Summary:	
Data Quality	
Data Type	Counting tower 1993-1995, weir 1996-2003. Stock specific ASL data available from 1980, 1994-95, 1997.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended SEG	
Comments	Change goal from a BEG to an SEG because system specific escapement goals developed by Clark (2001c) may not provide MSY from that individual river.

Appendix C.17. - Escapement goal for Nome River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

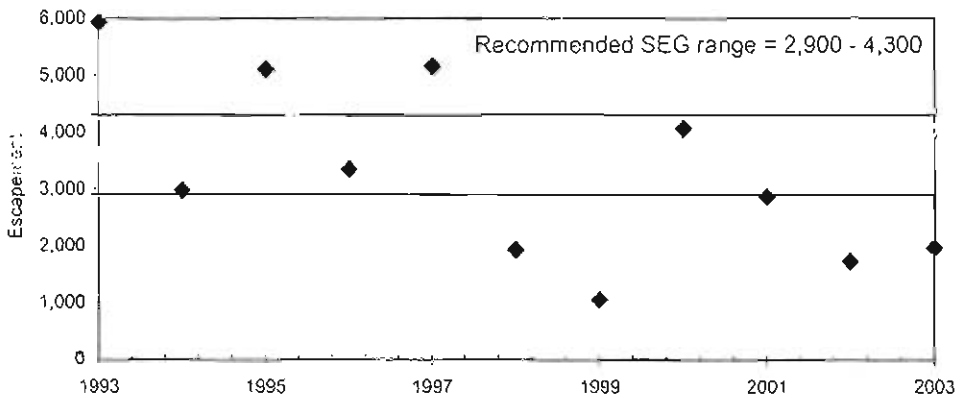
Data available for analysis of escapement goals.

Brood Year	Counting tower or weir count	
1993	5,925	
1994	2,969	
1995	5,093	
1996	3,339	
1997	5,147	
1998	1,930	
1999	1,048	
2000	4,056	
2001	2,859	
2002	1,720	
2003	1,957	

Appendix C.17. - Escapement goal for Nome River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.18. - Escapement goal for Bonanza River chum salmon (aerial expansion).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	2,300 - 3,400 (2001) see Clark (2001c)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	SEG range of 2,300 - 3,400
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Expansion of aerial survey counts.
Summary:	
Data Quality	
Data Type	Aerial surveys. No stock specific ASL data available.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended SEG	
Comments	Change goal from a BEG to an SEG because system specific escapement goals developed by Clark (2001c) may not provide MSY from that individual river.

Appendix C.18. - Escapement goal for Bonanza River chum salmon (aerial expansion).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

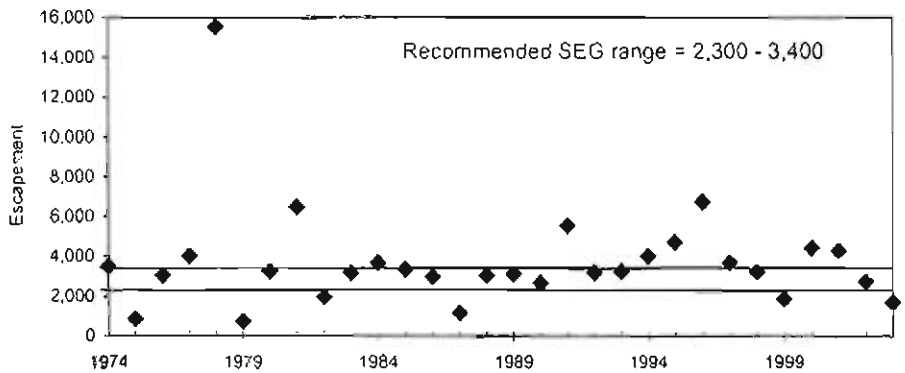
Brood Year	Aerial survey	Estimated total escapement
1974	820	3,474
1975	124	838
1976	681	3,021
1977	990	4,004
1978	5,984	15,513
1979	102	724
1980	748	3,242
1981	1,864	6,447
1982	380	1,947
1983	723	3,160
1984		3,657
1985	775	3,330
1986		2,955
1987	190	1,156
1988		3,033
1989		3,091
1990		2,664
1991	1,520	5,529
1992	80	3,176
1993		3,219
1994		3,998
1995		4,719
1996	1,980	6,747
1997	881	3,667
1998	290	3,203
1999	361	1,874
2000	1,130	4,423
2001	1,084	4,287
2002	595	2,729
2003	220	1,664

Shaded cells indicate incomplete count of run.

Appendix C.18. - Escapement goal for Bonanza River chum salmon (aerial expansion).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.19. - Escapement goal for Snake River chum salmon (tower).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	1,600 - 2,500 (2001) see Clark (2001c)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	SEG range of 1,600 - 2,500
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Counting tower
Summary:	
Data Quality	
Data Type	Stock specific ASL data available from 1994-95, 1997, 2001-02.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended SEG	
Comments	Change goal from a BEG to an SEG because system specific escapement goals developed by Clark (2001c) may not provide MSY from that individual river.

Appendix C.19. - Escapement goal for Snake River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

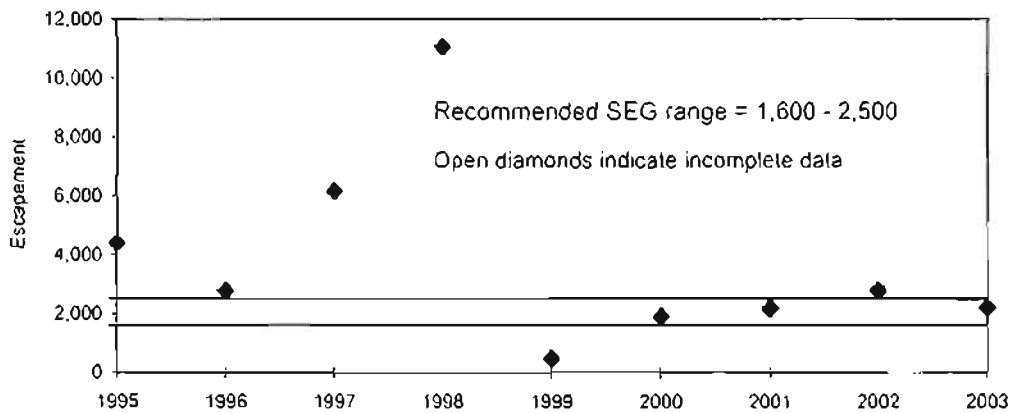
Data available for analysis of escapement goals.

Brood Year	Tower/weir count	
1995	4,395	
1996	2,772	
1997	6,184	
1998	11,067	
1999	484	Shaded cells were
2000	1,911	not used when
2001	2,182	calculating SEG
2002	2,776	range due to
2003	2,201	incomplete count of

Appendix C.19. - Escapement goal for Snake River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.20. - Escapement goal for Solomon River chum salmon (aerial expansion).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	1,100 - 1,600 (2001) see Clark (2001c)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	SEG range of 1,100 - 1,600
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Expanded aerial survey counts.
Summary:	
Data Quality	
Data Type	Stock specific ASL data available from 1995.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended SEG	
Comments	Change goal from a BEG to an SEG because system specific escapement goals developed by Clark (2001c) may not provide MSY from that individual river.

Appendix C.20. - Escapement goal for Solomon River chum salmon (aerial expansion).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

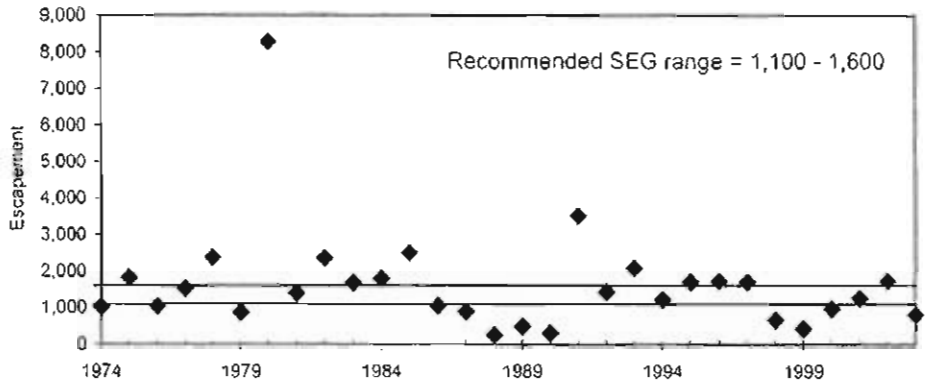
Brood Year	Aerial survey	Estimated total escapement
1974	160	1,015
1975		1,820
1976		1,034
1977	275	1,527
1978	497	2,383
1979	131	873
1980	2600	8,282
1981		1,388
1982	487	2,347
1983	310	1,671
1984		1,792
1985	530	2,502
1986	165	1,039
1987	135	893
1988	25	251
1989	60	485
1990	31	295
1991	830	3,506
1992	25	1,427
1993	415	2,081
1994		1,213
1995	315	1,691
1996	323	1,723
1997	316	1,695
1998	90	658
1999	51	429
2000	150	967
2001	280	1,242
2002	325	1,731
2003	73	806

Shaded cells indicate incomplete count of run.

Appendix C.20. - Escapement goal for Solomon River chum salmon (aerial expansion).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.21. - Escapement goal for Flambeau River chum salmon (aerial expansion).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	4,100 - 6,300 (2001) see Clark (2001c)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	SEG range of 4,100 - 6,300
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Expansion of aerial survey counts.
Summary:	
Data Quality	
Data Type	Aerial survey. No stock specific ASL data available.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended SEG	
Comments	Change goal from a BEG to an SEG because system specific escapement goals developed by Clark (2001c) may not provide MSY from that individual river.

Appendix C.21. - Escapement goal for Flambeau River chum salmon (aerial expansion).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

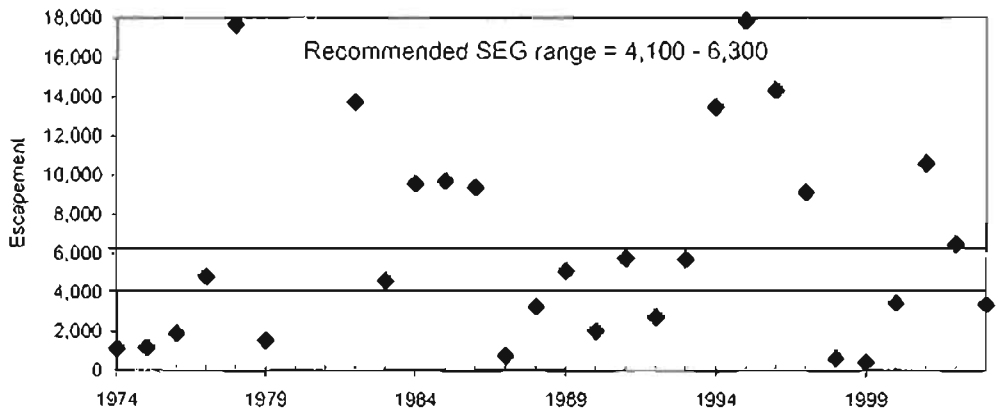
Data available for analysis of escapement goals.

Brood Year	Aerial survey	Estimated total escapement
1974		1,156
1975		1,188
1976		1,928
1977		4,844
1978		17,663
1979		1,560
1980		28,125
1981		26,243
1982		13,748
1983		4,613
1984		9,570
1985		9,718
1986		9,398
1987		792
1988		3,298
1989		5,123
1990		2,041
1991		5,766
1992		2,767
1993		5,720
1994		13,469
1995	7,205	17,840
1996	5,390	14,339
1997		9,129
1998		637
1999	51	429
2000	819	3,471
2001	3,612	10,608
2002	1,876	6,478
2003	647	3,380

Appendix C.21. - Escapement goal for Flambeau River chum salmon (aerial expansion).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.22. - Escapement goal for Eldorado River chum salmon (tower).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	6,000 - 9,200 (2001) see Clark (2001c)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	SEG range of 6,000 - 9,200
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	aerial, tower and weir 1995-03.
Summary:	
Data Quality	
Data Type	Stock specific ASL data available from 1978.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended SEG	
Comments	Change goal from a BEG to an SEG because system specific escapement goals developed by Clark (2001c) may not provide MSY from that individual river.
	1995 data not reliable

Appendix C.22. - Escapement goal for Eldorado River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

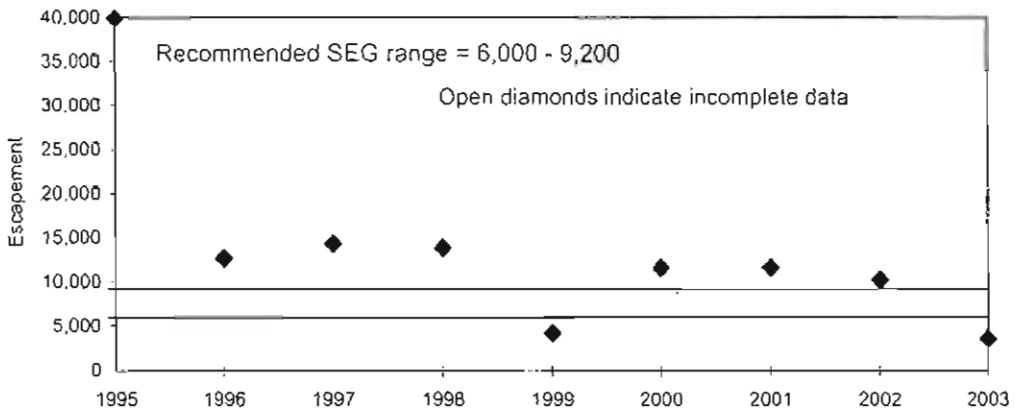
Brood Year	Tower counts	Aerial survey	Estimated total escapement
1993			9,048
1994			13,202
1995	39,867	8,920	18,955
1996	12,655	20,710	32,970
1997	14,302		
1998	13,808		
1999	4,218		
2000	11,617		
2001	11,635		
2002	10,243		
2003	3,591		

Shaded cells were not used when calculating SEG range due to inaccurate count of run.

Appendix C.22. - Escapement goal for Eldorado River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.23. - Escapement goal for Fish River chum salmon (aerial).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	23,200 - 46,400 (1999) see Fair et al. (1999)
Escapement Goal Type:	SEG
Recommended Escapement Goal:	Discontinue
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys performed on the Fish and Niukluk rivers from 1963 - 2001 (intermittent).
Summary:	
Data Quality	
Data Type	Stock specific ASL data available from 1978-79, 1995-2002.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended SEG	
Comments	Discontinue in favor of Niukluk River tower goal as an index. Investigate estimating total drainage escapement by using radiotelemetry.

Appendix C.23. - Escapement goal for Fish River chum salmon (aerial).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

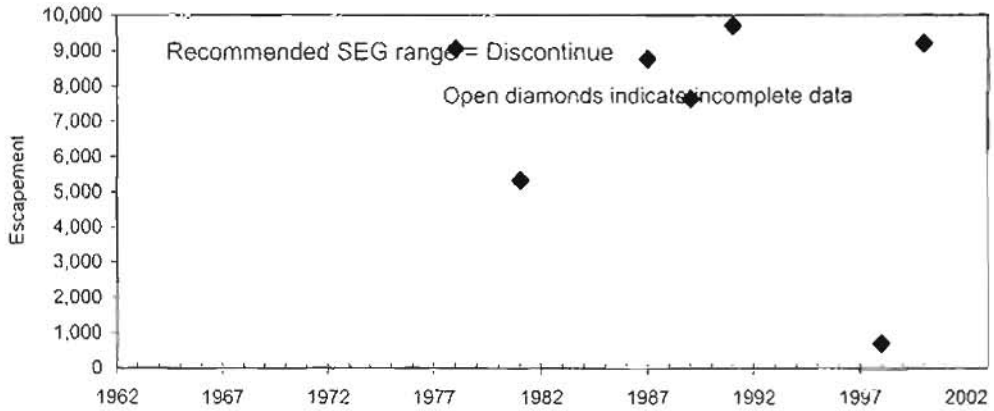
Brood Year	Aerial survey
1962	
1963	30,380
1964	
1965	22,061
1966	24,629
1967	89,593
1968	19,320
1969	92,050
1970	42,835
1971	18,368
1972	25,057
1973	22,091
1974	30,561
1975	12,524
1976	21,445
1977	36,624
1978	9,057
1979	30,465
1980	33,329
1981	5,325
1982	29,627
1983	34,572
1984	35,670
1985	27,852
1986	12,031
1987	8,767
1988	
1989	7,645
1990	23,140
1991	9,700
1992	30,648
1993	36,390
1994	43,012
1995	19,075
1996	40,610
1997	32,136
1998	690
1999	
2000	9,201
2001	
2002	
2003	

Shaded cells were not used when calculating SEG range due to incomplete count of run.

Appendix C.23. - Escapement goal for Fish River chum salmon (aerial).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year.



Appendix C.24. - Escapement goal for Niukluk River chum salmon (tower).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	none
Escapement Goal Type:	N/A
Recommended Escapement Goal:	SEG threshold of 30,000
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Counting tower 1995-2003
Summary:	
Data Quality	
Data Type	Stock specific ASL data available from 1978-79, 1995-2002.
Contrast	
Criteria for SEG	
15th - 85th Percentile	30,000-75,000
Years within recommended SEG	seven of nine years
Comments	SEG threshold recommended because chum salmon are managed incidentally to pink salmon in this system.

Appendix C.24. - Escapement goal for Niukluk River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

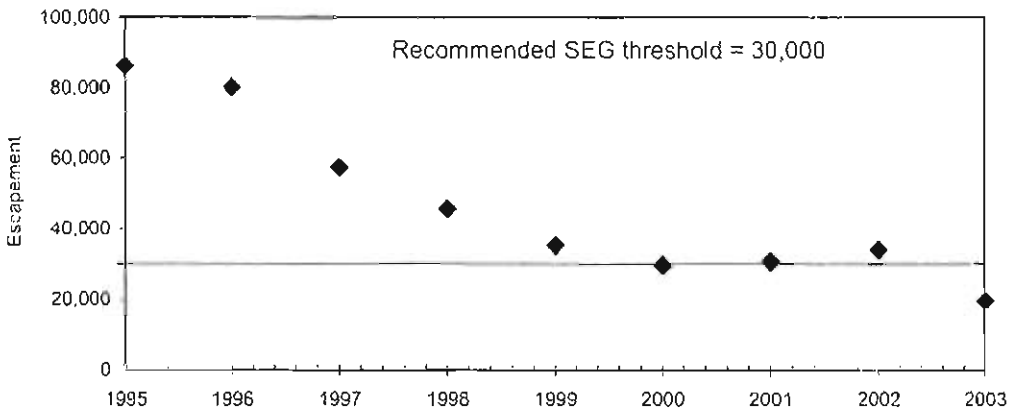
Data available for analysis of escapement goals.

Brood Year	Escapement
1995	86,332
1996	80,178
1997	57,305
1998	45,588
1999	35,239
2000	29,573
2001	30,662
2002	33,979
2003	19,681

Appendix C.24. - Escapement goal for Niukluk River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG threshold (solid line).



Appendix C.25. - Escapement goal for Kwiniuk River chum salmon (tower).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	10,000 - 20,000 (2001) see Clark (2001b)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	no change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Counting tower
Summary:	
Data Quality	
Data Type	Counting tower 1965-2003. Stock specific ASL data available 1962, 1967-69, 1975-2002
Contrast	N/A
Criteria for SEG	N/A
25th - 75th Percentile	N/A
Years within recommended EG	
Comments	Updating escapement data set with three more years of data produced same BEG result.

Appendix C.25. - Escapement goal for Kwiniuk River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

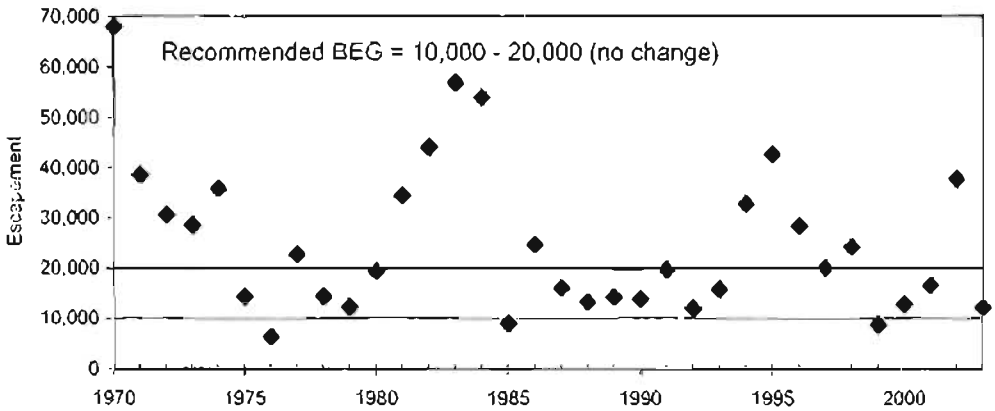
Data available for analysis of escapement goals.

Brood Year	Escapement
1970	68,004
1971	38,679
1972	30,686
1973	28,617
1974	35,899
1975	14,344
1976	6,466
1977	22,757
1978	14,408
1979	12,355
1980	19,374
1981	34,566
1982	44,099
1983	56,907
1984	54,043
1985	9,013
1986	24,705
1987	16,134
1988	13,302
1989	14,282
1990	13,957
1991	19,800
1992	12,077
1993	15,823
1994	32,875
1995	42,703
1996	28,493
1997	20,118
1998	24,248
1999	8,763
2000	12,878
2001	16,598
2002	37,864
2003	12,126

Appendix C.25. - Escapement goal for Kwiniuk River chum salmon (tower).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.26. - Escapement goal for Tubutulik River chum salmon (aerial).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	8,000 - 16,000 (2001) see Clark (2001b)
Escapement Goal Type:	BEG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys
Summary:	
Data Quality	
Data Type	Aerial surveys. Stock specific ASL data available 1985, 1994.
Contrast	N/A
Criteria for SEG	N/A
25th - 75th Percentile	N/A
Years within recommended EG	
Comments	Updating escapement data set with last three years of data produced same BEG result.
	Manage from Kwiniuk.

Appendix C.26. - Escapement goal for Tubutulik River chum salmon (aerial).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

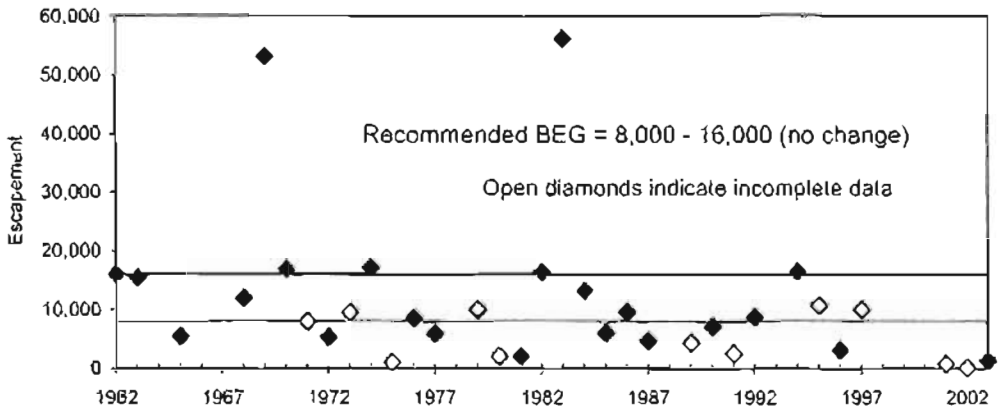
Brood Year	Escapement
1962	16,069
1963	15,469
1964	
1965	5,514
1966	
1967	
1968	12,040
1969	53,290
1970	16,820
1971	8,070
1972	5,383
1973	9,560
1974	17,141
1975	1,095
1976	8,540
1977	5,865
1978	
1979	10,000
1980	2,105
1981	2,044
1982	16,345
1983	56,210
1984	13,253
1985	5,975
1986	9,605
1987	4,662
1988	
1989	4,350
1990	7,085
1991	2,595
1992	8,740
1993	
1994	16,518
1995	10,790
1996	3,105
1997	10,060
1998	
1999	
2000	
2001	863
2002	180
2003	1,352

Shaded cells were not used when calculating BEG range due to incomplete count of run.

Appendix C.26. - Escapement goal for Tubutulik River chum salmon (aerial).
(continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.27. - Escapement goal for Unalakleet/Old Woman rivers chum salmon (combined aerial).

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	2,400 - 4,800 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	Discontinue
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys performed on the Unalakleet River 1995 - 2002 (intermittent).
Summary:	
Data Quality	
Data Type	Unalakleet River stock specific ASL data available from 1962-63, 1968, 1975-2002.
Contrast	
Criteria for SEG	
25th - 75th Percentile	
Years within recommended SEG	
Comments	Discontinue in favor of Unalakleet River test nets as an index. Continue to fly surveys when possible, but river is tannin stained and braided, can't survey all spawning areas. Data is received too late to be used inseason.

Appendix C.27. - Escapement goal for Unalakleet/Old Woman rivers chum salmon (combined aerial). (continued)

System: Norton Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

Brood Year	Unalakleet	Old Woman	Combined aerial
1970		4,470	4,470
1971			
1972	3,876		3,876
1973	4,445		4,445
1974	1,926		1,926
1975	4,702		4,702
1976	2,792		2,792
1977	2,685		2,685
1978	28,600	2,574	31,174
1979	570		570
1980	880	2,595	3,475
1981	55	810	865
1982	563		563
1983			
1984	300		300
1985	1,640	510	2,150
1986	486		486
1987	728	139	867
1988	560	1,060	1,620
1989			
1990	2,580	510	3,090
1991	4,285	990	5,275
1992			
1993		70	70
1994			
1995	5,610		5,610
1996		296	296
1997	4,670	170	4,840
1998	1,050	180	1,230
1999		5	5
2000			
2001			
2002	1,099	236	1,335
2003	652		652

Shaded cells were not used when calculating SEG range due to incomplete count of run.

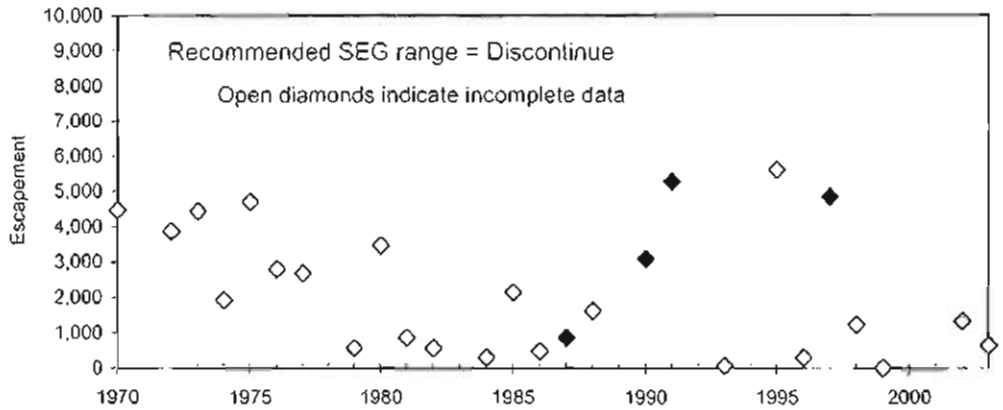
Appendix C.27. - Escapement goal for Unalakleet/Old Woman rivers chum salmon (combined aerial). (continued)

System: Norton Sound Area

Species: chum salmon

Stock Unit: N/A

Observed escapement by year.



Appendix C.28. - Escapement goal for Noatak and Eli rivers chum salmon (aerial).

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	64,000 - 128,000 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points:	none
Escapement Enumeration:	Aerial surveys
Summary:	
Data Quality	Good
Data Type	Noatak aerial surveys 1963-99 (intermittent), Eli aerial surveys 1993, 1998-99. Stock specific ASL data available from 1967-99 (intermittent).
Contrast	-
Criteria for SEG	-
25th-75th Percentile	-
Years within recommended SEG	-
Comments	

Appendix C.28. - Escapement goal for Noatak and Eli rivers chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

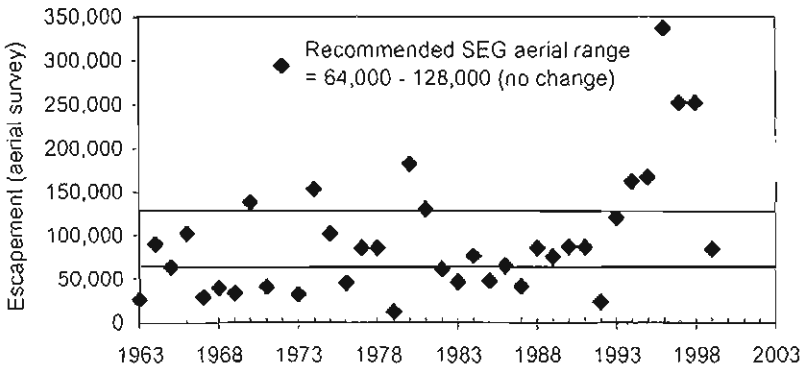
Brood Year	Escapement
1963	26,298
1964	89,816
1965	63,200
1966	101,640
1967	29,120
1968	39,394
1969	33,945
1970	138,145
1971	41,056
1972	293,943
1973	32,144
1974	153,270
1975	101,748
1976	45,472
1977	85,465
1978	85,465
1979	12,473
1980	182,167
1981	130,122
1982	61,407
1983	46,725
1984	76,399
1985	47,580
1986	65,158
1987	41,597
1988	85,592
1989	75,056
1990	86,693
1991	86,344
1992	23,620
1993	120,326
1994	162,000
1995	167,120
1996	336,940
1997	252,030
1998	252,030
1999	84,085
2000	
2001	
2002	
2003	

Shaded cells are estimated escapements for years in which no useable surveys were flown (Clark 2000)

Appendix C.28. - Escapement goal for Noatak and Eli rivers chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.29. - Escapement goal for Upper Kobuk and Selby rivers chum salmon (aerial).

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	8,000 - 16,000 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration	Aerial surveys
Summary:	
Data Quality	Good
Data Type	Kobuk aerial surveys 1963-2002 (intermittent), Selby aerial surveys 1974-2001. Stock specific ASL data available from 1965-2002 (intermittent).
Contrast	-
Criteria for SEG	-
25th-75th Percentile	-
Years within recommended SEG	-
Comments	

Appendix C.29. - Escapement goal for Upper Kobuk and Selby rivers chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

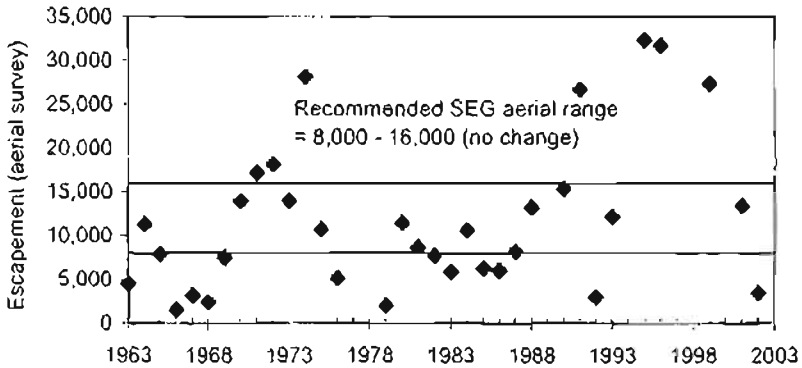
Brood Year	Escapement
1963	4,535
1964	11,288
1965	7,943
1966	1,474
1967	3,163
1968	2,370
1969	7,500
1970	13,908
1971	17,202
1972	18,155
1973	13,988
1974	28,120
1975	10,702
1976	5,151
1977	
1978	
1979	2,008
1980	11,472
1981	8,648
1982	7,718
1983	5,872
1984	10,621
1985	6,278
1986	6,015
1987	8,210
1988	13,250
1989	
1990	15,355
1991	26,655
1992	2,969
1993	12,158
1994	
1995	32,361
1996	31,721
1997	
1998	
1999	27,340
2000	
2001	13,420
2002	3,447
2003	

Shaded cells are estimated escapements for years in which no useable surveys were flown (Clark 2000)

Appendix C.29. - Escapement goal for Upper Kobuk and Selby rivers chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.30. - Escapement goal for Salmon River chum salmon (aerial).

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	3,200 - 6,400 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys
Summary:	
Data Quality	Good
Data Type	Aerial surveys 1963-76, 1978-97, 1999. Stock specific ASL data available from 1967-97 (intermittent).
Contrast	-
Criteria for SEG	-
25th-75th Percentile	-
Years within recommended SEG	-
Comments	

Appendix C.30. - Escapement goal for Salmon River chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

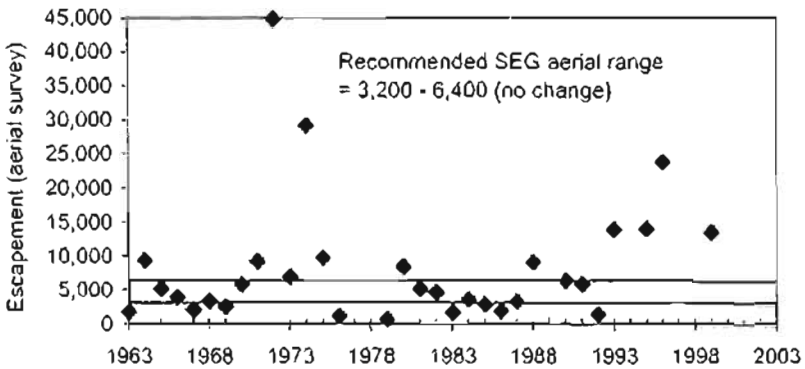
Brood Year	Escapement
1963	1,770
1964	9,353
1965	5,188
1966	3,957
1967	2,116
1968	3,367
1969	2,561
1970	5,854
1971	9,236
1972	44,769
1973	6,891
1974	29,190
1975	9,721
1976	1,161
1977	
1978	
1979	674
1980	8,456
1981	5,166
1982	4,694
1983	1,677
1984	3,621
1985	2,884
1986	1,971
1987	3,333
1988	9,139
1989	
1990	6,335
1991	5,845
1992	1,345
1993	13,880
1994	
1995	13,988
1996	23,790
1997	
1998	
1999	13,513
2000	
2001	
2002	
2003	

Shaded cells are estimated escapements for years in which no useable surveys were flown (Clark 2000)

Appendix C.30. - Escapement goal for Salmon River chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.31. - Escapement goal for Tutuksuk River chum salmon (aerial).

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	1,200 - 2,400 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys
Summary:	
Data Quality	Good
Data Type	Aerial surveys 1963-99 (intermittent). No stock specific ASL data available.
Contrast	-
Criteria for SEG	-
25th-75th Percentile	-
Years within recommended SEG	-
Comments	

Appendix C.31. - Escapement goal for Tutuksuk River chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

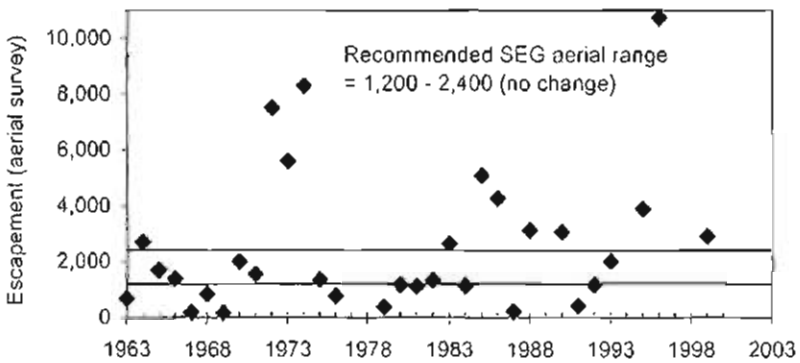
Brood Year	Escapement
1963	670
1964	2,685
1965	1,688
1966	1,383
1967	169
1968	823
1969	159
1970	2,000
1971	1,548
1972	7,501
1973	5,606
1974	8,312
1975	1,344
1976	758
1977	
1978	
1979	382
1980	1,165
1981	1,114
1982	1,322
1983	2,637
1984	1,132
1985	5,098
1986	4,257
1987	206
1988	3,122
1989	
1990	3,055
1991	400
1992	1,162
1993	1,996
1994	
1995	3,901
1996	10,740
1997	
1998	
1999	2,906
2000	
2001	
2002	
2003	

Shaded cells are estimated escapements for years in which no useable surveys were flown (Clark 2000)

Appendix C.31. - Escapement goal for Tutuksuk River chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.32. - Escapement goal for Squirrel River chum salmon (aerial).

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	7,200 - 14,400 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys
Summary:	
Data Quality	Good
Data Type	Aerial surveys 1963-99 (intermittent). Stock specific ASL data available from 1980-97 (intermittent).
Contrast	-
Criteria for SEG	-
25th-75th Percentile	-
Years within recommended SEG	-
Comments	

Appendix C.32. - Escapement goal for Squirrel River chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

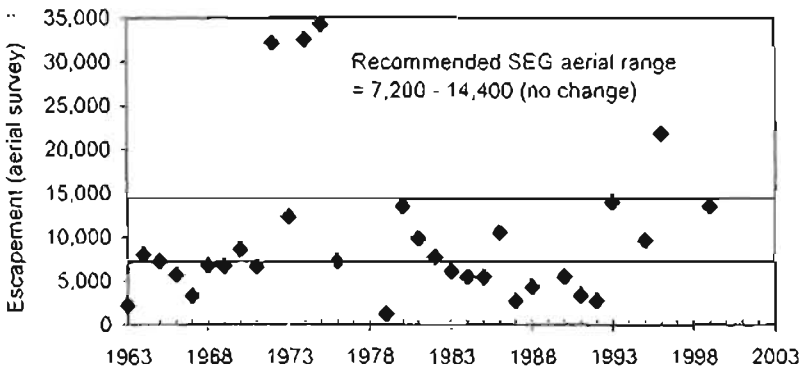
Brood Year	Escapement
1963	2,200
1964	8,009
1965	7,230
1966	5,719
1967	3,332
1968	6,746
1969	6,714
1970	8,566
1971	6,628
1972	32,126
1973	12,345
1974	32,523
1975	34,236
1976	7,229
1977	
1978	
1979	1,288
1980	13,536
1981	9,854
1982	7,690
1983	6,115
1984	5,473
1985	5,453
1986	10,489
1987	2,763
1988	4,351
1989	
1990	5,500
1991	3,400
1992	2,765
1993	13,946
1994	
1995	9,614
1996	21,805
1997	
1998	
1999	13,513
2000	
2001	
2002	
2003	

Shaded cells are estimated escapements for years in which no useable surveys were flown (Clark 2000)

Appendix C.32. - Escapement goal for Squirrel River chum salmon (aerial).
(continued)

System: Kotzebue Sound Area
Species: chum salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.33. - Escapement goal for Niukluk and Ophir rivers coho salmon (aerial).

System: Norton Sound Area
Species: coho salmon
Stock Unit: N/A

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	950 - 1,900 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	
	Aerial surveys
Summary:	
Data Quality	Good
Data Type	Aerial surveys 1984-2002 (intermittent). No stock specific ASL data available.
Contrast	-
Criteria for SEG	-
15th-85th Percentile	-
Years within recommended SEG	-
Comments	Set SEG next board cycle with more tower data.

Appendix C.33. - Escapement goal for Niukluk and Ophir rivers coho salmon (aerial) (continued)

System: Norton Sound Area
Species: coho salmon
Stock Unit: N/A

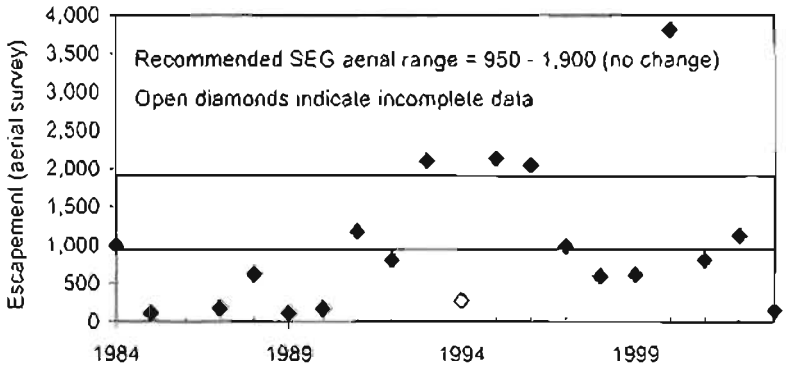
Data available for analysis of escapement goals.

Brood Year	Aerial Niukluk	Aerial Ophir	Sum aerials	Tower count
1984	998	1,338	2,336	
1985	109	223	332	
1986				
1987	176	81	257	
1988	621	474	1,095	
1989	112	70	182	
1990	170	194	364	
1991	1,178	60	1,238	
1992	812	224	1,036	
1993	2,104	14	2,118	
1994	274	197		
1995	2,136	15	2,151	4,713
1996	2,047	1,271	3,318	12,818
1997	983			3,997
1998	593	116	709	840
1999	619	61	680	4,260
2000	3,812	120	3,932	11,382
2001	809	162	971	3,468
2002	1,122			7,269
2003	146			1,275

Appendix C.33. - Escapement goal for Niukluk and Ophir rivers coho salmon (aerial). (continued)

System: Norton Sound Area
Species: coho salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.34. - Escapement goal for Kwiniuk River coho salmon (aerial).

System: Norton Sound Area
Species: coho salmon
Stock Unit: N/A

Description of stock and escapement goals:

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	650 - 1,300 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys / counting tower
Summary:	
Data Quality	Good
Data Type	Aerial surveys 1984-2002 (intermittent). No stock specific ASL data available.
Contrast	7
Criteria for SEG	medium
15th-85th Percentile	-
Years within recommended SEG	-
Comments	Set SEG next board cycle with more tower data.

Appendix C.34. - Escapement goal for Kwiniuk River coho salmon (aerial).
(continued)

System: Norton Sound Area
Species: coho salmon
Stock Unit: N/A

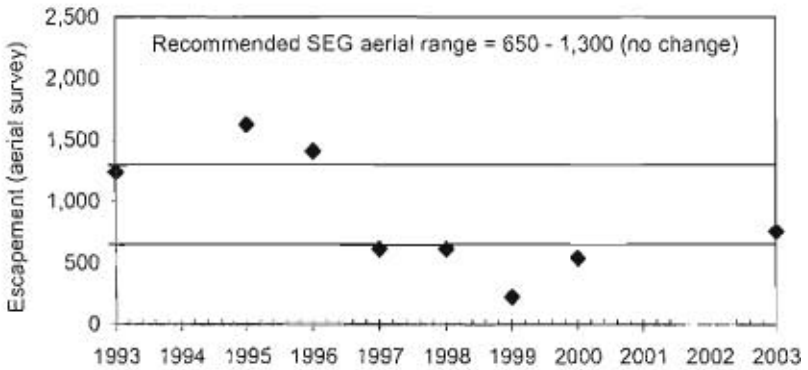
Data available for analysis of escapement goals.

Brood Year	Aerial survey	Tower count
1984	983	
1985	673	
1986		
1987	819	
1988	444	
1989		
1990	746	
1991	809	
1992	532	
1993	1,238	
1994		3,004
1995	1,625	
1996	1,410	
1997	610	
1998	610	
1999	223	
2000	541	
2001		9,532
2002		6,459
2003	760	5,400

Appendix C.34. - Escapement goal for Kwiniuk River coho salmon (aerial).
(continued)

System: Norton Sound Area
Species: coho salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).



Appendix C.35. – Escapement goal for North River coho salmon (aerial).

System: Norton Sound Area
Species: coho salmon
Stock Unit: *N/A*

Description of stock and escapement goals.

Regulatory Area:	Norton Sound
Management Division:	Commercial Fish
Primary Fishery:	Commercial and subsistence
Previous Escapement Goal:	550 - 1,100 (1999) see Fair et al. (1999)
Escapement Goal Type:	EG
Recommended Escapement Goal:	No change
Optimal Escapement Goal:	none
Inriver Goal:	none
Action Points	none
Escapement Enumeration:	Aerial surveys for North River coho salmon have been performed 6 times since 1993
Summary:	
Data Quality	Good
Data Type	Aerial surveys
Contrast	6
Criteria for SEG	medium
15th-85th Percentile	460 - 1,100
Years within recommended SEG	–
Comments	Age composition data area available from the District 6 commercial and Unalakleet River test chinook and coho salmon fisheries from 1980 to 2003. Revisit next BOF cycle with more counting tower data.

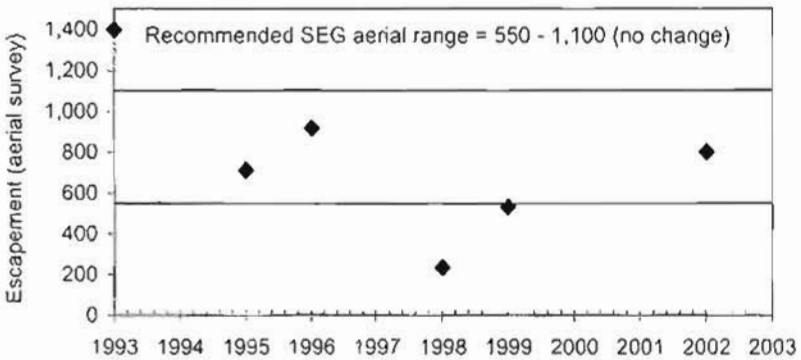
Appendix C.35. - Escapement goal for North River coho salmon (aerial). (continued)

System: Norton Sound Area
Species: coho salmon
Stock Unit: N/A

Data available for analysis of escapement goals.

Brood Year	Aerial survey counts
1993	1,397
1994	
1995	710
1996	917
1997	
1998	233
1999	533
2000	
2001	
2002	800
2003	

Appendix C.35. - Escapement goal for North River coho salmon (aerial).
(continued)

System: Norton Sound Area
Species: coho salmon
Stock Unit: N/A

Observed escapement by year and recommended SEG range (solid line).