



UW- STEVENS POINT NORTHERN AQUACULTURE DEMONSTRATION FACILITY

WALLEYE PROJECT- SUMMER 2006

By Gregory J. Fischer, Facilities Manager

Introduction

During the summer of 2006, the UW Stevens Point Northern Aquaculture Demonstration Facility (NADF) continued to cooperatively work with the Lac Courte Oreilles Tribal Fisheries Program (LCO) providing approximately 450,000 fry, 37,827 fingerlings, and 7,876 extended growth walleyes for the tribes' lake stocking program. The information presented in this case study describes the methods used from beginning to end in a "cookbook" style how the NADF incubated and raised the walleyes in two half acre outdoor earthen ponds (approx. 391,000 gallons) utilizing several types of organic and inorganic fertilizers, various aeration systems and forage minnows. The intent of this report is to provide information to assist other aquaculture and hatcheries that are raising walleyes and other coolwater fish.

Methods

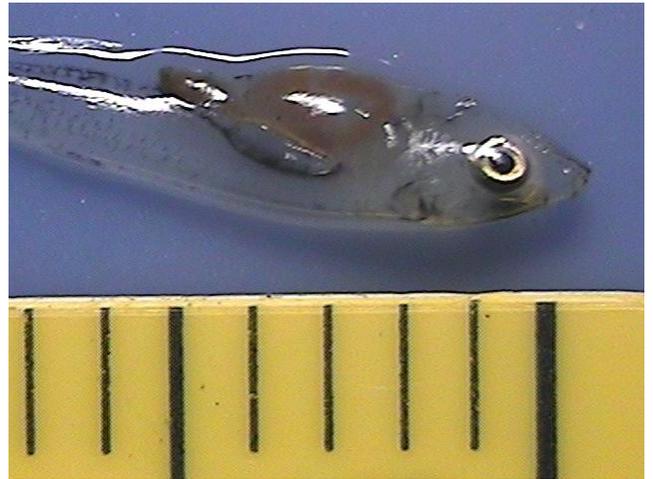
Adult male and female walleye were collected by NADF and WiDNR staff using fyke nets set in lakes on April 18 from Big LCO Lake. Eggs are stripped by hand from female walleyes into plastic containers and milt was added from several males utilizing both wet and dry methods. More than one male was utilized for several reasons; because milt from a single male may not be capable of fertilizing eggs, and for maintaining genetic diversity. After eggs and milt are in the pan, water was added and the combination stirred with a soft brush or feather. Stirring continues for several minutes and a slurry of bentonite clay is added to the mixture. Continue stirring and adding some fresh water for several minutes.

The egg clay mixture is then rinsed off with fresh water and placed into a larger bucket or cooler of fresh oxygenated water. Water in the container was freshened periodically to keep oxygen levels up and maintain



water temperature. Water hardened eggs were transported to NADF for incubation in the bell jar incubation system located at the facility.

Approximately 1,200,000 eggs were placed in McDonald style egg jars for rearing on April 18. Water temperature was maintained between 48-50 degree F throughout incubation, temperature was increased during hatch out to aid in hatching. Water flow through jars was approximately 1.0 gpm and then increased to 1.5 gpm once eggs became eyed. Dead eggs were removed daily from the hatching jars through siphoning. A chicken waterer with a 15 minute (1,200 mg/l) formalin drip was used daily after egg eyeup to control fungus. Formalin treatments were discontinued nearing egg hatchout. Fry hatching began on April 30 and lasted several days. Strong swimming fry were stocked into prepared NADF 17,600 sq.ft (0.4 acre) outdoor earthen ponds 3 and 4 at the rate of approximately 150,000 fry per pond on May 3 and May 4, respectively. Additionally, this year approximately 450,000 walleye fry were provided back to the LCO Natural Resources Department and stocked into local lakes for conservation purposes on May 8.



Two different types of organic fertilizer, soybean meal and alfalfa meal, was used this year in two separate walleye outdoor rearing ponds at NADF to do some comparison evaluations. The fertilizer type, cost, and application rates are as follows:

Pond 3: Pond number 3 was filled partway and prepared approximately one week in advance of filling with 400 pounds of alfalfa meal, 2.25 gallons liquid 28% nitrogen urea, and 1.0 lb. granular 0-45-0 phosphorous fertilizer. Granular phosphate was liquidified with heated water before application. A total of 900 pounds of alfalfa meal costing \$150.00, 3.75 gallons of 28% nitrogen costing \$145.00, and 3.0 lbs. of 0-45-0 phosphorous fertilizer costing \$27.00 was added during May-July to stimulate plankton blooms. Supplemental aeration was provided via the facilities main 5 h.p. rotary blower and two round membrane diffusers.

Pond 4: Pond number 4 was filled partway and prepared approximately one week in advance of filling with 400 lbs of soybean meal, 2.25 gallons of liquid 28% nitrogen urea, and 1.0 lb. of granular 0-45-0 p-phosphorous fertilizer. Granular phosphate fertilizer was liquidified with heated water before application. A total of 1000 pds. of soybean meal costing \$129.00, 3.75 gallons of 28% nitrogen costing \$132.00, and 3.0 pds. of 0-45-0 phosphorous fertilizer costing \$27.00 was added during May-July to stimulate plankton blooms. Supplemental aeration was provided via the facilities main 5 h.p. rotary blower and two handmade pvc airlifts.



Results

Walleye fry were observed around edges of the ponds in daylight and at night with lights in May. Plankton populations were average, but seemed adequate as sampled fish condition was good. Early fish sampling in both ponds yielded good numbers of fish per seining attempt which hypothetically meant good numbers in the ponds. Pond temperatures as well as the plankton populations increased in June as well as the plankton populations.

Walleyes from both ponds were sampled on a weekly basis to assess length, weight, and fish condition. Length and weights were very uniform throughout the summer for both ponds. Fish condition was excellent. Ponds were monitored daily for temperature, oxygen and pH throughout the summer (Table 1.). Lowest oxygen level in Pond 3 was in July at 3.2 ppm. Lowest oxygen level in Pond 4 was in June at 4.1 ppm. Highest oxygen level recorded was around 12.0 ppm. for both ponds in July and August. No problems related to oxygen or temperature was observed. There didn't seem to be an identifiable difference in stratification or oxygen levels in either pond with the different aeration systems.

Table 1. 2006 season temperature, ph, and oxygen measurement ranges in NADF outdoor walleye rearing ponds 3 and 4.

Pond #	Month	Temperature range (degrees C)	pH range	Oxygen range (ppm)	
3	May	10.0 - 24.0	7.9 - 9.9	4.5 - 16.6	
	June	18.0 - 22.0	8.7 - 9.1	5.8 - 8.1	
	June	12.7 - 24.0	8.1 - 8.7	6.8 - 8.4	values after draining for fingerling harvest and refilling
	July	22.0 - 27.0	8.1 - 9.2	3.2 - 12.0	
	August	19.6 - 25.0	8.8 - 9.3	5.8 - 10.2	
	September	20.0 - 21.0	8.3 - 9.3	7.7 - 9.7	drained for e.g. walleye harvest on September 6
4	May	8.0 - 24.0	7.5 - 10.0	7.9 - 16.0	
	June	18.0 - 22.0	8.1 - 9.1	4.1 - 8.8	
	June	15.0 - 23.0	8.4 - 9.5	8.0 - 12.0	after partial draining and refilling for fingerling harvest
	July	21.0 - 26.0	7.0 - 9.5	5.3 - 10.0	
	August	19.5 - 26.0	8.8 - 10.0	7.0 - 12.0	
	September	13.0 - 22.0	7.7 - 10.2	7.7 - 10.2	drained for e.g. walleye harvest on September 20



Ponds were stocked periodically with a total of 310 gallons (2,480 lbs) of forage minnows of various sizes ranging < 1” to 2” from June through September. Ratio of forage minnows to walleye was approximately 5:1. Total cost of minnows was \$7,930.00, which was paid by the LCO Fisheries Department.

Pond 3 was fully drained on June 13 and all fingerling walleyes were harvested from the catch kettle for LCO. Approximately 32,688 fingerling walleyes (908/lb) (average length 36.0 mm/1.4 inches) was harvested from pond 3. Pond 3 was then refilled with fresh well water. Pond 4 was partially drained and a portion of fingerling walleyes were harvested using the catch kettle and hand seines. Approximately, 14,900 fingerling walleyes averaging 946/lb and 33.0 mm/1.3 inches long were harvested from pond 4 on June 14. Total fingerlings provided to LCO at this time was 37, 827. A fish health assessment was performed on the walleye fingerlings from NADF on June 2 by Dr Myron Kebus of WiDATCP and a certified clean bill of health was provided.

Approximately 5,433 fingerlings from pond 4 were stocked back into refilled pond 3 for further rearing on July 12 and 13. Pond 4 had an unknown quantity of fingerlings left for further rearing. Fingerling walleye were monitored on weekly basis throughout the summer and averaged approximately 1.7 mm length increase per day feeding on minnows.



Extended growth (E.G.) walleyes were harvested from the pond 3 and 4 on September 6 and September 20 respectively. Ponds were drawn down slowly through the use of gate valves and dam boards located in the concrete funnel structure at the rear of the ponds. Fish were collected and held in the external concrete collecting kettle with fresh water and aeration. Approximately, 7,876 extended growth walleyes weighing 507 pounds were harvested from the two ponds and loaded on to the fish distribution truck. The harvested walleyes ranged from 130 to 175 mm (5.0 to 7.0 inches) in length and weighed between 28.0 to 31.0 grams (16/pd). No significant losses were recorded during harvest. The walleyes were stocked by LCO Fisheries Department into local lakes for conservation purposes.

Total estimated cost for this NADF project to produce the fingerling walleye was \$1,010.00 (\$0.027 per fish) which includes pond fertilizer, labor, electrical and miscellaneous expenses. Total estimated cost to produce the extended growth walleye was \$8,330.00 (\$1.06 per fish) which includes forage, labor, electrical, and miscellaneous expenses.

Acknowledgements

Special thanks go to Paul Christel and Bill Nebel at LCO Natural Resources Department for working with us on this project. Also would like to thank the WiDNR Tommy Thompson State Fish Hatchery for helping us collect walleye eggs on behalf of LCO to start the project. Sean Charette and Francis Cadotte from the Red Cliff Tribal Fish hatchery assisted LCO with hauling the fish. NADF staff, Kendall Holmes and Dan Duffy were assisted by college interns, James Barron (UWSP), Bradley Elm (UWSP), and Kurtis Weber (UWEC) to provide the necessary expertise monitoring ponds, sample counting and harvesting walleyes to complete the project.

Questions or comments regarding this project can be directed to Gregory Fischer, NADF Facility Manager, at 715-779-3461 or email gfischer@uwsp.edu