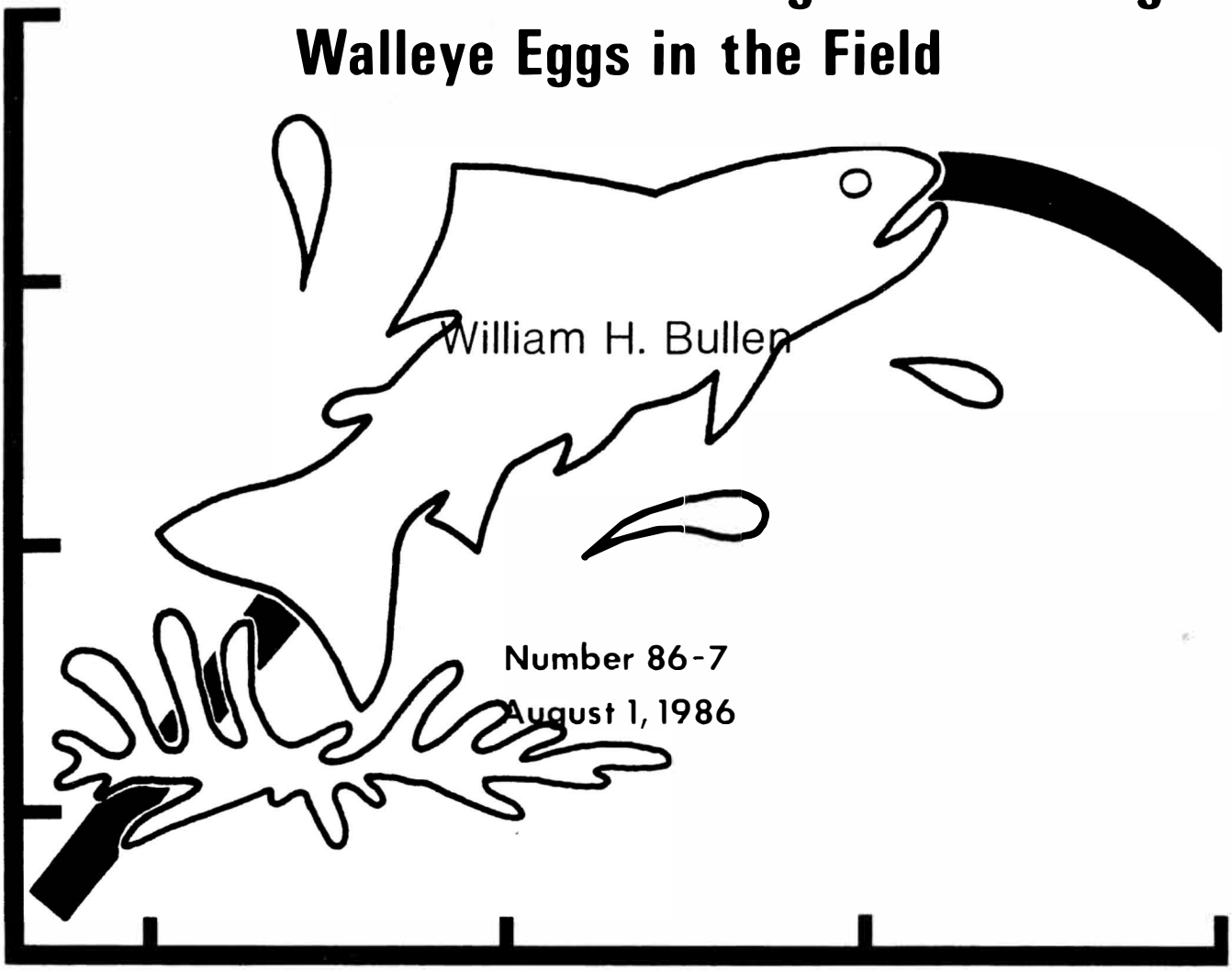
FISHERIES DIVISION

TECHNICAL REPORT

Revised Procedure for Taking and Handling Walleye Eggs in the Field



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REVISED PROCEDURE FOR TAKING AND HANDLING WALLEYE EGGS IN THE FIELD

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INTRODUCTION

The Escanaba District has been responsible for taking walleye eggs on Little Bay de Noc since 1971. Although the procedure was the same as used in other districts, the hatching rate of Little Bay de Noc walleye eggs was consistently lower than for other Upper Peninsula waters.

Attempts to improve the hatching rate by modifying the egg-taking procedure were unsuccessful until 1984 when bentonite was replaced with fuller's earth to minimize the adhesiveness of the fertilized eggs. That change also necessitated revising previously used methods of handling the walleyes and their eggs. These combined changes resulted in an increase of over 50% in the hatching rate.

METHODS

Spawning walleyes have historically congregated on limestone reefs in the north end of Little Bay de Noc in mid-April. Trap and fyke nets have been set in the same locations for many years to capture ripe fish. Prior to 1984 the routine procedure was to empty the nets daily and place ripe male and female walleyes into separate stock tanks (4 ft x 2 ft x 3 ft) on board an 18-foot work boat. Green walleyes and other fish were returned to the Bay. When the stock tanks contained a reasonable number of walleyes, the sorting process ceased and eggs were taken and fertilized. When the stock tanks were emptied, the cycle was repeated until all nets had been sorted. This stop-and-go procedure was functional but not very efficient.

The actual egg-taking process used prior to 1984 had remained unchanged for many years. Eggs were hand stripped from one or two ripe females into a dry plastic wash basin. Sperm from two or three males were placed on the eggs and water was added to allow fertilization. The pan of eggs was then covered and set aside for at least 5 minutes. Excess sperm, blood, and body fluids were then washed off the eggs by rinsing two to four times with lake water. Finally, four or five pans of eggs were placed in a plastic 5-gallon pail containing a solution of about 1 to 1 1/2 pints of bentonite mixed in 4 gallons of water. The eggs were gently stirred by hand two or three times during the next hour to break up any existing clumps of eggs and to minimize further clumping. The bentonite solution was rinsed off the eggs, after 1 hour, by exchanging it with lake water two to four times. Most of the bentonite was thus removed but some still remained in the bottom of the pail upon arrival at the Thompson State Fish Hatchery. Hatchery personnel routinely rinsed the eggs again before placing them in hatching jars.

The use of fuller's earth was recommended in 1982, as a replacement for bentonite to improve the hatching rate. Fuller's earth was used experimentally on all eggs taken during 1 day by simply substituting it for bentonite in the traditional process. However, the fuller's earth settled out of solution very rapidly, was difficult to wash out of the pail, and solidified in

the bottom of the pail causing the loss of many eggs. Its use was discontinued because of these problems.

Additional information on the use of fuller's earth, combined with encouragement from hatchery personnel, convinced us to use it again on our entire egg quota in 1984. But the 1982 experience had made it obvious a revised procedure would be necessary. The following procedure was developed after intensive in-house discussion and communication with other biologists. Two boats were used to take walleyes from the nets. The ripe fish were transferred into live crates placed just offshore from a nearby small island. The taking of eggs was delayed until all nets had been checked.

Egg stripping and fertilizing remained the same as before, but washing of the eggs was begun within 0 to 3 minutes after adding water to the sperm and egg mixture. Washing and rinsing were also reduced to one quick water exchange. In the meantime, a solution of 1 gallon of water mixed with a premeasured 1/2 pound of fuller's earth had been placed in each of four rectangular plastic dishpans. This solution was stirred with a 4-inch wide nylon bristle paint brush just before the freshly washed eggs were added. Eggs were placed in the dishpan containing fuller's earth and water, and gently stirred with the paint brush almost continuously for 5 minutes. The entire contents of the pan (eggs, earth, and water) were then poured into a fine-mesh kitchen strainer about 12 inches in diameter. The strainer was placed on top of a 5-gallon pail which caught the fuller's earth solution. The strainer full of eggs was immediately placed in a shallow stock tank (12 inches) full of water and gently shaken to remove any excess fuller's earth. Finally, the eggs were poured into a 5-gallon pail of water and allowed to harden for at least 1 hour. Additional washed eggs were added to the pans as they were emptied. Four or five pans of eggs were eventually added to each pail of water.

The used fuller's earth solution, which had drained through the strainer and into a 5-gallon pail, was poured back into the empty dishpan to be reused. Approximately 1 tablespoon of fuller's earth was added after each use to regain the original concentration. The solutions were thus used several times each day.

The eggs were still loose and showed no signs of clumping after being water hardened for at least 1 hour. The water was changed and the eggs transported to the Thompson Fish Hatchery.

The egg-taking process was completed on the boat decks and the shore of a small island. Although two volunteers assisted us, the process would not require more than four or five people. We had a seasonal laborer relaying fish from the live crates, to a biologist stripping the fish and fertilizing the eggs, a technician rinsing eggs and assisting with the stirring, another technician stirring and timing the eggs in the fuller's earth solution, and a biologist straining, rinsing, and water hardening the treated eggs.

RESULTS

A total of 11,643,536 walleye eggs (126.8 liters) was collected in 2 days by using these revised methods and the egg-taking process was completed by 12:30 P.M. each day. But more important was the significant increase in hatching rate experienced in 1984. The hatching rate for Little Bay de Noc walleye eggs ranged from 12% to 30.8% during the years 1978–83. The average was 25%. The hatching rate in 1984 was 45.4%, 50% better than the best previous year.

The Baraga District also adopted this procedure in 1984 for the later occurring egg-take on Lake Gogebic and experienced similar results. In spite of being taken in extremely adverse weather, 53.2% of Lake Gogebic eggs hatched in 1984; a significant improvement over the 1978–83 average of 35.1%.

The Thompson Hatchery in their 1984 rearing report stated, "Districts 1 and 3 used fuller's earth and eggs were free of adhesiveness when received and during incubation. These eggs 'rolled' freely with no clumping and no fungus. Number of dead eggs 'collared-up' and siphoned off were visibly much lower than expected."

Use of fuller's earth and revised methods of fish and egg handling resulted in significant time savings and at least a 50% increase in egg hatching rate. Baker (1985) reported similar results in a study of several solutions commonly used to treat walleye eggs.

LITERATURE CITED

Baker, J. P. 1985. An examination of methods to eliminate adhesiveness and increase survival of walleye eggs for hatchery production. Michigan Department of Natural Resources, Fisheries Technical Report 85-6, Ann Arbor, Michigan, USA.

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