

Fishery Data Series No. 99-16

**Harvest Estimate for the Gastineau Hatchery
Roadside Sport Fishery in Juneau, Alaska
During 1998**

by

Brian J. Frenette

August 1999

Alaska Department of Fish and Game

Division of Sport Fish



Symbols and Abbreviations

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Weights and measures (metric)		General		Mathematics, statistics, fisheries	
centimeter	cm	All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis	H_A
deciliter	dL	All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
gram	g	and	&	catch per unit effort	CPUE
hectare	ha	at	@	coefficient of variation	CV
kilogram	kg	Compass directions:		common test statistics	F, t, χ^2 , etc.
kilometer	km	east	E	confidence interval	C.I.
liter	L	north	N	correlation coefficient	R (multiple)
meter	m	south	S	correlation coefficient	r (simple)
metric ton	mt	west	W	covariance	cov
milliliter	ml	Copyright	©	degree (angular or temperature)	°
millimeter	mm	Corporate suffixes:		degrees of freedom	df
Weights and measures (English)		Company	Co.	divided by	÷ or / (in equations)
cubic feet per second	ft ³ /s	Corporation	Corp.	equals	=
foot	ft	Incorporated	Inc.	expected value	E
gallon	gal	Limited	Ltd.	fork length	FL
inch	in	et alii (and other people)	et al.	greater than	>
mile	mi	et cetera (and so forth)	etc.	greater than or equal to	≥
ounce	oz	exempli gratia (for example)	e.g.,	harvest per unit effort	HPUE
pound	lb	id est (that is)	i.e.,	less than	<
quart	qt	latitude or longitude	lat. or long.	less than or equal to	≤
yard	yd	monetary symbols (U.S.)	\$, ¢	logarithm (natural)	ln
Spell out acre and ton.		months (tables and figures): first three letters	Jan,...,Dec	logarithm (base 10)	log
Time and temperature		number (before a number)	# (e.g., #10)	logarithm (specify base)	log ₂ , etc.
day	d	pounds (after a number)	# (e.g., 10#)	mideye-to-fork	MEF
degrees Celsius	°C	registered trademark	®	minute (angular)	'
degrees Fahrenheit	°F	trademark	™	multiplied by	x
hour (spell out for 24-hour clock)	h	United States (adjective)	U.S.	not significant	NS
minute	min	United States of America (noun)	USA	null hypothesis	H_0
second	s	U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	percent	%
Spell out year, month, and week.				probability	P
Physics and chemistry				probability of a type I error (rejection of the null hypothesis when true)	α
all atomic symbols				probability of a type II error (acceptance of the null hypothesis when false)	β
alternating current	AC			second (angular)	"
ampere	A			standard deviation	SD
calorie	cal			standard error	SE
direct current	DC			standard length	SL
hertz	Hz			total length	TL
horsepower	hp			variance	Var
hydrogen ion activity	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

FISHERY DATA SERIES NO. 99-16

**HARVEST ESTIMATE FOR THE GASTINEAU HATCHERY ROADSIDE
SPORT FISHERY IN JUNEAU, ALASKA DURING 1998**

by

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ABSTRACT

Angler effort and sport harvests of chinook salmon *Oncorhynchus tshawytscha*, coho salmon *Oncorhynchus kisutch*, chum salmon *Oncorhynchus keta*, and pink salmon *Oncorhynchus gorbuscha* were estimated at Gastineau Hatchery from 8 June to 27 September 1998. An estimated 28,272 (SE = 701) angler-hours were expended to harvest a total of 471 (SE = 63) large chinook salmon at least 28 inches (71 cm) in total length, 86 (SE = 20) small chinook salmon (<28 inches in length), 11,722 (SE = 937) large coho salmon at least 16 inches (41 cm) in length, 1,187 (SE = 204) small coho salmon (<16 inches in length), 2,376 (SE = 280) chum salmon, and 5,653 (SE = 414) pink salmon.

Key words: creel survey, roadside, angler effort and harvest, sport fishery, hatchery, chinook salmon, *Oncorhynchus tshawytscha*, coho salmon, *Oncorhynchus kisutch*, chum salmon, *Oncorhynchus keta*, pink salmon, *Oncorhynchus gorbuscha*, Juneau, Gastineau Hatchery, Southeast Alaska.

INTRODUCTION

Roadside sport fisheries in marine waters near Juneau, Alaska offer unique fishing opportunities for both Alaskan residents and tourists visiting the area. During 1997, anglers spent an estimated 29,361 angler-days of shoreline saltwater fishing participation on the Juneau roadside (Howe et al. 1998). This represents 55% of the total marine shoreline roadside participation (53,391 angler-days) in Southeast Alaska and 24% of the total marine participation (123,990 angler-days) in the entire Juneau area during 1997. Demand for shoreline fishing opportunities on the Juneau roadside is increasing, as about 40% of the population of Southeast Alaska resided in the Juneau Borough in 1997, according to the 1997 State of Alaska census. The area is also visited each summer by more than 400,000 tourists (McDowell Group 1994).

The Gastineau Hatchery, located about 3 miles north of Juneau (Figure 1), is a popular destination for tourists and residents alike: over 120,000 paying customers toured the facility during the 1998 season, an increase of more than 2% over the previous year (Rick Focht, Gastineau Hatchery operations manager, Juneau, personal communication). The hatchery is owned and operated by Douglas Island Pink and Chum, Inc. (DIPAC), a private non-profit corporation.

Although sport harvests for the entire Juneau road system are estimated through use of the Statewide Harvest Postal Survey (SWHS)

questionnaires mailed annually to a sample of sport anglers (Howe et al. 1998), an onsite creel survey was used to obtain detailed information on the sport fishery for terminal runs of chinook, coho, chum, and pink salmon back to Gastineau Hatchery. The sport fishery at the hatchery targets chinook, pink, and chum salmon from mid-June through August, and coho salmon in mid-August through late September or early October.

In 1991, DIPAC hatchery, in cooperation with the Alaska Department of Fish and Game (ADF&G) (through the Sport Fish Partnership Program), installed a floating dock to increase access for roadside anglers. Salmon enhancement efforts at Gastineau and nearby Sheep Creek hatcheries (Figure 1) have been extensive (Table 1), including releases of chinook and coho salmon—the two species of salmon most preferred by anglers in Southeast Alaska (Jones & Stokes 1991).

Since 1993, ADF&G staff have assisted the Gastineau Hatchery in developing an onsite creel survey program to estimate sport harvests at the site. Hatchery personnel conducted the survey, while ADF&G provided technical planning and analyzed the data to estimate effort and harvest.

In 1997, an estimated 931 (SE = 123) large ($\geq 28''$) chinook salmon, 3,507 (SE = 436) large ($\geq 16''$) coho salmon, 1,605 (SE 235) chum salmon, and 2,878 (SE = 297) pink salmon were harvested between 16 June and 5 October (Frenette 1998).

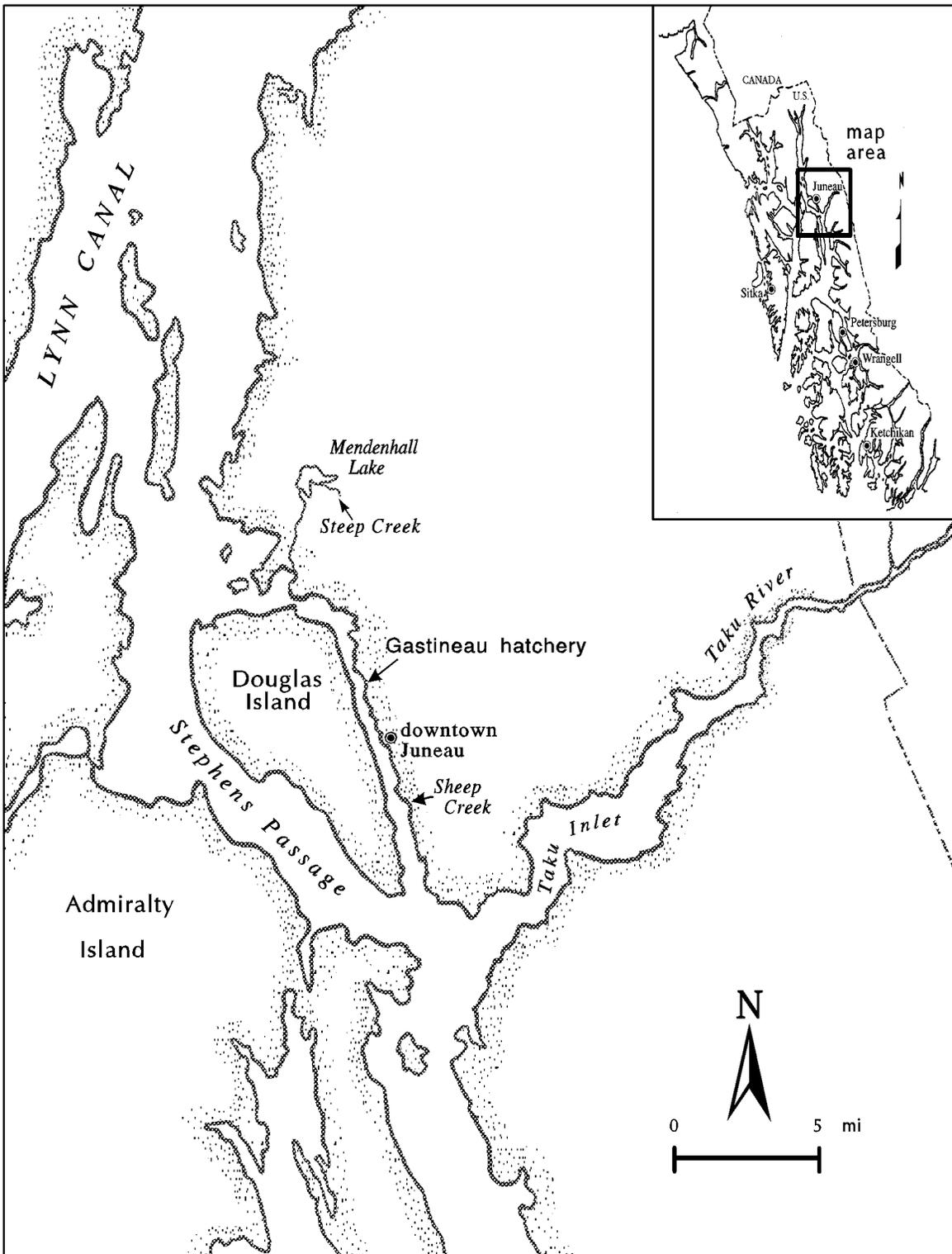


Figure 1. –Location of the Gastineau Hatchery roadside sport fishery, northern Southeast Alaska.

Table 1.—Summary of hatchery-reared salmon smolt releases (in thousands) at Sheep Creek and Gastineau Hatchery since 1991. All fish were reared at Gastineau or Sheep Creek hatcheries except as noted.

Year	Release site	Pink salmon	Chum salmon	Chinook salmon	Coho salmon
1991	Sheep Creek	16,258	37,874	101 ^a	505
	Gastineau Hatchery	14,846	11,327	44	508
1992	Sheep Creek	31,636	26,586	0	583
	Gastineau Hatchery	15,420	11,959	192	393
1993	Sheep Creek	32,660	27,002	0	562
	Gastineau Hatchery	15,769	11,891	208	478
1994	Sheep Creek	0	14,635	0	563
	Gastineau Hatchery	8,663	5,870	257	380
1995	Sheep Creek	0	44,674	29	611
	Gastineau Hatchery	8,540	11,825	159	422
1996	Sheep Creek	0	41,240	35	511
	Gastineau Hatchery	8,750	11,474	64	348
1997	Sheep Creek	0	36,700	45	576
	Gastineau Hatchery	5,901	12,168	172	426
1998	Sheep Creek ^b	0	0	0	0
	Gastineau Hatchery	8,709	24,247	212	824

^a Reared at Snettisham Hatchery.

^b Sheep Creek was discontinued as a smolt release site in 1998.

Sport harvests of chinook salmon in Southeast Alaska are limited by the King Salmon Management Plan that also requires estimates of contributions from hatchery chinook salmon stocks in addition to harvests from all other sources. In 1994, ADF&G entered into an agreement with the Gastineau Hatchery to rear chinook salmon for release at several sites in the Juneau area, including waters around the hatchery. The onsite creel survey provides information to properly evaluate the hatchery as a release site and terminal harvest area. In 1998, hatchery and ADF&G staff again cooperated to conduct the survey.

OBJECTIVE

The objective of the 1998 Gastineau Hatchery roadside creel survey was to estimate effort and harvests of pink, chum, coho, and chinook salmon from 8 June through 27 September, such

that estimates were within specified values 95% of the time: $\pm 10\%$ for angler-hours of effort, and $\pm 25\%$ for coho, chinook, pink, and chum salmon harvests.

METHODS

There are two survey sites: a non-snagging zone and a snagging zone. The non-snagging zone includes a 100-ft floating dock and 150 ft of beach adjacent to the dock, while the snagging zone is the remaining 100 yd of beach extending from the non-snagging zone boundary to a private barge landing to the north. Both locations are clearly marked and hatchery personnel enforce fishing rules. Both sites are discrete in shape and size, and easily surveyed.

A stratified, two-stage roving creel survey based on expansion of sample ratios was used to estimate fishing effort and harvest from 8 June to 27 September 1998. Days were primary sampling

units, and anglers within days were secondary sampling units. Two sites (snagging and non-snagging zones), 16 weekly (7-day) strata, and weekday versus weekend-holiday stratification were maintained¹. Therefore, there were 64 discrete temporal/spatial strata.

The sampling day was defined as beginning at early civil twilight or 0600 hours (whichever was later), and ended at late civil twilight, as computed for the midday of the sample week. This accounted for changes in the length of available daylight between June and September, and most angling at the site was expected to occur between those daylight hours. During each sampling day, anglers were counted six times within each site (snagging and non-snagging). The first count was randomly selected from the midpoint of the first, second, or last third of the first one-sixth of each sampling day. Subsequent counts occurred at intervals equal to one-sixth the length of each sampling day.

When not counting anglers, survey personnel interviewed anglers completing their trip without regard to angler success (angler harvest). Interviews were conducted during one-hour periods that alternated between sites (non-snagging or snagging). The site to start interviews in each stratum was selected at random, and alternated each day sampled.

During each interview, anglers were asked to report their effort and harvest at the site being sampled. In addition, technicians recorded the age class (child—under 16 years of age, adult—16 to 60 years, or senior—over the age of 60) and the residency (Alaska resident or non-resident) of the angler being interviewed. As many completed-trip interviews as possible were obtained during each day selected for sampling. Since hatchery technicians had other assigned duties, interviews were not conducted at some times during the day; however, sampling of anglers exiting the survey area was thought to occur roughly in proportion to the number exiting the site at different times of the day when sampling was not being conducted.

¹ Weekdays = Mondays–Fridays.
Weekend/holidays = Saturdays, Sundays, Independence Day (4 July), and Labor Day (7 September).

Effort was estimated by multiplying the average angler count for the day for each location by the hours available for sampling each day. The harvest per unit effort (HPUE) for each fish species was estimated from completed-trip interviews. The estimated harvest was obtained from the product of the effort and HPUE estimates.

Angler effort and harvest by species along with associated variances and standard errors were calculated by the following procedures.

The harvest in each stratum (and within each specific class) was estimated by:

$$\hat{H}_h = D_h * \bar{H}_h \quad (1)$$

$$\bar{H}_h = \frac{\sum_{i=1}^{d_h} \hat{H}_{hi}}{d_h} \quad (2)$$

where \hat{H}_{hi} is the estimated harvest in day i stratum h , d_h is the number of days sampled in stratum h , and D_h is the total number of days in stratum h .

The variance of the harvest in each stratum (and within each specific class) was estimated by:

$$v[\hat{H}_h] = (1 - f_h) D_h^2 \frac{\sum_{i=1}^{d_h} (\hat{H}_{hi} - \bar{H}_h)^2}{d_h (d_h - 1)} + f_h^{-1} \sum_{i=1}^{d_h} \hat{v}[\hat{H}_{hi}] \quad (3)$$

where $f_h = d_h / D_h$.

Harvest for each sampling day was estimated by:

$$\hat{H}_{hi} = \hat{E}_{hi} \overline{HPUE}_{hi}^* \quad (4)$$

where \overline{HPUE}_{hi}^* is the jackknife estimate of mean HPUE during stratum h day i , and \hat{E}_{hi} is the fishing effort in angler-hours during the same time.

Angler effort in each day was estimated by:

$$\hat{E}_{hi} = T_h \bar{X}_{hi} \quad (5)$$

where T_h is the number of hours in a sampling day and \bar{X}_{hi} is the average number of anglers counted in day i stratum h . If $\bar{X}_{hi} = 0$ and anglers were interviewed, then \hat{H}_{hi} in equation (4) was set equal to the observed harvest. In contrast, if $\bar{X}_{hi} > 0$ and no anglers were interviewed, then \overline{HPUE}_{hi}^* in equation (4) was set equal to the mean \overline{HPUE}_{hi}^* for the stratum.

The variance of E_{hi} was estimated by the method of Wolter (1985):

$$v[\hat{E}_{hi}] = T_h^2 \frac{\sum_{j=2}^{r_{hi}} (X_{hij} - X_{hi(j-1)})^2}{2 * r_{hi} (r_{hi} - 1)} \quad (6)$$

where r_{hi} is the number of times anglers were counted in day i .

The variance of the harvest H_{hij} in a period was estimated by the method of Goodman (1960):

$$v[\hat{H}_{hi}] = v[\hat{E}_{hi}] \overline{HPUE}_{hi}^{*2} + v[\overline{HPUE}_{hi}^*] \hat{E}_{hi}^2 - v[\hat{E}_{hi}] v[\overline{HPUE}_{hi}^*] \quad (7)$$

The \overline{HPUE}_{hi}^* and its variance were calculated according to procedures in Efron (1982). The inherent correctable bias of m_{hi}^2 (the number of interviews in a sampling period) of jackknife estimates were removed according to the procedure in Efron (1982, p. 6).

Harvest and effort (and their variances) for the entire season were the sums of the estimates for each strata. Relative precision (RP) of the estimates for the 95% level of precision was calculated as:

$$\left[\frac{(SE * 1.96)}{\hat{N}} \right] * 100 \quad (8)$$

where SE is the square root of the sums of all the variances of each stratum estimate for $[\hat{H}_{hi}]$ and $[\hat{E}_{hi}]$ stated in equations (6) and (7), respectively, over the sampling season.

RESULTS

Detailed sampling information, including angler counts and numbers of completed interviews for overall estimates, is presented in Appendix A1.

Appendix A2 contains a listing of the final data sets used for the analysis.

During the 1998 fishing season at Gastineau Hatchery, 3,404 interviews were conducted and nearly 8,000 anglers counted.

Effort for pink, chum, coho, and chinook salmon totaled 28,272 (SE = 701, RP = 5%) angler-hours, with the highest levels of effort expended during the coho salmon fishery (Table 2).

The relative precision of effort and harvest estimates for chinook, coho, chum and pink salmon were within or near those specified values stated in the objective. An estimated 11,722 (SE = 937, RP = 16%) large coho at least 16 inches (41 cm) in length, 2,376 (SE = 280, RP = 23%) chum, 5,653 (SE = 414, RP = 14%) pink, and 471 (SE = 63, RP = 26%) large chinook salmon at least 28 inches (71 cm) in length were harvested at Gastineau Hatchery from 8 June to 27 September. In addition, 86 (SE = 20) small chinook salmon <28 inches (71 cm) and 1,187 (SE = 204) small coho salmon <16 inches (41 cm) in length were harvested.

Anglers harvested most chinook salmon from mid-June through July, although small numbers were taken through the first week in September. Most of the chum salmon harvest occurred in July and August, whereas most of the pink salmon harvest took place in August. Harvests of large coho salmon ($\geq 16''$) began in early August, and were strong from late August through the end of the survey in late September.

Residency and age class data were collected at the time of interview by creel technicians allowed for class specific estimates of effort and harvest.

Table 2.—Summary of estimated weekly angler effort and harvest of large ($\geq 16''$) coho, small ($< 16''$) coho, large ($\geq 28''$) chinook, small ($< 28''$) chinook, chum, and pink salmon at the Gastineau Hatchery roadside fishery in 1998.

Weekly period	Angler effort		Large ($\geq 16''$) coho salmon		Small ($< 16''$) coho salmon		Large ($\geq 28''$) chinook salmon		Small ($< 28''$) chinook salmon		Chum salmon		Pink salmon	
	Hours	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a
6/08-6/14	306	66	0	0	0	0	3	3	0	0	0	0	0	0
6/15-6/21	614	82	0	0	0	0	11	7	0	0	0	0	0	0
6/22-6/28	1,598	210	0	0	0	0	100	34	15	9	127	60	0	0
6/29-7/05	1,484	156	0	0	0	0	37	13	12	8	37	23	3	3
7/06-7/12	2,068	187	0	0	0	0	132	39	23	10	291	55	39	15
7/13-7/19	1,510	104	0	0	0	0	62	21	8	5	398	153	124	40
7/20-7/26	2,117	275	0	0	0	0	48	16	18	11	457	96	116	29
7/27-8/02	1,774	117	0	0	0	0	15	10	0	0	207	68	246	50
8/03-8/09	1,611	175	6	4	3	3	15	7	2	2	114	30	979	139
8/10-8/16	2,230	210	86	23	24	13	37	14	8	5	583	162	1,728	227
8/17-8/23	2,593	240	399	116	3	3	0	0	0	0	149	81	2,032	297
8/24-8/30	1,943	199	881	112	0	0	8	5	0	0	0	0	327	80
8/31-9/06	2,660	193	2,920	303	25	12	3	3	0	0	13	13	59	28
9/07-9/13	2,324	163	3,183	735	141	41	0	0	0	0	0	0	0	0
9/14-9/20	2,374	183	3,210	450	688	172	0	0	0	0	0	0	0	0
9/21-9/27	1,066	86	1,037	130	303	101	0	0	0	0	0	0	0	0
Total	28,272	701	11,722	937	1,187	204	471	63	86	20	2,376	280	5,653	414

^a Standard error of effort or harvest estimate.

Class specific estimates of effort and harvest showed that Alaska residents accounted for 74% of the effort, and 82% of the chinook, 83% of both the large and small coho, 72% of the chum, and 71% of the pink salmon harvested (Table 3).

Age class specific estimates showed that adults accounted for about 61% of the effort, and 80% of the chinook, 79% of the large coho, 48% of the small coho, 82% of the chum, and 66% of the pink salmon harvests (Table 4). Children accounted for 30% of the effort, and 11% each of the chinook, large coho, and chum salmon, 24% of the small coho, and 25% of the pink salmon harvests. Seniors accounted for only 9% of the effort, and 10% of the large chinook and coho, 28% of the small coho, 7% of the chum, and 9% of the pink salmon harvests.

DISCUSSION

The 1998 sport fishing season at Gastineau Hatchery marked high points in history at the site in a number of ways. Effort at the site was the highest on record at 40% above the prior 5-year average and 26% over the prior year (Table 5). The substantial increase in effort accounted for a sizeable increase in the harvest of coho salmon since the bulk of the increased angler effort occurred during that fishery. The chinook salmon harvest declined from 1997 nearly 50%, but was still 19% above the 5-year average and the third

highest on record. Coho salmon returns to Gastineau Hatchery were very strong in 1998, resulting in a record harvest of nearly 12,000 fish. The coho harvest was nearly 3.5 times larger than that in 1997 (when weak returns were characteristic of the Southeast region), and nearly 2 times larger than the last record harvest in 1993. Chum salmon harvests were also a bit above the highest on record, and were up nearly 50% from both the 1997 and 5-year average harvests. Pink salmon harvests during 1998 were the second highest on record at the site; nearly 2 times greater than that of 1997, and over 1.5 times higher than the 5-year.

Residency information collected during 1998 indicated that the vast majority of use at the site is by resident anglers. How numbers compare to prior years is not known since 1998 was the first year this type of information was recorded.

Harvest estimates from the onsite survey and the SWHS have been compared for 1994 to 1997 (Table 6). Estimates were considered to be different if 95% confidence levels did not overlap. Chinook salmon estimates were not used in the comparison because starting dates for the onsite survey resulted in the early portion of the chinook fishery being missed. The SWHS estimates have often underestimated the harvests taking place at Gastineau Hatchery, and that trend was apparent once again in 1997. Angler

Table 3.—Effort and harvest estimates by residency of small (<16”) coho, large (≥16”) coho, large (≥28”) chinook, chum, and pink salmon at the Gastineau Hatchery roadside fishery in 1998.

Residency	Angler effort		Small (<16”) coho salmon		Large (≥16”) coho salmon		Large (≥28”) chinook salmon		Chum salmon		Pink salmon	
	Hours	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a
Resident	21,011	562	982	178	9,722	890	388	58	1,721	222	4,004	365
Nonresident	7,257	370	206	61	1,999	262	83	20	655	148	1,649	190
Total ^b	28,268	673	1,188	189	11,721	928	471	61	2,376	267	5,653	412

^a Standard error of the effort and harvest estimates.

^b Totals for hours and harvests may differ slightly from overall estimates because of rounding error. Totals for standard errors will not equal the overall estimate standard errors because they are not independent estimates across angler types.

Table 4.—Effort and harvest estimates by age class of small (<16”) coho, large (≥16”) coho, large (≥28”) chinook, chum, and pink salmon at the Gastineau Hatchery roadside fishery in 1998.

Age class	Angler effort		Small (<16”) coho salmon		Large (≥16”) coho salmon		Large (≥28”) chinook salmon		Chum salmon		Pink salmon	
	Hours	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a
Adult	17,364	502	570	110	9,243	838	376	59	1,945	265	3,752	329
Child	8,387	398	286	94	1,270	166	50	17	259	61	1,418	92
Senior	2,516	199	332	85	1,209	206	45	19	172	43	483	111
Total ^b	28,267	671	1,188	168	11,722	879	471	65	2,376	276	5,653	359

^a Standard error of the effort and harvest estimates.

^b Totals for hours and harvests may differ slightly from overall estimates because of rounding error. Totals for standard errors will not equal the overall estimate standard errors because they are not independent estimates across angler types.

age class data collected in 1998 will be used to analyze these differences in 1999 when the SWHS results become available and will be presented in the 1999 Gastineau Hatchery report.

Age class information collected in 1998 may prove useful when comparing the onsite estimates to the estimates in the SWHS since estimate comparisons for the various species have often been different. For example, harvests by children should be accounted for in the SWHS estimate by the head of household—but only if another member of the child's household had purchased a fishing license. One of our prior assumptions was that when large numbers of jack coho, pink, and chum salmon congregate near terminal sites they are relatively easy to catch and thereby harvested in large numbers by children. In 1998, we were able to determine that children accounted for almost 25% each of the small coho salmon (<16 inches), and pink salmon harvested—a number of which may not be reported in the SWHS. This assumption will be further investigated with the use of 1998 class specific estimates when 1998 SWHS estimates become available.

It is possible that anglers harvesting large numbers of pink or other “less desirable” species of salmon have poor recall when completing the postal survey and therefore underestimate the total number of fish they actually harvested. For some anglers, the harvest of small coho (<16 inches), pink and chum salmon may not be

significant or important compared to harvesting a large coho or chinook salmon.

CONCLUSIONS AND RECOMMENDATIONS

As the highest-use roadside sport fishery in the Juneau area, Gastineau Hatchery plays an important role in providing fishing opportunities to urban anglers and tourists who may not have the time or economic resources to participate in remote roadside or marine boat fisheries. Also, pressure on local wild stocks of salmon on the Juneau road system by local roadside anglers is likely lessened due to opportunities provided at the hatchery. Documentation of class specific harvests at the site through onsite creel surveys can be used to supplement harvest and effort information for the Juneau area provided by the SWHS.

Results of the 1998 creel survey show that roadside anglers again benefited from enhancement efforts at Gastineau Hatchery. Marine boat anglers in the Juneau area also benefited greatly from these enhancement activities: an additional 1,050 (SE = 151) chinook salmon and 3,267 (SE = 346) coho salmon reared at Gastineau Hatchery (Hubartt et al. *In prep.*) were taken in 1998 by marine boat anglers. Also, 53% of the chinook salmon and 28% of the coho salmon harvested during the 1998 Juneau Golden North Salmon

Table 5.—Summary of estimated angler effort and harvest of large coho, large chinook, chum, and pink salmon from onsite creel surveys at the Gastineau Hatchery roadside fishery in 1990 and 1993–1998.

Year (survey period)	Angler-hours	SE ^a	Large (≥16") coho salmon		Large (≥28") chinook salmon		Chum salmon		Pink salmon	
			Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a	Harvest	SE ^a
1990 (5 May–11 Nov) ^b	5,207	477	69	35	0	—	118	45	4,225	961
1993 (5 Jul–17 Oct) ^c	15,825	584	7,057 ^d	520	118 ^d	34	1,515	310	713	95
1994 (4 Jul–9 Oct) ^e	24,192	905	3,509	317	70	17	593	66	9,197	560
1995 (3 Jul–25 Sep) ^f	21,546	555	2,212	303	157	36	2,047	254	3,421	250
1996 (21 Jun–23 Sep) ^g	19,189	555	2,860	285	695	73	2,274	250	1,039	135
1997 (16 Jun–5 Oct) ^h	22,385	654	3,507	436	931	123	1,605	235	2,878	297
1998 (8 Jun–27 Sep)	28,273	701	11,722	937	471	63	2,376	280	5,653	414

^a Standard error (SE) of effort and harvest.

^e Estimates from Beers (1995).

^b Estimates from Suchanek and Bingham (1991).

^f Estimates from Beers (1996).

^c Estimates from Beers and Marshall (1994).

^g Estimates from Beers (1997).

^d Includes both large and small fish.

^h Estimates from Frenette (1998).

Table 6.—Comparison of Alaska statewide postal survey and onsite creel survey harvest estimates for the Gastineau Hatchery roadside sport fishery during 1994–1997. Statistics in bold have confidence levels which do not overlap.

Year	Survey type	Coho salmon ^a	95% CI	Pink salmon	95% CI	Chum salmon	95% CI
1994	Onsite ^b	3,520	2,899–4,141	9,197	8,099–10,295	593	464–722
	Statewide ^c	2,935	1,665–4,414	3,227	1,875–4,745	413	117–812
1995	Onsite ^d	2,634	2,007–3,261	3,421	2,931–3,911	2,047	1,549–2,545
	Statewide ^e	1,721	718–3,259	1,115	636–1,708	790	477–1,159
1996	Onsite ^f	3,625	3,010–4,240	1,039	774–1,304	2,274	1,784–2,764
	Statewide ^g	1,272	604–2,006	272	86–518	536	286–845
1997	Onsite ^h	5,108	4,087–6,129	2,878	2,296–3,460	1,605	1,144–2,066
	Statewide ⁱ	2,072	1,238–3,116	1,897	1,171–2,745	807	421–1,318

^a Combined large (≥16") and small (<16") coho salmon.

^f Beers (1997).

^b Beers (1995).

^g Howe et al. (1997).

^c Howe et al. (1995).

^h Frenette (1998).

^d Beers (1996).

ⁱ Howe et al. (1998).

^e Howe et al. (1996).

Derby in late August were of Gastineau Hatchery origin.

The success and continuation of the Gastineau Hatchery coho, pink, and chum salmon fisheries is directly tied to the hatchery's ability to meet production goals. Chinook salmon enhancement at the facility is accomplished through a cooperative agreement with ADF&G; therefore, continued monitoring of harvests at the site will help to evaluate the success of both these programs.

The goal set forth in the operational plan was achieved during the 1998 sampling season. Gastineau Hatchery creel survey staff proved to be effective in collecting as many completed trip interviews as possible with an 80% increase over the prior year. This contributed greatly to the final results of this project.

In recent years, chinook returns at the site have generated higher levels of effort earlier in the survey. Even though the survey was started one week earlier in 1998, there was little gained from earlier sampling to justify its cost. Although sampling was scheduled to continue until 11 October, it was discontinued after 27 September because of a drop in observed fishing effort and poor weather. Harvests did appear to be dropping off, but not to a point that would have indicated the coho run was at an end. Therefore, it is suggested that 1999 sampling exclude the early start in June (actual startup date would be June 14), and continue until the first or second week in October of 1999 (contingent upon funding, returns of coho salmon, and observed participation at the site).

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APPENDIX A

Appendix A1.–Summary of sampling results by date at Gastineau Hatchery in 1998.

Week	Stratum ^a	Date	Site	ANGLER COUNTS			INTERVIEW SAMPLING INFORMATION							
				No.	Mean	SD	No.	Effort	Large	Small	Large	Small	Pink	Chum
									chinook	chinook	coho	coho		
harvest	harvest	harvest	harvest	harvest	harvest									
6/8-6/14	WD	08Jun	NONSNAG	6	1.33	2.16	9	16.00	0	0	0	0	0	0
6/8-6/14	WD	08Jun	SNAGGING	6	0.83	2.04	2	2.50	0	0	0	0	0	0
6/8-6/14	WD	09Jun	NONSNAG	6	2.50	2.88	21	36.25	0	0	0	0	0	0
6/8-6/14	WD	09Jun	SNAGGING	6	0.67	1.63	0	0.00	0	0	0	0	0	0
6/8-6/14	WD	12Jun	NONSNAG	6	1.50	1.76	13	15.75	0	0	0	0	0	0
6/8-6/14	WD	12Jun	SNAGGING	6	0.17	0.41	2	2.25	0	0	0	0	0	0
6/8-6/14	WE/H	13Jun	NONSNAG	5	3.20	4.55	22	24.00	0	0	0	0	0	0
6/8-6/14	WE/H	13Jun	SNAGGING	5	0.00	0.00	0	0.00	0	0	0	0	0	0
6/8-6/14	WE/H	14Jun	NONSNAG	6	2.50	2.43	8	14.50	1	0	0	0	0	0
6/8-6/14	WE/H	14Jun	SNAGGING	6	0.33	0.82	2	1.50	0	0	0	0	0	0
6/15-6/21	WD	15Jun	NONSNAG	6	3.00	2.76	25	45.25	0	0	0	0	0	0
6/15-6/21	WD	15Jun	SNAGGING	6	0.33	0.52	1	1.00	0	0	0	0	0	0
6/15-6/21	WD	16Jun	NONSNAG	6	2.83	3.76	26	46.50	0	0	0	0	0	0
6/15-6/21	WD	16Jun	SNAGGING	6	1.17	1.60	3	4.00	0	0	0	0	0	0
6/15-6/21	WD	18Jun	NONSNAG	6	5.67	2.58	20	27.75	1	0	0	0	0	0
6/15-6/21	WD	18Jun	SNAGGING	6	0.33	0.82	5	9.00	1	0	0	0	0	0
6/15-6/21	WE/H	20Jun	NONSNAG	4	7.00	4.69	19	32.00	0	0	0	0	0	0
6/15-6/21	WE/H	20Jun	SNAGGING	4	1.75	2.22	1	1.00	0	0	0	0	0	0
6/15-6/21	WE/H	21Jun	NONSNAG	6	3.67	3.01	23	35.50	2	0	0	0	0	0
6/15-6/21	WE/H	21Jun	SNAGGING	6	0.67	1.21	9	11.50	1	0	0	0	0	0
6/22-6/28	WD	22Jun	NONSNAG	6	5.17	5.78	22	28.75	1	0	0	0	0	0
6/22-6/28	WD	22Jun	SNAGGING	6	2.50	2.43	11	38.00	1	0	0	0	0	0
6/22-6/28	WD	24Jun	NONSNAG	5	8.00	7.00	18	45.00	2	0	0	0	0	0
6/22-6/28	WD	24Jun	SNAGGING	5	6.20	5.07	10	24.50	0	0	0	0	0	2
6/22-6/28	WD	26Jun	NONSNAG	6	10.17	9.22	20	71.50	5	2	0	0	0	2
6/22-6/28	WD	26Jun	SNAGGING	6	5.17	6.52	8	12.00	3	0	0	0	0	6
6/22-6/28	WE/H	27Jun	NONSNAG	6	9.17	15.8	30	94.25	1	0	0	0	0	3
6/22-6/28	WE/H	27Jun	SNAGGING	6	6.50	9.03	23	48.00	7	3	0	0	0	10
6/22-6/28	WE/H	28Jun	NONSNAG	6	5.83	5.00	38	105.50	2	0	0	0	0	1
6/22-6/28	WE/H	28Jun	SNAGGING	6	8.33	7.03	14	29.00	1	0	0	0	0	0
6/29-7/05	WD	29Jun	NONSNAG	6	7.00	5.66	36	98.75	1	0	0	0	0	0
6/29-7/05	WD	29Jun	SNAGGING	6	3.67	3.14	2	2.50	0	0	0	0	0	0
6/29-7/05	WD	30Jun	NONSNAG	5	7.60	4.83	36	79.50	3	0	0	0	0	0
6/29-7/05	WD	30Jun	SNAGGING	5	6.40	10.7	10	23.00	0	1	0	0	0	2
6/29-7/05	WD	02Jul	NONSNAG	6	9.67	3.98	33	92.25	2	0	0	0	0	0
6/29-7/05	WD	02Jul	SNAGGING	6	2.83	2.23	9	24.00	0	0	0	0	0	0
6/29-7/05	WE/H	04Jul	NONSNAG	6	9.50	7.23	29	90.25	2	1	0	0	0	1
6/29-7/05	WE/H	04Jul	SNAGGING	6	3.50	4.28	3	7.00	1	0	0	0	0	2
6/29-7/05	WE/H	05Jul	NONSNAG	6	7.33	4.46	56	125.50	3	2	0	0	0	0
6/29-7/05	WE/H	05Jul	SNAGGING	6	3.50	2.88	18	36.75	5	0	0	0	2	1
7/06-7/12	WD	07Jul	NONSNAG	6	9.50	5.86	34	93.25	0	2	0	0	0	4
7/06-7/12	WD	07Jul	SNAGGING	6	4.67	5.28	15	20.75	0	0	0	0	0	9
7/06-7/12	WD	08Jul	NONSNAG	6	14.50	12.5	26	61.00	2	1	0	0	1	3
7/06-7/12	WD	08Jul	SNAGGING	6	6.17	4.58	23	37.25	10	1	0	0	0	5
7/06-7/12	WD	10Jul	NONSNAG	6	9.83	7.14	56	111.50	4	0	0	0	3	9
7/06-7/12	WD	10Jul	SNAGGING	6	5.50	6.35	15	35.00	4	1	0	0	3	13
7/06-7/12	WE/H	11Jul	NONSNAG	6	9.67	11.4	37	92.00	1	1	0	0	4	1
7/06-7/12	WE/H	11Jul	SNAGGING	6	10.67	9.20	11	37.50	9	0	0	0	1	18
7/06-7/12	WE/H	12Jul	NONSNAG	6	10.00	8.72	37	69.50	1	0	0	0	0	0
7/06-7/12	WE/H	12Jul	SNAGGING	6	7.00	5.40	4	22.00	0	0	0	0	0	2
7/13-7/19	WD	13Jul	NONSNAG	6	6.50	3.67	27	86.33	1	0	0	0	2	1
7/13-7/19	WD	13Jul	SNAGGING	6	5.00	4.20	5	10.25	1	0	0	0	2	0
7/13-7/19	WD	15Jul	NONSNAG	6	6.50	4.64	31	76.25	0	0	0	0	2	1
7/13-7/19	WD	15Jul	SNAGGING	6	4.67	4.84	13	28.25	2	0	0	0	0	17
7/13-7/19	WD	17Jul	NONSNAG	6	8.17	4.07	16	28.00	2	0	0	0	4	24
7/13-7/19	WD	17Jul	SNAGGING	6	5.17	5.78	19	55.00	1	1	0	0	11	9
7/13-7/19	WE/H	18Jul	NONSNAG	6	9.00	5.87	17	43.25	2	1	0	0	2	2
7/13-7/19	WE/H	18Jul	SNAGGING	6	5.17	7.14	16	38.50	2	0	0	0	7	17
7/13-7/19	WE/H	19Jul	NONSNAG	6	8.50	3.94	54	80.50	4	1	0	0	3	3
7/13-7/19	WE/H	19Jul	SNAGGING	6	6.67	3.44	28	66.25	0	0	0	0	0	22
7/20-7/26	WD	20Jul	NONSNAG	6	11.50	6.98	48	125.50	0	0	0	0	1	5
7/20-7/26	WD	20Jul	SNAGGING	6	4.83	2.48	17	30.25	0	0	0	0	1	14
7/20-7/26	WD	21Jul	NONSNAG	6	4.33	3.20	9	23.50	0	0	0	0	0	0
7/20-7/26	WD	21Jul	SNAGGING	6	3.17	1.47	7	18.00	1	0	0	0	2	12
7/20-7/26	WD	23Jul	NONSNAG	6	11.83	11.20	29	83.50	1	0	0	0	5	4
7/20-7/26	WD	23Jul	SNAGGING	6	8.33	8.87	19	45.00	3	0	0	0	5	24
7/20-7/26	WE/H	25Jul	NONSNAG	6	13.67	10.10	33	88.00	5	2	0	0	13	3
7/20-7/26	WE/H	25Jul	SNAGGING	6	8.67	10.00	8	22.00	0	1	0	0	3	7

-continued-

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Week	Stratum ^a	Date	Site	INTERVIEW SAMPLING INFORMATION											
				ANGLER COUNTS			No.	Effort	Large chinook	Small chinook	Large coho	Small coho	Pink	Chum	
				No.	Mean	SD			harvest	harvest	harvest	harvest	harvest	harvest	
7/20-7/26	WE/H	26Jul	NONSNAG	6	23.83	31.00	42	116.50	3	2	0	0	0	0	0
7/20-7/26	WE/H	26Jul	SNAGGING	6	8.00	7.40	6	7.00	0	0	0	0	0	0	7
7/27-8/02	WD	27Jul	NONSNAG	6	9.33	7.61	26	55.50	0	0	0	0	0	2	1
7/27-8/02	WD	27Jul	SNAGGING	6	4.67	3.67	6	6.50	0	0	0	0	0	0	3
7/27-8/02	WD	28Jul	NONSNAG	6	11.33	7.47	39	74.00	3	0	0	0	0	8	5
7/27-8/02	WD	28Jul	SNAGGING	6	3.67	4.03	4	4.00	0	0	0	0	0	0	0
7/27-8/02	WD	31Jul	NONSNAG	6	7.50	5.21	37	87.75	1	0	0	0	0	19	5
7/27-8/02	WD	31Jul	SNAGGING	6	3.83	4.92	30	62.50	0	0	0	0	0	17	14
7/27-8/02	WE/H	01Aug	NONSNAG	6	12.83	8.23	27	56.00	0	0	0	0	0	10	0
7/27-8/02	WE/H	01Aug	SNAGGING	6	10.50	7.26	17	33.75	0	0	0	0	0	14	12
7/27-8/02	WE/H	02Aug	NONSNAG	6	10.17	6.97	32	65.50	0	0	0	0	0	5	1
7/27-8/02	WE/H	02Aug	SNAGGING	6	6.17	6.49	20	17.75	0	0	0	0	0	1	3
8/03-8/09	WD	04Aug	NONSNAG	6	9.50	6.12	35	63.00	0	0	0	0	0	20	4
8/03-8/09	WD	04Aug	SNAGGING	6	6.00	5.02	10	12.00	0	0	0	0	0	4	1
8/03-8/09	WD	06Aug	NONSNAG	6	8.00	6.60	33	65.50	0	0	0	0	0	12	0
8/03-8/09	WD	06Aug	SNAGGING	6	4.67	6.47	13	22.50	1	0	0	0	0	14	4
8/03-8/09	WD	07Aug	NONSNAG	6	3.17	3.87	25	64.75	0	0	2	0	0	30	0
8/03-8/09	WD	07Aug	SNAGGING	6	3.50	3.02	6	11.00	0	0	0	0	0	15	2
8/03-8/09	WE/H	08Aug	NONSNAG	6	14.17	12.20	45	104.25	4	1	0	0	0	99	8
8/03-8/09	WE/H	08Aug	SNAGGING	6	9.50	10.70	14	33.50	0	0	0	0	0	42	3
8/03-8/09	WE/H	09Aug	NONSNAG	6	10.33	12.40	24	51.25	0	0	1	1	1	41	2
8/03-8/09	WE/H	09Aug	SNAGGING	6	5.00	5.22	7	11.50	0	0	0	0	0	0	1
8/10-8/16	WD	10Aug	NONSNAG	5	8.80	8.64	22	38.00	0	0	1	0	0	28	0
8/10-8/16	WD	10Aug	SNAGGING	5	5.20	5.54	9	9.00	0	0	0	0	0	13	12
8/10-8/16	WD	11Aug	NONSNAG	6	16.00	11.70	39	54.75	0	0	0	0	1	27	5
8/10-8/16	WD	11Aug	SNAGGING	6	7.00	8.29	13	17.50	0	0	0	0	0	5	18
8/10-8/16	WD	13Aug	NONSNAG	6	9.83	5.38	51	110.25	4	1	0	5	55	0	0
8/10-8/16	WD	13Aug	SNAGGING	6	3.67	4.80	10	24.50	2	1	0	1	29	6	0
8/10-8/16	WE/H	15Aug	NONSNAG	6	9.67	6.71	42	92.00	3	1	3	0	40	1	0
8/10-8/16	WE/H	15Aug	SNAGGING	6	11.33	8.41	24	45.00	0	0	7	0	62	8	0
8/10-8/16	WE/H	16Aug	NONSNAG	6	15.17	9.47	46	111.00	2	0	6	0	64	3	0
8/10-8/16	WE/H	16Aug	SNAGGING	6	14.00	12.70	25	52.00	2	0	7	0	76	20	0
8/17-8/23	WD	17Aug	NONSNAG	6	10.00	4.56	28	80.25	0	0	5	0	15	1	0
8/17-8/23	WD	17Aug	SNAGGING	5	6.80	5.22	15	25.50	0	0	0	0	42	3	0
8/17-8/23	WD	18Aug	NONSNAG	6	13.50	7.18	33	87.50	0	0	0	0	58	0	0
8/17-8/23	WD	18Aug	SNAGGING	5	15.80	5.93	15	29.00	0	0	11	0	19	0	0
8/17-8/23	WD	19Aug	NONSNAG	6	12.50	10.70	47	144.25	0	0	0	0	28	0	0
8/17-8/23	WD	19Aug	SNAGGING	6	7.83	7.33	10	18.50	0	0	5	0	42	8	0
8/17-8/23	WE/H	22Aug	NONSNAG	6	10.00	7.67	28	77.00	0	0	8	0	13	0	0
8/17-8/23	WE/H	22Aug	SNAGGING	6	10.17	12.20	16	40.50	0	0	10	0	56	4	0
8/17-8/23	WE/H	23Aug	NONSNAG	6	13.33	14.00	32	82.00	0	0	8	1	51	1	0
8/17-8/23	WE/H	23Aug	SNAGGING	6	12.00	13.40	12	26.50	0	0	11	0	26	2	0
8/24-8/30	WD	25Aug	NONSNAG	6	14.33	13.20	36	70.75	0	0	5	0	10	0	0
8/24-8/30	WD	25Aug	SNAGGING	6	4.00	3.16	5	5.50	0	0	2	0	3	0	0
8/24-8/30	WD	27Aug	NONSNAG	5	6.80	3.96	25	50.25	0	0	7	0	2	0	0
8/24-8/30	WD	27Aug	SNAGGING	5	6.00	6.63	18	27.25	0	0	14	0	13	0	0
8/24-8/30	WD	28Aug	NONSNAG	6	5.50	6.77	17	45.50	0	0	27	0	0	0	0
8/24-8/30	WD	28Aug	SNAGGING	6	4.50	4.09	21	41.00	0	0	42	0	16	0	0
8/24-8/30	WE/H	29Aug	NONSNAG	6	13.83	5.00	27	76.75	0	0	4	0	13	0	0
8/24-8/30	WE/H	29Aug	SNAGGING	6	13.50	4.72	13	29.50	0	0	46	0	2	0	0
8/24-8/30	WE/H	30Aug	NONSNAG	6	15.83	5.98	29	83.25	3	0	19	0	2	0	0
8/24-8/30	WE/H	30Aug	SNAGGING	6	15.17	8.93	15	36.00	0	0	22	0	4	0	0
8/31-9/06	WD	02Sep	NONSNAG	5	6.80	4.97	20	50.50	1	0	16	1	6	0	0
8/31-9/06	WD	02Sep	SNAGGING	5	10.20	10.20	15	32.50	0	0	42	0	3	0	0
8/31-9/06	WD	03Sep	NONSNAG	6	10.17	5.23	14	37.50	0	0	15	0	0	2	0
8/31-9/06	WD	03Sep	SNAGGING	6	11.17	11.20	7	16.50	0	0	12	0	1	0	0
8/31-9/06	WD	04Sep	NONSNAG	5	13.80	6.87	22	90.50	0	0	62	2	1	0	0
8/31-9/06	WD	04Sep	SNAGGING	5	14.20	12.20	22	75.50	0	0	105	0	0	0	0
8/31-9/06	WE/H	05Sep	NONSNAG	6	14.50	7.50	34	134.00	0	0	47	4	1	0	0
8/31-9/06	WE/H	05Sep	SNAGGING	6	23.00	20.00	22	56.00	0	0	113	0	0	0	0
8/31-9/06	WE/H	06Sep	NONSNAG	6	11.50	6.66	25	83.50	0	0	42	4	0	0	0
8/31-9/06	WE/H	06Sep	SNAGGING	6	22.67	16.20	27	65.50	0	0	145	0	0	0	0
9/07-9/13	WE/H	07Sep	NONSNAG	6	7.33	3.72	16	28.50	0	0	3	1	0	0	0
9/07-9/13	WE/H	07Sep	SNAGGING	6	13.67	6.68	21	51.00	0	0	67	1	0	0	0
9/07-9/13	WD	08Sep	NONSNAG	6	5.67	2.34	10	24.00	0	0	11	1	0	0	0
9/07-9/13	WD	08Sep	SNAGGING	6	14.00	10.10	26	68.25	0	0	52	3	0	0	0
9/07-9/13	WD	09Sep	NONSNAG	6	7.83	4.71	23	55.75	0	0	30	10	0	0	0
9/07-9/13	WD	09Sep	SNAGGING	6	19.50	13.80	16	31.00	0	0	72	0	0	0	0
9/07-9/13	WE/H	12Sep	NONSNAG	6	9.50	2.81	32	76.00	0	0	20	30	0	0	0

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Week	Stratum ^a	Date	Site	INTERVIEW SAMPLING INFORMATION										
				ANGLER COUNTS			No.	Effort	Large chinook	Small chinook	Large coho	Small coho	Pink	Chum
				No.	Mean	SD			harvest	harvest	harvest	harvest	harvest	harvest
9/07-9/13	WE/H	12Sep	SNAGGING	6	17.00	8.79	21	38.50	0	0	104	0	0	0
9/07-9/13	WE/H	13Sep	NONSNAG	6	8.50	6.50	24	56.00	0	0	26	8	0	0
9/07-9/13	WE/H	13Sep	SNAGGING	6	13.67	8.64	28	67.00	0	0	140	0	0	0
9/14-9/20	WD	14Sep	NONSNAG	6	8.17	2.64	20	39.50	0	0	19	23	0	0
9/14-9/20	WD	14Sep	SNAGGING	6	13.83	9.11	33	74.75	0	0	109	5	0	0
9/14-9/20	WD	15Sep	NONSNAG	6	7.17	3.19	29	61.45	0	0	29	29	0	0
9/14-9/20	WD	15Sep	SNAGGING	6	13.33	7.53	23	44.75	0	0	78	0	0	0
9/14-9/20	WD	16Sep	NONSNAG	6	11.00	2.68	35	83.00	0	0	53	100	0	0
9/14-9/20	WD	16Sep	SNAGGING	6	22.33	9.11	26	52.00	0	0	111	0	0	0
9/14-9/20	WE/H	19Sep	NONSNAG	6	11.00	8.12	40	98.00	0	0	17	79	0	0
9/14-9/20	WE/H	19Sep	SNAGGING	6	13.33	7.97	20	40.50	0	0	93	0	0	0
9/14-9/20	WE/H	20Sep	NONSNAG	6	9.83	3.71	32	65.00	0	0	10	24	0	0
9/14-9/20	WE/H	20Sep	SNAGGING	5	10.20	8.35	22	42.50	0	0	90	0	0	0
9/21-9/27	WD	21Sep	NONSNAG	5	6.80	3.49	21	47.50	0	0	11	40	0	0
9/21-9/27	WD	21Sep	SNAGGING	5	7.20	5.63	14	25.00	0	0	43	0	0	0
9/21-9/27	WD	24Sep	NONSNAG	6	6.67	3.78	24	70.00	0	0	27	56	0	0
9/21-9/27	WD	24Sep	SNAGGING	6	4.00	1.90	17	24.50	0	0	29	0	0	0
9/21-9/27	WD	25Sep	NONSNAG	6	4.33	3.72	22	44.50	0	0	19	1	0	0
9/21-9/27	WD	25Sep	SNAGGING	6	4.83	4.07	13	28.50	0	0	49	0	0	0
9/21-9/27	WE/H	26Sep	NONSNAG	6	4.67	3.67	24	50.50	0	0	7	38	0	0
9/21-9/27	WE/H	26Sep	SNAGGING	6	8.17	5.34	17	35.00	0	0	79	0	0	0
9/21-9/27	WE/H	27Sep	NONSNAG	6	4.67	4.27	21	41.50	0	0	8	7	0	0
9/21-9/27	WE/H	27Sep	SNAGGING	6	5.67	5.24	14	29.00	0	0	27	0	0	0

^a WD = weekdays (Mondays–Fridays, except 7 Sept.); WE/H = weekend/holidays (Saturdays, Sundays, and 7 Sept.).

Appendix A2.—Major computer files used for data analysis of Gastineau Hatchery roadside fishery in 1998. Custodian of data files listed below are the author and the Alaska Department of Fish and Game, Division of Research and Technical Services, Anchorage, Alaska. File archive name is “dipac_98.zip.”

File name	File type	File Description
CREEL	TXT	Raw ASCII data file of interviews and angler counts
DIPAC98	DTA	Final edited ASCII data set
DIPAC98A	SAS	SAS program to reformat ASCII file
DIPAC98	SSD	Summary subset SAS data file: count and interview data
BOWDEN8A	SAS	SAS program to estimate overall effort, harvests, and associated variances
DIPAC98Age_eff	SAS	SAS program to estimate effort, harvest, and associated variances by age class (A, C, S)
DIPAC98Resid_eff	SAS	SAS program to estimate effort, harvest, and associated variances by residency (R and N)