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Harvest Surveys at U.S. Forest Service Public Use Cabins in Southeast Alaska, 1993

by

J. Douglas Jones

November 1994

Alaska Department of Fish and Game

Division of Sport Fish

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HARVEST SURVEYS AT U.S. FOREST SERVICE PUBLIC USE CABINS IN SOUTHEAST ALASKA, 1993[1]

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ABSTRACT

We conducted a postal survey of parties reserving U.S. Forest Service (USFS) recreational cabins located in cutthroat trout or steelhead systems in Southeast Alaska in 1993. The purpose of the survey was to collect information on trout catches, harvest, and effort from USFS cabins in Southeast Alaska. This report presents findings for that survey. The portion of the survey that targeted cutthroat trout *Oncorhynchus clarki* estimated that anglers spent a total of 21,454 hours to catch 27,948 cutthroat trout, 80 steelhead, 3,085 rainbow trout *Oncorhynchus mykiss*, 1,177 kokanee *Oncorhynchus nerka*, and 2,828 Dolly Varden *Salvelinus malma*. The portion of the survey that targeted steelhead trout *Oncorhynchus mykiss* estimated that anglers spent a total of 29,247 hours to catch 1,025 steelhead, 3,893 rainbow trout, 9,562 cutthroat trout, 1,278 kokanee, and 8,203 Dolly Varden.

KEY WORDS: Harvest, catch, steelhead, cutthroat, rainbow, trout, kokanee, Dolly Varden, effort, angler, Southeast Alaska, recreation, cabin survey, creel census, mail survey.

INTRODUCTION

Harvests of cutthroat trout *Oncorhynchus clarki* in freshwater systems in Southeast Alaska are declining (1977–1992), while angler effort in fresh water is increasing (Figures 1–2) (Mills 1979–1993). Also, fewer large cutthroat trout are being entered in the Department of Fish and Game (ADF&G) Trophy Fish Program, suggesting that populations in the most productive lakes have declined in the past decade. Regulations in effect in 1993 included a daily bag limit of five fish, only one of which could be over 16 inches, and a possession limit of 2 daily bag limits. Due to a growing concern by the public and the ADF&G for the cutthroat trout fisheries in Southeast Alaska, catch-and-release only fishing for cutthroat trout in Turner, Reflection, and Wilson lakes was retained in 1993.

In contrast, harvests of steelhead trout *Oncorhynchus mykiss* in Southeast Alaska increased from 1977 to 1989 but declined by 75% since then (Figure 3). There is considerable concern for populations of steelhead trout in Southeast Alaska because catch rates and escapements in some well-known streams have declined (Harding and Jones 1993). Regulations in effect in 1993 allowed a bag limit of five fish, only two of which could be 16 inches or larger. Forty-eight stream systems were made catch-and-release only for steelhead due to conservation concerns.

Changes in cutthroat and steelhead trout populations may be related to increased effort (Figure 2) because cutthroat are very susceptible to fishing pressure (Behnke 1985), increasing angler skill, stocking of other salmonid species because cutthroat are easily displaced by many other species (Griffith 1988), laddering of systems which allows other salmonid species into cutthroat habitat, and land use practices like logging which increases access to streams with roads and alters the habitat in and around the small streams important to cutthroat (Meehan 1991).

The U.S. Forest Service (USFS) maintains recreational cabins on most important cutthroat trout lakes and steelhead streams in Southeast Alaska. The number of visitor-days to USFS cabins has increased in the past 15 years. Most angler effort for these species in systems with cabins probably originates from these cabins. This study estimated angler effort, catch, and harvest of all species of fish at USFS recreational cabins on steelhead trout streams and on cutthroat trout lakes in Southeast Alaska. Site-specific data on effort, catch, harvest, and release rates were needed to help identify potential problems in remote fisheries, a need identified in the Strategic Plans for Juneau, Sitka, and Ketchikan (Schwan 1990). This survey information was used to help managers evaluate the effects of regulations and to develop a regionwide management plan in late 1993. The information from this survey was used to formulate a management plan for both steelhead and cutthroat trout in 1993 which resulted in extensive regulatory changes by the Board of Fisheries in January of 1994. In future years information from this survey will be used to evaluate the effect of the regulatory changes on the fisheries.

The objectives for 1993 were:

1. to estimate angler effort, catch, and harvest of steelhead trout, cutthroat trout, rainbow trout *O. mykiss*, kokanee *O. nerka*, and Dolly Varden *Salvelinus malma* by USFS cabin for parties registered to use these cabins on steelhead streams in Southeast Alaska.

2. to estimate angler effort, catch, and harvest of cutthroat trout, rainbow trout, kokanee, and Dolly Varden by lake for parties registered to use USFS cabins on selected lakes in Southeast Alaska.

3. to estimate the proportion of days fished by parties registered to use selected USFS cabins where cut-throat trout harvests were limited because a bag or possession limit was reached.

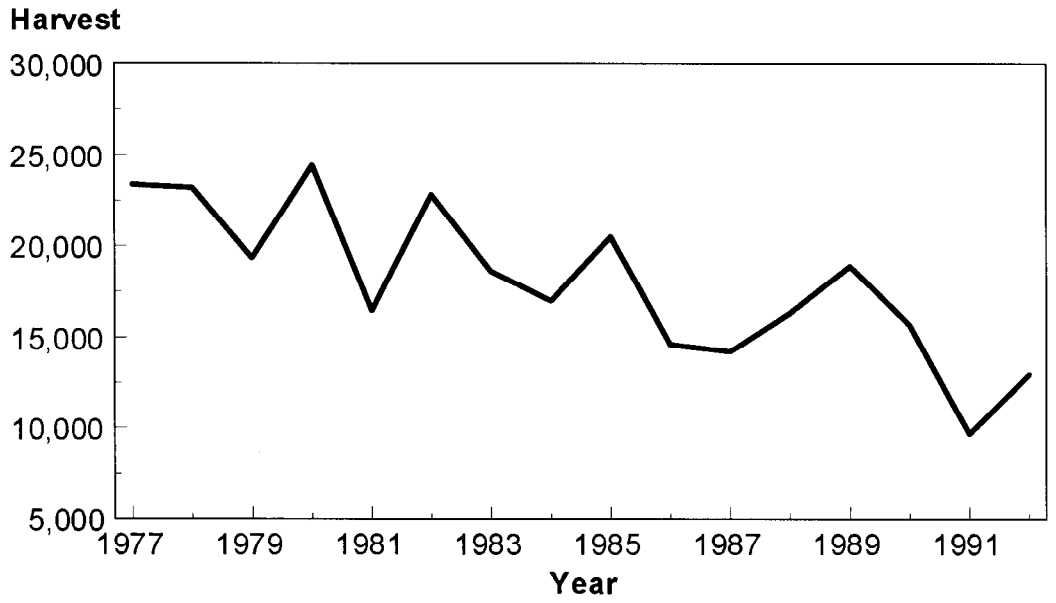

Figure 1. Harvests of cutthroat trout in fresh water in Southeast Alaska, 1977–1992. Data are from the statewide harvest survey (Mills 1979–1993).

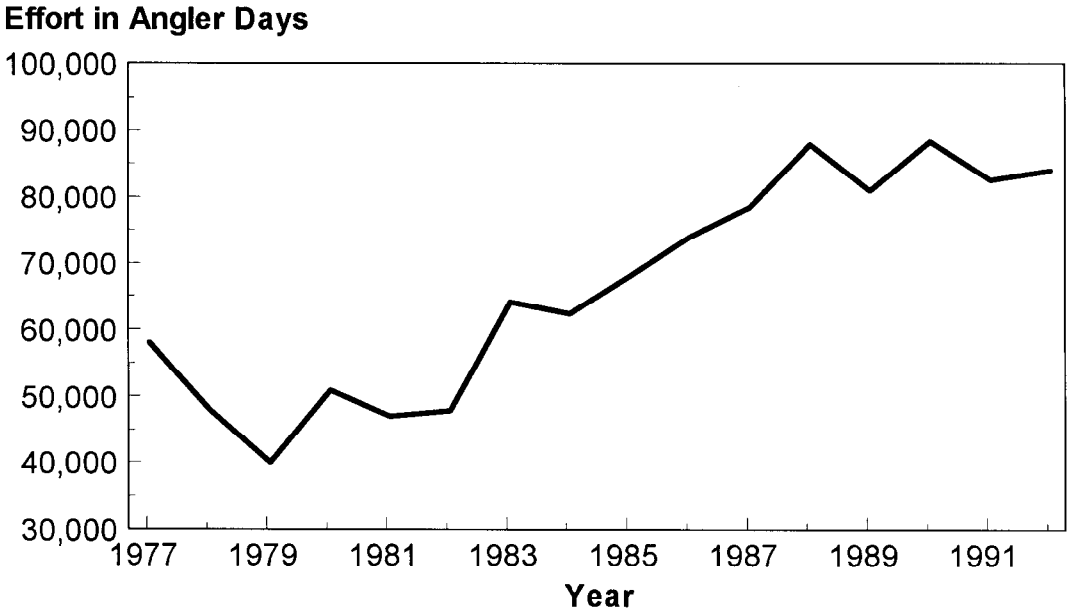

Figure 2. Angler effort (days fished) in fresh water in Southeast Alaska, 1977–1992. Data are from the statewide harvest survey (Mills 1979–1993).

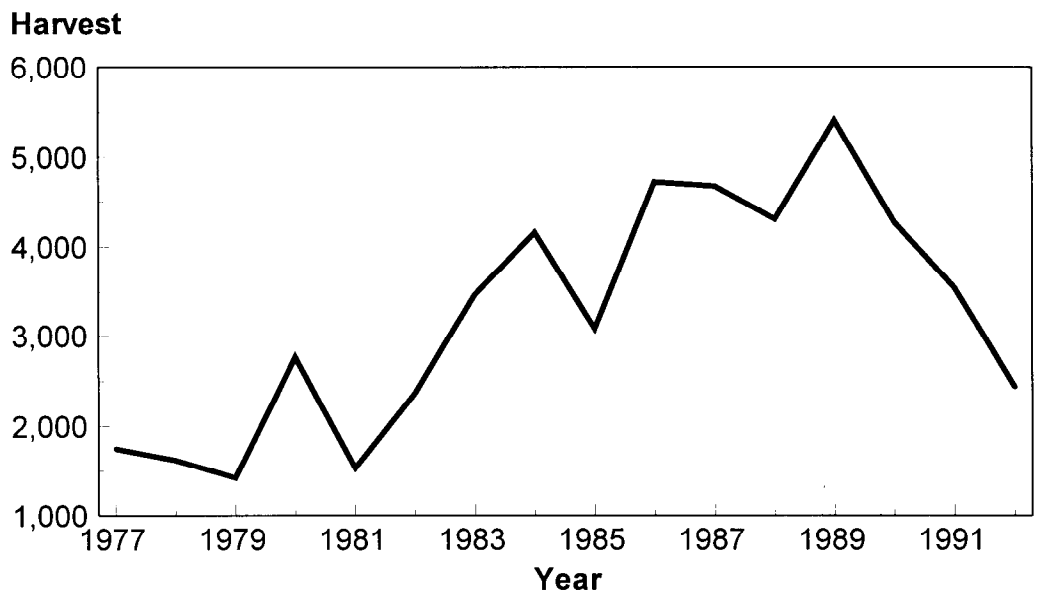

Figure 3. Steelhead trout harvests in Southeast Alaska, 1977–1992. Data are from the statewide harvest survey (Mills 1979–1993).

METHODS

A postal survey questionnaire identical to that used in 1992 (Jones 1993), was used to estimate angler effort, catch, and harvests by registered users of USFS cabins at 27 cutthroat trout lakes and 22 steelhead streams in 1993. Names of USFS cabin users were obtained from USFS cabin reservation lists from each of the ranger districts in Southeast. At cutthroat trout lakes where harvests of cutthroat trout were limited by the bag or possession limit, angler effort, catch, harvest, and the proportion of fishing days were surveyed by sending questionnaires to parties registered to use each of the selected cabins from January 1 through December 31, 1993 (Table 1). At cabins on steelhead river systems, angler effort, catch and harvest of steelhead trout were surveyed by sending questionnaires to parties registered to use each of the cabins from January 1 through December 31, 1993 (Table 2).

Each registered "party head" was sent a two-page questionnaire and a cover letter. The first page of the questionnaire (Appendix F) asks the party head if the reservation was used, the number of members in the group, if any members of the party fished, and how they would rate the fishing if they fished. The second page of the questionnaire (slightly different for each of the two surveys) asked about the number of days and hours party members fished, the numbers of steelhead, cutthroat trout, rainbow trout, kokanee, and Dolly Varden caught and kept, and the numbers of each species caught and released, by angler. The second page of questionnaires sent to users of cabins on cutthroat trout lakes also asked whether bag limits for cutthroat trout were restrictive and about catches of cutthroat trout above and below 18" in length. Information on bag or possession limits from steelhead anglers was not requested since the bag limit was one fish per day. For these anglers, the proportion of days fished with a catch or harvest (angler success) was more informative. Also, anglers in these systems were not asked about harvests of large and small cutthroat trout.

Reservation lists were obtained from the USFS after May 31, October 31, and December 31, 1993. Mailings to "party heads" in each list were conducted separately: e.g., all anglers scheduled to have completed the use of a cabin between January 1 and May 31 were sent surveys as if they represented a

Table 1. Number of registered parties, responding parties, and total estimated effort (days and hours fished), and fish kept and released by species for cutthroat trout systems surveyed in Southeast Alaska in 1993.

						Cutthroat		Steelhead		Rainbow		Kokanee		Dolly Varden	
System	Lost[1]	Registered	Responding	Days	Hours	Kept	Released	Kept	Released	Kept	Released	Kept	Released	Kept	Released
Bakewell Lake		17	14	180	690	108	437	0	0	7	35	0	0	5	27
Baranof Lake		16	9	53	199	161	339	0	0	0	0	0	0	0	0
Distin Lake		29	18	63	149	32	122	0	0	0	0	0	0	0	0
Eagle Lake		5	2	12	48	9	0	0	0	0	0	6	0	0	0
Ella Lake		86	46	344	1,338	441	2,098	0	0	272	114	0	11	5	12
Essowah Lake		9	4	99	719	5	2	0	0	0	0	0	0	0	0
Florence Lake		27	18	94	423	197	1,990	3	0	0	0	0	50	5	27
Goulding Lake	Y	9	4	40	92	8	68	0	0	19	24	0	0	0	0
Hasselborg Lake		87	61	587	2,379	840	2,152	0	0	6	1	14	141	38	107
Heckman Lake		33	23	500	2,906	164	1,103	0	20	189	1,017	17	49	14	136
Humpback Lake		33	18	229	1,341	208	2,610	0	0	0	10	9	0	23	104
Jims Lake	Y	29	18	162	615	188	647	0	0	7	16	0	0	1	0
Jordan Lake		36	22	223	1,362	12	271	0	33	147	442	27	0	11	15
Juneau Area		14	10	0	0	0	0	0	0	0	0	0	0	0	0
Lake Alexander		31	21	95	399	162	388	0	0	0	0	9	0	0	0
Lake Eva	Y	38	25	382	1,265	36	441	0	24	10	128	3	0	73	884
Lake Kathleen		15	14	37	131	0	1	0	0	0	0	0	0	0	34
Manzanita Lake		61	47	305	1,103	251	996	0	0	72	116	42	328	7	33
Orchard Lake		18	12	133	671	186	1,088	0	0	0	0	6	0	0	26
Patching Lake	Y	25	16	180	644	322	1,317	0	0	0	0	0	0	0	0
Rainbow Lake		5	4	13	43	0	0	0	0	41	38	0	0	0	0
Salmon Lake	Y	42	31	230	398	70	393	0	0	24	13	8	40	76	417
Sweetwater Lake		74	42	351	1,250	145	841	0	0	0	16	23	0	20	251
Taku River		19	15	8	18	0	15	0	0	0	0	0	0	0	0
Turner Lake		77	60	379	1,373	40	712	0	0	23	199	94	216	38	290
Virginia Lake		19	8	105	60	151	1,050	0	0	0	0	0	0	0	53
Wilson Lake		42	25	237	1,051	107	4,303	0	0	0	79	11	12	0	9
Young Lake		68	41	268	785	147	574	0	0	20	0	25	36	13	74
Total		1,029	664	5,311	21,454	3,990	23,958	3	77	837	2,248	294	883	329	2,499

[1] Lost (Y) indicates that the seasonal* system estimates were lost due to nonresponses, and the reported totals are biased low as a result.

Table 2. Number of registered parties , responding parties, and total estimated effort (days and hours fished), and fish kept and released by species for USFS cabins on steelhead streams in Southeast Alaska in 1993.

						Cutthroat		Steelhead		Rainbow		Kokanee		Dolly Varden	
System	PBias[1]	Registered	Responding	Days	Hours	Kept	Released	Kept	Released	Kept	Released	Kept	Released	Kept	Released
Admiralty Creek	0	67	49	186	632	61	381	2	3	45	73	0	9	59	250
Anan Bay	0	15	8	66	131	0	107	4	6	0	0	0	0	0	0
Andrew Creek	0	5	5	1	2	0	10	0	0	0	0	0	0	0	0
Castle River	0	41	31	265	931	69	733	1	1	16	528	0	262	14	303
Fish Creek	0	74	46	1,119	1,124	83	391	0	55	0	47	0	0	89	926
Harding River	0	9	6	13	37	0	34	0	0	0	0	0	0	5	0
Hugh Smith Lake	0	11	4	41	165	0	8	0	0	0	0	0	0	0	0
Italio River	0	10	9	150	817	44	162	1	2	2	12	0	0	9	23
Kadake Bay	0	7	7	45	141	11	64	0	0	10	21	0	0	0	6
Kah Sheets Lake	1	44	28	404	1,665	85	234	0	5	37	436	0	3	20	73
Karta River	0	112	72	1,453	7,477	773	2,352	91	236	99	708	73	317	357	2,067
Kegan Creek	0	48	34	676	1,987	155	892	5	3	58	366	29	169	60	876
Kook Lake	0	14	11	85	484	1	140	0	0	1	42	0	0	0	167
McDonald Lake	0	33	20	468	2,133	31	251	19	197	64	307	0	0	211	863
Petersburg Lake	0	21	14	134	540	0	17	0	0	0	12	0	0	15	45
Red Bay Lake	0	18	12	152	693	2	30	0	0	0	0	0	0	36	218
Reflection Lake	0	20	16	184	1,021	15	106	0	25	29	15	0	0	38	31
Salmon Bay Lake	0	29	23	281	1,416	72	574	0	38	16	118	0	206	103	250
Sarkar Lake	0	51	31	138	581	49	126	0	0	81	311	15	60	29	75
Sitkoh Lake	0	35	21	223	1,263	10	332	0	5	0	97	17	103	22	59
Situk River	1	65	54	947	4,785	60	431	0	283	91	234	0	15	98	456
Staney Creek	0	76	54	310	1,222	107	559	20	23	0	17	0	0	38	312
Total		805	555	7,341	29,247	1,628	7,934	143	882	549	3,344	134	1,144	1,203	7,000

[1] pBias = number of cabins in the system lost due to nonresponse: pBias>0 implies the totals are biased low.

unique population. The survey was thus seasonally stratified. Response data for each stratum were processed independently of data in other strata.

For each stratum, three mailings were conducted. The first mailing was sent to all party heads. If a response was not received within three weeks a second mailing was sent. If after an additional three weeks a response was not received, a final mailing was sent.

In each temporal stratum, total reported harvest H_r at each cabin (for the steelhead survey) or lake (for the cutthroat survey) was the sum over mailings, m=1..3:

$$H_r = \sum_{m=1}^{3} H_{r,m} \tag{1}$$

If response was not 100%, means, medians, and histograms of harvest per responding party for each mailing were made to decide if response to each mailing was similar. Visual comparisons between and across cabins were used to help identify trends in reported harvest per responding party by mailing. Since no trends were identified, total harvest H at the cabin (for the steelhead survey) or lake (for the cutthroat survey) was calculated:

$$H = \left(\frac{N}{N_r}\right) H_r \tag{2}$$

where N_r = number of responding parties, N = number of parties on the USFS reservation list. Calculation of total effort E and total catch C at each cabin or lake by species was as above after substituting the appropriate variable for H.

Occasionally, items were missing in a response: For example, a party head listed catch but not effort, or listed effort but not catch. Because this occurred at a very low rate in this survey (all were less than 3%), no adjustments or estimates for missing data items were made.

Variances for the estimated totals were computed using the formula for simple random sampling (Cochran 1977):

$$V[H] = (1 - \frac{N_r}{N}) N^2 \frac{\sum_{i=1}^{Nr} (H_r - \overline{H}_r)^2}{N_r (N_r - 1)} \tag{3}$$

which was justified by the finding no differences in mean response per party by mailing.

Effort, catch, and harvest for each cutthroat trout lake (Table 1) or steelhead stream (Table 2) and their variances (Appendix A–B) were obtained by summing point estimates for the individual cabins or systems over surveys or seasons.

The proportion of days that bag or possession limits for cutthroat trout were restricted was included to provide an indication of the effect of current and proposed management regulations at these fishing areas. The proportion was estimated:

$$p_r = \frac{D_r}{D} \tag{4}$$

where D_r = number of days in which respondents report angling was restricted by a bag or possession limit, and D = number of days of angling reported.

RESULTS

There were no apparent trends in the average harvest per responding party (Appendix C) in any of the three mailings for steelhead or cutthroat trout. As a result, direct expansions (Equation 2) were used to calculate total effort, catch, and harvest.

Anglers spent an estimated 21,454 hours spread over 5,311 fishing days to harvest 3,990 cutthroat trout, 3steelhead, 837 rainbow trout, 294 kokanee, and 329 Dolly Varden from the cutthroat lakes surveyed in 1993 (Table 1). Anglers also caught and released another 23,958 cutthroat trout, 77 steelhead, 2,248 rainbow trout, 883 kokanee, and 2,499 Dolly Varden in these systems.

In the steelhead streams with USFS cabins, anglers spent an estimated 29,247 hours spread over 7,341 days to harvest 143 steelhead trout, 549 rainbow trout, 1,628 cutthroat trout, 134 kokanee, and 1,203 Dolly Varden in 1993 (Table 2). Anglers also reported catching and releasing another 882 steelhead, 3,344 rainbow trout, 7,934 cutthroat trout, 1,144 kokanee, and 7,000 Dolly Varden from these systems.

In total, 5,618 cutthroat trout, 146 steelhead trout, 1,386 rainbow trout, 428 kokanee, and 1,532 Dolly Varden were harvested in 50,701 hours of effort spread over 12,652 days in the systems with USFS cabins included in this survey. An additional 31,892 cutthroat trout, 959 steelhead, 5,592 rainbow trout, 2,027 kokanee, and 9,499 Dolly Varden were caught and released.

Respondents to the cutthroat trout survey were asked how many days their fishing was limited by the current bag and possession limits. In 1993, anglers reported that their harvest was restricted by bag limits on only 7% of the total days fished.

Party heads rated fishing for cutthroat trout at the cabin they visited from excellent to poor (Table 3, Figure 4). The cabins at Essowah Lake, Eagle Lake, and Lake Kathleen received only poor ratings for cutthroat fishing. At the other extreme, Baranof Lake got only good to excellent ratings.

In the steelhead survey, 54% of the anglers responding reported catching a steelhead during the period from January through May. For the whole year, 14% of the anglers reported catching a steelhead.

Almost 62% of the respondents to the survey used their cabin reservations in 1993. Of the respondents who used their reservations, 437 (84.5%) reported that they fished at some time during their stay. The average party was 3.3 people (Appendix C–D), with a range from 1 to 13 people per party.

Of parties reserving cabins, 1,233 (67.7%) originated from within Alaska, and the remaining parties (587) originated from outside of Alaska. Of the out-of-state parties, 426 (69.4%) used their cabin reservations, and 622 (50.4%) of the parties originating from Alaska used their reservations. Out-of-state parties also fished longer while at a USFS cabin: out-of-state anglers fished an average of 23.1 hours, while anglers from Alaska fished an average of only 9.2 hours during their stay.

Table 3. Summary of how parties rated cutthroat trout fishing from the cabins they visited during 1993.

System	Excellent	Good	Fair	Poor
Bakewell Lake	1	3	4	5
Baranof Lake	2	2	0	0
Distin Lake	0	2	5	3
Eagle Lake	0	0	0	1
Ella Lake	5	8	11	6
Essowah Lake	0	0	0	3
Florence Lake	4	3	3	0
Goulding Lake	1	1	0	1
Hasselborg Lake	4	24	11	3
Heckman Lake	1	6	7	7
Humpback Lake	7	3	4	1
Jims Lake	3	5	4	0
Jordan Lake	1	0	5	6
Lake Alexander	2	3	2	4
Lake Kathleen	0	0	0	3
Manzanita Lake	7	7	12	8
Orchard Lake	2	2	4	1
Patching Lake	2	1	6	3
Rainbow Lake	0	0	1	1
Salmon Lake	2	3	5	7
Sweetwater Lake	2	2	6	15
Turner Lake	4	5	10	18
Virginia Lake	2	1	0	2
Wilson Lake	11	5	1	1
Young Lake	3	7	6	10
Total	66	93	107	109

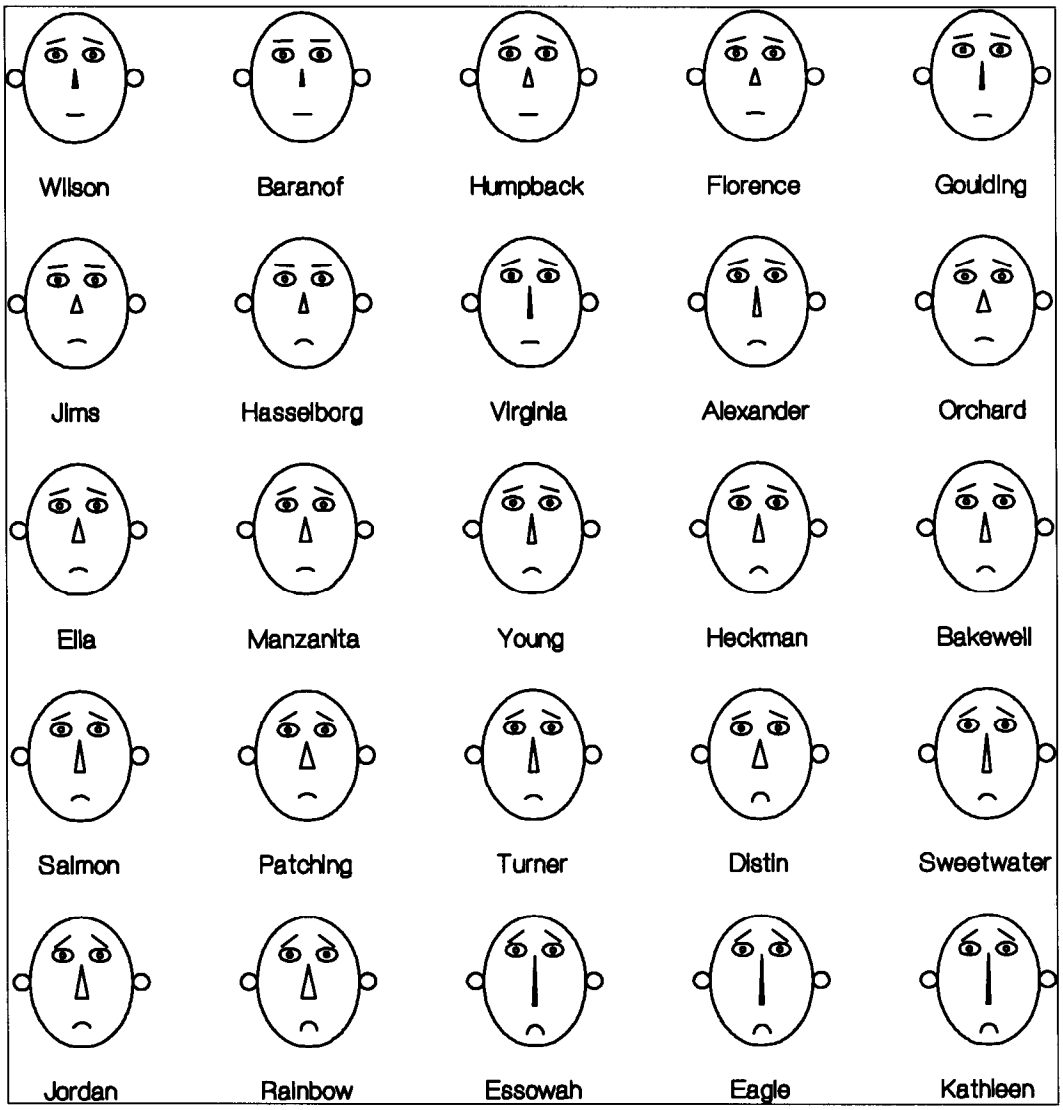

Figure 4. Graphic characterization of angler responses about fishing quality at cutthroat lakes in Southeast Alaska. The icons were generated in SYSTAT (Wilkinson 1990). Variables (the rating as proportions of all responses) are: Excellent (curvature of mouth), Good (angle of brow), Fair (width of nose), and Poor (length of nose). Faces are ordered in the plot by subjective criteria. Also see the data on Table 3.

DISCUSSION

Angler success for steelhead was down in 1993 from results reported in 1992 (Jones 1993). In 1993, 46% of the anglers responding caught a steelhead during the spring steelhead season, compared with 56% during the same period in 1992. For the calendar year, 14% of anglers fishing steelhead streams reported catching a steelhead in 1993, compared with 26% in 1992.

Anglers fishing at USFS cabins located on cutthroat trout lakes in 1993 reported being limited by harvest regulations (bag and possession limits) on only 7% of the days they fished, compared with 24% in 1992 (Jones 1993). Comparing 1993 angler ratings for cutthroat trout fishing (Table 3 and Figure 4) with those of 1992, it is apparent that anglers were not as satisfied with the fishing in 1993. Some anglers may also hold very high expectations, or they may base the quality of their fishing experience on criteria that were seldom met.

Some of the change in angler satisfaction may result from a decline in the overall cutthroat catch rates in 1993. Anglers caught an average of 1.8 cutthroat per hour in 1992 and 1.3 cutthroat per hour in 1993. The summer of 1993 was unusually warm, and anglers reported difficulty catching cutthroat trout during the extended dry spell.

Certain of the USFS recreational cabins were more popular than others in 1993 (Appendix C and D). Of all the cabins surveyed, Staney Creek on Prince of Wales Island had the most registered parties (76) in a season. In contrast, the cabin at McGilvery Creek (in the Karta River system) had only four registered parties.

Release rates for all species surveyed were high in 1993 and very comparable to the release rates reported in 1992. In total, the release rate for cutthroat trout (for both surveys combined) was 83% in 1992 and 85% in 1993. For steelhead, release rates dropped from 95% in 1992 to 87% in 1993. In 1993, 48 of the better steelhead streams were catch-and-release only for steelhead, which was up from 24 streams in 1992.

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APPENDIX A

Appendix A. Standard errors of estimates by system for effort (days and hours fished), and fish kept and released by species for selected cutthroat trout systems in Southeast Alaska in 1993.

				Cutthroat		Steelhead		Rainbow		Kokanee		Dolly Varden	
System	VBias[1]	Days	Hours	Kept	Released	Kept	Released	Kept	Released	Kept	Released	Kept	Released
Bakewell Lake	0	14	61	14	37	0	0	3	12	0	0	2	11
Baranof Lake	0	14	64	74	127	0	0	0	0	0	0	0	0
Distin Lake	0	13	35	7	35	0	0	0	0	0	0	0	0
Eagle Lake	2	.	.	.	.	.	.	.	.	.	.	.	.
Ella Lake	0	37	193	65	539	0	0	151	56	0	6	4	6
Essowah Lake	0	41	473	3	1	0	0	0	0	0	0	0	0
Florence Lake	0	16	89	57	731	2	0	0	0	0	27	3	10
Goulding Lake	0	18	45	6	51	0	0	15	19	0	0	0	0
Hasselborg Lake	0	54	231	78	202	0	0	3	1	5	43	9	32
Heckman Lake	0	32	256	27	177	0	7	42	182	10	29	6	41
Humpback Lake	0	36	266	42	496	0	0	0	7	6	0	10	35
Jims Lake	1	24	167	52	127	0	0	4	9	0	0	1	0
Jordan Lake	0	36	265	5	58	0	12	64	85	14	0	6	5
Juneau Area	0	0	0	0	0	0	0	0	0	0	0	0	0
Lake Alexander	0	17	83	35	101	0	0	0	0	5	0	0	0
Lake Eva	0	53	178	10	78	0	10	4	27	2	0	25	168
Lake Kathleen	0	8	26	0	0	0	0	0	0	0	0	0	11
Manzanita Lake	0	19	81	32	136	0	0	21	39	8	58	2	10
Orchard Lake	0	20	116	35	378	0	0	0	0	1	0	0	14
Patching Lake	0	27	94	87	443	0	0	0	0	0	0	0	0
Rainbow Lake	0	2	10	0	0	0	0	16	17	0	0	0	0
Salmon Lake	0	64	73	24	172	0	0	7	4	4	18	23	179
Sweetwater Lake	0	48	220	65	317	0	0	0	10	14	0	10	103
Taku River	0	3	6	0	7	0	0	0	0	0	0	0	0
Turner Lake	0	29	129	11	90	0	0	8	62	18	41	9	81
Virginia Lake	0	40	24	57	397	0	0	0	0	0	0	0	20
Wilson Lake	0	28	150	33	737	0	0	0	46	5	6	0	6
Young Lake	0	30	111	32	99	0	0	12	0	15	22	8	46

[1] If vbias > 0 then the standard error estimate is biased low (or undefined) due to inadequate responses to the survey.

APPENDIX B

Appendix B. Standard errors of estimates by system for effort (days and hours fished), and fish kept and released by species for steelhead systems in Southeast Alaska in 1993.

				Cutthroat		Steelhead		Rainbow		Kokanee		Dolly Varden	
System	VBias[1]	Days	Hours	Kept	Released	Kept	Released	Kept	Released	Kept	Released	Kept	Released
Admiralty Creek	0	25	111	9	49	1	2	15	19	0	5	11	65
Anan Bay	0	13	38	0	57	3	4	0	0	0	0	0	0
Andrew Creek	0	0	0	0	0	0	0	0	0	0	0	0	0
Castle River	1	43	149	11	94	1	1	4	97	0	98	4	37
Fish Creek	0	123	160	15	62	0	17	0	15	0	0	27	411
Harding River	0	4	11	0	14	0	0	0	0	0	0	3	0
Hugh Smith Lake	0	33	132	0	4	0	0	0	0	0	0	0	0
Italio River	0	14	76	4	19	0	1	1	2	0	0	3	8
Kadake Bay	0	0	0	0	0	0	0	0	0	0	0	0	0
Kah Sheets Lake	0	87	377	30	67	0	3	19	122	0	2	7	14
Karta River	1	84	387	221	377	32	86	32	237	33	133	65	227
Kegan Creek	0	88	217	31	199	3	2	13	24	9	59	11	237
Kook Lake	1	12	88	0	26	0	0	0	17	0	0	0	66
McDonald Lake	0	52	231	10	55	7	43	16	70	0	0	61	236
Petersburg Lake	0	36	154	0	10	0	0	0	7	0	0	7	18
Red Bay Lake	0	22	159	1	11	0	0	0	0	0	0	14	49
Reflection Lake	0	21	122	7	42	0	11	11	7	0	0	10	7
Salmon Bay Lake	0	32	155	11	119	0	10	4	25	0	62	12	55
Sarkar Lake	0	26	163	12	31	0	0	26	86	7	29	13	27
Sitkoh Lake	0	35	190	5	162	0	3	0	53	11	66	10	18
Situk River	0	54	340	9	44	0	38	14	27	0	6	22	81
Staney Creek	0	52	254	30	126	13	13	0	6	0	0	11	71

[1] vBias = the number of cabins without variance estimates; if vBias>0 the standard error is biased low (or missing).

APPENDIX C

Appendix C. Sum and average of hours fished, harvest, and numbers released per responding party, for cutthroat trout and steelhead trout recreational surveys, by survey strata and mailing, 1993.

Cutthroat trout survey							
		Sum of data			Mean of data		
Survey	Response	Hours	Kept	Released	Hours	Kept	Released
Spring	1	279.0	119	241	17.4	7	15
	2	173.0	32	121	15.7	3	11
	3	0	0	0	0	0	0
Summer	1	6,451.8	1,020	6,394	37.5	6	37
	2	2,228.0	560	2,910	32.8	8	43
	3	1,342.0	264	1,441	31.2	6	34
Fall	1	1,594.1	241	2,608	37.1	6	61
	2	854.0	154	668	38.8	7	30
	3	343.0	92	598	49.0	13	85
Total		13,264.8	2,482	14,981	34.7	6	39

Steelhead survey							
		Sum of data			Mean of data		
Survey	Response	Hours	Kept	Released	Hours	Kept	Released
Spring	1	1,694.0	0	2	21.2	11	126
	2	1,217.0	0	2	21.0	11	115
	3	60.0	0	0	20.0	0	1
Summer	1	9,264.5	0	0	19.8	40	75
	2	3,575.8	0	0	19.8	3	19
	3	1,702.0	0	1	20.5	1	79
Fall	1	2,217.5	0	1	16.9	0	83
	2	827.0	0	0	14.8	1	22
	3	432.0	0	1	13.1	1	34
Total		20,989.8	0	1	19.2	68	554

APPENDIX D

Appendix D. Summary of the number of reservations and average party size by seasonal strata for the cutthroat trout mailout survey.

Survey	System	Cabin name	Parties	Mean party size
Spring	Baranof Lake	Baranof Lake	1	0
	Distin Lake	Distin Lake	2	0
		Sportsmen	3	1
	Eagle Lake	Eagle Lake	3	1
	Ella Lake	Ella Narrows	4	3
		Red Alders	8	3
	Florence Lake	East Florence	2	4
		West Florence	1	0
	Goulding Lake	Goulding Lake	1	2
	Hasselborg Lake	Big Shaheen	4	3
		Little Shaheen	3	2
	Humpback Lake	Humpback Lake	5	3
	Jims Lake	Jims Lake	1	0
	Jordan Lake	Jordan Lake	7	1
	Lake Eva	Lake Eva	7	3
	Orchard Lake	Plenty Cutthroat	1	1
	Patching Lake	Patching Lake	1	0
	Salmon Lake	Salmon Lake 0 Sitka	19	4
	Sweetwater Lake	Sweetwater Lake	12	3
	Turner Lake	East Turner	1	1
		West Turner	4	2
	Virginia Lake	Virginia Lake	12	4
	Young Lake	North Young Lake	2	1
		South Young Lake	5	3
Summer	Bakewell Lake	Bakewell Lake	12	4
	Baranof Lake	Baranof Lake	15	3
	Distin Lake	Distin Lake	6	4
		Sportsmen	15	3
	Ella Lake	Ella Narrows	28	2
		Red Alders	12	3
	Essowah Lake	Essowah Lake	6	3
	Florence Lake	East Florence	10	1
		West Florence	7	3
	Goulding Lake	Goulding Lake	8	1
	Hasselborg Lake	Big Shaheen	27	4
		Hasselborg Creek	19	2
		Little Shaheen	29	3
	Heckman Lake	Heckman Lake	16	3
	Humpback Lake	Humpback Lake	19	2
	Jims Lake	Jims Lake	25	3
	Jordan Lake	Jordan Lake	15	3
	Lake Alexander	Lake Alexander	24	2
	Lake Eva	Lake Eva	31	3
	Lake Kathleen	Lake Kathleen	9	2

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Survey	System	Cabin name	Parties	Mean party Size
	Manzanita Lake	Beaver Camp	17	3
		Manzanita Lake	31	3
	Orchard Lake	Plenty Cutthroat	16	3
	Patching Lake	Patching Lake	17	2
	Rainbow Lake	Rainbow Lake	5	3
	Salmon Lake	Salmon Lake 0 Sitka	23	3
	Sweetwater Lake	Sweetwater Lake	34	3
	Taku River	Spruce Camp	19	2
	Turner Lake	East Turner	38	3
		West Turner	33	4
	Wilson Lake	Wilson Narrows	13	2
		Wilson View	17	2
	Young Lake	North Young Lake	24	3
		South Young Lake	25	4
Fall	Bakewell Lake	Bakewell Lake	5	2
	Distin Lake	Distin Lake	1	2
		Sportsmen	2	2
	Eagle Lake	Eagle Lake	2	0
	Ella Lake	Ella Narrows	21	2
		Red Alders	13	3
	Essowah Lake	Essowah Lake	3	3
	Florence Lake	East Florence	4	5
		West Florence	3	3
	Goulding Lake	Goulding Lake	3	0
	Hasselborg Lake	Big Shaheen	5	3
	Heckman Lake	Heckman Lake	17	3
	Humpback Lake	Humpback Lake	9	2
	Jims Lake	Jims Lake	4	1
	Jordan Lake	Jordan Lake	14	2
	Lake Alexander	Lake Alexander	7	2
	Lake Eva	Lake Eva	1	0
	Lake Kathleen	Lake Kathleen	6	2
	Manzanita Lake	Beaver Camp	3	3
		Manzanita Lake	10	2
	Orchard Lake	Plenty Cutthroat	1	1
	Patching Lake	Patching Lake	8	2
	Salmon Lake	Salmon Lake 0 Sitka	4	0
	Sweetwater Lake	Sweetwater Lake	28	3
	Turner Lake	West Turner	1	0
	Virginia Lake	Virginia Lake	7	3
	Wilson Lake	Wilson Narrows	2	4
		Wilson View	10	3
	Young Lake	North Young Lake	6	2
		South Young Lake	6	3

APPENDIX E

Appendix E. Summary of the number of reservations and average party size by seasonal strata for the steelhead mailout survey.

Survey	System	Cabin name	Parties	Average party size
Spring	Admiralty Creek	Admiralty Cove	13	3
	Anan Bay	Anan Bay	15	3
	Andrew Creek	Mount Rynda	5	2
	Fish Creek	Fish Creek	19	2
	Harding River	Harding River	8	2
	Italio River	Italio River	1	1
	Karta River	Karta Lake	9	2
		Karta River	12	3
		Salmon Lake 0 Karta	2	0
	Kegan Creek	Kegan Cove	2	3
	Kook Lake	Kook Lake	2	0
	McDonald Lake	McDonald Lake	8	4
	Salmon Bay Lake	Salmon Bay Lake	3	3
	Sarkar Lake	Sarkar Lake	6	3
	Sitkoh Lake	East Sitkoh Lake	5	5
		West Sitkoh Lake	3	1
	Situk River	Middle Situk R. North	5	3
		Middle Situk R. South	4	2
		Situk Weir	3	4
	Staney Creek	Staney Creek	14	3
Summer	Admiralty Creek	Admiralty Cove	42	4
	Castle River	Castle Flats	18	3
		Castle River	17	5
	Fish Creek	Fish Creek	28	4
	Italio River	Italio River	9	3
	Kadake Bay	Kadake Bay	7	3
	Kah Sheets Lake	Kah Sheets Bay	20	4
		Kah Sheets Lake	24	3
	Karta River	Karta Lake	16	3
		Karta River	15	3
		McGilvery Creek	3	4
		Salmon Lake 0 Karta	14	2
	Kegan Creek	Kegan Cove	19	3
		Kegan Creek	16	2
	Kook Lake	Kook Lake	12	2
	McDonald Lake	McDonald Lake	16	3
	Petersburg Lake	Petersburg Lake	21	3
	Red Bay Lake	Red Bay Lake	12	3
	Reflection Lake	Reflection Lake	15	2
	Salmon Bay Lake	Salmon Bay Lake	14	3
	Sarkar Lake	Sarkar Lake	32	3
	Sitkoh Lake	East Sitkoh Lake	12	3
		West Sitkoh Lake	15	3

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Survey	System	Cabin name	Parties	Average party size
	Situk River	Middle Situk R. North	9	4
		Middle Situk R. South	11	4
		Situk Lake	15	3
		Situk Weir	15	3
Fall	Staney Creek	Staney Creek	32	4
	Admiralty Creek	Admiralty Cove	12	3
	Castle River	Castle Flats	4	2
		Castle River	2	1
	Fish Creek	Fish Creek	27	3
	Harding River	Harding River	1	2
	Hugh Smith Lake	Hugh Smith Lake	11	3
	Kah Sheets Lake	Kah Sheets Bay	1	0
	Karta River	Karta Lake	17	3
		Karta River	20	2
		McGilvery Creek	1	3
		Salmon Lake 0 Karta	3	4
	Kegan Creek	Kegan Cove	5	4
		Kegan Creek	6	3
	McDonald Lake	McDonald Lake	9	3
	Red Bay Lake	Red Bay Lake	6	3
	Reflection Lake	Reflection Lake	5	2
	Salmon Bay Lake	Salmon Bay Lake	12	2
	Sarkar Lake	Sarkar Lake	13	3
	Situk River	Middle Situk R. North	3	2
		Middle Situk R. South	2	0
	Staney Creek	Staney Creek	30	3

APPENDIX F

Appendix F. List of data files and analysis programs developed for the cabin survey study, 1993.[a]

Data File	Description
CTVARS.SAS	SAS program to read CTPTY93.PRN and produce Table 1 and Appendix Table A.
SHVARS.SAS	SAS program to read SHPTY93.PRN and produce Table 2 and Appendix Table B.
CTPTY93.PRN	Data listing of catch, harvest, kept, and released by season, system, and party for the cutthroat trout survey.
SHPTY93.PRN	Data listing of catch, harvest, kept, and released by season, system, and party for the steelhead survey.
1993_PG1.XLS	The first page of survey information and responses.
CT_SHT2.XLS	Responses to cutthroat trout questionaire for those parties that fished.
SH_SHT2.XLS	Responses to steelhead questionnaire for those parties that fished.

[a]Data files are archived at, and available from, the Alaska Department of Fish and Game, Division of Sport Fish, Research and Technical Services, 333 Raspberry Road, Anchorage, Alaska 99518-1599.

APPENDIX G. QUESTIONNAIRE

Alaska Department of Fish & Game
Recreational Cabin Survey

Dear Mr./Mrs._____:

The Alaska Department of Fish and Game, the Division of Sport Fish is currently studying fish in «System». Because you reserved a cabin at «System», we are asking for your assistance. Information about any fishing you or anyone with you (your party) may have done while using that reservation is important to our study. Please complete the attached form to the best of your ability, then return the form in the enclosed addressed and stamped envelope. Your responses will remain strictly confidential; only the summary of information from all respondents will be published. If you wish a copy of the summary, please specify so in the additional comment box, and we will mail you one as soon as they are available.

Thank you for your participation in our study. Your information and that of other anglers will help perpetuate our opportunities to enjoy Alaska through recreational fishing.

Doug Jones
Fisheries Biologist
Division of Sport Fish