ZYMOETZ AND CLORE RIVER

STEELHEAD TROUT: A REPORT ON

THE 1978 and 1979 SPORT FISHERY

AND SOME ASPECTS OF THEIR

LIFE HISTORY

by

W.E. Chudyk

and

M.R. Whately

Skeena Fisheries Report No. 79—3 (S.E.P.)
British Columbia Fish & Wildlife Branch,
Smithers, B.C.

March, 1980

INTRODUCTION

Among the several Skeena River tributaries that harbour summer/ Fall runs of steelhead trout (Salmo gairdneri Richardson), the Zymoetz-Clore system ranks as one of the most important in terms of angler use. Located near the major urban centers of North—Coastal British Columbia (Terrace, Kitimat, and Prince Rupert), the Zymoetz—Clore sport fishery has sustained considerable angling pressure over the past two or three decades without displaying, until recently, any apparent sign of decline or collapse (Steelhead Harvest Analysis 1970—78). However, two major flood events in 1974 and 1978, plus concomitant construction and reconstruction of a natural gas pipeline adjacent to and in some places within the river channel, expanding logging activity, and continued commercial gillnetting at the mouth of the Skeena have contributed to a recent, marked decline in angler success.

The Fish and Wildlife Branch, being aware of the importance of this fishery to residents of the Lower Skeena area, and concerned about steelhead population declines attributable to both habitat loss and over-exploitation, has placed a high priority on the assessment and enhancement of Zymoetz—Clore steelhead stocks. Habitat inventories have been compiled by Truelson and Varney (M.S. 1975) and Humphries and Morley (M.S. 1978). The latter also presented an outline of potential enhancement

works in the upper Zymoetz (McDonell Lake) area. Ptolemy (M.S.

1979) intensively and critically inventoried and assessed biological conditions (and production limiting factors) within the steelhead spawning area located immediately below McDonell Lake. Chudyk (M.S. 1979) reported on the diversion of Serb Creek, a major constraint to steelhead enhancement in the McDonell Lake area. This paper presents data collected during a creel census conducted in the years 1978 and 1979, and includes information on angler harvest and success, and life histories of Zymoetz-Clore steelhead. Funding was made available via the Salmonid Enhancement Program.

DESCRIPTION OF THE STUDY AREA AND THE STEELHEAD FISHERY

Zymoetz River, locally known as the Copper, joins the Skeena River 8 km northeast of Terrace, B.C., 54°33'N, 128°29'W (Figures 1 and 2). From its source in the McDonell Lake chain in the Hazelton Mountains, the Zymoetz flows approximately 84 km in a S.W. direction draining an area of roughly 3,000 km^2. McDonell and two smaller upstream lakes (Dennis and Aldrich) are shallow bodies of water that lie between 10 and 26 km west of Smithers, B.C. behind Hudson Bay Mountain. These lakes moderate temperatures, flows and sediment loads in the Zymoetz for a short distance downstream of the lakes to Serb Creek, a glacial, silt—laden tributary (Figure 3). The Clore River is the largest tributary of the Zymoetz. Originating high in the Bulkley Ranges 50 km southwest of Telkwa in Burnie Lakes, it flows

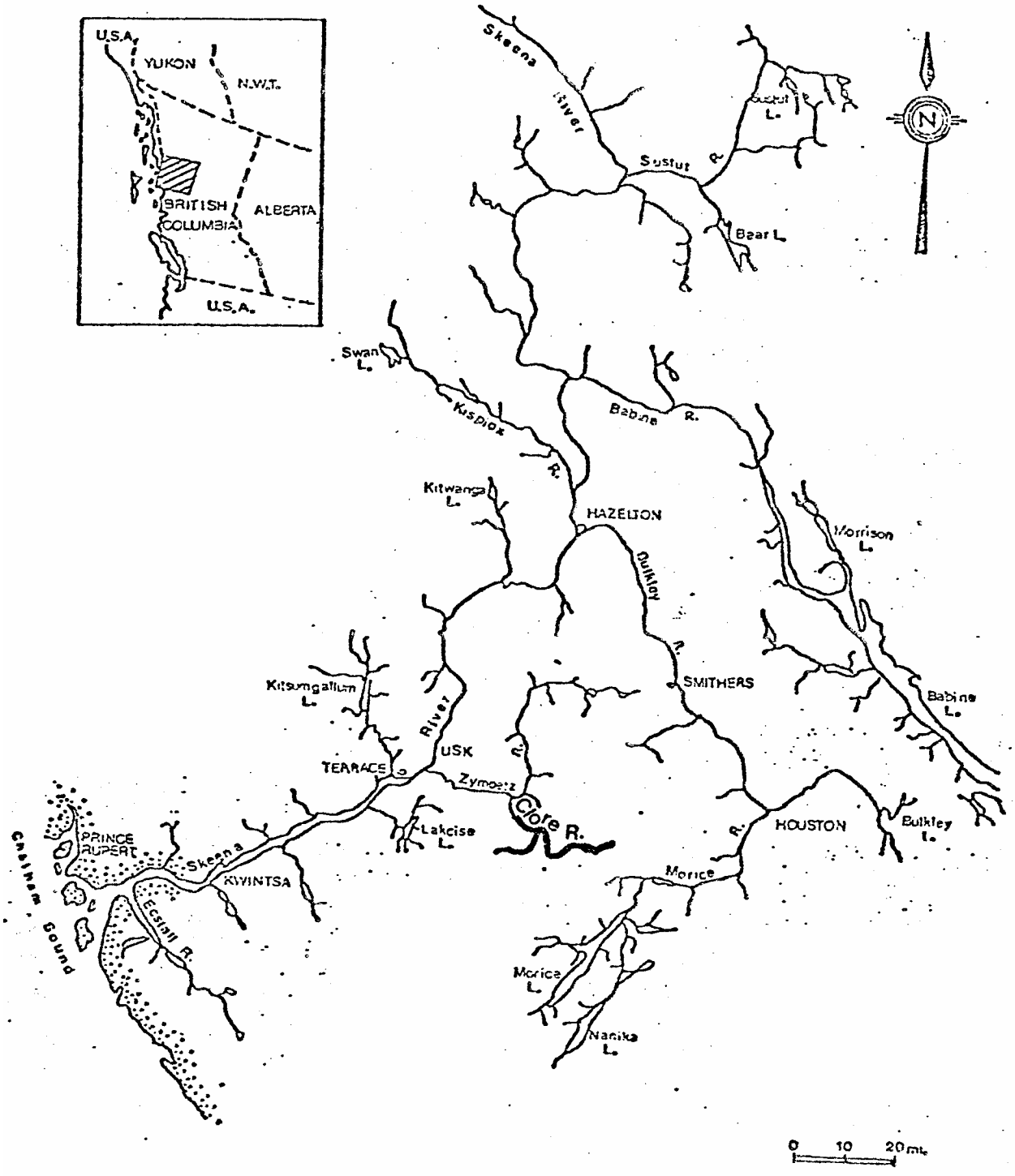

Fig. 1. The Skeena River and main tributaries.

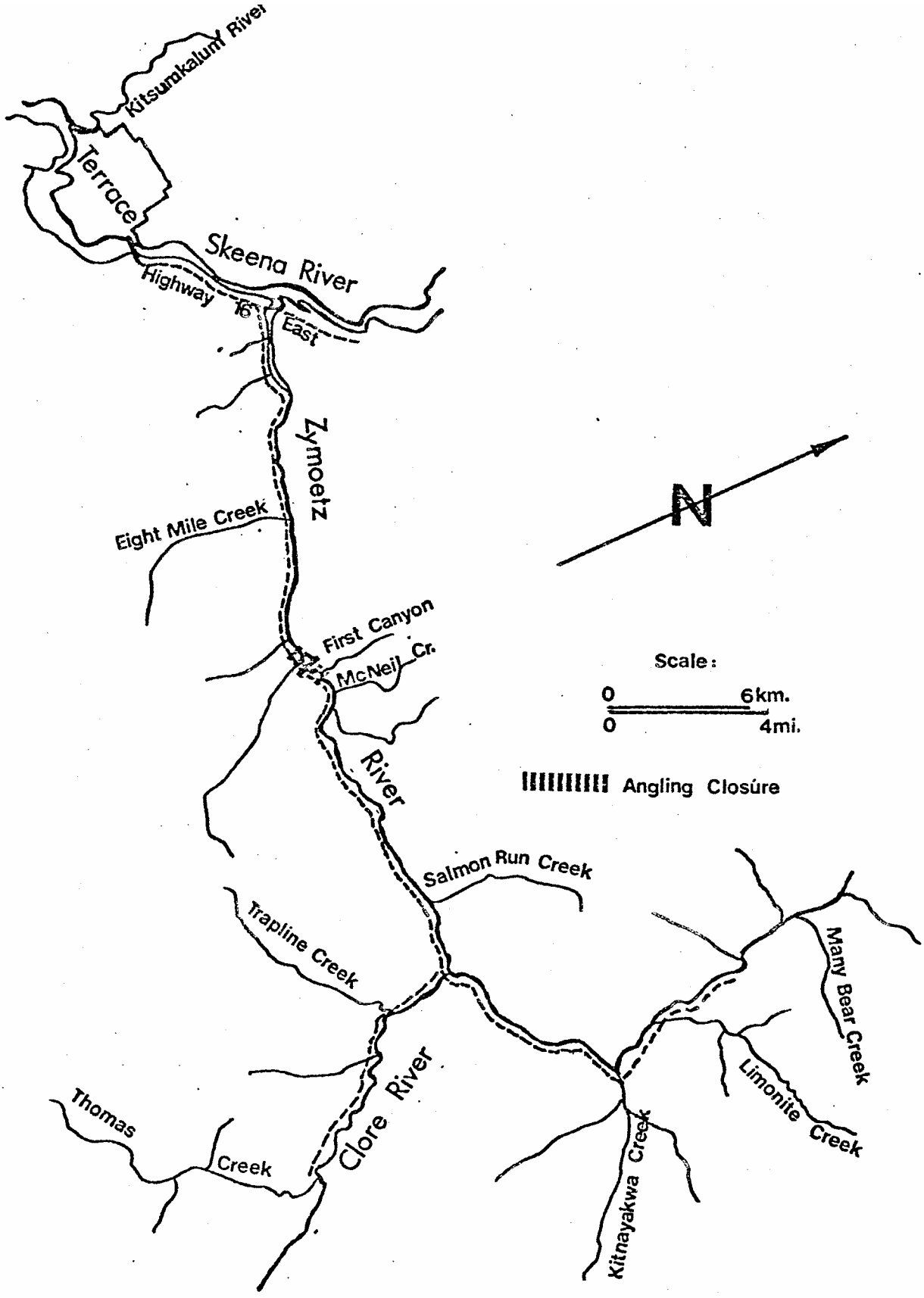

Fig. 2. The lower Zymoetz River and Clore confluence

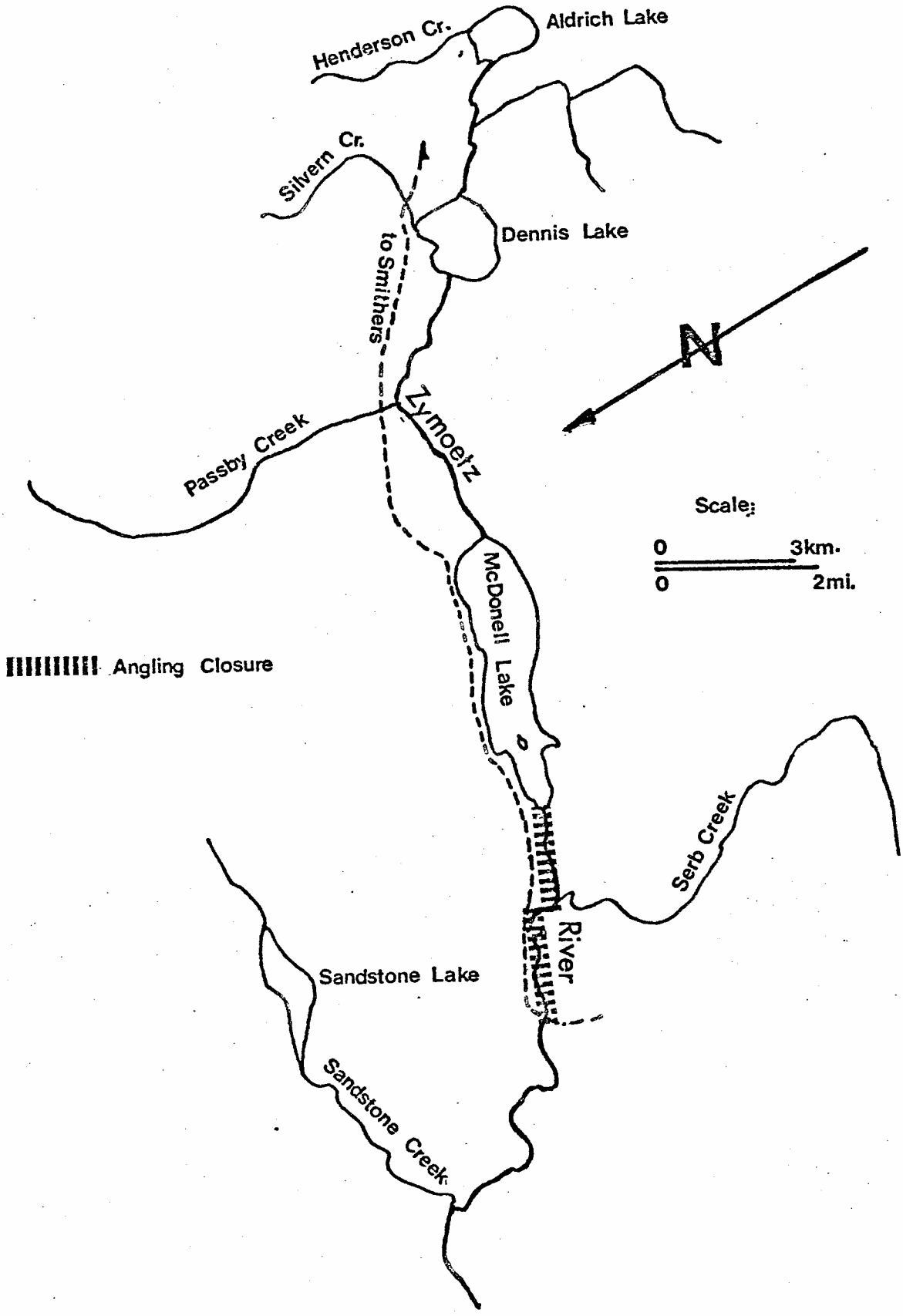

Fig. 3. Upper Zymoetz and headwater lakes.

for 75 km to its confluence with the Zymoetz approximately 30 km upstream from the Skeena.

Logging and recreation are the only ongoing activities within the Zymoetz drainage area. However, since the Zymoetz valley is the shortest route between Smithers and Terrace it has become a major east—west energy transportation corridor (gas and electricity) and there have been periods of heavy construction activity periodically since the mid-1960's. Road access to the lower Zymoetz and the Clore is gained via the Copper River Road, which originates near Terrace and parallels the river for 45 km. Access from Smithers is via the Copper River Ranch Road, which skirts the base of Hudson Bay Mountain and then runs adjacent to the upper-Zymoetz for about 24 km to the outlet of McDonell Lake (Figure 3). There is no road access between the Zymoetz—Clore confluence and McDonell Lake.

Zymoetz steelhead are subjected to several fisheries prior to entering the Zymoetz. Like most Skeena summer—run fish, they enter the Skeena estuary in July and August during the peak of the commercial gillnet fishery where they are taken incidental to sockeye and pink salmon. Upstream from the commercial fishery, Indian gill nets are set, primarily for salmon, at various sites along the main Skeena. Finally, Zymoetz— bound steelhead are subjected to an intensive sport fishery at the ZymoetzSkeena confluence and downstream on the mainstem Skeena. Steelhead begin appearing in Zymoetz anglers’ catches in late July. The fishery may continue, depending upon weather, throughout the winter. Spawning is known to occur at the outflow of McDonell Lake during late May and June (Pinsent and Chudyk, M.S. 1973).

British Columbia sport fishing regulations for the years during which this study was conducted Included the following angling closures: from McDonell Lake downstream about 3 km; upstream from and including Clore River, January 15 to June 30; and Zymoetz Canyon. Roe was banned from January 15 to June 30 and the steelhead catch limit was one fish per day with a maximum of two days possession.

METHODS

A permanent angler check station was established at the junction of the Copper River Road with Highway 16 approximately 8 km west of Terrace, B.C. The station was manned by two fisheries technicians from dawn to one hour after sunset each day for the duration of the study (September 1 to October 29, 1978; August 18 to December 13, 1979). A roving assistant periodically interviewed anglers on the river bank. Signs were set up to direct anglers off the road and onto a siding, away from traffic. Each group of anglers was then interviewed and the information recorded on creel data cards (the Zymoetz and Clore Rivers were treated as distinct systems). The information requested included residence, length of trip, location of effort, success, and tackle used. The name of each angler was also recorded in order to establish the precise number of individual anglers fishing the Zymoetz and/or the Clore (as opposed to angler—trips).

Steelhead scale samples were collected and lengths, weights, and sex determined from anglers' catches. Anglers were invited to participate by

collecting scale samples and other information from both killed and released steelhead.

Methods used in collection and analysis of steelhead scales were described by Narver and Withler (1974). Two high quality scales from each adult were placed on acetate strips and Impressions made with a heated press. The impressions were interpreted using a Microcom 1600 microfiche viewer.

RESULTS

ANGLER ORIGIN

Zymoetz—Clore River steelhead anglers that were checked through the creel census station were separated into residence categories corresponding to Steelhead Harvest Analysis areas (Tables 1 and 2). A further breakdown compared numbers of anglers from Terrace, Kitimat and Prince Rupert, all of whom were designated as "Local Residents" (Tables 3 and 4),

The angler residence data indicates that the Zymoetz—Clore fishery is comprised mainly of B.C. Residents (85.7% in 1978, 90.9% in 1979). Among B.C. Residents, Local Resident anglers were by far the greatest users 74.2% in 1978, and 77.6% in 1979.

Zymoetz

In 1978, the Zymoetz fishery attracted 590 anglers of which 335 (56.7%) were Local Residents. Although the creel census period in 1979 was twice as long as that for 1978, the total number of anglers checked

Table 1. Areas of residence and number of Zymoetz River steelhead anglers from creel surveys in 1978 and 1979. Areas of' residence are the same as areas in Steelhead Harvest Analysis, 1978 — 1979.

	Number of Anglers		Number of Angler Trips		Percent of Total Anglers		Percent of of Angler Trips	
Angler Residence	1978	1979	1978	1979	1978	1978	1978	1979
Vancouver Island	11	6	13	19	1.9	1.4	1.4	2.3
Lower Mainland	49	32	79	42	8.3	7.5	8.6	5.0
Kamloops	8	2	16	4	1.4	.5	1.8	0.5
Okanagan-Kootnay	23	16	40	26	3.9	3.8	4.4	3.1
Caribou	4	2	6	2	.7	.5	.7	.2
Northern Interior	51	13	66	24	8.6	3.1	7.2	2.9
Upper Mainland Coast	359	311	526	664	60.8	73.3	57.7	79.1
Queen Charlotte Islands	0	1	0	1	0	.2	0	.1
Non Resident Canadians	53	27	71	40	9.0	6.4	7.8	4.8
Non Canadians	32	14	95	17	5.4	3.3	10.4	2.0
Total	590	424	912	839	100	100	100	100

Table 2. Areas of residence and numbers of Clore River steelhead anglers from creel surveys in 1978 and 1979. Areas of' residence are the same as areas in Steelhead Harvest Analysis, 1978 — 1979.

	Number of Anglers		Number of Angler Trips		Percent of Total Anglers		Percent of of Angler Trips	
Angler Residence	1978	1979	1978	1979	1978	1978	1978	1979
Vancouver Island	2	2	6	3	3.3	1.7	6.5	1.7
Lower Mainland	5	13	8	15	8.3	11.1	8.6	8.4
Kamloops	0	0	0	0	0	0	0	0
Okanagan-Kootnay	1	0	11	0	1.7	0	1.8	0
Caribou	0	2	0	2	0	1.7	0	1.1
Northern Interior	0	4	0	4	0	3.4	0	2.2
Upper Mainland Coast	44	88	70	147	73.4	75.2	75.3	82.1
Queen Charlotte Islands	0	0	0	0	0	0	0	0
Non-Resident Canadians	5	7	5	7	8.3	6.0	5.4	3.9
Non-Canadians	3	1	3	1	5.0	.9	3.2	.6
Total	60	117	93	179	100	100	100	100

was considerably lower at 424. The number of local anglers declined only slightly (297 from 335) but representation by other groups in 1979 was only 50% of the 1978 totals (Tables 1 and 3).

Clore

The Clore fishery during 1978 and 1979 was observed to be the inverse of the Zymoetz fishery. Whereas the numbers of Zymoetz anglers declined between 1978 and 1979, the number of Clore anglers almost doubled. In 1978, the Clore attracted 60 anglers of which 40 (66.6%) were Local Residents. In 1979, 117 Clore anglers were checked of which 85 (72%) were Local Residents (Tables 2 and 4).

ANGLER EFFORT AND SUCCESS

Six hundred and fifty anglers were interviewed on the Zymoetz-Clore during the 1978 fishery, of which 590 fished the Zymoetz mainstem and 60 fished the Clore (Tables 1 and 2). In 1979, a total of 541 anglers were interviewed of which 424 fished the Zymoetz proper while 117 angled exclusively on the Clore. One thousand, two hundred and ten angler days were recorded on the Zymoetz-Clore (1,093 Zymoetz, 117 Clore angler days) in 1978, compared with 1,058 (874 Zymoetz, 184 Clore angler days) in 1979.

Zymoetz

Zymoetz anglers in 1978 killed 117 (51.5%) of 227 steelhead caught. In 1979, the total catch declined sharply to 127 fish, of which 78 (61.4%) were killed (Table 3).

Of the total catch in 1978, non—Local B.C. Residents caught the most fish (100 or 44.1%) followed by Local Residents who caught 71 (31.3%). In 1979 however, Local Residents were more successful than other angler groups, catching 57.4% (73 of 127 total steelhead).

Non—Canadian anglers on the Zymoetz released a greater proportion of their catch than any other group. In 1978, non—Canadians released 71.1% of their catch, followed by non—local B.C. Residents (51%), Local Residents (30.9%), and Other Canadians (0%). Over the two—year study period, non—Canadians released 70% of their catch. On the other hand, Local Residents released only 36.8% of their catch.

In terms of catch per angler, non—Canadians were the most successful in both years (1.63 fish per angler in 1978, 0.57 in 1979). Note, however, the severe decline in success between the two seasons. Local Residents remained relatively constant over 1978 and 1979 at 0.21 and 0.25 fish per angler, respectively.

Clore

A total of 37 Clore steelhead were caught in 1978, of which 17 (45.9%) were killed. In 1979, 49 steelhead were caught in the Clore, of which 18 (36.7%) were killed (Table 4).

The Clore was almost entirely a Local Resident fishery during the study period. Local anglers caught 69 of the 86 steelhead landed over the two years, Again, the success rate of local anglers remained relatively constant at 0.65 and 0.51 fish per angler for 1978 and 1979 respectively.

Table 3. Zymoetz River steelhead angler harvest and catch per unit effort for the 1978 and 1979 creel surveys.

Angler Residence	Number of Anglers		Number of Angler Trips		Number of Angler Days		Kills		Releases		Catch per Day		Catch per Angler	
	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979
Local Residents[1]	335	297	498	619	567	627	492	42	22	31	0.13.	0.12	0.21	0.25
Other B.C. Residents	170	86	248	163	344	172	49	29	51	13	0.29	0.24	0.59	0.15
Other Canadians	53	27	71	40	64	43	4	4	0	0	0.06	0.09	0.08	0.15
Non Canadians	32	14	95	17	118	32	15	3	37	5	0.44	0.25	1.63	0.57
	590	424	912	839	1093	874	117	78	110	49				

[1]Terrace, Kitimat or Prince Rupert residents.

[2]steelhead killed by local juveniles were not included in total.

Table 4. Clore River steelhead angler harvest and catch per unit effort for the 1978 and 1979 creel surveys.

Angler Residence	Number of Anglers		Number of Angler Trips		Number of Angler Days		Kills		Releases		Catch per Day		Catch per Angler	
	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1979	1979
Local Residents[1]	40	85	63	132	76	132	14	14	12	29	0.34	0.33	0.65	0.51
Other B.C. Residents	12	24	22	39	29	41	1	3	7	2	0.28	0.12	0.67	0.21
Other Canadians	5	7	5	7	6	7	0	1	0	0	0.0	0.14	0.0	0.14
Non Canadians	3	1	3	1	6	4	2	0	1	0	0.50	0.00	1.0	0.00
	60	117	93	179	117	184	17	18	20	31				

STEELHEAD CATCH DISTRIBUTION

Timing

As mentioned earlier Zymoetz-Clore steelhead first become available to the Zymoetz angler during the latter half of July. in 1978 the fishery continued until the first of November when torrential rain storms caused extensive flooding and forced the closure of the fishery. A warm, dry autumn in 1979 kept the fishery below the Zymoetz-Clore juncture open throughout the winter while the river above and including the Clore closed by regulation January 15. The 1979 census commenced in mid—August and continued until mid—December (Figures 4 through 9).

The harvest rate in the Zymoetz fishery during 1978 peaked during the week ending September 9 and during the week ending September 23. In 1979, peak steelhead catches were smaller and less distinct, occurring on the weeks ending September 2 and 30, and November 18 (Figure 4). Peak angler effort in 1978 and 1979 occurred in early September followed by a gradual decline of effort into November of 1978 and December in 1979 (Figure 6).

On the Clore, 1978 saw a peak in steelhead catches during the week ending September 23 and again during the final week of October. In 1979, however, the Clore fishery was slow in developing and significant numbers of fish were not caught until the period between November 1 and November 18. Thereafter, the catch declined swiftly (Figure 7). Steelhead harvest rates appeared relatively closely correlated with effort on the Clore (Figure 9).

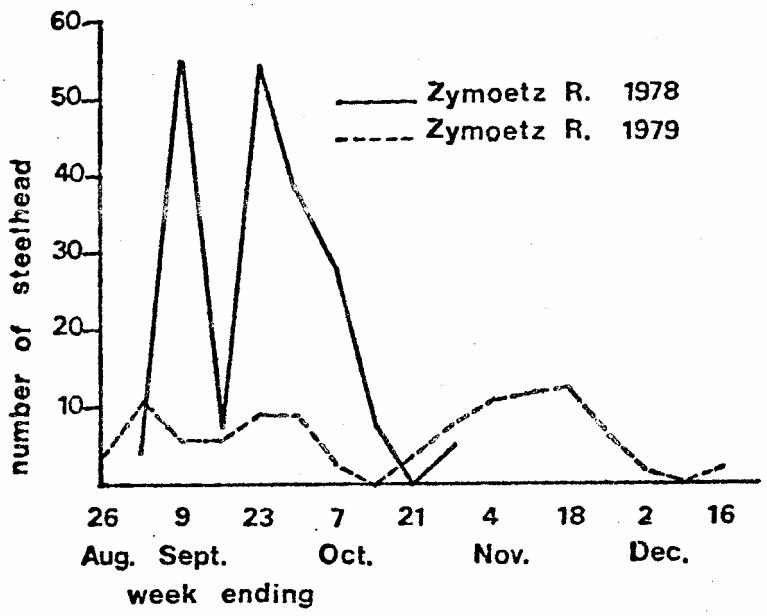

FIG. 4.. Weekly steelhead harvest (kills plus releases) Zymoetz River creel survey 1978 and 1979.

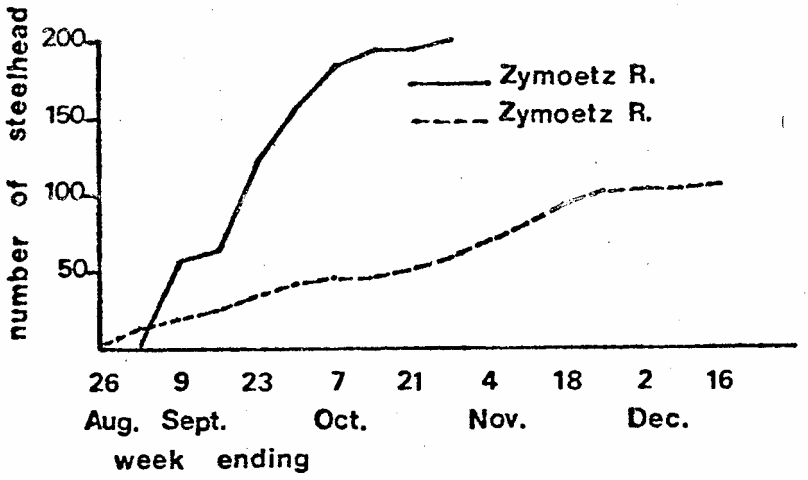

FIG. 5. Weekly cumulative steelhead harvest (kills plus releases) Zymoetz River creel survey 1978 and 1979.

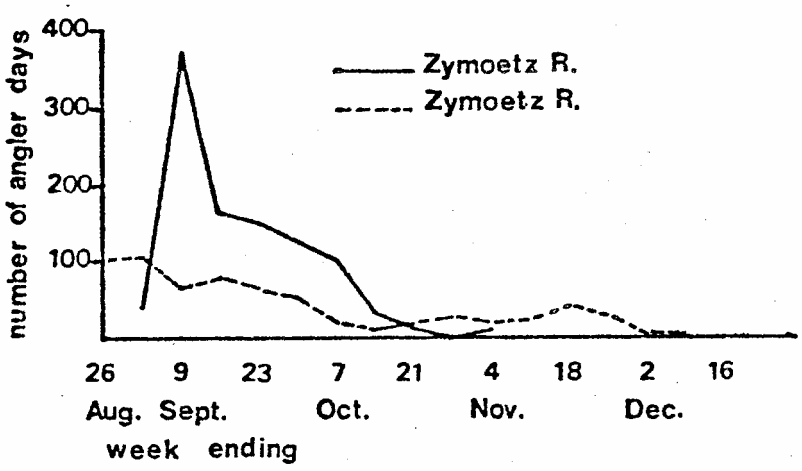

FIG. 6. Weekly total number of angler days Zymoetz River creel survey 1978 and 1979.

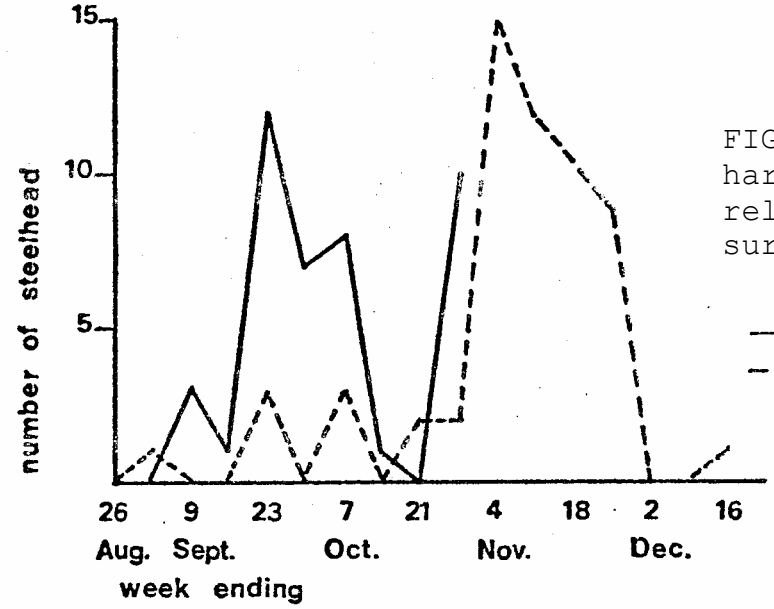

FIG. 7. Weekly steelhead harvest(kills plus releases) Clore River creel survey 1978 and 1979.

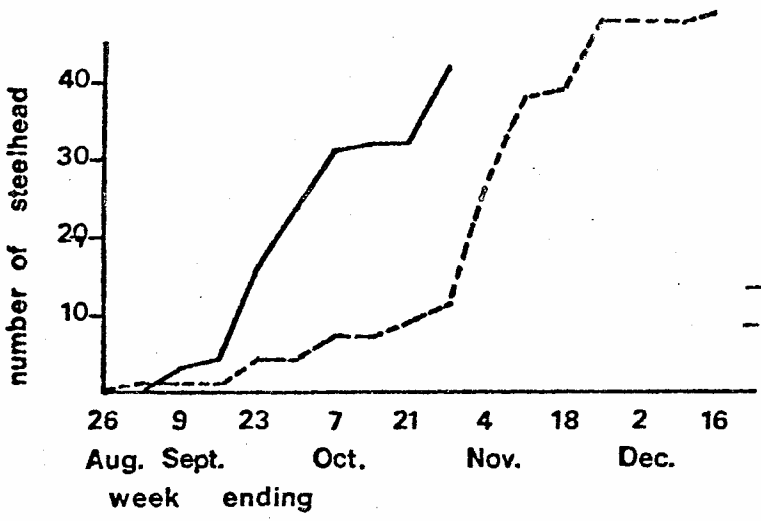

FIG. 8. Weekly cumulative steelhead harvest (kills plus releases) Clore River: creel survey 1978 and 1979

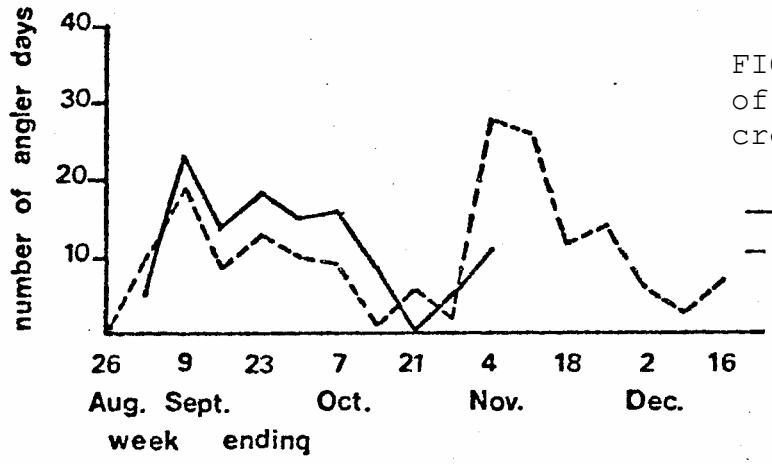

FIG. 9. Weekly total number of angler. days Clore River creel survey 1978 and 1979.

Location of Effort and Tackle Types

In 1978, the greatest number of Zymoetz-Clore angler trips (431 or 42.9%) were to the area on the Zymoetz upstream of the Clore confluence (Table 5). This area also accounted for over two—thirds of the total Zymoetz-Clore steelhead catch in 1978. The next most utilized area was between the Canyon (Figure *2)* and the Clore (26.5%). Steelhead catch, however, was greater on both the Clore (14% of total catch) and the area near McDonell Lake (8.3%) than the area between the Canyon and the Clore which contributed only 7.5 per cent.

The pattern completely changed in 1979. Most angler trips were to the area between the Skeena-Zymoetz confluence and the Canyon (42.2%), followed by the area upstream of the Canyon (25.4%), the Clore proper (17.4%), then the area upstream of the Clore (11.4%). The location of catch in terms of numbers also changed, but did not reflect the location of greatest effort. Almost 37 per cent of the total catch in 1979 was reported from the area upstream of the Canyon, followed by the Clore (27.8%), and then the area below the Canyon (19.3%). In direct, contrast to 1978, the catch above the Zymoetz-Clore confluence in 1979 only accounted for 4.6 per cent. The catch from the McDonell Lake area increased somewhat to approximately 11 per cent.

Angler trips to the Zymoetz—Clore on which lures (“Kitimats, "Spin-n-glos", etc.) were used by far outnumbered angler trips on which were used roe or artificial flies (Table 6). In both 1978 and 1979 however, lures were the least successful method in terms of steelhead caught per

Table 5. Numbers and location by area for number of angler trips and steelhead caught (kills plus releases) on the Zymoetz and Clore Rivers, in 1978 and 1979.

Location	Angler Trips[1]		Percent		Catch		Percent	
	1978	1979	1978	1979	1978	1979	1978	1979
River mouth to first canyon	199	440	19.8	42.2	6	34	2.3	19.3
Above canyon to Clore	266	265	26.5	25.4	20	65	7.6	36.9
Upstream of Clore	431	119	42.9	11.4	179	8	67.8	4.6
Clore River	95	181	9.5	17.4	37	49	14.0	27.8
McDonell Lake	13	38	1.3	3.6	22	20	8.3	11.4
Total	1004	1043	100	100	264	176	100	100

[1]Totals do not tally with numbers of angler trips presented in other Tables as many anglers fished several zones during one trip.

Table 6. Number of angler trips and catch by roe, lure and fly tackle during the Zymoetz—Clore steelhead fishery in 1978 and 1979.

	Angler Trips[1]	(%)	Total Catch[2]	Catch/ Angler Trip
1978 Creel Survey				
Roe	265	(26)	115	.43
Lure	704	(64)	110	.16
Fly	47	(5)	17	.36
Total:	1,016	(100)	242	
1979 Creel Survey				
Roe	321	(31)	74	.23
Lure	605	(59)	66	.10
Fly	98	(10)	16	.16
Total:	1,024	(100)	156	

[1]Many anglers used more than one angling method during a trip, therefore numbers of angler, trips in terms of tackle used will not compare with numbers of angler trips presented in other tables.

[2]lncludes kills plus releases.

trip. Anglers who used roe were the most successful in 1978 (0.43 fish per angler trip) followed by fly fishermen (0.36 fish per trip) and lure anglers (0.16 fish per trip). In 1979, success of all angling methods was less than in 1978, but the order remained the same — 0.23, 0.16, and 0.10 fish per trip for roe, fly and lure anglers respectively.

The ratio of steelhead killed to released in terms of tackle type also did not change between 1978 and 1979 (Table 7). Over the two—year period, roe and lure anglers killed approximately 53 per cent of their total catch, while fly anglers killed only 21.2 per cent.

LIFE HISTORY OF THE ZYMOETZ STEELHEAD

Of 189 steelhead sampled from anglers' catches on the Zymoetz during the study, 184 samples had scales that were readable for total age determination. Twelve age groups were identified (Table 8) — six groups for maiden fish and six groups for repeat spawners. The most frequently observed age groups for maiden fish were 4.2+ (40.2%), 3.2 (14.7%), 4.1 (12.5%). There were too few Clore samples to make any distinction hence Clore samples were combined with those of Zymoetz.

Adult Zymoetz steelhead sampled spent three (25.5%) and four (74.5%) winters in fresh water before migrating to sea (Table 9). There was no difference between males and females in age at smolting (males 77.3% at 4., females 79.2% at 4.). In ocean age, however, male first time spawners

Table 7. Numbers and percentages of steelhead killed and released by roe, lure and fly fishermen on the Zymoetz River in 1978 and 1979.

	Steelhead Killed[1]						Steelhead Released[1]					
	Roe		Lure		Fly		Roe		Lure		Fly	
	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979
Number	62	39	55	38	3	4	53	35	55	28	14	12
	101		93		7		88		83		26	
Per Cent	53.9	52.7	50.0	57.6	17.6	25.0	46.1	47.3	50.0	42.4	82.4	75.0
	53.3		53.8		21.3		46.7		47.2		78.7	

[1]Totals do not tally with total steelhead catch presented in other tables because information on type of gear used to catch twenty steelhead near McDonell Lake is not available.

Table 8. Steelhead trout age groups from Zymoetz River 1978 (n = 116) & 1979 (n = 68).

	Number Steelhead			Number Male		Number Female		Percent of Total		
Age Group	1978	1979	Total	1978	1979	1978	1979	1978	1979	Total
3.1+	5	6	11	4	3	1	3	4.3	8.8	6.0
3.2+	15	12	27	5	2	10	10	12.9	17.6	14.7
3.3+	1	1	2	1	1	0	0	0.9	1.5	1.1
3.2Sl+	5	2	7	1	1	4	1	4.3	2.9	3.8
4.1+	9	14	23	7	11	2	3	7.8	20.6	12.5
4.2+	50	24	74	17	10	33	14	43.1	35.3	40.2
4.3+	2	1	3	2	0	0	1	1.7	1.5	1.6
4.1Sl+	3	1	4	3	1	0	0	2.6	1.5	2.2
4.1SlSl+	1	0	1	1	0	0	0	0.9	0.0	0.5
4.1S2+	1	0	1	1	0	0	0	0.9	0.0	0.5
4.2Sl+	23	6	29	4	1	19	5	19.8	8.8	15.8
4.2SlSl+	1	1	2	0	0	1	1	0.8	1.5	1.1
12	116	68	184	46	30	70	38			

Table 9. Numbers of male and female steelhead of different fresh water ages. Zymoetz River 1978 (n = 116) and 1979 (n = 68).

Freshwater	1978				1979					
Age	Male	Female	Total	(%)	Male	Female	Total	(%)	Grand Total	(%)
3.	11	15	26	22.4	7	14	21	30.9	47	25.5
4.	34	56	90	77.6	23	24	47	69.1	137	74.5
TOTAL:	45	71	116	100	30	38	68	100	184	100

were distributed between .1+ (39.7%) and .2+ (53.9%) while females were largely .2+ (87.0%) (Table 10). In the sample of 140 first time spawners only five (3.6%) were of ocean age .3+ (four males and one female).

Forty—six (25%) of the total sample of 184 were observed to be repeat spawners (Table 11), The ratio of female to male repeat spawners was approximately 2.8:1 in 1978 and 3:1 in 1979. The majority (97.0%) of female repeat spawners had spent two winters in the ocean prior to their initial spawning migration, whereas male repeat spawners spent one (41.7%) and two (58.3%) winters in the ocean before their first spawn. One steelhead (a male) was returning for its second spawn two years after initial spawning while three steelhead (one male and two females) were returning to spawn for their third time.

Male and female steelhead of ocean age .2+ occurred most often (54.9%) among anglers' catches on the Zymoetz River (Table 9). The average weight of male .2+ steelhead was 5.1 kg and of females 4.4 kg (Table 12). One—ocean males averaged 1.9 kg while one—ocean females weighed 2.2 kg., Three—ocean fish were scarce; only four (two females) were caught, one of which (a male) weighed 8.6 kg.

DISCUSSION

The original objective of the two—year creel census on the Zymoetz-Clore steelhead fishery was to determine total numbers of anglers and their origin, their catch (numbers and distribution), the effort expended, and the angling methods used.. These data were to be compared with data

Table 10. Numbers and percentages of male and female steelhead of different ocean ages; Zymoetz River 1978 (n = 82 1979 (n = 58) (repeat spawners excluded).

		.1+			.2+			.3+			Total		Grand Total
		1978	1979	Total	1978	1979	Total	1978	1979	Total	1978	1979	
Male	n	11	14	25	22	12	34	3	1	4	36	27	63
	%	30.6	51.9	39.7	61.1	44.4	53.9	8.3	3.7	6.4	100	100	100
Female	n	3	6	9	43	24	67	0	1	1	46	31	77
	%	6.5	19.4	11.7	93.5	77.4	87.0	0	3.2	1.3	100	100	100
Total	n	14	20	34	65	36	101	3	2	5	82	58	140
	%	17.0	34.5	24.3	79.3	62.1	72.1	3.7	3.4	3.6	100	100	100

Table 11. Numbers and percentages of repeat spawning steelhead of different ocean age groups sampled from Zymoetz-Clore Rivers, angler's catches, 1978 (n = 116) and 1979 (n = 68).

1978		.1S1+	.1S1S1+	.1S2+	.2S1+	.2S1S1+	Total	% of Total Sample
Male	n	2	1	1	5	0	0	
	%	22.2	11.1	11.1	55.6	0	100	7.8
Female	n	1	0	0	23	1	25	
	%	4	0	0	92.0	4	100	21.6
Total	n	3	1	1	28	1	34	
	%	8.9	2.9	2.9	82.4	2.9	100	29.3
1979								
Male	n	1	0	0	2	0	3	
	%	33.3	0	0	66.7	0	100	4.4
Female	n	0	0	0	8	1	9	
	%	0	0	0	88.9	11.1	100	13.2
Total	n	1	0	0	10	1	12	
	%	8.3	0	0	83.4	8.3	100	17.6
Grand Total	n	4	1	1	38	2	46	
	%	8.7	2.2	2.2	82.6	4.3	100	25

Table 12. Round weights and fork lengths of male and female steelhead of different ocean ages from Zymoetz River anglers1 catch in the Fall of 1978 and 1979. Repeat spawners excluded; numbers of fish for each age group vary because of incomplete information as to weight or length of both.

Sex	Ocean Age	Average 1978	Average 1979	Total Average	Range 1978	Range 1979	Number 1978	Number 1979
				Weight – Kg				
Male	.1	1.9	1.9	1.9	1.5 - 4.3	1.8 - 2.8	4	11
	.2	5.5	4.7	5.1	5.0 — 5.9	2.9 - 6.0	7	12
	.3	8.6	6.0	7.3	8.6	6.0	1	1
Female	.1	2.6	1.7	2.2	1.9 — 2.9	.8 - 2.3	2	7
	.2	4.7	4.1	4.4	3.7 — 5.7	3.1 - 6.0	12	28
	.3	—	6.7	6.7	—	5.3 - 7.0	0	2
				Lengths -Cm				
Male	.1	56.9	57.1	57.0	53.0 - 61.0	51.5 - 63.0	10	14
	.2	80.6	77.8	79.2	75.5 - 91.5	67.0 - 85.0	16	12
	.3	93.4	81.5	87.5	91.3 - 35.5	—	2	1
Female	.1	64.2	55.7	59.9	61.0 - 67.0	43.0 - 62.0	3	7
	.2	75.4	74.5	75.0	67.8 - 87.0	67.0 - 89.0	33	27
	.3	—	85.5	85.5	—	84.0 - 87.0	0	2

reported in Steelhead Harvest Analysis of the same year and of past years in order to document the suspected decline in the fishery over the past decade. Also, the information was to be used to develop angling regulations and catch restrictions necessary to conserve the Zymoetz steel— head fishery in the short term, pending proven production from enhancement projects.

Unfortunately, torrential rains following heavy, early snowfalls caused' a flood during the last week in October, 1978 that not only terminated that season's fishery, but also changed the river channel to the extent that it was unrecognizable to both long—time steelheaders, and newcomers in 1979. Hence, the two years over which this creel census was conducted were totally abnormal and the data generated could not be legitimately compared with previous years.

In 1979, the steelhead fishery on the Zymoetz was well underway by the first week in August. The creel census was begun on September 1. Unfortunately, there is no way to accurately estimate angler numbers or success for the month of August, although a crude estimate can be made from information received from local anglers. Knowledgeable local anglers estimate that approximately 100 steelhead were caught in August of 1978. If we assume an August kill:release ratio similar to the September—October period (approximately 1:1) then the number of Zymoetz—Clore steelhead killed would approximate 50. The total 1978 harvest for the three month fishery (Zymoetz—Clore) would then be 184 fish plus 180 releases. The reader must bear in mind the hearsay evidence, no matter how knowledgeable the source, upon which these

assumptions are based. In 1979, an attempt was made to verify the above assumptions for the 1978 steelhead fishery by opening the creel census station in early August. Unfortunately, the Zymoetz in August, 1979 was still showing the effects of the 1978 flood and angler effort and success was negligible.

Apparently one of the effects of the flood in 1978 was to increase angler participation in the Clore fishery in 1979 while at the same time, reducing it on the Zymoetz. Angler effort almost doubled on the Clore (179 angler trips in 1979; 93 in 1978) (Table 4). Two explanations can be given for this occurrence; the first being the destruction of the road upstream of the Clore crossing, and the second being the unfamiliarity to anglers of the new configuration of the lower Zymoetz. Data from 1978 shows that 42.9% of the total number of Zymoetz—Clore angler trips were to the area above the confluence. In 1979, only 11.4% of the trips were to that area.

Although angler effort doubled on the Clore, overall success declined. Only local anglers maintained a constant success rate over the two years (.34 and .33 fish per day in 1978 and 1979, respectively). Increased participation by other anglers did not result in increased catch.

It is interesting to note that on the Zymoetz, local anglers killed 69% of their catch in 1978, and 57% in 1979. On the Clore, however, local anglers (accounting for 70% of the Clore fishery) killed 54% of their catch in 1978 and only 32% in 1979, indicating a different “attitude” among Clore anglers.

At this writing, the 1978—79 Steelhead Harvest Analysis is available

for comparison with results of the 1978 creel census. Data from each source is presented in Table 13.

Table 13. Comparison of estimates from Steelhead Harvest Analysis 1978-79 and 1978 Zymoetz and Clore River creel census.

Zymoetz	1978 Creel	1978 S.H.A.	% Difference
Angler Days	1093	3104	— 65.0
Anglers	590	605	2.5
Kills	117	378	— 69.1
Releases	110	588	81.3
Catch/day	0.21	0.33	— 36.4
Clore			
Angler Days	117	231	— 49.4
Anglers	60	24	+ 150.0
Kills	17	15	+ 13.3
Releases	20	73	— 72.6
Catch/day	0.32	0.39	— 18.0

[1]Positive or negative values indicate the degree to which the creel results differ from Steelhead Harvest Analysis estimates.

It will be noted that there is considerable discrepancy between the two sources. Again, it must be remembered that the creel census did not operate during August of 1978. However, the addition of the crude estimates of harvest for August still leave the creel results for the Zymoetz and Clore (combined) far short of the Steelhead Harvest Analysis estimates:

	1978 Creel +	August 1978 =	Total	1978 S.H.A	% Difference
Kills	134	50	184	393	- 53.2
Releases	130	50	180	661	- 72.8

Although "Special Rivers" by regulation, the Zymoetz and Clore do not attract large numbers of non-resident anglers to the degree that the Kispiox River does. In fact, the Zymoetz system is more akin to the Morice in terms of non—resident effort — non—resident anglers expended only 16% of the total number of angler days monitored on the Zymoetz—Clore in 1978 and 8% in 1979, while non—residents accounted for approximately 11% of the angler days on the Morice (Whately, et al 1978). On the Kispiox 76% of the effort in 1975 (Whately, 1977) was expended by non—residents.

The major feature not shared by the Morice, the Kispiox and the Zymoetz is the established renown connected with the Kispiox as a producer of trophy—sized fish (more than 9 kg). Kispiox steelhead are predominantly .2+. and .3+ ocean age (more than 70% of the total number of Kispiox age groups) with average weights ranging from 5 to 12.5 kg (Whately, 1977). On the other hand, ocean age for Zymoetz-Clore steelhead is dominantly .2+ (72.1%) (Table 11) with average weights ranging from 3.0 to 4.9 kg (Table 12). Morice steelhead are dominantly .1+ ocean age with an average weight of only 1.7 kg (Whately, et al, 1978).

Zymoetz anglers, like Morice anglers, tend to kill a higher proportion of their catch than do Kispiox anglers. Fifty—one percent of the steelhead caught in 1978 on the Zymoetz system were killed with 55% in 1979. Similarly, Morice anglers killed 68% of their total catch (Whately, 1977).

As is usual in most steelhead fisheries, however, Zymoetz—Clore fly fishermen killed a lesser percentage of their catch than did roe or lure anglers (18% in 1978 and 25% in 1979 as opposed to roughly 53% for roe and lure anglers in 1978 and 1979). Fly fishermen were very much a minority on the Zymoetz unlike the Morice (Whately et al, 1978) or the Kispiox (Whately, 1977),

Among Zymoetz steelhead age groups, fish of freshwater age 4. accounted for 74.5% of the total sample, hence 25.5% were of age 3.. Again, using Kispiox and Morice steelhead as a comparison, 70% of the Morice sample were 4. with 23.5% age 3. (Whately et al, 1978) while 56% of the Kispiox sample in 1975 were of freshwater age 4. and 40% were age 3. (Whately, 1977). Narver (1969) found that only 15% of a sample of Babine River steelhead were age 4. with 82% age 3.. Over the four systems compared, the Zymoetz, Morice, and to a lesser extent, the Kispiox, are close to having the same freshwater age structure while the Babine produces younger smolts. The more productive, stable environment afforded by a large lake such as Babine is a factor not shared by the other three that may contribute to greater proportions of 3. smolts in the Babine system. This assumption seems to be supported by the greater proportions of older smolts on the other three systems that are not headed by as large a body of water as Babine Lake.

Repeat spawners among the Zymoetz steelhead sample comprised 29.3 per cent of the total in 1978 and 23.1 per cent in 1979. This is high compared with the 17.6 per cent observed in the Kispiox sample (Whately, 1977) and the 6.6% on the Morice (Whately et al, 1978). The high incidence

of repeat spawners in the Zymoetz population may be related to the river's proximity to the ocean. The Zymoetz-Skeena confluence is located only 80 km from the ocean. Zymoetz steelhead should then be subjected to much less stress during upstream migration than Kispiox or Morice fish. The same might be assumed for downstream migration of kelts.

CONCLUSIONS

Results of the two—year study reported herein generally indicate that Zymoetz-Clore River anglers are predominantly local in origin, that Local Anglers are not as successful as non—Canadian anglers (except on the Clore), and that they kill most of the fish caught which rarely exceed 4.5 kg.

Reduced road access to the Zymoetz mainstem above the Clore with improved access upstream on the Clore (active logging) have caused major steelhead catch. areas to shift. Currently, the Zymoetz below the Clore junction is the major producer of sport caught steelhead while the Clore fishery has virtually doubled.

In the short term, until McDonell Lake spawning and rearing areas are enhanced, and production proven, Zymoetz stocks must be maintained using regulations designed to exemplify the non—specialized and local nature of the fishery while at the same time protecting this important but declining stock from overharvest.

SUMMARY

1. During the periods September 1 to October 29, 1978, and August 18 to December 13, 1979, a creel survey and catch sampling program was conducted on the, Zymoetz and Clore Rivers to gather information on the steelhead fishery including angler origin, effort, methods used and success. Scale samples, lengths and weights were also collected from anglers' catches for life history analysis.

2. Zymoetz River steelhead anglers were found to' be primarily British Columbia residents (87.5%) as were Clore River anglers (89.9%). "Local" residents (Terrace, Kitimat and Prince Rupert) had the highest representation on the Zymoetz and Clore, 62.3% and 70.6% respectively.

3. Total effort expended by all anglers on the Zymoetz—Clore was 1210 angler days (1093 on Zymoetz and 117 on Clore) and 1058 angler days (847 on Zymoetz and 184 on Clore) in 1978 and 1979 respectively.

4. The total Zymoetz catch in 1978 was 227 steelhead of which 117 (51.5%) were killed. The 1978 Clore fishery accounted for 37 fish of which 45.9% were killed. In 1979, the Zymoetz catch was 127 (78 or 61.4% killed) while the Clore catch was 49 (18 or 36.7% killed). In 1978, the majority of the total catch on the Zymoetz was attributable to non—Local Residents of B.C. (44.1% followed by Local Residents (31.3%) while on the Clore, local anglers accounted for 70.3% of the catch

followed by other B.C. Residents (21.6%). In 1979, most of the total catch on the Zymoetz was landed by Local Residents (57.5%) followed by non—Local Residents of B.C. (33.1%), and non—Canadians (6.3%) while on the Clore, Local Residents were most successful (87.8%) followed by Other Residents of B.C. (10.2%).

5. The success rate for all Zymoetz anglers was 0.21 and 0.15 fish per day in 1978 and 1979 respectively. Clore anglers experienced success rates of 0.32 and 0.27 fish per day in 1978 and 1979 respectively.

6. The 1978 Zymoetz—Clore steelhead fishery began in early August and continued until October 29 when torrential rains and flood waters closed down the fishery. The peak in harvest rate during the census period occurred in late September which corresponded to the highest concentration on anglers. In’1979, peak steelhead catches were smaller and occurred on the weeks ending September 2 and 30 and November 18 with roughly parallel peaks in angler pressure.

7. The most successfully fished area on the Zymoetz system in 1978 was from the Clore River upstream to the end of the Copper River Road, with 67.8% of the total catch reported’. In 1979, the majority of the catch (36.7%) was reported from the area between the Canyon and the Clore while the area upstream of the Clore declined to 4.6% of total catch.

8. The ratios in 1978 of steelhead killed to released for the three fishing methods (roe, lure and fly) were 1:0,8, 1:1 and 1:4.6, respectively, and in 1979, 1:0.9, 1:0.7 and 1:4, respectively.

9. Among 184 readable scales collected in 1978 and 1979, 12 age groups were identified. The most frequently observed age groups were 4.2+ (40.6%), 4.2Sl+ (19.8%), 3.2+ (14.4%) and 4.1 (12.3%). The majority of Zymoetz steelhead spent four (74.5%) years in freshwater prior to seaward migration.

10. Among first—time spawners 87.0% of the females and 53.9% of the males were of ocean age .2+. Forty per cent of the males were .1+ fish whereas only 6.5% of the females were .1+ fish.

11. Repeat spawners accounted for 25% of the total sample. The ratio of female to male repeat spawners was approximately 2.8:1 in 1978 and 3:1 in 1979. Of the 46 repeat spawners, four were observed to have spawned more than once.

12. Weights of male steelhead at ocean age .1+, .2+ and .3+ averaged 1.9, 5.5 and 8.6 kg respectively. Two—ocean females averaged 4.7 kg.

ACKNOWLEDGEMENTS

Special thanks to B.C. Fish and Wildlife Branch staff, including D.H. Humphries, C. Morley, C. Schultz, L.J. Imbleau, K. Diemert, B. Peters and G. Sojka for the many long hours spent operating the creel station and organizing survey data. The time and expense footed by the Ministry of Highways for construction of the creel station pull—out is gratefully appreciated.

REFERENCES

B.C. Fish and Wildlife Branch. 1970—1979. Steelhead Harvest Analysis. 1970-1971, 1971—1972, 1972—1973, 1973—1974, 1974 — 1975, 1975—1976, 1976—1977, 1977—1978, 1978—1979.

Chudyk, W.E. M.S. 1979. Zymoetz River steelhead trout: A progress report on the Zymoetz River enhancement program; specifically the diversion of Serb Creek. Unpubl. M.S. Fish and Wildlife Branch, Smithers, B.C. 12 pp.

Humphries, D.H. and C. Morley. M.S. 1978. A fisheries survey of the upper Zymoetz River system (headwaters to Red Canyon Creek) with particular reference to steelhead and cutthroat trout habitat and enhancement opportunities. Unpubl. M.S. Fish and Wildlife Branch, Smithers, B.C. 91 pp. and appendices.

Imbleau, L.J. M.S. 1974. Summary of steelhead angler interviews and list of tagged fish: Zymoetz River steelhead survey. Unpubl. M.S. Fish and Wildlife Branch, Smithers, B.C. 9 pp

Narver, D.W. 1969. Age and size of steelhead in the Babine River, British Columbia. J. Fish. Res. Bd. Can. 26:2745-2760.

Narver, D.W. and F.C. Withler. 1974. Steelhead of the Nanaimo River. Aspects of their biology and the fishery from three years of anglers' catches. Fisheries and Marine Service, Nanaimo, B.C. Circ. No. 99, 25 pp.

Pinsent, M.E. and W.E. Chudyk. M.S. 1973. An outline of the steelhead of the Skeena River system. Unpubl. M.S. Fish and Wildlife Branch, Prince George, B.C. 26 pp. and appendices.

Ptolemy, R.A. M.S. 1979. Some biological considerations for the proposed Serb Creek (upper Zymoetz River tributary) diversion project. Unpubl. M.S. Fish and Wildlife Branch, Victoria, B.C. 28 pp. and appendices.

Whately, M.R. 1977. Kispiox River steelhead trout: the 1975 sport fishery and life history characteristics from anglers' catches. B.C. Fish and Wildlife Branch. Fish. Tech. Circ. No. 30. 22 pp. and appendices.

Whately, M.R. W.E. Chudyk and M.C. Morris. 1978. Morice River steelhead trout: the 1976 and 1977 sport fishery and life history characteristics from anglers' catches. B.C. Fish and Wildlife Branch. Fish. Tech. Circ, No. 36. 25 pp.

Varney, B. and B. Truelson. .M.S. 1975. The Zymoetz River System. Stream files of B.C. Fish and Wildlife Branch, Smithers, B.C.