



Report Title: Site C Sport Fishing Survey – Interim Report
Issuer: The DPA Group Inc. in association with Western Renewable Resources
Date: December, 1989

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During Stage 2 of the Site C Project, studies are underway to update many of the historical studies and information known about the project.

The potential Site C project, as originally conceived, will be updated to reflect current information and to incorporate new ideas brought forward by communities, First Nations, regulatory agencies and stakeholders. Today's approach to Site C will consider environmental concerns, impacts to land, and opportunities for community benefits, and will update design, financial and technical work.

**PEACE RIVER SITE C
SPORT FISHING SURVEY**

INTERIM REPORT

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Our Ref: BCH 085641 (119016)

December, 1989

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1.0 INTRODUCTION

The planning associated with a development project such as the Site C hydroelectric project is a major undertaking. Engineering siting and costing studies are required. As well, impacts on the local resource base and people must be identified. In order to assess these impacts, first one must have a resource inventory and a profile of current use of those resources.

The fish and water resources of the Site C development area from Taylor upstream to Hudson Hope support extensive recreation opportunities for local residents and others. An important and high profile activity is sport fishing.

As part of the planning process for the Site C project when it was first proposed, B.C. Hydro commissioned a preliminary creel survey study to assess the extent and nature of the Peace River sport fishery at that time (the late 1970's). The British Columbia Utilities Commission identified significant methodological deficiencies in their review of the study - such as the lack of interviewing over all daylight hours and the restriction of the survey to a short peak summer period. A more rigorous and defensible approach was required.

Apart from this, there is a need for more current up-to-date information on the Peace River sports fishery for the planning of the Site C project.

The DPA Group in association with Western Renewable Resources has been commissioned by B.C. Hydro to undertake the required additional work.

The primary objective of the study is to obtain statistically reliable estimates of fishing effort and fish caught by anglers in the Site C development area. A secondary objective is to provide certain biological data for harvested fish. In this interim report we outline the operation and results of the first year of the two year research program.

2.0 THE RESEARCH PROGRAM

The project involved two primary data collection activities -- an on-site interview program with anglers and an aerial survey of anglers.

2.1 The Basic Approach

We adopted a hybrid access point creel survey - overflight survey procedure for this study. The access point survey involves stationing interviewers at a specific site for each full 7-8 hour interviewing shift, and interviewing anglers as they leave the site. The overflight survey involves counting the number of rods actively fishing along the Peace River from chartered aircraft.

We provide an illustrative example of how the information from the two data sources will be employed.

Suppose one flies over the region from 11:00 a.m. - 12:00 p.m. several times and counts an average of 20 rods. Suppose also that from the creel interviews we estimate that 10% of daily angler hours occur from 11:00 a.m. to 12:00 p.m. Then the daily effort estimate is 200 angler hours ($20/.10$), and the monthly effort estimate for a 30-day month is 6,000 angler hours (30×200). If the average catch per unit effort for rainbow trout, say, is .10 fish kept per angler-hour, then the monthly estimate of kept rainbow trout is 600 fish ($6,000 \times .10$). Exhibit A.1, Appendix A, displays the key information elements.

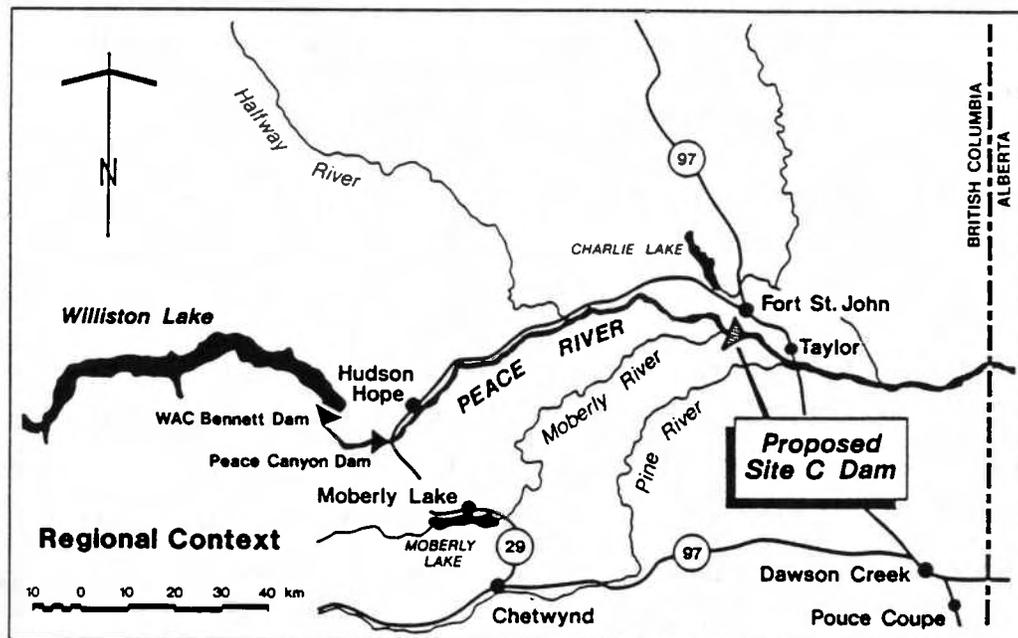
In the following subsections we describe the operational details of the two main survey components for our project.

2.2 The Study Area

The study area is the mainstem Peace River between the boat launch immediately downstream from the Highway 97 bridge crossing at Taylor (the "Taylor Boat Launch"),

and the Highway 29 bridge crossing at Hudson Hope. The study area also includes the tributaries to the Peace River below the full supply level of the proposed reservoir (Exhibit 2.1). The study area represents the reservoir area plus the tailrace area of the proposed Site C dam.

EXHIBIT 2.1: THE PEACE RIVER STUDY REGION



The stretch of the Peace River upstream of the Halfway River is mainly a rainbow trout and mountain whitefish fishery, with most of the angling effort by shore anglers. Downstream of the Halfway, the fishery occurs mainly at river confluences, and many people fish from boats. Walleye and northern pike, as well as rainbow trout and whitefish (mountain and lake), are caught. The Taylor boat launch is the major embarkation point for boat anglers fishing in the study area.

At the same time, many anglers fish from shore. Shore angling is dispersed throughout the study region -- a length of 100 km -- with many anglers using a variety of access means: access through private land, public access, etc. For certain stretches of the river there is road access to the north side but not to the south side. Farmers and others may use non-road access to the river. Anglers may canoe down the river to fish from shore, and arrange for pick up by friends later.

The result is that, although a few sites represent the bulk of angling effort, a significant share of angling effort occurs at low volume, geographically dispersed and isolated areas.

2.3 The Creel Survey

2.3.1 Description

Interviewers were stationed at a specific site for each full 7-8 hour interviewing shift. They had three main tasks:

- . To count rods actively fishing each hour;
- . To interview anglers as they leave the fishing site regarding catches realized (kept and released), time of fishing, etc.; and
- . To conduct a biological sampling program involving weight and length measurements, and the taking of scale, otoliths, or other calcified material for subsequent aging of fish.

The interviewing period varied by month depending on the changing hours of daylight. During summer months, two 7-8 hour interviewing periods existed. In October, a single 9 hour interview period occurred. The following table outlines the interview periods:

	Interview Period	
	Morning	Evening
May	7:00 a.m. - 3:00 p.m.	3:00 p.m. - 11:00 p.m.
June	7:00 a.m. - 3:00 p.m.	3:00 p.m. - 11:00 p.m.
July	7:00 a.m. - 3:00 p.m.	3:00 p.m. - 11:00 p.m.
August	7:30 a.m. - 3:00 p.m.	3:00 p.m. - 10:30 p.m.
September	8:30 a.m. - 3:00 p.m.	3:00 p.m. - 9:00 p.m.
October	10:00 a.m. -	7:00 p.m.

The individual angler was the basic interviewing unit -- that is, if several people were fishing together, each person was interviewed. Three data recording forms were employed -- a tally sheet for rod counts, a one-page questionnaire for angler interviews, and a biological data sheet (see Appendix B).

The focus of the study is angling activity. However, in many cases, without interviewing the individual, it is impossible to determine whether the person had been fishing. (This is especially prevalent for boating parties.) Accordingly, the interviewer attempted to approach all individuals leaving the site. If the interviewer determined the person was not fishing, the interview was terminated after the first question.

Anglers were segmented between those fishing from shore and those fishing from boats.

We attempted to interview anglers as they left the site, i.e., after their fishing trip was "completed". However, during the morning interview shift, few anglers may leave the site before the 3:00 p.m. end point of the shift. Therefore, to enhance contact rates with anglers, we interviewed all anglers, or as many as possible, actively fishing during the last one to two hours of each shift as well as all anglers leaving the site before this time. The intent was to provide some additional data for analysis if low volumes of completed trip interviews occurred. As well, this expanded the pool of fish available for biological sampling.

In the month of October -- when we had a single interviewer -- we altered the above format. Given the decrease in fishing activity during the fall season, we implemented a modified roving creel survey for part of the October schedule. The interviewer conducted rod counts at one site "on the hour", and at an adjacent site "on the half hour". That is, within each hour of selected shifts, the interviewer visited two adjacent sites. The intent was to realize some efficiencies in interviewing and angler contact during the fall off-peak fishing period. We also conducted conventional shifts whereby the individual was anchored at a single site for the whole shift.

The interviewer asked anglers the time that they planned to leave the site. In this way we could conduct mainly completed trip interviews (19 of 24 October interviews were completed trip interviews).

With the aid of provincial Ministry of Environment personnel, we selected representative sites for interviews on the basis of anticipated angler volumes and accessibility. The locations of the eight sites utilized in 1989 are displayed in Exhibit 2.3 to follow.

The creel survey was voluntary and anonymous. No information was recorded that could be used to identify the individual. Refusals amounted to less than 3% of those individuals approached for interviews.

2.3.2 Creel Survey Interviewing Effort

Exhibit 2.2 summarizes the extent of the survey effort in terms of people employed, number of sites sampled, number of interviewing shifts, and number of interviews.

The survey got underway in mid-May 1989. This first two weeks of the survey were treated as a pilot survey at which time interview procedures were formalized, and the final questionnaire was determined. The survey started formally in June with two interviewers deployed among six sites.

EXHIBIT 2.2

CREEL SURVEY INTERVIEWING EFFORT 1989

Month	No. Inter-viewers	Sites Sampled ^b	Inter-view Shifts	No. Inter-views	Fishing Interviews ^a		
					All	Shore	Boat
May	2	5	13	71	63	49	14
June	2	6	39	164	120	105	15
July	3	8	61	353	325	283	42
August	3	8	59	294	230	192	38
September	2	5	42	90	79	66	13
October	1	3	23	24	24	24	0
Total	13	35	237	996	841	719	122

Site	Months of Interviews ^c						Inter-view Shifts	No. Inter-views	Fishing Interviews ^a		
	M	J	J	A	S	O			All	Shore	Boat
HH Bridge	x	x	x	x			19	48	48	48	0
Alwin Holland	x	x	x	x			24	132	132	132	0
HH Townsite	x	x	x	x	x	x	44	204	202	196	6
Lynx Creek	x	x	x	x	x	x	36	82	82	79	3
Sheep Farm			x	x			8	35	35	35	0
Cobble Landing				x	x	x	20	52	52	50	2
Halfway River		x	x	x	x	x	37	106	93	87	6
Taylor Landing	x	x	x	x	x		49	337	197	9	105
Total							237	996	841	719	122

^a shore : angler fished from shore.

^b boat : angler fished from boat.

^c number of different sites at which interviews took place.

"x" indicates interviews occurred at the site in the month.

In July and August, a third interviewer was added. The number of sampling sites increased from six to eight. In September, survey effort was reduced to two interviewers; five sites were covered.

Finally, in October, the survey was cut back to a single interviewer covering three sites.

Over the six month survey period:

- . 996 individuals were interviewed;
- . 841 of these people had been fishing (719 fished from shore and 122 fished from a boat).

Most of the 155 non-fishing individuals were interviewed at Taylor Landing. Taylor is a popular boat launch site for both general pleasure craft and non-recreational craft such as jet boats.

2.4 The Aerial Survey

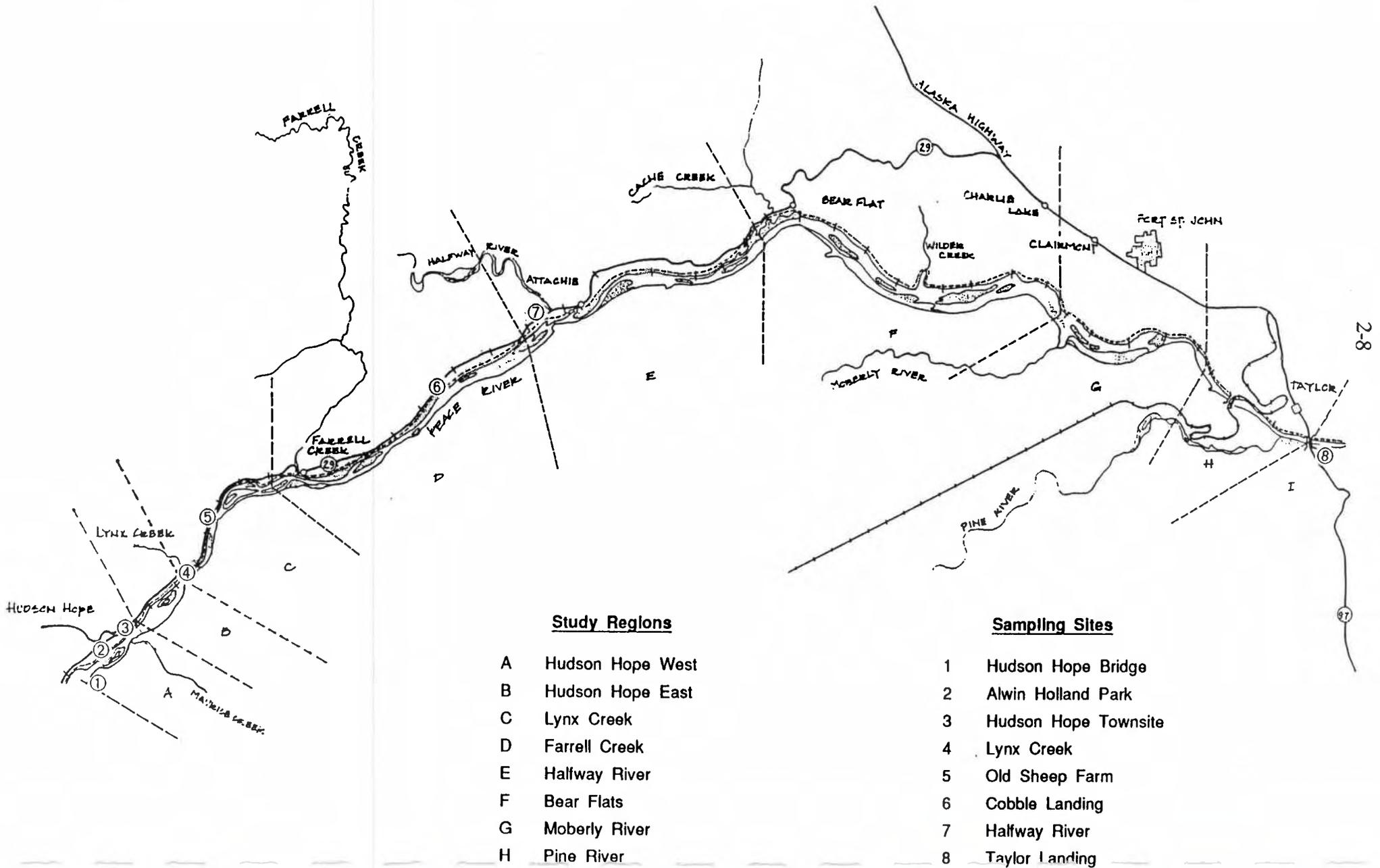
2.4.1 Description

The aerial survey entailed counting, from a Cessna 172 fixed wing aircraft, the number of individuals/rods actively fishing. Shore-based and boat-based anglers were distinguished. As well, the number of boats associated with the boat anglers were identified.

For a given month and day type (weekends versus weekdays), we attempted to conduct the counts during the same hour of the day over a sequence of days. The round-trip length of each flight was approximately 1 1/2 hours.

We have segmented the study region into nine subregions, labelled A through I (subarea I downstream of Taylor lies outside the formal study area). The subregional boundaries represent confluences of major tributaries flowing into the Peace River (Exhibit 2.3).

EXHIBIT 2.3: STUDY REGIONS AND SAMPLING SITES



- A - Hudson Hope West
- B - Hudson Hope East
- C - Lynx Creek
- D - Farrell Creek
- E - Halfway River
- F - Bear Flats
- G - Moberly River
- H - Pine River
- I - Downstream of Taylor

We tried to make the boundaries consistent with a 1985 summer creel survey¹ conducted in part of the region.

For statistical precision reasons, it is desirable to conduct overflight counts at hours of the day corresponding to peak fishing activity.² Little information was available as to the time of peak fishing. As a result, initially we started both weekday and weekend flights at 11:00 a.m.

Subsequently, we received field reports of greater angling activity in the evening for weekdays. As a result, on July 12, we flew twice -- once at 11:00 a.m. and a second time in the early evening. The rod count data, although not conclusive since it represents a single day, did indicate more people fishing in the evening than at mid-day. As a result of this evidence, we shifted the starting time of overflights to 7:30 p.m. for weekdays.

¹R.J. Hammond, Peace River Summer Creel Census 1985, B.C. Ministry of Environment and Parks, Report No. PCE.05, Fort St. John, February 1986.

²The time of overflights affects the statistical precision or standard error around effort estimates, but does not necessarily affect the accuracy of the effort estimate.

2.4.2 Number of Overflights

Exhibit 2.4 summarizes the number of overflights by month and by weekend versus weekday for the 1989 field program. A total of 46 overflights occurred from May through October 1989.

EXHIBIT 2.4 OVERFLIGHT SURVEY EFFORT 1989

Month	Number of Overflights		Total
	Weekday	Weekend	
May	2	2	4
June	3	3	6
July	6	7	13
August	5	7	12
September	3	3	6
October	3	2	5
Total	22	24	46

3.0 THE 1989 SURVEY DATA

We have focused the 1989 work program to date on survey design, survey operation and processing of the data collected. Accordingly, at this time estimates of total angler activity and catch levels are not available. These estimates will be generated during the second year of the project as we planned at the study outset.

Nevertheless, the data collected in the 1989 field program does provide several useful insights as to the operation of the Peace River sports fishery. For this reason, we briefly describe some simple tabulations derived from the raw, unweighted survey data. The reader should be aware, however, that certain estimates may change when rigorous weighting procedures are applied to the data (e.g. catch rates per angler-hour). As well, some further editing of the survey data may occur.

3.1 The Creel Survey

3.1.1 Fishing Trip Characteristics

Trip characteristics of boat anglers and shore anglers differ. We summarize characteristics for these two main angler categories below.

Complete and Incomplete Fishing Trips. The 841 angler interviews comprise:

- . 112 incomplete fishing trips (all shore anglers), and
- . 729 completed fishing trips (607 shore anglers and 122 boat anglers).

All boat angler interviews represent completed trips since boating parties are approached as they return to a boat launch. As noted earlier, some shore anglers are interviewed in the middle of their fishing trip just before the termination of interviewing shifts.

Access Method to Grounds. All anglers fishing from a boat obviously use the boat to travel to and from fishing locations. However, many people use a boat to travel to the fishing site, and then fish from shore, gravel bars, river islands, etc.

The 719 shore anglers comprise:

- 144 people who used a boat to access the shore fishing site (half these anglers used the Taylor boat launch), and
- 575 people who travelled by land to the shore fishing site.

Average Time Fished. The average boat angler fished 2.8 hours whereas the average shore angler fished 2.2 hours (Exhibit 3.1).

Average Trip Length. Average trip length for boat anglers was 5.2 hours, or more than two hours longer than the 2.9 hour trip length for shore anglers. Boat anglers spend considerably more time at the river on non-fishing pursuits such as cruising, picnicing, etc. than do shore anglers. By and large shore anglers spend the majority of their time fishing.

EXHIBIT 3.1: ANGLER TRIP CHARACTERISTICS

	Fishing Location		
	Shore	Boat	All
<u>Average Time Fished^a</u>	2.24 h	2.80 h	2.33 h
<u>Average Trip Length^a</u>			
Time Fished	2.24 h	2.80 h	2.33 h
Non-Fishing Time	0.64 h	2.40 h	0.93 h
Total Trip Time	2.88 h	5.20 h	3.26 h

^a Completed trip interviews only.

Average Party Size. Average party size for boat anglers was 3.8 people and for shore anglers was 2.9 people. Corresponding average numbers of rods in use for each party are much more comparable at 2.8 and 2.6, respectively. Boat angling parties are more likely to include some individuals who do not fish.

3.1.2 Fishing Success Rates

The 841 anglers interviewed had fished 1,922 hours up to the time of interview. During this time, they caught and kept 473 fish, and caught and released 422 fish (Exhibit 3.2 and 3.3).

Kept-Fish Success Rates. Over 85 percent of the harvest was comprised of rainbow trout, Arctic grayling and whitefish (lake or mountain). Small numbers of bull trout (commonly called dolly varden), northern pike, kokanee, and walleye were also captured.

Success rates in number of fish caught and kept per angler-hour were highest for rainbow trout at .075 fish per angler-hour. Overall the average angler interviewed caught and kept .245 fish per angler-hour (Exhibit 3.2).

Fishing success varied by region. Anglers interviewed at the Taylor boat launch had the highest success rate; anglers fishing by the Highway 29 bridge crossing near Hudson Hope had the lowest.

Species caught and kept varied by region with:

- . higher rainbow trout catch rates upstream than downstream of Lynx Creek;
- . significantly higher Arctic grayling catch rates for anglers using the Taylor boat launch than for anglers using other sites (very low catch rates close to the Peace Canyon dam);
- . the Taylor boat launch essentially being the only site at which anglers landed walleye or northern pike.

Exhibit 3.2: Peace River Sport Fishing Creel Survey Kept Fish Rates, 1989

	Fishing Interviews	Kept Fish									Total
		Rainbow Trout	Arctic Grayling	Mountain Whitefish	Lake Whitefish	Bull Trout ^a	Northern Pike	Kokanee	Walleye	Coarse Fish	
HH Bridge	48	3	0	4	1	1	0	0	0	0	9
Alwin Holland	132	26	1	18	1	0	0	0	0	0	46
HH Townsite	202	55	3	10	24	2	0	9	0	0	103
Lynx Creek	82	34	10	19	7	4	0	1	0	0	75
Sheep Farm	35	5	5	0	0	5	1	0	0	0	16
Cobble Landing	52	2	9	13	0	1	0	0	0	0	25
Halfway River	93	7	16	8	6	4	0	0	0	0	41
Taylor Landing	197	13	56	42	13	3	21	2	7	1	158
All	841	145	100	114	52	20	22	12	7	1	473

	Hours Fished	Kept Fish per Angler Hour									Total
		Rainbow Trout	Arctic Grayling	Mountain Whitefish	Lake Whitefish	Bull Trout ^a	Northern Pike	Kokanee	Walleye	Coarse Fish	
HH Bridge	112	.027	-	.036	.009	.009	-	-	-	-	.081
Alwin Holland	229	.144	.004	.079	.004	-	-	-	-	-	.201
HH Townsite	385	.143	.008	.026	.062	.005	-	.023	-	-	.267
Lynx Creek	230	.148	.043	.083	.030	.017	-	.004	-	-	.325
Sheep Farm	111	.045	.045	-	-	.045	.009	-	-	-	.144
Cobble Landing	162	.056	.080	-	.006	-	-	-	-	-	.154
Halfway River	254	.028	.063	.031	.024	.016	-	-	-	-	.162
Taylor Landing	439	.030	.128	.096	.030	.007	.048	.004	.016	.002	.361
All	1922	.075	.052	.059	.027	.010	.011	.006	.004	.002	.245

Note: Angler hours equal hours fished to time of interview.

a Commonly called dolly varden

Exhibit 3.3: Peace River Sport Fishing Creel Survey Released Fish Rates, 1989

	Fishing Interviews	Released Fish									Total
		Rainbow Trout	Arctic Grayling	Mountain Whitefish	Lake Whitefish	Bull Trout ^b	Northern Pike	Kokanee	Walleye	Coarse Fish	
HH Bridge	48	6	0	0	0	0	0	0	0	0	6
Alwin Holland	132	29	3	12	0	1	0	0	0	0	45
HH Townsite	202	29	2	6	5	1	0	0	0	0	43
Lynx Creek	82	8	5	9	0	1	0	0	0	0	23
Sheep Farm	35	5	4	23	0	1	0	0	0	0	33
Cobble Landing	52	1	4	25	0	0	0	0	0	1 ^a	31
Halfway River	93	5	17	40	60	0	1	0	0	0	123
Taylor Landing	197	8	29	25	15	0	38	0	0	3	118
All	841	91	64	140	80	4	39	0	0	4	422

	Hours Fished	Released Fish per Angler Hour									Total
		Rainbow Trout	Arctic Grayling	Mountain Whitefish	Lake Whitefish	Bull Trout ^b	Northern Pike	Kokanee	Walleye	Coarse Fish	
HH Bridge	112	.054	-	-	-	-	-	-	-	-	.054
Alwin Holland	229	.127	.013	.052	-	.004	-	-	-	-	.197
HH Townsite	385	.075	.005	.016	.013	.003	-	-	-	-	.112
Lynx Creek	230	.035	.022	.039	-	.004	-	-	-	-	.100
Sheep Farm	111	.045	.036	.207	-	.009	-	-	-	-	.297
Cobble Landing	162	.006	.025	.154	-	-	-	-	-	.006	.191
Halfway River	254	.020	.067	.157	.236	-	.003	-	-	-	.483
Taylor Landing	439	.018	.066	.057	.034	-	.087	-	-	.007	.269
All	1922	.047	.033	.073	.042	.002	.020	-	-	.002	.219

Note: Angler hours equal hours fished to time of interview.

a Burbot

b Commonly called dolly varden

H.C. HYDRO INFORMATION SERVICES

The anglers using the Taylor site travel by boat upstream and then fish from the boat or land and fish from shore (approximately half fish from shore and half fish from boat, Exhibit 2.2).

Generally, boat anglers have higher success rates than shore anglers, and the great majority of boat anglers interviewed were at the Taylor boat launch. This is the main reason underlying the high success rates for anglers using Taylor.

When the data are analyzed in detail during the upcoming year, we will calculate angler success rates by region of fishing activity rather than interview location.

Released Fish Rates. Over 85 percent of the fish caught and released were rainbow trout, Arctic grayling and lake or mountain whitefish. Mountain whitefish had the highest release rate at .073 fish per angler-hour. The average angler caught and released .219 fish per angler-hour (Exhibit 3.3).

Anglers at the Halfway River had the highest release rate, particularly for mountain and lake whitefish.

Anglers released more mountain whitefish, lake whitefish and northern pike than they kept of these species. In contrast, no anglers surveyed released any kokanee or walleye.

Marked Rainbow Trout. Some rainbow trout in the Peace River are clipped, indicating that they are hatchery fish planted in Dinosaur Lake or planted directly into the Peace River near Hudson Hope. Interviewers observed 15 clipped or marked trout -- 6 with their adipose fin clipped, and 9 with a maxillary bone clipped. The 15 marked fish represent 10% of the 145 rainbow trout creel (Exhibit 3.2).

We note, however, that in approximately 20% of cases interviewers were not able to inspect the creel of anglers, i.e., the angler refused or was in a hurry, the fish had already been

eaten, the fish was filleted, etc. This would suggest that the share of marked rainbow trout of those actually inspected was closer to 13%.

Tagged Fish. The consulting firm RL&L Environmental Services Ltd. tagged fish in the Peace River study region during the spring and summer of 1989 as part of a fish movement study. Four yellow "spaghetti" tags were intercepted by our field interviewers from anglers during the six month creel survey period -- 1 rainbow trout, 2 Arctic grayling, and 1 walleye. Interviewers also collected tags from fish caught on previous days when an interviewer was not scheduled to be present.

3.1.3 Angler Characteristics

Angler Residence. The majority of anglers interviewed were local residents. The regional distribution of anglers from the interviews is:

- . 89% local residents;
- . 8% residents of the rest of B.C.; and
- . 3% residents outside B.C.

Age. The age distribution of anglers interviewed was -- 21% under 16 years of age and 79% 16 years or older.

Gender. Of the anglers interviewed, 17% were female and 83% were male.

Gear Used. Three main types of gear are used by Peace River anglers:

- . 29% used bait;
- . 70% used lures; and
- . 39% used flies.

The percentages add to more than 100 percent since some anglers use more than one type of gear.

Seasonal Distribution of Annual Angling Effort. Anglers indicated that 11% of their total angling effort in the past year occurred in the winter November to March period. The majority or 89% of annual angling effort occurred from April to October.

3.2 The Aerial Survey

The overflight data for each flight day are summarized in Appendix C.

Rod Counts. On the 46 overflight days we observed 382 rods actively fishing -- 250 rods fishing from shore and 132 rods fishing from boats. During the peak activity months of July and August, we observed approximately 10-12 anglers per flight on average. In other months, average angler numbers were less than half this.

Prior to mid-July we did not observe many anglers, and the Peace River was still very murky. At about this time the colour of the river cleared and angler catch rates increased.

The 35% boat angler share of total rods is substantially higher than the 15% boat angler share of total angler interviews (Exhibit 2.2). It is likely that relatively more boat anglers than shore anglers fish during the middle of the day, the time when the majority of overflights were scheduled. This may explain the discrepancy.¹

In any case, we will be estimating separate daily angler activity profiles and separate angler effort estimates for the two classes of anglers (see Appendix A for schematic of methodology). In this way, we can produce reliable estimates of the distribution between shore and boat anglers through the weighting or extrapolation procedure.

¹As well, boat anglers may be more likely to use private access means than shore anglers.

Regional Distribution. Shore angling is concentrated upstream of the Halfway River with 32% of all shore anglers observed in Hudson Hope Region A (see Exhibit 3.4). Two thirds of boat angling occurs in three regions -- Lynx Creek (Region C), Farrell Creek (Region D) and Bear Flats (Region F). A much greater share of boat angling occurs downstream towards Taylor than does shore angling. There are not many sites between Halfway River and Taylor that provide public access by land.

EXHIBIT 3.4: OVERFLIGHT DATA SUMMARY 1989

		Rod Counts May to October 1989		
		Shore Anglers	Boat Anglers	All Anglers
<u>Region</u>				
A	Hudson Hope	80	9	89
B	The Gates	28	6	34
C	Lynx Creek	38	26	64
D	Farrell Creek	32	39	71
E	Halfway River	42	10	52
F	Bear Flats	18	25	43
G	Moberly River	5	15	20
H	Pine River	7	2	9
Study Region		250	132	382

		Regional Distribution		
		Shore Anglers	Boat Anglers	All Anglers
<u>Region</u>				
A	Hudson Hope	32%	7%	23%
B	The Gates	11%	5%	9%
C	Lynx Creek	15%	20%	17%
D	Farrell Creek	13%	29%	19%
E	Halfway River	17%	8%	14%
F	Bear Flats	7%	19%	11%
G	Moberly River	2%	11%	5%
H	Pine River	3%	1%	2%
Study Region		100%	100%	100%

We can segment rod counts upstream and downstream of the proposed Site C dam (the damsite is just downstream of the Moberly River in Region G).

	<u>Rod Counts May to October 1989</u>		
	Shore Anglers	Boat Anglers	All Anglers
Upstream of Dam Site	241	127	368
Downstream of Dam Site	9	5	14
Study Region	250	132	382

	<u>Regional Distribution</u>		
	Shore Anglers	Boat Anglers	All Anglers
Upstream of Dam Site	96%	96%	96%
Downstream of Dam Site	4%	4%	4%
Study Region	100%	100%	100%

Fully 96 percent of angling activity occurred upstream of the proposed Site C dam site.

4.0 THE 1990 WORK PROGRAM

The combination creel-overflight survey program will continue in 1990 during the April to June period. The anticipated survey effort by month is:

	No. Interviewers	No. Overflights
April	1	4
May	2	4
June	2	6
1990 Total	5	14

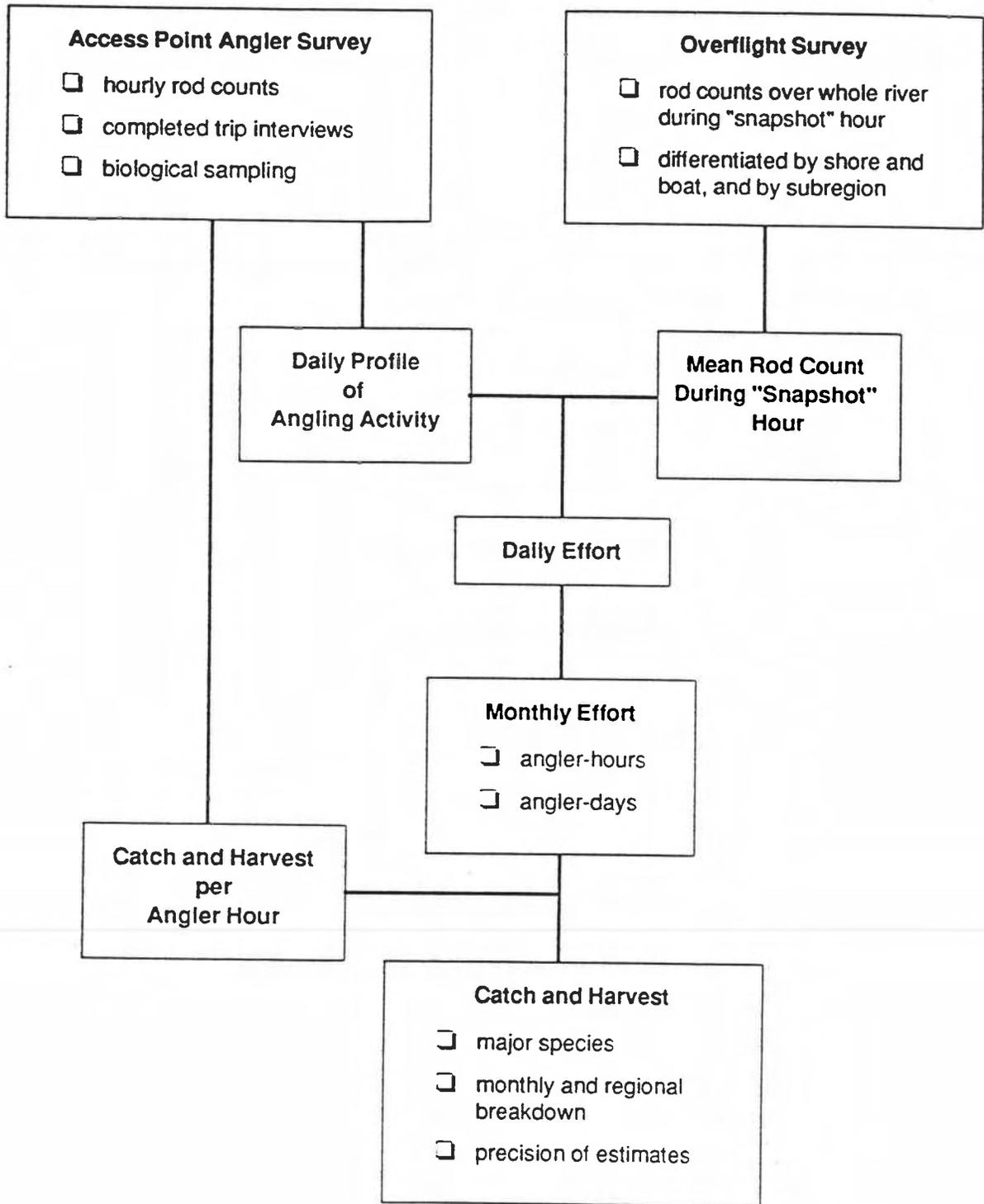
In the December/89 to March/90 period, we will conduct a limited winter survey encompassing 8 overflights and 8 days of creel interviews.

In 1990, we will be generating estimates of angler effort and angler catch through weighting the raw survey data. As well, the biological data on weight, length, age, etc. will be summarized.

We will be producing a final project report in the fall of 1990.

APPENDIX A
OVERVIEW OF METHODOLOGY

EXHIBIT A.1: OVERVIEW OF METHODOLOGY



APPENDIX B
DATA RECORDING FORMS

1989/90 Peace River Sport Fishery Survey

No 3501

Interviewer _____ / _____ / _____ Reach _____ / _____ Date _____ / _____ / _____
 Site _____ / _____ Time _____ Y M D
 Day: S M T W T F S

Completed Trip: Yes¹ No² Boating Trip: Yes¹ No²
 1) Were you fishing today? \longrightarrow (For boating parties only) If yes, did you fish the Peace or its tributaries
 Yes¹ No² upstream or downstream of Taylor? Up¹ Down² Both³

2) Did you fish mainly from shore or from a boat? Shore¹ Boat²
 3) What is your telephone prefix number (3 digits) and area code? Male¹
 Prefix/Area Code: _____ / _____ Age: <16¹ or 16+² \longrightarrow or Female²

4) How many individuals are in your party? _____ 5) How many fishing rods did your party use? _____ rods

6) At what time did you arrive at the river today? _____:_____ AM./PM. \longrightarrow At what time did you start fishing today? _____:_____ A.M./P.M.
 (exclude travelling and other set up time)

7) How long have you been fishing today (nearest 0.5 hr.)? _____

- 8) When was your fishing line in the water? (circle appropriate blocks)
- (1) Before 5:00 a.m. (6) 9:00-9:59 (11) 2:00-2:59 (16) 7:00-7:59
 - (2) 5:00-5:59 (7) 10:00-10:59 (12) 3:00-3:59 (17) 8:00-8:59
 - (3) 6:00-6:59 (8) 11:00-11:59 (13) 4:00-4:59 (18) 9:00-9:59
 - (4) 7:00-7:59 (9) 12:00-12:59 (14) 5:00-5:59 (19) 10:00-10:59
 - (5) 8:00-8:59 (10) 1:00-1:59 (15) 6:00-6:59 (20) After 11:00

9) (If still fishing), how much longer do you intend to fish? _____ hrs.

10) What is the main type of gear that you are using? Bait¹ Lure² Fly³ 11) What species are you most interested in catching?
 _____ / _____ / _____

12) Catch Summary

		Area	Main	Other
Total Kept	Kept Unmarked			
	Kept Marked			
Total Intentionally Released	Rel. Unmarked			
	Rel. Marked			

Total Hours _____ hrs. Time Fished _____ hrs. _____ hrs.

13) Was the catch inspected? Yes¹ No² NA³

14) In the past 12 months, on how many days did you fish the stretch of the Peace River from Hudson Hope downstream to Taylor? _____ days. Of these days, how many were from November through March? _____ days.

15) Are you a member of a fish/wildlife club? Yes¹ No²

1989/90 Peace River Sport Fishery Biological Data

Interviewer _____ / _____

Species:
 AR - Arctic grayling MW- Mountain whitefish
 B - Burbot (ling) NP- Northern pike
 GE - Goldeye RB - Rainbow trout
 DV - Dolly varden W - Walleye
 KO - Kokanee YP - Yellow perch
 LW - Lake whitefish CF - Coarse fish (non-game)
 LT - Lake trout

Maturity:
 1- immature
 2- developing gonads
 3- gravid
 4- kelt
 5- resting

Diet:
 1- terr. insects
 2- aqua. insects
 3- crustacean
 4- fish
 5- other

Hatchery Clip:
 N - None
 MR - Right Maxillary
 MLR - Left Maxillary
 PFR - Right (Vent) Pelvic
 PFL - Left (Vent) Pelvic
 AF - Adipose

Date Y/M/D	Int/ Scale #	Capture Location (km marker)	Species	Fork Length (mm)	Weight (gm)	Sex	Mature	Diet	Parasites	Tag #	Hatchery Clip	Age Method	Age
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				
89/ /						M F ?	1 2 3 4 5 ?	1 2 3 4 5	Y N ?				

APPENDIX C
OVERFLIGHT DATA 1989

EXHIBIT C.1: SUMMARY OF ROD COUNTS TOTAL STUDY REGION 1989

		<u>Study Region Rod Count</u>			Mean Time of Count
		Total	Shore Anglers	Boat Anglers	
May					
May 19	Friday	0	0	0	11:40 a.m.
May 20	Saturday	15	15	0	11:38 a.m.
May 24	Wednesday	1	1	0	11:26 a.m.
May 28	Sunday	<u>3</u>	<u>3</u>	<u>0</u>	11:21 a.m.
Total		19	19	0	
June					
June 6	Tuesday	1	0	1	11:30 a.m.
June 10	Saturday	3	1	2	11:27 a.m.
June 14	Wednesday	0	0	0	11:39 a.m.
June 17	Saturday	11	8	3	11:20 a.m.
June 25	Sunday	5	2	3	11:28 a.m.
June 29	Thursday	<u>0</u>	<u>0</u>	<u>0</u>	11:21 a.m.
Total		20	11	9	
July					
July 1	Saturday	5	4	1	11:40 a.m.
July 3	Monday	6	4	2	11:29 a.m.
July 6	Thursday	6	3	3	11:27 a.m.
July 9	Sunday	6	1	5	11:25 a.m.
July 12	Wednesday	3	2	1	11:24 a.m.
July 12	Wednesday	5	4	1	8:21 p.m.
July 15	Saturday	16	6	10	11:26 a.m.
July 16	Sunday	22	12	10	11:23 a.m.
July 18	Tuesday	10	8	2	7:51 p.m.
July 22	Saturday	22	11	11	11:31 a.m.
July 24	Monday	6	3	3	8:25 p.m.
July 28	Friday	13	4	9	7:55 p.m.
July 30	Sunday	<u>14</u>	<u>11</u>	<u>3</u>	11:21 a.m.
Total		134	73	61	

Exhibit C.1 (cont'd)

		<u>Study Region Rod Count</u>			Mean Time of Count
		Total	Shore Anglers	Boat Anglers	
August					
August 3	Thursday	5	5	0	7:16 p.m.
August 5	Saturday	18	11	7	11:26 a.m.
August 6	Sunday	24	21	3	11:35 a.m.
August 11	Friday	10	9	1	7:28 p.m.
August 12	Saturday	12	2	10	11:20 a.m.
August 13	Sunday	21	13	8	11:21 a.m.
August 14	Monday	15	15	0	7:43 p.m.
August 19	Saturday	7	4	3	11:15 a.m.
August 20	Sunday	20	11	9	11:20 a.m.
August 23	Wednesday	3	3	0	7:22 a.m.
August 27	Sunday	10	8	2	11:29 a.m.
August 29	Tuesday	<u>2</u>	<u>2</u>	<u>0</u>	7:17 p.m.
Total		147	104	43	
September					
September 3	Sunday	26	19	7	12:27 p.m.
September 7	Thursday	0	0	0	7:38 p.m.
September 9	Saturday	1	1	0	12:21 p.m.
September 12	Tuesday	0	0	0	12:20 p.m.
September 20	Wednesday	3	0	3	12:21 p.m.
September 24	Sunday	<u>14</u>	<u>11</u>	<u>3</u>	12:29 p.m.
Total		44	31	13	
October					
October 4	Wednesday	2	0	2	2:23 p.m.
October 12	Thursday	0	0	0	2:24 p.m.
October 19	Thursday	2	2	0	2:21 p.m.
October 21	Saturday	8	6	2	3:07 p.m.
October 22	Sunday	<u>6</u>	<u>4</u>	<u>2</u>	3:11 p.m.
Total		18	12	6	
<u>May to October Total</u>		382	250	132	