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FISHERIES SURVEY OF WELLS RESERVOIR

1979

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DOUGLAS COUNTY PUD

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INTRODUCTION

A fisheries abundance and distribution survey was conducted by Public Utility District No. 1 of Douglas County in the Wells Project Reservoir (RM 515.6 to RM 538.0) Columbia River, Washington (Figure 1). This information is intended to provide additional knowledge of the fisheries resource within the Wells pool.

The study began 12 September and extended through 22 October 1979. During this time an effort was made to obtain as much information as possible utilizing portable trap nets and beach seining. This information is augmented by angling in the project area from 30 July through 10 October 1979.

METHODS AND PROCEDURES

Materials and Equipment

To collect as many resident and migratory fish as possible three types of fish collection gear were used.

Two New York Trap Nets were used during the majority of the study. These nets were used because they are relatively easy to set and relocate. General information on trap design, construction details and trap dimensions are given in Figure 2.

A 150-foot by 15-foot beach seine was used during the last four days of the study. The seine tapered to three feet at the ends. The ends were 30 feet long by 3/4 inch mesh. The bag was constructed of 1/4 inch woven mesh.

Approximately 56.5 man hours were spent from 30 June to 10 October angling in several locations for game fish. Spinning gear was used exclusively during this period.

A 16-foot Boston Whaler with 85 HP outboard was used during the entire study.

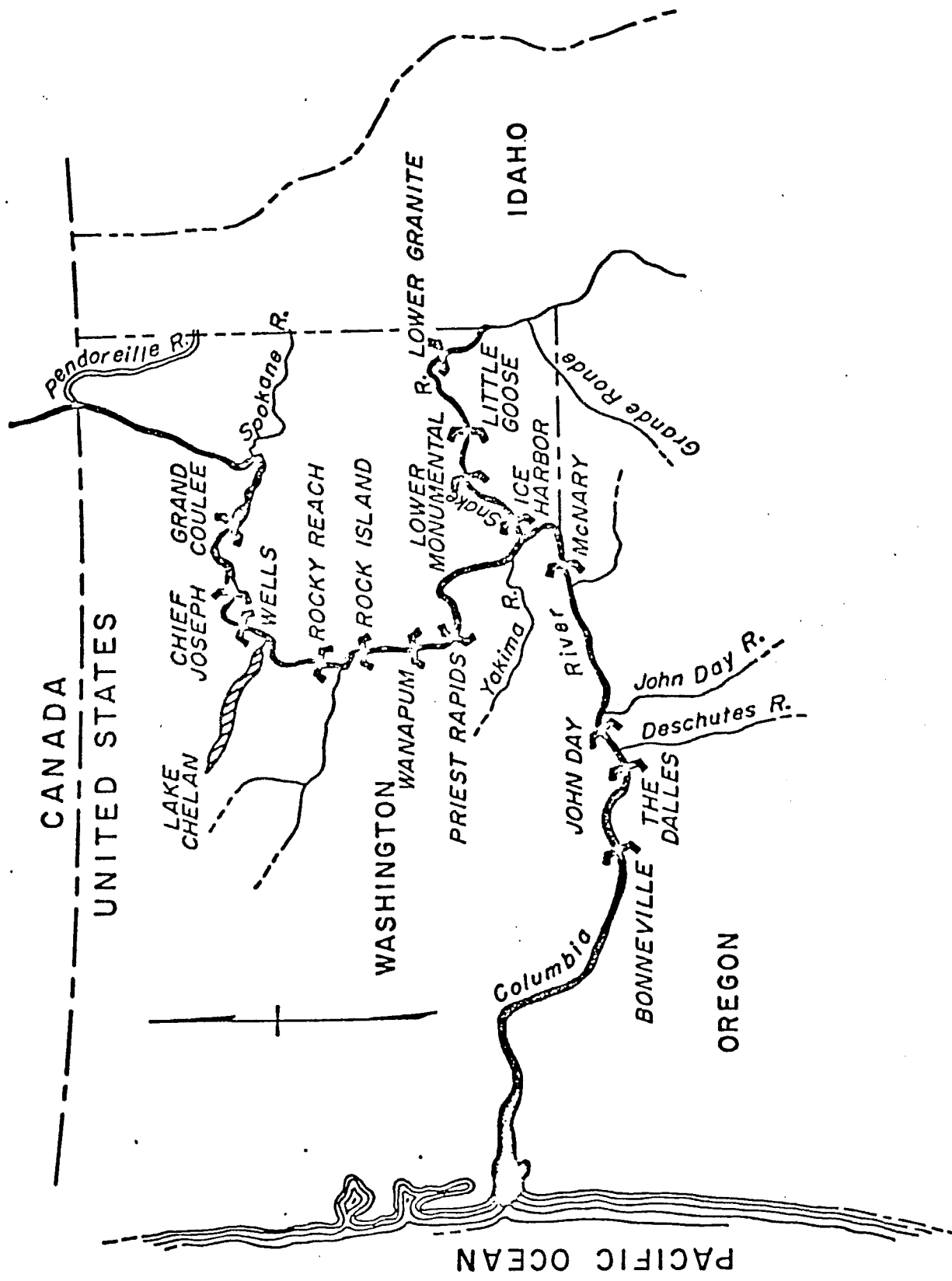
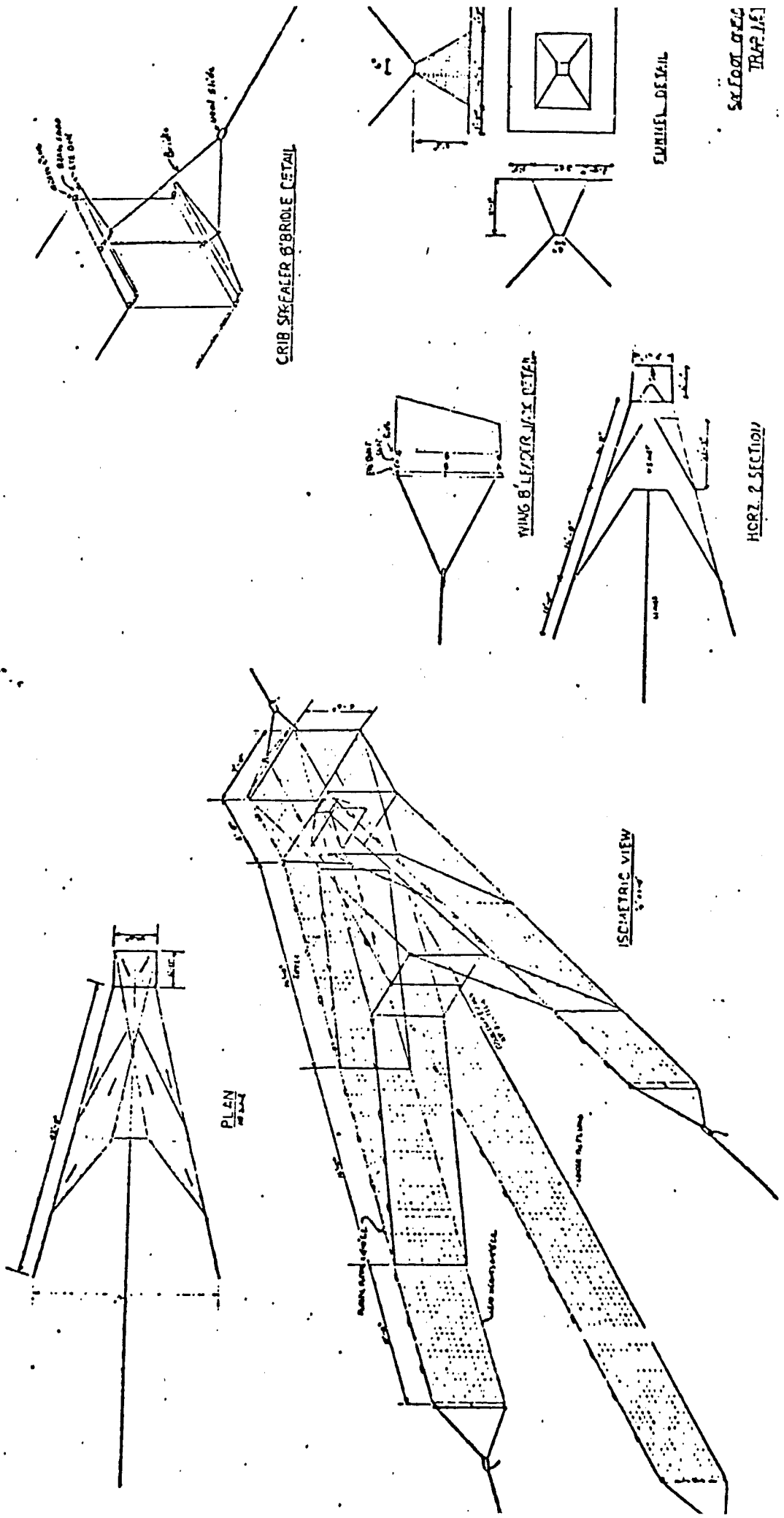


Figure 1. Map of Dams on Main Stem of the Columbia River



SEALERS
TRAP NET

Figure 2. New York Trap Net.

Procedure

The New York Trap nets were set at one location for a 23 to 24.5 hour period then moved to a new location. No fish remained in the trap for more than 24.5 hours. Two sets were made above the mouth of the Methow River in the first pool. To prevent possible conflict with local steelhead fishermen, the sets were made during daylight hours (5 and 5.5 hours) and watched to prevent vandalism.

Past experience by other researchers (Steve Hayes, Chelan County P.U.D., Pers. Comm.) has determined that the best fishing results are obtained when the trap is set in shallow water six feet in depth with a gentle slope to shore. The trap was set with the floor resting on the bottom and the heart hood just below the surface. The central lead ran to shore or shallow water less than one-foot in depth.

Most sets were made in locations where travel lanes existed between deeper areas in an attempt to increase the catch. Only fish moving in the zero to six-foot contour were collected.

The beach seine was set by the usual methods. Care was taken to prevent the lead line from losing contact with the bottom. Fish in the zero to fifteen foot contour were collected.

Both the beach seine and New York Traps are shore oriented. Random sampling could not be used since shallow shoreline and backwater areas were not available throughout the pool. Except for angling, no fish were taken in areas with a strong current or at a depth greater than 15-feet.

Fish collected were anesthetized with MS222 (tricane methanesulfonate) before handling and were allowed to recover before release. All fish were released alive. Game fish and a subsample of non-game fish were measured to the nearest .5 cm (Fork Length). Each fish was superficially examined for wounds, parasites and identifying marks.

Live trap and beach seine sites and angling locations are indicated on the reservoir map (Figure 3). All three types of gear were used in various locations in the pool.

RESULTS

Fish Catch

The total catch of resident and migratory fish included 20 of the 27 known species previously trapped in the mid-Columbia Reservoirs. Table 1 gives the known species captured in the mid-Columbia Reservoirs (Dell, M. B., et al 1975). Suckers, dace and sculpins will be identified by family in this report. A total of 2,480 fish were collected during the study period, including angling. Salmonids and game fish totaled 459 including pumpkinseed, rainbow trout, steelhead, black crappie, bullhead, smallmouth bass, mountain whitefish, yellow perch and juvenile chinook. Non-game fish totaled 2,021 including chiselmouth, carp, peamouth, squawfish, dace, shiners, tench, suckers, and sculpins. Table 2 gives the percentage of each species caught.

The trap net catch totaled 1,909 fish for 406.5 hours fishes. Beach seining for 10 hours caught 522 fish. Angling produced a total of 49 fish for 54.5 hours fishes.

Beach seining was the most efficient method used to catch fish with 52.0 fish per hour, and 59 percent game fish in the catch. The trap net was second in efficiency with 4.71 fish per hour but with a game fish catch of only 6.47 percent. Angling though more selective for game fish (53.1%) was the least efficient use of time with .89 fish per hour.

Location of Catch

Salmonids

The distribution of rainbow trout in the catch was confined to areas trapped below the mouth of the Okanogan River, except for one trout caught on hook and

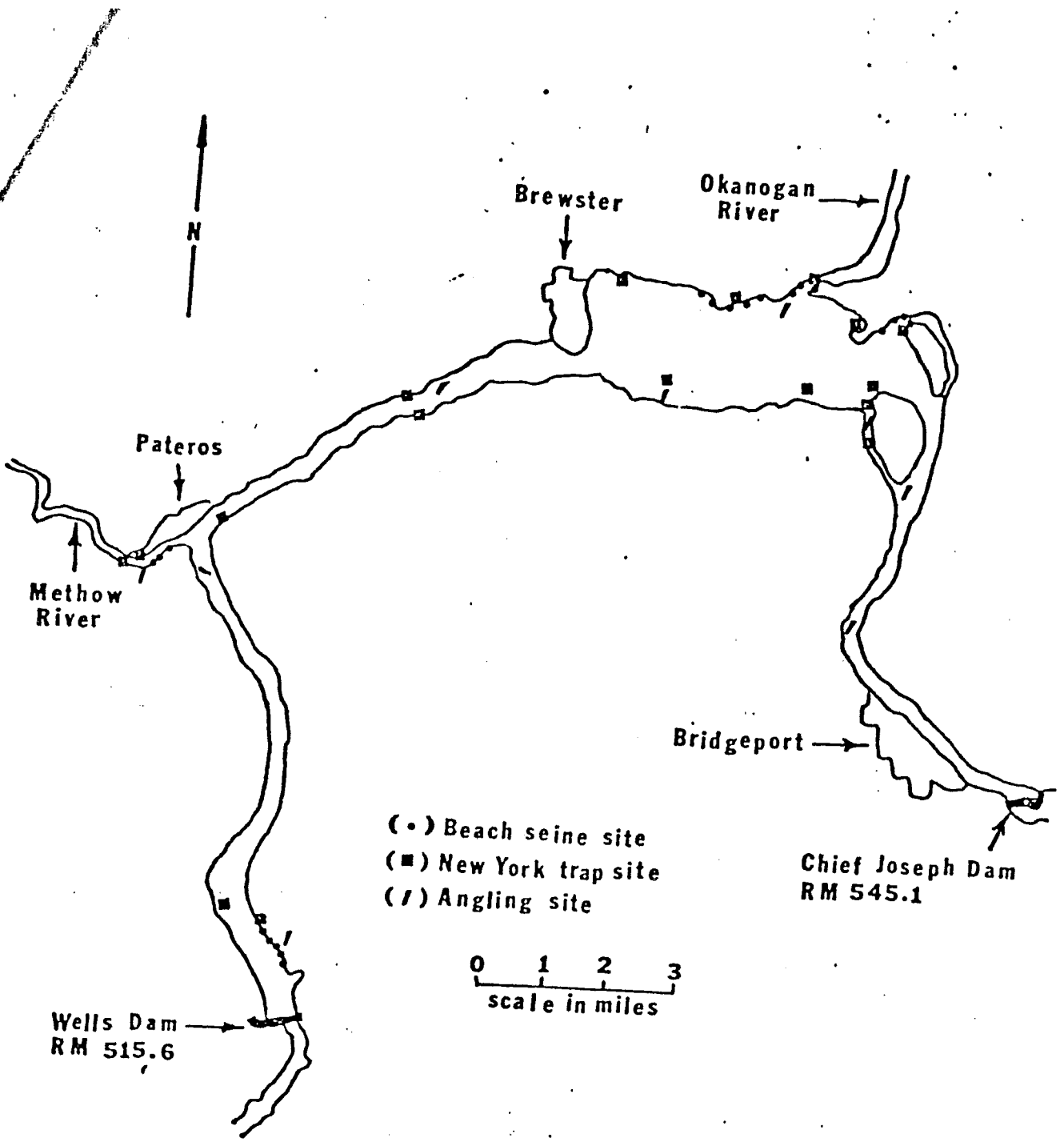


Figure 3. Sampling sites on Wells Reservoir.

Table 1. Names of fish species collected from the main stem of the Columbia River (River Miles 397.1 to 545.1) May-August 1974. (Dell, M B, et. al., 1975)

Family and Common Name	Scientific Name
Petromyzontidae: Pacific lamprey	<u>Entosphenus tridentatus</u>
Salmonidae: Coho salmon Chinook salmon* Mountain whitefish* Rainbow trout (steelhead)* Rainbow trout (resident)* Dolly Varden	<u>Oncorhynchus kisutch</u> <u>O. tshawytscha</u> <u>Prosopium willamsoni</u> <u>Salmo gairdneri</u> <u>S. gairdneri</u> <u>Salvelinus malma</u>
Cyprinidae: Chiselmouth* Carp* Peamouth* Northern squawfish* Dace* Redsided shiner* Tench*	<u>Acrocheilus alutaceus</u> <u>Cyrpinus carpio</u> <u>Mylocheilus caurinus</u> <u>Ptychocheilus oregonensis</u> <u>Rhinichthys spp.</u> <u>Richardsonius balteatus</u> <u>Tinca tinca</u>
Catostomidae: Bridgelip sucker(Finescale)* Largescale sucker*	<u>Catostomus columbianus</u> <u>C. macrocheilus</u>
Ictaluridae: Black bullhead* Brown bullhead*	<u>Ictalurus melas</u> <u>I. nebulosus</u>
Percopsidae: Sand roller (Trout Perch)	<u>Percopsis transmontana</u>
Centrarchidae: Pumpkinseed* Bluegill Smallmouth bass* Largemouth bass Black crappie*	<u>Lepomis gibbosus</u> <u>L. macrochirus</u> <u>Micropterus dolomieu</u> <u>M. salmoides</u> <u>Pomoxis nigromaculatus</u>
Percidae: Yellow perch* Walleye	<u>Perca flavescens</u> <u>Stizostedion vitreum</u>
Cottidae: Sculpins*	<u>Cottus spp.</u>
Gasterosteidae: Threespine stickleback	<u>Gasterosteus aculeatus</u>

* Fish species collected in Wells Reservoir between RM 515.6 and 538.0 (1979).

	Trap Net N=1909		Beach Seine N= 522		Total Catch N=2431	
	Number Caught	Percent	Number Caught	Percent	Number Caught	Percent
GAME FISH						
<u>Salmonidae</u>						
Chinook	1	0.05	0	0.0	1	0.04
Steelhead	3	0.16	0	0.0	3	0.12
Rainbow Trout	8	0.42	0	0.0	8	0.33
Mt. Whitefish	1	0.05	6	1.15	7	0.29
<u>Centrarchidae</u>						
Pumpkinseed	34	1.77	287	55.19	321	13.17
Smallmouth Bass	4	0.20	8	1.54	12	0.49
Black Crappie	21	1.10	4	0.76	25	1.03
<u>Percidae</u>						
Yellow Perch	3	0.16	0	0.0	3	0.12
<u>Ictaluridae</u>						
Black Bullhead	19	0.99	4	0.76	23	0.94
Brown Bullhead	8	0.42	0	0.0	8	0.33
Game Fish Sub-Total	124	6.47	309	59.42	433	17.77
NON-GAME FISH						
<u>Cyprinidae</u>						
Chiselmouth	1045	54.51	1	0.19	1046	42.92
Carp	13	0.68	2	0.38	15	0.62
Peamouth	60	3.13	12	2.31	72	2.95
Squawfish	193	10.07	2	0.38	195	8.00
Dace	11	0.57	0	0.0	11	0.45
Redsided Shiner	159	8.29	155	29.81	314	12.88
Tench	11	0.57	1	0.19	12	0.49
<u>Catostomidae</u>						
Bridgelip Sucker	2	0.10	0	0.0	2	0.08
Largescale Sucker	287	14.97	24	4.61	311	12.76
<u>Cottidae</u>						
Sculpins	4	0.20	16	3.07	19	0.91
Non-Game Fish Sub-Total	1785	93.11	213	40.96	1998	81.98

Table 2. Total number and percentage of each species caught by trap net and beach seine.

line at the upstream end of Park Island. The trout fishery in the upper pool is spotty at best. All of the trout were collected in areas where the bottom dropped off sharply from the shoreline with dense aquatic vegetation. Table 3 gives the total number of each species caught and fork length range. Appendix 1 and 2 gives the catch by river mile (RM) location.

Five residual steelhead (counted as rainbow trout) were caught on hook and line approximately one mile above Wells Dam. These fish had clipped adipose fins and IJ brands, first position, right anterior. Two local fishermen were contacted while fishing in this area; they caught 12 rainbow, two with IJ brands. Trout were control fish released during the Washington Department of Game imprinting study on the Methow River, 1979.

Three adult steelhead were trapped approximately one mile above Wells Dam along the left shoreline. One adult steelhead was caught on a lure in the first pool of the Methow River. The fork length of these fish indicates that they were one ocean fish (Bill Pedersen, Washington Department of Game, Pers. Comm.). Steelhead fishermen were observed during the study, boat and bank fishing in the first pool of the Methow River. They were also observed trolling through the Pateros Rapids, one mile below Pateros and in the forebay of Wells Dam.

Chinook salmon were not well represented in the sample. One juvenile was caught on a lure one mile above the dam along the left bank. The second was taken in a trap, one mile below the mouth of the Okanogan River along the right bank.

Mountain whitefish were only caught along the left shoreline one mile above Wells Dam. All of the whitefish were collected near deep protected water with dense aquatic vegetation.

Game Fish

Spiny rays, except for pumpkinseeds and smallmouth bass were found exclusively above RM 528. Pumpkinseeds were trapped throughout the pool though

Table 3. Fork length range and total catch by species.

Species	Total Catch	Fork Length Range
Chinook	2	7.6 and 10 Cm. (3 and 3.9 inches)
Steelhead	4	56.7 to 68.6 Cm. (23,5 to 27 inches)
Rainbow Trout	31	7 to 44 Cm. (3 to 17.3 inches)
Mt. Whitefish	7	5 to 25 Cm. (1.9 to 9.8 inches)
Pumpkinseed	321	2 to 14 Cm. (0.7 to 5.5 inches)
Smallmouth Bass	13	2 to 15 Cm. (0.7 to 5.9 inches)
Black Crappie	25	4 to 22 Cm. (1.5 to 8.6 inches)
Yellow Perch	3	6 to 19 Cm. (2.3 to 7.8 inches)
Black Bullhead	23	17 to 25 Cm. (6.7 to 9.8 inches)
Brown Bullhead	8	17 to 20 Cm. (6.7 to 7.8 inches)
Chiselmouth	1047	9 to 40 Cm. (3.5 to 15.7 inches)
Carp	15	8 to 34 Cm. (3.1 to 13.3 inches)
Peamouth	72	8 to 31 Cm. (3.1 to 12.2 inches)
Squawfish	216	8 to 37 Cm. (3.1 to 14.5 inches)
Dace Spp.	11	13 to 15 Cm. (5.1 to 5.9 inches)
Redsided Shiner	314	6 to 12 Cm. (2.4 to 4.7 inches)
Tench	12	13 to 38 Cm. (5.1 to 14.7 inches)
Bridgelip Sucker	2	23 and 38 Cm. (9.0 and 14.7 inches)
Largescale Sucker	312	6 to 49 Cm. (2.4 to 19.3 inches)
Sculpin Spp.	20	5 to 11 Cm. (1.9 to 4.3 inches)

none were larger than 15 cm in fork length. A smallmouth bass was taken two miles below Brewster (RM 528) on hook and line and eleven were captured in the mouth of the Okanogan River and Washburn Island pond outlet. One lone bass was captured one mile above the dam, but no other evidence of bass was found in this portion of the pool. Black crappie were found only above Brewster along the right shoreline. Locations where they were found included the Cassimer Bar area and the outlet of Washburn Island pond. Three yellow perch were collected during the study. One fish was found at each of the following locations; the Bridgeport Bar islands, mouth of the Okanogan River and along the right bank opposite the Kirk Islands.

All areas where spiny rays, other than pumpkinseeds, were found had similar habitat. These areas all had gently sloping bottom with dense aquatic vegetation and debris. This habitat was found mainly in backwater areas with reduced currents.

No walleye or large mouth bass were taken during the survey. Ken Williams (1977) reports a year round walleye fishery from Chief Joseph Dam to the mouth of the Okanogan River. He also stated that the spiny ray fishing at the mouth of the Okanogan River is good but confined mainly to local fishermen.

Both black and brown bullheads were captured above river mile 528. Bullhead were found only in or adjacent to calm backwater areas. No evidence of bullheads was found further downstream.

Non-Game Fish

The catch of resident fish was much greater than that of game fish. Suckers, chiselmouth, squawfish, peamouth, sculpins, shiners and carp were found to be distributed throughout the reservoir. Dace species were found only in the lower eight miles of the pool. Tench were only found, one mile above the dam and in the Bridgeport Bar area.

DISCUSSION

Abundance

The results of the fish trapping indicate that non-game fish are more abundant than anadromous and game fish (Table 1 & 2). Since the sample size is small, the abundance of five times as many resident as game fish can only be used as an index and not as the true proportion. Instantaneous fish collection provided by beach seining indicated a near one to one ratio for abundance of resident and game fish. The true abundance is probably somewhere between the two.

Sampling Bias

The use of the beach seine and trap nets created a few problems. The efficiency of the New York Trap was affected by water fluctuations caused by power production and waves from high wind. Two trap sets were found with the trap wing anchors torn free after a wind storm. The buildup of drifting aquatic vegetation on the lead and throat of the trap may have influenced the catch. Frequent cleaning was necessary.

Actual catch in the New York Trap was underestimated because of predation. Regurgitated stomach contents of squawfish showed that the following species were preyed upon in the trap, peamouth, squawfish, chiselmouth, suckers and shiners. A few fish in the trap showed signs of predation, deep abrasions and bites on the sides and belly were noted. No estimates of predation in the traps can be made.

The major concern when using the beach seine was to find a location where the bottom conditions allowed efficient net retrieval. Soft mud clinging to the lead line on occasions prevented the seine from being pulled to shore. Snagging on rocks and debris not only caused tears in the web but made it impossible to pull the net without the leadline losing contact with the bottom, allowing fish to escape.

Sampling bias also has affected the results since collection was restricted to the 15-foot contour. Shallow areas provide excellent habitat for resident fish but salmonids appear to be only incidentally caught in these locations. The limitations of the sampling gear prevented their use in areas with strong current. Also areas where gear could be torn or tangled by underwater objects had to be avoided. This non-random sampling may be reflected in the abundance of resident fish in the catch.

The study was originally designed with the use of variable mesh gill nets along with the live traps. Gill nets were unavailable during the study period. The use of gill nets would have increased the flexibility of the areas we were able to sample. Deeper areas with less gradual contours could have been easily sampled, preventing some of the biases involved with the selection of survey sites.

Date	Hours	Location	Chinook	Rainbow Trout	Steelhead	Squawfish	Chiselmouth	Largescale Sucker	Smallmouth Bass
7/30	6	RM 516.8 517.2 LB	1	11 2 IJ Brand	-	1	-	-	-
7/31	6	Mouth of Methow	-	-	-	1	-	-	-
8/1	7	RM 516.8 517.2 LB	-	11 3 IJ Brand	-	-	-	-	-
8/6	2	RM 528 RB	-	-	-	-	-	-	-
8/7	6	RM 541 LB	-	-	-	6	-	1	-
8/13	2	RM 533 LB	-	-	-	3	-	-	-
8/16	2	RM 533 LB	-	-	-	6	1	-	-
9/21	8	Mouth of Methow	-	-	-	-	-	-	-
9/25	4	RM 539.5 LB	-	1	-	2	-	-	-
9/2	2	RM 516.8 LB	-	-	-	-	-	-	-
9/28	8	Mouth of Methow	-	-	1	-	-	-	-
10/1	2	RM 537.5 RB	-	-	-	-	-	-	-
10/1	1.5	Rm 537 LB	-	-	-	-	-	-	-
Total	56.5		1	23	1	21	1	1	1

Appendix 2. Angling fish catch by river mile location.