Speed Letter® 44-902 GrayLine® SNAP-A-WAY® FORM

# Speed Letter®

To Dan Hinrichs
RR Somers Lake
Maple Lake, MN 55358

From Paul Diedrich
Route 1 Box 175
Montrose, MN 55363

Subject Somers Lake Fish Barrier

—No. 9 & 10 FOLD

MESSAGE

I met with Ed Feiler on Friday and he said that the proposed new culvert on the outlet of Somers Lake was going to take some more work. Area Hydrologist Dale Homuth has a new computer program that he will use to do a new work-up. I don't know how long this will take but apparently Dale is going to begin working on this immddiately. I hope this won't stall the project too much and I will keep you informed of any developments.

c:Ed Feiler Date 1/16/90 Signed Paul Diedrich

REPLY

—No. 9 FOLD

—No. 10 FOLD

Date Signed

WilsonJones
GRAYLINE FORM 44-902 3-PART
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1177

# DNR Fisheries Proposes Projects
## for Mink and Somers Lakes

*by Paul Diedrich, Area Supervisor*

The **DNR Fisheries Section** is proposing several projects for Mink and Somers Lakes, Wright County. The problem is that there has been a series of winterkills such that populations of carp, bullheads and small panfish are extremely abundant. These fish are not accepted by anglers and it seems unlikely that the situation will be reversed by nature. The projects are: constructing a fish barrier, aerating the lakes, killing the existing fish and evaluating the results.

**A fish barrier** is proposed for the outlet of Somers Lake which would prevent any undesirable fish from migrating into the lake. This is absolutely essential if reclamation is pursued. The costs are estimated at less than $5,000 and will be borne by the state. The barrier will simply be a culvert through which fish cannot swim because of the high velocity of the water. It is hoped to replace the existing culvert with a concrete culvert by November 1, 1990.

**An aeration system** is proposed that would effectively eliminate winterkill. The state would provide the equipment at a cost of $20,000 and the association would pay for electrical hookup and operation. Hookup is estimated at $1,000 and annual operation and insurance could cost $1,000. At the present time it is not worthwhile aerating the present fish populations. They are not valuable enough to justify the expense. For the state to provide aeration equipment is contingent on the association paying the other costs.

**Reclamation means** eliminating the entire fish population and starting over. The reason that this is proposed is that other methods of population manipulation such as removal are not effective. The carp and bullhead populations could get worse but local observations suggest that is unlikely! Additionally, there may be some benefits to water quality by eliminating carp and bullheads. A very favorable cost to benefit ratio has been calculated and the costs of the project, $160,000, will be borne entirely by the state.

"The carp and bullhead populations could get worse but local observations suggest that that is unlikely!"

**Benefits** of reclamation include improved fishing, water quality and property values. The lakes would be treated in the fall and restocked the following spring with walleye, largemouth bass, bluegill, yellow perch and minnows. Some fishing would be possible by the fall after stocking. In other projects water clarity was improved after reclamation because carp and bullheads were no longer present to

uproot aquatic vegetation and stir bottom sediments. It seems likely that property values would be maintained or increased if angling was good, the water was clearer and the threat of winterkill eliminated.

The reclamation and aeration projects have neither been approved nor funded by DNR fisheries administrators. First, we await the general approval by the property owners association. These projects will not proceed without the overwhelming approval by the Mink and Somers property owners. A tentative timetable for the projects would be: fish barrier - November 1990, reclamation - October 1991, restocking - spring 1992 and aeration - winter 1992-93.

"These projects will not proceed without the overwhelming approval by property owners."

A great deal of information can be found in the "Better Fishing Through Management" brochure which is being distributed with this newsletter. The brochure discusses rotenone, which is the agent used in killing the fish.

It is hoped that this project will not be controversial but rather a sound decision based on information. To that end I'd like to briefly discuss criticisms of these kinds of reclamation projects.

Some people are opposed to the use of pesticides for any reason. They fear that all is not known about the effects of pesticides and point to the former use of DDT, for example. All of us probably share that fear to a degree. I believe that rotenone is safe to use in accordance with label directions.

Another criticism may involve a mistrust of agencies like the DNR. People wonder if the agency is acting responsibly; and they know that the agency is made up of people who sometimes make mistakes. I would like to encourage each person reading this to become familiar with the area fisheries staff. We are working in your behalf for the betterment of our fisheries and we gladly welcome your input into proposed projects.

"We are working in your behalf for the betterment of our fisheries."

Some would argue that reclamation is a symptomatic treatment of larger problems, that the best "reclamation" is to upgrade septic systems, eliminate run-off from agricultural lands, and generally eliminate non-point sources of pollution. I am in complete agreement with the need for eliminating pollution. I have been assured by the leadership of TAMS that they will do all they can to comply with local pollution ordinances.

Another criticism has to do with the life expectancy of the project. It would only take a few individuals to illegally stock bullheads or carp into the lakes for those fish to become established again. However, if water quality is somewhat restored and the fish populations brought into balance, good fishing can be expected for at least 10 years. And if aeration prevents winterkill then it is unlikely that bullheads will become abundant again.

SF-00006-02

STATE OF MINNESOTA

DEPARTMENT NATURAL RESOURCES - WATERS

# Office Memorandum

TO : Tim Brastrup, Fisheries - Brainerd DATE: 2/5/90

FROM : Dale Homuth, Area Hydrologist-St. Cloud PHONE: 255-4278

SUBJECT: MINK & SOMERS LAKES' OUTLET STUDY; WRIGHT COUNTY

As we discussed, and as you requested, attached is my final draft of the study of fish barrier possibilities for Mink and Somers Lakes.

If you have other suggestions for a barrier device, please don't hesitate to ask me to review it. I have the model set-up now, so it would only take a short time to analyze other possible structures.

Let me know if you have any questions or comments on the report.

c: Dave Hills, Regional Hydrologist
Ed Feiler, Regional Fisheries Manager
Paul Diedrich, Area Fisheries Manager

ENCLOSURE

FINAL DRAFT

# MINK AND SOMERS LAKES' (86-229 & 230) OUTLET STUDY

HYDROLOGIC ANALYSIS OF WATERSHED
HYDRAULIC ANALYSIS OF OUTLET AS A ROUGH FISH BARRIER

Dale Homuth, Area Hydrologist, St. Cloud Office
Minnesota DNR - Division of Waters
January 1990

## DESCRIPTION OF THE AREA AND THE PROBLEM

DNR - Section of Fisheries is interested in reclaiming Mink and Somers Lakes, located about two miles northwest of the City of Maple Lake, by eliminating the present fish population and restocking the lakes. If the lakes are reclaimed, Fisheries needs assurance that rough fish cannot re-enter the lakes. Re-sloping a township road culvert, located about 1500 feet downstream of Somers Lake has been proposed, in order to increase velocities so as to impede rough fish passage. The Division of Waters was asked to comment on the effectiveness of such a proposal. A copy of this proposal is attached (attachment "A").

Section of Fisheries advises that they need culvert velocities of at least 8.5 feet per second (preferably 9.0 feet per second) under all discharge conditions to create an effective barrier to rough fish. Other fisheries' studies also indicate that a vertical barrier of at least 3 feet with no tailwater pool, and at least 6 feet with a tailwater pool, will act as an effective barrier to rough fish.

Mink and Somers Lakes outlet to the south along a poorly defined private watercourse for about 900', to a field approach road with a 54" diameter culvert. The outlet then follows along a township road for about 600' until it crosses under the road via a 48" diameter culvert. South (downstream) of the township road is a well maintained public ditch called Wright County Ditch No. 20. See photos of area on attachment "E". The downstream end of the Township Road culvert is perched about four feet above the bed of Co. Ditch No. 20. CD No. 20 extends to the southeast and east for about 3 miles until it outlets to Silver Creek, near Mary Lake (86-156). Silver Creek flows north, until it eventually drains to the Mississippi River near Hasty.

## HYDROLOGY OF MINK AND SOMERS LAKES

Mink and Somers Lakes appear to be connected and equalized at all but the lowest levels. They can be considered as one lake for most management purposes. They have a combined surface area of about 460 acres (Mink Lake = 304 acres; Somers Lake = 156 acres) at their Ordinary High Water Level. It is estimated that 2126 acres (3.32 square miles) of land drain into the lakes (See attachment "B"). However, the watershed boundary has not been field checked.

Based on soils' types and land use in this watershed, a weighted curve number of 81 has been estimated, using the methodology described in the "Hydrology Guide for Minnesota", SCS, St. Paul, MN. This number is used in estimating the volume of runoff that can be expected to reach the lake during a certain precipitation event.

Using USGS topographic maps, and the procedures outlined in the Hydrology Guide, an average Time of Concentration (Tc) was estimated at 4.1 hours for this watershed. The Time of Concentration is the time it takes for runoff to travel across the watershed and to the lake's outlet system. The Tc is a very important factor in estimating the peak flow expected at the lakes'

outlet as a result of a given precipitation event.

A study of the water level regimes of the lakes and a detailed topographic survey of the lakes' outlet was completed by the Division of Water's Hydrographic Services Section in October of 1983 (see attachments "C" & "D"). The outlet was found to be located at the southwest side of Somers Lake and it consisted of a loose rock dam roughly 12 feet in length.

To estimate peak discharge rates out of Mink and Somers Lakes a reservoir routing computer program, developed by MnDOT was used. This program requires input of the watershed size, curve number, lake storage characteristics, time of concentration, precipitation data, and an outlet stage-discharge curve. The outlet stage-discharge curve was eventually refined using a computer program called HEC2, which will be discussed later in this document. The precipitation data used was obtained from the U.S. Weather Bureau's Technical Paper No. 40. Storm events of a once in 50, 10, 5, 2 and 1 year frequency were analyzed. A summary of the results of this analysis as shown on Table 1. (Note: Q50 = a 24 hour rainstorm expected to occur an average of once every 50 years; Q10 = such a storm expected once in 10 years; etc.)

TABLE 1
Estimated Peak Lake Stage and Outflow Summary

| 24-hour Rainfall (inches) | Storm Event | Peak Lake Elevation* MnDOT Meth. | Peak Lake Elevation* HEC 2 Meth. | Estimated Peak Outflow (Cubic ft./second) |
|---|---|---|---|---|
| 5.25 | Q50 | 1023.44 | 1023.46 | 76.9 |
| 4.1 | Q10 | 1023.14 | 1023.14 | 41.7 |
| 3.5 | Q5 | 1022.94 | 1022.95 | 28.4 |
| 2.7 | Q2 | 1022.68 | 1022.69 | 12.0 |
| 2.3 | Q1 | 1022.56 | 1022.56 | 5.5 |

* All elevations are in feet above mean sea level, 1929 adjustment. Note: Some attachments may show elevations of +100 feet (e.g., 1122.5): Please subtract 100 feet for the correct elevation.

During the Division of Water's 1983 study of the lakes an Ordinary High Water (OHW) Level for both lakes of elevation 1023.1 feet was determined. The survey crew also noted evidence of peak flood levels at elevations ranging from 1023.7 to 1024.5 feet (See attachment "C"). Precipitation records indicate that in excess of 6 inches of rain fell in the area on June 21, 1983, just prior to this survey. The Division of Water's Surface Water Hydrologist advises that he normally expects the OHW level of most lakes to fall somewhere between the 5 and 10 year frequency peak lake levels. The above estimates of peak lake levels appear to fall with this range and the flood level evidence is explained by the 100 year(+) storm that occurred in 1983.

The only recorded water surface elevations for Mink or Somers Lakes are as follows: 1951 - 1020; 1974 - 1023; October 6, 1983 - 1022.37; and July 2, 1984 - 1022.66. Since sometime in late 1986 or early 1987 the lakes have not

outletted. Lake levels are currently estimated to be 2 to 4 feet below the level where outletting would occur.

## DESCRIPTION OF HYDRAULIC ANALYSIS OF OUTLET SYSTEM

In order to review the effectiveness of any fish barrier, a model had to be developed to determine the hydraulic characteristics of the outlet channel, culverts, and any proposed modifications. A computer program developed by the U.S. Army Corps of Engineers called HEC2 was used for this analysis. This program calculates water surface profiles for flows in man-made or natural channels using a computational procedure generally known as the "Standard Step Method". Simply put, using surveyed or estimated cross-sectional elevation information, the program routes a given discharge through the stream starting at the downstream end and "stepping" back to each subsequent cross-section upstream. See attachment "F" for cross-section locations.

Unfortunately, HEC2 does not do a really good job of estimating flows and velocities through culverts. Since accurate estimates of flows and velocities through the township road culvert were critical for this project, two other computer programs designed for analyzing culvert hydraulics were also used to refine the HEC2 model of the outlet and to review the effectiveness of various proposals.

One of these programs was the "Hydraulic Rating Program", developed by Peter Singhofen, P.E. in December 1983. This program accurately determines flow rates or headwater elevations for culverts using calculations based on energy principles. However, it requires an accurate estimate of tailwater conditions and it does not provide culvert velocity estimates.

Therefore, another computer program was recently acquired, entitled "FHWA Culvert Analysis", developed by Penn State Univ., in cooperation with the Federal Highway Administration. This program uses approximately the same calculation procedures as the Hydraulic Rating Program, but it also computes culvert outlet velocities.

The HEC2 model was then adjusted using the results of the analysis by these two culvert analysis programs until the results were comparable.
Various changes were made to the model to examine the effects of changing culvert or structure type, slope and elevation. The various changes were also checked using the two culvert programs to achieve greater accuracy. The goal of these various changes was to find a configuration that will provide velocities in excess of 8.5 feet per second (fps) and/or vertical drops of 3 to 6 feet, depending on tailwater conditions.

## HYDRAULIC ANALYSIS FINDINGS

The following possible changes were analyzed:

1. Leave the outlet in it's existing condition: The existing township road

culvert provides a vertical barrier of about 4 feet above the downstream ditch bottom. Downstream pool depth varies from one foot at Q1 to 4 feet at Q50. At high discharge rates (Q50) this vertical barrier height is reduced to 1.8 feet, due to downstream tailwater conditions. However, the maximum velocity of the culvert is about 8.6 feet per second, and occurs at the downstream end of the culvert. At lower flow rates, like the Q1 event, the vertical barrier increases to 2.8 feet, but culvert outlet velocity is reduced to roughly 4.0 fps. Therefore, this alternative would appear to be an effective barrier only at very high and very low flows. See attachments "G, H, I, & J" for the resulting flood profiles, HEC2 summary and culvert analysis of the existing condition.

2. Reslope the township culvert as steep as possible: This proposal would leave the upstream end of the township road culvert at its present elevation, but would lower the downstream end to match the County Ditch bottom. Analysis indicates that this will result in only slight increases in velocity (e.g.- 8.7 fps at Q50) and will eliminate any vertical barrier. Apparently, tailwater levels eliminate any outlet velocity increase and the higher velocities are transferred to the inlet. Therefore, this alternative would slightly reduce the effectiveness of the culvert as a fish barrier, compared to the existing condition. See attachments "K & L" for the HEC2 summary and culvert analysis of this alternative.

3. Replace the township culvert with a smooth reinforced concrete pipe (RCP) at the same elevation: The present corrugated metal pipe is not as efficient at passing water as would be a smooth culvert. Theoretically, such a culvert should cause substantial increases in velocity. Analysis indicates that some increase in velocity occurs (e.g. 10.7 fps at Q50, and 8.3 fps at Q10), but not enough to create an effective barrier at lower flow rates. See attachment "M" for the culvert analysis of this alternative.

4. Replace township culvert with a RCP of larger size and at higher elevation: A higher elevation of the pipe would create a more effective vertical barrier, and a larger pipe size would theoretically help offset upstream flood level increases. If the pipe were raised one foot and pipe size increased to 54", an effective barrier would be created at high flows due to velocity (e.g. 10.1 fps at Q50 and 8.5 fps at Q10). Raising the pipe 1' would also raise the vertical barrier by 1', compared to existing conditions (e.g. 2.8' at Q50, 3.5'at Q10, and 3.9' at Q1). However, raising the elevation of the pipe necessitates raising of the entire township road bed, a costly project. Also, such an elevation increase does cause some increase in upstream flood levels, even with a larger pipe, which may necessitate purchase of flowage easements from land owners. See attachment "N" for the culvert analysis of this alternative.

5. Install a weir, 600' downstream of the lake, and lower both culverts and the ditch accordingly: The greatest slope in the outlet channel is located about 600' downstream of the lake. This would be the best location to construct a barrier such as a sheet metal weir. The weir could be installed at grade or up to one foot above grade, without adversely affecting any upstream properties. Analysis indicates that a vertical barrier of between 5.5' at Q50 and 9.0' at low flow could be created with a 10' wide

weir with a crest set 1' above grade. The effectiveness of the barrier at Q50 is slightly less than the goal, but the barrier should be adequate under all lower flow conditions. Such a project would be somewhat costly to construct, but it is expected that adjacent landowners would not object to, or may even support such a project, since it would reduce flooding of their property. This proposal would result in slight reductions of peak lake level (as much as 0.14' at Q50), but should not affect the OHW elevation. See attachments "O, P, Q, & R" for the HEC2 summary and profiles relating to this alternative.

Various other possible structures to be installed at or near the township road culvert were also analyzed, such as weirs, drop-inlet structures, additional culverts, and other devices. However, due to the channel slope at this location and the tailwater effects caused by the slope and other culverts, it was not possible to create enough velocity or vertical drop to act as an effective barrier without causing upstream damage.

RECOMMENDATIONS

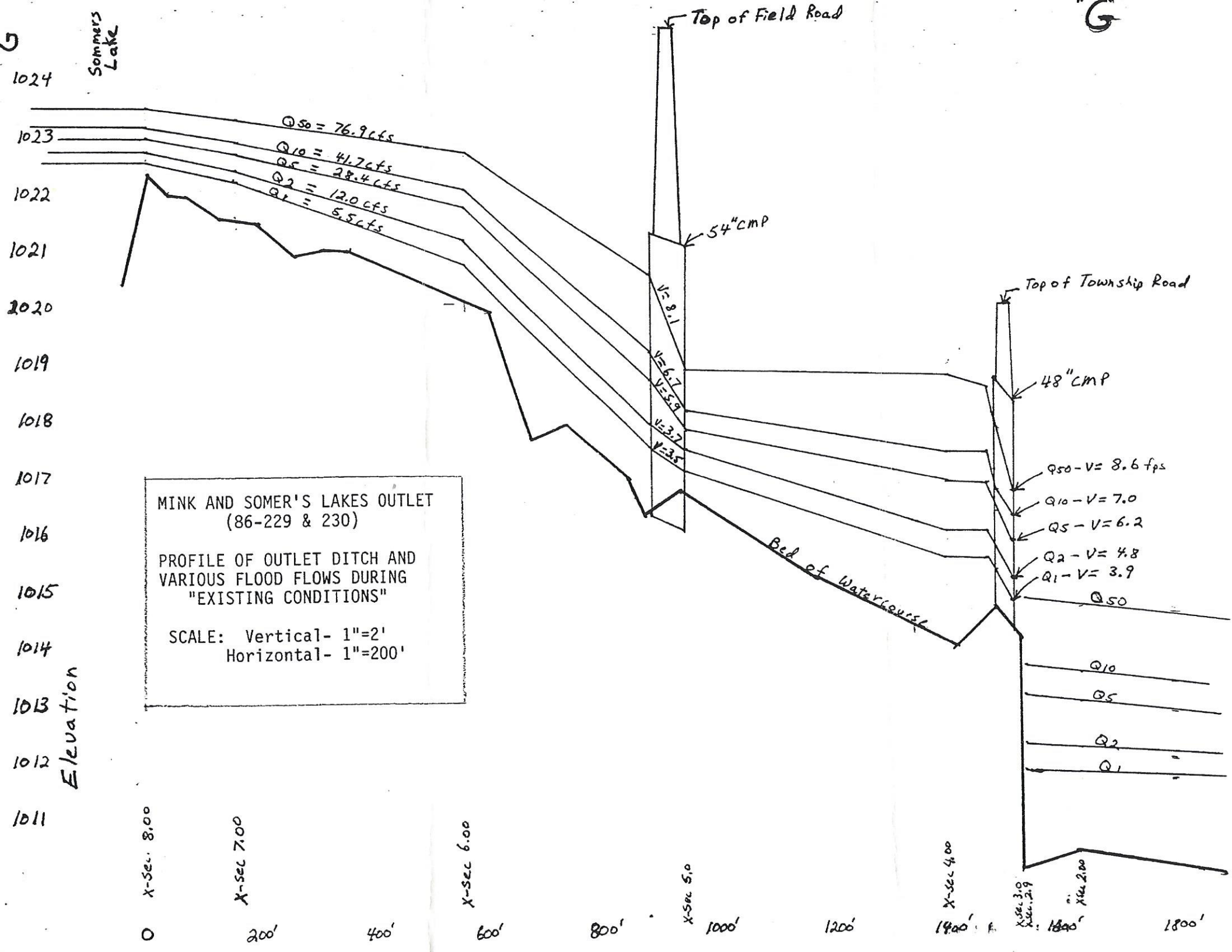
Based on the foregoing analysis, there appears to be no simple or inexpensive way of creating a fish barrier at the Somers Lake outlet that completely satisfies the velocity and vertical barrier height requirements given. It is suggested that Section of Fisheries do further review of their requirements for a barrier. The existing township road crossing does provide a barrier that may be effective under many flow conditions, at no cost. Therefore, it may turn out to be most cost effective to do nothing.
The only option analyzed so far that provides a complete barrier under nearly all flow conditions, would be to construct a weir at a point about 600 feet downstream of the lake. Because such a weir would have 8'+ of exposed surface at the downstream side; the weir would have to be fairly substantial and therefore costly. In addition, lowering of both culverts and excavation of 900' of ditch would be required. The advantage of this option is that landowner support and permission may be easier to obtain.

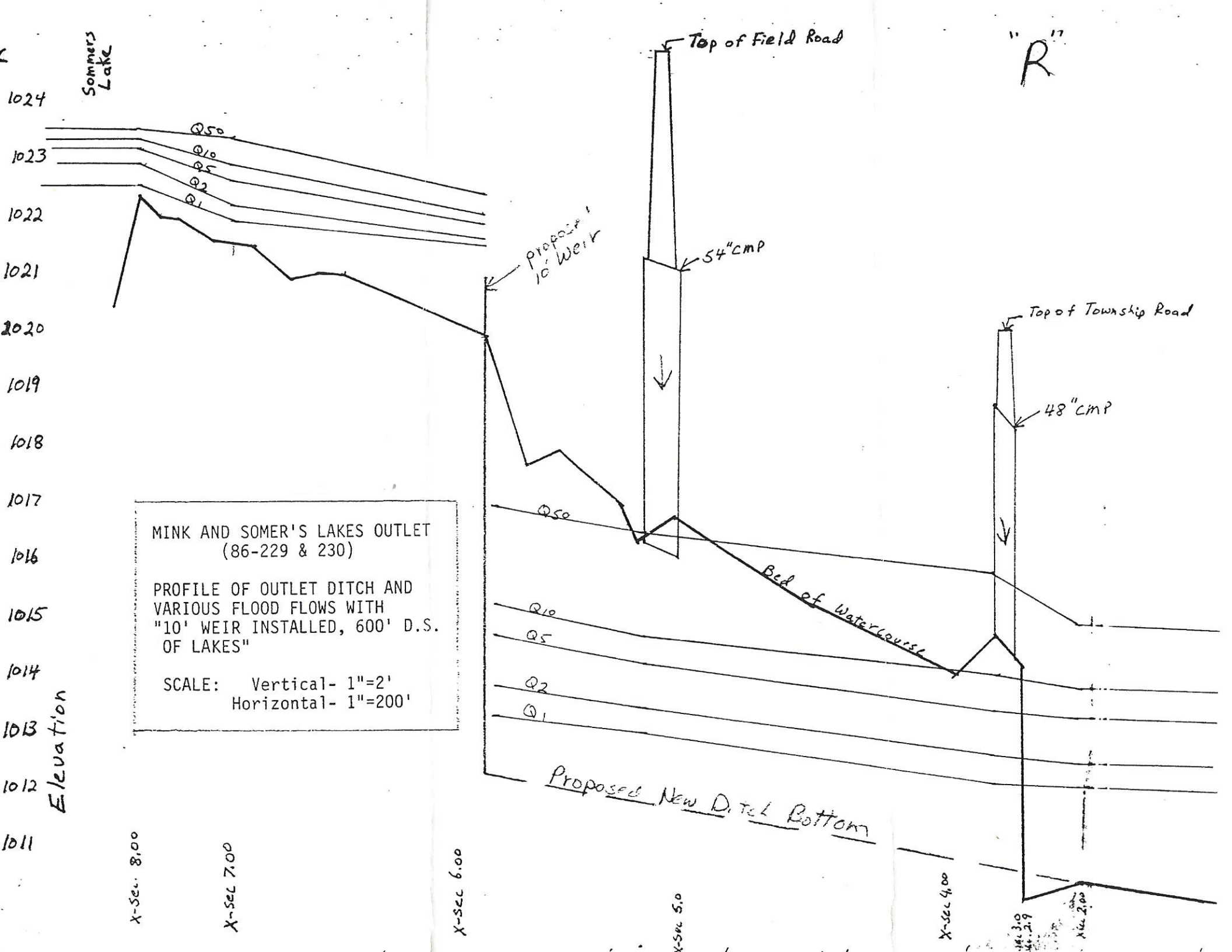
Raising the township road culvert by 2' to 4' would also provide a completely effective barrier, but about 800' of road bed would have to be raised and considerable private acreage would be adversely affected. Further survey work and analysis would be needed to adequately review this option.

Section of Fisheries should also look into the option of adding a mechanical screen or electric weir to the township culvert. In general, a screen would be a high maintenance item, and the electric weir a high cost item. However, the cost of such items may be less than a structural weir placed upstream.

None of the proposals discussed in this document require a State "Work in Protected Waters" permit to construct. The watercourse is not classified as a protected water and none of the proposals significantly affect lake levels. The approval of Wright County would only be needed for work done in the ditch downstream of the township culvert. Of course, permission of the township and any other affected landowners would be needed. U.S. Army Corps of Engineers approval may be needed, if any earthmoving is done upstream of the township culvert, as portions of this area may be considered "wetlands".

8' weir
600' Downstream
of lake - set
at grade.


Sommers Lake
Top of Field Road
54"cmp
Top of Township Road
48"cmp
Q50 = 76.9 cfs
Q10 = 41.7 cfs
Q5 = 28.4 cfs
Q2 = 12.0 cfs
Q1 = 5.5 cfs
V= 8.1
V=6.7
V=5.9
V=3.7
V=3.5
Q50 - V= 8.6 fps
Q10 - V= 7.0
Q5 - V= 6.2
Q2 - V= 4.8
Q1 - V= 3.9
Bed of Watercourse
Q50
Q10
Q5
Q2
Q1
MINK AND SOMER'S LAKES OUTLET
(86-229 & 230)
PROFILE OF OUTLET DITCH AND VARIOUS FLOOD FLOWS DURING "EXISTING CONDITIONS"
SCALE: Vertical- 1"=2'
Horizontal- 1"=200'
Elevation
1024
1023
1022
1021
2020
1019
1018
1017
1016
1015
1014
1013
1012
1011
X-Sec. 8.00
X-Sec 7.00
X-Sec 6.00
X-Sec 5.0
X-Sec 4.00
X-Sec 3.0
X-Sec. 2.9
X-Sec 2.00
0
200'
400'
600'
800'
1000'
1200'
1400'
1600'
1800'




MINK AND SOMER'S LAKES OUTLET
(86-229 & 230)

PROFILE OF OUTLET DITCH AND VARIOUS FLOOD FLOWS WITH "10' WEIR INSTALLED, 600' D.S. OF LAKES"

SCALE: Vertical- 1"=2'
Horizontal- 1"=200'

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

Celebrate MINNESOTA 1990

PHONE NO. FILE NO.

Area Fisheries Headquarters
Route 1 Box 175
Montrose, MN 55363
February 6, 1990

Mr. Dan Hinrichs
1225 43rd Avenue NE
Columbia Heights, MN 55421

Dear Dan:

I spoke with Dale Homuth last week and he said he was going to try to get something in writing by February 10 concerning the outlet of Somers Lake. We'll just have to wait for that. I will forward a copy to you when I receive it.

I am enclosing a publication which should help to answer questions about the rehabilitation of Mink and Somers Lakes.

You may want to use the following in your newsletter as well.

The proposal is to reclaim Mink and Somers Lakes. By reclaim is meant to kill all existing fish and restock with gamefish. This proposal has come forward from the leadership of the Lake Association and the Montrose Area DNR Fisheries Office. Before reclamation can take place a number of other steps must be taken:

1. All association members need to be informed. By providing this information it is hoped to stimulate discussion among all users of Mink and Somers Lakes. If all users are not in agreement with the project it will likely not be attempted.
2. A "fish barrier" has to be in place at the outlet. The reason for this is so that when the undesirable species are eliminated there is no chance that carp or bullheads could swim into the lakes from elsewhere in the watershed.
3. An aeration system is available to prevent winterkill. After the lakes are restocked with gamefish it would not be productive to allow them to die during winter.

This project has not been approved for funding at the present time. The earliest time at which approval is likely to come is July 1991. The proposal seems timely for two reasons: 1) 1989 test netting shows that fish populations are composed primarily of small carp, bullheads, black crappies and bluegill. Walleye and northern pike are present but in low numbers. 2) Lake water levels are low and thus the lake volume is smaller. The smaller the volume of water to treat, the less rotenone is required and the cost is reduced.

Estimated costs for this project are:

| | |
|---|---|
| fish stocking | 15,000 |
| fish barrier | (unknown) |
| aeration | $25,000 |
| treatment | 75,00 |

I hope this information is helpful. Please contact me if you have any further questions.

Yours truly,

Paul Diedrich

Paul Diedrich
Montrose Area Fisheries Supervisor

SF-00006-02

STATE OF MINNESOTA

DEPARTMENT NATURAL RESOURCES - WATERS

# Office Memorandum

TO : Tim Brastrup, Fisheries - Brainerd DATE: 3/2/90

FROM : Dale Homuth, Area Hydrologist-St. Cloud PHONE:255-4278

SUBJECT: MINK & SOMERS LAKES' OUTLET STUDY; ADDITIONAL ANALYSIS

As we discussed, I attempted to model Dave Hills' suggestion of installing a longer culvert (80' worked best) through the township road at a skewed angle. As I suspected, the HEC2 model indicated some increase in velocities, but not enough to obtain the 8.5 foot per second (fps) flow rate you desire.

However, while playing around with the model, I discovered another possible solution to the problem. I found that if a smooth culvert were placed at a steeper slope (but, not as steep as possible), one modeling program I have indicates that outlet velocities in excess of 8.5 fps will occur at all discharge rates. A summary of those results are attached. These results do seem consistent with various culvert tables I have examined. I am unable to show as high of velocities using the HEC2 program, but the Corps of Engineers advises that HEC2 shouldn't be considered accurate for culverts.

Therefore, it would appear that simply replacing the existing culvert with a concrete pipe at a slightly steeper slope would create an adequate fish barrier. It may even be possible to use the existing culvert, if the interior were grouted or tarred to make it smoother.

Call if you have any other questions or comments.

c: Dave Hills, Regional Hydrologist
Ed Feiler, Regional Fisheries Manager
Paul Diedrich, Area Fisheries Manager ✓

ENCLOSURES

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

Celebrate MINNESOTA 1990

PHONE NO. 612/675-3301 FILE NO.

Area Fisheries Headquarters
Route 1 Box 175
Montrose, MN 55363
April 11, 1990

Mr. Dan Hinrichs
1225 43rd Avenue NE
Columbia Heights, MN 55421

Dear Dan:

The Section of Fisheries would like to replace the culvert on the outlet of Somers Lake in Wright County (map enclosed). The purpose of the replacement is to provide an effective barrier to fish migration. By using a smooth barrelled concrete culvert and "tipping" it slightly, the velocity of water in the culvert will be too fast for fish to swim against. I don't have the exact culvert invert elevation, however, our engineers hope to have the project completely designed by July 1, 1990. It is expected that the slope of the culvert will probably not change radically from the present slope.

A headwall will be constructed on the upstream part of the culvert and an anti-seep collar will be attached to it. The headwall construction will likely be sheet piling. An apron will be placed on the downstream end of the culvert and field stone will be placed to reduce the depth of the plunge pool.

All of this work and the cost of the culvert will be borne by the Minnesota Department of Natural Resources. I expect that the existing culvert can be salvaged and returned to the township. Timetable for completion will be the end of the construction season or about November 1, 1990.

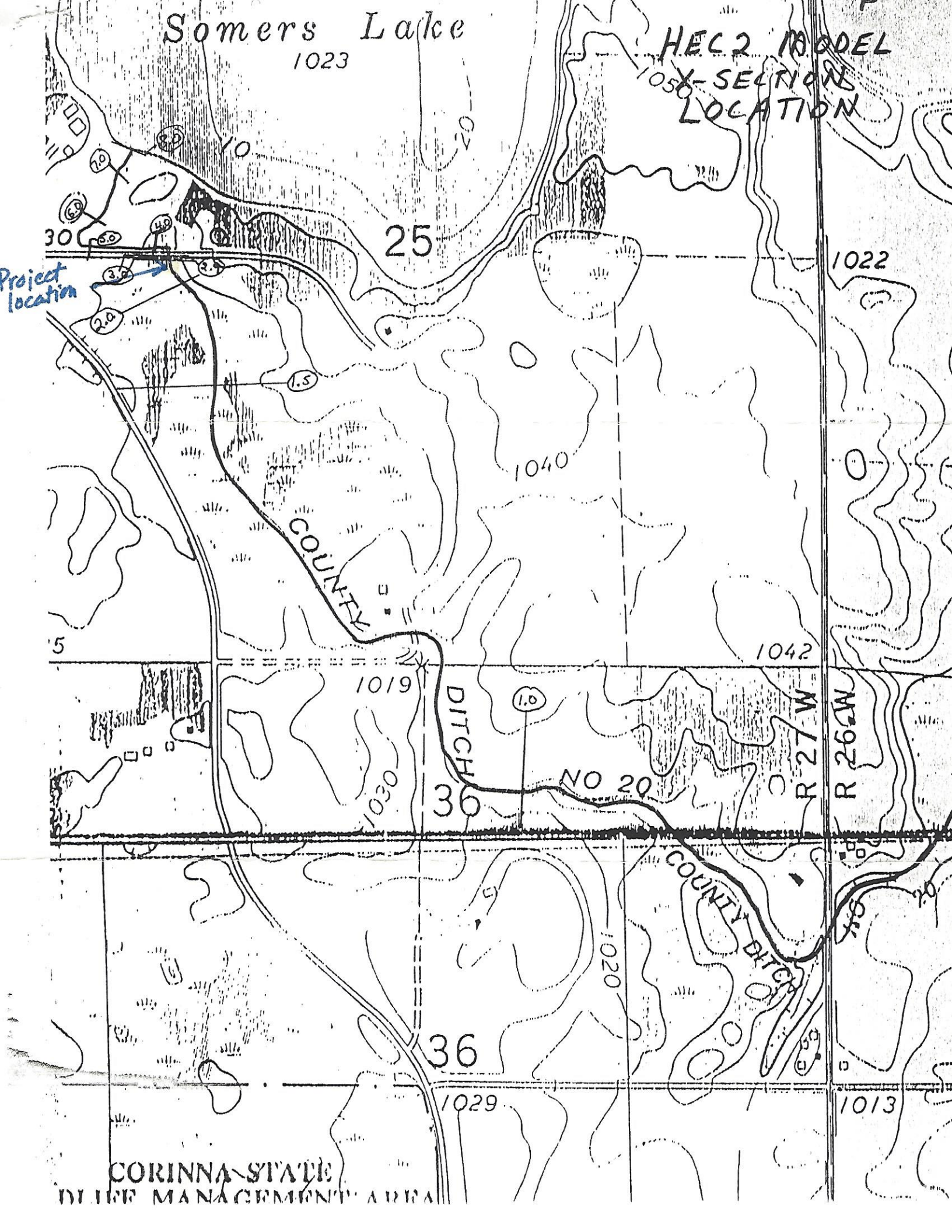
This culvert replacement is an essential fore-runner to other upcoming projects that we are considering for the fish management at Mink and Somers Lakes. I would say it is absolutely essential for the long term health and well being of the lakes. We are in wait of a resolution in the affirmative from the township board for this project to move ahead.

Yours truly,

Paul Diedrich

Paul Diedrich
Montrose Area Fisheries Supervisor

c:Ed Feiler
Somers Lake file


Somers Lake
1023
HEC2 MODEL
X-SECTIONS
LOCATION
1056
Project location
25
1022
1040
COUNTY
DITCH
NO 20
1042
1019
1030
36
R 27 W
R 26 W
COUNTY DITCH
1020
36
1029
1013
CORINNA STATE

STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES
1601 Minnesota Drive, Brainerd, MN 56401

PHONE NO. 218/828-2271

FILE NO.

November 21, 1990

To Whom it May Concern:

You may recall having received a letter dated November 1, 1990, from the Minnesota Department of Natural Resources, Section of Fisheries. The letter, a copy of which is attached, advised of a construction project at the County Ditch #20 culvert under Township Road T-783 on the south end of Somers Lake. The project was originally scheduled for mid-November, 1990, however, it has now been re-scheduled for June, 1991. There are some problems and details regarding the detour route to consider before the project can continue.

You will be kept advised of the project progress. Please retain these letters so that when we make contact with you in June, you will be able to make reference to the project.

Thank you for your time and attention to this matter.

Sincerely,

Tim Brastrup

Timothy J. Brastrup
Regional Fisheries Special
Projects Coordinator

TJB/lkm
attachment

STATE OF
MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

PHONE NO. 218/828-2271

1601 Minnesota Drive, Brainerd, MN 56401

FILE NO.

November 1, 1990

To Whom it May Concern:

The Minnesota Department of Natural Resources, Section of Fisheries, is planning to replace the culvert in County Ditch #20 under Township Road T-783. The project site is approximately two (2) miles north of Maple Lake, Minnesota. See the attached maps of the area.

The project will involve removing the existing culvert and replacing it with a specific culvert type and design to prevent carp migration to Mink and Somers Lakes via County Ditch #20. The township road will be closed for approximately one week. During that construction period, a detour will route traffic to and from the development area on the south part of Somers Lake along the township road. See the attached map for the detour route.

The dates of the project have not been established, however, if the project is conducted during the fall of 1990, it would likely be during the period November 12 to November 20.

This is to advise you of the impending construction and associated traffic detour route in the even of an emergency or local services. You will be contacted by phone prior to the starting date. Please retain this letter, place the actual starting date in the space provided, and route copies to appropriate individuals as you wish.

Dates: _____

If you have any questions, please feel welcome to contact this office.

Sincerely,

Timothy J. Brastrup
Special Projects Coordinator
Region 3 Fisheries