GUIDING JUVENILE SALMONIDS WITH LONG LEAD NETS AT THE UPPER END OF BROWNLEE RESERVOIR

by

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INTRODUCTION

Mounting evidence of failures to pass fish at high dams points to the need for collection and bypass systems that will assure the safe passage of young salmonids around these barriers.

Most of the efforts to collect downstream migrants have been in the lower end of reservoirs. Recent observations indicate that downstream migrants sometimes fail to negotiate large reservoirs and consequently are not available to collection equipment located at the downstream end. This suggests that collecting efforts may have to be shifted to the upper end of reservoirs, or possibly to reservoir tributaries.

In the spring of 1963 members of the Fish-Passage Research Program conducted an experiment in the upper end of Brownlee Reservoir, taking advantage of a surface concentration of downstream migrants, to explore the feasibility of collecting downstream migrants at the upper end of a reservoir with long lead nets.

MATERIAL AND METHODS

The experimental area was located approximately 40 miles upstream from Brownlee Dam (fig. 1) in an area where the reservoir is about 1/4 mile wide with depths to 80 feet at normal full pool (2,077 feet elevation).

The experimental collection equipment consisted of two floating fingerling traps with long lead nets fabricated of 3/4-inch stretched-measure knotless nylon. One trap--a Lake Merwin type--was anchored 200 feet from the Idaho shore (fig. 2) and connected to the bank by an inner lead net that was 30 feet deep. An outer net, 975 feet long by 20 feet deep, extended upstream into mid-reservoir at about a 45^{o} angle to the flow and was moored at the terminal end to an anchored buoy. The second trap (fig. 3) was located approximately 1/2 mile downstream near the Oregon shore. This unit employed similar leads that were attached to an automatic trapping device called a migrant dipper.

After the experimental collection equipment was installed in the reservoir, it was fished continuously from May 9 to June 15, 1963. During this period, there were short intervals each day when the nets were cleaned and repaired, the mechanical devices lubricated and repaired, or the pot of the Lake Merwin trap was emptied of fish.

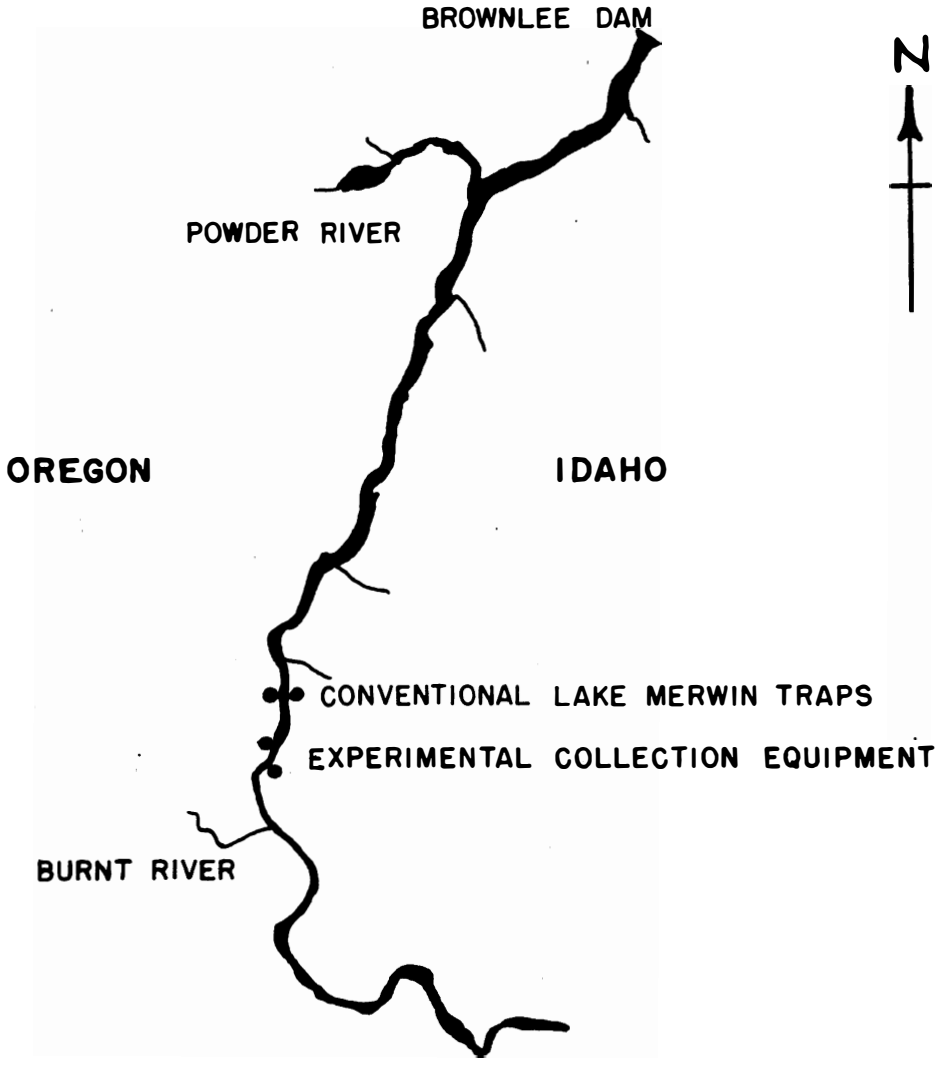

Figure 1.--Diagrammatic sketch of Brownlee Reservoir showing relative location of collection equipment.

Figure 2.--Floating Lake Merwin-type trap and lead nets viewed from Idaho shore, Brownlee Reservoir. Shore lead is 200 feet long by 30 feet deep; outer lead is 975 feet long by 20 feet deep.

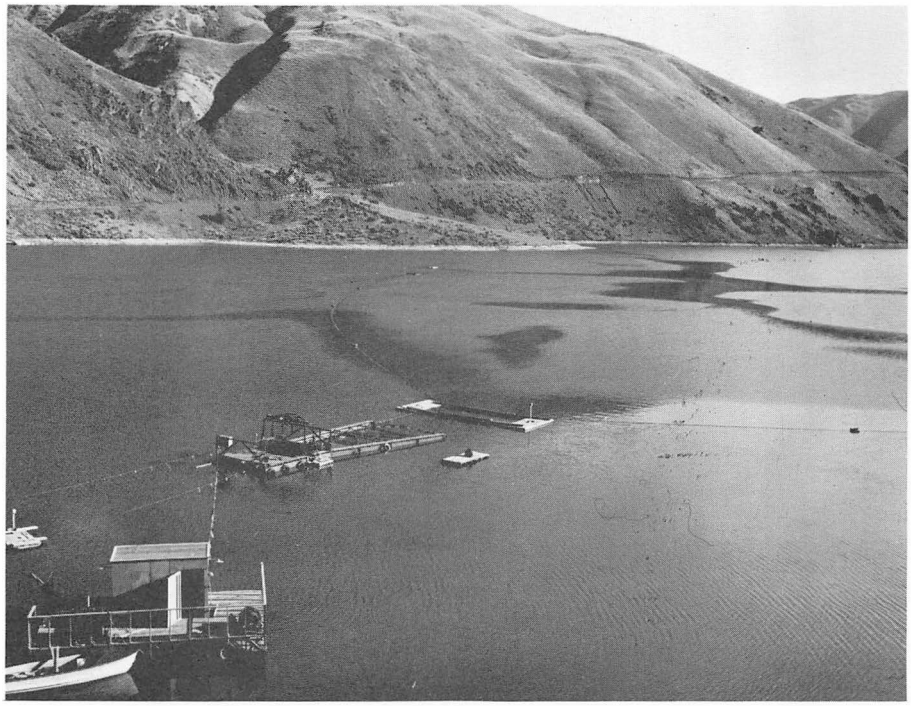

Figure 3.--Migrant dipper trap and lead net extensions as seen from Oregon shore, Brownlee Reservoir.

All of the fish captured in both traps were marked with either a jaw tag or a tattoo, depending upon the size of the fish, and then released back into the reservoir. The marks provided a means of identifying fish that were recaptured by the experimental collection equipment or by other research projects in the area.

RESULTS

Total salmonid catches of the experimental collection equipment and of conventional (no long outer lead net) Lake Merwin traps fished in the same general area are shown in the table below. The sampling period was from May 9 to June 15, 1963.

Collection equipment	Location	Species		Total
		Chinook	Steelhead	
Experimental:				
Lake Merwin trap	Idaho shore, Res. mile 40.0	1,023	463	1,486
Migrant dipper	Oreg. shore, Res. mile 39.5	1,891	452	2,343
Total:		2,894	915	3,829
Conventional:				
Lake Merwin trap	Idaho shore, Res. mile 37.0	1,124	948	2,072
Lake Merwin trap	Oreg. shore, Res. mile 37.0	808	1,585	2,393
Total:		1,932	2,533	4,465

DISCUSSION AND CONCLUSIONS

The long outer lead nets apparently failed to enhance the collection of fingerlings. The experimental collection equipment did not catch significantly more fish than conventional Lake Merwin traps.

Although the reservoir is about 80 feet deep in this area, gill net catches revealed that the majority of the fish were migrating within the top 20 feet of water--the layer screened by the lead nets. However, a few fish were captured as deep as 40 feet, suggesting that some of the downstream migrants might have escaped beneath the lead nets.

Large quantities of debris necessitated the cleaning of the nets daily. At times the debris would become so plentiful it would raise the lead line of the nets to the surface, and consequently, the fish guiding effectiveness of the nets would be lost.

It was almost impossible to hold the nets in fishing position in water velocities over 0.5 f.p.s. In order to keep the nets in such reduced flows, it was necessary to move them approximately 11 miles downstream from the head of the reservoir. In these reduced velocities the fish appeared to be milling about rather than migrating downstream. This milling about apparently contributed to the ineffectiveness of the nets in guiding fish.

The water was also very turbid during the entire experiment. The lead nets might have diverted fish more effectively if the visibility had been better.

In conclusion, long lead nets did not prove to be a suitable method for diverting downstream migrating salmonids in the upper end of Brownlee Reservoir.