SPRAY OBSERVATIONS IN THE YELLOWSTONE AND GALLATIN RIVER DRAINAGES DURING 1960

During June 30 through July 13, 1960, the U. S. Forest Service sprayed DDT in portions of the Yellowstone and Gallatin River drainages in an attempt to control spruce budworm.

Both streams have valuable fish populations and are rated as "blue ribbon" streams in Montana's stream rating system.

Research studies conducted during previous spray programs demonstrated some of the dangers to aquatic organisms and suggested methods of minimizing or preventing fishery losses.

Spray observations in 1960 were more of a management nature and were designed to provide a field check on the spray operation and techniques in order to detect losses of stream insects and fish, if any occurred as a result of the spraying.

The spray area in the Yellowstone River Drainage was near Livingston on the east side of the stream. It extended from the Pine Creek Drainage downstream to and including the headwaters of Mission Creek. The spray area approached the river closely only near the Carter Bridge just south of Livingston.

FIGURE I - Rainbow Trout Mortalities in Rat Lake Resulting From D.D.T.

In the Gallatin River drainage, the spray area was larger and the spray blocks were on both sides of the river. In general, the spray area extended from Buffalo

Horn Creek downstream to about the Squaw Creek Ranger Station on the east side of the river and from the West Fork Gallatin River downstream to about the same area on the west side.

An attempt was made to have an observer in the areas adjacent to the streams at the time of spraying, although in the confusion of the operation this was not always possible. Drift samples were made in the streams before and after spraying to detect insect mortalities resulting from DDT reaching the water. These samples are stored at the Fisheries Laboratory at Montana State College.

In the Yellowstone River drainage, the spray area was well removed from the Yellowstone River except for a short distance near Carter Bridge thus minimizing danger to the fish and insects. Spray fell into the river at a point just below the Carter Bridge on the first morning of spraying as the spray drifted down a steep slope into one channel of the stream. Spraying in the headwaters of Mission Creek resulted in a sharp increase in drift insects which lasted over 24 hours. Insects in the lower portion of the stream were not killed.

In the Gallatin River drainage, reduced concentrations of DDT were sprayed adjacent to the Gallatin River and the major tributary streams. It was obvious that the Forest Service was attempting to minimize the chances for spray to reach the streams but during the course of the spraying, spray planes were observed to turn over the Gallatin River with the spray on; in one steep area a plane flew directly over the stream while spraying; planes turned over the stream with valves only partially closed and returned to the airport by flying directly down the river with spray still leaking out. Spray was observed to reach the river near Squaw Creek, in the Canyon above Squaw Creek, at Moose Creek Flats, above Portal Creek, and near Red Cliff Camp.

On July 2, there was a sharp increase in drift insects at points from the upper end of the spray area, Buffalo Horn Creek, to Squaw Creek. Dead insects were collected at Gallatin Gateway (about 15 miles downstream from the spray area).

The area around Rat Lake was sprayed on July 9 and enough spray reached the lake to cause a visible oil film just after spraying. This shallow, productive lake had an excellent rainbow trout population. Fish foods (amphipods, diptera, caddiceflies and damselflies) were abundant. Within 24 hours, insects and amphipods were dieing and some distressed toads were observed. A week later, a few distressed trout were observed. A heavy mortality was in progress on July 28 when a total of 90 dead and distressed rainbow trout were counted (FIG. I). These fish exhibited the symptoms of DDT poisoning. A few trout apparently survived spraying and one ~~otter~~ was observed near the inlet stream late in the summer. The fish food organisms suffered almost a complete mortality and did not recover the remainder of the summer.

No fish mortalities were observed in any of the streams in the spray area. Portions of the Gallatin River, below Moose Creek, were checked for dead trout throughout the fall. Population studies in the tributaries were made by shocking 300 foot sections of Squaw Creek, Swan Creek, West Fork Gallatin River, Porcupine Creek, Taylors Fork, and Buffalo Horn Creek in September. These samples duplicated pre-spray samples made in September 1959. There was no evidence of fish mortalities in any of the streams.

These observations again show the dangers to aquatic organisms and fish in spray areas. Fish food organisms suffered mortalities even though reduced concen-

trations of DDT were used adjacent to the streams and it was apparent that the Forest Service was attempting to avoid spraying the streams. The terrain, air movement, and pilot error all contributed to spray reaching the Gallatin River, and in the small tributary streams it was not feasible to spray the trees and avoid the stream. Insect mortalities were observed in the Gallatin River, Mission, Squaw, Swan, Portal and Porcupine Creeks.

Trout and fish food mortalities were almost complete in Rat Lake. This lake is small, but it provided an excellent sports fishery with trout up to 19 inches in length observed in the lake. With food organisms decimated, the fishery could not possibly recover until the end of the 1962 growing season.

It is obvious that the presence of a fisheries biologist in the spray area is necessary in order to check on possible mortalities of fish foods and trout and to provide assurance that spraying is conducted in such a manner as to minimize dangers to trout and fish foods in the lakes and streams. Such observations provide a basis for checking the cause of delayed mortalities should they occur.

The presence of fisheries biologists also serve as a reminder to the spray agency that the Fish and Game Department is vitally interested in these operations which endanger a valuable fish resource.

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