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Stock Assessment of Sockeye Salmon from the Buskin River, Kodiak, Alaska, 2004

by

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and
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May 2005

Alaska Department of Fish and Game

Division of Sport Fish



Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
metric ton	mt
milliliter	ml
millimeter	mm

Weights and measures (English)

cubic feet per second	ft ³ /s
foot	ft
gallon	gal
inch	in
mile	mi
ounce	oz
pound	lb
quart	qt
yard	yd
Spell out acre and ton.	

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
hour (spell out for 24-hour clock)	h
minute	min
second	s
Spell out year, month, and week.	

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.
All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.
and	&
at	@
Compass directions:	
east	E
north	N
south	S
west	W
Copyright	©

Corporate suffixes:

Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
et alii (and other people)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.,
id est (that is)	i.e.,
latitude or longitude	lat. or long.
monetary symbols (U.S.)	\$, ¢
months (tables and figures): first three letters	Jan, ..., Dec
number (before a number)	# (e.g., #10)
pounds (after a number)	# (e.g., 10#)
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)

Mathematics, statistics, fisheries

alternate hypothesis	H _A
base of natural logarithm	e
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	F, t, χ^2 , etc.
confidence interval	C.I.
correlation coefficient	R (multiple)
correlation coefficient	r (simple)
covariance	cov
degree (angular or temperature)	°
degrees of freedom	df
divided by	÷ or / (in equations)
equals	=
expected value	E
fork length	FL
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	log ₂ , etc.
mid-eye-to-fork	MEF
minute (angular)	'
multiplied by	x
not significant	NS
null hypothesis	H ₀
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
standard length	SL
total length	TL
variance	Var

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TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ii
LIST OF FIGURES	ii
LIST OF APPENDICES	ii
ABSTRACT	1
INTRODUCTION	1
METHODS.....	4
Buskin River Weir	4
Age-Sex-Length Sampling	4
Data Analysis.....	5
RESULTS.....	6
DISCUSSION.....	11
ACKNOWLEDGMENTS	11
LITERATURE CITED.....	11
APPENDIX A. SUPPORTING DATA.....	12

LIST OF TABLES

Table	Page
Table 1.- Subsistence harvests of Buskin River sockeye salmon, 1994-2003	3
Table 2.-Estimated sport fishery harvest of Buskin River sockeye salmon, 1994-2003.....	3
Table 3- Escapement of sockeye salmon into the Buskin River, 1995-2004	4
Table 4.-Immigration of sockeye salmon through the Buskin River weir by date, 2004.....	8
Table 5.-Immigration of sockeye salmon through the Lake Louise weir by date, 2004.....	9

LIST OF FIGURES

Figure	Page
Figure 1.-Map of Kodiak Island showing Buskin River drainage.	2
Figure 2.-Location of the Buskin River drainage weirs, 2002.....	7
Figure 3.-Buskin River daily and cumulative sockeye salmon escapement, 2002.	10
Figure 4.-Lake Louise daily and cumulative sockeye salmon escapement, 2002.....	10

LIST OF APPENDICES

Appendix	Page
Appendix A1.-Estimated age composition of Buskin River sockeye salmon escapement, 2004.	13
Appendix A2.-Estimated sample age composition of Buskin River sockeye salmon subsistence harvest, 2004.....	14
Appendix A3.-Estimated age composition of Lake Louise sockeye salmon escapement, 2004	15

ABSTRACT

Salmon weirs were operated on the Buskin River drainage on Kodiak Island, Alaska, from May 17 – August 15, 2004 to enumerate sockeye salmon *Oncorhynchus nerka*. A total of 22,023 sockeye salmon, the second largest recorded escapement, were counted into Buskin Lake. A total of 2,086 sockeye salmon were also counted into the Lake Louise tributary. The midpoint of the Buskin Lake run occurred on June 13; the midpoint of the Lake Louise tributary run occurred on July 29. Most sockeye salmon in the Buskin Lake escapement were aged 1.3, 2.2 or 2.3; salmon in the Lake Louise tributary run were aged 1.2 and 1.3. The preliminary 2002 subsistence harvest was 10,804 sockeye salmon, most of which were aged 1.3 or 2.3.

Key words: Buskin River, Kodiak Island, sockeye salmon, *Oncorhynchus nerka*, weir, subsistence harvest, age composition.

INTRODUCTION

The Buskin River drainage (Figure 1), located approximately 2 miles from the city of Kodiak, supports a subsistence fishery which occurs in marine waters near the mouth of the Buskin River and harvests relatively large numbers of sockeye salmon *Oncorhynchus nerka*. Between 1990 and 1998 annual subsistence harvests averaged 4,837 sockeye salmon, but recently have increased, averaging more than 10,000 fish in 2001 - 2003 (Table 1). Currently, the Buskin River is the single largest source of subsistence salmon harvests in federally managed waters within the Kodiak area.

Sockeye salmon from the Buskin River are also harvested by a sport fishery which has been monitored since 1980. Sport harvests have averaged approximately 1,700 sockeye salmon between 1994-2003 (Table 2) and angler effort on the Buskin River has recently represented an average of 35% of the annual freshwater sport fishing effort in the Kodiak Management Area (Schwarz et al. 2002), although this statistic also represents sport fishing effort targeting other species besides sockeye salmon, such as coho salmon *O. kisutch*, pink salmon *O. gorbuscha*, and Dolly Varden *Salvelinus malma*. Buskin River sockeye salmon are also harvested commercially, but to a much lesser degree than by subsistence and sport fisheries, at less than 100 fish annually during recent years.

Annual escapements of sockeye salmon returning to the Buskin River have been monitored since 1980. Between 1980 and 1984 escapements were indexed using aerial survey counts and since 1985 a weir has been used to enumerate total escapements. From 1995-2004 sockeye salmon escapements into the Buskin River have averaged more than 14,000 fish (Table 3).

Although sockeye salmon harvests and escapements have been monitored historically, age data from returns of adult fish have been collected consistently only since 1993 (Schwarz and Clapsadl 2000). Consequently, at the present time there is a continuing need for information necessary to assess productivity of this salmon stock and to evaluate the current biological escapement goal (BEG).

The Buskin River is fed by primarily by Buskin Lake, although two other tributaries that terminate in small lakes also drain into the Buskin River. Along with Buskin Lake, these small lakes are utilized by sockeye salmon for spawning and rearing habitat. Since 1990 the ADF&G weir has been operated near the outlet of Buskin Lake rather than further downstream, to avoid weir washouts resulting from frequent inriver flooding. Consequently, the inriver return of sockeye salmon to the down river tributaries was not documented. Since 2002 installation of a weir on the main tributary stream from Lake Louise to the Buskin River has

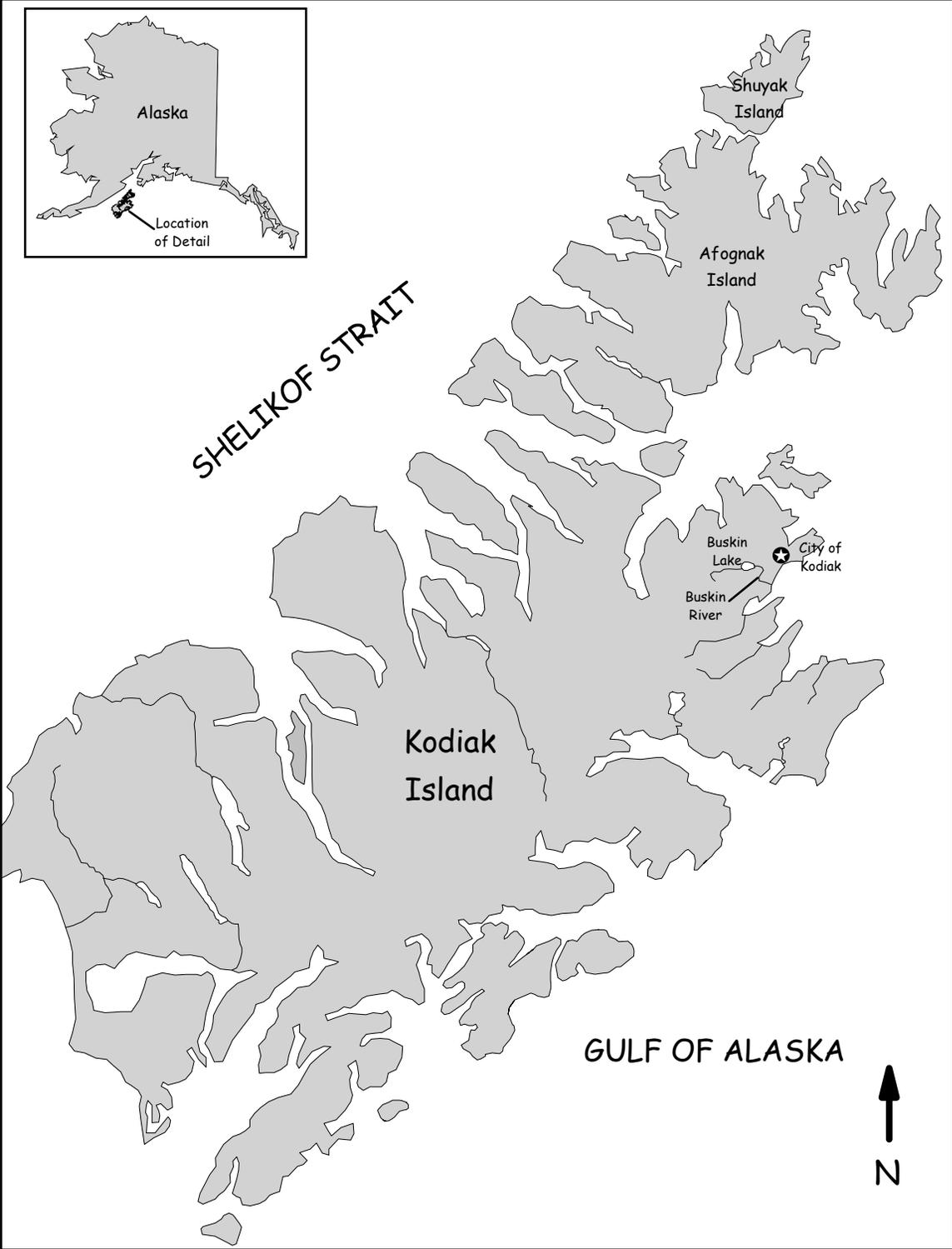


Figure 1.-Map of Kodiak Island showing Buskin River drainage.

provided complete escapement counts of sockeye salmon returning to the drainage. Operation of this tributary weir will continue annually for the duration of the stock assessment study.

Estimates of total return by age from sampling the escapement and subsistence harvest are needed in order reconstruct the run and develop brood tables to evaluate the BEG. Cumulative weir counts are needed for comparison to historic time of entry data in order to ensure fisheries are managed so that the current BEG is achieved. Results from this project will ensure that the health of the Buskin River sockeye salmon stock is not negatively impacted by subsistence, recreational, or commercial fisheries.

Table 1.- Subsistence harvests of Buskin River sockeye salmon, 1994-2003.

Year	Reported Subsistence Fishery Harvest
1994	4,899
1995	5,547
1996	5,403
1997	5,890
1998	6,011
1999	7,985
2000	7,315
2001	10,260
2002	13,588
2003	10,728
Average	7,763

Source: ADF&G Commercial Fisheries Division, Kodiak; 2004 data not available.

Table 2.- Estimated sport fishery harvest of Buskin River sockeye salmon, 1994-2003.

Year	Estimated Sport Fishery Harvest
1994	2,573
1995	1,087
1996	1,881
1997	1,843
1998	1,983
1999	1,467
2000	2,041
2001	826
2002	1,903
2003	3,012
Average	1,692

Source: 1994-2000, Schwarz et al. 2002; 2001-2003 Schwarz et al. *in prep.*

Table 3.- Escapement of sockeye salmon into the Buskin River, 1995-2004.

Year	Escapement
1995	15,520
1996	9,661
1997	9,840
1998	14,767
1999	10,812
2000	11,233
2001	20,556
2002	17,174
2003	23,870
2004	22,023
Average	14,132

Sources: 1995-2000 data from Schwarz et al 2002; 2001-2004 data from Schwarz et al. *in prep*).

During 2004 the objectives of the stock assessment study were to census the sockeye salmon escapement into the Buskin River drainage and to estimate the age composition of the escapement and subsistence fishery harvest. This information, along with historic data and sport and commercial harvest estimates, will be used to augment a brood table in development for evaluation of the sockeye salmon BEG.

METHODS

BUSKIN RIVER WEIR

The spawning escapement of sockeye salmon was censused through a weir at the outlet of Buskin Lake from May 17 – August 14, 2004 (Figure 2). Fish migrating upstream were enumerated as they passed through the weir. Daily counts of sockeye salmon were entered on salmon weir count data forms. After August 14 the weir was relocated downstream to enumerate escapement of coho salmon.

A second weir was operated in the tributary stream flowing into the Buskin River from the Lake Louise portion of the drainage beginning on June 1 (Figure 2). Daily counts of sockeye salmon were entered on salmon weir count data forms through August 31, when the weir was removed for the year.

AGE-SEX-LENGTH SAMPLING

Sockeye salmon were sampled from the Buskin River escapement during each of four temporal strata: June 1 – June 15, June 16-30, and July 1-15, and July 16-31. Ideally, sampling was conducted on two days, one week apart, during each stratum. All fish captured on selected days were sampled, even if the daily sample goal was exceeded. On occasions when large numbers of sockeye salmon were observed behind the weir, fish were ideally sampled during the early, middle and late portions of the time interval required for their passage upstream.

Sockeye salmon were also sampled at the Lake Louise weir site during each during each of four temporal strata: June 1 – July 15, July 16-30, and August 1-15, and August 16-31. All fish captured on selected days were sampled, even if the daily sample goal was exceeded.

The subsistence harvest was sampled for age, sex, and length during each of three temporal strata: June 1 – June 15, June 16-30, and July 1-15. Harvested fish were sampled from subsistence fishers opportunistically within each time stratum. Sampling was conducted either from a boat on the fishing grounds or dockside at local boat harbors.

Fish were measured from mid-eye to fork-of-tail and sex determined. Two scales were taken from each fish and mounted on a gum card. Scales were taken from the left side of the body, at a point on a diagonal line from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin, two rows above the lateral line (Clutter and Whitesel 1956). Scales were taken proximal to the preferred region when necessary, although only within the area bounded dorsally by the fourth row of scales above the lateral line, ventrally by the lateral line, and between lines drawn vertically from the posterior insertion of the dorsal fin and the anterior insertion of the anal fin. If scales were not available in the preferred region on the left side of the fish, scales were collected from the preferred region on the right side. Age was interpreted from scales using the criteria of Clutter and Whitesel (1956).

DATA ANALYSIS

Chi-squared statistics were used to test for differences in age and sex composition among temporal strata within each source (i.e. escapement or subsistence harvests) and also between each source. If differences were detected, estimates were stratified to minimize bias. If differences were not detected, age data were pooled to improve precision. The proportion of sockeye salmon from source h (escapement or subsistence harvest) during stratum i ($i = 1,2,3,4$) in age/sex class j was estimated as a binomial proportion by:

$$\hat{p}_{hij} = \frac{n_{hij}}{n_{hi}} \quad (1)$$

and its variance by:

$$\hat{V}(\hat{p}_{hij}) = \left[\frac{N_{hi} - n_{hi}}{N_{hi}} \right] \frac{\hat{p}_{hij}(1 - \hat{p}_{hij})}{n_{hi} - 1}, \quad (2)$$

where:

n_{hij} = the number of sockeye salmon from source h during stratum i that were in age/sex class j ,

n_{hi} = the number of sockeye salmon sampled from source h during stratum i , and

N_{hi} = the total number of sockeye salmon in source h during stratum i .

Weir counts and permit returns of subsistence harvests were treated as censuses with no variance. In the event that temporal stratification was required for the subsistence harvest, N_{Si} was calculated by multiplying the total subsistence harvest by the proportion of the sockeye salmon run passing through the weir in temporal stratum i .

The number of fish from source h during stratum i of age/sex class j was estimated by:

$$\hat{N}_{hij} = N_{hi} \hat{P}_{hij}, \quad (3)$$

where N_{hi} = the total number of sockeye salmon from source h during stratum i;
and its variance by:

$$\hat{V}(\hat{N}_{hij}) = N_{hi}^2 \hat{V}(\hat{P}_{hij}). \quad (4)$$

The total number of fish from source h of age/sex class j was estimated as:

$$\hat{N}_{hj} = \sum_{i=1}^t \hat{N}_{hij} \quad (5)$$

where t = the number of strata; and the variance was estimated as the sum of the variances as:

$$V(\hat{N}_{hj}) = \sum V(\hat{N}_{hij}). \quad (6)$$

The proportion of sockeye salmon age age/sex class j for the total of source h was estimated as:

$$\hat{P}_{hj} = \frac{\hat{N}_{hj}}{N_h}, \quad (7)$$

where N_h = the total for source h.

The variance of the proportion was estimated by:

$$V(\hat{P}_{hj}) = \frac{V(\hat{N}_{hj})}{N_h^2}. \quad (8)$$

RESULTS

At the conclusion of the 2004 sockeye salmon stock assessment project on August 15 a total of 21,774 adult fish were counted through the weir located at the outlet of Buskin Lake. The entire 2004 escapement (including fish counted at the lower weir site) eventually totaled 22,023 (Table 3). The highest daily count of 2,125 sockeye salmon occurred on June 8 and the midpoint of the run occurred on June 13 (Table 4; Figure 3). Age, length and sex data were collected from 433 sampled fish, and sex and length only data from an additional 76 fish. Age compositions were not significantly different by temporal strata ($\chi^2 = 12.59$, $df = 6$, $P = .32$). Fish comprising the escapement were evenly split between ages 1.3, 2.2 and 2.3 (Appendix A1). Mean length of females in the escapement was 501 mm (SE = 38); mean length of males was 535 mm (SE = 55).

A total of 2,086 sockeye salmon were counted through the weir located on the Lake Louise tributary stream (Table 5). The highest daily count of 418 sockeye salmon occurred on August 9 and the midpoint of the run occurred on July 29 (Table 5; Figure 4). Age, length and sex data were collected from 461 sampled fish and sex and length only data from an additional 58 fish. Age compositions were significantly different by temporal strata ($\chi^2 = 49.52$, $df = 9$, $P > .001$) and were subsequently stratified. Most fish bound for Lake Louise were ages 1.2 and 1.3 (Appendix

A2). Mean length of Lake Louise females was 501mm (SE = 41), while mean length for males was 510 mm (SE = 60).

A preliminary tally of the 2004 subsistence harvest is not available. There was not a significant difference in age compositions of fish sampled from the harvest by temporal strata ($\chi^2 = .45$, $df = 2$, $P = .79$). Most fish in the subsistence harvest were ages 1.3 or 2.3 (Appendix A3). Mean length of females was 528 mm (SE = 23), and 550 mm (SE = 32) for males.

The age composition of the Buskin River escapement was significantly different from the subsistence harvest ($\chi^2 = 231.66$; $df = 2$; $P < .001$).

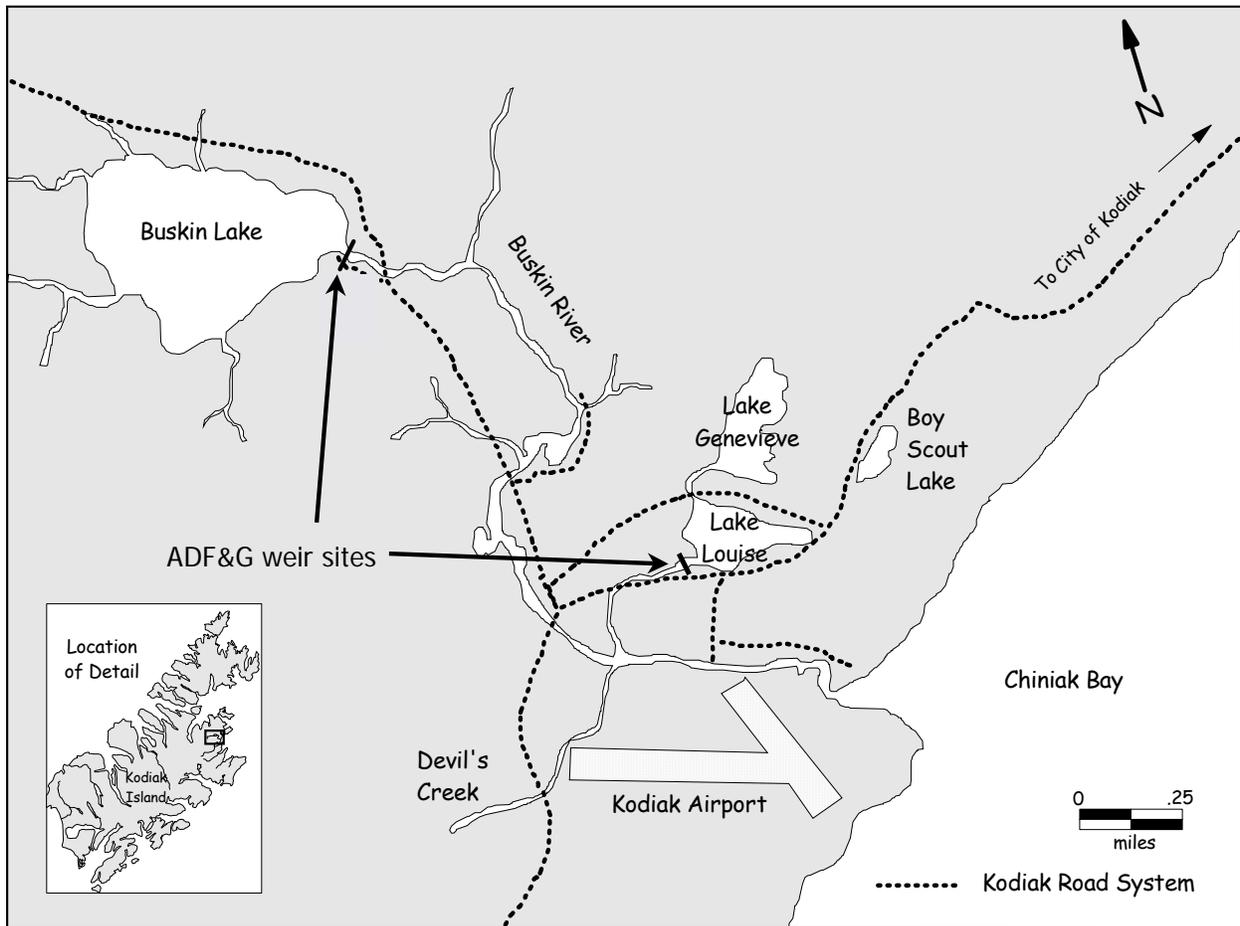


Figure 2.-Location of the Buskin River drainage weirs, 2004.

Table 4.-Immigration of sockeye salmon through the Buskin River weir by date, 2004.

Date	Daily	Cumulative		Date	Count	Cumulative	
	Count	Count	%			Count	%
17-May	1	1	0%	1-Jul	27	18,194	83%
18-May	1	2	0%	2-Jul	29	18,223	83%
19-May	0	2	0%	3-Jul	113	18,336	83%
20-May	0	2	0%	4-Jul	26	18,362	83%
21-May	0	2	0%	5-Jul	60	18,422	84%
22-May	0	2	0%	6-Jul	16	18,438	84%
23-May	46	48	0%	7-Jul	88	18,526	84%
24-May	348	396	2%	8-Jul	195	18,721	85%
25-May	208	604	3%	9-Jul	253	18,974	86%
26-May	372	976	4%	10-Jul	111	19,085	87%
27-May	3	979	4%	11-Jul	157	19,242	87%
28-May	61	1,040	5%	12-Jul	36	19,278	88%
29-May	212	1,252	6%	13-Jul	79	19,357	88%
30-May	246	1,498	7%	14-Jul	3	19,360	88%
31-May	82	1,580	7%	15-Jul	642	20,002	91%
1-Jun	670	2,250	10%	16-Jul	221	20,223	92%
2-Jun	312	2,562	12%	17-Jul	8	20,231	92%
3-Jun	1,228	3,790	17%	18-Jul	2	20,233	92%
4-Jun	615	4,405	20%	19-Jul	1	20,234	92%
5-Jun	517	4,922	22%	20-Jul	323	20,557	93%
6-Jun	287	5,209	24%	21-Jul	7	20,564	93%
7-Jun	962	6,171	28%	22-Jul	349	20,913	95%
8-Jun	2,125	8,296	38%	23-Jul	29	20,942	95%
9-Jun	331	8,627	39%	24-Jul	4	20,946	95%
10-Jun	266	8,893	40%	25-Jul	18	20,964	95%
11-Jun	1,526	10,419	47%	26-Jul	107	21,071	96%
12-Jun	1,227	11,646	53%	27-Jul	5	21,076	96%
13-Jun	617	12,263	56%	28-Jul	109	21,185	96%
14-Jun	527	12,790	58%	29-Jul	33	21,218	96%
15-Jun	467	13,257	60%	30-Jul	29	21,247	96%
16-Jun	682	13,939	63%	31-Jul	26	21,273	97%
17-Jun	212	14,151	64%	1-Aug	13	21,286	97%
18-Jun	388	14,539	66%	2-Aug	34	21,320	97%
19-Jun	174	14,713	67%	3-Aug	84	21,404	97%
20-Jun	45	14,758	67%	4-Aug	28	21,432	97%
21-Jun	343	15,101	69%	5-Aug	30	21,462	97%
22-Jun	135	15,236	69%	6-Aug	36	21,498	98%
23-Jun	326	15,562	71%	7-Aug	25	21,523	98%
24-Jun	167	15,729	71%	8-Aug	66	21,589	98%
25-Jun	176	15,905	72%	9-Aug	41	21,630	98%
26-Jun	59	15,964	72%	10-Aug	55	21,685	98%
27-Jun	49	16,013	73%	11-Aug	7	21,692	98%
28-Jun	225	16,238	74%	12-Aug	13	21,705	99%
29-Jun	23	16,261	74%	13-Aug	46	21,751	99%
30-Jun	1,906	18,167	82%	14-Aug	23	21,774	99%

Table 5.-Immigration of sockeye salmon through the Lake Louise weir by date, 2004.

Date	Daily Count	Cumulative Count	%	Date	Count	Cumulative Count	%
1-Jun	0	0	0%	17-Jul	11	671	32%
2-Jun	0	0	0%	18-Jul	69	740	35%
3-Jun	0	0	0%	19-Jul	12	752	36%
4-Jun	0	0	0%	20-Jul	22	774	37%
5-Jun	0	0	0%	21-Jul	10	784	38%
6-Jun	1	1	0%	22-Jul	126	910	44%
7-Jun	0	1	0%	23-Jul	34	944	45%
8-Jun	0	1	0%	24-Jul	14	958	46%
9-Jun	1	2	0%	25-Jul	27	985	47%
10-Jun	0	2	0%	26-Jul	27	1,012	49%
11-Jun	2	4	0%	27-Jul	0	1,012	49%
12-Jun	1	5	0%	28-Jul	0	1,012	49%
13-Jun	0	5	0%	29-Jul	27	1,039	50%
14-Jun	6	11	1%	30-Jul	33	1,072	51%
15-Jun	21	32	2%	31-Jul	2	1,074	51%
16-Jun	15	47	2%	1-Aug	1	1,075	52%
17-Jun	4	51	2%	2-Aug	7	1,082	52%
18-Jun	3	54	3%	3-Aug	1	1,083	52%
19-Jun	9	63	3%	4-Aug	4	1,087	52%
20-Jun	5	68	3%	5-Aug	0	1,087	52%
21-Jun	4	72	3%	6-Aug	1	1,088	52%
22-Jun	10	82	4%	7-Aug	0	1,088	52%
23-Jun	10	92	4%	8-Aug	7	1,095	52%
24-Jun	0	92	4%	9-Aug	418	1,513	73%
25-Jun	1	93	4%	10-Aug	69	1,582	76%
26-Jun	5	98	5%	11-Aug	6	1,588	76%
27-Jun	4	102	5%	12-Aug	0	1,588	76%
28-Jun	6	108	5%	13-Aug	9	1,597	77%
29-Jun	20	128	6%	14-Aug	4	1,601	77%
30-Jun	21	149	7%	15-Aug	1	1,602	77%
1-Jul	22	171	8%	16-Aug	1	1,603	77%
2-Jul	13	184	9%	17-Aug	5	1,608	77%
3-Jul	26	210	10%	18-Aug	5	1,613	77%
4-Jul	24	234	11%	19-Aug	130	1,743	84%
5-Jul	13	247	12%	20-Aug	0	1,743	84%
6-Jul	13	260	12%	21-Aug	5	1,748	84%
7-Jul	30	290	14%	22-Aug	7	1,755	84%
8-Jul	11	301	14%	23-Aug	18	1,773	85%
9-Jul	51	352	17%	24-Aug	267	2,040	98%
10-Jul	66	418	20%	25-Aug	23	2,063	99%
11-Jul	43	461	22%	26-Aug	10	2,073	99%
12-Jul	22	483	23%	27-Aug	4	2,077	100%
13-Jul	26	509	24%	28-Aug	9	2,086	100%
14-Jul	81	590	28%	29-Aug	0	2,086	100%
15-Jul	64	654	31%	30-Aug	0	2,086	100%
16-Jul	6	660	32%	31-Aug	0	2,086	100%

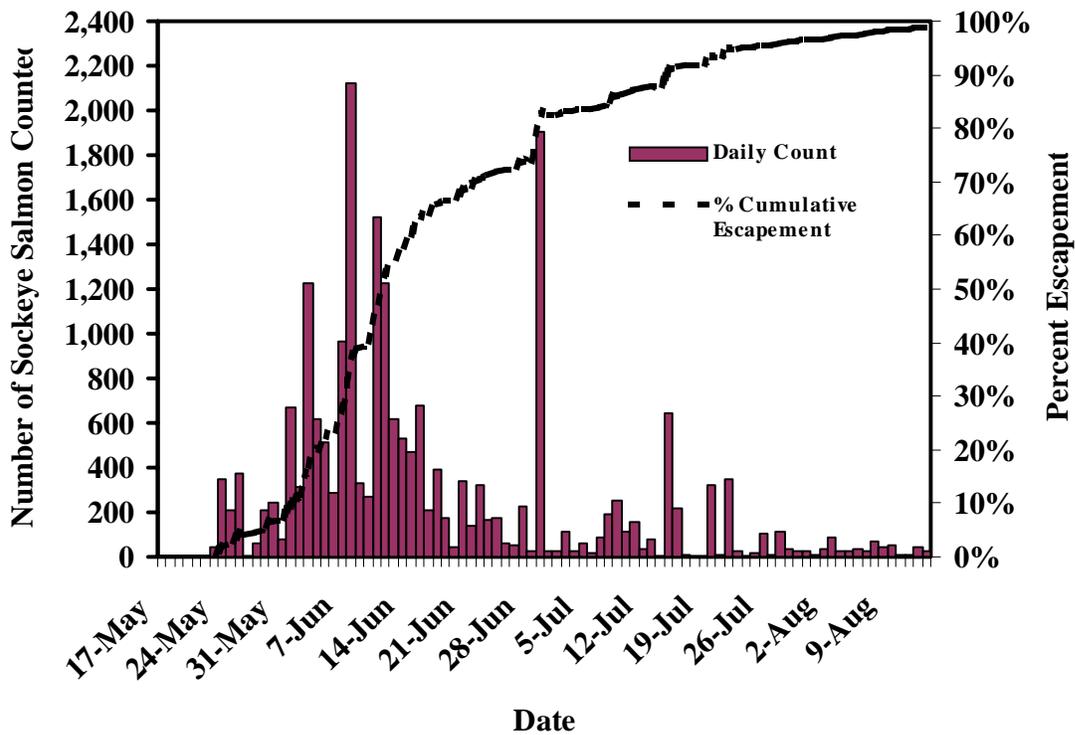


Figure 3.-Buskin River daily and cumulative sockeye salmon escapement, 2004.

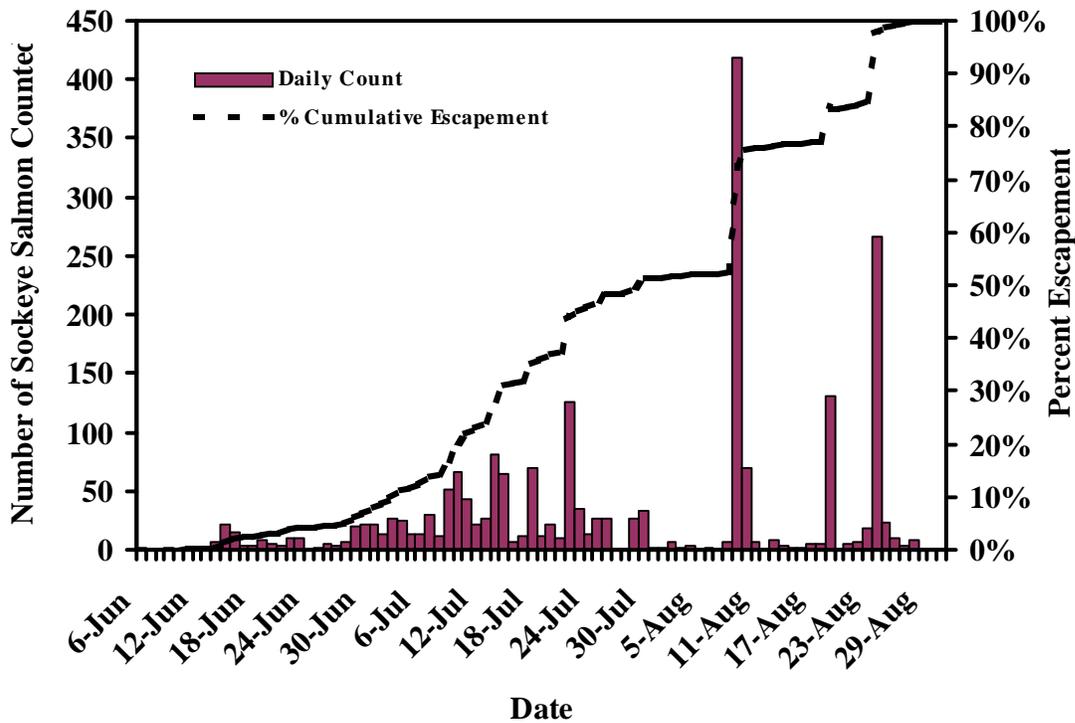


Figure 4.-Lake Louise daily and cumulative sockeye salmon escapement, 2002.

DISCUSSION

The 2004 escapement of sockeye salmon into the Buskin River was the second highest on record since weir operations began in 1985. The 2003 subsistence harvest of more than 10,000 fish is indicative of the recent trend of substantially increased activity in this fishery. Information obtained from the stock assessment project through 2003 has been used to complete an initial analysis for evaluation of the sockeye salmon BEG, the results of which are presented in Schmidt et al. *in prep*. Data results from the 2004 project, including escapements, subsistence harvests and corresponding age composition estimates will be used along with sport and commercial harvest data to refine this analysis through expanded development of a sockeye salmon brood table.

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APPENDIX A. SUPPORTING DATA

Appendix A1.-Estimated age composition of Buskin River sockeye salmon escapement, 2004.

Run Component	Age								Total
	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	
<u>Males</u>									
Sample Proportion	0.00	0.04	0.15	0.00	0.01	0.12	0.18	0.00	0.51
SE	0.0000	0.0091	0.0172	0.0000	0.0056	0.0156	0.0186	0.0033	0.0241
Estimated Run	0	814	3,306	0	305	2,645	4,018	102	11,190
SE	0	7	57	0	2	41	75	0	269
<u>Females</u>									
Sample Proportion	0.00	0.05	0.12	0.00	0.00	0.16	0.15	0.00	0.49
SE	0.000	0.011	0.016	0.002	0.002	0.018	0.017	0.003	0.024
Estimated Run	0	1,119	2,696	51	51	3,459	3,357	102	10,833
SE	0	12	43	0	0	61	58	0	261
<u>Total</u>									
Sample Proportion	0.0	0.09	0.27	0.00	0.02	0.28	0.33	0.01	1.00
SE	0.000	0.014	0.021	0.002	0.006	0.022	0.023	0.005	
Estimated Run	0	1,933	6,002	51	356	6,103	7,375	203	22,023
SE	0	26	129	0	2	131	167	1	

Appendix A2.-Estimated age composition of Lake Louise sockeye salmon escapement, 2004.

Run Component	Age									Total
	0.3	1.1	1.2	2.1	1.3	2.2	1.4	2.3	2.4	
<u>Males</u>										
Sample Proportion	0	0.02	0.18	0.02	0.14	0.06	0.002	0.06	0.004	0.49
SE	0.000	0.007	0.018	0.006	0.016	0.011	0.002	0.011	0.003	0.023
Estimated Run	0	45	382	36	301	128	5	123	9	1,029
SE	0	<1	7	<1	5	1	<1	1	<1	24
<u>Females</u>										
Sample Proportion	0.0022	0.002	0.19	0.00	0.21	0.04	0.01	0.05	0.00	0.51
SE	0.0022	0.002	0.018	0.000	0.019	0.010	0.004	0.010	0.000	0.023
Estimated Run	5	5	401	0	437	91	14	105	0	1,057
SE	<1	<1	7	0	8	1	<1	1	0	25
<u>Total</u>										
Sample Proportion	0.002	0.02	0.38	0.02	0.35	0.10	0.01	0.11	0.00	1.00
SE	0.0022	0.007	0.023	0.006	0.022	0.014	0.004	0.015	0.003	
Estimated Run	5	50	783	36	738	219	19	228	9	2,086
SE	<1	<1	18	<1	17	3	<1	3	<1	

Appendix A3.-Estimated sample age composition of Buskin River sockeye salmon subsistence harvest, 2004.

Run Component	Age									Total
	0.3	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	
<u>Males</u>										
Number Sampled	0	0	7	35	0	0	10	50	1	103
Sample Proportion	0.00	0.00	0.04	0.18	0.00	0.00	0.05	0.26	0.01	0.53
SE	0.000	0.000	0.013	0.027	0.000	0.000	0.016	0.031	0.005	0.036
<u>Females</u>										
Number Sampled	1	0	1	50	2	0	3	35	1	93
Sample Proportion	0.01	0.00	0.01	0.26	0.01	0.00	0.02	0.18	0.01	0.47
SE	0.005	0.0000	0.0051	0.0312	0.0072	0.0000	0.0088	0.0274	0.0051	0.0358
<u>Total</u>										
Number Sampled	1	0	8	85	2	0	13	85	2	196
Sample Proportion	0.00	0.00	0.04	0.43	0.01	0.00	0.07	0.43	0.01	1.00
SE	0.005	0.000	0.014	0.035	0.007	0.000	0.018	0.035	0.007	