Fishery Data Series No. 91-3

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ABSTRACT

Creel surveys were conducted at Ugashik Narrows during the summers of 1987 and 1988, and at Ugashik Outlet during the summer of 1988. Coho salmon *Oncorhynchus kisutch*, sockeye salmon *Oncorhynchus nerka*, and Arctic char/ Dolly Varden *Salvelinus alpinus/Salvelinus malma* were the primary species targeted in both fisheries. Sport fishing effort at Ugashik Narrows was estimated at 2,027 angler-hours in 1987 and 2,148 angler-hours in 1988. Coho and sockeye salmon comprised most of the harvest, while Arctic char/Dolly Varden comprised most of the catch. Arctic grayling *Thymallus arcticus* harvest was extremely low, and comprised only 5 to 7 percent of the catch. Effort at the Outlet was estimated at 1,675 angler-hours, with coho salmon dominating catch and harvest. Arctic char/Dolly Varden caught at the Narrows ranged from 250 to 750 millimeters fork length, and were larger in 1988. Most sport caught Arctic grayling in both fisheries were between 400 and 500 millimeters fork length. The majority of anglers in both fisheries were guided non-residents fishing with lures.

KEY WORDS: Ugashik Narrows, Ugashik Outlet, Ugashik Lakes, Alaska Peninsula, Arctic grayling, *Thymallus arcticus*, coho salmon, *Oncorhynchus kisutch*, sockeye salmon, *Oncorhynchus nerka*, Arctic char, *Salvelinus alpinus*, Dolly Varden, *Salvelinus malma*, creel survey, sport fishing, sport catch, sport harvest, sport effort, age composition, size.

INTRODUCTION

The Ugashik Lakes are on the Alaska Peninsula, 560 km southwest of Anchorage (Figure 1). A short channel, called the Narrows, connects Upper Ugashik Lake (22,300 ha) and Lower Ugashik Lake (19,200 ha). The upper 2 km of the Ugashik River, between Lower Ugashik Lake and a large lagoon, is popularly referred to as the Outlet. The Outlet consists of shallow, braided channels with moderately fast water. The Ugashik Lakes area is accessible only by float plane or by boat from the village of Ugashik, 40 km downstream from the Outlet.

Angler effort in the Ugashik Lakes area is concentrated at the Narrows and Outlet, with very limited effort expended in other parts of the drainage. Because the area is remote, sport fishing pressure is light compared to other parts of Alaska. Most anglers are guided, non-residents that fly in for the day from sport fishing lodges outside of the drainage. Only two active sport fishing lodges are located on the lakes, one at the Narrows and one at the Outlet. Expansion of these lodges and construction of new lodges are expected.

Primary species of interest in the sport fishery include Arctic grayling *Thymallus arcticus*, coho salmon *Oncorhynchus kisutch*, sockeye salmon *O. nerka*, Arctic char *Salvelinus alpinus*, Dolly Varden *S. malma*, and lake trout *S. namaycush*. Interestingly, rainbow trout *Oncorhynchus mykiss* have never been documented in the drainage. No on-site creel surveys were conducted prior to this study, but drainage-wide sport harvest has been estimated through the Alaska statewide sport fish harvest survey since 1977. Harvests were typically highest for Arctic char/Dolly Varden (referred to as char hereafter) and coho and sockeye salmon, and lowest for lake trout (Table 1). Harvest of all species was relatively minor at less than 500 fish per year (Mills 1979-1990).

Although most angler effort is directed toward salmon and char, the Ugashik Lakes area is well known for producing catches of some of the largest Arctic grayling in North America. The current state hook and line record of 2.185 kg (4 pounds, 13 ounces) was taken at the Narrows in 1981. Nineteen trophy fish certificates for Arctic grayling over 1.362 kg (3 pounds) have been issued since 1977 (M. J. Mills, Alaska Department of Fish and Game, Anchorage, personal communication).

Creel surveys were prompted by indications in the mid-1980s that Arctic grayling abundance had declined from historic levels and the threat of a substantial increase in sport fishing effort in the drainage. In addition, a research program was begun in 1988 to estimate Arctic grayling abundance at the Narrows and Outlet, and examine historical changes in age and size distributions (Meyer *In press*). Catch and harvest estimates from creel surveys were integrated with abundance estimates to assess the current status and future management of Arctic grayling. Since these were the first on-site surveys in the drainage, the opportunity was used to establish baseline catch, harvest, age, and size data on other species as well. This report presents fishery information on all species, including data that were not essential for Arctic grayling stock assessment.

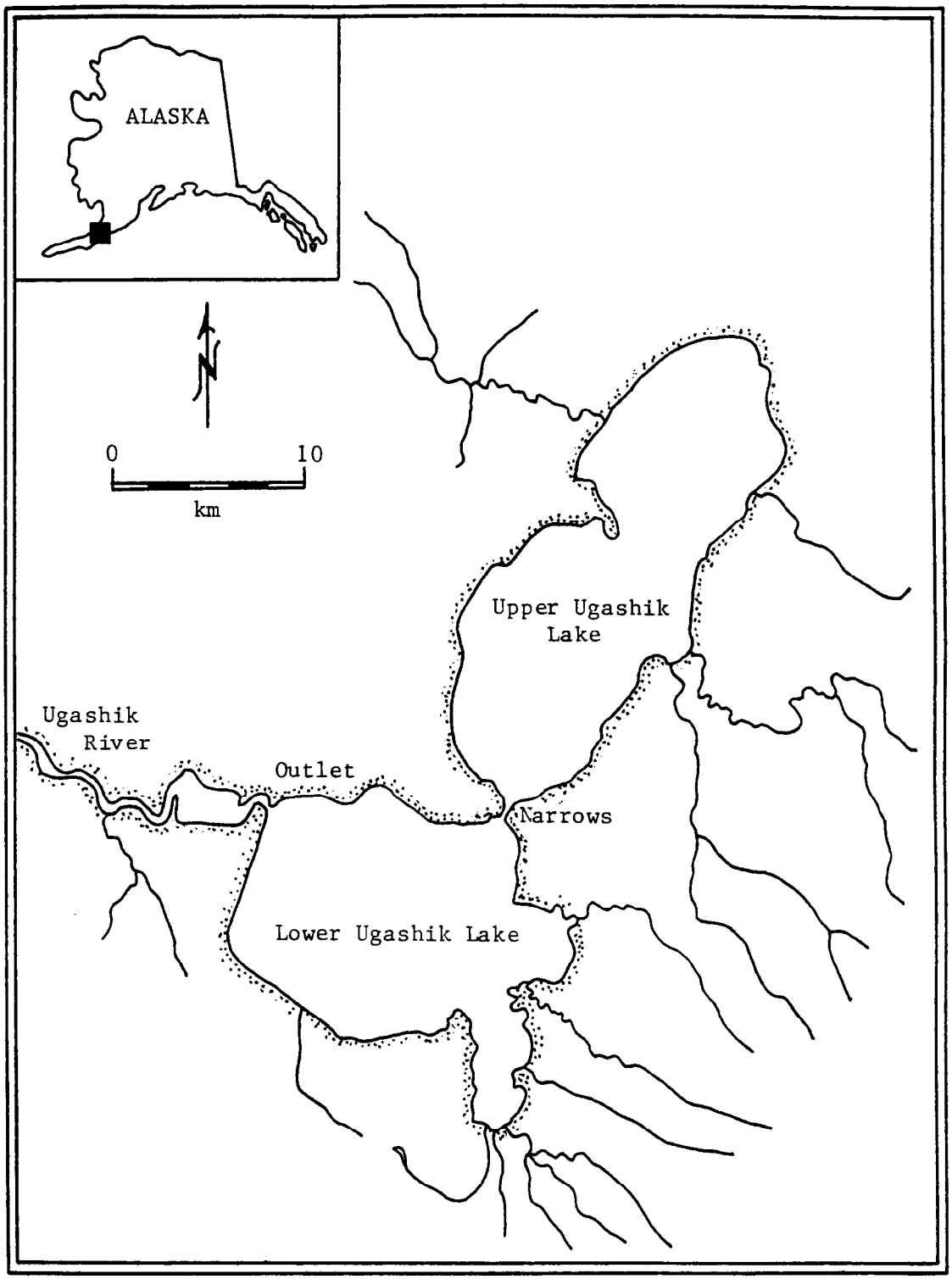

Figure 1. The Ugashik Lakes and major tributaries.

Table 1. Ugashik drainage system-wide angler effort and harvest by species, 1977-1989. Estimates are from the ADFG statewide harvest study (Mills 1979-1990).

Year	Estimated Angler Effort (days fished)	Estimated Number of Fish Harvested				
		Arctic Grayling	Coho Salmon	Sockeye Salmon	Arctic Char/ Dolly Varden	Lake Trout
1977	707	141	26	213	51	14
1978	2,477	72	163	127	389	45
1979	1,399	145	125	189	200	9
1980	472	215	17	379	164	9
1981	671	195	87	11	270	11
1982	870	142	314	126	304	10
1983	769	168	157	55	73	10
1984	1,609	237	611	100	486	37
1985[a]	-	-	-	-	-	-
1986[a]	-	-	-	-	-	-
1987	1,682	278	215	370	493	172
1988[a]	-	-	-	-	-	-
1989	998	41	234	884	104	114
Average:	1,165	163	195	245	253	43

[a] The number of survey responses was inadequate to generate reliable estimates in 1985, 1986, and 1988.

The goal of the creel surveys was to describe the summer sport fisheries at these locations. Specific objectives included estimation of:

1. the number of angler-hours of fishing effort, and total catch and harvest of all fishes in the sport fishery at the Narrows in 1987 and 1988, and at the Outlet in 1988;

2. characteristics of sport anglers, including residency, gear type, and proportion that are guided; and

3. size and age characteristics of coho salmon, Arctic grayling, and char caught and harvested in the Narrows and Outlet sport fisheries.

METHODS

Creel Surveys

The USFWS initiated public use surveys at Ugashik Narrows in 1987. In cooperation with the Alaska Department of Fish and Game, that project was adapted to include on-site creel surveys at the Narrows in 1987 and 1988, and at the Outlet in 1988.

Narrows:

The surveyed area included waters from the head of the Narrows downstream and that portion of Lower Ugashik Lake within 1/2 km of the mouth of the Narrows (Figure 2). Direct expansion creel surveys were conducted in 1987 and 1988. Four days per week were scheduled for sampling in 1987, with the fishing day considered to be 13 hours long. Seven full days of sampling per week were scheduled in 1988, with the fishing day considered to be 18 hours long.

Anglers enter and exit the fishery by float plane or small boat. The limited fishing areas available at the Narrows allowed technicians stationed at the Narrows to attempt to interview every angler exiting the fishery as they completed fishing for the day. For each angler contacted, the following data were recorded: the number of hours fished, the number of fish in the angler's possession by species, the number of fish released by species, whether the angler was guided or not guided, sex, residency, and gear type. All interviews were of individual anglers and not party or group interviews. When anglers occasionally exited the fishery without being interviewed, the number of anglers missed was recorded. Survey estimates were later expanded to account for missed anglers.

Survey results were divided into temporal components based on examination of daily catch rates for the principal species in the fishery. Components were chosen to minimize variation in catch rates within each component. The 1987 components were: (1) 22 June through 16 July, (2) 17 July through 10 August, and (3) 11 August through 30 August. The 1988 components were: (1) 20 June through 30 June, (2) 1 July through 26 July, (3) 27 July through 9 August, (4) 10 August through 8 September, and (5) 9 September through 21 September.

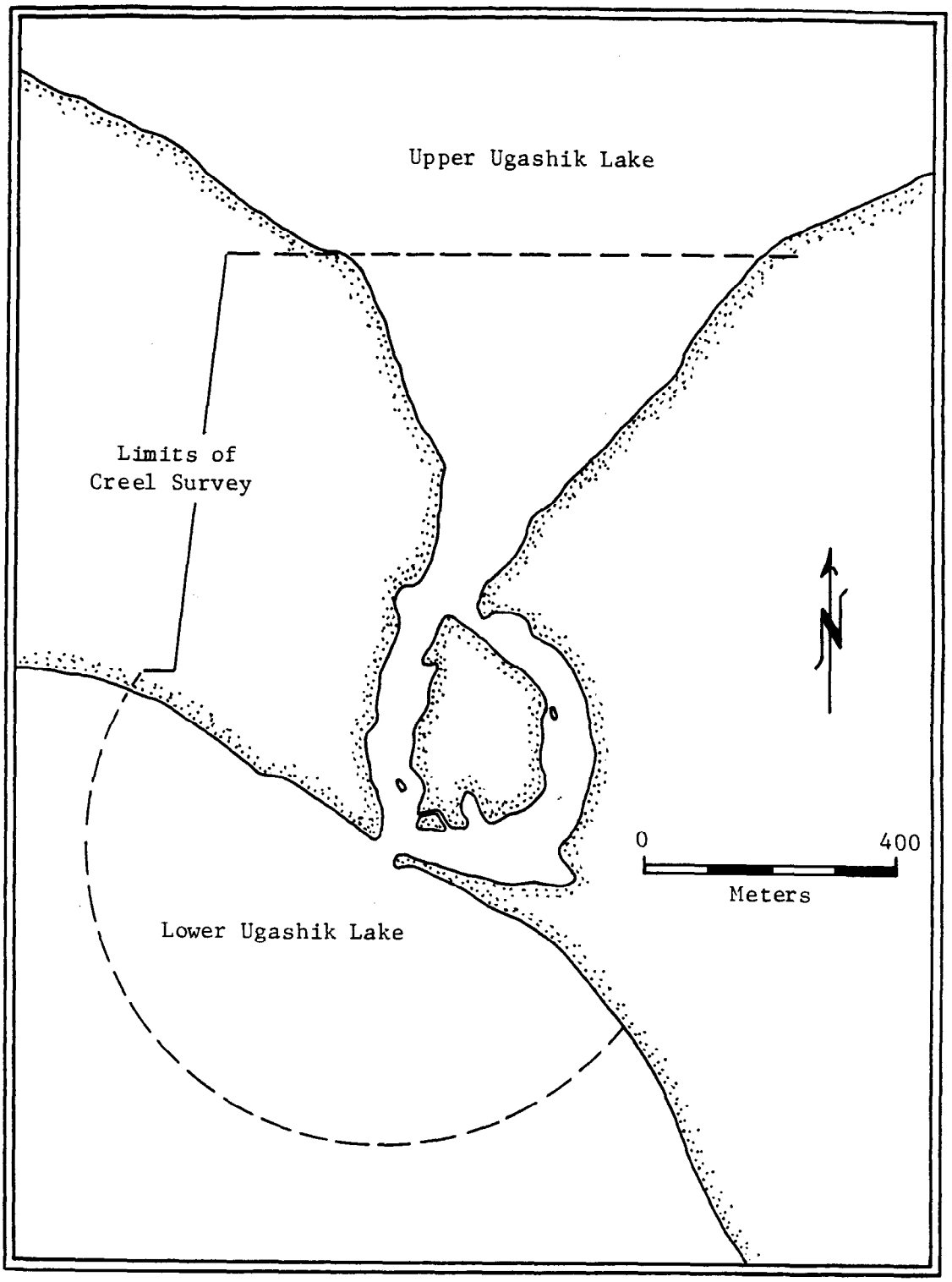

Figure 2. The Ugashik Narrows creel survey site.

Effort for each temporal component was estimated by

$$\hat{E} = H\,(\bar{e}/h) \qquad [1]$$

where:

$\hat{E}$ = the estimate of effort in angler-hours,

H = the total number of hours available to the fishery in the temporal component,

h = the number of hours surveyed each day, and

$\bar{e}$ = the mean number of angler-hours expended, or

$$\bar{e} = 1/d \sum_{k=1}^{d} e_k \qquad [2]$$

where:

e_k = the total number of angler-hours expended, and

d = the number of days sampled.

The variance of effort was estimated as

$$V(\hat{E}) = H^2/h^2\, V(\bar{e}) \qquad [3]$$

where
$$V(\bar{e}) = (1-d/D)(s_b^2/d) + (d/dD)(s_w^2/d), \qquad [4]$$

and:

s_b^2 = the variance between days, with (1-d/D) being the finite population correction factor (FPC),

s_w^2 = the variance between anglers within a day, with (d/dD) being the FPC, and

D = the number of days available in the temporal component.

The variance between days was estimated by

$$s_b^2 = 1/(d-1) \sum_{k=1}^{d} (e_k-\bar{e})^2. \qquad [5]$$

The variance between anglers within a day was estimated by

$$s_w^2 = \sum_{k=1}^{d} M_k^2 \, (1-m_k/M_k) \, s_f^2/m_k \qquad [6]$$

where

$$s_f^2 = [1/(m_k-1)] \sum_{i=1}^{mk} (f_{ik} - \bar{f}_k), \qquad [7]$$

$$\bar{f}_k = (1/m_k) \sum_{i=1}^{mk} f_{ik}, \qquad [8]$$

and:

m_k = the number of anglers interviewed on day k,

M_k = the number of anglers leaving the fishery on day k,

f_{ik} = the number of hours fished by angler i leaving the fishery on day k,

d = the number of days sampled, and

$\bar{f}_k$ = the mean number of hours fished by anglers interviewed on day k.

When anglers were missed on any day, m_k was less than M_k, and the number of angler hours expended on that day was estimated by

$$\hat{e}_k = M_k \, \bar{f}_k \qquad [9]$$

and substituted for e_k in equations 2 and 5. When missed anglers were the only anglers that day, effort could not be estimated and that day was considered not sampled.

When all anglers are interviewed on any day k, $(1 - m_k/M_k)$ in equation 6 goes to zero and the variance between anglers goes to zero for that day. If all days are sampled then (1 - d/D) in equation 4 goes to zero, leaving only the variance between anglers. When all anglers were interviewed and all days were sampled within a temporal component, the total variance of effort was zero, and the survey constituted a complete census.

The catch and harvest of each species were estimated with the same procedures used to estimate effort, by simply substituting catch or harvest for effort. Total effort, catch, and harvest for the season were estimated by summing over temporal components. Because temporal components were assumed to be independent, the corresponding variances were additive.

Assumptions necessary for the direct expansion creel survey design were:

1. no significant fishing effort occurred during the hours not included in the fishing day;

2. all anglers participating in the fishery exited through the surveyed area; and

3. all missed anglers were counted.

Although it was not possible to rigorously test any of these assumptions, there were no indications that any of them were violated. The survey crew lived in a camp at the Narrows and were aware of fishing traffic during non-surveyed hours.

Outlet:

The study area consisted of the Ugashik River from the head at Lower Ugashik Lake to the upper end of a shallow lagoon approximately 2 km downstream. It included those waters of Lower Ugashik Lake within 0.5 km of the head of the Outlet (Figure 3).

A roving creel survey (Neuhold and Lu 1957) using a stratified random sampling design was employed to count anglers and conduct angler interviews from 9 July through 28 September. Effort prior to 9 July was considered negligible as established by other on-site Alaska Department of Fish and Game personnel. Angler counts were used to estimate effort in units of angler-hours. Angler interviews provided estimates of catch and harvest rates (fish per angler-hour) by species. Catch and harvest for each species were estimated by the product of the estimated effort and the species-specific catch and harvest rates.

The fishing day was defined as 12 hours in duration (0900-2100 hrs). Anticipating variation in effort during the day, each day was stratified into six sampling periods: (A) 0900-1100 hrs, (B) 1100-1300 hrs, (C) 1300-1500 hrs, (D) 1500-1700 hrs, (E) 1700-1900 hrs, and (F) 1900-2100 hrs. The weekly sampling level was set at 12 trips where anglers were both counted and interviewed and 6 trips where anglers were counted only. Periods to be sampled were randomly chosen with the constraint that a maximum of two angler count/interview sessions and one angler count could be designated in any one day. Seventy-five percent of the weekly sampling effort (nine count/interview sessions) was allocated to periods B-E and 25% (three count/interview sessions) to periods A and F. Angler count sample units were randomly selected from available remaining periods with a maximum of one count per day. This random selection process was done independently for each week.

A survey trip started at the upstream or downstream boundary of the survey area. A coin was tossed to determine if angler counts or angler interviews were to be conducted first. For an angler count, the technician drove a skiff through the fishery area and counted all anglers actively fishing. The angler count was completed within 20 minutes of the start and was considered an instantaneous count (Neuhold and Lu 1957).

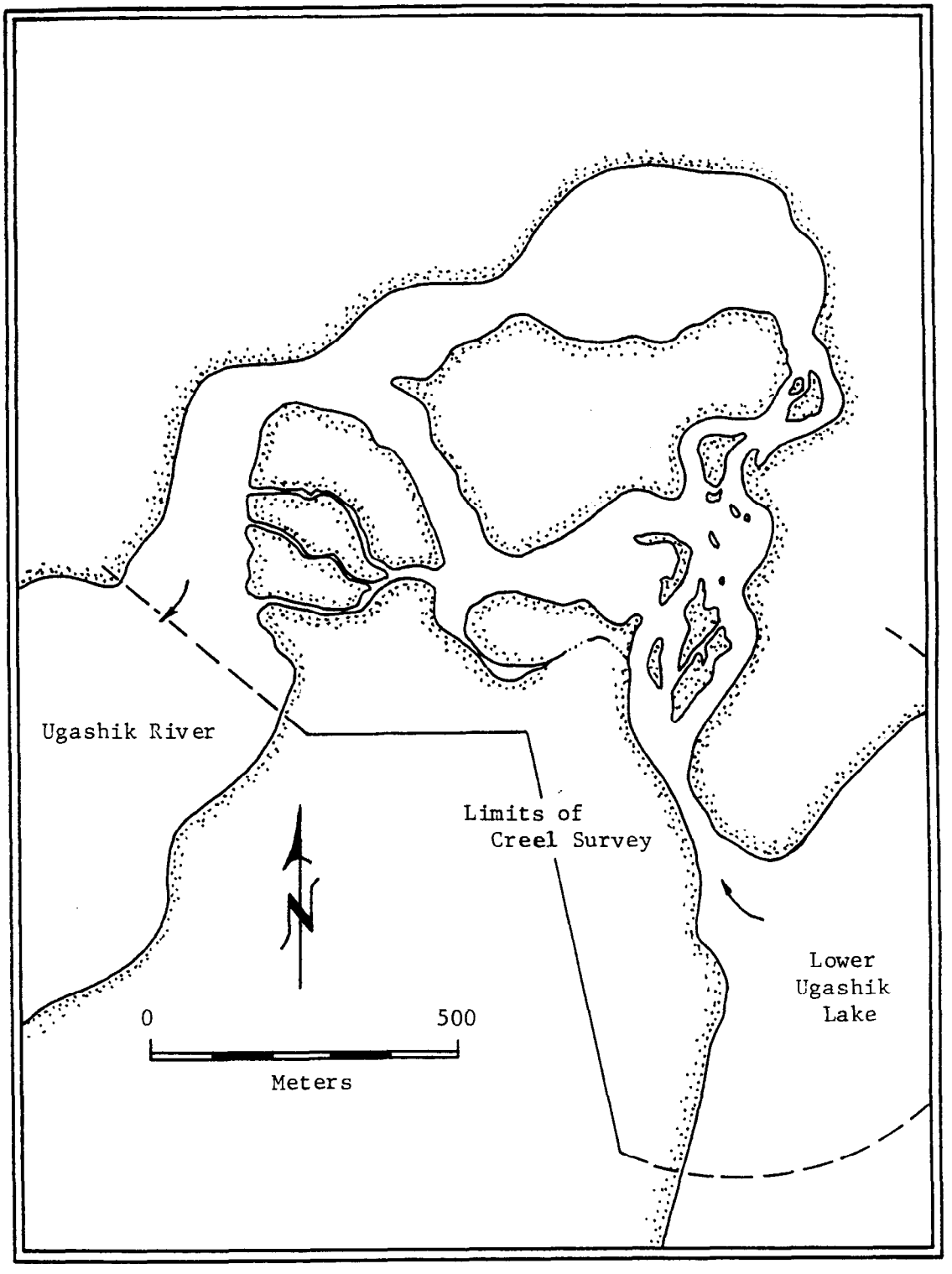

Figure 3. The Ugashik Outlet creel survey site.

All interviews were of individual anglers and were not party interviews. The creel survey technician attempted to keep the number of anglers interviewed proportional to the angler effort expended during the sampled time (Neuhold and Lu 1957, DiConstanzo 1956). Because the area surveyed was relatively small, a high proportion of anglers were interviewed. Anglers were randomly selected from throughout the fishing area. Completed trip interviews were collected on an opportunistic basis as often as possible. For each angler contacted, the creel survey technician recorded the number of hours fished, the number of fish in the angler's possession by species, the number of fish released by species, whether the angler was guided or not guided, sex, residency, and gear type.

The survey results were divided into five temporal components: (1) 9 July through 29 July, (2) 30 July through 19 August, (3) 20 August through 26 August, (4) 27 August through 9 September, and (5) 10 September through 28 September. Components were selected to minimize variation in daily catch rates for the principal species in the fishery. Effort was estimated for each temporal component of the fishery using a stratified random sampling approach by period. Effort (E) for each component was estimated by

$$\hat{E} = \sum_{i=1}^{p} H_i \bar{y}_i \qquad [10]$$

where:

H_i = the total number of hours of possible fishing time in period i,

$\bar{y}_i$ = the mean angler count for period i, and

p = 6, the total number of periods.

The variance of $\hat{E}$ was estimated by

$$V(\hat{E}) = \sum_{i=1}^{p} H_i^2 (s_y^2/m_i) \qquad [11]$$

where

$$s_y^2 = [\sum_{k=1}^{mi} \sum_{i=1}^{p} (y_{ik}-\bar{y}_i)^2] / (m_i-1), \qquad [12]$$

and:

y_{ik} = the number of anglers observed during count k in period i,

m_i = the number of angler counts conducted during period i.

Total effort for the season was estimated by summing the effort estimates over temporal components. Because these are assumed to be independent estimates, the variance for total effort is the sum of the temporal component variances.

The mean catch per unit effort (catch per angler-hour) was estimated for each species in each temporal component by

$$CPUE = \left\{ \sum_{i=1}^{d} \sum_{h=1}^{mi} c_{hi} \right\} / \left\{ \sum_{i=1}^{d} \sum_{h=1}^{mi} f_{hi} \right\} \quad [13]$$

where:

c_{hi} = the catch by angler h interviewed on day i,

f_{hi} = the effort (number of hours) expended by angler h on day i at the time of the interview,

d = the number of days on which interviews were conducted, and

m_i = the number of anglers interviewed on day i.

The variance of CPUE was estimated in five steps. The first step was to estimate mean angler effort across all days:

$$\bar{f} = (1/d) \sum_{i=1}^{d} \bar{f}_i \quad [14]$$

where $\bar{f}_i$ was the mean effort per angler on day i. Mean catch per angler was calculated the same way, substituting catch for effort in the above equation.

Second, the total variance of mean effort per angler across all days, V(f), was estimated using a two-stage variance formula (von Geldern and Tomlinson 1973):

$$V(\bar{f}) = V(\bar{f}_b) + V(\bar{f}_w) \quad [15]$$

where:

$V(\bar{f}_b)$ = the between day variance component, and

$V(\bar{f}_w)$ = the within-day variance component.

The between-day variance component was estimated by

$$V(\bar{f}_b) = [1-(d/D)]\ s_b^2/d \qquad [16]$$

with

$$s_b^2 = 1/(d-1) \sum_{i=1}^{d} (\bar{f}_i - \bar{f})^2 \qquad [17]$$

where:

d = the number of days on which interviews were conducted,

D = the number of days possible, and

s_b^2 = the between-day sample variance of effort.

The within-day variance component was estimated by

$$V(\bar{f}_w) = 1/dD\ \Sigma\ (s_{fi}^2/m_i) \qquad [18]$$

where;

s_{fi}^2 = the within-day sample variance of f on day i, and

m_i = the number of anglers interviewed on day i.

Third, the total variance of mean catch per angler across all days, V(c), was also estimated using two-stage variance formulas, by substituting catch for effort in equations 15, 16, 17, and 18.

The fourth step was to estimate the correlation between catch and effort:

$$r = \frac{\Sigma\ cf}{\Sigma\ c\ \ \Sigma\ f} \qquad [19]$$

where

$$\Sigma\ cf = \sum_{i=1}^{d} \sum_{h=1}^{mi} c_{ih}\ f_{ih} - (1/m_i) \sum_{i=1}^{d} \sum_{h=1}^{mi} c_{ih} \sum_{i=1}^{d} \sum_{h=1}^{mi} f_{ih}, \qquad [20]$$

$$\Sigma\ c = \sum_{i=1}^{d} \sum_{h=1}^{mi} c_{ih}^2 - (1/m_i) \left[\sum_{i=1}^{d} \sum_{h=1}^{mi} c_{ih}\right]^2, \qquad [21]$$

and $$\Sigma f = \sum_{i=1}^{d} \sum_{h=1}^{mi} f_{ih}^2 - (1/m_i) \left[\sum_{i=1}^{d} \sum_{d=1}^{mi} f_{ih} \right]^2, \quad [22]$$

and d, m_i, c_{ih}, and f_{ih} are defined above.

Finally, omitting the finite population correction factor, the variance of CPUE was approximated as (Jessen 1978):

$$V(CPUE) = (\bar{c}/\bar{f})^2 [V(\bar{c})/\bar{c}^2 + V(\bar{f})/\bar{f}^2 - (2r\, V(\bar{c})\, V(\bar{f})/\bar{c}\,\bar{f})]. \quad [23]$$

The estimated catch of each species during each component (C_k) was simply:

$$\hat{C}_k = \hat{E}\ (CPUE). \quad [24]$$

The variance of the estimated catch of each species was estimated using the product of two independent random variables as described by Goodman (1960).

Harvest rates and harvest for each temporal component were estimated with the same procedures as for catch. Total catch and harvest of each species for the season were estimated by summing the estimates of catch and harvest over the temporal components. Because temporal components were assumed to be independent, the variances of the total catch and harvest estimates were also summed over the temporal components.

The assumptions necessary for these analyses were:

1. incomplete-trip angler CPUE provided an unbiased estimate of completed-trip angler CPUE,

2. interviewed anglers were representative of the total angler population,

3. no significant fishing effort occurred between 2100 hours and 0900 hours,

4. catch and effort by individual anglers were normally distributed random variables, and

5. catch rate and duration of fishing trip were independent (Di Constanzo 1956).

A Wilcoxon signed-rank test (Zar 1984) was used to test for differences in catch rates between completed-trip and incomplete trip interviews at the Outlet in 1988. Since a high proportion of anglers were interviewed, they likely were representative of all anglers. The creel survey crew stationed on-site was able to monitor nearly all fishing activity after 2100 hours. Simple frequency distribution plots were used to examine normality of catch and effort. Independence of catch rate and duration of fishing trip were examined for coho and sockeye salmon using scatter plots.

Age and Size Composition

Sampling Procedures:

Salmon, char, Arctic grayling, and lake trout were sampled from the sport harvest at the Narrows and Outlet. Most Arctic grayling caught at both locations were released, making it difficult to obtain a representative sample of the sport catch. Therefore, Arctic grayling caught on hook and line and released for mark-recapture abundance estimates by ADFG personnel were used to describe the size distribution of the sport catch. Age composition and size-at-age of Arctic grayling at the Narrows and Outlet were summarized in Meyer (*In press*).

Mid-eye to fork length was recorded to the nearest millimeter for all salmon harvested. Fork length was recorded to the nearest millimeter on all resident freshwater species. Salmon, char, and lake trout were weighed to the nearest 20 g. Arctic grayling less than 500 g were weighed to the nearest 5 g, while Arctic grayling over 500 g were weighed to the nearest 10 g using spring scales.

For age estimation, four scales were taken from the left side of salmon on a diagonal line between the posterior insertion of the dorsal fin and the anterior insertion of the anal fin, approximately two rows above the lateral line (Clutter and Whitesel 1956). Scales were cleaned, mounted on adhesive-backed cards, and pressed against 20 mil acetate film at 1,056 kg/cm^2 at 110°C. Ages were determined by duplicate readings using a microfiche reader. Otoliths were removed from harvested char and lake trout, but too few were collected to provide meaningful estimates of age composition.

Estimation of Age Composition:

Age composition of harvested coho salmon was estimated for the Narrows and Outlet in 1988. The unbiased estimator of the proportion of fish in each age class, p_h, was:

$$\hat{p}_h = y_h / n \qquad [25]$$

where:

y_h = the number of fish of age h in the sample, and

n = the number of legible scales in the sample.

The unbiased variance of this proportion was estimated using the normal approximation to the binomial (Schaeffer et al. 1979):

$$V(\hat{p}_h) = \hat{p}_h(1-\hat{p}_h)/(n-1). \qquad [26]$$

The standard error of the proportion was simply the square root of the variance. Age composition and standard error were reported as percentages.

Mean Fork Length and Weight at Age:

Mean lengths and weights were calculated as the arithmetic mean for each age. Confidence intervals for mean length and weight at age were estimated assuming length and weight were normally distributed random variables. Standard errors of mean length and weight were computed with the finite population correction factor ignored (Cochran 1977). Standard error estimates were conservative when the sample size was large relative to the population size.

RESULTS

Creel Surveys

Narrows:

The 1987 creel survey was conducted from 22 June through 30 August. The 1988 survey was approximately 3 weeks longer, extending from 20 June through 21 September. Effort prior to the surveys was assumed to be low. The creel survey crew on site at the Narrows during the period 16-19 June 1988 reported no effort prior to the start of the survey.

The Narrows sport fishery was characterized by male, adult, non-residents fishing from shore. Artificial lures were the predominant terminal gear type for 63% to 70% of the anglers interviewed. Surprisingly, only 40% of the interviews in 1987 were of guided anglers, compared with 86% in 1988 (Figure 4). Non-resident anglers staying at a lodge located at the Narrows usually fish without a guide, and could have comprised a large portion of the interviews in 1987. This group alone constituted 78% of the unguided angler days in 1988 (Savage and Payne 1988).

Total sport fishing effort during the duration of the surveys was estimated at 2,027 angler-hours in 1987 and 2,148 angler-hours in 1988 (Table 2). The 1987 effort estimate was based on 244 interviews from 31 days, resulting in a relative precision of 24%. By contrast, the 1988 estimate was based on 479 interviews from 91 days and constituted nearly a complete angler census. Relative precision was high at 4%. Although estimated effort was slightly higher in 1988, actual effort was probably higher in 1987. The 1987 survey was of shorter duration and creel survey crews obtained an average of 7.9 interviews per day in 1987 compared with 5.3 interviews per day in 1988.

Mean catch and harvest rates at the Narrows were less than one fish per angler-hour for all species in each temporal component of 1987 (Table 3). Char (Arctic char/Dolly Varden) and sockeye salmon supported the highest catch rates among species. Harvest rates for all species were correspondingly low, generally not exceeding 0.1 fish per angler-hour. The greatest harvest rates were for sockeye salmon caught from mid-July to mid-August (component 2), and for coho salmon caught in late August

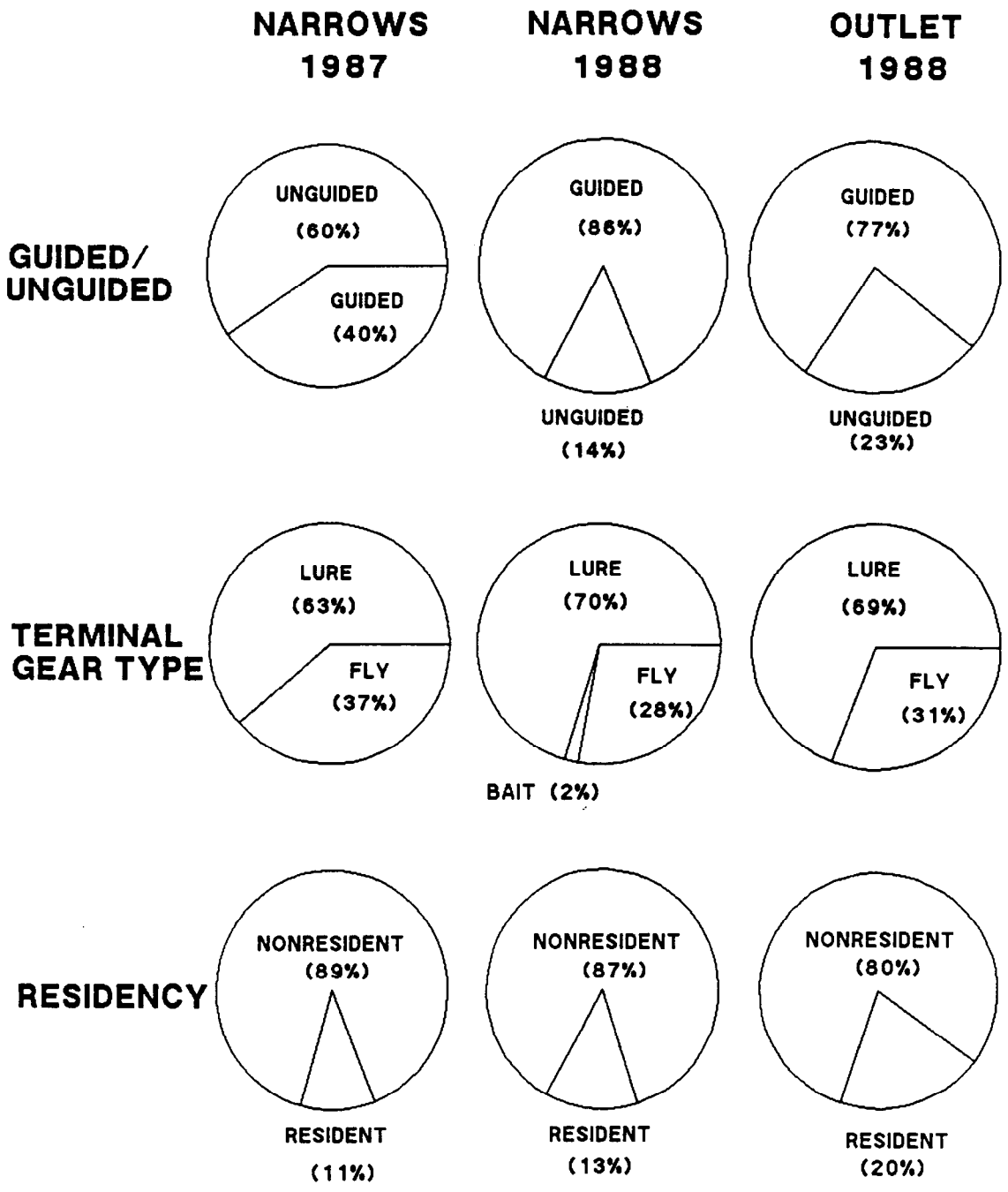

Figure 4. Angler characteristics in the Ugashik Narrows and Outlet sport fisheries in 1987 and 1988 (figures are percentages of angler interviews).

Table 2. Estimated effort (angler-hours) by temporal component for the Ugashik Narrows sport fishery, 1987-1988.

Year	Temporal Component (Dates)	Number of Interviews	D[a]	d[b]	Effort		
					Angler-hours	SE[c]	RP[d]
1987	1 (6/22-7/16)	50	25	11	393.4	72.35	36.1%
	2 (7/17-8/10)	92	25	10	865.2	180.85	41.0%
	3 (8/11-8/30)	102	20	10	768.8	156.53	39.9%
	Season:	244	70	31	2,027.4	249.89	24.2%
1988	1 (6/20-6/30)	12	11	11	30.8	0.00	0.0%
	2 (7/01-7/26)	133	26	24	621.5	28.42	9.0%
	3 (7/27-8/09)	64	14	14	230.5	0.00	0.0%
	4 (8/10-9/08)	231	30	29	1,075.0	32.15	5.9%
	5 (9/09-9/21)	39	13	13	190.3	6.97	7.2%
	Season:	479	94	91	2,148.1	43.47	4.0%

[a] Number of days possible.
[b] Number of days surveyed.
[c] Standard error of the estimate.
[d] Relative precision ($\alpha = 0.05$).

Table 3. Estimated catch and harvest per angler-hour by species and temporal component for the Ugashik Narrows sport fishery, 1987.

Species	Temporal Component[a]	Catch Rate		Harvest Rate	
		Fish/Hr	SE[b]	Fish/Hr	SE[b]
Coho Salmon	1	0.0000	0.0000	0.0000	0.0000
	2	0.0032	0.0058	0.0032	0.0058
	3	0.0805	0.0215	0.0694	0.0207
Sockeye Salmon	1	0.0381	0.0193	0.0064	0.0097
	2	0.3613	0.2074	0.1014	0.0464
	3	0.6414	0.1291	0.0056	0.0043
Arctic Grayling	1	0.0826	0.0490	0.0127	0.0069
	2	0.1300	0.0634	0.0127	0.0052
	3	0.2971	0.0905	0.0056	0.0033
Arctic Char/ Dolly Varden	1	0.3621	0.0820	0.0191	0.0088
	2	0.1458	0.0551	0.0127	0.0064
	3	0.9746	0.1703	0.0139	0.0090
Lake Trout	1	0.0254	0.0117	0.0064	0.0057
	2	0.0539	0.0302	0.0095	0.0044
	3	0.0083	0.0100	0.0000	0.0000

[a] Component 1: 6/22-7/16, component 2: 7/17-8/10, component 3: 8/11-8/30.
[b] Standard error of the estimate.

(component 3). Catch and harvest rates were computed using effort for all species, so variation in rates reflects changes in targeted species. Catch rates computed using targeted effort could have been much higher.

Mean catch rates in 1988 were again generally less than one fish per angler-hour, with the exception that char were caught at a rate of over two fish per hour in the last 3 weeks of September (Table 4). This higher catch rate probably resulted from char being targeted at that time of year. Similar to 1987, harvest rates of all species were low. Sockeye salmon harvest rates were highest in July, and coho salmon harvest rates were highest during the period 10 August-8 September (component 4). The harvest rate for char was highest in late June (component 1).

In 1987, the total catch of 1,029 char led all other species, but only 27 (2.6%) were harvested (Table 5). An estimated 902 sockeye salmon were caught, of which 114 were harvested (12.6%). The Arctic grayling catch of 377 was third highest among species, but harvest was only 19 (5.0%). Only 63 coho salmon were caught, but 53 were harvested, leading all other species with a retention rate of 84%. It should be noted when comparing catch and harvest estimates for 1987 that relative precision of estimates was poor for all species, ranging from 43% to 109%. The low precision probably resulted from low sampling intensity.

In 1988, the coho salmon harvest of 176 fish led all other species (Table 6). Catch and harvest of coho salmon were highest in the last 3 weeks of August. Catch of sockeye salmon was highest during the last 3 weeks of September, but harvest was highest in July, when fish were fresh. The catch of 1,360 char was again the highest among species. Catch and harvest of Arctic grayling were lower than in 1987, even though the season was longer and effort was slightly higher than 1987. As in 1987, lake trout catch and harvest were much lower than all other species. Most lake trout were taken from boats fishing the mouth of the Narrows in Lower Ugashik Lake, and were not commonly caught within the Narrows proper.

Relative precision of the 1988 catch and harvest estimates was much improved over 1987. Relative precision of catch estimates was under 10% for all species but Arctic grayling. Relative precision of harvest estimates for the season ranged from 8.9% to 31.9%. The increased precision of catch and harvest estimates in 1988 resulted from increased sampling intensity.

Outlet:

The 1988 roving creel survey was conducted from 9 July through 28 September. A creel survey crew on site during the period 5-8 July reported no effort prior to the start of the survey.

The Outlet sport fishery was similar to the Narrows in 1988 in that anglers were predominantly male, adult, guided non-residents fishing with artificial lures (Figure 4). Nearly all fishing was from shore or while wading.

Coho and sockeye salmon were the primary species of interest in the fishery in 1989. Mean angler counts and estimated effort were highest from 20 August

Table 4. Estimated catch and harvest per angler-hour by species and temporal component for the Ugashik Narrows sport fishery, 1988.

Species	Temporal Component[a]	Catch Rate		Harvest Rate	
		Fish/Hr	SE[b]	Fish/Hr	SE[b]
Coho Salmon	1	0.0000	0.0000	0.0000	0.0000
	2	0.0000	0.0000	0.0000	0.0000
	3	0.0630	0.0182	0.0291	0.0125
	4	0.2979	0.0320	0.1500	0.0175
	5	0.0745	0.0319	0.0135	0.0164
Sockeye Salmon	1	0.0000	0.0000	0.0000	0.0000
	2	0.1243	0.0276	0.1166	0.0269
	3	0.0630	0.0185	0.0484	0.0077
	4	0.0421	0.0106	0.0010	0.0006
	5	0.8054	0.1746	0.0745	0.0042
Arctic Grayling	1	0.1301	0.1328	0.0000	0.0000
	2	0.2294	0.0392	0.0115	0.0062
	3	0.0048	0.0037	0.0000	0.0000
	4	0.0514	0.0277	0.0051	0.0017
	5	0.0068	0.0026	0.0000	0.0000
Arctic Char/ Dolly Varden	1	0.7805	0.4764	0.2276	0.2217
	2	0.3346	0.0550	0.0535	0.0214
	3	0.3293	0.0429	0.0387	0.0199
	4	0.5731	0.0512	0.0411	0.0114
	5	2.1861	0.2521	0.0609	0.0168
Lake Trout	1	0.0000	0.0000	0.0000	0.0000
	2	0.0134	0.0071	0.0038	0.0043
	3	0.0581	0.0153	0.0484	0.0144
	4	0.0031	0.0014	0.0021	0.0011
	5	0.0000	0.0000	0.0000	0.0000

[a] Component 1: 6/20-6/30, component 2: 7/1-7/26, component 3: 7/27-8/9, component 4: 8/10-9/8, component 5: 9/9-9/21.

[b] Standard error of the estimate.

Table 5. Estimated catch and harvest by species and temporal component for the Ugashik Narrows sport fishery, 1987.

Species	Temporal Component[a]	Catch			Harvest			Percent Harvested
		Number	SE[b]	RP[c]	Number	SE[b]	RP[c]	
Coho Salmon	1	0	0.0		0	0.0		
	2	3	2.6	130.7%	3	2.0	130.7%	100.0
	3	60	19.8	64.5%	50	19.2	75.1%	83.3
	Total	63	19.9	61.8%	53	19.3	71.2%	84.1
Sockeye Salmon	1	14	7.3	101.9%	2	1.7	169.5%	14.3
	2	408	281.5	135.2%	108	63.1	114.4%	26.5
	3	480	154.9	63.3%	4	2.8	138.7%	0.8
	Total	902	321.4	69.8%	114	63.1	108.6%	12.6
Arctic Grayling	1	30	13.8	90.0%	5	2.2	87.8%	16.7
	2	105	25.3	47.3%	10	5.9	116.0%	9.5
	3	242	88.2	71.5%	4	2.0	98.0%	1.7
	Total	377	92.8	48.3%	19	6.6	68.4%	5.0
Arctic char/ Dolly Varden	1	130	30.8	46.4%	7	2.7	74.2%	5.4
	2	115	22.0	37.5%	10	5.2	101.9%	8.7
	3	784	222.4	55.6%	10	3.2	61.9%	1.3
	Total	1,029	225.6	43.0%	27	6.6	48.1%	2.6
Lake Trout	1	9	3.7	81.4%	2	1.7	169.5%	22.2
	2	43	30.8	140.5%	8	4.1	100.9%	18.6
	3	6	2.2	73.2%	0	0.0		0.0
	Total	58	31.1	105.2%	10	4.5	87.6%	17.2

[a] Component 1: 6/22-7/16, component 2: 7/17-8/10, component 3: 8/11-8/30.
[b] Standard error of the estimate.
[c] Relative precision ($\alpha = 0.05$).

Table 6. Estimated catch and harvest by species and temporal component for the Ugashik Narrows sport fishery, 1988.

Species	Temporal Component[a]	Catch			Harvest			Percent Harvested
		Number	SE[b]	RP[c]	Number	SE[b]	RP[c]	
Coho Salmon	1	0	0.0		0	0.0		
	2	0	0 0		0	0.0		
	3	16	2.7	32.5%	8	1.3	32.6%	50.0
	4	321	13.3	8.1%	166	11.3	13.3%	51.7
	5	12	1.3	21.6%	2	0.0	0.0%	16.7
	Total	349	13.7	7.7%	176	11.4	12.6%	50.4
Sockeye Salmon	1	0	0.0		0	0.0		
	2	85	7.9	18.2%	79	7.0	17.4%	92.9
	3	13	0.0	0.0%	10	0.0	0.0	76.9
	4	49	4.2	16.8%	1	0.2	39.2%	2.0
	5	145	9.2	12.5%	12	1.1	17.2%	8.3
	Total	292	12.9	8.6%	102	7.1	13.7%	34.9
Arctic Grayling	1	4	0.0	0.0%	0	0.0		0.0
	2	140	9.8	13.7%	9	2.2	48.5%	6.4
	3	1	0.0	0.0%	0	0.0		0.0
	4	57	4.9	16.8%	5	0.4	16.6%	8.8
	5	1	0.3	56.8%	0	0.0		0.0
	Total	203	10.9	10.6%	14	2.3	31.9%	6.9
Arctic char/ Dolly Varden	1	24	0.0	0.0%	7	0.0	0.0%	29.2
	2	221	12.6	11.1%	34	3.6	20.7%	15.4
	3	81	3.7	9.0%	10	2.8	55.5%	12.3
	4	608	21.1	6.8%	49	5.3	21.0%	8.1
	5	426	34.1	15.7%	9	0.8	18.3%	2.1
	Total	1,360	42.2	6.1%	109	7.0	12.6%	8.0

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Table 6. (Page 2 of 2).

Species	Temporal Component[a]	Catch Number	Catch SE[b]	Catch RP[c]	Harvest Number	Harvest SE[b]	Harvest RP[c]	Percent Harvested
Lake Trout	1	0	0.0		0	0.0		
	2	7	0.8	22.2%	2	0.6	56.3%	28.6
	3	12	0.0	0.0%	10	0.0	0.0%	83.3
	4	3	0.3	22.2%	2	0.3	28.4%	66.7
	5	0	0.0		0	0.0		
	Total	22	0.8	7.5%	14	0.6	8.9%	63.6

[a] Component 1: 6/20-6/30, component 2: 7/1-7/26, component 3: 7/27-8/9, component 4: 8/10-9/8, component 5: 9/9-9/21.
[b] Standard error of the estimate.
[c] Relative precision (a = 0.05).

to 9 September (temporal components 3 and 4), corresponding with the peak of the coho salmon run. Effort was also relatively high in the last 3 weeks of July (component 1), corresponding with the peak run of sockeye salmon. Total effort for the season was estimated at 1,675 angler hours, plus or minus 18.4% (Table 7). Effort estimates for each temporal component were rather imprecise, probably a result of few high counts and numerous zero counts.

Catch and harvest rates were estimated from both complete and incomplete trip interviews. Wilcoxon signed-rank tests failed to show significant differences between interview types in either catch rates ($p > 0.50$) or harvest rates ($p > 0.50$) of coho salmon. Estimated catch and harvest rates of coho salmon were highest from 30 July to 9 September (components 2 through 4). Estimated catch and harvest rates for sockeye salmon were highest in July and early August (components 1 and 2). Catch and harvest rates of all other species were extremely low (Table 8). Simple plots of catch rate (for coho and sockeye salmon) and duration of fishing trip were adequate to assure that the assumption of independence was satisfied.

Coho salmon clearly dominated the Outlet fishery in 1988 (Table 9). Catch for the season was estimated at 2,199, with 566 fish harvested (26%). Coho catch and harvest peaked in late August and early September (component 4). Sockeye salmon were the next most important species, with an estimated catch of 405, and harvest of 203 (50%). Catch and harvest of all other species were extremely low. Relative precision of harvest estimates was poor, ranging from 27% for coho salmon to 95% for char. Relative precision was generally better for catch estimates, but ranged from 27% for coho salmon to 108% for Arctic grayling.

Frequency distributions of effort, as well as coho and sockeye salmon catches, were not normal. Violations of normality assumptions may have biased effort and catch variances, but likely did not affect the conclusion that effort and catch of all species are low relative to other Alaska sport fisheries.

Poor precision in estimation prompted cursory analysis of the survey design. Investigation of angler counts by period showed that little precision was gained with the stratified sampling design employed by the survey. Overlapping 95% confidence intervals indicated that mean angler counts in periods A through E were not significantly different from each other or the overall mean count (Figure 5). The mean count in period F was significantly lower than mean counts in period B, C, and D. The coefficient of variation in mean angler counts was highest in periods A and F, indicating increased sampling effort was needed in those periods (Figure 6). Variation in angler counts, represented by the standard deviation, increased as the mean count increased (Figure 7). Counts were not normally distributed in any period because of the high occurrence of zero counts (Figure 8). Future surveys at the Outlet can and should be conducted as direct expansion surveys with an intensive sampling schedule.

Table 7. Estimated effort (angler-hours) by temporal component and period for the Ugashik Outlet sport fishery, 1988.

Temporal Component[a]	Period[b]	Counts			Effort		
		Number	Mean	SE[c]	Angler-Hrs	SE[c]	RP[d]
1	A	9	1.2	0.85	51	35.54	
	B	7	0.6	0.57	24	24.00	
	C	13	2.3	0.90	97	37.85	
	D	8	1.8	0.59	74	24.78	
	E	9	1.9	0.72	79	30.07	
	F	4	0.0	0.00	0	0.00	
	Total	50			325	69.22	41.7%
2	A	8	0.9	0.58	37	24.39	
	B	10	0.8	0.53	34	22.41	
	C	10	0.1	0.10	4	4.24	
	D	10	0.3	0.30	13	12.61	
	E	6	0.0	0.00	0	0.00	
	F	8	0.0	0.00	0	0.00	
	Total	52			88	35.68	79.5%
3	A	3	3.0	3.00	42	42.00	
	B	3	8.3	3.67	117	51.33	
	C	2	11.0	1.00	154	14.00	
	D	5	6.2	1.53	87	21.42	
	E	2	3.5	3.50	49	49.00	
	F	2	0.0	0.00	0	0.00	
	Total	17			449	86.34	37.7%
4	A	7	5.9	2.57	164	71.89	
	B	9	6.0	0.97	168	27.20	
	C	5	3.8	1.11	106	31.18	
	D	5	3.8	1.53	106	42.84	
	E	6	1.3	0.67	37	18.65	
	F	3	0.0	0.00	0	0.00	
	Total	35			581	95.21	32.1%

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Table 7. (Page 2 of 2).

Temporal Component[a]	Period[b]	Counts			Effort		
		Number	Mean	SE[c]	Angler-Hrs	SE[c]	RP[d]
5	A	5	0.0	0.00	0	0 00	
	B	7	1.1	0.40	43	15.36	
	C	7	2.3	0.92	87	34.90	
	D	14	1.0	0.26	38	9.75	
	E	5	0.4	0.24	15	9.33	
	F	10	1.3	0.52	49	19.67	
	Total	48			232	44.98	38.0%
Season					1,675	156.86	18.4%

[a] Component 1: 7/9-7/29, component 2: 7/30-8/19, component 3: 8/20-8/26, component 4: 8/27-9/9, component 5: 9/10-9/28.

[b] Period A: 0900-1100, period B: 1100-1300, period C: 1300-1500, period D: 1500-1700, period E: 1700-1900, period F: 1900-2100.

[c] Standard error of the estimate.

[d] Relative precision ($\alpha = 0.05$).

Table 8. Estimated catch and harvest per angler-hour by species and temporal component for the Ugashik Outlet sport fishery, 1988.

Species	Temporal Component[a]	Catch Rate		Harvest Rate	
		Fish/Hr	SE[b]	Fish/Hr	SE[b]
Coho Salmon	1	0.0000	0.0000	0.0000	0.0000
	2	0.8889	0.1718	0.4127	0.1584
	3	1.8073	0.1660	0.4046	0.0533
	4	2.0495	0.2398	0.4607	0.0693
	5	0.5103	0.0963	0.3448	0.0736
Sockeye Salmon	1	1.0044	0.2323	0.6167	0.1679
	2	0.6032	0.1550	0.0317	0.0382
	3	0.0462	0.0178	0.0000	0.0000
	4	0.0086	0.0262	0.0000	0.0000
	5	0.0000	0.0000	0.0000	0.0000
Chum Salmon	1	0.0000	0.0000	0.0000	0.0000
	2	0.0000	0.0000	0.0000	0.0000
	3	0.0501	0.0179	0.0000	0.0000
	4	0.0000	0.0000	0.0000	0.0000
	5	0.0000	0.0000	0.0000	0.0000
Pink Salmon	1	0.0000	0.0000	0.0000	0.0000
	2	0.0317	0.0293	0.0000	0.0000
	3	0.0578	0.0250	0.0000	0.0000
	4	0.0000	0.0000	0.0000	0.0000
	5	0.0828	0.0392	0.0000	0.0000
Chinook Salmon	1	0.0000	0.0000	0.0000	0.0000
	2	0.0000	0.0000	0.0000	0.0000
	3	0.0000	0.0000	0.0000	0.0000
	4	0.0129	0.0044	0.0000	0.0000
	5	0.0000	0.0000	0.0000	0.0000
Arctic char/ Dolly Varden	1	0.0176	0.0108	0.0000	0.0000
	2	0.0952	0.0568	0.0000	0.0000
	3	0.0655	0.0279	0.0077	0.0053
	4	0.0215	0.0160	0.0000	0.0000
	5	0.1931	0.0644	0.0552	0.0305

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Table 8. (Page 2 of 2).

Species	Temporal Component[a]	Catch Rate		Harvest Rate	
		Fish/Hr	SE[b]	Fish/Hr	SE[b]
Arctic Grayling	1	0.0000	0.0000	0.0000	0.0000
	2	0.1270	0.1097	0.0000	0.0000
	3	0.0000	0.0000	0.0000	0.0000
	4	0.0129	0.0058	0.0000	0.0000
	5	0.0000	0.0000	0.0000	0.0000

[a] Component 1: 7/9-7/29, component 2: 7/30-8/19, component 3: 8/20-8/26, component 4: 8/27-9/9, component 5: 9/10-9/28.

[b] Standard error of the estimate.

Table 9. Estimated catch and harvest by species and temporal component for the Ugashik Outlet sport fishery, 1988.

Species	Temporal Component[a]	Catch			Harvest			Percent Harvested
		Number	SE[b]	RP[c]	Number	SE[b]	RP[c]	
Coho Salmon	1	0	0.0		0	0.0		
	2	78	34.6	86.9%	36	19.5	106.0%	46.2
	3	811	172.3	41.7%	182	42.1	45.3%	22.4
	4	1,191	238.7	39.3%	268	59.2	43.3%	22.5
	5	118	31.7	52.7%	80	22.8	55.9%	67.8
	Total	2,199	298.1	26.6%	566	78.6	27.2%	25.7
Sockeye Salmon	1	326	101.4	60.9%	200	68.3	66.9%	61.3
	2	53	24.9	92.0%	3	3.3	216.9%	5.7
	3	21	8.8	81.9%	0	0.0		0.0
	4	5	15.0	589.2%	0	0.0		0.0
	5	0	0.0		0	0.0		
	Total	405	105.8	51.2%	203	68.4	66.0%	50.1
Chum Salmon	1	0	0.0		0	0.0		
	2	0	0.0		0	0.0		
	3	22	9.0	80.2%	0	0.0		0.0
	4	0	0.0		0	0.0		
	5	0	0.0		0	0.0		
	Total	22	9.0	80.2%	0	0.0		0.0
Pink Salmon	1	0	0.0		0	0.0		
	2	3	2.7	173.1%	0	0.0		0.0
	3	26	12.1	91.1%	0	0.0		0.0
	4	0	0.0		0	0.0		
	5	19	9.7	100.1	0	0.0		0.0
	Total	48	15.72	64.2%	0	0.0		0.0
Chinook Salmon	1	0	0.0		0	0.0		
	2	0	0.0		0	0.0		
	3	0	0.0		0	0.0		
	4	7	2.8	79.2%	0	0.0		0.0
	5	0	0.0		0	0.0		
	Total	7	2.8	79.2%	0	0.0		0.0

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Table 9. (Page 2 of 2).

Species	Temporal Component[a]	Catch Number	Catch SE[b]	Catch RP[c]	Harvest Number	Harvest SE[b]	Harvest RP[c]	Percent Harvested
Arctic char/ Dolly Varden	1	6	3.6	117.9%	0	0.0		0.0
	2	8	5.7	138.7%	0	0.0		0.0
	3	29	13.5	91.4%	3	2.5	160.1	10.3
	4	12	9.4	153.2%	0	0.0		0.0
	5	45	17.0	74.2%	13	7.4	110.8	28.9
	Total	101	24.7	47.9%	16	7.8	94.9	15.8
Arctic Grayling	1	0	0.0		0	0.0		
	2	11	9.9	176.4%	0	0.0		0.0
	3	0	0.0		0	0.0		
	4	7	3.6	101.1%	0	0.0		0.0
	5	0	0.0		0	0.0		
	Total	19	10.5	108.7%	0	0.0		0.0

[a] Component 1: 7/9-7/29, component 2: 7/30-8/19, component 3: 8/20-8/26, component 4: 8/27-9/9, component 5: 9/10-9/28.
[b] Standard error of the estimate.
[c] Relative precision ($\alpha = 0.05$).

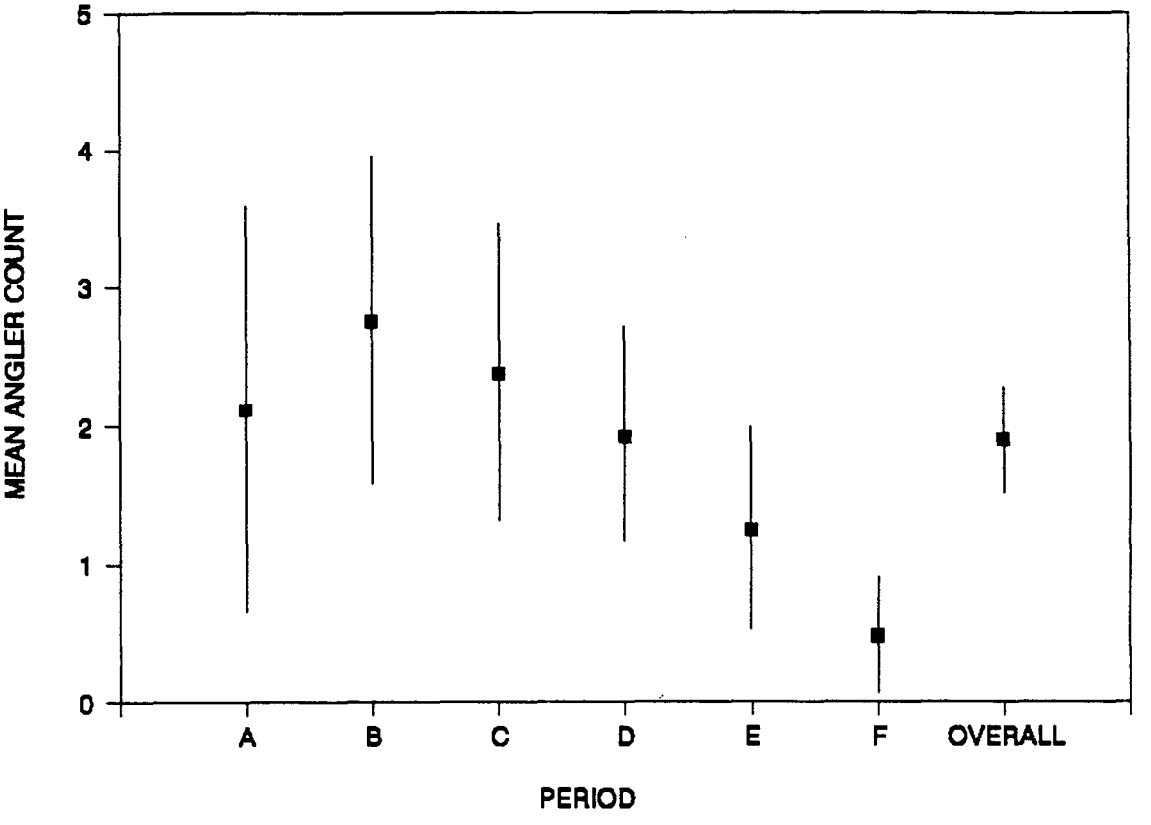

Figure 5. Mean angler counts by sampling period and overall mean angler count in the Ugashik Outlet creel survey, 1988. Vertical bars represent 95% confidence intervals of means.

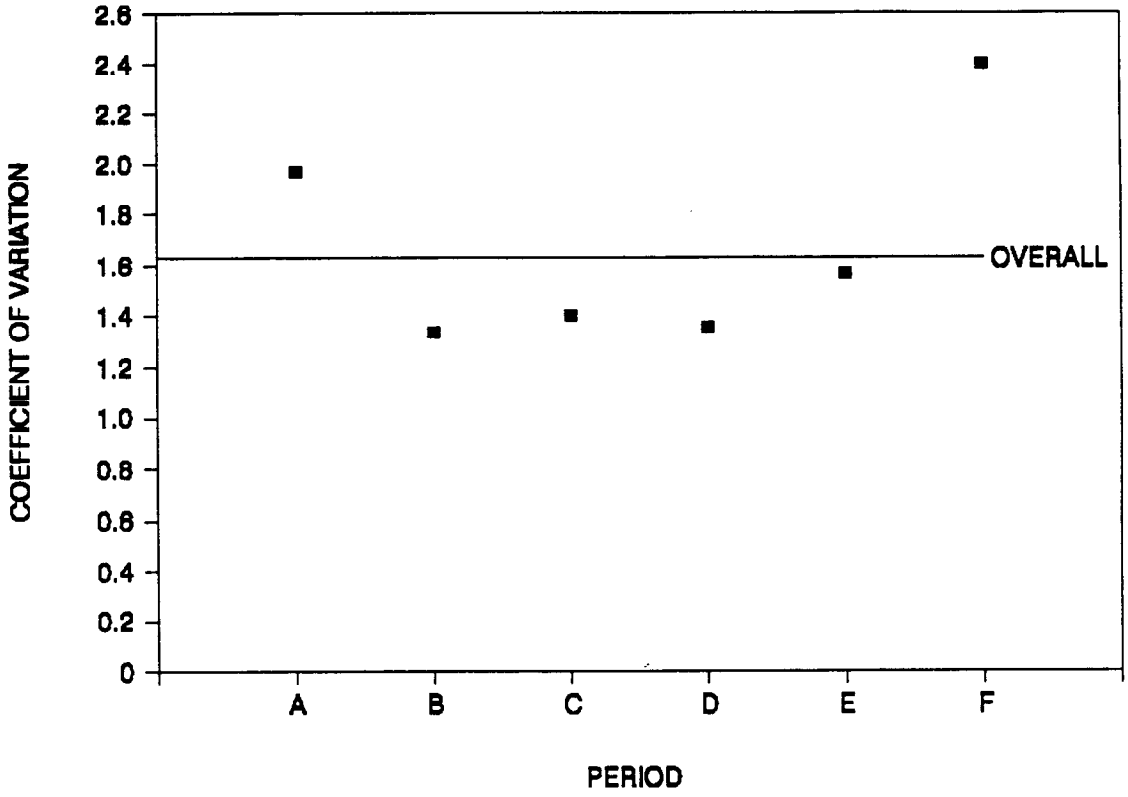

Figure 6. The relationship of coefficient of variation (standard deviation/ mean) in angler counts of periods A-F to the overall coefficient of variation (all periods), Ugashik Outlet creel survey, 1988.

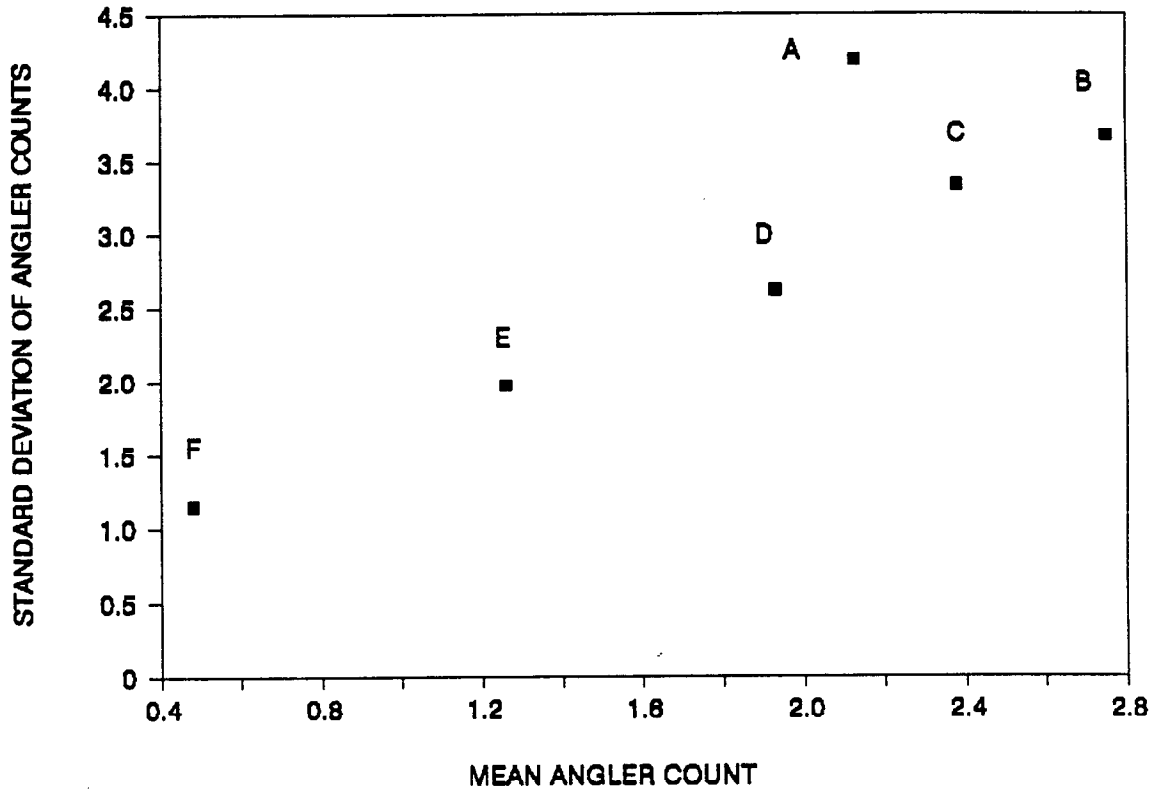

Figure 7. The relationship of standard deviation to mean angler counts for sampling periods A-F in the Ugashik Outlet creel survey, 1988.

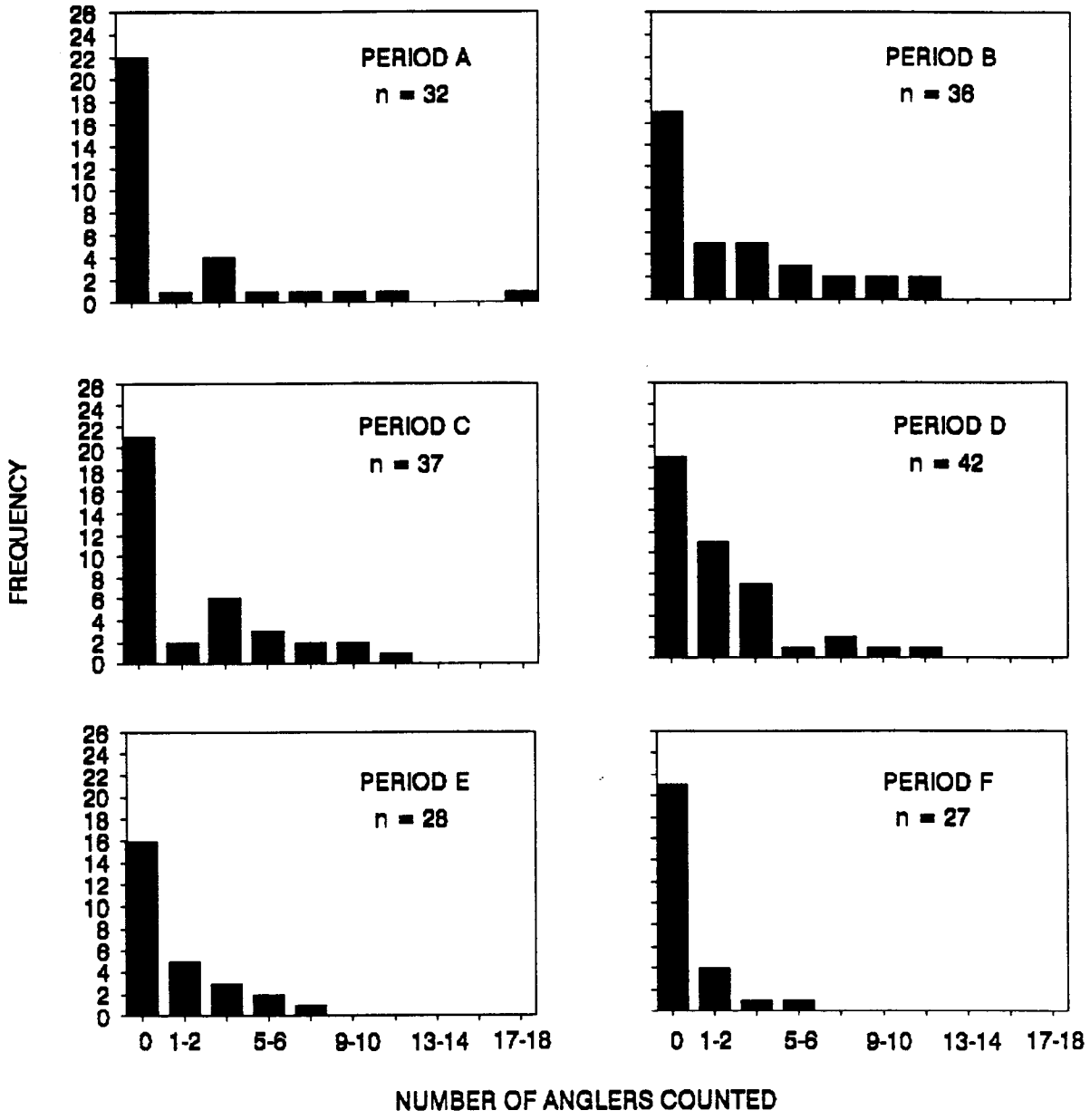

Figure 8. Frequency distributions of angler counts by sampling period for the Ugashik Outlet creel survey, 1988.

Age and Size Composition

Coho Salmon:

Coho salmon from the Narrows and Outlet sport fisheries were sampled for age and size in 1988 only. All cohos harvested at the Narrows were of age class 2.1 (Table 10). Age 2.1 fish also comprised 91% of the harvest at the Outlet (Table 11). Sex ratios were approximately 1:1 in both fisheries. Mean length and weight of males and females harvested were similar in both fisheries.

Arctic Char/Dolly Varden:

Arctic char and Dolly Varden (char) caught in the sport fishery at the Narrows were sampled for fork length in 1987 and 1988. Length of char appeared greater than 1988, but may have been biased by small sample size or differences in time of sampling (Figure 9). Most of the 1987 samples were from the period 18-27 August, when catch rates were highest (Table 3). The 1988 samples were evenly distributed over the period 16 June through 14 September. Char abundance and size at the Narrows fluctuated with abundance of spawning sockeye and coho salmon. The large average size of char and ease of capture are major factors in their popularity in the Narrows fishery.

Arctic Grayling:

Extremely low harvest precluded estimation of the size composition of harvested Arctic grayling. Size composition of the sport catch was estimated from hook and line samples used for abundance estimates in 1988. Arctic grayling in the 400 mm to 500 mm length range dominated the sport catch in most months at the Narrows and Outlet (Figures 10 and 11). During June, August, and September of 1988, fish under 400 mm constituted a significant proportion of the samples from the Narrows (Figure 10).

Fish under 400 mm represented a greater proportion of the samples from the Narrows than from the Outlet. The frequency of fish under 400 mm caught by hook and line at the Outlet has steadily declined since 1980 (Meyer *In press*).

DISCUSSION

The creel surveys were an important first step in characterizing and understanding the sport fisheries at the Narrows and Outlet. Sport fishing effort is low to moderate, compared to other sport fisheries in southwestern Alaska. The catch and release ethic, characteristic of non-resident, guided anglers, has kept these fisheries non-consumptive with respect to resident freshwater species such as lake trout and Arctic grayling. Annual creel surveys are probably unwarranted unless dramatic changes occur. The U.S. Fish and Wildlife Service regularly monitors public use at the Narrows and should be able to provide adequate information for scheduling future surveys.

Table 10. Age composition and mean length (mm) and weight (g), by sex and age group, of coho salmon harvested in the Ugashik Narrows sport fishery, 1988.

SEX		Age Group		
		UNKNOWN	2.1	TOTAL
FEMALES	n (Known Age)		14	14
	Percent		41.2	41.2
	SE		0.09	0.09
	Mean Length	577	600	592
	SE	16.93	7.01	7.49
	Sample Size	7	14	21
	Mean Weight	3239	3715	3548
	SE	336.70	137.68	151.77
	Sample Size	7	13	20
MALES	n (Known Age)		20	20
	Percent		58.8	58.8
	SE		0.09	0.09
	Mean Length	589	579	582
	SE	10.60	13.17	10.07
	Sample Size	7	20	27
	Mean Weight	3821	3677	3715
	SE	279.21	259.97	203.47
	Sample Size	7	20	27
TOTAL	n (Known Age)		34	34
	Percent		100.0	100.0
	SE		0.00	
	Mean Length	583	588	587
	SE	9.75	8.36	6.52
	Sample Size	14	34	48
	Mean Weight	3530	3692	3644
	SE	225.13	164.72	132.81
	Sample Size	14	33	47

Table 11. Age composition and mean length (mm) and weight (g), by sex and age group, of coho salmon harvested in the Ugashik Outlet sport fishery, 1988.

		Age Group							
SEX		UNKNOWN	1.1	1.2	2.1	2.2	3.0	3.1	TOTAL
UNKNOWN	n (Known Age)		1		13				14
	Percent		0.6		8.2				8.9
	SE		0.01		0.02				0.02
FEMALES	n (Known Age)		2		67	2	1	1	73
	Percent		1.3		42.4	1.3	0.6	0.6	46.2
	SE		0.01		0.04	0.01	0.01	0.01	0.04
	Mean Length	612	596		603	517	320	630	599
	SE	9.29	6.50		3.38	68.00			4.86
	Sample Size	11	2		67	2	1	1	84
	Mean Weight	3840	3550		3791	3150	700		3732
	SE	193.05	50.00		72.99	350.00			77.08
	Sample Size	10	2		59	2	1	0	74
MALES	n (Known Age)		5	1	63	2			71
	Percent		3.2	0.6	39.9	1.3			44.9
	SE		0.01	0.01	0.04	0.01			0.04
	Mean Length	594	595	584	601	614			599
	SE	11.26	7.49		5.18	45.50			4.35
	Sample Size	15	5	1	63	2			86
	Mean Weight	3923	4160	3100	3967	4150			3965
	SE	214.05	157.64		93.98	1100.00			80.98
	Sample Size	14	5	1	60	2			82
TOTAL	n (Known Age)		8	1	143	4	1	1	158
	Percent		5.1	0.6	90.5	2.5	0.6	0.6	100.0
	SE		0.02	0.01	0.02	0.01	0.01	0.01	
	Mean Length	598	595	584	601	566	320	630	598
	SE	8.30	5.37		3.01	43.68			3.24
	Sample Size	27	7	1	133	4	1	1	174
	Mean Weight	3825	3986	3100	3864	3650	700		3833
	SE	153.60	156.87		59.24	552.65			56.57
	Sample Size	25	7	1	122	4	1	0	160

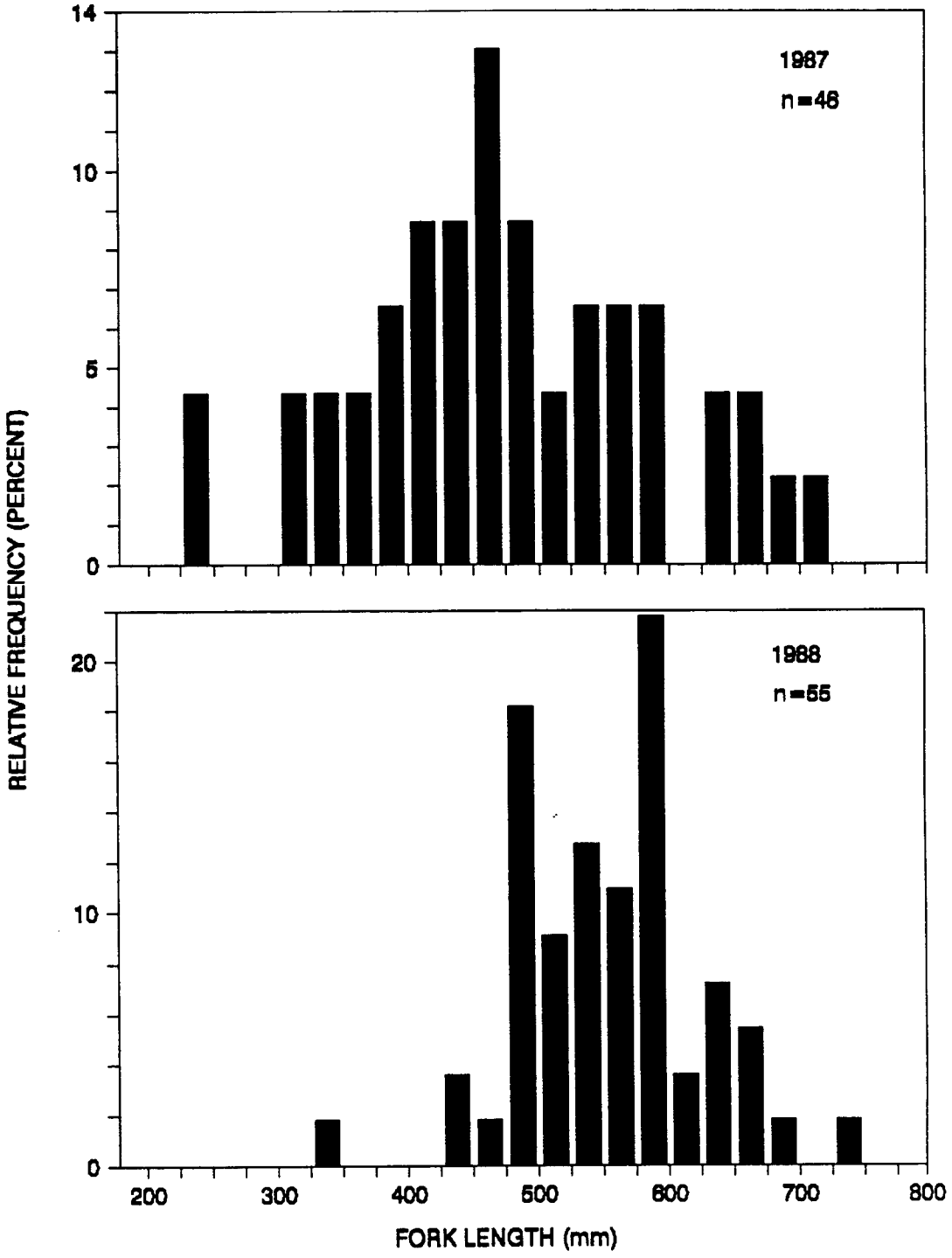

Figure 9. Length-frequency distributions of Arctic Char/Dolly Varden caught by hook and line in the Ugashik Narrows sport fishery in 1987 (top) and 1988 (bottom).

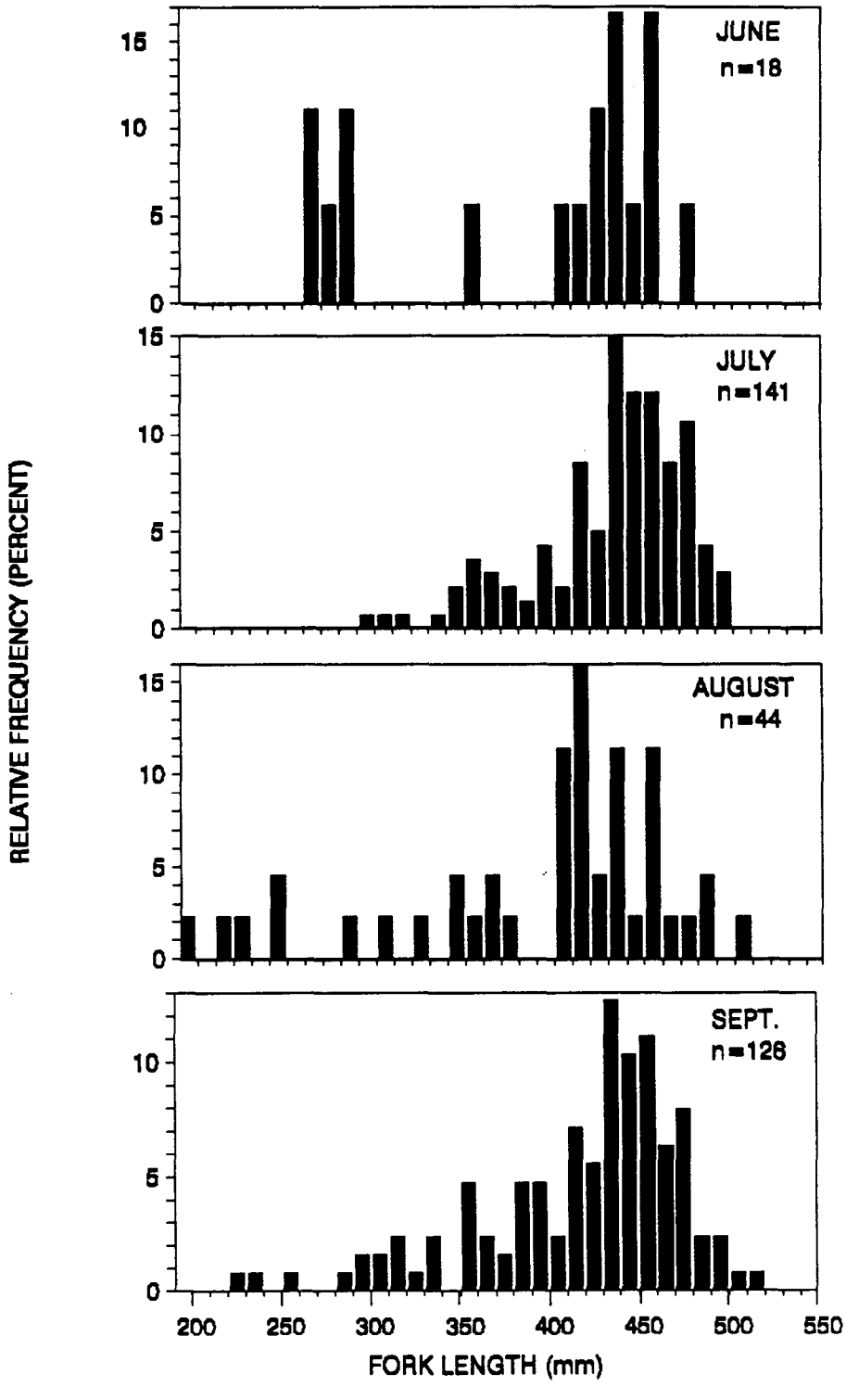

Figure 10. Length-frequency distributions of Arctic grayling caught by hook and line at Ugashik Narrows in 1988.

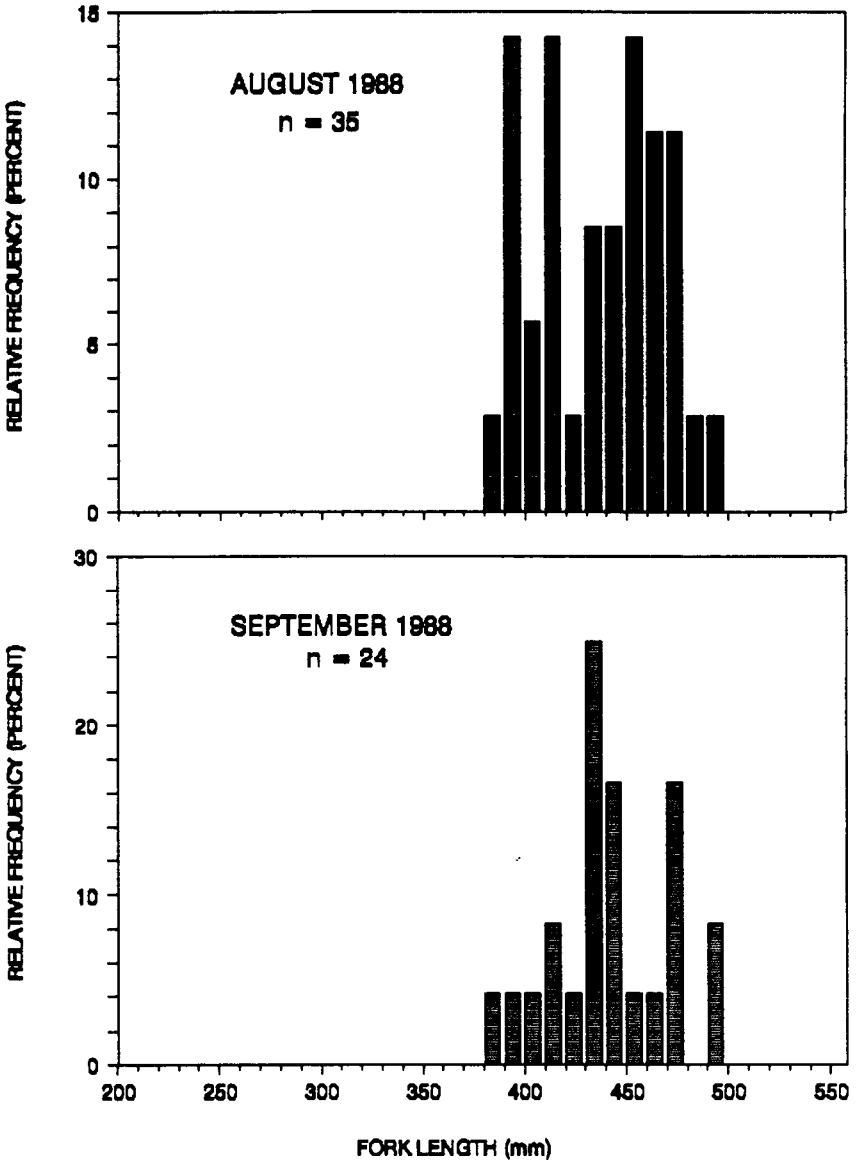

Figure 11. Length-frequency distributions of Arctic grayling caught by hook and line at Ugashik Outlet in 1988.

The low precision of estimates for the Outlet was a function of low effort in the fishery and an inappropriate sample design. The area is small enough, and access is restricted enough, to allow a nearly complete census with a direct expansion design in future creel surveys. As a first survey, however, it adequately documented effort, catch, and harvest in the fishery.

The catch of Arctic grayling was extremely low at the Outlet in 1988, compared with historical information. Abundance estimates in 1988 and 1989 indicated a population of less than 100 fish through most of the summer. Arctic grayling abundance at the Narrows fluctuated from month to month, but was generally less than 2,000 fish, and appeared to decrease from 1988 to 1989 (Meyer *In press*). This prompted a decision by the Alaska Board of Fisheries to close the Ugashik drainage to Arctic grayling fishing in 1990, to allow the population to rebuild.

Harvest of Arctic grayling in the Ugashik drainage has been generally very low for several years. The declining proportion of small fish in hook and line samples from the Outlet, coupled with decreasing abundance and low harvest, suggest that recruitment has declined (Meyer *In press*). Periodic monitoring of size and age composition will be necessary to document the return of this valuable fishery.

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APPENDIX A

Appendix A1. Summary of completed-trip angler interviews, Ugashik Narrows sport fishery, 1987.

Temporal Component	Date	No. of Anglers Interviewed	No. of Anglers Missed	Mean Effort per Angler	SE[a]
1	22-Jun	1	0	6.0	0.00
	23-Jun				
	24-Jun				
	25-Jun	5	0	5.5	0.00
	26-Jun				
	27-Jun				
	28-Jun	7	0	2.8	0.21
	29-Jun				
	30-Jun				
	01-Jul				
	02-Jul	2	0	1.3	0.75
	03-Jul				
	04-Jul	5	5	3.1	0.49
	05-Jul				
	06-Jul				
	07-Jul				
	08-Jul	1	0	1.5	0.00
	09-Jul	4	0	4.1	1.13
	10-Jul	3	0	2.1	0.66
	11-Jul	10	0	3.9	0.56
	12-Jul				
	13-Jul	4	0	1.0	0.14
	14-Jul				
	15-Jul				
	16-Jul	8	0	2.4	0.44
2	17-Jul				
	18-Jul				
	19-Jul				
	20-Jul	10	5	6.1	0.65
	21-Jul				
	22-Jul				
	23-Jul				
	24-Jul	5	0	1.9	0.25
	25-Jul				
	26-Jul	12	0	4.9	0.41
	27-Jul				
	28-Jul	18	0	3.9	0.69
	29-Jul				
	30-Jul				
	31-Jul	13	0	3.1	0.68
	01-Aug	8	0	1.7	0.73
	02-Aug				

-Continued-

Appendix A1. (Page 2 of 2).

Temporal Component	Date	No. of Anglers Interviewed	No. of Anglers Missed	Mean Effort per Angler	SE[a]
2 (cont.)	03-Aug	7	0	3.5	0.54
	04-Aug	3	0	1.3	0.33
	05-Aug				
	06-Aug				
	07-Aug	5	0	2.7	1.13
	08-Aug	11	0	1.9	0.30
	09-Aug				
	10-Aug				
3	11-Aug				
	12-Aug	3	0	1.9	0.58
	13-Aug	10	0	1.4	0.22
	14-Aug				
	15-Aug				
	16-Aug				
	17-Aug				
	18-Aug	8	0	0.6	0.15
	19-Aug	8	0	2.4	0.47
	20-Aug				
	21-Aug	8	0	1.4	0.25
	22-Aug				
	23-Aug	19	0	3.7	0.67
	24-Aug				
	25-Aug	16	0	4.3	0.48
	26-Aug				
	27-Aug	12	5	4.9	0.66
	28-Aug	13	0	7.0	0.88
	29-Aug				
	30-Aug	5	0	3.4	0.52

[a] Standard error.

Appendix A2. Summary of angler effort (angler-hours) and catch rates (CPUE, fish per angler hour) by species in the Ugashik Narrows sport fishery, 1987. Data are from completed-trip angler interviews.

Date	Wd/ We[a]	Sample Size	EFFORT		Coho Salmon			Sockeye Salmon			Arctic Grayling			Arctic Char/ Dolly Varden			Lake Trout		
			Mean	SE[b]	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE
625	Wd	5	5.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	2.40	1.939	0.436	0.20	0.200	0.036
628	We	7	2.8	0.21	0.00	0.000	0.000	0.00	0.000	0.000	0.43	0.297	0.154	2.29	0.680	0.821	0.00	0.000	0.000
702	Wd	2	1.3	0.75	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	1.50	1.500	1.200	0.00	0.000	0.000
704	We	5	3.1	0.48	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
709	Wd	4	4.1	1.13	0.00	0.000	0.000	0.00	0.000	0.000	2.00	1.225	0.485	1.25	0.479	0.303	0.00	0.000	0.000
710	Wd	3	2.1	0.66	0.00	0.000	0.000	0.67	0.333	0.316	0.00	0.000	0.000	0.00	0.000	0.000	0.33	0.333	0.158
711	We	10	3.9	0.56	0.00	0.000	0.000	0.00	0.000	0.000	0.10	0.100	0.025	1.00	0.394	0.255	0.20	0.200	0.051
713	Wd	4	1.0	0.14	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	1.75	0.750	1.828	0.00	0.000	0.000
716	Wd	8	2.4	0.44	0.00	0.000	0.000	0.50	0.327	0.211	0.00	0.000	0.000	0.38	0.263	0.158	0.00	0.000	0.000
720	Wd	10	6.1	0.65	0.00	0.000	0.000	9.70	2.574	1.590	0.10	0.100	0.016	0.00	0.000	0.000	0.00	0.000	0.000
724	Wd	5	1.9	0.24	0.00	0.000	0.000	0.00	0.000	0.000	0.20	0.200	0.108	0.80	0.374	0.432	0.00	0.000	0.000
726	We	12	4.9	0.41	0.00	0.000	0.000	0.08	0.083	0.017	0.42	0.260	0.085	0.25	0.179	0.051	1.33	0.449	0.271
728	Wd	18	3.8	0.69	0.00	0.000	0.000	0.22	0.173	0.058	0.44	0.294	0.116	0.17	0.121	0.043	0.06	0.056	0.014
731	Wd	13	3.1	0.68	0.00	0.000	0.000	0.38	0.213	0.124	0.69	0.286	0.223	0.15	0.104	0.049	0.00	0.000	0.000
801	We	8	1.7	0.73	0.00	0.000	0.000	0.13	0.125	0.074	0.38	0.263	0.221	0.38	0.263	0.221	0.00	0.000	0.000
803	Wd	7	3.5	0.53	0.00	0.000	0.000	0.14	0.143	0.041	0.14	0.143	0.041	1.71	0.778	0.490	0.00	0.000	0.000
804	Wd	3	1.3	0.33	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	1.00	0.577	0.750	0.00	0.000	0.000
807	Wd	5	2.6	1.13	0.20	0.200	0.075	0.80	0.583	0.302	2.40	1.749	0.906	1.60	0.927	0.604	0.00	0.000	0.000
808	We	11	1.9	0.30	0.00	0.000	0.000	0.09	0.091	0.047	0.09	0.091	0.047	0.73	0.449	0.376	0.00	0.000	0.000
812	Wd	3	1.9	0.58	0.00	0.000	0.000	1.00	0.577	0.522	0.33	0.333	0.174	0.00	0.000	0.000	0.33	0.333	0.174
813	Wd	10	1.4	0.22	0.00	0.000	0.000	0.50	0.269	0.370	0.20	0.133	0.148	0.20	0.200	0.148	0.10	0.100	0.074
818	Wd	8	0.6	0.15	0.13	0.125	0.203	0.38	0.375	0.610	0.00	0.000	0.000	0.38	0.183	0.610	0.00	0.000	0.000
819	Wd	8	2.4	0.47	0.00	0.000	0.000	0.38	0.263	0.154	0.00	0.000	0.000	1.25	0.412	0.513	0.00	0.000	0.000
821	Wd	8	1.4	0.25	0.00	0.000	0.000	0.25	0.250	0.182	0.00	0.000	0.000	1.75	0.648	1.273	0.00	0.000	0.000
823	We	19	3.7	0.67	0.11	0.072	0.028	5.53	1.384	1.484	0.63	0.278	0.170	2.05	0.516	0.551	0.05	0.053	0.014
825	Wd	16	4.3	0.48	0.69	0.299	0.159	1.50	0.677	0.347	0.69	0.445	0.159	3.19	0.823	0.738	0.00	0.000	0.000
827	Wd	12	4.9	0.66	0.25	0.131	0.052	1.75	0.617	0.361	2.75	1.553	0.567	8.17	1.953	1.682	0.00	0.000	0.000
828	Wd	13	6.9	0.88	0.85	0.274	0.122	4.85	2.425	0.698	3.69	1.919	0.532	8.85	2.267	1.273	0.00	0.000	0.000
830	We	5	3.4	0.52	0.20	0.200	0.059	0.40	0.400	0.117	0.00	0.000	0.000	3.60	1.691	1.054	0.00	0.000	0.000

[a] Wd = weekday, We = weekend or holiday.
[b] Standard error.

Appendix A3. Summary of angler effort (angler-hours) and harvest rates (HPUE, fish harvested per angler hour) by species in the Ugashik Narrows sport fishery, 1987. Data are from completed-trip angler interviews.

Date	Wd/ We[a]	Sample Size	EFFORT		Coho Salmon			Sockeye Salmon			Arctic Grayling			Arctic Char/ Dolly Varden			Lake Trout		
			Mean	SE[b]	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE
625	Wd	5	5.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.20	0.200	0.036	0.20	0.200	0.036
628	We	7	2.8	0.21	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
702	Wd	2	1.3	0.75	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
704	We	5	3.1	0.48	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
709	Wd	4	4.1	1.13	0.00	0.000	0.000	0.00	0.000	0.000	0.25	0.250	0.061	0.00	0.000	0.000	0.00	0.000	0.000
710	Wd	3	2.1	0.66	0.00	0.000	0.000	0.33	0.333	0.158	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
711	We	10	3.9	0.56	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
713	Wd	4	1.0	0.14	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.25	0.250	0.261	0.00	0.000	0.000
716	Wd	8	2.4	0.44	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
720	Wd	10	6.1	0.65	0.00	0.000	0.000	2.20	0.696	0.361	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
724	Wd	5	1.9	0.24	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
726	We	12	4.9	0.41	0.00	0.000	0.000	0.00	0.000	0.000	0.08	0.083	0.017	0.00	0.000	0.000	0.17	0.112	0.034
728	Wd	18	3.8	0.69	0.00	0.000	0.000	0.22	0.173	0.058	0.17	0.121	0.043	0.00	0.000	0.000	0.06	0.056	0.014
731	Wd	13	3.1	0.68	0.00	0.000	0.000	0.23	0.166	0.074	0.00	0.000	0.000	0.15	0.104	0.049	0.00	0.000	0.000
801	We	8	1.7	0.73	0.00	0.000	0.000	0.13	0.125	0.074	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
803	Wd	7	3.5	0.53	0.00	0.000	0.000	0.14	0.143	0.041	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
804	Wd	3	1.3	0.33	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
807	Wd	5	2.6	1.13	0.20	0.200	0.075	0.20	0.200	0.075	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
808	We	11	1.9	0.30	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.18	0.182	0.094	0.00	0.000	0.000
812	Wd	3	1.9	0.58	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
813	Wd	10	1.4	0.22	0.00	0.000	0.000	0.00	0.000	0.000	0.10	0.100	0.074	0.00	0.000	0.000	0.00	0.000	0.000
818	Wd	8	0.6	0.15	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
819	Wd	8	2.4	0.47	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.25	0.250	0.103	0.00	0.000	0.000
821	Wd	8	1.4	0.25	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
823	We	19	3.7	0.67	0.11	0.072	0.028	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
825	Wd	16	4.3	0.48	0.63	0.301	0.145	0.00	0.000	0.000	0.06	0.063	0.014	0.06	0.063	0.014	0.00	0.000	0.000
827	Wd	12	4.9	0.66	0.08	0.083	0.017	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
828	Wd	13	6.9	0.88	0.85	0.274	0.122	0.15	0.154	0.022	0.00	0.000	0.000	0.08	0.077	0.011	0.00	0.000	0.000
830	We	5	3.4	0.52	0.20	0.200	0.059	0.00	0.000	0.000	0.00	0.000	0.000	0.20	0.200	0.059	0.00	0.000	0.000

[a] Wd = weekday, We = weekend or holiday.
[b] Standard error.

Appendix A4. Summary of completed-trip angler interviews, Ugashik Narrows sport fishery, 1988.

Temporal Component	Date	No. of Anglers Interviewed	No. of Anglers Missed	Mean Effort per Angler	SE[a]
1	20-Jun	5	0	3.00	0.000
	21-Jun	0	0	0.00	
	22-Jun	0	0	0.00	
	23-Jun	0	0	0.00	
	24-Jun	4	0	2.25	0.000
	25-Jun	0	0	0.00	
	26-Jun	0	0	0.00	
	27-Jun	0	0	0.00	
	28-Jun	0	0	0.00	
	29-Jun	0	0	0.00	
	30-Jun	3	0	2.27	0.500
2	01-Jul	10	0	4.25	0.382
	02-Jul	0	0	0.00	
	03-Jul				
	04-Jul	4	0	6.00	0.000
	05-Jul	6	0	4.00	0.000
	06-Jul	3	0	3.00	0.000
	07-Jul	0	0	0.00	
	08-Jul	0	0	0.00	
	09-Jul	3	0	3.00	0.000
	10-Jul	13	0	4.42	0.304
	11-Jul	5	0	5.00	0.000
	12-Jul	1	0	2.00	0.000
	13-Jul	5	0	2.00	0.000
	14-Jul	5	0	3.00	0.000
	15-Jul	6	0	2.00	0.632
	16-Jul	5	0	5.00	0.000
	17-Jul	11	0	3.36	0.472
	18-Jul	9	0	5.11	0.484
	19-Jul	12	5	4.29	0.551
	20-Jul	8	0	4.94	0.628
	21-Jul				
	22-Jul	5	0	4.00	0.000
	23-Jul	0	0	0.00	
	24-Jul	6	5	4.50	0.000
	25-Jul	4	0	4.00	0.000
	26-Jul	12	3	2.58	0.358
3	27-Jul	10	0	1.95	0.302
	28-Jul	4	0	2.38	0.625
	29-Jul	4	0	4.00	0.000

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Temporal Component	Date	No. of Anglers Interviewed	No. of Anglers Missed	Mean Effort per Angler	SE[a]
3	30-Jul	6	0	3.08	0.300
(cont.)	31-Jul	4	4	3.00	0.000
	01-Aug	4	0	2.50	0.289
	02-Aug	4	0	2.50	0.645
	03-Aug	4	0	4.00	1.414
	04-Aug	4	0	4.50	0.866
	05-Aug	4	0	5.00	0.577
	06-Aug	4	0	4.00	0.000
	07-Aug	4	0	4.00	0.000
	08-Aug	4	3	4.00	0.000
	09-Aug	4	0	2.25	0.250
4	10-Aug	15	0	3.87	0.376
	11-Aug	10	0	5.30	0.790
	12-Aug	5	3	2.70	0.122
	13-Aug	12	0	3.54	0.502
	14-Aug	5	1	1.00	0.000
	15-Aug	2	1	4.00	0.000
	16-Aug				
	17-Aug	6	1	4.67	0.279
	18-Aug	2	0	5.00	2.000
	19-Aug	6	2	4.54	0.557
	20-Aug	9	0	3.22	0.703
	21-Aug	9	0	3.42	0.520
	22-Aug	5	0	6.00	0.000
	23-Aug	6	0	5.50	0.224
	24-Aug	10	0	2.19	0.426
	25-Aug	12	0	3.75	0.494
	26-Aug	16	0	8.59	0.539
	27-Aug	19	0	6.11	0.611
	28-Aug	5	6	4.00	1.225
	29-Aug	7	0	5.57	1.212
	30-Aug	14	0	2.27	0.514
	31-Aug	9	0	2.56	0.467
	01-Sep	5	0	4.27	1.052
	02-Sep	12	0	3.63	0.610
	03-Sep	3	1	0.83	0.083
	04-Sep	2	5	2.25	0.250
	05-Sep	4	0	3.06	0.938
	06-Sep	9	0	3.61	0.666
	07-Sep	8	0	4.47	0.638
	08-Sep	4	0	4.75	0.250

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Temporal Component	Date	No. of Anglers Interviewed	No. of Anglers Missed	Mean Effort per Angler	SE[a]
5	09-Sep	0	0	0.00	0.000
	10-Sep	0	0	0.00	0.000
	11-Sep	10	2	4.72	0.698
	12-Sep	0	0	0.00	0.000
	13-Sep	12	1	4.38	0.776
	14-Sep	1	4	2.50	0.000
	15-Sep	1	0	2.00	0.000
	16-Sep	2	0	3.50	0.000
	17-Sep	2	0	2.25	0.250
	18-Sep	4	0	0.63	0.217
	19-Sep	1	0	1.50	0.000
	20-Sep	0	0	0.00	0.000
	21-Sep	6	4	4.67	0.853

[a] Standard error.

Appendix A5. Summary of angler effort (angler-hours) and catch rates (CPUE, fish per angler hour) by species in the Ugashik Narrows sport fishery, 1988. Data are from completed-trip angler interviews.

Date	Wd/ We[a]	Sample Size	EFFORT		Coho Salmon			Sockeye Salmon			Arctic Grayling			Arctic Char/ Dolly Varden			Lake Trout		
			Mean	SE[b]	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE
620	Wd	5	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.80	0.374	0.267	0.00	0.000	0.000
624	Wd	4	2.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000	1.00	1.000	0.444	1.25	0.629	0.556	0.00	0.000	0.000
630	Wd	3	2.3	0.50	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	5.00	2.517	2.222	0.00	0.000	0.000
701	Wd	10	4.3	0.38	0.00	0.000	0.000	0.00	0.000	0.000	0.80	0.291	0.188	2.10	0.623	0.494	0.00	0.000	0.000
704	We	4	6.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	1.75	0.750	0.292	0.75	0.250	0.125	0.00	0.000	0.000
705	Wd	6	4.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.50	0.224	0.125	1.67	0.615	0.417	0.00	0.000	0.000
706	Wd	3	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.67	0.667	0.222	3.00	0.577	1.000	0.33	0.333	0.111
709	We	3	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	1.33	0.882	0.444	6.67	1.202	2.222	0.00	0.000	0.000
710	We	13	4.4	0.30	0.00	0.000	0.000	0.00	0.000	0.000	0.77	0.231	0.174	2.15	0.529	0.487	0.00	0.000	0.000
711	Wd	5	5.0	0.00	0.00	0.000	0.000	0.20	0.200	0.040	1.20	0.200	0.240	5.00	1.483	1.000	0.20	0.200	0.040
713	Wd	5	2.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	1.60	0.400	0.800	0.00	0.000	0.000
714	Wd	5	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.60	0.400	0.200	0.60	0.600	0.200	0.00	0.000	0.000
715	Wd	6	2.0	0.63	0.00	0.000	0.000	1.00	0.516	0.500	0.00	0.000	0.000	0.17	0.167	0.083	0.33	0.333	0.167
716	We	5	5.0	0.00	0.00	0.000	0.000	3.60	0.872	0.720	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
717	We	11	3.4	0.47	0.00	0.000	0.000	0.36	0.152	0.108	0.91	0.415	0.270	0.36	0.152	0.108	0.09	0.091	0.027
718	Wd	9	5.1	0.48	0.00	0.000	0.000	0.67	0.236	0.130	1.00	0.553	0.196	0.67	0.333	0.130	0.11	0.111	0.022
719	Wd	12	4.3	0.55	0.00	0.000	0.000	0.58	0.229	0.136	0.67	0.310	0.155	0.75	0.179	0.175	0.00	0.000	0.000
720	Wd	8	4.9	0.63	0.00	0.000	0.000	0.00	0.000	0.000	1.50	0.598	0.304	1.75	0.559	0.354	0.00	0.000	0.000
722	Wd	5	4.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	4.20	1.772	1.050	0.40	0.245	0.100	0.20	0.200	0.050
724	We	6	4.5	0.00	0.00	0.000	0.000	1.83	0.307	0.407	0.67	0.333	0.148	0.67	0.333	0.148	0.00	0.000	0.000
725	Wd	4	4.0	0.00	0.00	0.000	0.000	1.25	0.479	0.313	0.50	0.289	0.125	0.25	0.250	0.063	0.00	0.000	0.000
726	Wd	12	2.6	0.36	0.00	0.000	0.000	0.58	0.336	0.226	0.92	0.668	0.355	0.50	0.230	0.194	0.00	0.000	0.000
727	Wd	10	1.9	0.30	0.00	0.000	0.000	0.10	0.100	0.051	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
728	Wd	4	2.4	0.63	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	1.25	0.479	0.526
729	Wd	4	4.0	0.00	0.00	0.000	0.000	1.75	0.250	0.438	0.00	0.000	0.000	0.50	0.289	0.125	0.25	0.250	0.063
730	We	6	3.1	0.30	0.00	0.000	0.000	0.33	0.211	0.108	0.17	0.167	0.054	1.00	0.632	0.324	0.83	0.307	0.270
731	We	4	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	2.25	0.250	0.750	0.00	0.000	0.000
801	Wd	4	2.5	0.29	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	1.50	0.289	0.600	0.00	0.000	0.000
802	Wd	4	2.5	0.65	0.25	0.250	0.100	0.00	0.000	0.000	0.00	0.000	0.000	1.75	0.479	0.700	0.00	0.000	0.000
803	Wd	4	4.0	1.41	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	2.25	0.629	0.563	0.00	0.000	0.000
804	Wd	4	4.5	0.87	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	2.50	1.190	0.556	0.00	0.000	0.000
805	Wd	4	5.0	0.58	0.50	0.289	0.100	0.00	0.000	0.000	0.00	0.000	0.000	2.00	1.000	0.400	0.00	0.000	0.000
806	We	4	4.0	0.00	1.00	0.408	0.250	0.00	0.000	0.000	0.00	0.000	0.000	0.25	0.250	0.063	0.00	0.000	0.000
807	We	4	4.0	0.00	0.50	0.289	0.125	0.00	0.000	0.000	0.00	0.000	0.000	0.75	0.479	0.188	0.00	0.000	0.000
808	Wd	4	4.0	0.00	1.00	0.577	0.250	0.00	0.000	0.000	0.00	0.000	0.000	1.25	0.750	0.313	0.00	0.000	0.000
809	Wd	4	2.3	0.25	0.00	0.000	0.000	0.75	0.750	0.333	0.00	0.000	0.000	0.50	0.500	0.222	0.25	0.250	0.111

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Date	Wd/ We[a]	Sample Size	EFFORT		Coho Salmon			Sockeye Salmon			Arctic Grayling			Arctic Char/ Dolly Varden			Lake Trout		
			Mean	SE[b]	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE
810	Wd	15	3.9	0.38	0.00	0.000	0.000	0.07	0.067	0.017	0.87	0.551	0.224	1.13	0.363	0.293	0.00	0.000	0.000
811	Wd	10	5.3	0.79	0.60	0.221	0.113	0.20	0.133	0.038	0.00	0.000	0.000	0.50	0.269	0.094	0.00	0.000	0.000
812	Wd	5	2.7	0.12	0.00	0.000	0.000	0.20	0.200	0.074	0.00	0.000	0.000	0.60	0.400	0.222	0.00	0.000	0.000
813	We	12	3.5	0.50	0.33	0.188	0.094	0.08	0.083	0.024	0.50	0.261	0.141	2.00	0.769	0.565	0.00	0.000	0.000
814	We	5	1.0	0.00	0.80	0.490	0.800	0.60	0.600	0.600	1.20	1.200	1.200	0.80	0.374	0.800	0.00	0.000	0.000
815	Wd	2	4.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	2.50	0.500	0.625	2.00	1.000	0.500	0.00	0.000	0.000
817	Wd	6	4.7	0.28	0.50	0.342	0.107	0.00	0.000	0.000	0.83	0.477	0.179	4.33	0.667	0.929	0.00	0.000	0.000
818	Wd	2	5.0	2.00	1.00	1.000	0.200	0.00	0.000	0.000	3.00	3.000	0.600	2.50	2.500	0.500	0.00	0.000	0.000
819	Wd	6	4.5	0.56	0.83	0.307	0.183	0.33	0.333	0.073	0.00	0.000	0.000	5.00	0.683	1.101	0.00	0.000	0.000
820	We	9	3.2	0.70	1.89	0.611	0.586	0.67	0.373	0.207	0.11	0.111	0.034	1.22	0.703	0.379	0.11	0.111	0.034
821	We	9	3.4	0.52	2.00	0.764	0.585	0.33	0.236	0.098	0.22	0.147	0.065	1.22	0.596	0.358	0.11	0.111	0.033
822	Wd	5	6.0	0.00	1.80	0.490	0.300	0.00	0.000	0.000	0.00	0.000	0.000	1.20	0.490	0.200	0.00	0.000	0.000
823	Wd	6	5.5	0.22	3.00	0.683	0.545	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
824	Wd	10	2.2	0.43	3.00	0.775	1.369	0.00	0.000	0.000	0.00	0.000	0.000	1.40	0.476	0.639	0.00	0.000	0.000
825	Wd	12	3.8	0.49	0.50	0.195	0.133	0.42	0.229	0.111	0.17	0.112	0.044	5.08	2.210	1.356	0.00	0.000	0.000
826	Wd	16	8.6	0.54	0.56	0.241	0.065	0.19	0.188	0.022	0.13	0.085	0.015	3.31	1.297	0.385	0.00	0.000	0.000
827	We	19	6.1	0.61	0.68	0.230	0.112	0.00	0.000	0.000	0.00	0.000	0.000	4.00	1.582	0.655	0.00	0.000	0.000
828	We	5	4.0	1.22	2.60	0.812	0.650	0.00	0.000	0.000	0.00	0.000	0.000	0.80	0.374	0.200	0.00	0.000	0.000
829	Wd	7	5.6	1.21	2.14	0.670	0.385	0.00	0.000	0.000	0.00	0.000	0.000	1.00	0.535	0.179	0.00	0.000	0.000
830	Wd	14	2.3	0.51	0.43	0.251	0.189	0.29	0.221	0.126	0.14	0.097	0.063	2.86	0.966	1.257	0.07	0.071	0.031
831	Wd	9	2.6	0.47	0.56	0.377	0.217	0.11	0.111	0.043	0.00	0.000	0.000	2.33	1.424	0.913	0.00	0.000	0.000
901	Wd	5	4.3	1.05	4.60	1.939	1.078	0.00	0.000	0.000	0.00	0.000	0.000	1.00	0.775	0.234	0.00	0.000	0.000
902	Wd	12	3.6	0.61	3.75	1.274	1.034	0.00	0.000	0.000	0.00	0.000	0.000	1.92	1.171	0.529	0.00	0.000	0.000
903	We	3	0.8	0.08	0.33	0.333	0.400	0.33	0.333	0.400	0.00	0.000	0.000	1.33	0.882	1.600	0.00	0.000	0.000
904	We	2	2.3	0.25	0.00	0.000	0.000	0.50	0.500	0.222	0.00	0.000	0.000	1.00	0.000	0.444	0.00	0.000	0.000
905	We	4	3.1	0.94	2.75	1.250	0.898	0.75	0.479	0.245	0.00	0.000	0.000	2.00	2.000	0.653	0.00	0.000	0.000
906	Wd	9	3.6	0.67	1.67	0.943	0.462	0.33	0.333	0.092	0.00	0.000	0.000	2.89	1.252	0.800	0.00	0.000	0.000
907	Wd	8	4.5	0.64	1.50	0.802	0.336	0.00	0.000	0.000	0.00	0.000	0.000	6.75	2.351	1.510	0.00	0.000	0.000
908	Wd	4	4.8	0.25	0.00	0.000	0.000	0.25	0.250	0.053	0.00	0.000	0.000	3.50	0.866	0.737	0.00	0.000	0.000
911	We	10	4.7	0.70	0.50	0.269	0.106	6.00	1.844	1.270	0.00	0.000	0.000	10.30	3.159	2.180	0.00	0.000	0.000
913	Wd	12	4.4	0.78	0.00	0.000	0.000	1.92	0.543	0.438	0.08	0.083	0.019	8.58	2.291	1.962	0.00	0.000	0.000
916	Wd	2	3.5	0.00	0.00	0.000	0.000	4.50	0.500	1.286	0.00	0.000	0.000	1.50	0.500	0.429	0.00	0.000	0.000
917	We	2	2.3	0.25	1.00	1.000	0.444	9.00	4.000	4.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
918	We	4	0.6	0.22	0.25	0.250	0.400	1.25	0.946	2.000	0.00	0.000	0.000	0.75	0.750	1.200	0.00	0.000	0.000
921	Wd	6	4.7	0.85	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	17.83	4.969	3.821	0.00	0.000	0.000

1 Wd = weekday, We = weekend or holiday.
2 Standard error.

Appendix A6. Summary of angler effort (angler-hours) and harvest rates (HPUE, fish harvested per angler hour) by species in the Ugashik Narrows sport fishery, 1988. Data are from completed-trip angler interviews.

Date	Wd/ We[a]	Sample Size	EFFORT		Coho Salmon			Sockeye Salmon			Arctic Grayling			Arctic Char/ Dolly Varden			Lake Trout		
			Mean	SE^2	Mean	SE^2	CPUE	Mean	SE^2	CPUE	Mean	SE^2	CPUE	Mean	SE^2	CPUE	Mean	SE^2	CPUE
620	Wd	5	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.20	0.200	0.067	0.00	0.000	0.000
624	Wd	4	2.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
630	Wd	3	2.3	0.50	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	2.00	1.000	0.889	0.00	0.000	0.000
701	Wd	10	4.3	0.38	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.10	0.100	0.024	0.00	0.000	0.000
704	We	4	6.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
705	Wd	6	4.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	1.00	0.632	0.250	0.00	0.000	0.000
706	Wd	3	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.33	0.333	0.111	0.00	0.000	0.000
709	We	3	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.33	0.333	0.111	2.00	1.155	0.667	0.00	0.000	0.000
710	We	13	4.4	0.30	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.08	0.077	0.017	0.00	0.000	0.000
711	Wd	5	5.0	0.00	0.00	0.000	0.000	0.20	0.200	0.040	0.00	0.000	0.000	1.00	0.316	0.200	0.00	0.000	0.000
713	Wd	5	2.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
714	Wd	5	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
715	Wd	6	2.0	0.63	0.00	0.000	0.000	1.00	0.516	0.500	0.00	0.000	0.000	0.17	0.167	0.083	0.33	0.333	0.167
716	We	5	5.0	0.00	0.00	0.000	0.000	3.60	0.872	0.720	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
717	We	11	3.4	0.47	0.00	0.000	0.000	0.36	0.152	0.108	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
718	Wd	9	5.1	0.48	0.00	0.000	0.000	0.67	0.236	0.130	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
719	Wd	12	4.3	0.55	0.00	0.000	0.000	0.58	0.229	0.136	0.08	0.083	0.019	0.17	0.112	0.039	0.00	0.000	0.000
720	Wd	8	4.9	0.63	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.25	0.164	0.051	0.00	0.000	0.000
722	Wd	5	4.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
724	We	6	4.5	0.00	0.00	0.000	0.000	1.50	0.224	0.333	0.33	0.211	0.074	0.33	0.211	0.074	0.00	0.000	0.000
725	Wd	4	4.0	0.00	0.00	0.000	0.000	1.25	0.479	0.313	0.25	0.250	0.063	0.25	0.250	0.063	0.00	0.000	0.000
726	Wd	12	2.6	0.36	0.00	0.000	0.000	0.42	0.229	0.161	0.08	0.083	0.032	0.00	0.000	0.000	0.00	0.000	0.000
727	Wd	10	1.9	0.30	0.00	0.000	0.000	0.10	0.100	0.051	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
728	Wd	4	2.4	0.63	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	1.25	0.479	0.526
729	Wd	4	4.0	0.00	0.00	0.000	0.000	1.75	0.250	0.438	0.00	0.000	0.000	0.50	0.289	0.125	0.25	0.250	0.063
730	We	6	3.1	0.30	0.00	0.000	0.000	0.33	0.211	0.108	0.00	0.000	0.000	0.00	0.000	0.000	0.67	0.333	0.216
731	We	4	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.50	0.500	0.167	0.00	0.000	0.000
801	Wd	4	2.5	0.29	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
802	Wd	4	2.5	0.65	0.25	0.250	0.100	0.00	0.000	0.000	0.00	0.000	0.000	0.50	0.500	0.200	0.00	0.000	0.000
803	Wd	4	4.0	1.41	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
804	Wd	4	4.5	0.87	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.50	0.500	0.111	0.00	0.000	0.000
805	Wd	4	5.0	0.58	0.25	0.250	0.050	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
806	We	4	4.0	0.00	0.25	0.250	0.063	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
807	We	4	4.0	0.00	0.25	0.250	0.063	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
808	Wd	4	4.0	0.00	0.50	0.289	0.125	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
809	Wd	4	2.3	0.25	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000

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Appendix A6. (Page 2 of 2).

Date	Wd/ We[a]	Sample Size	EFFORT		Coho Salmon			Sockeye Salmon			Arctic Grayling			Arctic Char/ Dolly Varden			Lake Trout		
			Mean	SE[b]	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE
810	Wd	15	3.9	0.38	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.13	0.133	0.034	0.00	0.000	0.000
811	Wd	10	5.3	0.79	0.30	0.153	0.057	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
812	Wd	5	2.7	0.12	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
813	We	12	3.5	0.50	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.25	0.179	0.071	0.00	0.000	0.000
814	We	5	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
815	Wd	2	4.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
817	Wd	6	4.7	0.28	0.50	0.342	0.107	0.00	0.000	0.000	0.00	0.000	0.000	1.50	0.922	0.321	0.00	0.000	0.000
818	Wd	2	5.0	2.00	1.00	1.000	0.200	0.00	0.000	0.000	0.00	0.000	0.000	0.50	0.500	0.100	0.00	0.000	0.000
819	Wd	6	4.5	0.56	0.83	0.307	0.183	0.00	0.000	0.000	0.00	0.000	0.000	1.00	0.516	0.220	0.00	0.000	0.000
820	We	9	3.2	0.70	1.56	0.377	0.483	0.00	0.000	0.000	0.11	0.111	0.034	0.11	0.111	0.034	0.11	0.111	0.034
821	We	9	3.4	0.52	0.33	0.167	0.098	0.00	0.000	0.000	0.11	0.111	0.033	0.11	0.111	0.033	0.00	0.000	0.000
822	Wd	5	6.0	0.00	1.40	0.245	0.233	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
823	Wd	6	5.5	0.22	2.17	0.401	0.394	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
824	Wd	10	2.2	0.43	1.70	0.496	0.776	0.00	0.000	0.000	0.00	0.000	0.000	0.40	0.163	0.183	0.00	0.000	0.000
825	Wd	12	3.8	0.49	0.17	0.112	0.044	0.00	0.000	0.000	0.08	0.083	0.022	0.00	0.000	0.000	0.00	0.000	0.000
826	Wd	16	8.6	0.54	0.25	0.144	0.029	0.00	0.000	0.000	0.06	0.063	0.007	0.13	0.085	0.015	0.00	0.000	0.000
827	We	19	6.1	0.61	0.58	0.192	0.095	0.00	0.000	0.000	0.00	0.000	0.000	0.05	0.053	0.009	0.00	0.000	0.000
828	We	5	4.0	1.22	1.80	1.114	0.450	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
829	Wd	7	5.6	1.21	1.57	0.751	0.282	0.00	0.000	0.000	0.00	0.000	0.000	0.71	0.360	0.128	0.00	0.000	0.000
830	Wd	14	2.3	0.51	0.29	0.221	0.126	0.07	0.071	0.031	0.07	0.071	0.031	0.21	0.155	0.094	0.07	0.071	0.031
831	Wd	9	2.6	0.47	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
901	Wd	5	4.3	1.05	1.40	0.245	0.328	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
902	Wd	12	3.6	0.61	1.42	0.557	0.391	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
903	We	3	0.8	0.08	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
904	We	2	2.3	0.25	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.50	0.500	0.222	0.00	0.000	0.000
905	We	4	3.1	0.94	1.00	0.408	0.327	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
906	Wd	9	3.6	0.67	0.44	0.242	0.123	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
907	Wd	8	4.5	0.64	0.75	0.313	0.168	0.00	0.000	0.000	0.00	0.000	0.000	0.13	0.125	0.028	0.00	0.000	0.000
908	Wd	4	4.8	0.25	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
911	We	10	4.7	0.70	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.10	0.100	0.021	0.00	0.000	0.000
913	Wd	12	4.4	0.78	0.00	0.000	0.000	0.50	0.289	0.114	0.00	0.000	0.000	0.42	0.193	0.095	0.00	0.000	0.000
916	Wd	2	3.5	0.00	0.00	0.000	0.000	2.00	1.000	0.571	0.00	0.000	0.000	1.00	0.000	0.286	0.00	0.000	0.000
917	We	2	2.3	0.25	0.50	0.500	0.222	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
918	We	4	0.6	0.22	0.25	0.250	0.400	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
921	Wd	6	4.7	0.85	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000

[a] Wd = weekday, We = weekend or holiday.
[b] Standard error.

Appendix A7. Angler counts for the Ugashik Outlet sport fishery, 1988.

Temporal Component	Date	Period A	B	C	D	E	F
1	09-Jul			0		3	
	10-Jul		0	0	1		
	11-Jul			0		1	
	12-Jul	0		0		0	
	13-Jul	0		0		0	
	14-Jul	0		0			0
	15-Jul			7	0		0
	16-Jul		4	4			
	17-Jul	0		9			
	18-Jul	7			4	0	
	19-Jul			5	3	0	
	20-Jul		0			5	
	21-Jul			5	0		
	22-Jul		0	0		5	
	23-Jul	4			0	3	
	24-Jul	0			3		
	25-Jul						
	26-Jul	0	0	0			
	27-Jul		0		3		
	28-Jul	0					0
	29-Jul		0				0
2	30-Jul	0	0			0	
	31-Jul	0				0	0
	01-Aug		0	0	0		
	02-Aug		0	0	0		
	03-Aug	0					0
	04-Aug			0	0		
	05-Aug		0	0			0
	06-Aug				0	0	0
	07-Aug	0			0		
	08-Aug						
	09-Aug		0		3		
	10-Aug	3	4				
	11-Aug	4		1			0
	12-Aug		4		0	0	
	13-Aug			0		0	
	14-Aug		0	0			0
	15-Aug			0	0		
	16-Aug	0			0	0	
	17-Aug		0	0			0
	18-Aug		0		0		0
	19-Aug	0		0			

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Appendix A7. (Page 2 of 2).

Temporal Component	Date	Period A	B	C	D	E	F
3	20-Aug	0			2		0
	21-Aug				7		
	22-Aug				11	7	
	23-Aug	0	1		4		
	24-Aug		12		7	0	
	25-Aug			12			0
	26-Aug	9	12	10			
4	27-Aug					2	0
	28-Aug				2	2	
	29-Aug	2			0		
	30-Aug	6	6				0
	31-Aug		5	7		0	
	01-Sep	12	9	4			
	02-Sep	18	8	0			
	03-Sep		8		3		
	04-Sep				5	0	
	05-Sep	0	5			4	
	06-Sep		4	4			
	07-Sep	3					0
	08-Sep		9	4	9		
	09-Sep	0	0			0	
5	10-Sep			0			1
	11-Sep				1	1	0
	12-Sep			6		0	0
	13-Sep			4	0		2
	14-Sep			0			
	15-Sep	0			2		
	16-Sep		0		2		0
	17-Sep	0		2	0		
	18-Sep		3		0	0	
	19-Sep				0		5
	20-Sep		0	4	2		
	21-Sep	0	1		2		
	22-Sep		2	0	0		
	23-Sep	0					3
	24-Sep		1			1	
	25-Sep		1		2	0	
	26-Sep	0			1		1
	27-Sep				2		0
	28-Sep				0		1

Appendix A8. Summary of angler effort (angler-hours) and catch rates (CPUE, fish per angler hour) by species in the Ugashik Outlet sport fishery, 1988. Data are from completed-trip and incomplete-trip angler interviews.

Date	Wd/ We[a]	Sample Size	EFFORT		Chinook Salmon			Coho Salmon			Sockeye Salmon			Chum Salmon			Pink Salmon		
			Mean	SE[b]	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE
709	We	3	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
715	Wd	7	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	5.00	0.000	1.667	0.00	0.000	0.000	0.00	0.000	0.000
716	We	8	1.9	0.33	0.00	0.000	0.000	0.00	0.000	0.000	3.75	1.146	1.935	0.00	0.000	0.000	0.00	0.000	0.000
717	We	9	3.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000	2.67	1.434	0.762	0.00	0.000	0.000	0.00	0.000	0.000
718	Wd	4	5.8	0.48	0.00	0.000	0.000	0.00	0.000	0.000	4.50	3.571	0.783	0.00	0.000	0.000	0.00	0.000	0.000
721	Wd	5	0.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
722	Wd	5	2.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000	1.20	0.583	0.533	0.00	0.000	0.000	0.00	0.000	0.000
723	We	4	1.2	0.06	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
727	Wd	3	0.8	0.25	0.00	0.000	0.000	0.00	0.000	0.000	0.33	0.333	0.444	0.00	0.000	0.000	0.00	0.000	0.000
803	Wd	3	1.7	0.33	0.00	0.000	0.000	0.33	0.333	0.200	1.33	1.333	0.800	0.00	0.000	0.000	0.00	0.000	0.000
809	Wd	3	1.0	0.00	0.00	0.000	0.000	1.67	0.333	1.667	0.33	0.333	0.333	0.00	0.000	0.000	0.00	0.000	0.000
810	Wd	4	2.4	0.56	0.00	0.000	0.000	2.25	0.854	0.923	1.25	0.750	0.513	0.00	0.000	0.000	0.00	0.000	0.000
811	Wd	4	1.2	0.31	0.00	0.000	0.000	1.50	0.289	1.263	0.50	0.500	0.421	0.00	0.000	0.000	0.25	0.250	0.211
812	Wd	4	2.3	0.59	0.00	0.000	0.000	1.75	1.436	0.778	1.75	0.629	0.778	0.00	0.000	0.000	0.00	0.000	0.000
821	We	14	3.8	0.34	0.00	0.000	0.000	5.43	1.550	1.441	0.36	0.199	0.095	0.29	0.163	0.076	0.64	0.341	0.171
822	Wd	15	1.0	0.22	0.00	0.000	0.000	3.00	0.951	2.951	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
823	Wd	13	4.3	0.78	0.00	0.000	0.000	8.38	1.760	1.964	0.38	0.180	0.090	0.23	0.166	0.054	0.31	0.175	0.072
824	Wd	17	3.4	0.42	0.00	0.000	0.000	4.53	0.827	1.345	0.12	0.081	0.035	0.18	0.176	0.052	0.12	0.081	0.035
825	Wd	12	3.3	0.33	0.00	0.000	0.000	5.17	0.944	1.590	0.00	0.000	0.000	0.08	0.083	0.026	0.00	0.000	0.000
826	Wd	21	1.9	0.26	0.00	0.000	0.000	4.76	1.491	2.516	0.00	0.000	0.000	0.10	0.095	0.050	0.00	0.000	0.000
827	We	2	2.5	0.00	0.00	0.000	0.000	1.50	1.500	0.600	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
828	We	2	6.0	0.00	0.00	0.000	0.000	7.50	6.500	1.250	1.00	1.000	0.167	0.00	0.000	0.000	0.00	0.000	0.000
830	Wd	7	3.2	0.18	0.00	0.000	0.000	4.43	0.869	1.378	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
901	Wd	12	3.3	0.26	0.00	0.000	0.000	8.83	1.211	2.650	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
902	Wd	10	2.0	0.23	0.00	0.000	0.000	6.20	1.618	3.024	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
903	We	11	4.1	0.59	0.27	0.141	0.066	8.82	1.934	2.132	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
904	We	4	2.0	0.50	0.00	0.000	0.000	3.50	1.443	1.750	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
905	We	8	2.1	0.35	0.00	0.000	0.000	3.75	0.796	1.765	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
906	Wd	4	3.0	0.00	0.00	0.000	0.000	8.00	1.472	2.667	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
907	Wd	3	1.3	0.00	0.00	0.000	0.000	5.00	1.000	4.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
908	Wd	8	4.4	1.08	0.00	0.000	0.000	3.63	1.267	0.829	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
909	Wd	2	5.5	0.00	0.00	0.000	0.000	21.00	0.000	3.818	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
910	We	7	2.4	0.30	0.00	0.000	0.000	2.86	0.670	1.212	0.00	0.000	0.000	0.00	0.000	0.000	0.86	0.857	0.364
913	Wd	4	1.0	0.35	0.00	0.000	0.000	1.00	1.000	1.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
915	Wd	2	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
916	Wd	2	0.5	0.00	0.00	0.000	0.000	0.50	0.500	1.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
917	We	2	1.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
918	We	3	1.0	0.00	0.00	0.000	0.000	0.67	0.667	0.667	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
919	Wd	5	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
920	Wd	5	1.6	0.24	0.00	0.000	0.000	0.20	0.200	0.125	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
921	Wd	4	1.3	0.31	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
922	Wd	2	1.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
923	Wd	4	1.5	0.50	0.00	0.000	0.000	1.50	1.500	1.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
925	We	2	5.0	0.00	0.00	0.000	0.000	1.50	0.500	0.300	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
927	Wd	3	1.3	0.17	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
928	Wd	2	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000

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Appendix A8. (Page 2 of 2).

Date	Wd/ We[a]	Sample Size	EFFORT Mean	EFFORT SE[b]	Arctic Char/ Dolly Varden Mean	Arctic Char/ Dolly Varden SE[b]	Arctic Char/ Dolly Varden CPUE	Arctic Grayling Mean	Arctic Grayling SE[b]	Arctic Grayling CPUE
709	We	3	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
715	Wd	7	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
716	We	8	1.9	0.33	0.00	0.000	0.000	0.00	0.000	0.000
717	We	9	3.5	0.00	0.22	0.222	0.063	0.00	0.000	0.000
718	Wd	4	5.8	0.48	0.00	0.000	0.000	0.00	0.000	0.000
721	Wd	5	0.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000
722	Wd	5	2.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000
723	We	4	1.2	0.06	0.00	0.000	0.000	0.00	0.000	0.000
727	Wd	3	0.8	0.25	0.00	0.000	0.000	0.00	0.000	0.000
803	Wd	3	1.7	0.33	0.00	0.000	0.000	0.00	0.000	0.000
809	Wd	3	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
810	Wd	4	2.4	0.56	0.00	0.000	0.000	0.00	0.000	0.000
811	Wd	4	1.2	0.31	0.25	0.250	0.211	0.00	0.000	0.000
812	Wd	4	2.3	0.59	0.50	0.500	0.222	1.00	1.000	0.444
821	We	14	3.8	0.34	0.07	0.071	0.019	0.00	0.000	0.000
822	Wd	15	1.0	0.22	0.00	0.000	0.000	0.00	0.000	0.000
823	Wd	13	4.3	0.78	0.85	0.390	0.198	0.00	0.000	0.000
824	Wd	17	3.4	0.42	0.12	0.081	0.035	0.00	0.000	0.000
825	Wd	12	3.3	0.33	0.00	0.000	0.000	0.00	0.000	0.000
826	Wd	21	1.9	0.26	0.14	0.104	0.075	0.00	0.000	0.000
827	We	2	2.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
828	We	2	6.0	0.00	0.50	0.500	0.083	0.00	0.000	0.000
830	Wd	7	3.2	0.18	0.00	0.000	0.000	0.14	0.143	0.044
901	Wd	12	3.3	0.26	0.00	0.000	0.000	0.17	0.167	0.050
902	Wd	10	2.0	0.23	0.00	0.000	0.000	0.00	0.000	0.000
903	We	11	4.1	0.59	0.36	0.364	0.088	0.00	0.000	0.000
904	We	4	2.0	0.50	0.00	0.000	0.000	0.00	0.000	0.000
905	We	8	2.1	0.35	0.00	0.000	0.000	0.00	0.000	0.000
906	Wd	4	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
907	Wd	3	1.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000
908	Wd	8	4.4	1.08	0.00	0.000	0.000	0.00	0.000	0.000
909	Wd	2	5.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
910	We	7	2.4	0.30	0.00	0.000	0.000	0.00	0.000	0.000
913	Wd	4	1.0	0.35	0.25	0.250	0.250	0.00	0.000	0.000
915	Wd	2	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
916	Wd	2	0.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
917	We	2	1.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
918	We	3	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
919	Wd	5	1.0	0.00	0.20	0.200	0.200	0.00	0.000	0.000
920	Wd	5	1.6	0.24	0.00	0.000	0.000	0.00	0.000	0.000
921	Wd	4	1.3	0.31	0.50	0.500	0.400	0.00	0.000	0.000
922	Wd	2	1.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
923	Wd	4	1.5	0.50	0.50	0.289	0.333	0.00	0.000	0.000
925	We	2	5.0	0.00	2.50	0.500	0.500	0.00	0.000	0.000
927	Wd	3	1.3	0.17	0.67	0.333	0.500	0.00	0.000	0.000
928	Wd	2	1.0	0.00	0.50	0.500	0.500	0.00	0.000	0.000

[a] Wd = weekday, We = weekend or holiday.
[b] Standard error.

Appendix A9. Summary of angler effort (angler-hours) and harvest rates (HPUE, fish harvested per angler hour) by species in the Ugashik Outlet sport fishery, 1988. Data are from completed-trip and incomplete-trip angler interviews.

Date	Wd/ We[a]	Sample Size	EFFORT		Chinook Salmon			Coho Salmon			Sockeye Salmon			Chum Salmon			Pink Salmon		
			Mean	SE[b]	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE
709	We	3	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
715	Wd	7	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	5.00	0.000	1.667	0.00	0.000	0.000	0.00	0.000	0.000
716	We	8	1.9	0.33	0.00	0.000	0.000	0.00	0.000	0.000	1.88	0.915	0.968	0.00	0.000	0.000	0.00	0.000	0.000
717	We	9	3.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000	1.22	0.401	0.349	0.00	0.000	0.000	0.00	0.000	0.000
718	Wd	4	5.8	0.48	0.00	0.000	0.000	0.00	0.000	0.000	1.50	1.190	0.261	0.00	0.000	0.000	0.00	0.000	0.000
721	Wd	5	0.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
722	Wd	5	2.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.40	0.245	0.178	0.00	0.000	0.000	0.00	0.000	0.000
723	We	4	1.2	0.06	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
727	Wd	3	0.8	0.25	0.00	0.000	0.000	0.00	0.000	0.000	0.33	0.333	0.444	0.00	0.000	0.000	0.00	0.000	0.000
803	Wd	3	1.7	0.33	0.00	0.000	0.000	0.33	0.333	0.200	0.33	0.333	0.200	0.00	0.000	0.000	0.00	0.000	0.000
809	Wd	3	1.0	0.00	0.00	0.000	0.000	1.33	0.333	1.333	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
810	Wd	4	2.4	0.56	0.00	0.000	0.000	1.75	0.629	0.718	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
811	Wd	4	1.2	0.31	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
812	Wd	4	2.3	0.59	0.00	0.000	0.000	0.25	0.250	0.111	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
821	We	14	3.8	0.34	0.00	0.000	0.000	0.64	0.225	0.171	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
822	Wd	15	1.0	0.22	0.00	0.000	0.000	0.53	0.165	0.525	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
823	Wd	13	4.3	0.78	0.00	0.000	0.000	2.31	0.429	0.541	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
824	Wd	17	3.4	0.42	0.00	0.000	0.000	1.29	0.281	0.384	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
825	Wd	12	3.3	0.33	0.00	0.000	0.000	1.17	0.458	0.359	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
826	Wd	21	1.9	0.26	0.00	0.000	0.000	1.05	0.375	0.553	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
827	We	2	2.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
828	We	2	6.0	0.00	0.00	0.000	0.000	3.00	2.000	0.500	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
830	Wd	7	3.2	0.18	0.00	0.000	0.000	1.86	0.404	0.578	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
901	Wd	12	3.3	0.26	0.00	0.000	0.000	2.08	0.668	0.625	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
902	Wd	10	2.0	0.23	0.00	0.000	0.000	1.60	0.340	0.780	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
903	We	11	4.1	0.59	0.00	0.000	0.000	1.00	0.234	0.242	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
904	We	4	2.0	0.50	0.00	0.000	0.000	1.25	0.479	0.625	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
905	We	8	2.1	0.35	0.00	0.000	0.000	1.00	0.423	0.471	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
906	Wd	4	3.0	0.00	0.00	0.000	0.000	2.25	0.750	0.750	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
907	Wd	3	1.3	0.00	0.00	0.000	0.000	0.67	0.667	0.533	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
908	Wd	8	4.4	1.08	0.00	0.000	0.000	1.25	0.526	0.286	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
909	Wd	2	5.5	0.00	0.00	0.000	0.000	1.00	0.000	0.182	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
910	We	7	2.4	0.30	0.00	0.000	0.000	2.71	0.606	1.152	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
913	Wd	4	1.0	0.35	0.00	0.000	0.000	0.25	0.250	0.250	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
915	Wd	2	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
916	Wd	2	0.5	0.00	0.00	0.000	0.000	0.50	0.500	1.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
917	We	2	1.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
918	We	3	1.0	0.00	0.00	0.000	0.000	0.67	0.667	0.667	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
919	Wd	5	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
920	Wd	5	1.6	0.24	0.00	0.000	0.000	0.20	0.200	0.125	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
921	Wd	4	1.3	0.31	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
922	Wd	2	1.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
923	Wd	4	1.5	0.50	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
925	We	2	5.0	0.00	0.00	0.000	0.000	0.50	0.500	0.100	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
927	Wd	3	1.3	0.17	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000
928	Wd	2	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000	0.00	0.000	0.000

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Appendix A9. (Page 2 of 2).

Date	Wd/ We[a]	Sample Size	EFFORT		Arctic Char/ Dolly Varden			Arctic Grayling		
			Mean	SE[b]	Mean	SE[b]	CPUE	Mean	SE[b]	CPUE
709	We	3	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
715	Wd	7	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
716	We	8	1.9	0.33	0.00	0.000	0.000	0.00	0.000	0.000
717	We	9	3.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
718	Wd	4	5.8	0.48	0.00	0.000	0.000	0.00	0.000	0.000
721	Wd	5	0.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000
722	Wd	5	2.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000
723	We	4	1.2	0.06	0.00	0.000	0.000	0.00	0.000	0.000
727	Wd	3	0.8	0.25	0.00	0.000	0.000	0.00	0.000	0.000
803	Wd	3	1.7	0.33	0.00	0.000	0.000	0.00	0.000	0.000
809	Wd	3	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
810	Wd	4	2.4	0.56	0.00	0.000	0.000	0.00	0.000	0.000
811	Wd	4	1.2	0.31	0.00	0.000	0.000	0.00	0.000	0.000
812	Wd	4	2.3	0.59	0.00	0.000	0.000	0.00	0.000	0.000
821	We	14	3.8	0.34	0.00	0.000	0.000	0.00	0.000	0.000
822	Wd	15	1.0	0.22	0.00	0.000	0.000	0.00	0.000	0.000
823	Wd	13	4.3	0.78	0.08	0.077	0.018	0.00	0.000	0.000
824	Wd	17	3.4	0.42	0.00	0.000	0.000	0.00	0.000	0.000
825	Wd	12	3.3	0.33	0.00	0.000	0.000	0.00	0.000	0.000
826	Wd	21	1.9	0.26	0.05	0.048	0.025	0.00	0.000	0.000
827	We	2	2.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
828	We	2	6.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
830	Wd	7	3.2	0.18	0.00	0.000	0.000	0.00	0.000	0.000
901	Wd	12	3.3	0.26	0.00	0.000	0.000	0.00	0.000	0.000
902	Wd	10	2.0	0.23	0.00	0.000	0.000	0.00	0.000	0.000
903	We	11	4.1	0.59	0.00	0.000	0.000	0.00	0.000	0.000
904	We	4	2.0	0.50	0.00	0.000	0.000	0.00	0.000	0.000
905	We	8	2.1	0.35	0.00	0.000	0.000	0.00	0.000	0.000
906	Wd	4	3.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
907	Wd	3	1.3	0.00	0.00	0.000	0.000	0.00	0.000	0.000
908	Wd	8	4.4	1.08	0.00	0.000	0.000	0.00	0.000	0.000
909	Wd	2	5.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
910	We	7	2.4	0.30	0.00	0.000	0.000	0.00	0.000	0.000
913	Wd	4	1.0	0.35	0.00	0.000	0.000	0.00	0.000	0.000
915	Wd	2	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
916	Wd	2	0.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
917	We	2	1.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
918	We	3	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
919	Wd	5	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
920	Wd	5	1.6	0.24	0.00	0.000	0.000	0.00	0.000	0.000
921	Wd	4	1.3	0.31	0.50	0.500	0.400	0.00	0.000	0.000
922	Wd	2	1.5	0.00	0.00	0.000	0.000	0.00	0.000	0.000
923	Wd	4	1.5	0.50	0.25	0.250	0.167	0.00	0.000	0.000
925	We	2	5.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000
927	Wd	3	1.3	0.17	0.33	0.333	0.250	0.00	0.000	0.000
928	Wd	2	1.0	0.00	0.00	0.000	0.000	0.00	0.000	0.000

[a] Wd = weekday, We = weekend or holiday.
[b] Standard error.