HABITAT IMPROVEMENT PROJECT

Fishery Division

Opossum Shrimp Collection - 1966
Number 20
STATE OF OREGON
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C. J. Campbell, Chief of Operations

Opossum Shrimp Collection

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OPOSSUM SHRIMP COLLECTION

ABSTRACT

Opossum shrimp *Mysis relicta* were collected in Upper Waterton Lake, Alberta, Canada, in the summer of 1966 for the second successive year. Approximately 650,000 were collected and introduced into Waldo, Wallowa, Big Cultus, Crescent, and Timothy Lakes in Oregon.

INTRODUCTION

The introduction of *Mysis relicta*, the opossum shrimp, to Oregon lakes was continued in 1966 as a follow-up of the initial transplants made a year earlier and reported by Sayre and Stout (1965). Approximately 650,000 shrimp were collected from Upper Waterton Lake, Alberta, Canada, in 1966 and distributed to Wallowa, Waldo, Big Cultus, Crescent, and Timothy Lakes in Oregon. The purpose of the introduction is to improve the fish-producing capacity of these oligotrophic waters.

METHODS

Collections

Trawling operations to capture shrimp were begun on August 11, 1966 and terminated on August 24. Collections were made in the north end of Upper Waterton Lake and in Emerald Bay next to the townsite. Large concentrations of shrimp were found in both areas at a depth range of from 100 to 200 feet. Figures 1 and 2 depict the lake and trawling areas.

Gear employed to capture the shrimp was the same as used in 1965, except that an electric winch was substituted for the slow and tiresome hand winch. The net was mounted in a rigid tubular frame so its mouth was held open. The lower lip of the net rode 6 inches off the bottom which minimized the dredging of bottom detritus. The electric winch held 400 feet of 1/8-inch airplane cable. A rigid but socket-
Figure 2. North end of Upper Waterton Lake, Emerald Bay, and Waterton Townsite where opossum shrimp collection activities were centered in 1966.

Figure 3. Boat and trawling rig used during the 1966 opossum shrimp collections.
mounted steel boom was used to support the towing cable and net. The boom could
be swiveled to allow easier handling of the cod-end of the trawl when removing
the shrimp. The average individual trawling time was 5 minutes. The trawling
assembly is shown in Figure 3.

Mysis were held aboard the boat in well insulated 12-gallon plastic con-
tainers, and were given a constant oxygen supply through porous air stones. Hold-
ing facilities were provided at the Waterton Park Spring Creek Hatchery in stand-
ard hatchery troughs and holding boxes in outdoor raceways. The shrimp were
provided with good water circulation and care was taken to protect them from
direct light.

Transportation

With the exception of the final load, all of the 1966 collections were
shipped to Oregon by air. The last shipment was made by pickup truck. Mysis
were loaded in plastic bags, charged with oxygen, iced, and trucked 40 miles to
the airstrip at Babb, Montana. At Babb, the shrimp were repacked in large
plastic cans and more ice was added. Oxygen was metered to the shrimp through a
cylinder and valve arrangement throughout the flight to Oregon.

Upon arrival of the shrimp in Oregon, a variety of methods was employed to
transport the shrimp to their final destination. Liberation trucks, plastic cans,
and plastic fish bags were all utilized. A fish-planting boat was used at times
to distribute the shrimp to the deeper sections of the larger lakes.

Counting

The number of Mysis collected and distributed was determined by volumetric
displacement. An average of 8,200 shrimp was required to displace 100 milli-
liters of water.
DISCUSSION

Distribution

On August 18, 240,000 shrimp were put in 20 plastic fish bags with 3 gallons of 45°F water. The bags were charged with oxygen and sealed, loaded in the truck, iced, and covered for the one-hour drive to the airstrip. At the airplane, the Mysis were repacked into eight 20-gallon garbage cans with 12 gallons of water and 18 pounds of chlorine-free ice. A trickle system delivered oxygen to each container through an air stone.

The 150,000 shrimp destined for Wallowa Lake, arrived at Joseph, Oregon after a 2.5-hour flight. During the flight the water temperature ranged from 37° to 46° F. At Joseph, the shrimp were transferred to a fish-liberation truck, hauled 45 minutes to the lake, and liberated from a fish-planting boat.

The shrimp were tempered in lake water to adjust them to the 69° F. surface temperature. Approximately 20,000 were lost to handling difficulties during the entire transfer.

The remaining 90,000 shrimp were flown for another 3 hours to Fall River, Oregon. From there they were transported by truck in the 20-gallon cans to the liberation site at Big Cultus Lake. After 30 minutes tempering, they were released in the 68° F. water.

A second aerial shipment was made on August 25. Shipping density was increased by distributing the 300,000 shrimp in 15 plastic fish bags. Each bag held 20,000 shrimp and 3 gallons of water. At the airstrip, 3 of the bags, still with the original oxygen charge, were iced and then loaded in a separate compartment in the nose of the airplane. The rest of the load was divided among the 20-gallon plastic cans. Each can held 40,000 Mysis and 15 gallons of water and ice. Oxygen was provided as in previous hauls.

After a 4-hour flight, the shrimp were loaded into trucks at Fall River for distribution to Waldo and Crescent Lakes. Water temperature during the flight ranged from 37° to 50° F.
Crescent Lake was stocked with 100,000 shrimp. Lake surface temperature, at release of the Mysis was 61° F. Waldo Lake received 200,000 shrimp and had a surface water temperature of 64° F. At both lakes the water containing the shrimp was tempered to lake water before release. The shrimp hauled in the nose of the aircraft exhibited little mortality in the 6 hours from loading at Waterton Lake. The total loss of shrimp on the second flight was about 10,000 animals.

The final load of 110,000 shrimp was transported from Waterton Lake by pickup truck. They were divided evenly in 9 plastic bags, each of which held 3 gallons of water. After charging with oxygen, the bags were iced and sealed, and were then covered with wet burlap and a tarpaulin to exclude heat and light. After 24-hours, the shipment was re-oxygenated and iced again. A dissolved oxygen sample, taken before recharging, showed a concentration of 21 milligrams per liter.

Upon arrival at Timothy Lake 30 hours after loading, all the shrimp were alive except for a loss of 12,000 which occurred when a bag ruptured. The shrimp were tempered to the surface water at 64° F. and released. At Timothy Lake, a sample of fifty shrimp was put in a live-box and lowered 35 feet to the thermocline. Dissolved oxygen concentration at the thermocline was 7.9 milligrams per liter. Twenty-four hours later they were still alive and were released.

A small number of shrimp were taken to the Department of Microbiology at Oregon State University where they were examined for the presence of bacterial diseases or parasites. No evidence of either condition was found.

Water chemistry and temperature data, for comparison of Waterton Lake and the Oregon lakes, is given in the 1965 Opossum Shrimp Collection Report by Sayre and Stout (1965).

Some superficial and unsuccessful attempts have been made to determine the survival of the Mysis introduced in 1965. More thorough investigations to evaluate the results of the introductions will be conducted in 1967.
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REFERENCES