

FISH POPULATIONS IN RUNYAN LAKE

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OBJECTIVES OF THE STUDY

- 1. Examine the dissolved oxygen profiles in the lake
- 2. Sample the fish populations in the lake

QUESTIONS TO ADDRESS?

- 1. Are lake herring still present?
- 2. How well are the stocked walleyes doing and what impact have they had?
- 3. Have there been any changes to the species composition or abundance of any fish?

WHAT ARE THE PRODUCTS OF THE STUDY?

- 1. Update and comparison with historical fish community data
- 2. Determine if lake herring are present
- 3. Determine the status of northern pike and walleyes
- 4. Provide recommendations for fish management and future studies

METHODS

- 1. Measured dissolved oxygen and temperature using a YSI instrument in the water column
- 2. Sampled the fish population using seines, trap nets, and gill nets





SAMPLING SITES

- Three trap nets and one gill net were set on 31 May 2008
- Seining occurred at three sites (SA, SB, SC) on 1 June 2008
- Three gill nets were set on 28 June 2008
- See map on next slide

RUNYAN LAKE

TOWNSHIP 4N

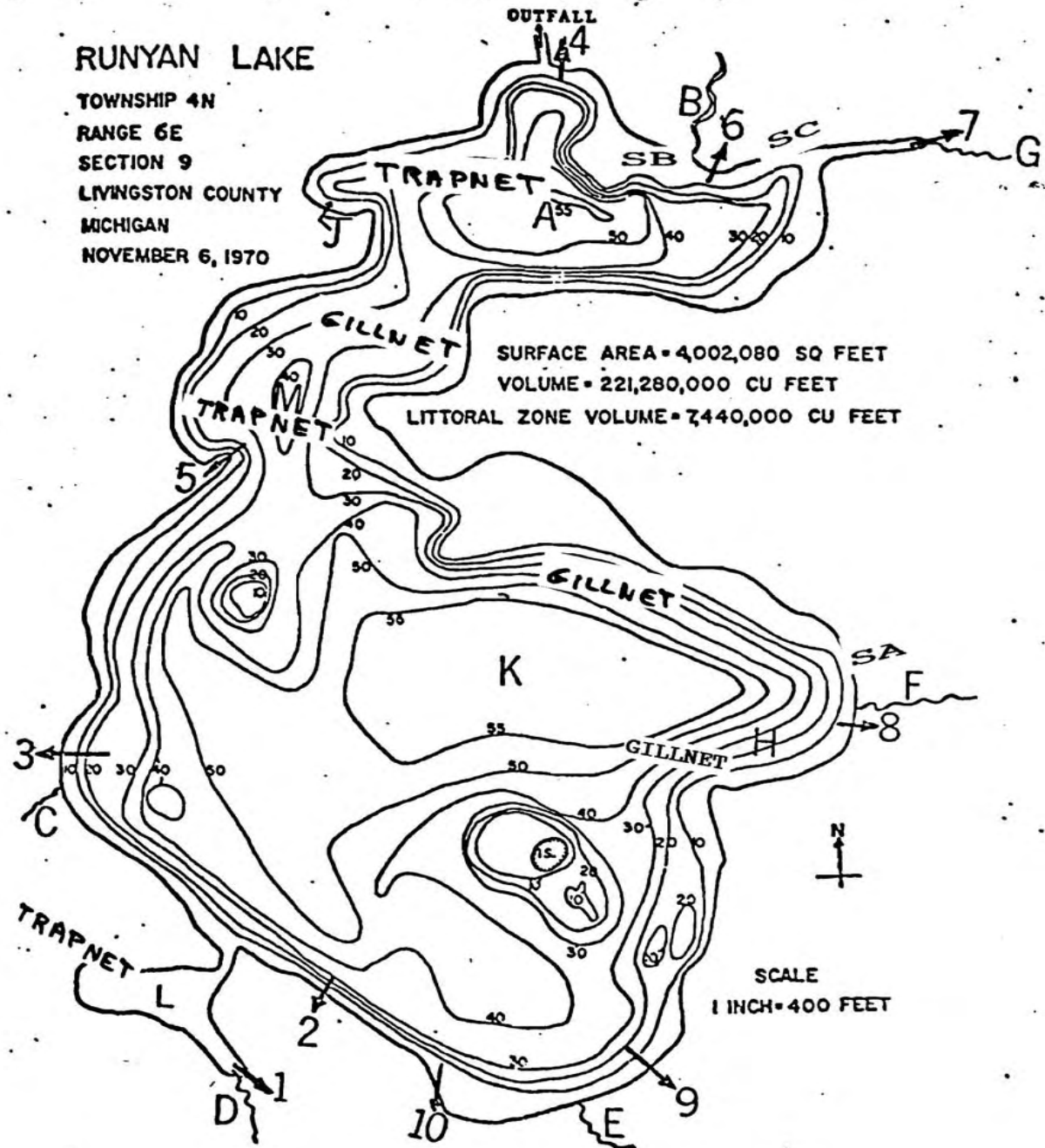
RANGE 6E

SECTION 9

LIVINGSTON COUNTY

MICHIGAN

NOVEMBER 6, 1970



RESULTS

- Dissolved oxygen – temperature relationships

LAKE STRATIFICATION

- Three layers of different temperature form
- Important determinant of fish distribution, survival, and growth

STRATIFICATION PROCESS

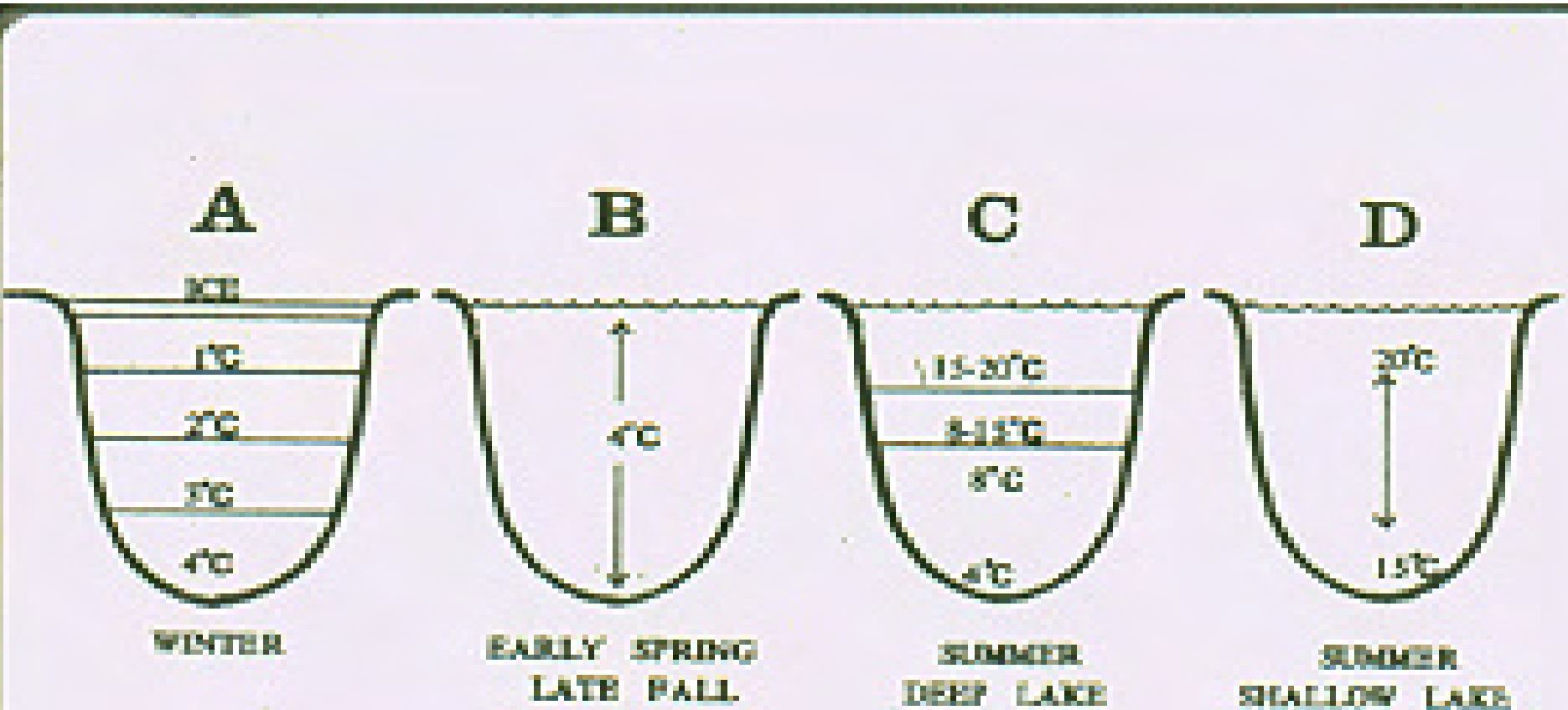
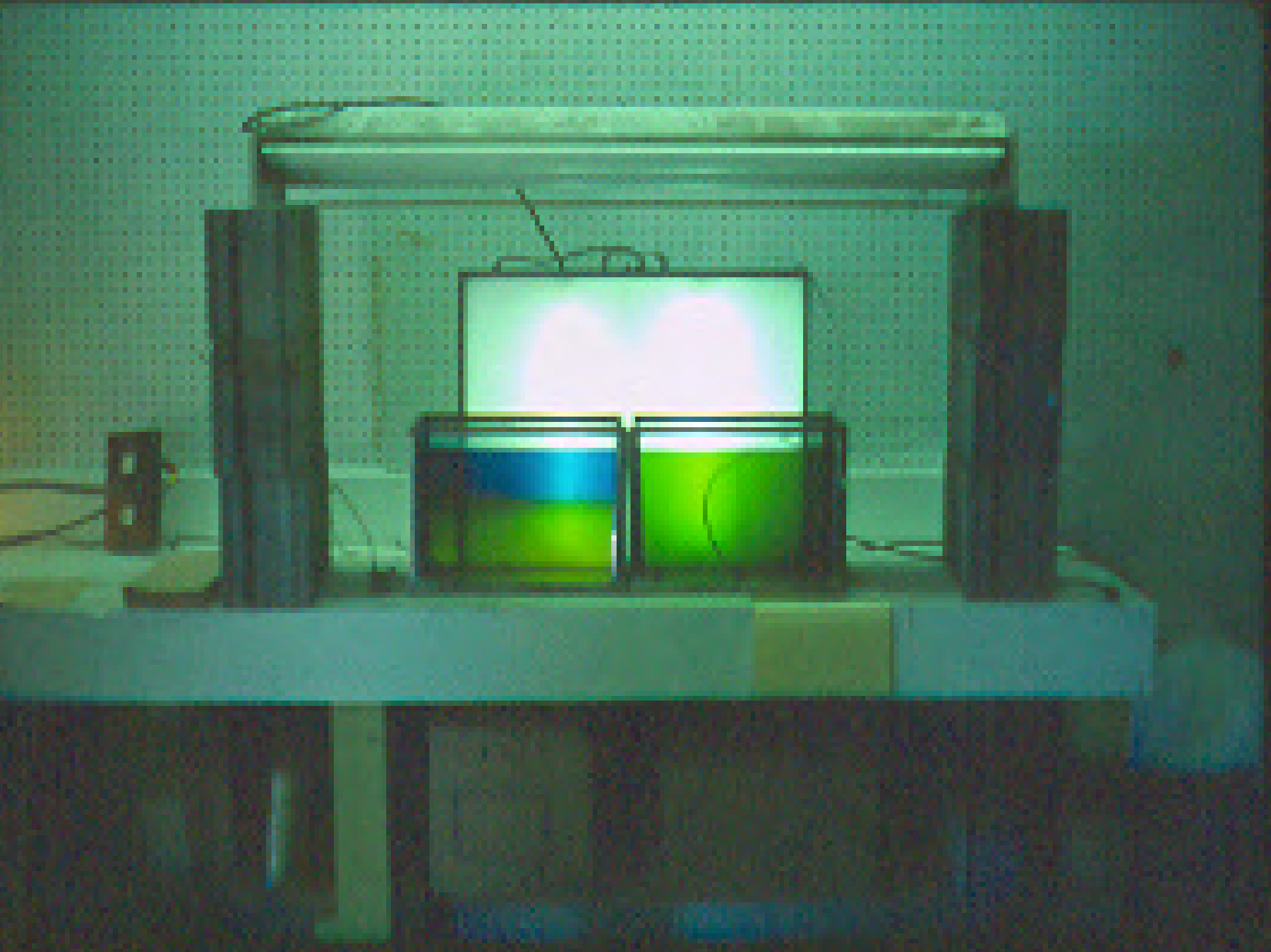
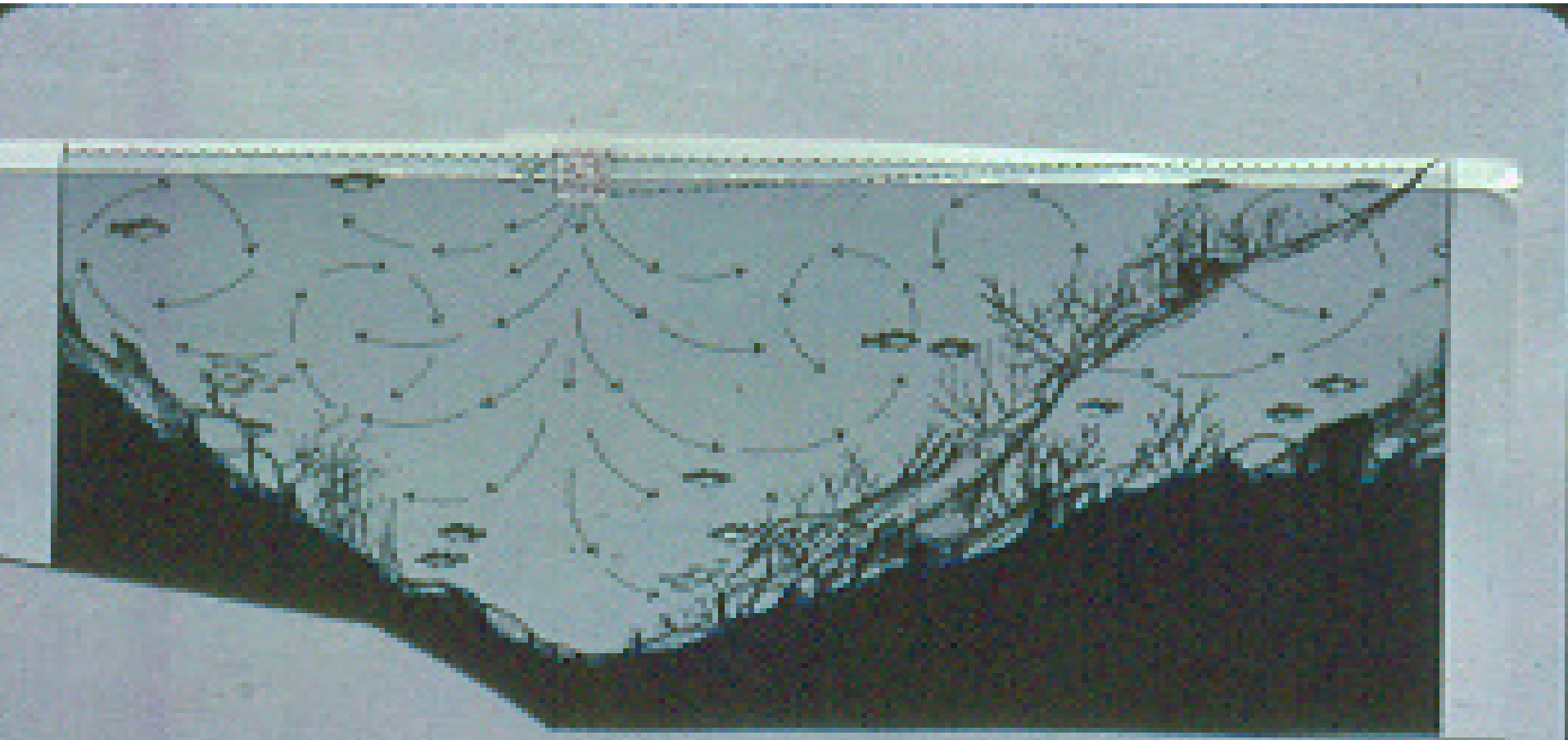


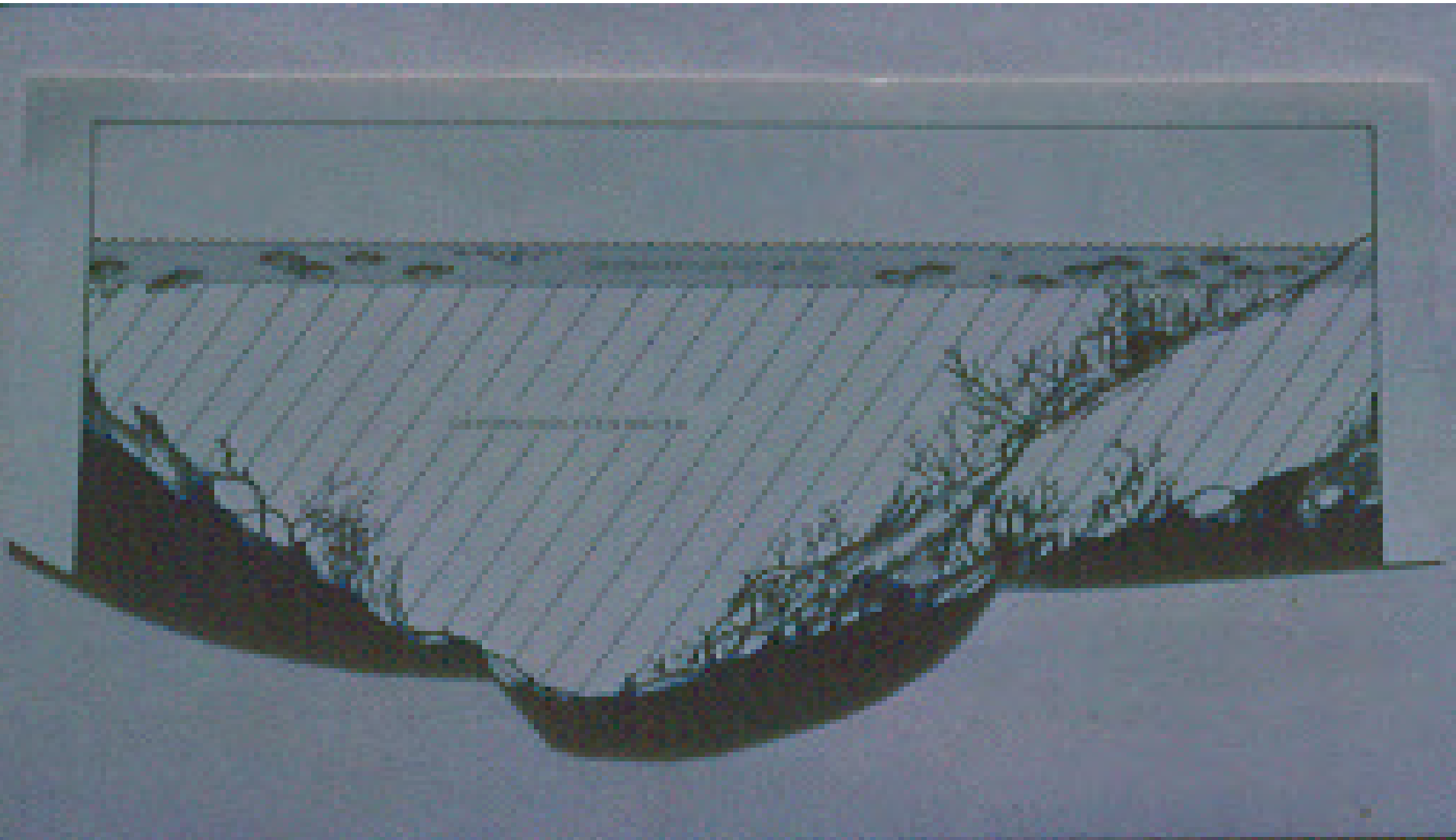
FIGURE 3: Seasonal Temperature Profiles



AERATED LAKE, UNSTRATIFIED ALLOWING FISH FREE ACCESS



STRATIFIED LAKE WITH ANOXIA ON BOTTOM FORCING FISH UP

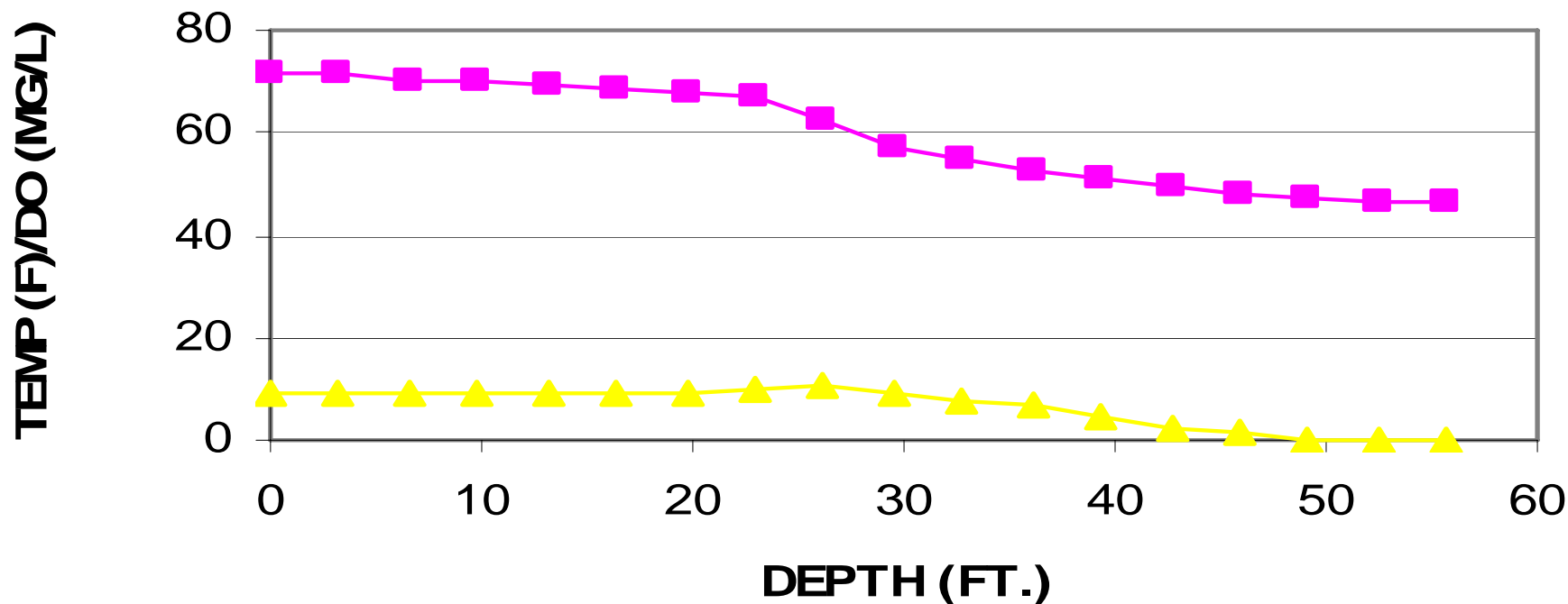


IMPLICATIONS FOR RUNYAN LAKE

- 1. Lake herring, northern pike, and walleyes are coolwater fish, requiring high dissolved oxygen and cold temperatures
- 2. They will be forced to occupy a layer of water that might not have adequate dissolved oxygen during the summer maximum – degraded conditions on bottom

20-43 FT OK FOR LH ALSO FOR WL AND NP

**DISSOLVED OXYGEN PROFILE FOR RUNYAN LAKE, 30
SEP 2007: SQUARE=TEMP (F); TRIANGLE =
DISSOLVED OXYGEN (MG/L)**



RESULTS OF OXYGEN AND TEMPERATURE PROFILES

- The 1979, 1982, and 2007-2008 data all show that there is a layer of water present that has sufficient dissolved oxygen and is cold enough to support coolwater fish (see report data from other years)

RESULTS - FISH

- Number of species collected were as follows for each year:
- 1979 - 17 (nets), 1 (anglers)
- 1995 - 18 (nets), 3 (anglers)
- 2008 - 13 (nets), 1 (anglers)

FISH NOT FOUND IN 2008:

- Lake herring – were common
- Yellow perch – were common
- Were rare:
- Warmouth, Longnose Gar, Black crappie, Black and yellow bullhead, Grass pickerel, Logperch, Rock bass, White sucker

YELLOW PERCH



LOGPERCH





BLACKSIDE DARTER – Similar to Iowa Darter





BLOATERS – Similar to Lake Herring



LAKE HERRING

- Very unusual fish to have in inland lakes; only occur in 153 of Michigan's lakes
- Require high dissolved oxygen and cool temperatures
- Considered an endangered species in Michigan because it is so rare

LAKE HERRING

- Were common in gill net catches in 1979 and 1995
- Absent in 2008 collections
- Think that predation by stocked walleyes, combined with northern pike, led to a severe population decline

YELLOW PERCH

- Common to abundant in 1979 and 1995 collections
- Absent from 2008 collections despite 4 gill net sets/seines
- Prime prey for walleye and pike
- Believe that predation by the stocked walleyes reduced their population, similar to lake herring

WALLEYE

- Caught one walleye (19.7 in.; 5-yr old) growing better than Michigan average (18.9 in. for a 5-yr old walleye)
- Fish were stocked in 1999 and 2004, so the fish should be 4 or 8 yr old – could be an error in reading the scales.

WALLEYE

- 1,250 were stocked in 1999
- 1,650 were stocked in 2004
- The disappearance of yellow perch and lake herring suggests heavy predation on these fish by walleye
- Northern pike also prefer these species, but co-occurred before walleye were stocked without any depletion



NORTHERN PIKE

- We collected four fish
- They were growing below state averages
- We believe they are present in adequate numbers, but more attention needs to be focused on where they spawn and how many offspring are produced

LARGEMOUTH BASS

- Did not collect enough to make strong statements
- They do appear to be reproducing and doing well based on our current and past data, angler reports, and the Runyan Lake Fishing Tournament catches

BLUEGILL/PUMPKINSEED

- Growing faster than state averages
- May indicate a density-dependent response
- More predation by walleye/northern pike may have caused populations to decline and those left grow faster

RECOMMENDATIONS -1/2

- 1. High mercury in large fish suggests catch-and-release fishery for top predators and large panfish
- 2. Some additional gillnetting should be done to locate lake herring
- 3. Walleyes should not be stocked, but stocking could be allowed on an experimental basis – see report for justification

RECOMMENDATIONS -2/2

- 4. No largemouth bass, northern pike, or other species should be stocked in Runyan Lake
- 5. Monitor northern pike spawning – ensure good habitat
- 6. Protect the diversity of habitat that you have from development/degradation

ACKNOWLEDGEMENTS

- 1. Thank you to Stephen Hensler
- 2. Thank you to Ivan Quinn and Steve
- QUESTIONS?

THE END

