

DESCRIPTION OF THE STUDY AREAS

Study Waters

Ten Wisconsin waters were selected for taking walleye spawn in 1967. These waters were selected on the basis of three criteria: (1) a wide range of DDT residue levels in fish as determined by previous survey information should be represented; (2) waters sustaining good walleye reproduction as well as those showing poor walleye reproduction should be included; and (3) experienced personnel should be available for taking walleye spawn in these waters in the spring of 1967.

Muskellunge and Escanaba Lakes in Vilas County, Green Lake in Green Lake County, the Wolf River in Outagamie County, Pike Lake in Washington County, and Lakes LaBelle, Golden, Pine, Upper Nemahbin, and Nagawicka in Waukesha County were subsequently selected for taking walleye eggs in 1967. Previous survey information describing the DDT and dieldrin levels found in walleyes in these waters and the status of walleye reproduction are presented in Table 1. The location of these waters in Wisconsin is illustrated in Figure 1.

Studies of walleyes from these ten waters prior to 1967 showed that DDT and its analogs in whole fish ranged from .082 ppm for a sample of Escanaba Lake walleyes to 7.62 for one of six walleye samples from Lake LaBelle. Dieldrin found in walleye samples from the ten waters prior to 1967 did not exceed .025 ppm in whole fish samples.

Natural walleye reproduction in Escanaba and Pike Lakes and the Wolf River has yielded year classes in most years while most of the other waters have failed to produce year classes.

Geographically, these waters represent southeastern and northeastern Wisconsin. Golden Lake, the smallest of the ten, covers 250 acres; Green Lake, the largest, covers 7,325 acres. The Wolf River is one of Wisconsin's major rivers. It joins the Fox River to flow into 137,708 acre Lake Winnebago. Water quality of the ten varies from the lakes of the northeast which are relatively soft, low in dissolved solids and total alkalinity, to the more fertile waters of the southeast which are moderately hard and much higher in dissolved solids and total alkalinity.

Comprehensive records of the amounts of pesticides used in Wisconsin do not exist. Neither are figures available on the amounts of pesticides sold in Wisconsin. DDT is used in Wisconsin to control household, lawn, agricultural, orchard and forest insects. DDT has been extensively used to attempt to control elm bark beetles, the carriers of the Dutch elm disease. The waters in the present study vary in terms

of the human population density of the watersheds and the known or suspected use of DDT in the watershed. Muskellunge and Escanaba Lakes are located in a forested region. Escanaba Lake has no history of DDT spraying and is completely undeveloped with the exception of a boat landing and a fisheries research station operated by the Department of Natural Resources. Muskellunge Lake is chiefly undeveloped with a public campground occupying part of the shoreline which has been treated with DDT for mosquito control. The Wolf River occupies a large watershed for which a past history of DDT use has not been determined. All of the other lakes in the study have shorelines partially or completely developed into summer and permanent homes and resorts. DDT use around certain of these lakes for either mosquito control or Dutch elm disease control is known. In general, where DDT use is known or suspected higher levels of DDT have been observed in fish samples.

In addition to these waters, walleye eggs were taken at Trout Lake in Vilas County for use in DDT exposure studies at Westfield. Trout Lake is an oligotrophic drainage lake of 3,870 acres having slightly alkaline water of high transparency. Trout Lake is only moderately developed as 96 percent of the shoreline is in public ownership.

Westfield Hatchery

Facilities at the Westfield Hatchery, located at Westfield, Wisconsin, were used for hatching the walleye eggs and for holding the fry in observation aquaria in 1967. The Westfield Hatchery was ideal for this work due to its central location and excellent water supply furnished by Artesian wells. The water has a nearly constant temperature of 50° F. and is free of silt and algae which could foul the fine screening required to retain walleye fry. Analysis of a sample of Westfield Hatchery water taken in April 1967 exhibited a pH of 7.6, a total alkalinity of 156 ppm, total phosphorus of .043 ppm and specific conductance of 300 micromhos (Table 2).

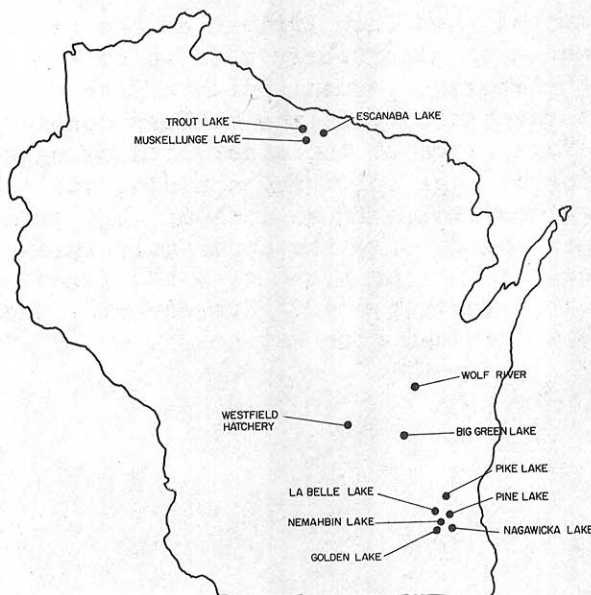


FIGURE 1.
Location of the Westfield
Hatchery and Waters Where
Walleye Spawn Was Taken in
1967.