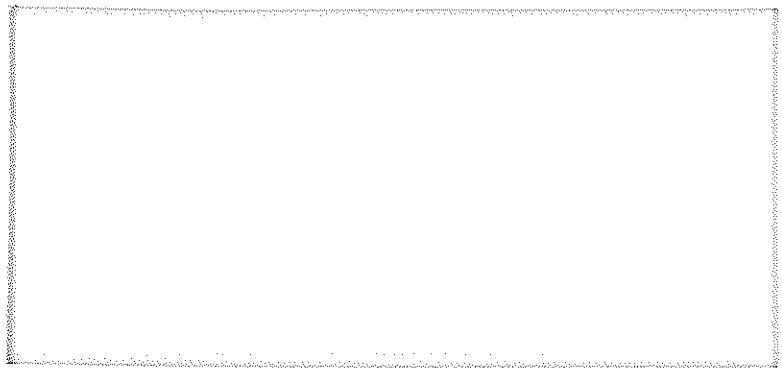

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BC Environment

SURVEY OF NATIVE FOOD FISHERIES FOR STEELHEAD IN THE SKEENA RIVER SYSTEM, 1990

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INTRODUCTION

Skeena River summer steelhead (Oncorhynchus mykiss) are harvested in commercial, native and sport fisheries as they return from the Pacific ocean to their spawning areas each summer/fall. Although standardized surveys are conducted to estimate fishing effort and catch in the commercial (hail data on file, Department of Fisheries and Oceans (DFO), Prince Rupert; sales slip data, British Columbia Commercial Catch Statistics, DFO, Pacific Region) and sport fisheries (eg. Billings 1989), little data pertaining to the native food fishery has been compiled. Unpublished data from the DFO and Ministry of Environment (MOE) files, and cursory surveys by Morrel et al. (1985), Lough (M.S. 1988) and Tetreau et al. (M.S. 1990) describe some elements of the fishery.

Further study of the native food fishery and of steelhead catches in particular was conducted during 1990. The study involved two distinctly different areas and types of fisheries; part of the study focused on gillnetting on the mainstem Skeena, while the remainder was directed at the Moricetown Canyon gaff/jig/dipnet fishery on the Bulkley River. The objectives of the investigations were:

1. to provide information on the spatial and temporal distribution of fishing effort;
2. to document catch with special reference to steelhead.

METHODS

SKEENA RIVER GILLNET FISHERY

Logistic constraints prevented examination of the entire mainstem Skeena food fishery. As a result, only that part of the Skeena River which has traditionally supported the bulk of native fishing effort (Lough, M.S. 1988) was selected as the focus of the survey; this was the area between Kitwanga and Kispiox (Figure 1).

The survey was undertaken from a power boat. Access was available at both the Kispiox-Skeena confluence and the Bulkley-Skeena confluence areas and all operating nets were counted as the survey crew progressed either upstream or downstream from the launch site. A net fishing any part of one day was considered as one "net day" in the determination of effort. Catch data was obtained when possible by discretely lifting nets and counting the number of fish by species. In addition, all native gillnet fishermen encountered on the river were interviewed. Due to sample size, actual observations were chosen over interviews for procuring a catch estimate.

The survey was partitioned into three sample periods of approximately one month each, beginning August 1 and ending October 20, 1990. The river was surveyed a total of sixteen times. During the month of August the survey area was examined twice a week while

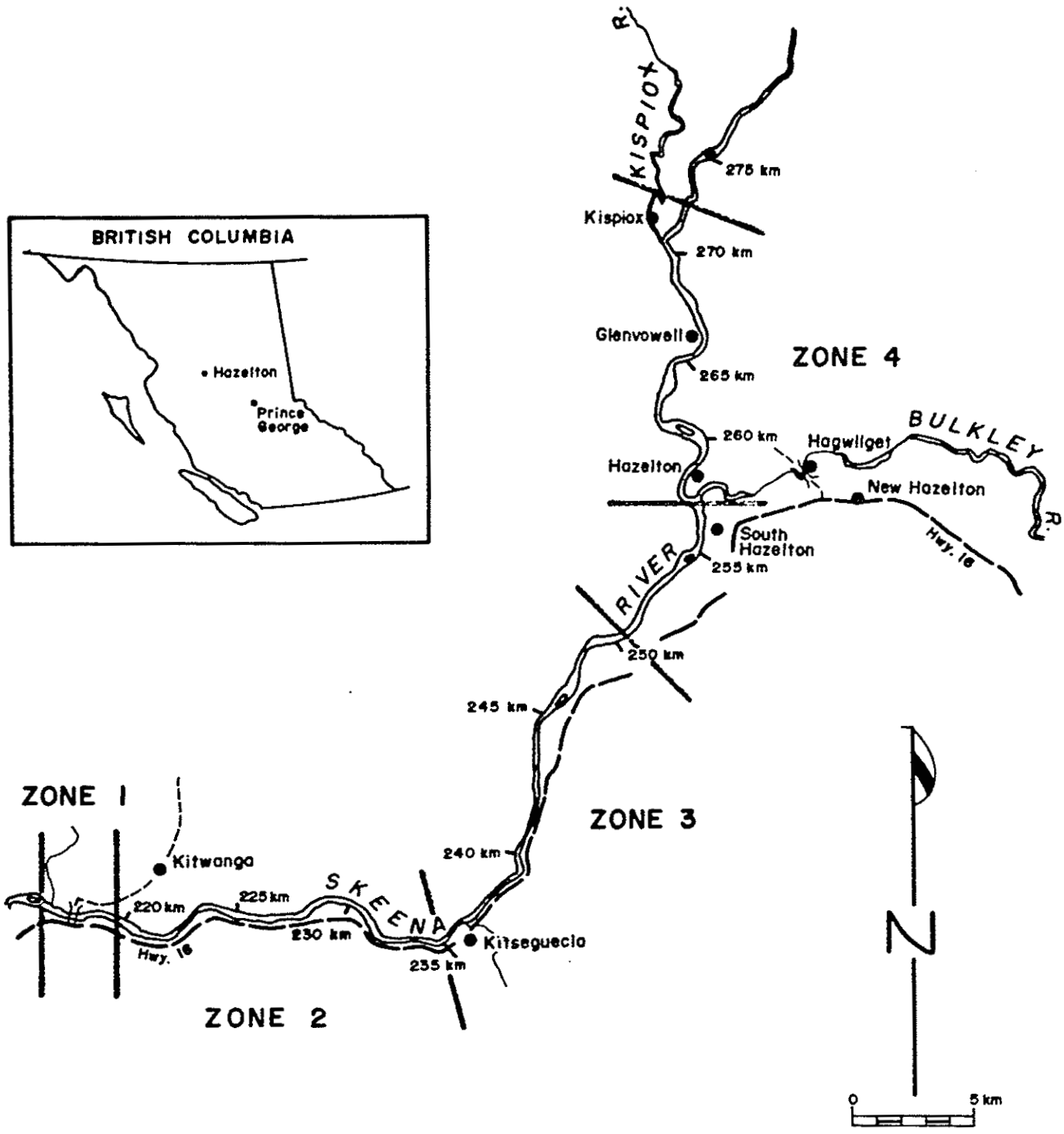

Figure 1. Native netting survey area, showing native villages and kilometers from the Skeena River estuary.

in September and October a single weekly survey was conducted. Examination dates were chosen at random (Scheaffer et al. 1979).

The mean daily net count for each month was calculated and combined to estimate a total effort figure for the survey period (Procedures For Coded Wire Tagging Pacific Salmonids). It was assumed that the netting effort was the same at night as during the day and the same on weekdays as on weekends.

Catch per net day was determined by dividing the total number of fish by the total number of nets checked. As this survey was stratified by month, a daily catch per unit effort (CPUE) figure was determined for each month. Effort was then multiplied by CPUE to give the total estimated catch for each of the three months of the survey.

DRIFT GILLNETS

Effort and catches associated with drifted gillnets in the immediate vicinity of Kitwanga and Glen Vowell were difficult to assess. Interviews conducted with drift fishermen encountered during the study formulated the basis of effort and catch estimations.

THE MORICETOWN CANYON GAFF/JIG/DIPNET FISHERY

The Moricetown Canyon gaff/jig/dipnet fishery on the Bulkley River was monitored by Branch Staff between August 15 and August 30, 1990. One hour observation periods were randomly scheduled for each day of the study period; the survey was divided into morning and afternoon strata. These strata were considered five and nine hours duration, respectively, for extrapolation purposes. At times, shorter observations were made to avoid conflict when native fishermen suspected they were being scrutinized. Recorded observations included time of day, number of fishermen, fishing method used, length of time fished, catch by species during the observation period as well as the catch by species specific harvest prior to our arrival. In many instances native fishermen were questioned informally regarding their activities and the fishery in general. The majority of fishermen freely volunteered information regarding the fishery and their fishing practices.

Both steelhead and coho catches were calculated for the study period. A catch per hour figure was calculated as a result of direct observations. This figure was extrapolated over the available fishing hours in a given day.

RESULTS AND DISCUSSION

SKEENA RIVER GILLNET FISHERY

SET GILLNETS

The 60 km section of the Skeena River between Kitwanga and Kispiox was surveyed randomly a total of 16 times between August 3 and October 20, 1990. The number of net days by zone is illustrated in Figure 2. Mean daily net counts and the corresponding percentages of total weekly netting effort are recorded in Appendix I. The total effort for the study period was estimated at 991 (95% CL +/- 152) net days. Tetreau and Spence (1990) estimated approximately 245 gillnet days were expended in the same area between September 3 and October 14, 1989; in comparison, during the same period, this study estimated a total effort of 388 net days. The most intensive period of netting effort was observed during the week of August 1-7 at 25 nets. The area where the highest effort figure was recorded was zone 3 at a mean total of 58 net days or 43.6% of the total effort for the study area; the lowest effort was expended in zone 1 at 5 net days or 3.8% of the total effort. The number of native nets encountered on survey dates and computation of estimated total netting effort is summarized in Appendix II.

The total steelhead catch based on 43 net inspections was 1550 (95% CL +/- 1324). Table 1 shows the catch by species and the catch per net from gillnets observed during the net survey. The catch per

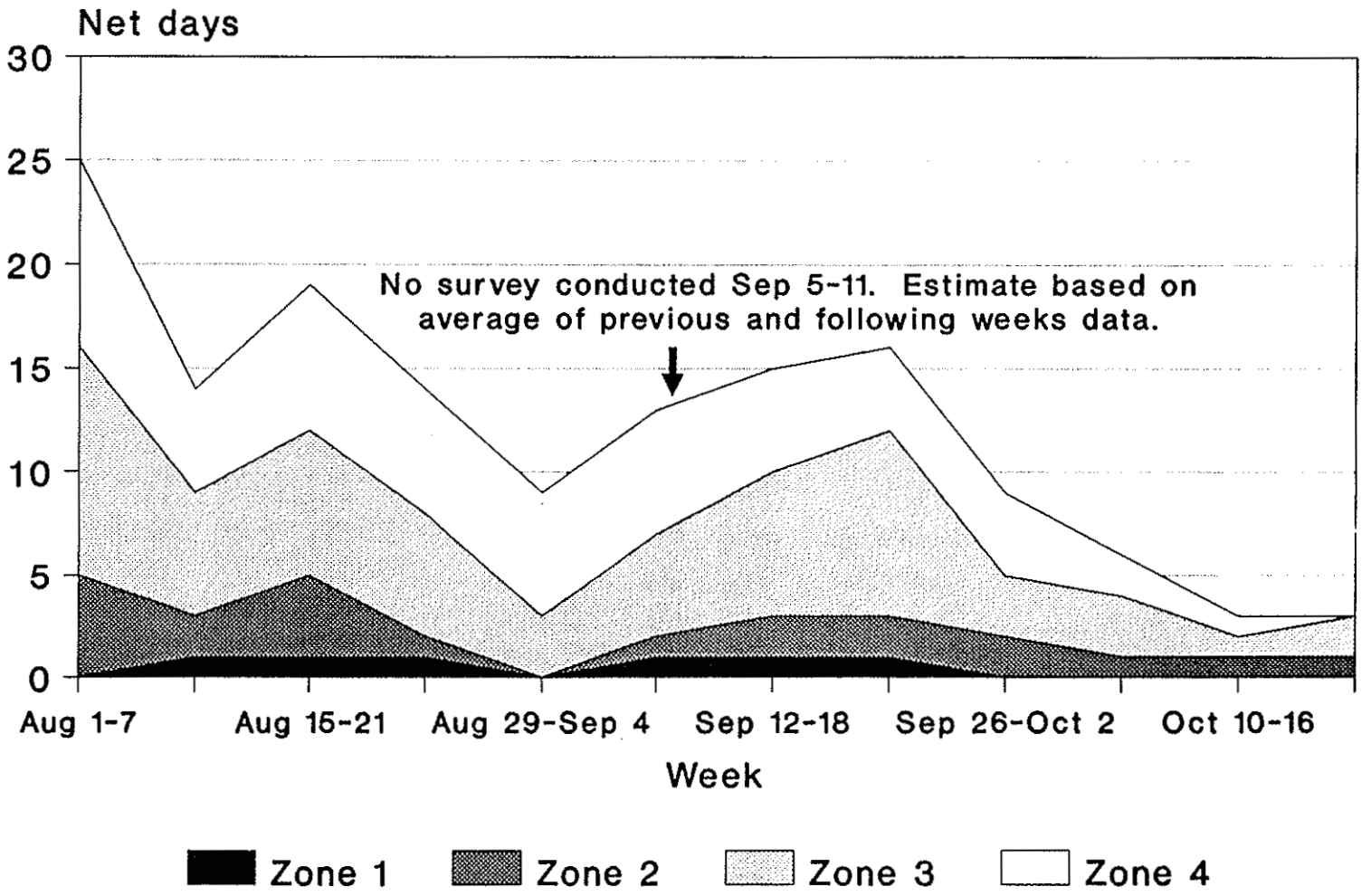

Figure 2. Mean number of net days by zone for the Skeena River (Kitwanga to Kispiox) native gillnet fishery, 1990.

Table 1. Catch by species and catch per net from gillnets observed during the Skeena River (Kitwanga to Kispiox) native net survey, fall 1990.

Zone	No. of nets		Steelhead		Coho		Pink		Sockeye		Chum		Chinook		Dolly Varden	
	Counted	Checked	No.	Per Net	No.	Per Net	No.	Per Net	No.	Per Net	No.	Per Net	No.	Per Net	No.	Per Net
1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	30	5	1	0.2	8	1.6	68	13.6	60	12	1	0.2	0	0	0	0
3	84	19	49	2.6	36	1.9	41	2.2	137	7.2	2	0.1	5	0.3	8	0.4
4	71	23	17	0.7	15	0.7	43	2.1	247	10.7	8	0.1	4	0.2	0	0
All	191	47	67	0.9	59	1.0	152	4.5	444	7.5	11	0.1	9	0.1	8	0.1

net figure for all zones fished, 0.9 steelhead per net day, was almost identical to that estimated by Tetreau and Spence (1990) for the same area in 1989 (1.0 steelhead per net day). Appendix III shows the number of set gillnets, number of steelhead counted in net inspections and computation of the estimated steelhead catch.

A number of set nets were not regularly tended, and when inspected, contained decomposing fish (see photographs in Appendix V). On average, a single net per survey day was found to be poorly tended; during the last month of the survey this number increased to as many as four nets per observation day. Algae growth on net material was a ready indication of neglect. Two gillnets were removed from zones 2 and 3 of the Skeena River at the end of the survey as they had not been checked for a minimum of three weeks. These nets were sunken with the weight of decomposing fish. Two drowned western grebes (Aechmophorus occidentalis) were also found tangled in one of the nets removed.

Interviews

Throughout the study period seven set gillnet fishermen were questioned regarding their activities on the Skeena. From interview data the average catch was calculated at 1.4 steelhead for a single net over a twenty four hour period. Steelhead catches ranged from 0 steelhead to 6 steelhead per net day.

DRIFT GILLNETS

Drift fishermen were observed near the Glen Vowell and Kitwanga reservations. Fishermen were interviewed on four separate occasions. Steelhead catches by drift gillnet fishermen averaged 0.4 steelhead per drift. A standard length drift gillnet was approximately 30 metres in length. A single drift lasted approximately 15 minutes and covered between 500 and 750 meters of the river in a single pass. Catches ranged from a low of a single steelhead for a week of netting (15 drifts) to twenty steelhead in a single drift at Glen Vowell, October, 1989 (Marvin Samuels, Glen Vowell resident, pers. comm.). Pink salmon (Oncorhynchus gorbuscha) caught in observed drift fisheries were discarded dead.

MORICETOWN CANYON GAFF/JIG/DIPNET FISHERY

Observations of the Moricetown Canyon fishery for the period of August 13 through August 31, 1990 are summarized in Table 2. Appendix IV shows the estimated catch of steelhead and coho salmon per hour at Moricetown for the study period. An estimated 257 (95% CL +/- 1646) steelhead and 1608 (95% CL +/- 5868) coho were caught in the Moricetown fishery between August 13 through August 31, 1990. As it was not always possible to determine the species of fish wounded and lost, no estimate of this number is provided.

Table 2. Summary of observations of the native food fishery at Moricetown Canyon on the Bulkley River, August 13 - August 31, 1990.

Date	Number of Fishermen	Observation Times		Catch		Catch D.O.A.*	
		Start Time	Duration Hrs: Min	Co	St	Co	St
Aug 13	1	08:00	00:10	0	0	0	0
Aug 15	2	08:00	01:00	6	1	0	0
Aug 15	6	15:45	01:00	10	1	53	17
Aug 16	5	08:00	01:00	17	5	4	2
Aug 17	1	08:00	00:05	0	0	0	0
Aug 17	0	18:00	01:00	4	3	30	16
Aug 19	3	09:00	01:15	5	2	0	3
Aug 19	3	11:00	01:00	4	0	11	5
Aug 20	3	08:00	00:05	0	0	0	0
Aug 21	1	08:00	01:00	10	0	6	0
Aug 21	1	18:00	01:00	4	1	13	6
Aug 22	2	08:00	01:00	12	1	17	4
Aug 22	4	16:15	01:05	7	2	66	2
Aug 22	1	20:00	00:20	2	0	12	4
Aug 23	1	08:15	01:00	1	0	15	2
Aug 23	1	15:45	01:00	13	0	26	2
Aug 24	1	07:30	01:00	7	1	1	0
Aug 24	4	12:30	01:00	7	0	39	0
Aug 26	4	14:00	01:00	5	0	31	5
Aug 27	2	09:30	00:30	5	2	12	3
Aug 28	1	08:45	00:15	0	0	13	1
Aug 29	2	09:00	01:00	5	1	16	1
Aug 30	0	07:30	00:05	0	0	0	0
Aug 30	6	16:00	00:05	0	0	18	2
Aug 31	2	14:40	01:05	0	1	10	1
All			19:00	124	21	393	75

* D.O.A. denotes catch that was caught and killed prior to observation period

As many as six fishermen participated in the fishery at any one time; the number of fishing sites within the canyon are limited. The small falls on the west side of the canyon was the most frequented area and was almost exclusively utilized by gaff fishermen. Fishermen on the east side of the canyon obtained fish by jigging with large, weighted treble hooks. Similarly, jig fishermen dominated the area at the base of the main falls on the west side of the canyon. Less frequently gaff fishermen used this area, particularly earlier in the season during the chinook migration. Dipnetting was rarely observed at the fish ladder on the east side of the canyon.

The fishery proceeded without any discernable order. Fishermen would randomly change locations, fishing method and time of day fished. Fishermen interviewed stated that early morning (between 0700 and 0900 hrs) was the best time to intercept fish moving through the canyon.

Pink salmon were observed being retained in only two instances. All other jigged, gaffed or dipnetted pink salmon were returned to the river and almost always in mortally wounded condition. At the peak of the pink salmon migration as many as a single pink salmon per minute was jigged per fisherman.

Fish obtained in the Moricetown fishery were commonly sold to

tourists or onlookers, taken to the Moricetown smokehouse downstream of the fishery, or taken to unknown off-site locations.

The total steelhead catch estimate for the study assumes that fishing activity during observation periods accurately represents the Moricetown Canyon fishery for the entire season. The estimated total steelhead catch may be higher than the actual catch due to the assumption that fishermen were active in the canyon from 7:00 am to 9:00 pm.

CONCLUSIONS

1. An estimated 991 (95% CL +/- 152) net days were expended on the 60 km section of the Skeena River between Kitwanga and Kispiox between August 3 and October 20, 1990. Based on 43 net inspections the steelhead catch is estimated at 1550 (95% CL +/- 1324) during this period.

2. An estimated 257 (95% CL +/- 1646) steelhead were captured and retained in the Moricetown fishery between August 15 and August 31, 1990.

RECOMMENDATIONS

1. Future surveys of native set gillnet fisheries in the Skeena River should commence in mid-July to ensure that all effort extended over the entire steelhead harvest is monitored; for the same reason the Moricetown Canyon fishery should be monitored from the beginning of August.

2. Nets should be regularly monitored to reduce unnecessary waste of fish and bird life as a result of unattended nets.

3. Gaff and jig fisheries in the Moricetown Canyon must be replaced by more selective fishing methods to avoid unnecessary waste of fish injured and lost as well as pink salmon injured and discarded.

ACKNOWLEDGEMENTS

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Appendix I. Mean daily net counts and corresponding percentages of total weekly netting effort by zone during the Skeena River native food fishery survey, 1990.

Sample Period	ZONE 1 Net Days Mean/Day	Percent	ZONE 2 Net Days Mean/Day	Percent	ZONE 3 Net Days Mean/Day	Percent	ZONE 4 Net Days Mean/Day	Percent	ALL Net Days Total	Percent
Aug 1-7	0	0.0	5	20.0	11	44.0	9	36.0	25	18.8
Aug 8-14	1	7.1	2	14.3	6	42.9	5	35.7	14	10.5
Aug 15-21	1	5.3	4	21.1	7	36.8	7	38.8	19	14.3
Aug 22-28	1	7.1	1	7.1	6	42.9	6	42.9	14	10.5
Aug 29-Sep 4	0	0.0	0	0.0	3	33.3	6	66.7	9	6.8
Sep 5-11	N.S.	N.S.	N.S.	N.S.	N.S	N.S.	N.S.	N.S.	N.S.	N.S.
Sep 12-18	1	6.7	2	13.3	7	46.7	5	33.3	15	11.3
Sep 19-25	1	6.3	2	12.5	9	56.3	4	25.0	16	12.0
Sep 26-Oct 2	0	0.0	2	22.2	3	33.3	4	44.4	9	6.8
Oct 3-9	0	0.0	1	16.6	3	50.0	2	33.3	6	4.5
Oct 10-16	0	0.0	1	33.3	1	33.3	1	33.3	3	2.3
Oct 17-23	0	0.0	1	33.3	2	66.7	0	0.0	3	2.3
Total of Means (%)	5	(3.8)	21	(15.8)	58	(43.6)	49	(36.8)	133	(100.0)

N.S. = Not surveyed

Appendix II. Number of native gillnets per monthly strata, computation of stratum effort and estimated total netting effort for the Skeena River, Kitwanga to Kispiox, August to October, 1990.

MONTHLY STRATA:	AUGUST 01-31	SEPTEM 01-30	OCTOBER 01-24
	23	9	6
	26	15	3
	18	16	3
	9	9	
	18		
	21		
	14		
	13		
	11		
AVERAGE:	17.0	12.3	4.0
SD:	5.7	3.8	1.7
SE:	1.9	1.9	1.0
NO. SAMPLING UNITS:	31	30	24
	9	4	3
STRATUM EFFORT:	527.0	367.5	96.0
VARIANCE:	2462.8	2778.8	504.0
SE:	49.6	52.7	22.4

TOTAL NETS:	991
SE:	76
LOW CL:	839
UP CL:	1143

Appendix III. Number of native gillnets inspected, number of steelhead counted and computation of estimated steelhead catch for the Skeena River, Kitwanga to Kispiox, August to October, 1990.

MONTHLY STRATA:	AUGUST 01-31		SEPTEM 01-30		OCTOBER 01-24	
	NETS	STHD	NETS	STHD	NETS	STHD
	1	0	1	0	1	5
	7	5	1	6	0	0
	0	0	0	0	3	7
	1	1	4	6		
	1	0				
	4	7				
	1	2				
	9	7				
	9	11				
TOTAL:	33	33	6	12	4	12
AVERAGE:	3.7	3.7	1.5	3.0	1.3	4.0
SD:	3.7	4.0	1.7	3.5	1.5	3.6
SE:	1.2	1.3	0.9	1.7	0.9	2.1
NO. SAMPLING UNITS:	31	31	30	30	24	24
SAMPLED:	9	9	4	4	3	3
STRATUM TOTAL:	113.7	113.7	46.5	93.0	41.3	124.0
VARIANCE:	1041.9	1212.4	585.0	2340.0	392.0	2184.0

STRATUM CPUE:	1.00	2.00	3.00
VARIANCE:	0.17	2.31	5.58
SE:	0.42	1.52	2.36
STRATUM STHD CATCH:	527	735	288
STRATUM VARIANCE:	50095	329514	58774

TOTAL STHD CATCH:	1550
VARIANCE:	438383
SE:	662
LOW CI:	226
UP CI:	2874

Appendix IV. Estimated catch per hour of steelhead and coho in the Moricetown Canyon native fishery, August 15 to August 31, 1990.

DATE	STEELHEAD CATCHES/HR		COHO CATCHES/HR	
	MORNING	AFTERNOON	MORNING	AFTERNOON
AUGUST 15	1	1	6	10
16	5		17	
17	3			4
19	2		5	
19	0		4	
21	0	1	10	4
22	1	2	12	7
23	0	0	1	13
24	1	0	7	7
26		0		6
29	1		5	
31		1		0
AVERAGE:	1.22	1.00	7.44	6.38
SD:	1.56	1.07	4.82	3.96
SE:	0.52	0.38	1.61	1.40
SAMPLED:	9	8	9	8
POSSIBLE:	85	153	85	153
STRATA TOTAL:	104	153	633	975
SE SQUARED:	166592	511479	1586406	7024844
TOTAL:	257		1608	
SE:	823		2934	

Appendix V. Photographs of a neglected net in the 1990 Skeena River native gillnet fishery. These photographs were taken in netting zone 2, nine kilometres downstream of the Kitseguecla River, on October 20.