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OPERATION OF THREE WALLEYE REARING PONDS IN DISTRICT 7 IN 1974

William J. Buc, Fisheries Biologist

SUMMARY

The District 7 Fisheries Division Office used 3 borrow pits as walleye rearing ponds in 1974. A walleye harvest of 187,009 fingerlings was obtained from plantings of 2,050,000 fry. Only 2 of the 3 ponds were seined extensively, yielding 95 percent of the total harvest.

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INTRODUCTION AND POND DESCRIPTION

In 1974, District 7 operated 3 walleye rearing ponds. All 3 are borrow pits, which were dug during the construction of that portion of the I-75 Expressway that runs through Roscommon County. These pits have had water in them for two or three years prior to 1974. They were mapped in early 1974 to determine their areas and depths.

Surface area of each of the ponds is slightly under 20 acres; 2 of the 3 ponds, #1 and #2, besides having nearly the same surface area, are also similar in that they both have maximum depths of 7 feet, average depths of slightly over 3 feet, and water volumes of approximately 60 and 65 acre feet, respectively. Pond #3, while having nearly the same surface area, has a maximum depth of 9 feet, an average depth of 5 feet, and a water volume of 93 acre feet. In addition, pond #3 has an island, a feature which the other two do not. Ponds #1 and #2 also have more irregular shapes, which result in several arms, or bays, in those 2 ponds.

The pond bottoms are similar in all 3 ponds; sand with mud and silt in the deeper areas. All had moderately abundant emergent vegetation along the shorelines. Each has some patches of submerged vegetation as well, but not an excessive amount in any of the ponds.

Prior to planting walleye fry, Pond #1 contained yellow perch, pumpkinseed, and northern pike. Pond #2 had no fish of any kind, and Pond #3 contained yellow perch, bullheads and one species of unidentified minnow.

No chemical or physical analyses of the water were made during 1974. Surface water temperatures were taken and recorded on days when the ponds were being seined. Indications are that the water temperature profiles of the 3 ponds are similar.

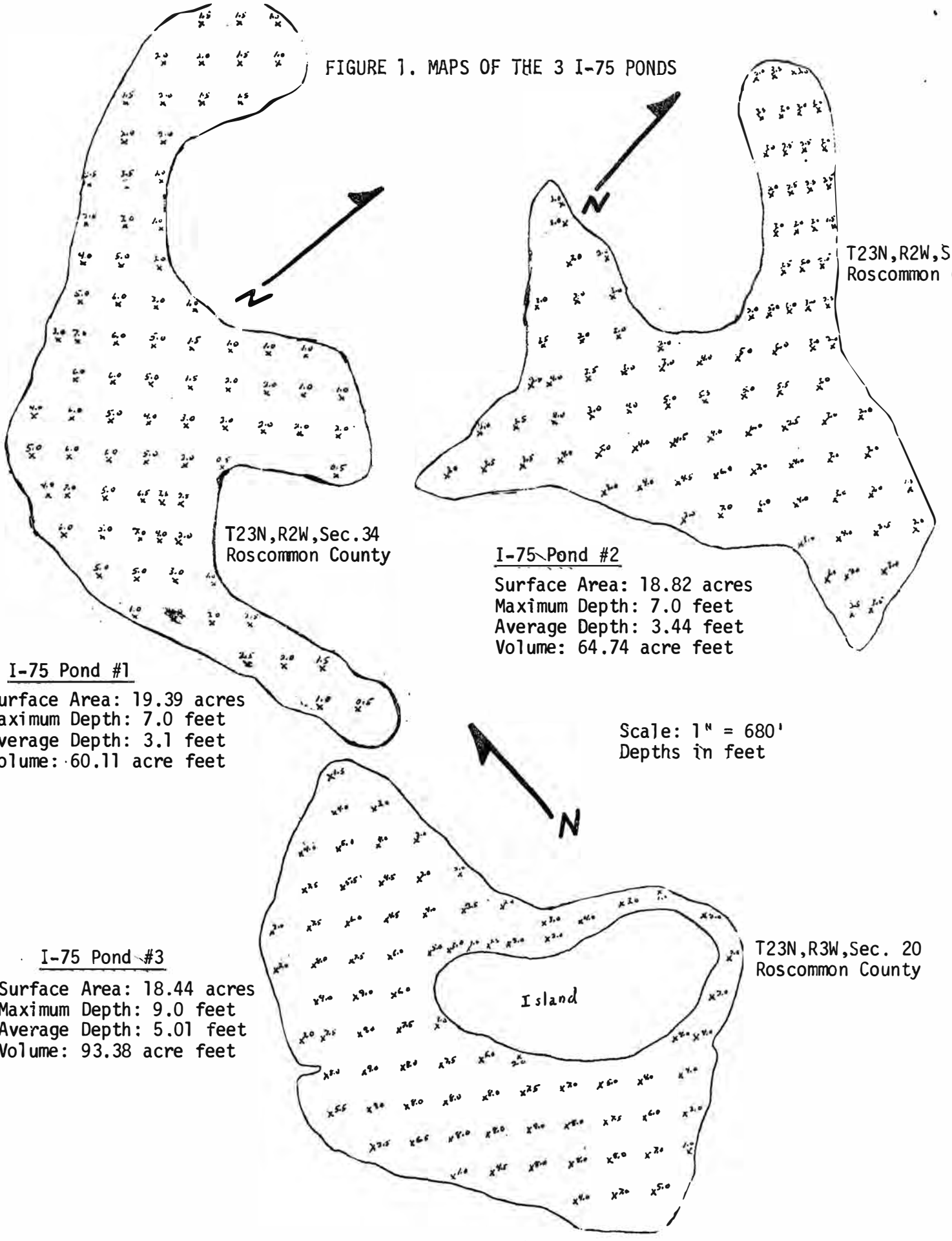
Maps of the 3 ponds are contained in Figure 1.

INITIAL POND PREPARATION AND STOCKING

All 3 ponds were fertilized with applications of hay and torula yeast, beginning in early April with applications of hay at the rate of approximately 3 bales per acre. The hay was spread on the ice on 2 of the ponds before spring break-up. Hay was spread on the water, by boat, on Pond #3 in early May.

Following application of the hay, the next step was planting fry during the first week in May. Pond #1 received 750,000 (38,680 per acre); Pond #2 700,000 (37,194 per acre); and Pond #3 600,000 (32,538 per acre). Fry were planted in all ponds on the same day; however, initially Pond #2 received 600,000 fry, and 26 days later another 100,000. That later planting was with fry hatched at the Grayling Field Station. All of the other fry came from the New York Department of Natural Resources.

FIGURE 1. MAPS OF THE 3 I-75 PONDS



I-75 Pond #1

Surface Area: 19.39 acres
Maximum Depth: 7.0 feet
Average Depth: 3.1 feet
Volume: 60.11 acre feet

I-75 Pond #2

Surface Area: 18.82 acres
Maximum Depth: 7.0 feet
Average Depth: 3.44 feet
Volume: 64.74 acre feet

Scale: 1" = 680'
Depths in feet

I-75 Pond #3

Surface Area: 18.44 acres
Maximum Depth: 9.0 feet
Average Depth: 5.01 feet
Volume: 93.38 acre feet

On the day when all 3 ponds were first planted, the weather was described as "partly cloudy and windy," with air temperature of 42°F, all pond water temperatures at 58°F and water temperature of 54°F for the water in which the fry were transported.

Regarding plankton at the time the fry were planted, the following comments are recorded: Pond #1, "not too good a bloom"; Pond #2, "good bloom"; and Pond #3, "no bloom." Only visual observations were made; no attempt was made to actually seine for plankton.

The first yeast was applied to the ponds 5 days after the fry were planted. Each pond received 200 pounds, slightly over 10 pounds per acre. The initial applications were followed by 2 more applications at 2 week intervals at the same rate as the initial application. Total yeast application, therefore, amounted to 600 pounds per pond, approximately 31 pounds per acre.

Besides fertilization and fry planting, 2 of the 3 ponds were seeded with plankton on the 15th of May. Twelve quarts of plankton were planted in Pond #1, and another 12 quarts in Pond #3. No plankton was put in Pond #2 because it appeared to have a good bloom, on that day, whereas Ponds #1 and #3 did not. The Houghton Lake South Pike Marsh was the plankton source.

Table 1 Walleye Rearing Pond Preparation And Stocking Data

Date	Hay		Walleye Fry		Yeast		Plankton
1974	No. Bales	Bales/Acre	No.	No./Acre	No. Lbs.	Lbs./Acre	Quarts
Pond #1							
4/3	60	3.1					
5/3			750,000	38,680			
5/8					200	10.3	
5/15							12
5/21					200	10.3	
6/5					200	10.3	
Totals	60	3.1	750,000	38,680	600	30.9	12
Pond #2							
4/4	60	3.2					
5/3			600,000	31,881			
5/8					200	10.6	
5/21					200	10.6	
5/29			100,000	5,313			
6/5					200	10.6	
Totals	60	3.2	700,000	37,194	600	31.9	None

Pond #3

Date 1974	Hay		Walleye Fry		Yeast		Plankton
	No. Bales	Bales/Acre	No.	No./Acre	No. Lbs.	Lbs./Acre	Quarts
5/3			600,000	32,538			
5/6	30	1.6					
5/8	28	1.5			200	10.8	
5/15							12
5/21					200	10.8	
6/5					200	10.8	
Totals	58	3.1	600,000	32,538	600	32.5	12

SEINE OPERATIONS

Seining of walleye fingerlings began on the 11th of July. At that time the fish were averaging 2 inches in length and about 1 gram in weight. Pond #1 was seined on 8 different days, Pond #2 on 13 different days and Pond #3 on 1 day only.

Pond #3 was seined only once after it had become obvious that because of the time and manpower involved, it would be impossible to harvest all 3 ponds. The #3 pond proved to be the most difficult to seine due to its depth, heavy population of small perch and bullheads and obstructions (stumps, logs, etc.) on the bottom; therefore, no more seining effort was expended on it.

All seining was done with a 150' long, 12' deep, 1/4" mesh seine. It was impossible to haul this seine by manpower alone. The method used was to pull the seine out from, then parallel to shore with a 16', flat bottom, aluminum boat and a 20 hp outboard.

After the seine was stretched out parallel to shore, the lines from both ends were brought up to shore, run through a pulley block fastened to the trailer hitch of a pickup truck, then hauled in by another vehicle pulling the end of the line by moving ahead parallel to the shore. Using this method, the pulling vehicle was able to stay on the relatively solid, open banks of the pond. Hauling was continued alternately until both ends of the seine had been pulled well up on shore. The remaining bag was brought in by pulling in the lead line, starting at both ends and working toward the middle, all the while pulling in the lead line without raising it off the bottom. Once the lead line was entirely up on shore, the fish could be worked down to a small center section by lifting both lead and float line at that point where both were out of the water at the shoreline, and shaking the net so that everything moved toward the center. When enough fish were concentrated in a small pocket, they were emptied into a water filled bucket. After several netsful were in the bucket, it was taken to the planting truck and dumped into the tank. While one man was doing this, the others continued worked the net towards the center, thus continuously reducing the size of the bag, yet keeping the fish in the water.

When all fish had been removed from the seine and transferred to the planting truck, one brail of the seine was wedged across and in the boat and another run was started. Figure 2 is a rough sketch of the method used to pull the seine out from shore then back in for each haul. The pond was covered by a continuous series of sweeps along the shoreline, with one day's seining commencing at the point on shore where the previous day's seining had ended.

It was found that anchor weights were needed on the lower ends of the brail to hold the lead line on the bottom and the brail upright while pulling the bridle lines into shore with the boat.

It was also found that pulling the seine up on shore with vehicles resulted in heavy net wear along the lead line. The heavy strain on the lead line as it was being pulled up was due to mud, vegetation, and debris in the seine. The amounts of such material varied from spot to spot along the shore. Several areas were seined a second time to find out whether there were fewer fish in a given area after it had been seined once. Since much of the mud and debris were always cleared out on the initial seining run, the subsequent hauls over the same area were always easier and resulted in much less strain and wear on the lower portion of the seine.

The number of seine hauls made per day varied from 5 to 10 and usually was determined by the amount of difficulty encountered in hauling the seine. A minimum of 4 men were needed for each day of seining.

TRAP OPERATIONS

On the 15th of July, 11 small fyke traps were placed around the shore of Pond #2 at various locations. All were set with the center leads perpendicular to and all the way to shore. In some locations the traps were completely under water, while at other spots, the upper portion was partially out of the water. The leads were approximately 25' long.

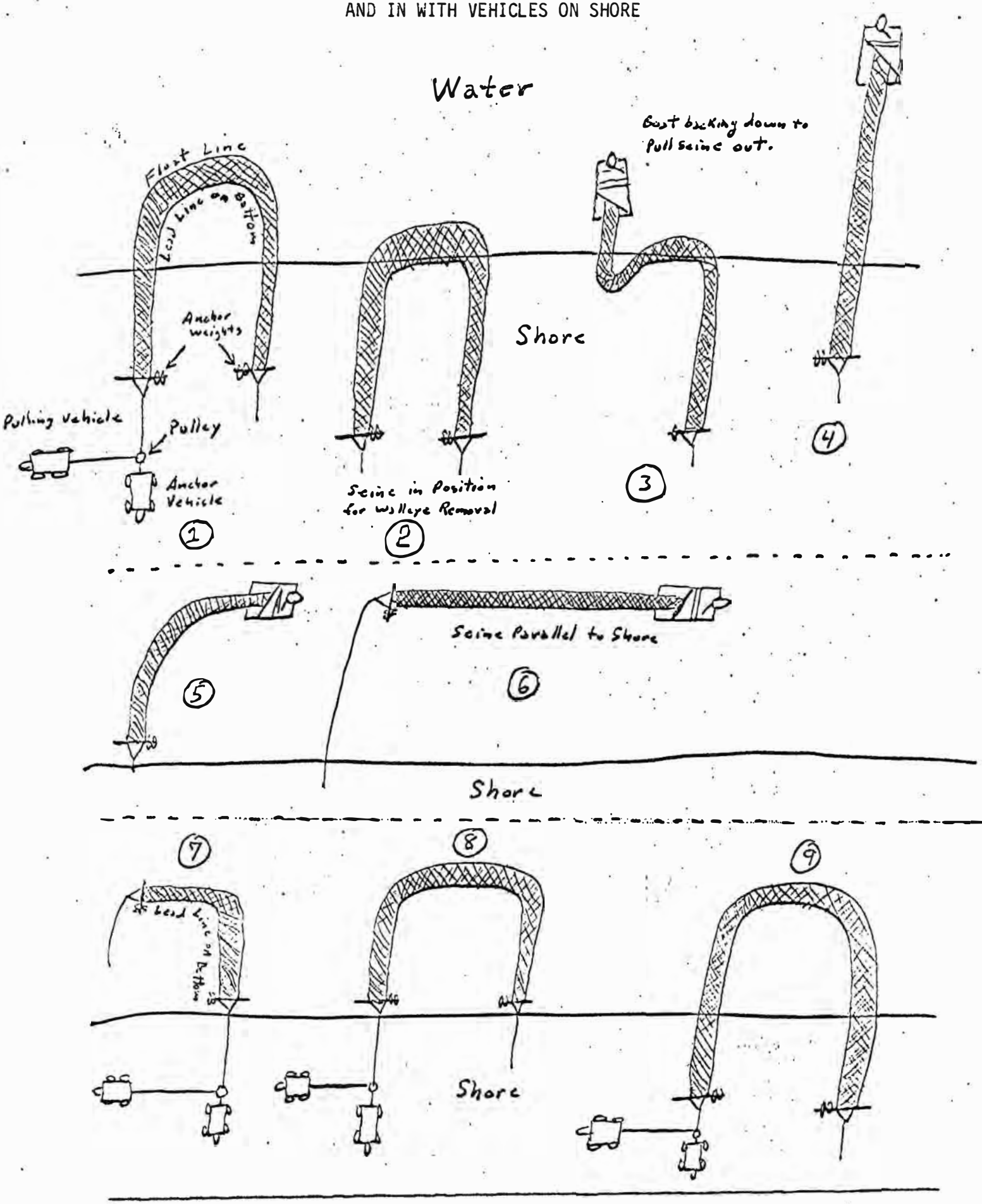
Trapping success was poor. Two days after the initial set there were only 20-30 walleyes in some of the traps; some were empty. The largest catch was 600-800 walleyes, from all 11 traps after 4 days. Traps that were left unattended for that long a period also contained many dead walleyes that appeared to be victims of predacious insects. After a week of very low catches the traps were pulled.

FINGERLING HARVEST

Walleye samples were taken on the 27th of June by seining with a small seine. The fish averaged slightly under 2 inches in all three ponds on that day. Actual harvesting began on the 11th of July and was completed on the 22nd of August, with a total of 22 days of harvesting.

Pond #1, which was seined on 8 different days, yielded 43,349 walleyes weighing 283.8 pounds; plus an estimated 600 more with an estimated weight of 6.0 pounds which were seined by District 6 personnel in September. Pond #2, which was seined on 13 different days, produced nearly the same weight of walleyes - 290.5 pounds, but approximately 3 times the number, 133,988. Pond #3 was only seined on 1 day and yielded 9,072 walleyes weighing 16.0 pounds.

FIGURE 2. PROCEDURE FOR HAULING SEINE OUT WITH BOAT AND 20 HP MOTOR AND IN WITH VEHICLES ON SHORE



The walleyes in Pond #1 started out with an average length of 2.09 inches on July 7th and ended up with an average length of 3.30 inches on August 12th. In contrast, the ones in Pond #2 started out with an average length of 2.0 inches on July 15th and were only up to 2.25 inches by August 20th. On the last day of seining, August 22nd, their average for the day was 2.15 inches. For the one day of seining in Pond #3, August 5th, the average length was 1.9 inches.

Table 2. Walleye Fingerling Seining Data, June through August, 1974, from I-75 Rearing Ponds, Roscommon County, Michigan

Date 1974	Length (inches) Average	Range	Weight (grams) Average	Numbers Fingerlings per pound	Lbs.	Walleyes
Pond #1						
6/27	1.89	1.7-2.2	----	----	----	----
7/11	2.09	1.9-2.5	1.12	405	7.2	2,900
7/29	2.85	2.5-3.3	2.45	185	22.8	4,218
7/30	2.85	2.6-3.3	2.75	165	31.5	5,198
7/31	2.90	2.6-3.4	2.89	157	38.0	5,966
8/1	2.90	2.7-3.3	2.93	155	56.0	8,680
8/6	3.02	2.8-3.3	3.40	133	73.0	9,709
8/7	3.03	2.7-3.5	3.70	123	43.8	5,387
8/12	3.30	3.1-3.5	4.30	105	11.5(+83) Fish	1,291
*9/16[1]	3.50	-------	----	Est.100 Est.	6.0 Est.	600
				TOTALS	289.8	43,949
Pond #2						
6/27	1.86	1.7-2.0	----	----	----	----
7/15	2.00	1.8-2.1	0.90	504	13.9	7,006
7/17	2.04	1.8-2.5	0.90	504	24.6	12,398
7/22	2.02	1.8-2.3	0.82	553	8.6	4,756
7/23	2.02	1.8-2.4	0.79	574	23.8	13,661
7/24	2.06	1.9-2.5	0.85	534	26.9	14,365
7/25	2.02	1.8-2.2	0.87	521	20.6	10,733
8/13	2.16	1.9-2.3	1.00	454	28.8	13,075
8/14	2.10	-------	1.00	454	24.8	11,259
8/15	2.10	-------	1.10	412	8.7	3,584
*8/19[2]	2.20	2.0-2.4	1.10	412	28.2	11,618
*8/20[3]	2.25	2.0-2.9	1.20	378	29.7	11,227
8/21	2.22	2.0-2.8	1.09	416	24.4	10,150
8/22	2.15	2.0-2.4	1.22	372	27.3	10,156
				TOTALS	290.3	133,988

*Note: 1. One day of seining by District 6 Fisheries Division Office.
2. On the 19th of August 25 walleyes were taken that averaged 6.1"; range 4.9"-6.9".
3. On the 20th of August 19 walleyes were taken that averaged 6.27"; range 4.4"-7.8".

Pond #3

Date 1974	Length (inches) Average	Range	Weight (grams) Average	Numbers Fingerlings per pound	Lbs.	Walleyes
6/27	1.80	1.6-2.0	----	----	----	----
8/5	1.90	1.8-2.1	0.80	567	16.0	9,072
				TOTALS	16.0	9,072

There were other fish besides walleyes in 2 of the 3 ponds. Pond #2 contained only walleyes, while Pond #1 had some northern pike and fairly large numbers of pumpkinseed and yellow perch. Some of the northern pike in Pond #1 were as large as 14 inches; both pumpkinseed and perch reached maximum lengths of approximately 8 inches. There were many perch in the 2 1/2 to 4 inch size range in this pond. The pumpkinseed were spawning when seining was first started, and numerous beds were seen in the shallows.

Pond #3, in one day (August 5th) of seining, produced an estimated 10,000 bullheads and another 50,000 or more small perch besides the 9,072 small walleyes. Several hundred unidentified minnows were also taken in one of the seine hauls. Most of the bullheads were 1 1/2 to 2 1/2 inches long, with 20-25 being 6 to 8 inches long. The perch averaged 2.5 inches and 5.3 grams, which was considerably heavier than the 3 inch walleyes found in Pond #1 on about the same date. Comparison of average lengths, and length ranges, from Table #1 indicates that the walleyes in Pond #3 were the slowest growers.

The walleyes in Pond #1 were apparently the fastest growers; however, since no stomach analyses were performed, it is unknown whether or not this faster growth was due to these walleyes utilizing other species of fish for food. It seems likely that this was the case. Conversely, it is also not known to what extent the other species utilized the walleyes as food.

Pond #2 walleyes did not have any other species to compete with, but their growth was very slow during the 39 day period during which they were seined. Some cannibalism was indicated by the fish which grew to between 5 and 8 inches. Approximately 50 such walleyes were seined during the period. It should be noted that this pond was the only one which did not receive a planting of plankton in mid-May because a good bloom was visible at that time.

Each day during seining operations the walleyes were sampled to obtain size data, and to make harvest estimates. Fingerling weight was obtained by adding 100 fingerlings to a known weight of water in a container placed on a small gram scale. The fish were measured to the nearest tenth of an inch on a measuring board first; in this way no water was added to the container in the process of weighing the 100 fish. Several 100-fish samples were taken from every truck load.

To obtain the total weight of the fingerlings planted, a large bucket was placed on a platform scale and water was added until the total weight was 25 pounds. Approximately 2 pounds of fingerlings were then added, after letting the scap net drain before each batch of fish were placed in the bucket. It usually took less than one minute to scap 2 pounds of fingerlings,

and as soon as they were dumped into the lake, the procedure was repeated. As the number of fish in each tank became fewer, water was drained off (through a scap net) to make it easier to scap the fish remaining. When only a few fish were left in a tank, they were removed by completely draining the tank through a scap.

This method did not take very much time, and was felt to be much more accurate than "eyeball" estimates. With the average fingerling weight as obtained from samples, and a known total weight of fish planted, it was a simple matter to calculate the total number of fish planted each day.

TRANSPORT AND PLANTING

All of the fingerlings were transported from the ponds in Roscommon County to Lake Missaukee (2002.4 acres) in Missaukee County in one of the new Manchester planting trucks. Mortality during seining, transporting and planting was estimated at less than .5 per cent.

During the first few days of operations, the planting truck tank water was tempered down to the mid to high 60's F. The pond temperatures were running in the low 70's and the Lake Missaukee water was running in the mid 70's. The run to the lake from the ponds varied between 1 and 2 hours, depending on which pond was seined, and where the walleyes were planted in the lake. Oxygen was used continuously from the time the fingerlings were placed in the planting tanks until they were planted in the lake.

After several days of incrementally raising the planting truck temperatures, it was found that the fingerlings could be safely transported at pond water temperatures. The truck was filled by pumping from the pond to the truck when the truck first arrived at the seining site. Occasional temperature checks were made and small chunks of ice were added to the individual tanks as necessary to maintain the starting temperatures. There was a cold water circulating system installed in the Manchester unit; however, it was found that temperatures could be controlled closely enough by merely adding chunks of ice to the individual planting tanks. This saved putting unnecessary hours of operation and wear on the cold water circulating pumps. During the entire operation the maximum temperature spread between lake water and planting tank water was 5°F, so the walleyes were planted directly from tank to lake after the first few days of experimenting. The highest temperatures encountered were on the 20th of August when the lake temperature was 79°F and the planting truck temperature 74°F at the time of planting.

Not having to temper the planting tank water temperature downward after seining, then upward later for planting into the lake saved much time. Even though the first fish of the day were sometimes in the planting tanks by 9:00 AM, and not planted until as late as 6:00-7:00 PM, no problems with distressed fish occurred at any time. The presence of a continuous supply of oxygen rather than temperature seemed to be the key element. Aerators were tried initially, but seemed to place unnecessary stress on the fish, so their use was discontinued.

The fingerlings were planted at approximately ten different sites around the lake. There were never any concentrations of panfish at any of the planting sites; in fact, usually none were seen. As mentioned previously, mortality was very low throughout the operation. Those few walleyes which were dead upon arrival at the planting site mostly appeared to be the victims of predacious insects in the tanks. At no time were any distressed fingerlings seen in the lake after planting. Most of the time all had swam off and disappeared within 20 to 30 seconds after planting.

CHEMICAL TREATMENT

In September, 1974, ponds #1 and #2 were chemically treated to prepare them for the 1975 rearing season. To expedite the treatment, a DNR helicopter was used to spray a rotenone/water mixture on the ponds. The helicopter was equipped with a 30 gallon tank and a spray bar across its skids. Rotenone and water were mixed at the site in 55 gallon drums then pumped into the helicopter tank with a portable engine driven pump.

The helicopter was able to treat the 2 walleye rearing ponds, plus both of the Houghton Lake pike marshes in one day, which is a good indication of its superiority over using the older system of much manpower, muscle, boats, motors, backpack sprayers, and long hours. For the above day's operation with the helicopter, only the pilot and two other men were needed, plus one pump, two 55 gallon drums, and one pickup truck.

Treatment took place on the 27th of September. Both ponds were treated at 1 ppm rotenone. The rotenone was mixed with water at the rate of 1 part rotenone to 2 parts water before being pumped into the helicopter tank. The resultant mixture flowed freely through the spray bar, and each pond was treated in two trips per pond. Time to treat one pond was approximately 30 minutes.

At the time of treatment the pond water temperatures were both 52°F. Although this is cooler than that normally desired for rotenone treatment, the desired result of 100% fish kill seems to have been achieved.

No counts of dead fish were made. However, based on visual observation, it is estimated that between 3,000 and 5,000 walleyes were killed in Pond #1. At least 10,000 walleyes were killed in Pond #2. Most walleyes in Pond #2 were still only 2 1/2 to 3 inches long, with the exception of 150 walleyes counted which were 8 to 8 1/2 inches long.

Besides the walleyes, Pond #1 had probably at least 5,000 dead perch, 200 to 400 small sunfish, and 2 dozen small pike. No fish other than the walleyes had been found in Pond #1 during the entire seining operation. This was also true for the rotenone treatment; only dead walleyes were found.

DISCUSSION

A total of 186,409 walleye fingerlings were harvested by District 7. In addition, 3 weeks after District 7 finished operations, District 6 seined 600 more fish which averaged 3.5 inches, and should have weighed approximately

6 pounds. These 600 came out of Pond #1; original production there was 43,349 so the final number harvested was very close to 44,000 fingerlings. Final production, then, averaged 2,269 walleyes per acre for Pond #1. With a total of 133,988 fish from Pond #2 its production was 7,119 walleyes per acre. Since Pond #3 was only seined once no valid estimate of its production, either total or per acre, can be made.

By weight, Pond #1 produced 283.8 pounds for District 7 plus the estimated 6 pounds for District 6 for a total of 289.8 pounds of fingerlings. Pond #2 produced 290.3 pounds. Although both ponds produced basically the same weight of fish, one can only speculate as to which pond's production will be the most beneficial to Lake Missaukee's future walleye fishery.

Based on an area of 2002.4 acres, the stocking rate for the lake was 93.1 fingerlings per acre.

District 7 plans for 1975 are to conduct a creel census on Lake Missaukee to determine walleye catch statistics prior to the 1974 walleye plant entering the fishery. Later censuses will be conducted to evaluate the contribution to the walleye fishery of the 1974 plant, plus future years' plants.

Plans also call for increasing the yeast fertilization per acre, as well as closer monitoring, measuring and recording of all aspects of the upcoming 1975 walleye rearing operation.