A FISH SANCTUARY BARGE

by

Winston E. Farr

and

Willman M. Marquette

September 1964

FISH-PASSAGE RESEARCH PROGRAM
U.S. Bureau of Commercial Fisheries
Seattle, Washington

INTRODUCTION

The use of a funnel net to recover fish passed through Kaplan turbines requires an accompanying unit to capture and protect fish after they have passed through the net. To assess the effect of a turbine on downstream migrants, it is essential that fish taken in a trap be maintained in good condition and not be subjected to stresses unassociated with the turbine. To accomplish this, fish migrants must be separated from the fast-flowing water and diverted into quieter water in a protected area from which they can be transferred, with a minimum of disturbance, to a holding area for subsequent observation.

This report describes a sanctuary barge which was developed for collecting fingerling migrants from the funnel net. This unit, attached to the cod end of the net, was designed to (1) strain the entire flow from the cod end of the net, (2) operate in velocities up to 5 feet per second from the cod end, (3) separate fish into a compartment or trap through which a small amount of water flows, and (4) facilitate removal of the trap containing fish and water for transfer to shore.

EQUIPMENT

The sanctuary barge was based on a sump concept, whereby a head differential was maintained between the cod end of the net and the top of a trap within the sanctuary. With this method, all of the water from the net was moved over an inclined plane screen, and while the majority of the water passed through the screen, a small amount of water and all of the fish passed over the end of the screen into a trap. For ease of operation, maneuverability, and simplicity, the sump screen and trap were incorporated in a barge (figs. 1 and 2).

The barge was constructed so that its buoyancy could be adjusted to control the velocity of water flowing from the net through the connecting pipe into the barge. Two flotation chambers were provided at the corners of the barge, each of which contained a water inlet at the bottom. The two compartments were interconnected at each corner by a compressed air line controlled by a three-way air valve with a float level control mechanism.

For an increase in buoyancy, the float level control mechanism was adjusted to permit compressed air to enter the compartments, thus forcing water out and raising the barge. When the desired level of floatation was obtained, the float control mechanism was locked and the level was maintained automatically through the float's action on the three-way valves. To decrease the buoyancy, the procedure was reversed by adjusting the control mechanism, allowing air to be released from the compartments and water to enter through the holes at the bottom.

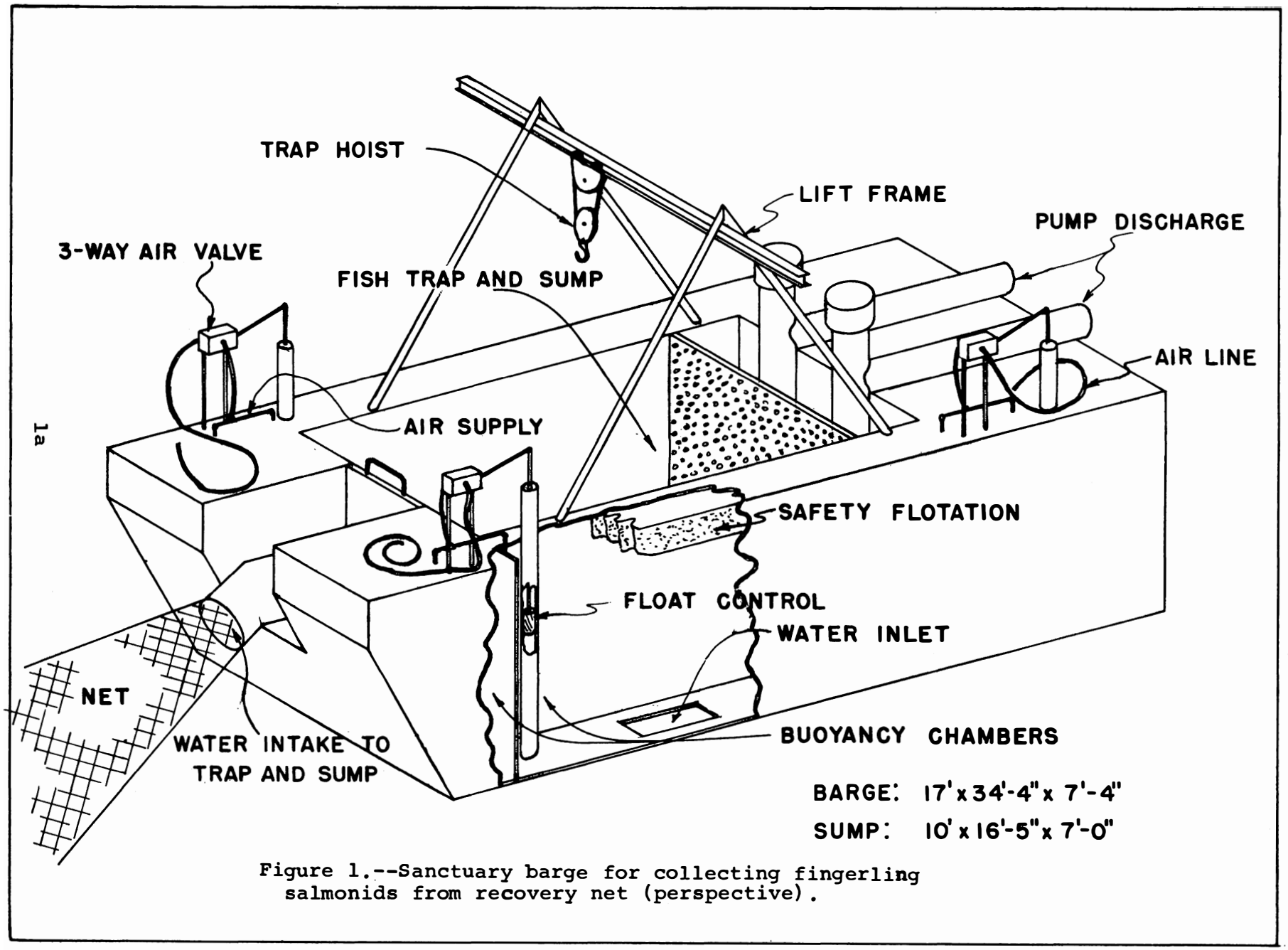
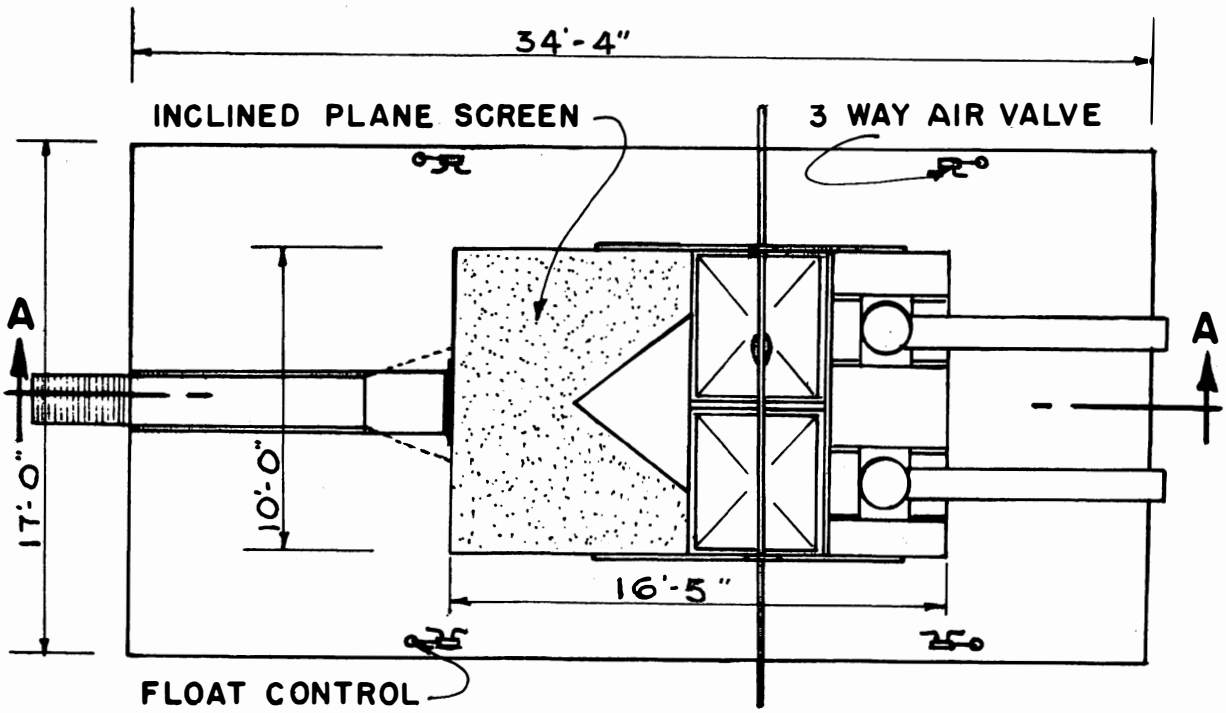


Figure 1.--Sanctuary barge for collecting fingerling salmonids from recovery net (perspective).



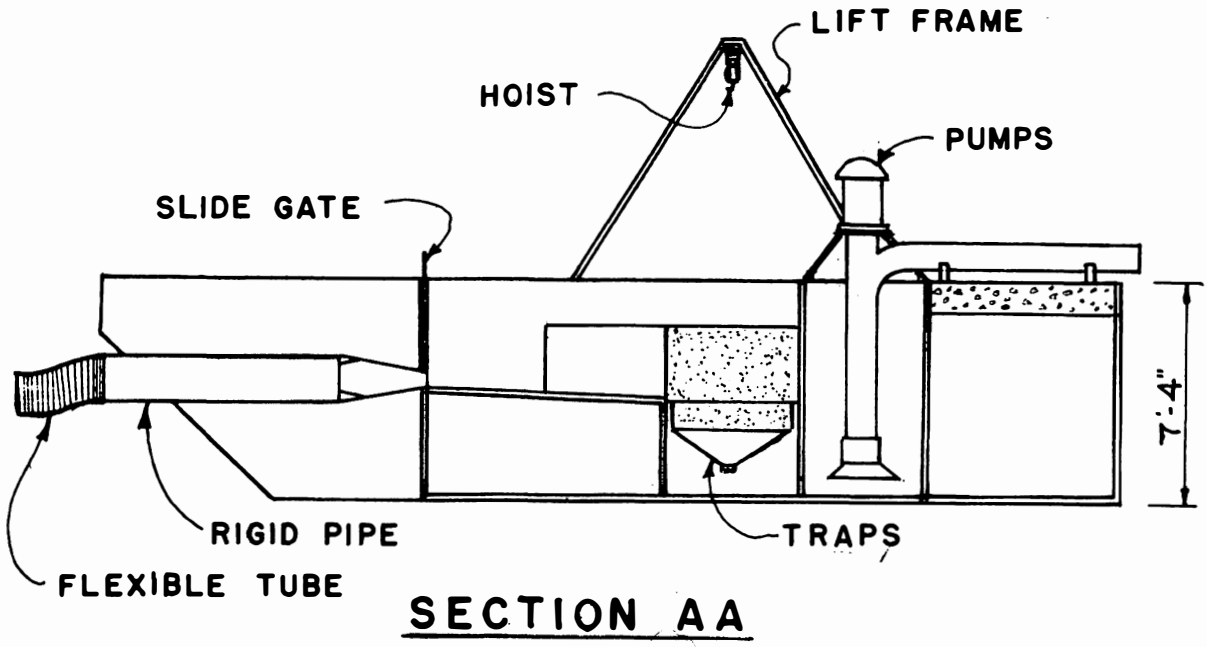


Figure 2.--Location of inclined plane screen and fish traps within sanctuary barge.

The level of the water in the sump was controlled by two pumps discharging water over the stern of the barge. These are ditch-type pumps, each capable of producing not less than 2,240 gallons of water per minute against a total head of 8 feet. One pump was equipped with a variable speed motor drive so that the volume of water pumped from the sump could be adjusted, thus maintaining the desired water level.

Two funnel-bottom traps were positioned in the sump to collect fish from the inclined screen. When a sufficient number of fish had been collected in one trap, it was removed and the second trap was positioned to continue the collection. Removal of the trap containing the fish was facilitated by a traveling hoist on an "A" frame over the trap area. The hoist raised the trap, moved it to the side of the barge, and deposited it in a boat for transfer to shore.

EVALUATION

The sanctuary barge adequately fulfills the requirements for collecting and maintaining fish. The migrants move from the small end of the net, over the inclined plane screen, and into a trap. The trap containing fish is easily transferred to a boat adjacent to the barge with little or no disturbance to the fish. The unit is presently being employed at Bonneville Dam.