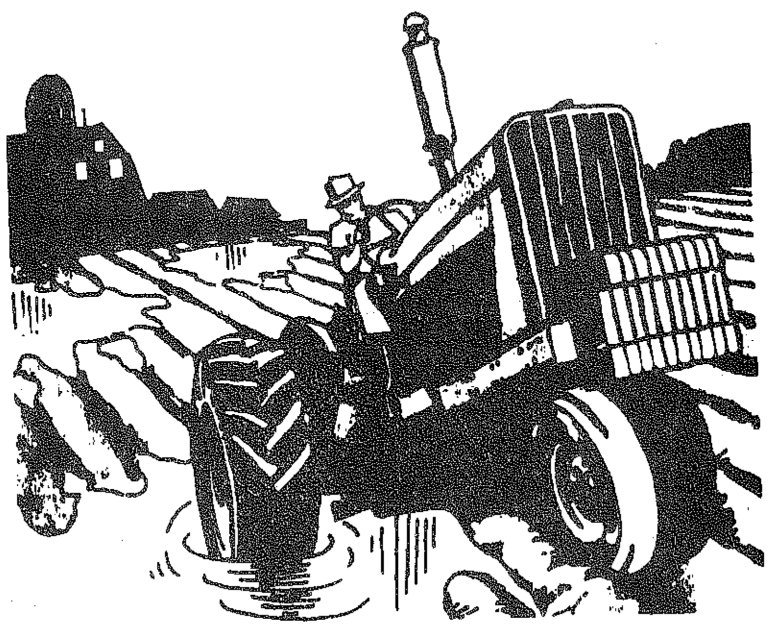
DRAINAGE RESEARCH
MINER INSTITUTE - 1980

SOIL and CROP RESPONSES

F.N. Swader
L.D. Geohring

June 1981



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Report 81-01

An interdisciplinary project of the New York State College of Agriculture and Life Sciences

Acknowledgements

This publication reports data obtained during 1980 by a cooperative project (Hatch 498) conducted at Miner Institute, Chazy, N.Y., involving the Departments of Agricultural Engineering, Agricultural Economics, and Agronomy of the College of Agriculture and Life Sciences. The respective cooperators are R. D. Black and L. D. Geohring; R. A. Milligan; and F. N. Swader. The field data were collected under the active supervision of Mr. David H. Wilson.

This is the fourth in a continuing series of reports on the research into soil and water management for increased crop production in Northern New York. Previous reports were published as follows:

1977: Agronomy Mimeo 78-12

1978: Agronomy Mimeo 80-36; Agricultural Economics Research 80-32; Agricultural Engineering Staff Report 80-05.

1979: Agronomy Mimeo 80-37, Agricultural Economics Research 80-33; Agricultural Engineering Staff Report 80-06.

Hatch 498

Drainage Research - Miner Institute

1980

Crop and Soil Responses

F.N. Swader

A. Introduction

This report covers the fourth year of a project (Soil and Water Management for Increased Crop Production in Northern New York, Hatch 498) designed to reflect the effects of drainage on crop yields. The project is comprised of fields 3I-1, 3I-2, and a field at Lake Alice. The general locations are shown in Fig. 1.

The Lake Alice site is managed as a control treatment both with respect to intensive cropping (and drainage improvement) and with respect to an optimum cropping system (without drainage improvement). The yield subplots and soils are shown in Fig. 2.

The west half of the area constitutes the control for the drainage treatments, and is cropped (as much as possible) like field 3I-1. In 1980 corn was planted late due to field wetness.

The east half is considered as a control for a traditional (non-intensive, non-drained) situation. The area is currently being managed and harvested as a "native meadow" with a wide variety of grass and sedge species present. It had no tillage operations for at least 15 years. The grass is harvested as hay, and this is the first year for harvest to be recorded as subplots.

Field 3I-1 is a comparison of sub-surface drainage systems with two drain spacings (50 and 100 feet) in 4 distinct soil types. The field plan and plot locations are shown in Figures 3 and 4-7.

Field 3I-2 is a comparison of surface drainage treatments, as indicated in Fig. 8.

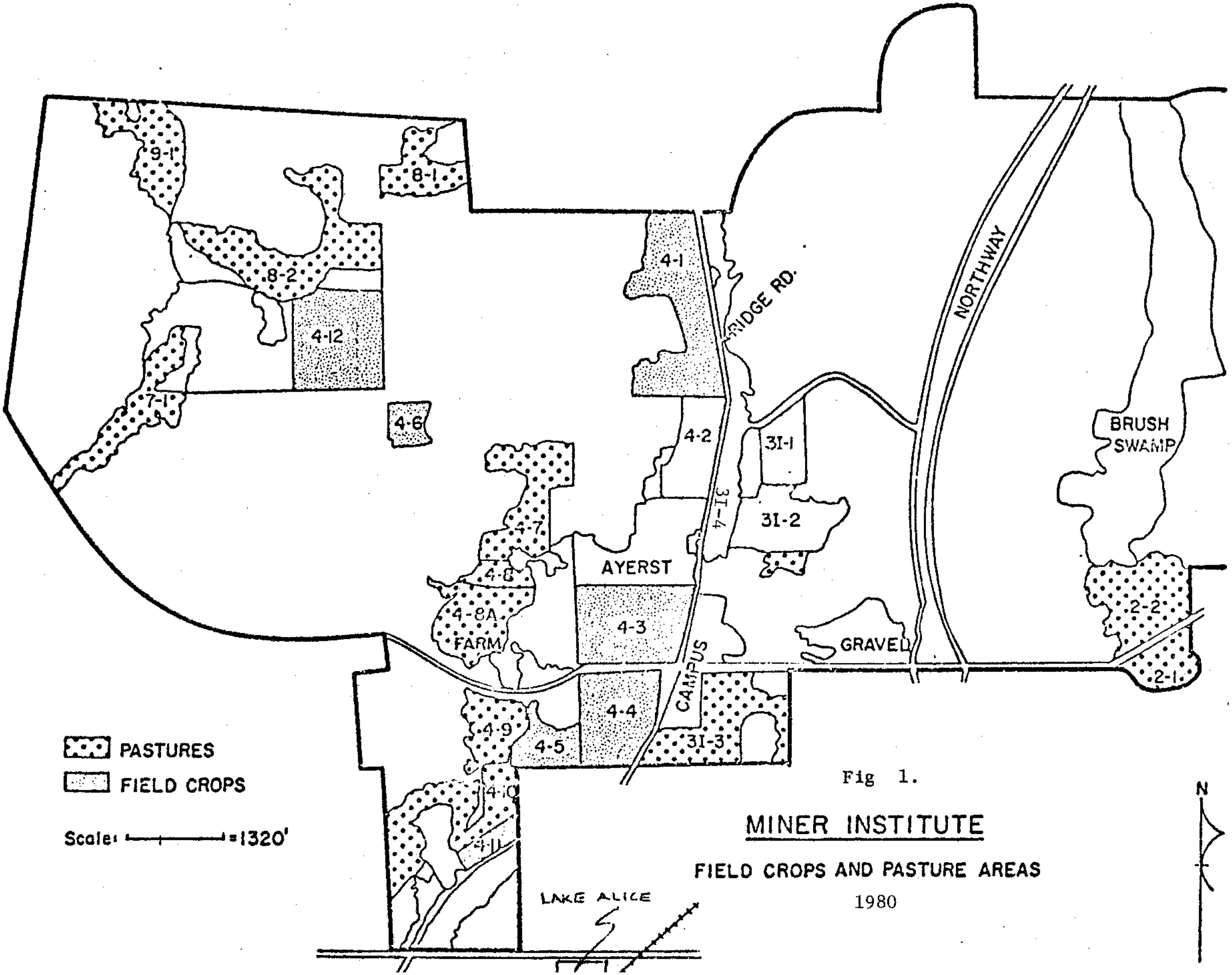

Fig 1.

MINER INSTITUTE

FIELD CROPS AND PASTURE AREAS

1980

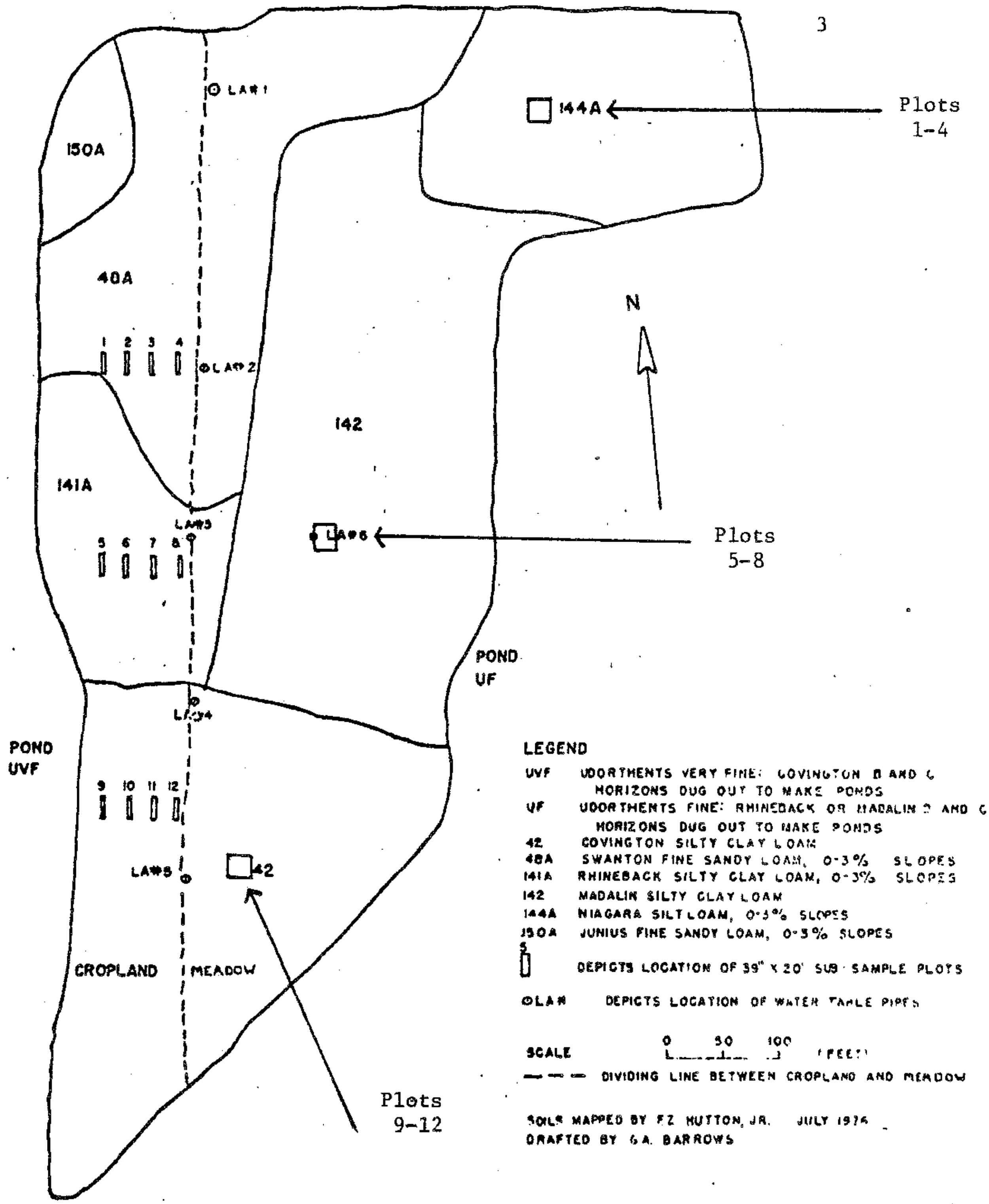

Figure 2. Plot locations, Lake Alice, 1980

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NEW YORK STATE COLLEGE OF AGRICULTURE AND LIFE SCIENCES
A STATUTORY COLLEGE OF THE STATE UNIVERSITY
AT CORNELL UNIVERSITY
ITHACA, NEW YORK

SOIL MAP
MINER INSTITUTE-LAKE ALICE
CORNELL-MINER DRAINAGE PROJECT

DR. BY MARTIN SAILUS	CK. BY L. D. Geohring	SHEET ___ OF ___
DES. BY	DATE 7/3/79	PLAN

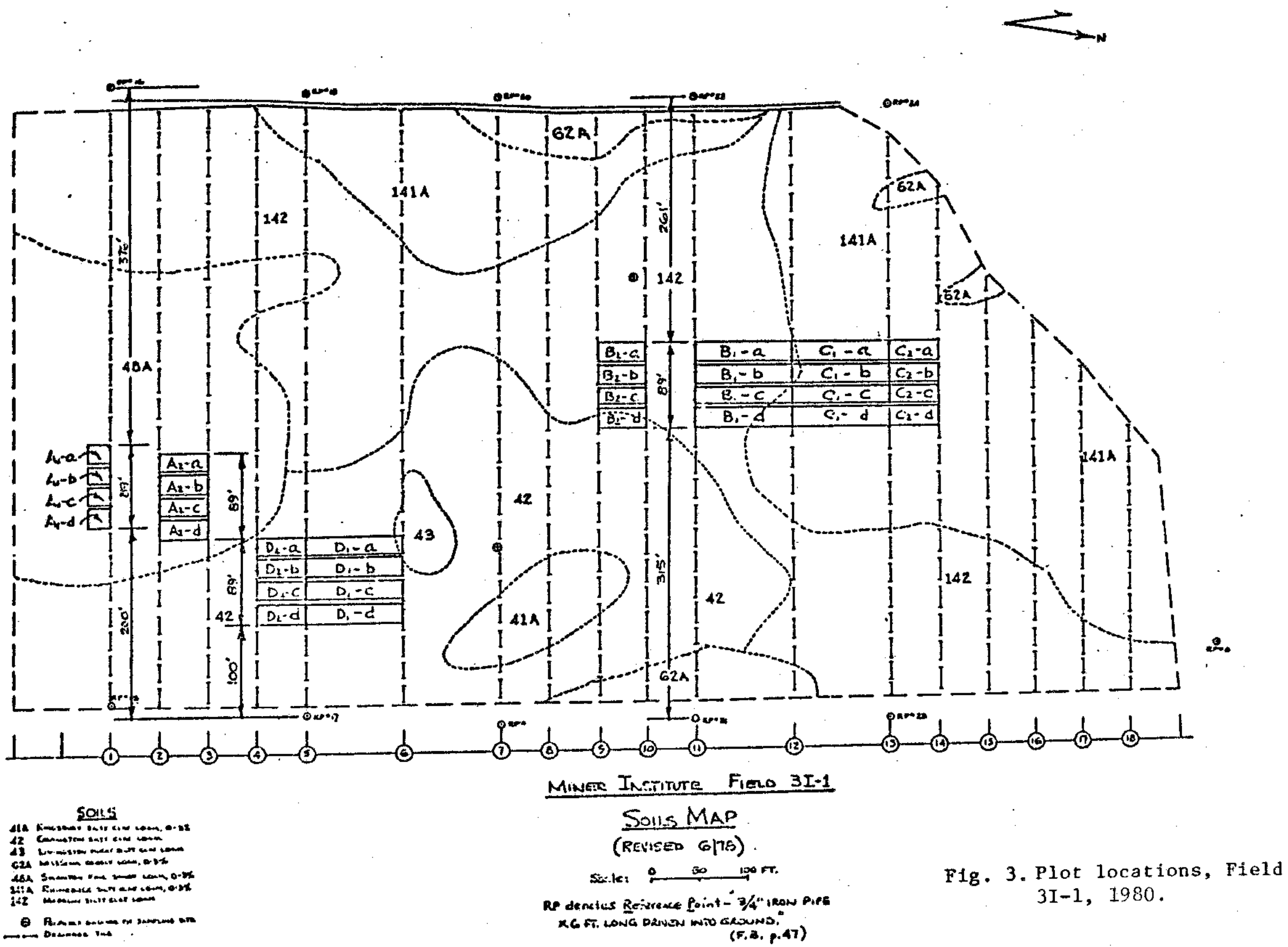


Fig. 3. Plot locations, Field 3I-1, 1980.

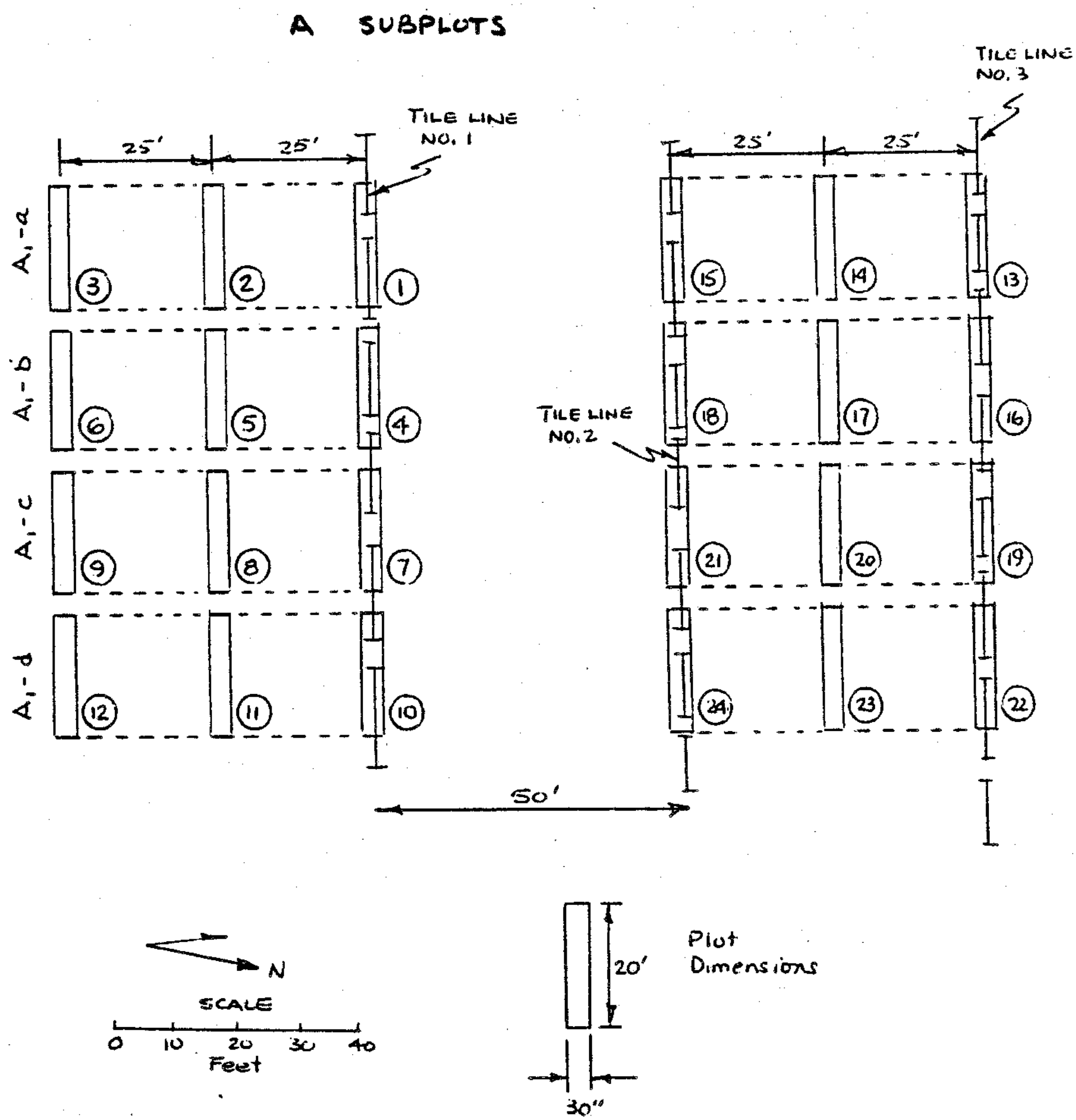


Figure 4. Subplot locations, Field 3I-1, 1980.

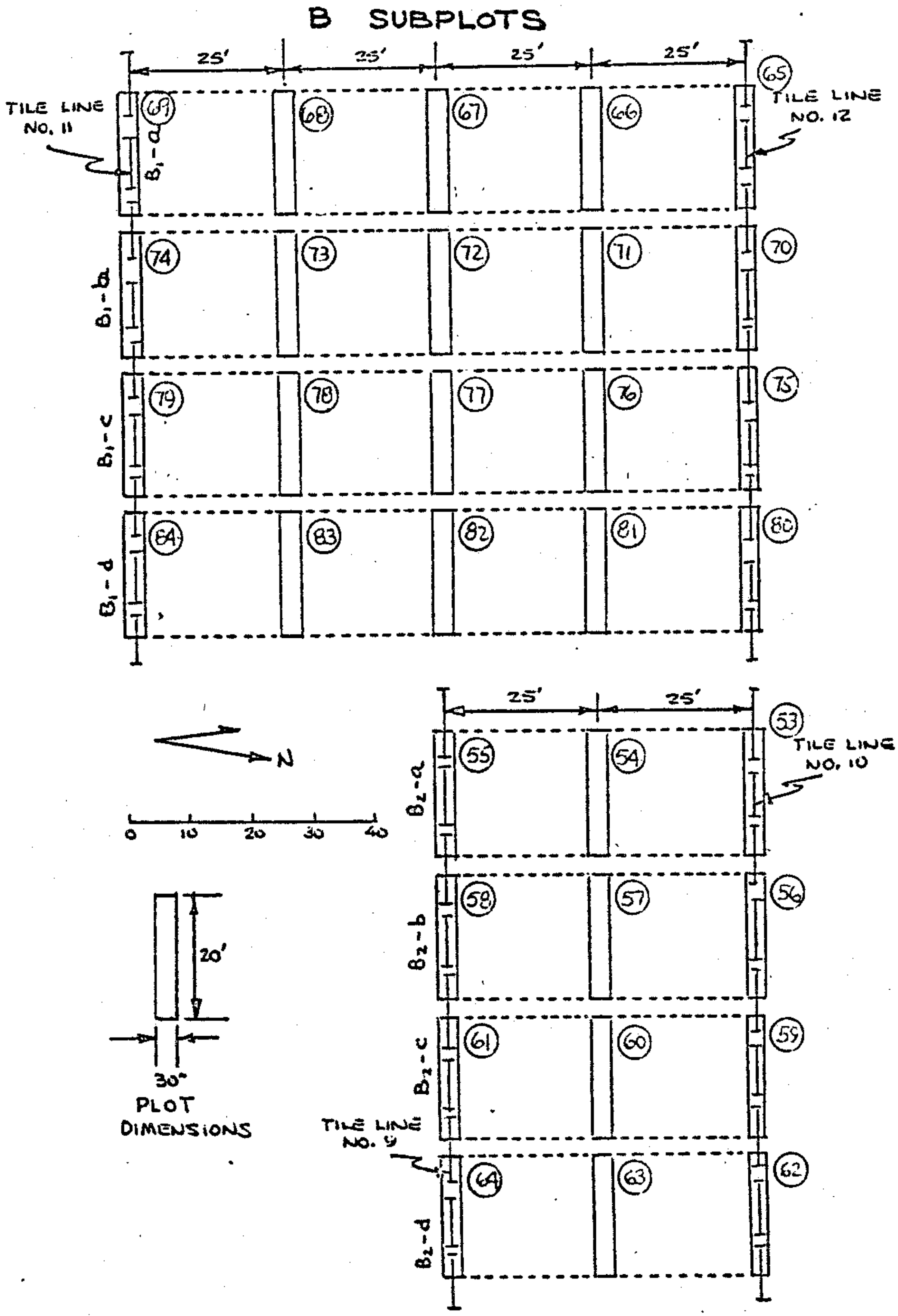


Figure 5. Subplot locations, Field 3I-1, 1980.

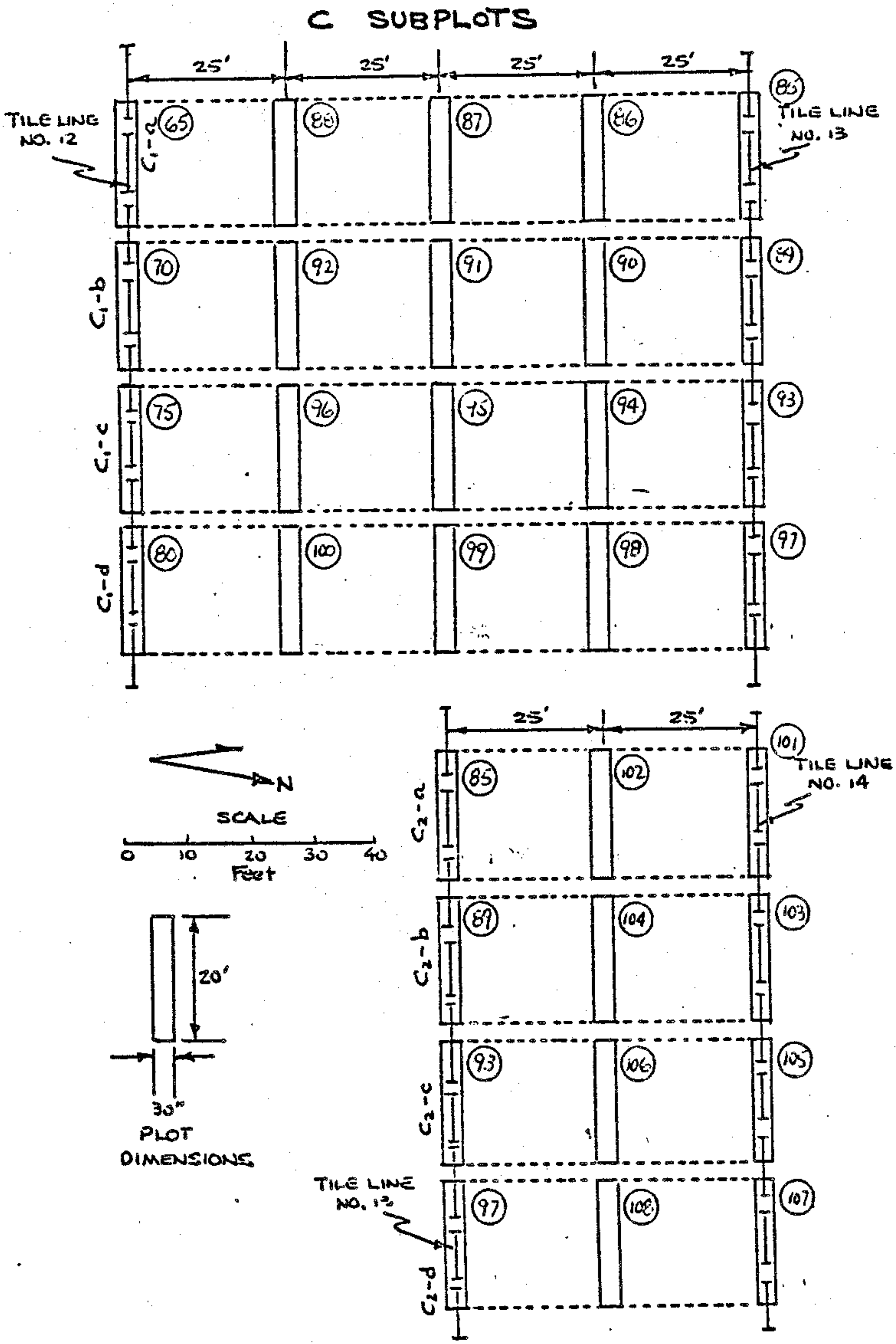


Figure 6. Subplot locations, Field 3I-1, 1980.

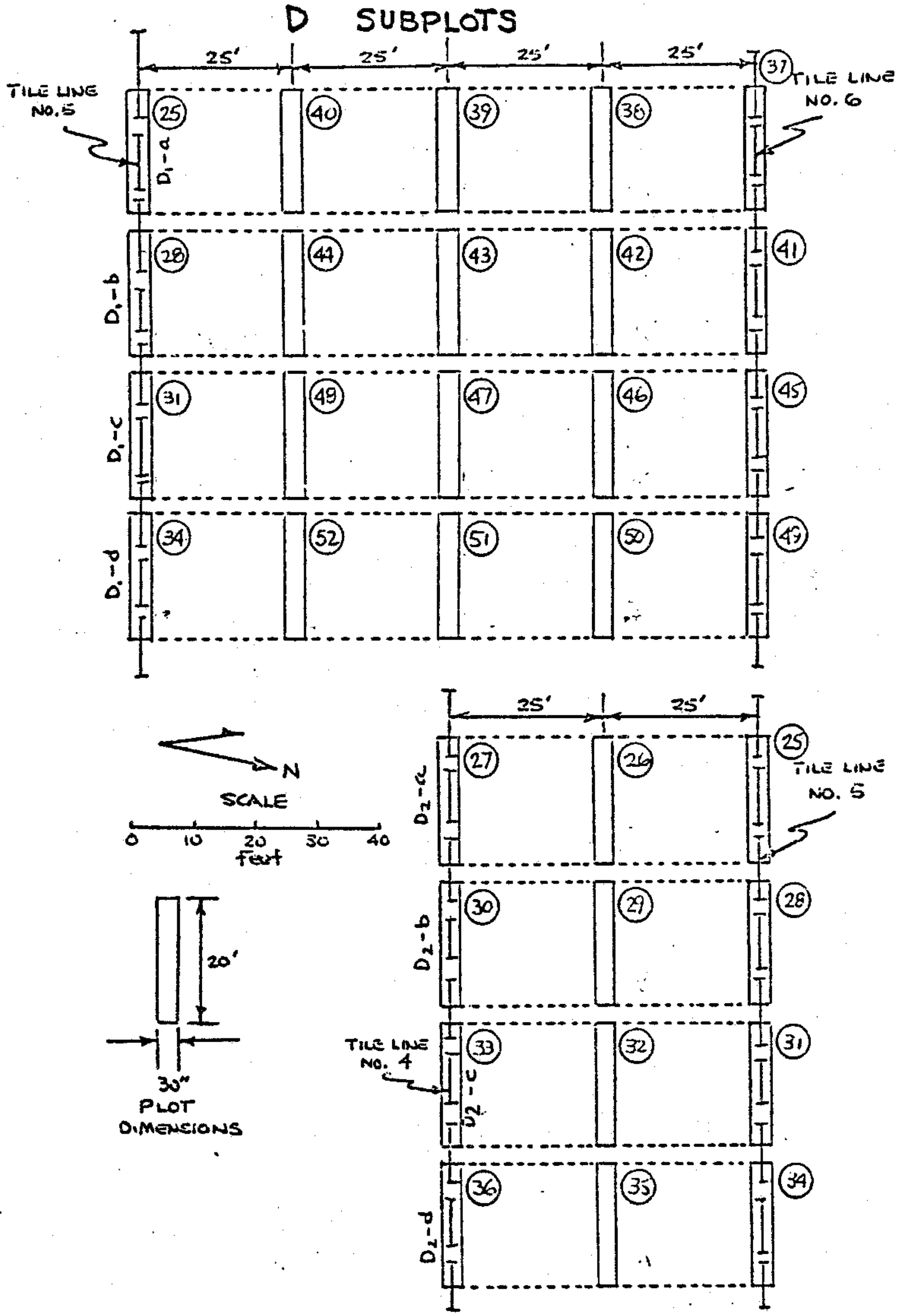
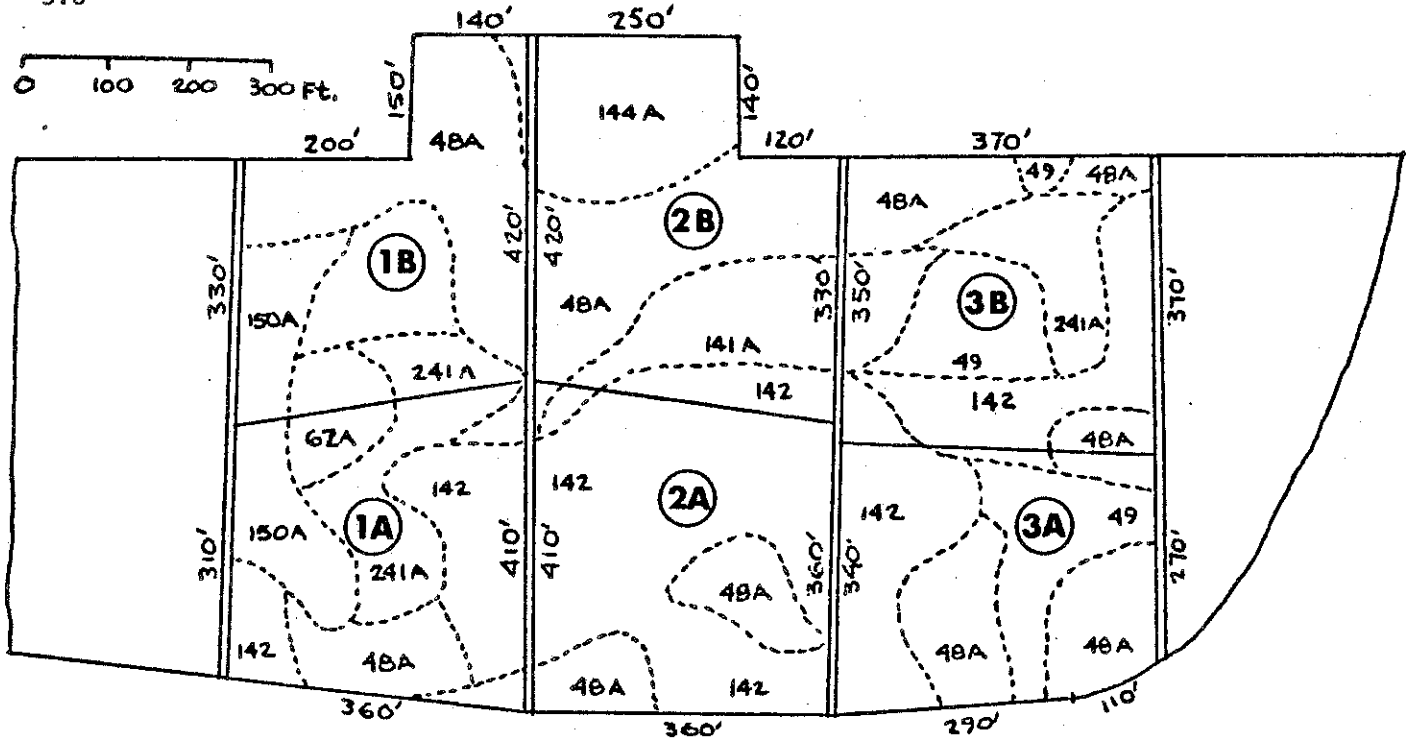


Figure 7. Subplot locations, Field 3I-1, 1980.

FIELD	ACRES	TREATMENT
1A	3.0	Smoothed
1B	2.8	
2A	3.2	Smoothed and Graded
2B	3.4	
3A	2.7	Smoothed
3B	3.0	



48A	Swanton fsl	142	Madalin sicl
49	Whately fsl	144A	Niagara sil
62A	Massena cobbly l	150A	Junius fsl
141A	Rhinebeck sicl	241A	Rhinebeck fsl

Fig. 8. Field Areas, Hatch 498, 1980. Field 3I-2.

B. Crop Management and Yields

Lake Alice (corn):

Tillage: Chisel plowed and disced twice

Pesticides: 2# Lasso plus 1# Aatrex; 1# Furadan

Fertilizer: 0-0-60 200# broadcast

11-48-0 130# banded

N 100# sidedress

Planting: Pioneer 3901 @ 32,000 K/A; May 29

P.A.G. SX-111 @ 32,000 K/A

Harvested: Sept. 27 for silage

Yields:

Table 1a. Corn Silage Yields, (70% moisture), Lake Alice, 1980

Soil: Swanton fine sandy loam

Plot No.	1	2	3	4	Mean
Corn silage yield T/A					
Pioneer 3901	-	-	20.0	21.6	20.8
P.A.G. SX-111	22.4	18.8	-	-	20.6

Soil: Rhinebeck silty clay loam

Plot No.	5	6	7	8	Means
Corn silage yield T/A					
Pioneer 3901	-	-	20.5	19.6	20.0
P.A.G. SX-111	21.4	21.2	-	-	21.3

Soil: Covington silty clay loam

Plot No:	9	10	11	12	Mean
Corn silage yield T/A					
Pioneer 3901	-	-	23.6	18.7	21.2
P.A.G. SX-111	21.2	20.9	-	-	21.0

Table 1b. Corn Grain Yields (15% moisture), Lake Alice, 1980

Soil = Swanton fine sandy loam

Plot No.	1	2	3	4	Mean
Corn grain yield Bu/A					
Pioneer 3901	-	-	101.9	111.5	106.7
P.A.G. SX-111	79.2	60.9	-	-	70.0

Soil = Rhinebeck silty clay loam

Plot No.	5	6	7	8	Mean
Corn grain yield Bu/A					
Pioneer 3901	-	-	113.0	105.0	109.0
P.A.G. SX-111	88.8	84.9	-	-	86.8

Soil: Covington silty clay loam

Plot No.	9	10	11	12	Mean
Corn grain yield Bu/A					
Pioneer 3901	-	-	129.2	103.1	116.2
P.A.G. SX-111	95.3	80.4	-	-	87.8

Lake Alice (meadow):

Tillage: none

Pesticides: none

Fertilizer: 325 lbs. 15-15-15

Planting: none

Harvested: Aug. 18 for baled hay

Table 2. Hay Yields, (15% moisture), Lake Alice, 1980

Soil: Niagara silt loam

Plot No.	1	2	3	4	Mean
Hay yield T/A	2.06	1.97	1.89	1.67	1.90
% legume in hay	5	10	10	5	7.50

Soil: Madalin silty clay loam

Plot No.	5	6	7	8	Mean
Hay yield T/A	1.26	1.50	1.27	1.38	1.35
% legume in hay	5	5	10	5	6.25

Soil: Covington silty clay loam

Plot No.	9	10	11	12	Mean
Hay yield T/A	0.87	1.04	0.83	1.00	0.94
% legume in hay	5	10	5	5	6.25

Field 3I-1

Tillage: chisel plowed and disced twice

Pesticides: 2# Lasso plus 1# Aatrex; 1# Furadan

Fertilizer: 0-0-60 200# broadcast

11-48-0 130# banded

N 100# sidedress

Planting: Pioneer 3901 @ 32,000 K/A; May 12

Harvested: Sept. 25 and 26 for silage

Yields:

A. 50-foot drain spacing

Table 3. Mean Silage Yields, T/A (70% moisture), Field 3I-1, 1980

Plot Area[1/]	Soil	Treatment[2/] A	B	C
A_2	Swanton fsl	25.3[a]	25.1[a]	22.0[b]
B_2	Madalin sicl	24.4[a]	26.4[a]	27.7[a]
C_2	Rhinebeck sicl	22.4[a]	20.6[a]	21.6[a]
D_2	Covington sicl	26.7[a]	24.8[a]	25.2[a]

1/ See plot location maps (Figures 4-7).

2/ Treatments are distances (in feet) from the drain line: A = 0, B = 25, C = 0.

3/ Means superscripted by the same letter are not significantly different at P = 0.05 (Duncan's Multiple Range Test). Comparisons may be made only horizontally.

Table 4. Mean Grain Yield, Bu/A (15% moisture), Field 3I-1, 1980

Plot Area[1/]	Soil	Treatment[2/] A	B	C
A_2	Swanton fsl	174.7[a]	163.5[a]	155.8[a]
B_2	Madalin sicl	158.6[a]	170.6[a]	174.2[a]
C_2	Rhinebeck sicl	143.6[a]	140.0[a]	141.0[a]
D_2	Covington sicl	181.3[a]	168.0[a]	168.8[a]

1/ See plot location maps (Figure 4-7).

2/ Treatments are distances (in feet) from the drain line: A = 0, B = 25, C = 0.

3/ Means superscripted by the same letter are not significantly different at P = 0.05 (Duncan's Multiple Range Test). Comparisons may be made only horizontally.

B. 100-foot drain spacing:

Table 5. Mean Silage Yields, T/A (70% moisture), Field 3I-1, 1980

Plot Area[1/]	Soil	Treatment[2/] A	B	C	D	E
A_1	Swanton fsl	26.2[a]	25.6[a]	-	-	-
B_1	Madalin sicl	24.7[a]	23.6[a]	26.8[a]	26.1[a]	25.1[a]
C_1	Rhinebeck sicl	21.6[a]	23.0[a]	24.7[a]	24.5[a]	24.7[a]
D_1	Covington sicl	25.8[a]	23.2[b]	26.2[a]	25.8[a]	26.7[a]

1/ See plot location maps (Figures 4-7).

2/ Treatments are distances (in feet) from the drain line: A = 0, B = 25, C = 50, D = 25, E = 0.

3/ Means superscripted by the same letter are not significantly different at P = 0.05 (Duncan's Multiple Range Test). Comparisons may be made only horizontally.

Table 6. Mean Grain Yields, Bu/A, (15% moisture), Field 3I-1, 1980.

Plot Area[1/]	Soil	Treatment[2/] A	B	C	D	E
A_1	Swanton fsl	174.6[a]	174.0[a]	-	-	-
B_1	Madalin sicl	163.0[a]	157.4[a]	178.7[a]	177.0[a]	169.1[a]
C_1	Rhinebeck sicl	141.0[b]	156.7[a]	168.0[a]	168.4[a]	163.0[a]
D_1	Covington sicl	174.8[a]	154.5[b]	170.4[a]	168.8[b]	181.3[a]

1/ See plot location maps (Figures 4-7).

2/ Treatments are distances (in feet) from the drain lines: A = 0, B = 25, C = 50, D = 25, E = 0.

3/ Means superscripted by the same letter are not significantly different at P = 0.05 (Duncan's Multiple Range Test). Comparisons may be made only horizontally.

Field 3I-2

Tillage: Chisel plowed and disced twice

Pesticides: 2# Lasso plus 1# Aatrex; 1# Furadan

Fertilizer = 0-0-60 200# broadcast

11-48-0 130# banded

N 100# sidedress

Planting: Pioneer 3901 @ 32,000 K/A May 16

Harvested: Sept. 23, 24 and 25 for silage.

Yields:

Table 7. Corn Silage, T/A (70% moisture), Field 3I-2, 1980.

Soils:	Rhinebeck Madalin	Swanton Madalin	Madalin	Niagara Swanton Rhinebeck	Madalin Swanton Whately	Rhinebeck Madalin Whately
Plot No.	1A	1B	2A	2B	3A	3B
Drainage Treatment	Smoothed		Smoothed and graded		Smoothed	
T/A (70% moisture)	18.9	27.0	16.6	25.9	15.6	15.2

Total 1980 silage production: 361 tons (70% moisture)

C. Yield Responses to Drainage

Lake Alice:

These plots are maintained as a control to the drainage treatments on Field 3I-1 (see Table 1). The delayed planting (May 29) contrasts with the drained fields, which were planted 2 weeks earlier.

Field 3I-1:

50-foot spacing: There were no significant differences in yield of either silage or grain as a function of distance from the drain. The one anomaly in the Swanton soil type is probably due to some localized soil disturbance when the drain line was laid.

100-foot spacing: Very few significant differences in yield as a function of distance from the drain were noted. The major anomaly is in the Covington soil type and occurs at 25 feet from the tile line.

Field 3I-2:

The yield data were collected only on a subfield basis (see Table 7), and have not been statistically analyzed.

D. Discussion

1980 proved to be the best year yet for corn yields from Field 3I-1 (Table 9 Both silage and grain yields were high; silage yield was approximately 3 tons per acre higher than either the preceeding 2 years, while average grain yields were some 6 bushels per acre higher than 1978 and almost 100 bushels per acre higher than 1979. Rainfall was below the long term mean (LTM) during May and June as indicated in Figure 9, but the remainder of the season from July through October was nearly normal on a month-by-month basis.

Since drainage is a method of removing excess soil water, one would expect little response to drainage in a slightly drier than normal season (when little or no excess water occurs).

The mean yields of grain and silage in field 3I-1, over all soil types were:

50-foot spacing: grain 161.7 Bu/A; Silage 24.4 T/A.

100-foot spacing: grain 167.1 Bu/A; Silage 25.0 T/A.

There were no substantial differences attributable to tile spacings in 1980. The grain yields were considerably higher than in 1979 (166 Bu/A vs 65 Bu/A), while silage yields were slightly higher than in 1979 (25 T/A vs 21+ T/A). These differences, especially in grain yield, are undoubtedly due to differences in growing season rainfall. In 1979, there was only 1.8 inches of rain in June and July (a deficit of 5.0 inches), compared to 4.0 inches in June and July of 1980 (a deficit of only 2.8 inches).

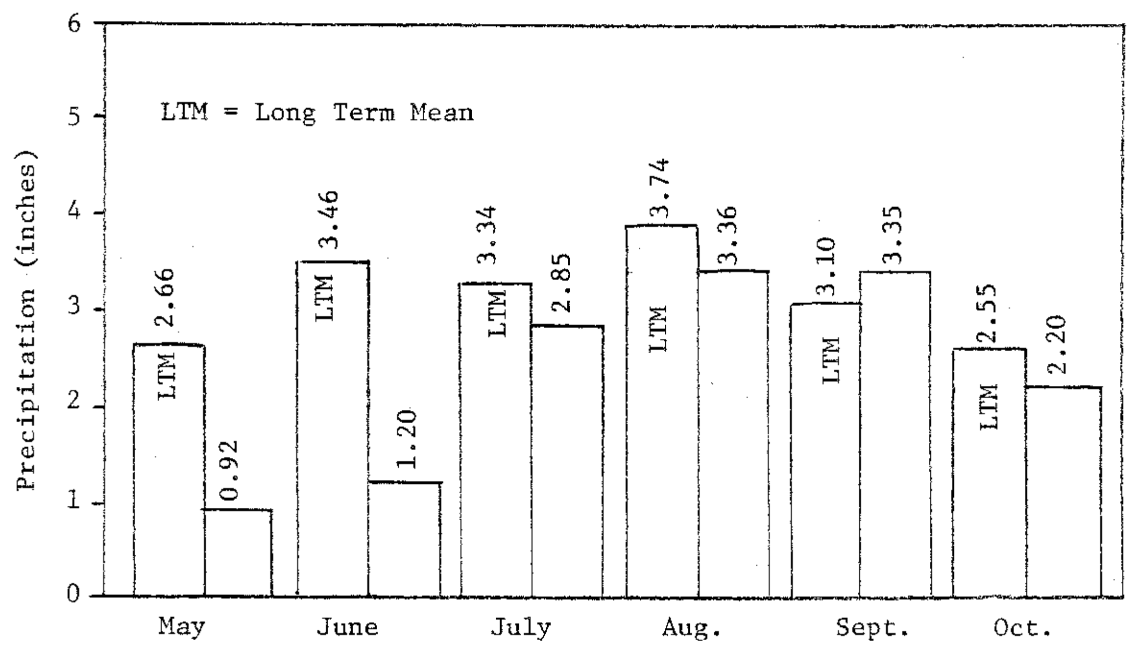


Fig. 9. Growing Season Rainfall, Chazy, N.Y., 1980.

Table 8. Rainfall and Evaporation, Miner Institute, 1980

Date	April Pptn.	April Evap.	May Pptn.	May Evap.	June Pptn.	June Evap.	July Pptn.	July Evap.	August Pptn.	August Evap
1	-	N/A	0.03	.16	0.32	.07	0.02	.06	-	.29
2	-		-	.14	0.05	.20	0.05	.30	0.31	.27
3	-		-	.25	T	.09	0.24	.05	0.31	.20
4	0.10		-	.31	0.08	.08	-	.05	0.35	.10
5	0.54		-	.19	0.10	.16	-	.23	-	.16
6	-		-	.13	-	.19	0.15	.22	T	.27
7	-		0.27	.07	-	.29	-	.39	-	.08
8	-		0.11	.18	0.02	.21	0.01	.33	-	.24
9	0.21		-	.09	0.08	.03	0.14	.05	-	.20
10	0.01		-	.10	0.12	.16	-	.19	-	.23
11	0.44		-	.05	0.07	.08	0.07	.20	-	.20
12	-		-	.10	T	.09	0.06	.18	0.37	.19
13	0.21		-	.31	-	.21	-	.09	0.14	.16
14	-		0.01	.05	-	.15	-	.24	-	.05
15	0.15		T	.07	-	.02	0.01	.28	0.34	.16
16	-		-	.10	T	.07	0.09	.07	0.01	.08
17	-		-	.11	-	.28	-	.20	0.04	.23
18	-		-	.15	-	.13	0.22	.23	-	.10
19	-		0.39	.04	0.10	.26	-	.13	0.37	.20
20	-		-	.19	-	.07	-	.37	0.18	.03
21	T		-	.21	0.19	.07	0.26	.05	-	.11
22	-		-	.27	-	.02	0.10	.06	-	.20
23	-		-	.20	0.07	.24	0.12	.07	-	.20
24	T		-	.19	-	.20	0.60	.29	-	.29
25	T		-	.15	-	.39	-	.19	-	.20
26	0.33		-	.11	-	.21	0.03	.30	-	.10
27	-		-	.31	-	.33	0.29	.28	0.08	.07
28	T		-	.34	-	.26	0.03	.13	0.66	.04
29	0.28		-	.24	-	.13	-	.12	-	.04
30	0.03		-	.20	T	.30	0.30	.04	-	.08
31	-		0.11	.17	-	-	0.06	.05	0.47	.21
Totals	2.30	-	0.92	5.18	1.20	4.99	2.85	5.44	3.36	4.98
LTM*	2.41	-	2.66	4.85	3.46	5.48	3.34	6.09	3.74	4.92

*Long Term Mean

Table 9. Corn Yields, Field 3I-1.

Year	Grain, Bu/A	Silage, T/A
1978	159	22.2
1979	65	21.4
1980	166	24.6

Table 10. Silage Yields on Similar Soils, Lake Alice and Field 3I-1.

	Corn Silage Yield, T/A	
Soil	Lake Alice	Field 3I-1
Swanton fsl	20.8	25.4
Rhinebeck sicl	20.0	21.8
Covington sicl	21.2	25.2

A comparison of corn silage yields on similar soils from a drained field (3I-1) and from an undrained (control) field (Lake Alice) indicate, except for Rhinebeck soils, a clear yield advantage in 1980: 4 tons/acre for Covington soils and nearly 5 tons/acre for Swanton soils (Table 10).

E. Water Levels and Tile Discharge

1. Methods

In addition to crop yield data, the influences of drainage on the levels of water in the soil were monitored in perforated plastic pipes which were installed in the soil. The pipe locations are shown in Figures 2 and 10.

Twelve pipes were installed in Field 3I-1 in 1977, between tile lines #6 and #8, and six were installed between tile lines 2 and 3 (see Figure 10). The depth to the water surface was measured periodically from April 11 through November 25. The data are shown in Appendix B.

Six pipes installed at the Lake Alice site in 1976 (Figure 2), were similarly monitored. These provide a non-drained comparison for many of the soils which occur in Field 3I-2. The data are shown in Appendix C.

Water table pipes installed in Field 3I-2 in 1975 at distances of 1, 30, and 45 feet upslope from a subsurface drain which is located at the boundary of 3I-2 and the adjacent pasture to the west, and in locations in Field 3I-4 which are located where the subsurface drain would have been if it were extended to the north, and 30 feet on either side of such an extension. These data are shown in Appendix D and E, respectively.

The discharge from some tile lines in Field 3I-1 (#3, 6, 9, and 12) was measured on the same dates as the water table levels, to ascertain whether there were differences in the rate of flow, which might be related to soil differences. These data are shown in Appendix F. The data were gathered by catching the outflow for a specific period of time, measuring it, and calculating the flow in gallons per minute (g.p.m.). It should be noted that these are instantaneous data, and may not accurately represent tile flow for any entire day, or perhaps even a significant portion of a day. Continuous data have not been obtained.

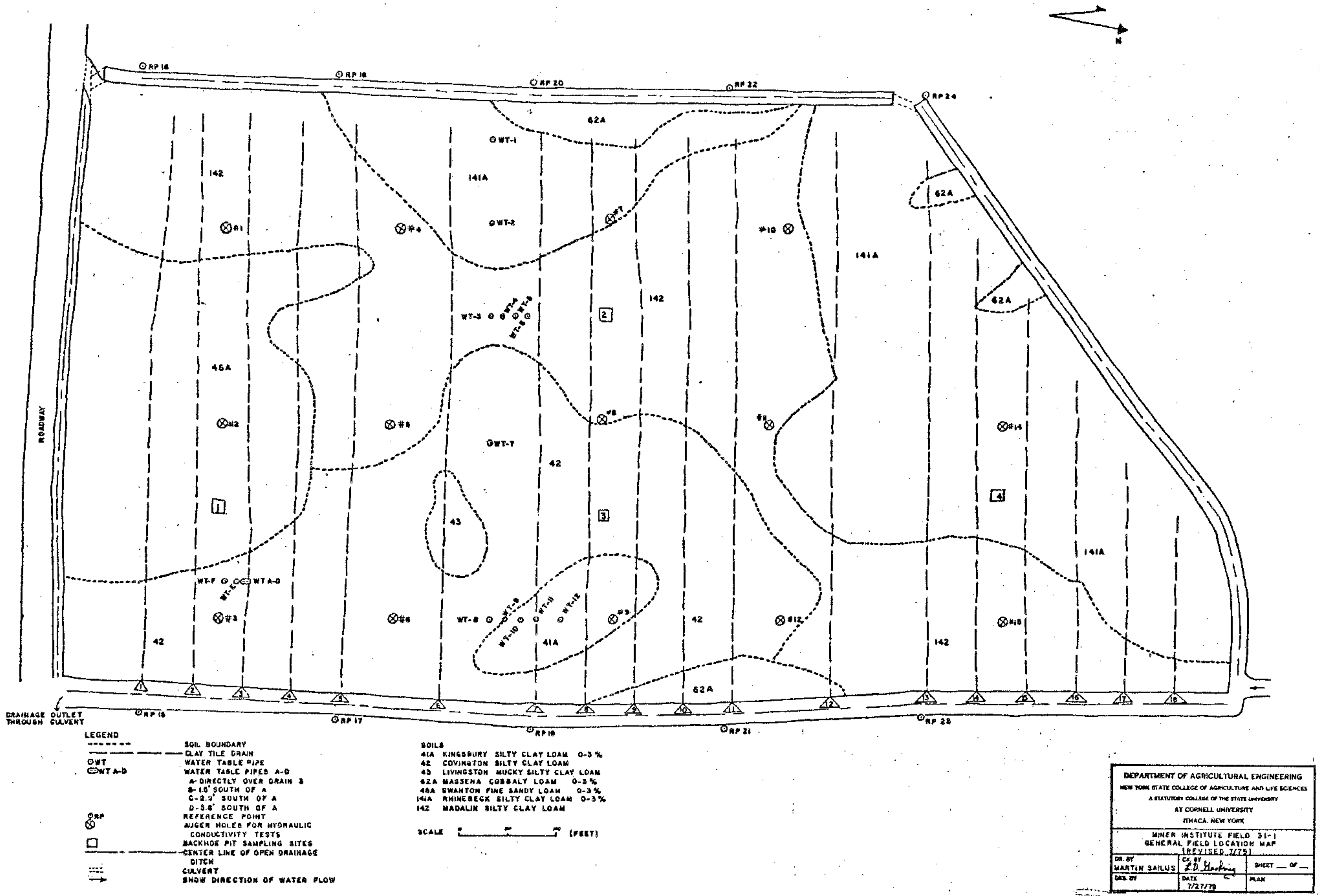


Fig. 10. Water table pipe locations, Field 3I-1.

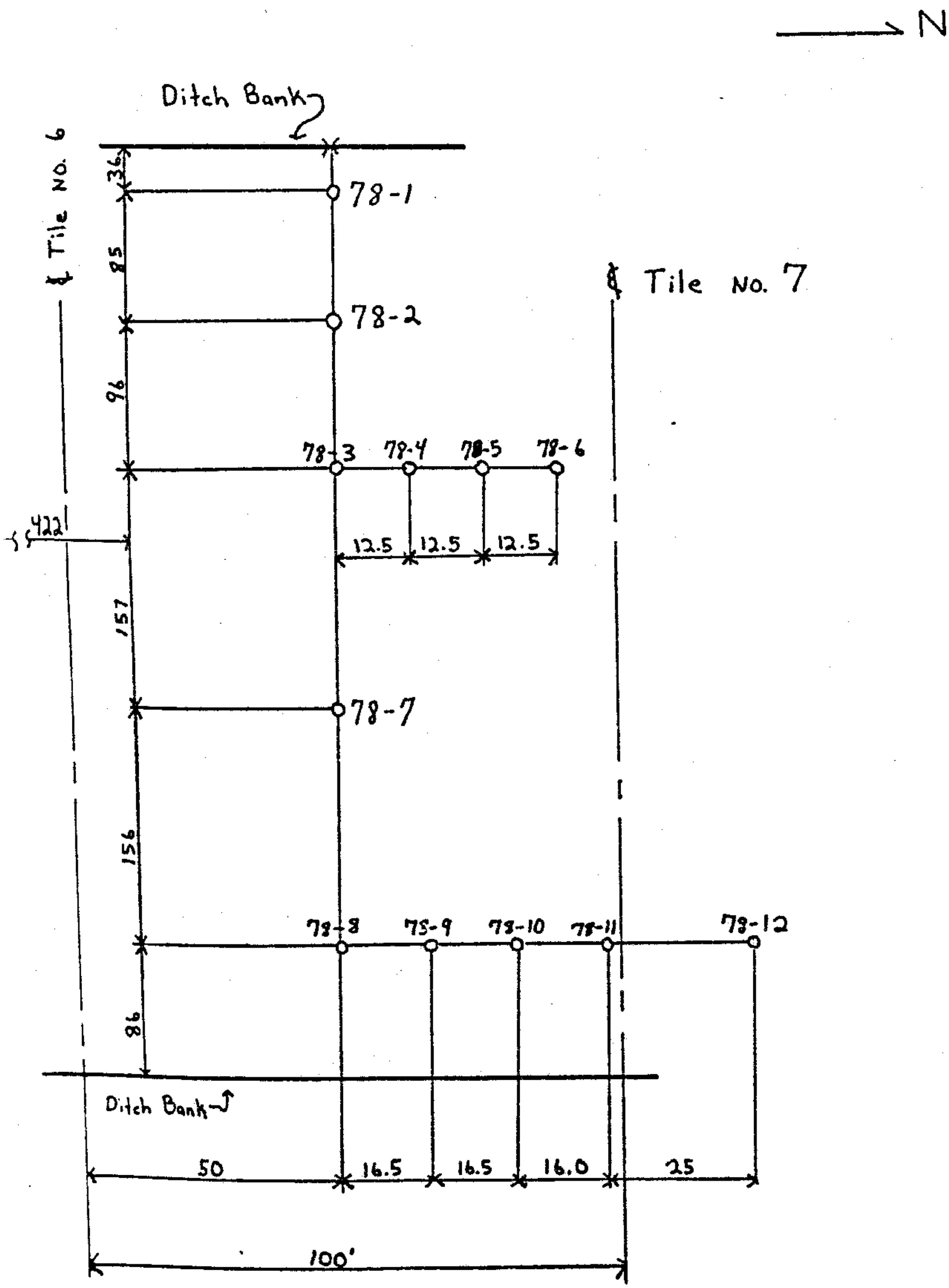


Figure 10a. Water Table Pipes
Miner Institute-Fld 3I-1
installed 6/27/77

2. Data

The field data are shown in Appendix B, C, D, and E.

3. Discussion

The daily rainfall and evaporation for the summer months are shown in Table 8 and in graphic form in Figure 9. Rainfall was well below the LTM in May and June, slightly below in July, about normal in August and September, and slightly below in October.

The data in Figure 11 indicate that water table levels were lower in a drained Covington soil than in a non-drained one. The earliest conceivable date that the non-drained Covington could have been safely planted would have been May 29, while the drained Covington had a consistently lower water table for a whole month and a half earlier. These results are consistent with those found in 1979.

Figure 12 indicated that the difference in the depths to a water table were very similar in the Madalin soil, but that the drainage had a greater effect on lowering the water table.

Figure 13 shows the late summer/early fall response on Covington soils; Figure 14 shows this response on Madalin soils.

If we assume that a water table level closer than 30 inches to the surface makes harvest increasingly difficult, these data indicate that wetness would increasingly interfere with harvest on both the non-drained Covington and Madalin soils from early in September, while drained Covington and Madalin soils would have been dry enough for efficient harvest to as late as mid- to late-November. In these comparisons, drainage would have been the major factor in a successful crop harvest from late October in non-drained Covington soils, and from about mid-October in non-drained Madalin soils.

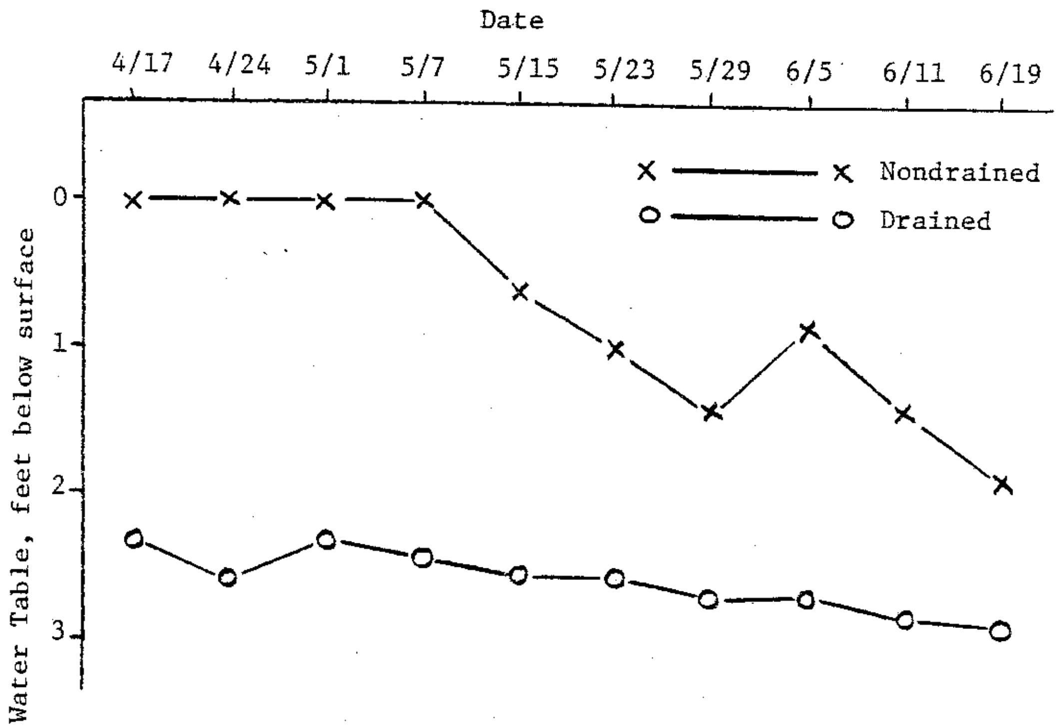


Fig. 11. Effect of drainage on water tables, Miner Institute, Spring 1980. Covington soils.

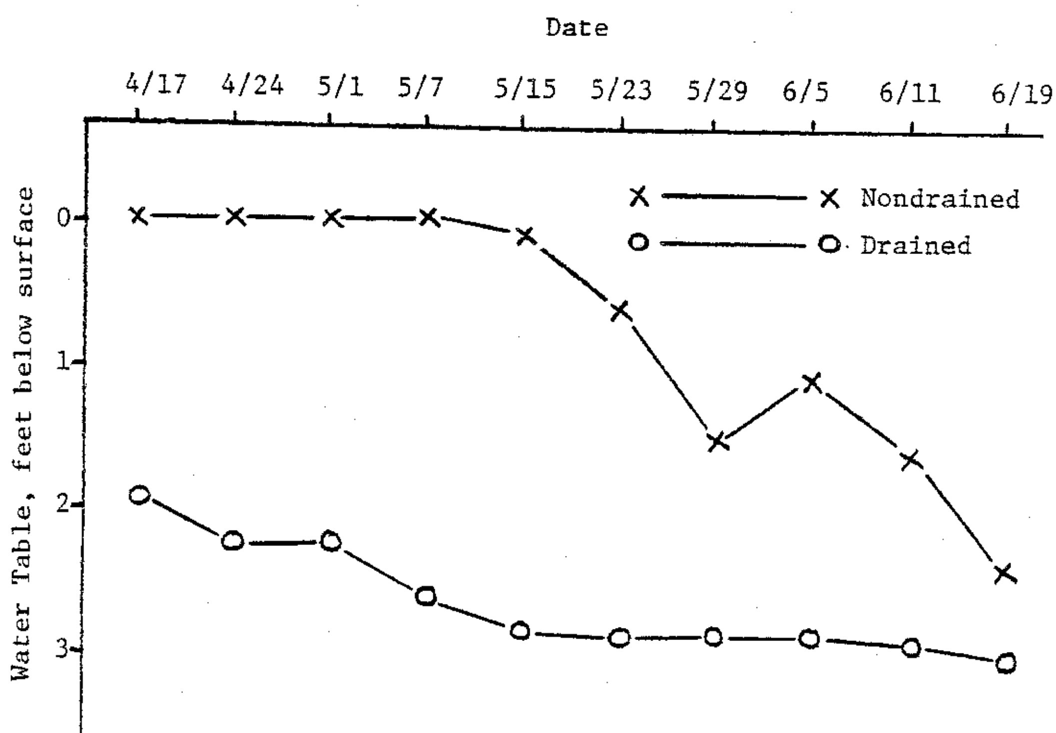


Fig. 12. Effect of drainage on water tables, Miner Institute, Spril 1980. Madalin Soils

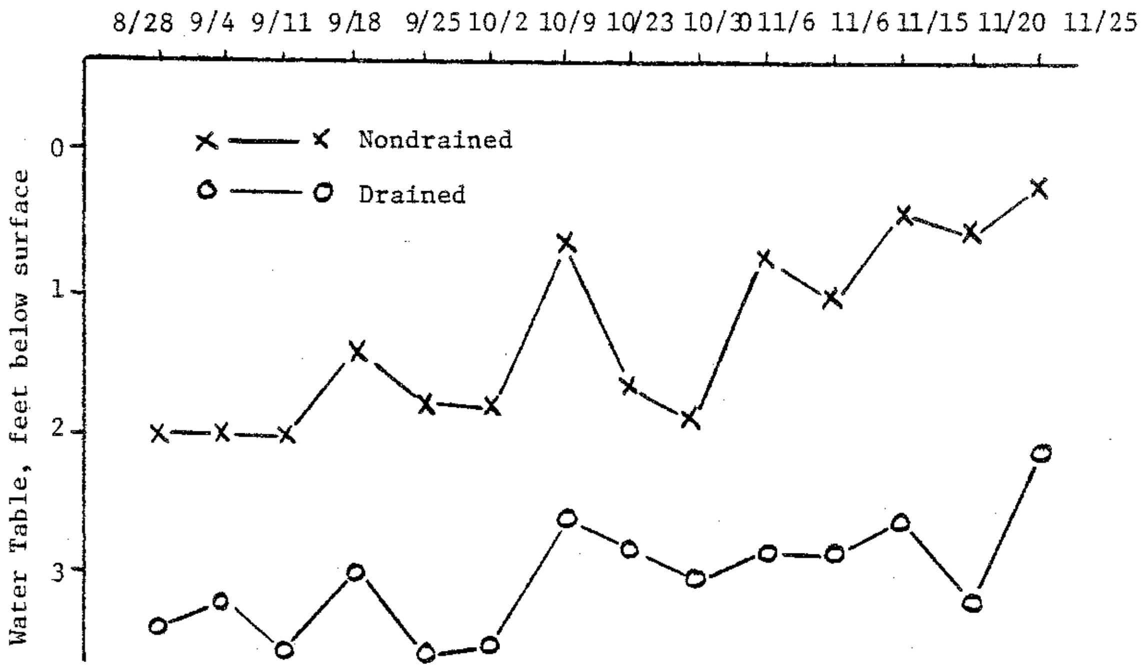


Fig. 13. Effect of drainage on water tables. Miner Institute, Fall, 1980. Covington soils.

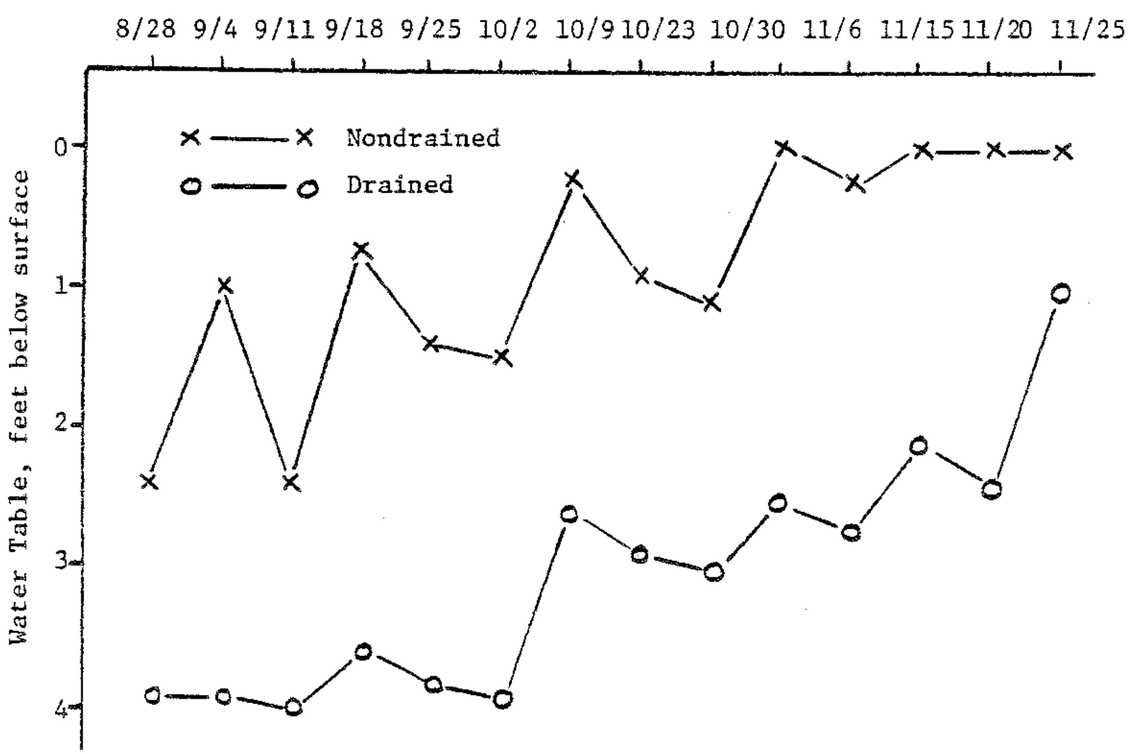


Fig. 14. Effect of drainage on water table, Miner Institute, Fall, 1980. Madalin soils.

Figure 15 and 16 show the effect of tile drains on water table levels (depth below the surface) and elevation (depths with respect to one another) in Covington and Kingsbury soils. Since the water table pipes are nearly identical in their ground elevations, the 2 sets of data may be used interchangeably.

For the period from April 17 to May 23, the water table depth at a distance of 1 foot from the tile line ranged from 1.8 to 2.6 feet. During the same period, the range in depths to water table at a distance of 50 feet from a tile line ranged from 1.1 to 2.5 feet.

An unexpected observation (similar to one of 1979) is that the water table elevations in tube 78/8 (50 feet from a tile line) are generally as low or lower than tubes 78/9 and 78/10 which are about 35 and 17 feet from a tile, respectively. Somewhat similar results occurred in Madalin soils (Figures 17 and 18).

Tile discharge data are shown in Appendix F. Some selected data are also shown in Figure 19. These data were collected by measuring the tile flow for a minute or less, once a week. They provide some comparison of instantaneous flow rates, but it is not possible to say, for instance, that the measured discharge from tile #12 was consistently greater than that from tile #9 during the spring.

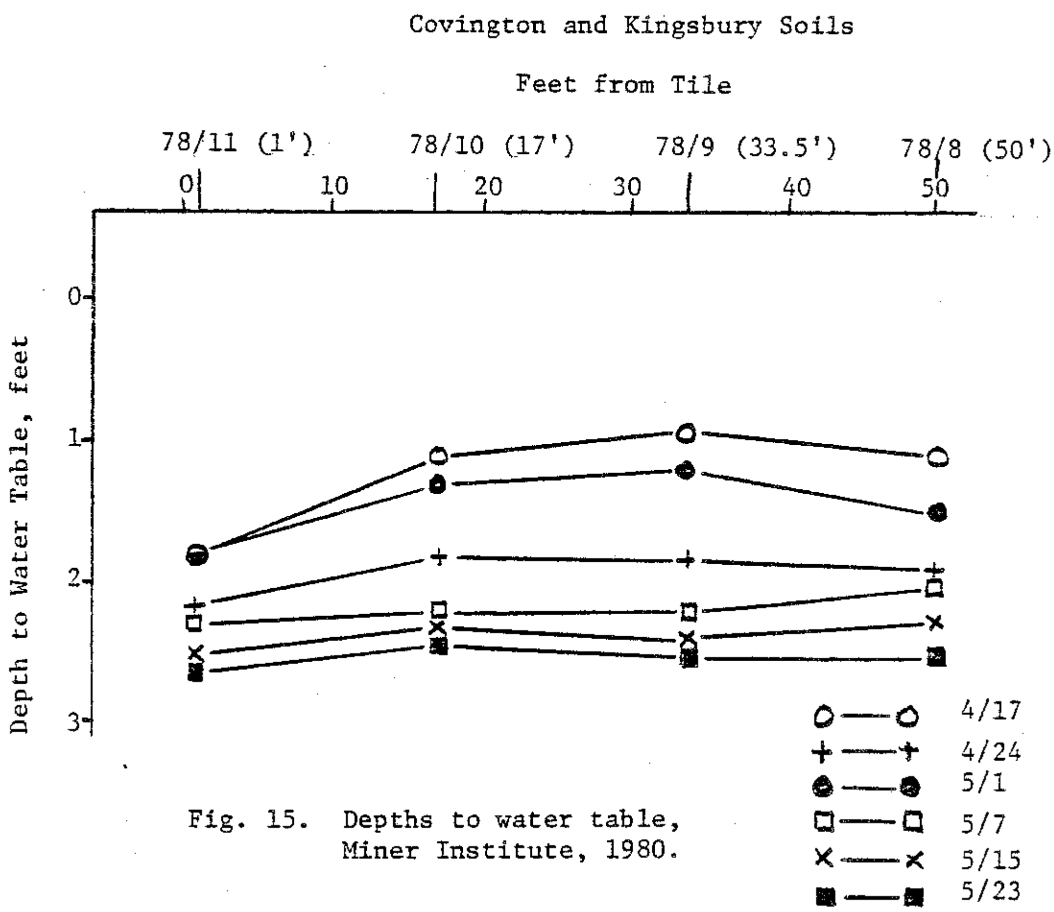


Fig. 15. Depths to water table, Miner Institute, 1980.

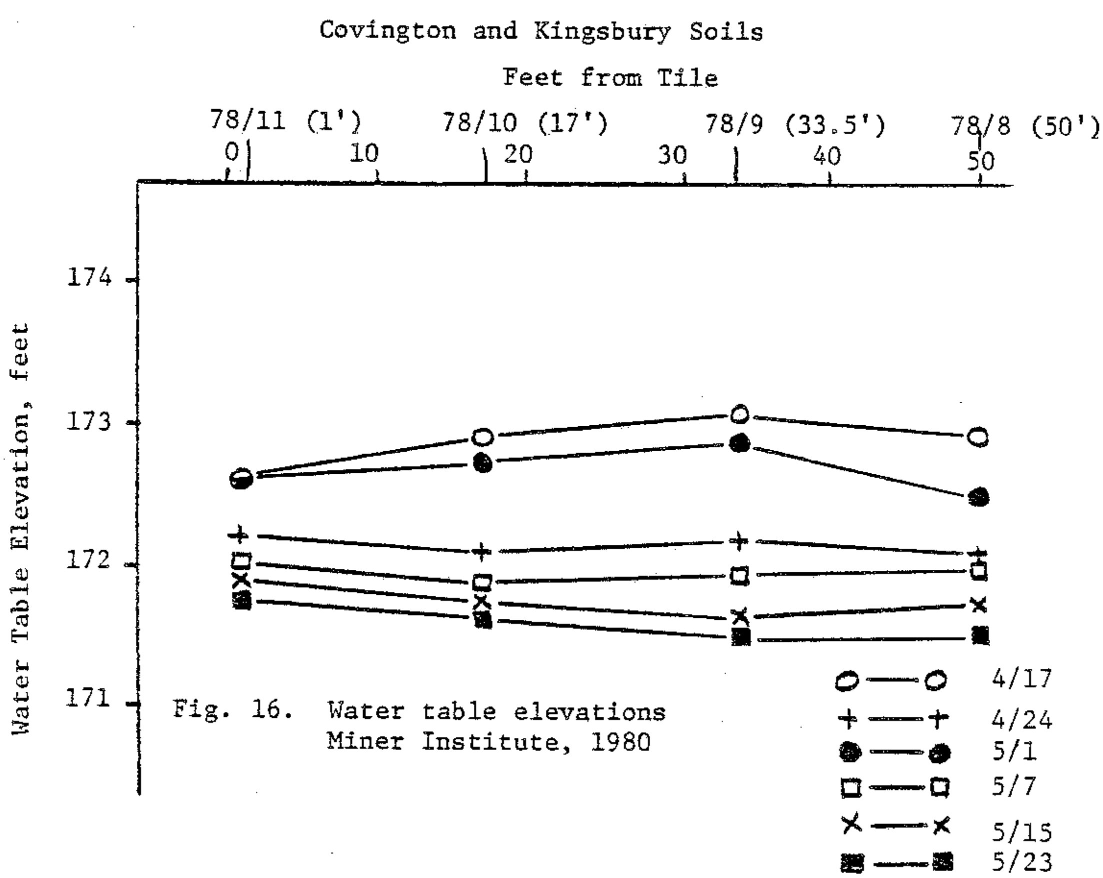


Fig. 16. Water table elevations Miner Institute, 1980

Madalin Soil

Feet from Tile

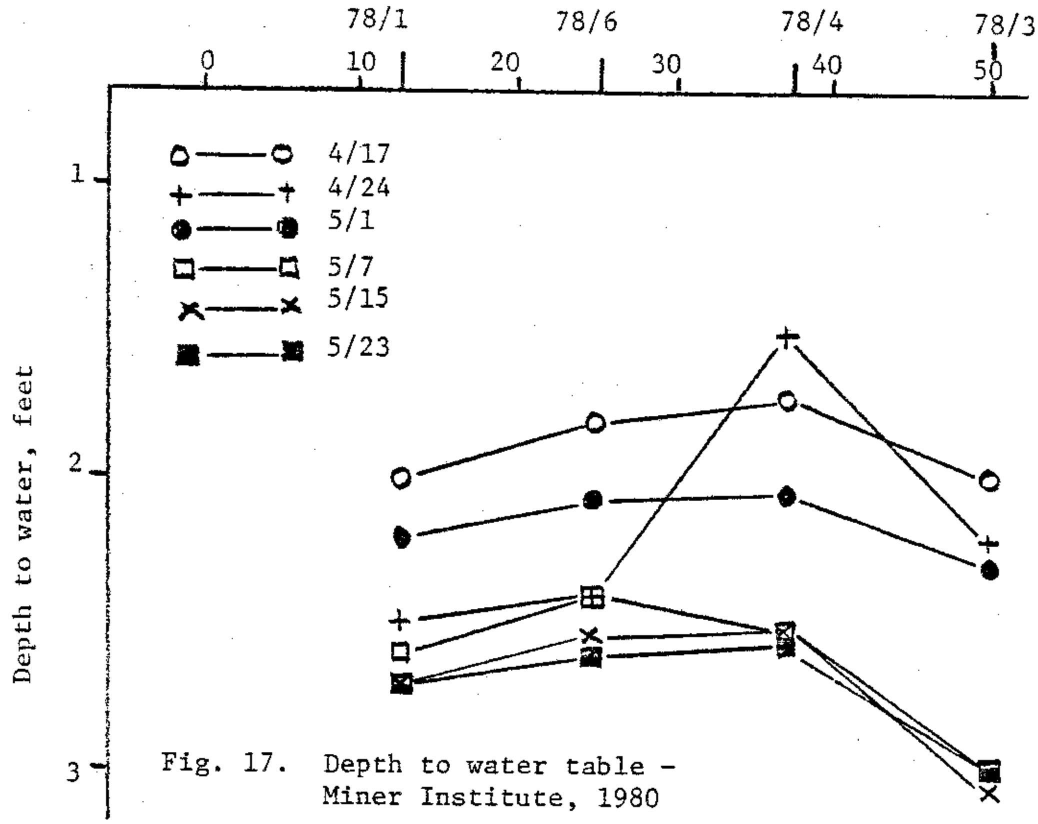


Fig. 17. Depth to water table - Miner Institute, 1980

Madalin Soil

Feet from Tile

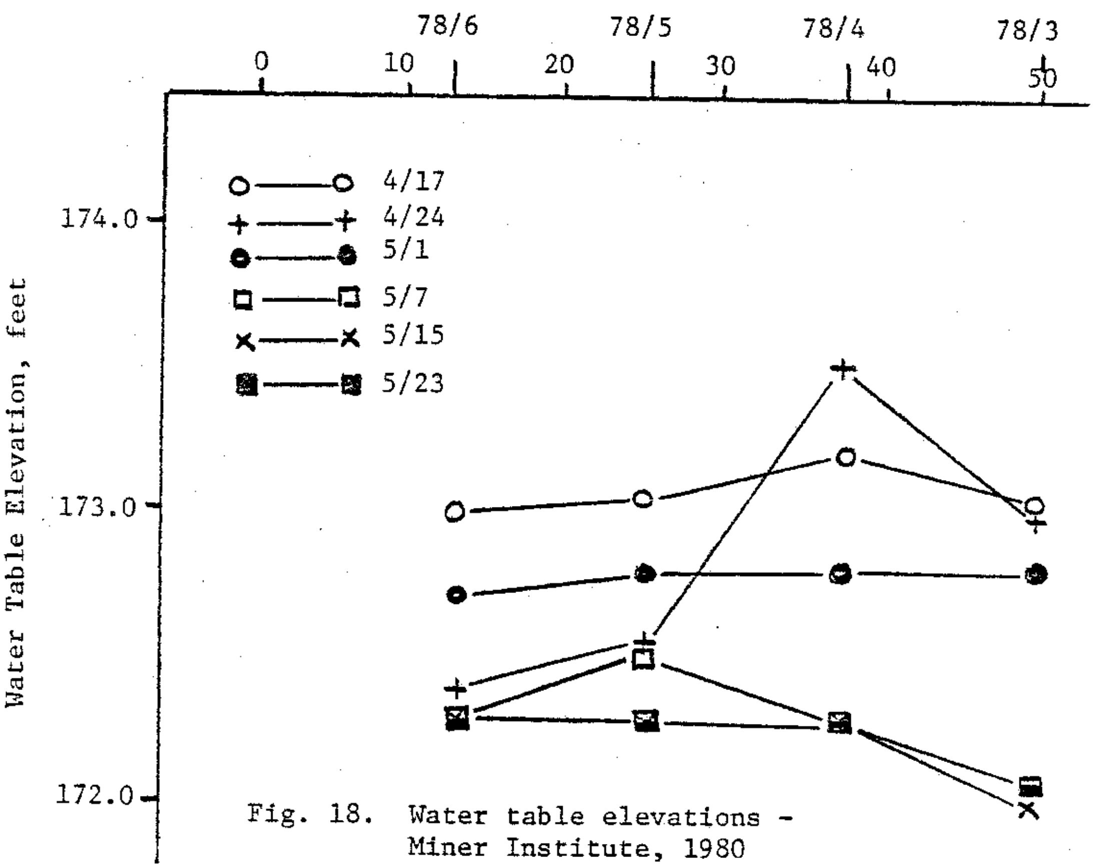


Fig. 18. Water table elevations - Miner Institute, 1980

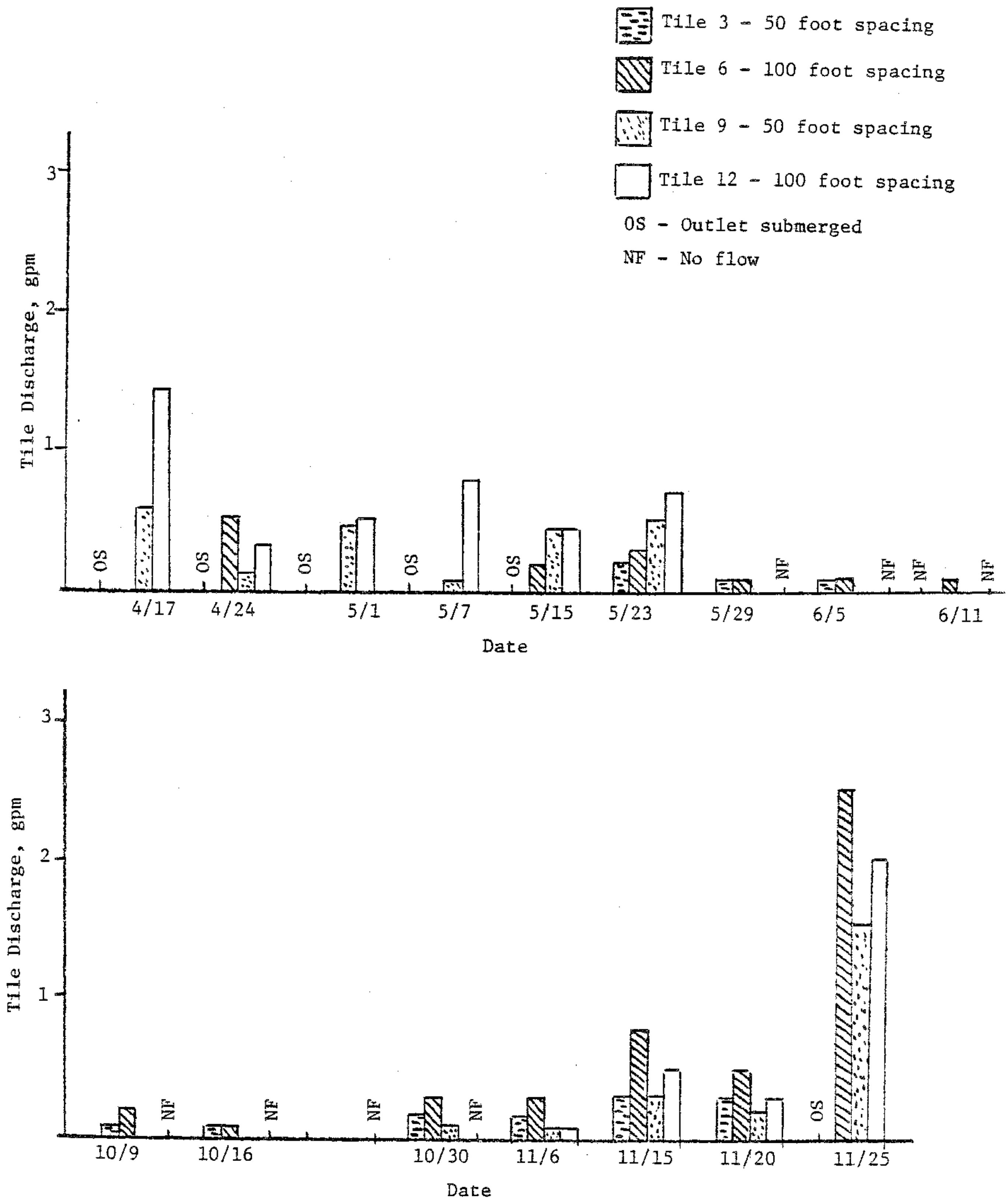


Fig. 19. Instantaneous tile discharge rates.
Miner Institute, 1980.

APPENDIX A

CORN YIELDS - MINER INSTITUTE, 1980

Field 3I-1

Plot		Treatment (Spacing, ft.)	Grain Yield (Bu/A @ 15%)	Silage Yield (T/A @ 70%)
A_1	1	0	172.9	25.0
	2	25	170.3	24.8
	3	50	172.2	27.8
	4	0	174.7	24.5
	5	25	167.6	25.4
	6	50	172.8	26.3
	7	0	185.7	26.5
	8	25	178.4	26.7
	9	50	175.1	27.5
	10	0	128.2	24.9
	11	25	167.4	24.3
	12	50	181.5	26.9
A_2	13	0	176.3	26.0
	14	25	146.8	20.7
	15	0	170.1	22.2
	16	0	167.6	24.2
	17	25	148.5	19.8
	18	0	172.0	24.5
	19	0	181.8	25.4
	20	25	160.3	23.3
	21	0	184.9	27.4
	22	0	180.1	27.0
	23	25	161.7	23.8
	24	0	176.3	27.1
D_2	25	0	148.3	23.3
	26	25	-	-
	27	0	187.9	26.2
	28	0	150.8	22.3
	29	25	169.4	25.6
	30	0	176.2	26.0
	31	0	192.9	26.8
	32	25	175.3	26.1
	33	0	184.6	27.1
	34	0	150.5	24.0
	35	25	173.7	27.1
	36	0	183.1	28.5

Plot		Treatment (Spacing, ft)	Grain Yield (Bu/A @ 15%)	Silage Yield (T/A @ 70%)
D_1	37	0	162.2	24.3
	38	25	144.5	21.1
	39	50	164.0	24.7
	40	25	156.2	23.2
	41	0	175.2	26.4
	42	25	149.8	21.9
	43	50	170.1	26.4
	44	25	168.8	26.1
	45	0	177.1	25.6
	46	25	173.1	25.6
	47	50	174.0	26.6
	48	25	166.9	25.2
	49	0	139.3	22.7
	50	25	154.7	23.2
	51	50	181.4	25.9
	52	25	161.3	23.6
B_2	53	0	168.2	26.6
	54	25	138.8	27.5
	55	0	-	-
	56	0	190.1	28.9
	57	25	191.0	30.0
	58	0	175.3	26.9
	59	0	169.5	26.9
	60	25	185.4	27.3
	61	0	177.8	26.2
	62	0	171.2	26.2
	63	25	196.3	28.6
	64	0	169.4	26.2
B_1	65	0	156.3	23.2
	66	25	154.1	23.7
	67	50	147.4	21.4
	68	25	174.3	26.0
	69	0	177.1	25.6
	70	0	163.6	24.2
	71	25	157.6	24.1
	72	50	134.1	19.6
	73	25	162.5	25.1
	74	0	171.1	25.0
	75	0	188.9	27.8
	76	25	162.6	24.7
	77	50	176.7	27.3
	78	25	181.8	27.3
	79	0	190.3	27.5

PLOT		TREATMENT (Spacing, ft.)	GRAIN YIELD (Bu/A @ 15%)	SILAGE YIELD (T/A @ 70%)
B_1	80	0	167.5	25.3
	81	25	148.7	23.3
	82	50	178.0	26.6
	83	25	183.1	26.8
	84	0	184.9	26.6
C_1	85	0	151.6	22.1
	86	25	149.8	21.4
	87	50	157.6	23.9
	88	25	140.6	20.8
	89	0	144.1	23.8
	90	25	162.1	24.8
	91	50	170.3	24.8
	92	25	167.4	24.9
	93	0	119.4	17.2
	94	25	137.0	19.2
	95	50	161.1	23.4
	96	25	180.6	25.8
	97	0	147.2	22.3
	98	25	160.3	23.9
	99	50	169.4	24.6
	100	25	165.0	26.1
C_2	101	0	108.9	16.3
	102	25	169.6	24.1
	103	0	123.2	20.7
	104	25	146.1	21.5
	105	0	113.6	18.2
	106	25	139.1	20.5
	107	0	144.5	20.7
	108	25	155.7	21.7

WATER TABLE ELEVATIONS - MINER INSTITUTE, 1980

FIELD 31-1

		WATER TABLE PIPES							
		A		B		C		D	
Calendar Date	Julian Date	Water Table Elevations (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface
4/11	102	173.2	2.5	170.9	2.8	170.7	2.1	172.4	1.2
4/17	108	173.2	2.5	170.9	2.8	170.1	2.6	171.3	2.3
4/24	115	172.5	3.2	170.9	2.8	170.0	2.8	171.0	2.6
5/1	122	173.2	2.5	170.9	2.7	170.2	2.6	171.2	2.4
5/7	128	173.1	2.5	170.9	2.8	169.9	2.8	170.9	2.7
5/15	136	173.1	2.5	170.8	2.8	169.9	2.8	170.8	2.8
5/23	144	173.1	2.6	170.8	2.8	170.0	2.8	170.9	2.7
5/29	150	173.1	2.6	170.8	2.8	169.8	2.9	170.8	2.8
6/5	157	173.1	2.6	170.8	2.8	169.8	2.9	170.8	2.9
6/11	163	173.1	2.6	170.8	2.9	169.8	3.0	170.7	2.9
6/19	171	173.1	2.6	170.7	2.9	169.6	3.1	170.6	3.1
6/25	175	173.1	2.6	170.5	3.2	169.5	3.3	170.4	3.2
7/3	185	173.1	2.6	170.4	3.2	169.2	3.6	170.2	3.5
7/10	192	173.1	2.6	170.4	3.2	173.2	4.1	170.1	3.5
7/17	199	173.1	2.6	170.5	3.2	169.2	3.6	170.2	3.5
7/24	206	173.0	2.6	170.4	3.2	169.1	3.6	170.2	3.5
7/31	213	173.0	2.6	170.4	3.2	169.2	3.6	170.2	3.5
8/7	220	173.0	2.6	170.4	3.2	169.2	3.6	170.2	3.5
8/14	227	173.0	2.7	170.3	3.3	173.2	4.1	170.2	3.5
8/21	234	173.0	2.7	170.4	3.2	169.2	3.6	170.1	3.5
8/28	241	173.2	2.5	170.4	3.3	169.2	3.6	170.1	3.5
9/4	248	173.0	2.7	170.3	3.3	173.2	4.1	170.1	3.5
9/11	255	173.0	2.7	170.2	3.4	173.2	4.1	169.7	3.9
9/18	262	172.9	2.7	170.4	3.2	170.2	2.6	170.1	3.5
9/25	269	172.9	2.8	170.3	3.3	173.2	4.1	170.1	3.5
10/2	276	172.9	2.8	170.3	3.3	169.2	3.6	170.1	3.5
10/9	283	172.9	2.8	170.9	2.8	169.9	2.8	170.9	2.7
10/16	290	172.8	2.8	170.8	2.9	169.8	3.0	170.7	2.9
10/23	297	176.2	3.4	170.6	3.0	169.9	2.8	170.5	3.1
10/30	304	176.2	3.4	170.7	2.9	169.9	2.8	170.9	2.7
11/6	311	176.2	3.4	170.7	2.9	169.8	2.9	170.9	2.8
11/15	320	176.2	3.4	170.8	2.9	170.1	2.7	171.2	2.5
11/20	325	176.2	3.4	170.8	2.8	169.9	2.8	171.0	2.7
11/25	330	173.1	2.5	170.9	2.8	170.3	2.5	171.5	2.1

WATER TABLE ELEVATIONS - MINER INSTITUTE, 1980

FIELD 3I- 1

		WATER TABLE PIPES							
		E		F					
Calendar Date	Julian Date	Water Table Elevations (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface
4/11	102	173.1	0.4	173.5					
4/17	108	171.7	1.9	171.8	1.7				
4/24	115	171.3	2.2	171.2	2.2				
5/1	122	171.6	1.9	171.7	1.8				
5/7	128	171.2	2.3	171.1	2.4				
5/15	136	171.2	2.3	171.1	2.4				
5/23	144	171.2	2.4	171.1	2.4				
5/29	150	171.0	2.5	171.0	2.5				
6/5	157	170.9	2.6	170.9	2.6				
6/11	163	170.8	2.7	170.8	2.6				
6/19	171	170.5	3.0	170.7	2.7				
6/25	175	170.5	3.0	170.6	2.9				
7/3	185	170.3	3.2	170.6	2.9				
7/10	192	170.2	3.3	170.6	2.9				
7/17	199	170.1	3.4	170.6	2.9				
7/24	206	174.0	4.1	170.6	2.9				
7/31	213	174.0	4.1	170.6	2.9				
8/7	220	174.0	4.1	170.6	2.9				
8/14	227	174.0	4.1	174.1	3.5				
8/21	234	174.0	4.1	174.1	3.5				
8/28	241	174.0	4.1	174.1	3.5				
9/4	248	170.1	3.4	171.1	2.3				
9/11	255	174.0	4.1	174.1	3.5				
9/18	262	170.1	3.4	170.8	2.7				
9/25	269	174.0	4.1	174.1	3.5				
10/2	276	174.0	4.1	174.1	3.5				
10/9	283	171.1	2.4	171.2	2.2				
10/16	290	178.8	2.8	170.9	2.6				
10/23	297	170.5	3.0	170.7	2.8				
10/30	304	171.1	2.4	171.2	2.3				
11/6	311	171.0	2.5	171.0	2.5				
11/15	320	171.4	2.1	171.5	2.0				
11/20	325	171.2	2.4	171.2	2.3				
11/25	330	172.1	1.4	172.4	1.1				

WATER TABLE ELEVATIONS - MINER INSTITUTE, 1980

FIELD 31-1

		WATER TABLE PIPES							
		78-1		78-2		78-3		78-4	
Calendar Date	Julian Date	Water Table Elevations (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface
4/11	102	176.3	1.5	---	ice	174.2	0.9	174.3	0.7
4/17	108	175.7	2.2	173.9	2.2	173.1	2.0	173.2	1.7
4/24	115	175.0	2.8	173.1	3.0	173.0	2.2	173.5	1.5
5/1	122	175.2	2.7	173.8	2.3	172.8	2.3	172.8	2.1
5/7	128	174.8	3.0	173.3	2.7	172.1	3.0	172.3	2.6
5/15	136	179.1	3.7	173.2	2.9	172.0	3.1	172.3	2.6
5/23	144	179.1	3.7	173.2	2.9	172.1	3.0	172.3	2.7
5/29	150	179.1	3.7	173.0	3.0	172.0	3.4	172.2	2.7
6/5	157	179.1	3.7	173.0	3.1	171.9	3.2	172.2	2.7
6/11	163	179.1	3.7	172.9	3.1	171.9	3.3	172.2	2.8
6/19	171	179.1	3.7	173.3	2.8	171.8	3.3	172.1	2.9
6/23	175	179.1	3.7	172.7	3.3	171.8	3.3	171.9	3.0
7/3	185	179.1	3.7	172.7	3.4	171.6	3.5	175.8	3.7
7/10	192	179.1	3.7	172.6	3.4	171.4	3.7	171.7	3.2
7/17	199	179.1	3.7	172.6	3.4	171.4	3.7	175.8	3.7
7/24	206	179.1	3.7	172.6	3.4	171.3	3.8	175.8	3.7
7/31	213	179.1	3.7	172.6	3.4	171.1	4.0	175.8	3.7
8/7	220	179.1	3.7	172.6	3.5	171.1	4.0	175.8	3.7
8/14	227	179.1	3.7	172.5	3.5	172.0	3.1	175.8	3.7
8/21	234	179.1	3.7	172.6	3.5	171.1	4.0	171.4	3.5
8/28	241	179.1	3.7	172.5	3.5	171.1	4.0	175.8	3.7
9/4	248	179.1	3.7	172.5	3.5	171.0	4.1	175.8	3.7
9/11	255	179.1	3.7	172.5	3.6	175.4	4.6	175.8	3.7
9/18	262	179.1	3.7	172.5	3.6	171.1	4.0	171.7	3.2
9/25	269	179.1	3.7	172.4	3.6	171.0	4.1	171.7	3.2
10/2	276	179.1	3.7	172.4	3.6	175.4	4.6	171.7	3.2
10/9	283	179.1	3.7	173.1	3.0	171.7	3.4	172.6	2.3
10/16	290	179.1	3.7	173.0	3.1	172.0	3.1	172.2	2.7
10/23	297	179.1	3.7	172.8	3.3	171.7	3.4	172.0	2.9
10/30	304	179.1	3.7	173.1	3.0	172.2	2.9	172.5	2.4
11/6	311	179.1	3.7	173.1	3.0	172.1	2.9	172.4	2.6
11/15	320	174.9	3.0	173.8	2.2	172.8	2.3	173.0	1.9
11/20	325	179.1	3.7	173.8	2.5	172.3	2.8	172.6	2.3
11/25	330	176.2	1.6	175.0	1.1	174.0	1.1	174.2	0.7

WATER TABLE ELEVATIONS - MINER INSTITUTE, 1980

FIELD 3I-1

		WATER TABLE PIPES							
		78-5		78-6		78-7		78-8	
Calendar Date	Julian Date	Water Table Elevations (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface
4/11	102	174.2	0.7	174.0	0.9	174.0	0	173.9	0.1
4/17	108	173.1	1.8	173.0	2.0	---	ice	172.9	1.1
4/24	115	172.6	2.4	172.4	2.5	171.5	2.5	172.1	1.9
5/1	122	172.8	2.1	172.7	2.2	172.0	2.0	172.5	1.5
5/7	128	172.5	2.4	172.3	2.6	171.6	2.4	172.0	2.0
5/15	136	172.3	2.6	172.3	2.7	171.5	2.4	171.7	2.3
5/23	144	172.3	2.7	172.3	2.7	171.6	2.4	171.5	2.5
5/29	150	172.3	2.6	172.2	2.7	171.5	2.5	171.4	2.6
6/5	157	172.2	2.7	172.2	2.8	171.5	2.5	171.2	2.8
6/11	163	172.2	2.7	172.1	2.8	171.4	2.6	171.0	3.0
6/19	171	172.1	2.8	172.0	2.9	171.3	2.6	170.8	3.2
6/25	175	172.1	2.9	172.0	3.0	171.1	2.9	175.2	3.8
7/3	185	171.9	3.0	171.8	3.2	171.2	2.8	175.2	3.8
7/10	192	171.8	3.2	171.6	3.3	171.1	2.9	175.2	3.8
7/17	199	171.6	3.4	171.4	3.5	171.0	2.9	175.2	3.8
7/24	206	171.6	3.4	171.3	3.6	170.9	3.1	175.2	3.8
7/31	213	171.6	3.4	171.2	3.7	170.8	3.2	175.2	3.8
8/7	220	171.6	3.4	171.2	3.8	170.7	3.3	175.2	3.8
8/14	227	171.5	3.4	175.5	4.4	170.5	3.4	175.2	3.8
8/21	234	171.6	3.4	175.5	4.4	170.4	3.6	175.2	3.8
8/28	241	171.5	3.4	175.5	4.4	170.3	3.6	175.2	3.8
9/4	248	171.6	3.4	175.5	4.4	170.3	3.7	170.8	3.1
9/11	255	171.5	3.4	175.5	4.4	170.3	3.7	170.8	3.1
9/18	262	171.5	3.4	171.1	3.8	170.2	3.8	170.6	3.3
9/25	269	171.5	3.5	175.5	4.4	170.3	3.7	175.2	3.8
10/2	276	171.4	3.5	175.5	4.4	170.3	3.7	175.2	3.8
10/9	283	172.8	2.2	172.5	2.5	171.6	3.7	171.2	2.8
10/16	290	172.4	2.6	172.3	2.7	171.4	2.5	170.8	3.2
10/23	297	172.2	2.8	172.0	3.0	171.2	2.8	175.2	3.8
10/30	304	172.6	2.3	172.4	2.5	171.6	2.3	171.3	2.7
11/6	311	172.4	2.6	172.3	2.6	171.6	2.4	170.1	2.9
11/15	320	172.9	2.0	172.8	2.2	171.9	2.1	172.3	1.7
11/20	325	172.6	2.3	172.5	2.4	171.7	2.3	171.8	2.1
11/25	330	174.0	1.0	173.7	1.3	172.9	1.0	173.4	0.6

WATER TABLE ELEVATIONS - MINER INSTITUTE, 1980

FIELD 31-1

		WATER TABLE PIPES							
		78-9		78-10		78-11		78-12	
Calendar Date	Julian Date	Water Table Elevations (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface
4/11	102	174.1	-0.1	173.9	0.1	---	ice	173.9	0.7
4/17	108	173.1	0.9	172.9	1.1	172.6	1.8	172.7	1.8
4/24	115	172.2	1.8	172.1	1.8	172.2	2.2	172.2	2.3
5/1	122	172.8	1.2	172.7	1.3	172.6	1.8	172.7	1.8
5/7	128	171.9	2.2	171.8	2.2	172.0	2.3	172.0	2.5
5/15	136	171.6	2.4	171.7	2.3	171.9	2.5	171.8	2.7
5/23	144	171.5	2.5	171.6	2.4	171.7	2.6	171.6	2.9
5/29	150	171.3	2.7	171.3	2.7	171.7	2.7	171.5	3.1
6/5	157	171.2	2.9	171.2	2.7	171.7	2.7	171.3	3.2
6/11	163	171.1	2.9	171.0	2.9	171.7	2.7	171.3	3.3
6/19	171	170.9	3.2	170.8	3.2	171.7	2.7	171.2	3.3
6/25	175	170.7	3.3	175.1	3.8	171.6	2.7	171.2	3.3
7/3	185	170.7	3.4	175.1	3.8	171.6	2.7	171.2	3.3
7/10	192	170.7	3.4	175.1	3.8	171.6	2.7	171.2	3.3
7/17	199	170.7	3.4	170.8	3.2	171.6	2.9	171.2	3.3
7/24	206	170.7	3.4	175.1	3.8	171.6	2.7	171.2	3.3
7/31	213	170.7	3.4	170.8	3.2	171.6	2.8	171.2	3.3
8/7	220	170.6	3.4	170.8	3.2	171.6	2.8	171.2	3.3
8/14	227	170.6	3.4	175.1	3.8	171.5	2.8	171.2	3.4
8/21	234	170.6	3.4	175.1	3.8	171.6	2.8	171.2	3.4
8/28	241	170.6	3.4	175.1	3.8	171.5	2.8	175.6	3.9
9/4	248	170.6	3.4	175.1	3.8	171.5	2.8	171.2	3.9
9/11	255	170.6	3.4	175.1	3.8	171.5	2.9	171.2	3.4
9/18	262	175.0	4.0	170.7	3.3	171.7	2.7	171.1	3.4
9/25	269	170.6	3.4	170.8	3.2	171.7	2.7	175.6	3.9
10/2	276	170.6	3.5	170.8	3.2	171.7	2.7	171.2	3.4
10/9	283	171.2	2.8	171.2	2.8	171.8	2.6	171.3	3.2
10/16	290	170.6	3.4	170.8	3.2	171.6	2.8	171.1	3.4
10/23	297	175.0	4.0	175.1	3.8	171.5	2.8	175.6	3.9
10/30	304	171.1	2.9	171.2	2.8	171.8	2.6	171.3	3.2
11/6	311	171.2	2.8	171.3	2.7	171.7	2.7	171.3	3.3
11/15	320	172.3	1.7	172.3	2.7	172.2	2.1	172.4	2.2
11/20	325	171.8	2.2	171.9	2.1	172.1	2.3	172.0	2.6
11/25	330	173.6	0.5	173.5	0.5	173.0	1.4	173.4	1.1

APPENDIX C

WATER TABLES - MINER INSTITUTE 1980

LAKE ALICE

		WATER TABLE PIPES					
		LAWT-1		LAWT-2		LAWT-3	
Calendar Date	Julian Date	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface
4/11	102	361.8	0	362.1	0	362.0	0
4/17	108	361.3	0	362.1	0	-----	-----
4/24	115	360.9	0.2	361.5	0.2	361.6	0.4
5/1	122	361.2	0	361.7	0	361.7	0.3
5/7	128	361.2	0.1	361.5	0.2	361.7	0.3
5/15	136	360.0	1.1	360.5	1.2	360.9	1.1
5/23	144	359.4	1.7	360.1	1.6	360.5	1.5
5/29	150	NW	> 2.8	359.5	2.2	360.0	2.0
6/5	157	359.0	2.1	359.8	1.9	360.2	1.8
6/11	163	NW	> 2.8	359.5	2.1	360.1	1.9
6/19	171	NW	> 2.8	359.5	2.2	360.0	2.0
6/25	175	NW	> 2.8	359.5	2.2	360.0	2.0
7/3	185	NW	> 2.8	359.5	2.2	360.0	2.0
7/10	192	NW	> 2.8	359.5	2.2	360.0	2.0
7/17	199	NW	> 2.8	359.5	2.2	350.0	2.0
7/24	206	NW	> 2.8	359.5	2.2	360.0	2.0
7/31	213	NW	> 2.8	359.5	2.2	360.0	2.0
8/7	220	NW	> 2.8	359.5	2.2	360.0	2.0
8/14	227	NW	> 2.8	359.5	2.2	360.0	2.0
8/21	234	NW	> 2.8	359.5	2.2	360.0	2.0
8/28	241	NW	> 2.8	359.4	2.3	360.0	2.0
9/4	248	NW	> 2.8	359.5	2.2	359.9	2.1
9/11	255	NW	> 2.8	359.3	2.4	359.8	2.2
9/18	262	NW	> 2.8	359.4	2.3	359.8	2.2
9/25	269	NW	> 2.8	359.5	2.2	NW	> 2.7
10/2	276	NW	> 2.8	NW	>2.8	NW	> 2.7
10/9	283	359.2	1.9	359.9	1.8	360.2	1.8
10/16	290	NW	> 2.8	359.6	2.1	360.0	2.0
10/23	297	NW	> 2.8	359.6	2.1	359.9	2.1
10/30	304	359.7	1.4	360.3	1.4	360.5	1.5
11/6	311	359.5	1.6	360.1	1.5	360.3	1.7
11/15	320	360.3	0.8	360.9	0.8	361.0	2.0
11/20	325	360.1	1.0	360.8	0.9	360.9	1.1
11/25	330	361.1	0	361.9	0.2	361.8	0.2

NW = No water table in pipe, water table lower than pipe depth.

WATER TABLES - MINER INSTITUTE 1980

LAKE ALICE

		WATER TABLE PIPES					
		LAWT-4		LAWT-5		LAWT-6	
Calendar Date	Julian Date	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface
4/11	102	362.2	0	362.4	0	361.7	0
4/17	108	362.1	0	362.1	0	361.7	0
4/24	115	362.0	0	362.1	0	361.3	0
5/1	122	362.1	0	362.1	0	361.3	0
5/7	128	362.0	0	362.1	0	361.3	0
5/15	136	361.4	0.4	361.5	0.6	361.0	0.1
5/23	144	361.0	0.8	361.1	1.0	360.0	0.6
5/29	150	360.5	1.3	360.7	1.4	359.6	1.5
6/5	157	360.7	1.1	361.3	0.8	360.0	1.1
6/11	163	359.9	1.5	360.7	1.4	359.5	1.6
6/19	171	359.9	1.9	360.3	1.8	NW	>2.4
6/25	175	359.8	2.0	360.3	1.8	NW	>2.4
7/3	185	359.9	1.9	360.3	1.8	NW	>2.4
7/10	192	NW	>2.5	360.3	1.8	NW	>2.4
7/17	199	NW	>2.5	360.3	1.8	NW	>2.4
7/24	206	NW	>2.5	350.3	1.8	NW	>2.4
7/31	213	NW	>2.5	360.3	1.8	NW	>2.4
8/7	220	NW	>2.5	360.2	1.9	NW	>2.4
8/14	227	NW	>2.5	360.2	1.9	NW	>2.4
8/21	234	NW	>2.5	360.2	1.9	NW	>2.4
8/28	241	NW	>2.5	360.1	2.0	NW	>2.4
9/4	248	359.9	1.9	360.1	2.0	359.5	1.0
9/11	255	NW	>2.5	360.1	2.0	NW	>2.4
9/18	262	360.0	1.8	360.8	1.4	359.8	0.7
9/25	269	NW	>2.5	360.3	1.8	359.1	1.4
10/2	276	NW	>2.5	360.3	1.8	359.0	1.5
10/9	283	360.6	1.2	361.5	0.6	360.3	0.2
10/16	290	360.0	1.8	360.6	1.6	359.6	0.9
10/23	297	NW	>2.5	360.3	1.8	359.4	1.1
10/30	304	360.8	1.0	361.4	0.7	359.6	0
11/6	311	360.6	1.2	361.1	1.0	359.3	0.2
11/15	320	361.4	0.4	361.7	0.4	361.1	0
11/20	325	361.2	0.6	361.6	0.5	359.9	0
11/25	330	361.9	0.7	361.9	0.2	361.1	0

APPENDIX D

Water Table Pipes 3I-2, Chazy, NY, 1980

Depth to Water Table

Date	1	2	3
4-11/80	.50	.67	GL
4-17	1.55	Froze	GL
4-24	1.60	NW	1.50
5-1	1.55	NW	1.85
5-7	NW	↓	2.00
5-15	↓	↓	NW
5-23	↓	↓	↓
5-29	↓	↓	↓
6-5	↓	↓	↓
6-11	↓	↓	↓
6-19	↓	↓	↓
6-25	↓	↓	↓
7-3	↓	↓	↓
7-10	↓	↓	↓
7-17	↓	↓	↓
7-24	↓	↓	↓
7-31	↓	↓	↓
8-14	↓	↓	↓
8-21	↓	↓	↓
8-28	↓	↓	↓
9-5	↓	↓	↓
9-11	↓	↓	↓
9-18	↓	↓	↓
9-25	2.38	↓	↓
10-2	NW	↓	↓
10-9	↓	↓	↓
10-16	↓	↓	2.14
10-23	↓	↓	2.40

Date	1	2	3
10-30	NW	NW	2.05
11-6	↓	↓	2.10
11-15	↓	↓	1.96
11-20	↓	↓	2.05
11-25	↓	↓	1.90

GL = Water table at ground level.

WATER TABLE ELEVATIONS - MINER INSTITUTE, 1980

FIELD 3I-4

		WATER TABLE PIPES							
		3oW		0		3oE			
Calendar Date	Julian Date	Water Table Elevations (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface	Water Table Elevation (feet)	Feet Below Ground Surface
4/11	102	---	ice	---	ice	---	ice		
4/17	108	184.0	2.3	184.2	1.9	184.2	1.7		
4/24	115	184.0	2.3	184.2	1.9	184.2	1.7		
5/1	122	184.0	2.3	184.2	1.9	184.2	1.7		
5/7	128	184.0	2.3	184.2	1.9	184.2	1.7		
5/15	136	184.0	2.3	184.2	1.9	184.2	1.7		
5/23	144	184.0	2.3	184.2	1.9	184.2	1.7		
5/29	150	184.0	2.3	184.2	1.9	184.2	1.7		
6/5	157	184.0	2.3	184.2	1.9	184.2	1.7		
6/11	163	184.0	2.3	184.2	1.9	184.2	1.7		
6/19	171	184.0	2.3	184.2	1.9	184.2	1.7		
6/25	175	184.0	2.3	184.2	1.9	184.2	1.7		
7/3	185	184.0	2.3	184.2	1.9	184.2	1.7		
7/10	192	184.0	2.3	184.2	1.9	184.2	1.7		
7/17	199	184.0	2.3	184.2	1.9	184.2	1.7		
7/24	206	184.0	2.3	184.2	1.9	184.2	1.7		
7/31	213	184.0	2.3	184.2	1.9	184.2	1.7		
8/14	227	184.0	2.3	184.2	1.9	184.2	1.7		
8/21	234	184.0	2.3	184.2	1.9	184.2	1.7		
8/28	241	184.0	2.3	184.2	1.9	184.2	1.7		
9/4	248	184.0	2.3	184.2	1.9	184.2	1.7		
9/11	255	184.0	2.3	184.2	1.9	184.2	1.7		
9/18	262	184.0	2.3	184.2	1.9	184.2	1.7		
9/25	269	184.0	2.3	184.2	1.9	184.2	1.7		
10/2	276	184.0	2.3	184.2	1.9	184.2	1.7		
10/9	283	184.0	2.3	184.2	1.9	184.2	1.7		
10/16	290	184.0	2.3	184.2	1.9	184.2	1.7		
10/23	297	184.0	2.3	184.2	1.9	184.2	1.7		
10/30	304	184.0	2.3	184.2	1.9	184.2	1.7		
11/6	311	184.0	2.3	184.2	1.9	184.2	1.7		
11/15	320	184.0	2.3	184.2	1.9	184.2	1.7		
11/20	325	184.0	2.3	184.2	1.9	184.2	1.7		
11/25	330	184.0	2.3	184.2	1.9	184.2	1.7		

APPENDIX F

Tile Discharge - Miner Institute, 1980

Field 3I-1

Calendar Date	Julian Date	#3 (gpm)	#6 (gpm)	#9 (gpm)	#12 (gpm)
4/11	101	OS	OS	OS	OS
4/17	107	OS	OS	0.6	1.4
4/24	114	OS	0.5	0.1	0.3
5/1	121	OS	OS	0.4	0.5
5/7	127	OS	OS	>0.1	0.8
5/15	135	OS	0.2	0.4	0.4
5/23	143	0.2	0.3	0.5	0.7
5/29	149	0.1	0.1	NF	NF
6/5	156	>0.1	0.1	NF	NF
6/11	162	NF	>0.1	NF	NF
6/19	170	NF	NF	NF	NF
6/25	176	NF	NF	NF	NF
7/3	184	NF	NF	NF	NF
7/10	191	NF	NF	NF	NF
7/17	198	NF	NF	NF	NF
7/24	205	NF	NF	NF	NF
7/31	212	NF	NF	NF	NF
8/14	226	NF	NF	NF	NF
8/21	233	NF	NF	NF	NF
8/28	240	NF	NF	NF	NF
9/4	247	NF	NF	NF	NF
9/11	254	NF	NF	NF	NF
9/18	261	NF	NF	NF	NF
9/25	268	NF	NF	NF	NF
10/2	275	NF	NF	NF	NF
10/9	282	0.1	0.2	NF	NF
10/16	289	>0.1	0.1	NF	NF
10/23	296	NF	Trace	NF	NF
10/30	303	0.2	0.3	>0.1	NF
11/6	310	0.2	0.3	>0.1	>0.1
11/15	319	0.3	0.8	0.3	0.5
11/20	324	0.3	0.5	0.2	0.3
11/25	329	OS	2.6	1.6	2.1

OS = Outlet submerged

NF = No measurable flow