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F-50-R-17 2010 c.1

# FINAL REPORT

## FEDERAL AID GRANT NO. F-50-R-17
## Fish Research for Oklahoma Waters

## PROJECT NO. 33
## Oklahoma Walleye Stocking Evaluation

## OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

## JANUARY 1, 2010 through DECEMBER 31, 2010

FINAL REPORT

State: Oklahoma Grant Number: F-50-R-17

Grant Title: Fish Research for Oklahoma Waters

Project Number: 33

Project Title: Oklahoma Walleye Stocking Evaluation.

Project Leader: Greg Summers

Project Period: From: January 1, 2010 To: December 31, 2010

I. Project Objective: To determine the contribution of stocked walleye fry and fingerlings to the year class of the fishery.

II. Summary of Progress

**A. Introduction**

Introducing and sustaining walleye (*Zander vitrium*) populations in non-native waters is generally accomplished using one of two methods. The walleye are either stocked in large numbers as fry, or reared on hatchery ponds to grow to fingerling size (1 to 3 inches) and stocked at much lower densities. Both methods have been reported to produce acceptable walleye fisheries. In an American Fisheries Society symposium overview of walleye stocking, Ellison and Franzin (1992) reported that 32% of fry stockings, 32% of fingerling stockings, and 50% of advanced fingerling stockings were considered successful.

Walleye introductions in Texas and Colorado were successful using mass fry stockings (Kraai et al 1983, Munger 2002). Kansas walleye fry stockings were successful so long as reservoir mean storage ratios were less than 1.0 (Willis and Stephen 1987). In Iowa lakes, over-winter survival of stocked fry was greater than survival of stocked fingerlings (McWilliams and Larscheid 1992, Mitzner 2002).

Other management agencies have had success creating walleye fisheries by stocking fingerlings or advanced fingerlings. In South Dakota lakes, fingerling stocking was reported to make a significant contribution to the fall year class population, while fry stocking did not (Fielder 1992). Fingerling walleye stockings in Missouri lakes resulted in greater survival rates of stocked fish than fry stockings (Koppelman et al 1992). A stocking comparison among ten Illinois lakes resulted in fingerling stocking surpassing fry stocking when year class strength was measured over a period of several years (Brooks et al 2002).

Current Oklahoma Department of Wildlife Conservation (ODWC) walleye stocking

protocol calls for fry to be stocked at a rate of 500 per surface acre. Lake Hefner in central Oklahoma is stocked with fingerlings reared at the Oklahoma City fish hatchery. A comparison of fry versus fingerling stocking can be used to evaluate current ODWC protocol in an effort to maximize walleye stocking success

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Walleye fry and fingerlings can be mass marked using oxytetracycline (OTC). Walleye stocked in Tennessee lakes showed a high efficacy for fry (98%) and fingerlings (99%) marked with OTC (Vandergoot and Bettoli 2003). Other studies have shown high mark retention using OTC concentrations from 500 mg/L to 700 mg/L (Ellison and Franzin 1992, Kayle 1992, Lucchessi 2002). Differential marking between fry and fingerlings will allow a direct comparison of contribution to year class in a given year.

## B. Methods

OTC Marking

All walleye fry and fingerlings stocked into the four study reservoirs in 2010 were treated with a 700 mg/L solution of OTC prior to stocking. All OTC chemical treatments used sodium phosphate dibasic as a buffer to keep pH at acceptable levels (6-8). Walleye fry were obtained form multiple sources and marked at Byron State Fish Hatchery between April 1 and April 14, 2010. Study lakes were stocked with fry immediately (within six hours) after OTC treatment, and all remaining treated fry were held at ODWC hatcheries to rear to fingerling size. Once walleye fry had grown to fingerling size (>40 mm minimum) in hatchery ponds, the fish were harvested and treated again with 700 mg/L solutions of OTC. Fingerlings were exposed to the OTC bath for a minimum of five hours while en route to study lakes for stocking. All four study lakes were stocked with OTC treated fingerlings between May 5 and May 25, 2010.

Walleye Stocking

Walleye fry and fingerlings treated with OTC were stocked into four study lakes in 2010: Fort Supply Lake (Woodward County, 1,820 surface acres), Foss Lake (Custer County, 8,800 surface acres), Hefner Lake (Oklahoma County, 2,499 surface acres) and Spavinaw Lake (Mayes County, 1,578 surface acres). Table 1 lists the stocking rate of fry and fingerlings for each lake and the total number of stocked walleye.

OTC Mark Analysis

Saggital otoliths from fall 2010 age-0 walleye collected via electrofishing and gillnetting were removed after each fish was measured (nearest mm total length) and weighed (nearest gram). Otoliths were mounted on glass slides using Crystal-Bond® adhesive, polished on ultra-fine grit paper, then viewed under 12.25x to 50x magnification using focused fluorescent light. Presence of OTC mark was confirmed as yellow to orange glowing rings using this viewing setup. Each otolith was viewed by at least two independent readers to find both a fingerling and fry OTC mark, the different marks determined by their distance from the otolith kernel.

## C. Results

OTC Marking

In 2010, 8,259,000 OTC treated walleye fry and 146,980 OTC treated fingerlings were stocked into four study lakes (Table 1). A subsample of several batches of walleye were held at Oklahoma Fishery Research Laboratory (OFRL) to test for OTC mark efficacy. OTC marks on fingerlings bound for Spavinaw and Hefner were confirmed using focused fluorescent light under 40x magnification, although marks were weak in appearance. Fry mark efficacy was performed for each batch of fingerlings stocked at all four lakes using a small sample taken directly off the stocking truck. Weak OTC marks were found but not on all specimens.

It appears that 2010 OTC marking was a failure for most batches of stocked walleye. Even in cases where some marks were confirmed, the percentage of fish marked was not acceptable (below 50% in all cases).

Stocking

A summary of 2010 walleye stocking is provided in Table 1. In all fry and fingerling stockings, no measurable initial mortality was reported.

OTC Mark Analysis

A total of 175 (Fort Supply = 111, Foss = 39, Hefner = 25, Spavinaw = 0) age-0 walleye otoliths were analyzed for OTC mark presence or absence in 2010. Walleye from fall sampling ranged from 161 mm to 315 mm in length (mean = 248.3 mm, SE = 2.3152). No OTC marks were found for any fish collected from Fort Supply or Foss lakes (0 of 150). Lake Hefner otolith analysis revealed three fry marks and one fingerling mark out of 25 fish collected.

**D. Conclusions/Recommendations**

- OTC marking of walleye fry and fingerlings did not produce reliable marking of fish in 2010. The marking methods used in 2010 will be re-evaluated and tested prior to OTC marking for 2011 to ensure reliable marks will be present on 2011 stocked walleye.
- A sample from each batch of OTC-marked fingerlings should be retained to certify OTC mark presence. These fish can be held at OFRL plant rearing cells for several weeks to verify OTC mark presence.
- Fish handling and stocking in 2010 produced negligible initial mortality.
- Multiple sampling gears may be needed to collect walleye in fall samples. Electrofishing produced sufficient samples in three of four study lakes, but no walleye were collected at Lake Spavinaw in fall 2010.
- Once OTC marks can be verified, spring sampling of the four study lakes is recommended to detect differences in over-winter survival between fry and fingerling stocked walleye.

**III. Significant Deviations: None**

**Prepared by**: _____
Kurt Kuklinski, Senior Fisheries Biologist

**Date:** 30MAR11

**Approved by**: BARRY BOCON

Fisheries Administration
Oklahoma Department of Wildlife Conservation

John D. Stafford
John Stafford
Federal Aid Coordinator
Oklahoma Department of Wildlife Conservation

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Table 1. Walleye fry and fingerling stocking rates and number stocked in four study

lakes in 2010.

| Lake | Fry Stocking Rate (# per surface acre) and Number Stocked | Fingerling Stocking Rate (# per surface acre) and Number Stocked |
|---|---|---|
| Fort Supply | 1000/ac N=1,820,000 | 10/ac N=18,200 |
| Foss | 500/ac N=4,400,000 | 10/ac N=88,000 |
| Hefner | 500/ac N=1,250,000 | 10/ac N=25,000 |
| Spavinaw | 500/ac N=789,000 | 10/ac N=15,780 |

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