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Box 27, Folder 1: Publications - Mike Dombeck - M.S. and Ph.D notes, ca. 1970's and early 1980's. [1970-1980?]

[s.l.]: [s.n.], [1970-1980?]

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BLACK LAKE

652	South Creek	- #1
834	Sawmill	- #2
053	N. Bay	- #3
996	N. Bay	- #4
710	Sawmill	- #5
054		
806		



NATIONAL

53-110
EYE-EASE PAPER
Made in U.S.A.

95¢

190

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Minneapolis, Minn. 55455.

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1 3

→

68°

→

6'
7°-66°

↘

67°

→

67°

↗

ing

15N

↗

44



8-IX

Transmitter # 830 (834)
90 day

6# 31.5"

3

10:00

Fish tagged & released

10:00

16, 23 ^{captured} Fish released

Sawmill

9-IX

9:20

6, 21

Resting

3' deep, sand bottom
scattered *Nuphar*
*advena*50% alto cumulus →
5' NW
air 55°, 0'-69, 3'-69°

10-IX

8:00

~~2, 22~~

3, 15

Resting

Water shield
Large Pond lilies
3' Hard gravel bottomClear - Calm →
Air Surf. 3' 6'
46° 67° 67°-66°

11-IX

17:30

~~7, 20~~

9, 10

fish resting

10 mph S-W clear
0'-71, 3'-69 ↓

12-IX

17:30-1830

2, 11; 3, 11

4, 11; 3, 10

4, 10

moving rapidly

20 SSW; 75%
↓ cirrus, altostratus
0'-67; 3'-67°, 6'-67°

13-IX

9:30

9, 30; 11, 29

11, 27; 11, 26

11, 28; 10, 26

Moving constantly, Pond lilies all species
Heavy weed growth75% alto cumulus →
S-10 mph
air-64; Surf-67, 3' 67°

Net 2 (10, 25) (4)

Big Rock 9, 24

10:40

10, 27; 11, 27

11, 27; 11, 28

10, 28; 11, 28

14-IX

10:00

11, 31; 11, 30

11, 29; 11, 28

10, 27; 10, 26

moving

Minor 9:34

100% cumulostratus ↑
Overcast - Misty
0'-66; 3'-66°

13:00

✓✓

moving

✓✓ ↑

15 IX

9:45

9, 22; 10, 22

11, 22; 10, 24

11, 24; 11, 23

10, 25; 11, 25

9, 26; 10, 26

11, 26

Moving rapidly

Minor 10:24

50% cumulus 15N
clearing ↑
0'-65 3' 64 6' 64

16-IX

16:00

24, 32

resting

clear calm
0' 70 3' 65

18-IX - 14:10
23,35 resting

Clear
S-10

0'-70°
3'-69°
6'-68°

Time	Temp	Activity
21:IX 10:45	13,26	resting
11:00	11,27	moving
22:IX 14:15	13,29	moving
14:30	13,29	moving
14:40	11,29	✓✓
14:50	11,26	✓✓
15:26	10,24	✓✓
15:25	9,26	✓✓
15:30	9,28	✓✓
15:35	10,26	
15:40	12,29	✓✓

S-10 90% strato - cumulus

75% cumulus wind 10 N
0'-62° 3'-62°
light intensity 60% @ 3' 1127
0' 61° 3'-61°
3'-75%

S-10 50% strato - cumulus

3'-75%

10% strato - cumulus

10% alt cumulus

23 IX

Time	Temp	Activity
9:30	10,28	Moving
9:40	11,29	moving
9:50	11,27	✓✓
9:55	10,25	✓✓
9:58	10,26	
10:00	11,26	✓✓
10:30	11,24	✓✓
10:40	10,30	✓✓
10:42	10,28	
10:44	10,26	
10:50	12,30	

N 10 10% cumulus

0'-60°, 3'-60°, 75%

N 15 ✓✓

Time	Temp	Activity
28-IX 17:00	10,27	resting
17:10	10,27	resting
18:10	10,27	✓✓
18:15	10,27	moving
18:20	10,28	✓✓
18:25	10,28	resting

20.5 W 10% CUM
✓✓ 10% CIR

0'-56, 3'-56 70%

24.96 → 60%

10 N

3' 11.27

Time	Temp	Notes	Wind	Clouds	Pressure	Humidity
30:1X	10-25	resting	10 SW	clear	3'-57	80%
13:00	"				29.71	→
13:16	"					
13:25	"					
13:35	"					
13:50	"					
14:00	"					
14:16	10, 27	+				
14:15	11, 30	+				
14:20	vv	0				
14:30	vv	0				

Time	Temp	Notes	Wind	Clouds	Pressure	Humidity
2-X	15:15	9, 15	+	5 NNE	10%	un
15:30	9, 22	+				
15:40	10, 24	+				
15:45	10, 24	+				
15:50	vv	0				

Time	Temp	Notes	Wind	Clouds	Pressure	Humidity
3-X	11:45	11, 25	0	10 S	50%	CIR
12:00	11, 27	+	vv	vv	3' 59	80%
12:05	10, 27	+			29.95	→
12:08	11, 26	+				
12:10	11, 25	+				
12:13	10, 27	+				
12:15	10, 26	+				
12:50	10, 26	0	15 S	vv		
13:00	10, 26	0				
13:05	10, 26	0				

Time	Temp	Notes	Wind	Clouds	Pressure	Humidity
5-X	15:15	9, 26	0	10 W	75%	STC
15:30	9, 26	0			3' 58	75%
					29.84	→

Time	Temp	Notes	Wind	Clouds	Pressure	Humidity
9-X	09:20	13, 29	+	Calm	100%	FOG
09:25	12, 29	+			3' 53	65%
09:30	12, 29	0			30.01	→
09:40	11, 28	+				
09:45	11, 28	0				
10:05	12, 29	+	3 N	vv		
10:07	11, 28	+				
10:10	11, 28	+				
10:15	11, 28	+				
10:45	10, 26	0				
10:50	10, 26	0				

13-X

13:00	10, 26	0
13:15	10, 26	+
13:30	10, 26	+

20 NW 50% CUM

3'-54° 70%
29.80 →

15-X

14:00	12, 27	0
14:05	12, 27	0
14:10	12, 27	0
14:14	11, 27	+
15:00	10, 25	+
16:00	11, 24	+
16:15	10, 24	+
16:30	10, 23	+
16:45	10, 25	+
17:00	10, 26	+

15 NW 100 STC
PPT

3' 53, 60%

50%

45

40

17-X

12:00	11, 24	+
12:05	10, 27	+
12:10	11, 26	+
12:15	11, 26	+
12:50	11, 29	+
12:55	11, 29	+
13:00	13, 30	+
13:05	11, 29	+

10 N 50% CUM
30.22 →

3'-51 75%

75%

20-X

14:05	14, 28	+
14:10	12, 26	+
14:20	11, 27	+
14:25	9, 26	+
14:55	9, 27	+
15:25	10, 27	+
15:30	10, 27	+
15:45	10, 30	+

10 S 100% NIS Snow

3'-49° 55%

18:00	11, 26	0
18:15	11, 26	0
18:30	11, 26	0
19:40	10, 27	+
20:00	9, 29	+
20:15	10, 27	+
22:00	10, 26	0
22:15	10, 26	0
22:30	12, 29	+

Calm 100% NIS

3'-49°

20%

29.90 X

20

10

0

0

0

0

0

0

0

21-X

9:55

17, 30

+

15 NW 100% CUM

3'-48° 65%

10:15

12, 28

+

29.73 v

10:20

12, 28

+

10:35

11, 26

+

22-Y

11:00

10, 26

+

10 W Clear

3'-46 80%

11:15

10, 26

+

29.90 ↑

11:30

10, 27

+

11:45

10, 26

+

12:00

10, 26

+

23-X

13:35

11, 25

+

3N 100 CIR

3'-44 70%

30.05 →

26-X

14:00

11, 27

+

5N 100 CUM

3'-43° 65%

14:10

10, 26

+

30.31 → SNOW

14:20

10, 26

+

14:30

10, 27

+

30-X

10:00

11, 29

0

3'-40° 75%

50% ALC 5N

10:05

11, 29

0

29.85 →

10:15

11, 29

0

10:20

11, 28

+

11:05

10, 27

+

11:35

12, 27

+

1-X

16:35

13, 25

+

3'-40° 40%

Clear 3S

16:42

14, 25

+

30%

30.04 →

16:45

12, 26

+

25%

17:10

13, 24

+

5%

calm

17:16

13, 25

+

0%

5-X

10:30

21, 29

+

38°, 75%

SW 10 50% CIR

11:15

12, 28

+

29.75 v

11:30

12, 26

+

11:45

15, 24

+

11:55

16, 25

+

12:10

12, 15

+

12:12

17, 30

+

12:15

18, 16

+

12:17

20, 20

+

12:19

21, 22

+

12:21	22, 25	+ ✓✓
12:25	20, 27	+
12:30	19, 29	+

✓✓

✓✓

XI-11

9:15	14, 24	+
9:30	15, 25	+

3' - 340, 75%
30.101

Clear 5-N
ice on lake

XI-16

14:00	26, 39	+
15:02	25, 35	+
15:25	26, 41	+

10S Clear 4" ice 1/2" snow

21-XI

12:05	32, 43	
-------	--------	--

3N 100% N/S SNOW

25-XI

9:35	11, 25	
------	--------	--

calm 100% N/S SNOW
29.50 ↓

30-XI

14:30	13, 29	0
14:45	13, 29	0
16:25	13, 29	0

5SW Clear. 4" snow
29.92 → 7" ice

9-XII

13:00	26, 41	0
13:30	26, 41	0

10 SW 100% STR
29.89 ↓

15-XII

09:30	4, 14	+
10:45	10, 12	+
11:00	17, 16	+

5SW 100% STR
29.70 →

18-XII

12:15	15, 13	0
14:00	15, 13	0

5SVV Clear 29.70 ↓

23-XII

Unable to locate signal

650 (652) 31" 6.5#

300 day

31

8-IX

10:20

Captured

South Creek

10:50

16, 23

Released

9-IX

113, 113

resting

sand bottom 3'

Nuphar advena" *vaiegatum**Juncus nodosus**Brasenia schreberi*

50% altocumulus →

5' NW air 55°

0'-68°, 3'-68°

9:40

10-IX

~~8, 26~~

Occasional mit.

3'-Hard sand bottom

Clear - Calm →

8:10

10, 11

in small area

Clear to few pond lilies

Air - Surf. 3'

46° 67° 67°

11-IX

10, 24

resting

Clear, 10 W

0'-71°, 3'-69°

17:30

12-IX

10, 11; 10, 10

moving rapidly

20 SSW; 75% cumulus

altocumulus.

0'-67°, 3'-67°, 6'-67°

17:30

8, 9 8, 10

18:30

6, 8 6, 9

5, 8 5, 9

4, 8 4, 9

13-IX

4, 10 4, 14

Moving rapidly

Clear Water

75% altocumulus

5-10 mph

Air 64° - Water 66°

9:40

4, 9 5, 9

4, 7 5, 7

3, 7 4, 8

3, 6 4, 6

6, 6

3, 5 4, 5

11:18

3, 7 4, 7

3, 6 4, 6

Moving

Clear Water

14-IX

2, 11 3, 10

Moving

Clear Water

100% Overcast - Misty

Cumulohumilis

clouds breaking

10:05

3, 10 4, 9

4, 8 5, 8

10:15

4, 7 5, 7

13:30

✓✓

moving

15-IX

4, 9

resting

within 75' of shore

Minor 10:24

50% cumulus 15 W

clearing

0'-64° 3'-65° 6'-65°

10:06

16-IX

16:15

4, 9

resting

clear calm

0'-70° 3'-65°

18 ~~IX~~ 14:40 — 2,33 — ~~lake~~ -6'

Clear

S-10

0.68°, 3-67, 6-67.

21:IX 10:50 3, 10 moving
10:55 4, 9 moving

75% cumulus wind 10N

22 IX 14:55 3, 10 moving

01-62° 3'-62°
3' light intensity 75% 3, 10

15:00 4, 9 Moving
15:05 5, 9 ✓✓

25% stratocumulus 0-62°, 3'-61° 75%
10.5

15:15 5, 8 ✓✓

Plomogiton g.

Water shield

Water lily

10.70 strato cumulus

23: IX 10:00 2, 12 ✓/
10:05 3, 12 ✓/
10:07 3, 11 ✓/
10:10 6, 10 ✓/
10:12 7, 10 ✓/
10:15 5, 9
10:18 4, 9
10:20 3, 11
10:22 2, 11

10 N 10% CUM 0-60, 3'-60, 75%

28: IX 18:30 4, 9 resting
18:45 4, 9 "
19:00 4, 9 "
19:15 4, 9 "
19:30 4, 9 "

20 SW 10% CIR 3'-55' 60%

15 SW 10% CIR

50%

30%

5%

29.96

30: IX 4, 10 resting
13:00 ✓/
13:15 ✓/
13:30 ✓/
13:45 ✓/
14:00 ✓/
14:15 ✓/
14:30 ✓/

10 SW clear

3'-57° 80%

29.71 →

2-X	4.8-	Resting	NNE 10	59% CIR	60° 75% 29.95 →	33
15:00						
15:15	✓					
15:30	✓					
3-X	3.5	0	SE 10	50% CIR	59° 80% 29.95 →	
12:30	✓✓	0	✓✓			
12:45	✓✓	0	✓✓			
5-X	3.11	0	10W	75% STC	3' 58- 70% 29.84 →	
15:45	✓✓	0				
16:00						
9-X	2.13	+	Calm	100 FOG	3'-530 65% 30.01 →	
09:55	2.12	+				
10:00	2.12	+				
10:05	2.11	+				
10:10	2.12	0				
10:35	2.11	+	3N			
10:40	3.11	+				
10:42	3.12	+				
10:44	3.13	+				
10:46	2.11	+				
10:48	3.11	+				
10:50	2.11	+				
13-X	4.10	0	20 NW	40% CUM	3'-540 70% 29.80 →	
12:30	4.10	+				
12:40	4.10	0				
12:50	4.11					
15-X	4.7	0	15NW	100% STC PPT	3'-53 60%	
15:00	4.7	+	Weak signal			
15:10	4.7	+				
15:15	4.6	+				
15:35	5.6	+				
15:50	5.6	+				
16:12	4.6	+				
16:25	4.7	+				
16:50	5.7	+				40%
17:15	4.7	+				25%

17-X

12:20	4,9	0
12:25	4,9	0
12:30	4,9	+
12:35	4,9	0

75% CUM 10N 3' 51° 75% 30.22 →

20-X

14:35	4,7	+
14:40	4,6	+
14:50	4,7	+
15:00	4,9	+
15:30	5,9	+
15:45	5,10	+
16:00	4,10	+

100% NIS 10S 3' 49° 60%

SNOW

18:40	4,13	+
18:50	4,12	+
19:00	4,10	0
19:15	4,10	0
19:30	4,10	0
22:45	3,4	+
23:00	2,3	+
23:15	4,3	+

Calm 100% NIS
29.90 →

3' 49°

15

10

5

SNOW

0

SNOW

0

0

0

0

21-X

10:50	4,2	+
11:00	4,3	+
11:10	4,2	0
11:15	4,2	0

15NW 100% CUM 3' 48° 65%

29.73 →

22-X

12:10	3,10	0
12:25	3,10	0
12:40	3,11	+
13:00	4,11	+

10W 100% CUM 3' 46° 80%

29.90 →

23-X

13:45	5,7	0
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5N 100% CIR 3' 45° 75%

30.05 →

26-X

14:45	4,11	+
14:55	5,10	+
15:00	5,10	+
15:10	4,9	+

5N 100% CUM 3' 43° 65%

SNOW

30.31 →

30-X					
10:30	4,7	+	43°	75%	10 NE 50 ALC
10:35	5,6	+			29.85→
10:38	6,4	+			
10:41	4,3	+			
10:45	4,2	+			
10:50	5,10	+			
10:55	4,7	+			
1-XI					
16:55	4,7	0	41°	15%	Clear calm
17:10	4,7	0		5%	30.04→
5-XI					
12:06	5,8	0	38	75	105W 50% CIR
12:15	5,8	0	38	75	29.75V
11-XI					
11:00	6,7	0	3'-34°	75%	10 N Clear
11:15	6,7	0		30.10V	
16-XI					
15:50	3,4	0			
16:10	3,4	0			
21-XI					
11:50	6,9				3N 100 NIS
					Snow
25-XI					
14:00	5,8				calm 100% NIS
					SNOW 29.50V
30-XI					
15:55	5,4	0			55W Clear 4" SNOW
16:10	5,4	0			2" ICE
9-XII					
15:00	8,6	0			105W 100% STR
15:25	8,6	0			29.89V
15-XII					
09:39	7,5	0			55W 100% STR
					29.70→
18-XII					
12:00	7,5	0			55W Clear 29.70V
14:10	7,5	0			

23-XII

10:00 4,4

29.80 ↑ Clear.

30-XII

12:30 6,5

Clear NW 10 29.80 ↑

10-I

13:00 6,4

Clear 29.90 ↑

13-I

09:00 6,4

100% STR Calm
Snow 29.90 ↓

31-I

11:00 8,8

100% STR Calm.
29.90 ↑

19-II

13:00 6,7

Clear.

20-II

15:00 6,7

80% STC.

26-II

08:45 8,6

50% Cum 10 W
15% " "

12:15 8,6

13:00 8,6

13:30 8,6

15:45 8,6

3-III

13:00 9,8

100% ALS calm.

6-III

14:00 16,14

14:30 16,14

16:00 16,16

50% ALC calm.

12-III

6:00 6,7

6:30 6,7

14-III

9:00 6,9

9:30 6,9

20-III

16:00 7,10

16:45 7,10

24-III

11:00

11:30

9, 14

9, 14

0

0

April 1

2-5-36

652

37

27-III

17:00

17:15

9, 17

9, 17

+

+

6-9-39

4-IV

8:30

8:45

16, 14

16, 14

0

0

18-41°

9-IV

11:00

11:30

21, 30

21, 30

+

+

ice out April 12

14-IV

8:00

8:30

14:00

14:30

2, 12

2, 11

2, 12

2, 12

+

+

+

+

spanning

3' 47° 70%

49° 80%

clear calm

15% CUM calm

15-IV

7:00

7:30

2, 12

2, 12

+

+

3' 49° 55%
60%

calm 10% STC

17-IV

22:00

22:30

2, 11

3, 11

3, 11

+

+

3' 52° 0%

calm clear

20-IV

9:00

9:30

5, 9

5, 9

+

+

3' 55° 80%

clear calm

24-IV

14:00

14:30

7, 6

7, 6

+

0

3' 57° 80%

30% CIR SW
weak signal.

27-IV

12:00

unable to locate signal

Transmitter #052 (053)

28" 4#

61

300 day

13-IX 10:00	33,50 33,51	Captured	N. Bay.
10:30	34,46	Released with transmitter ✓	
14-IX 10:25	29,42 30,42 31,42 31,39 32,39 32,39	Moving	90% overcast cumulostratus mist 0'-66°, 3'-66° ↑
12:45	29,42 30,42	moving	100% ✓ ↑
15-IX 9:35	26,40 27,40 26,41 27,42 27,42	✓✓ Minor 10:24	80% cumulus clearing 10N ↑ 0'-65°, 3'-64°, 6'-67°
16-IX 15:30	21,41	resting Water shield, like	clear calm → 0'-70°, 3'-65°
18-IX 15:10	21,40	S. Illies 5' deep	Clear - Calm 0'-69, 3'-68 6'-66
21-IX 11:10	21,42	moving	75% cumulus wind 10N 21,42
11:35	21,39	moving	0'-61° 3'-61° light intensity 80% @ 3' 75 21,39
22-IX 15:40	22,37	moving	5% altocumulus 10.5 0'-60°, 3'-60°, 70% 70
15:45	23,43	✓✓ Heavy water shield	
15:50	22,38	✓✓	✓✓
16:15	22,39	✓✓	✓✓
16:20	21,39	✓✓	✓✓
23-IX 10:55	21,38	moving 15N ↑	0'-60 3'-58 80% 70
11:00	22,39	5% cumulus	
11:02	22,40		
11:05	23,40		
11:10	23,42		
11:12	23,43		
11:15	24,43	clear.	
11:25	25,40		
11:30	24,41		

28-X	23,44	resting	20 SW	3'-56° 60%
17:15			10% CUM	29.95
17:20	✓✓	✓✓	✓✓	
17:25	✓✓			
17:30	✓✓			
17:35	✓✓			
17:40	✓✓			
18:00	-		20 SW 10% CIR	✓✓
18:10	✓✓	✓✓		

30-X	40,40	resting	10 SW Clear	3'-55° 85%
14:30	✓✓			29.71 →
14:35	✓✓			
14:45	✓✓			

2-X 15:55	20,47	+	5 NNE 10% Cirrus	3'-61° 80%
16:00	25,47	+		29.95 →
16:10	24,47	+		
16:15	22,45	0		
16:20	22,45	0		
16:25	22,45	0		

3-X				
10:15	22,42	0	10 SE 25% CIR	3' 59° 75%
10:30	22,42	0		29.95 →
10:45	22,42	0		
11:30	22,41	+		
11:45	23,41	+	✓✓ 50% CIR	✓✓
13:10	23,42	+	✓✓	✓✓
13:30	23,42	+	✓✓	✓✓

5-X				
14:30	28,42	0	10 W 75% STC	3' 59° 70%
14:45	28,42	0		29.84 →
15:00	28,42	0		

9-X				
08:30	26,40	0	calm 100% FOG	3'-52° 65%
08:45	26,40	0		30.01 →
10:30	26,40	0	3N ✓✓	✓✓
10:45	25,40	+		
11:00	25,41	+		
11:15	25,42	+		
11:30	24,41	+		
11:45	24,42	+		
12:00	23,42	+		

13-X

12:00	22,39	+
12:15	23,39	+
12:30	23,38	+
12:45	23,39	+
13:35	22,40	0
13:55	22,40	0
14:15	22,40	0
14:30	22,40	+
14:40	21,40	+
15:00	21,41	+

20 NW 50% CUM

3' 540 70%
29.80 →

63

15-X

Transmitter found tangled in brush at 22,42
no evidence of fish present

054
27.5" 4.5#

22-X

13:00

31, 48

captured
released

13:10

31, 48

23-X

13:55

26, 47

+

calm 100% CIR
30.05 →

3' - 44° 70%
ice on bay

14:10

27, 47

+

26-X

13:00

26, 47

+

NS - 80% CUM
SNOW sh
30.31 →

3' - 43° 70%
ice on bay

13:15

30, 47

+

13:30

31, 48

+

13:45

36, 49

+

13:55

40, 48

+

30-X

12:10

27, 40

+

SNE

60% ALS

3' - 44° 75%
29.85 →

12:15

26, 41

+

40% ALS

12:17

27, 42

+

40% ALS

12:19

29, 43

+

30% ALS

12:30

31, 41

+

25% ✓✓

12:35

32, 42

+

25% ✓✓

1-X

15:00

26, 37

+

41° 70%

10S Clear
30.04 →

15:10

26, 41

+

15:20

25, 39

+

15:25

25, 40

0

15:30

25, 40

0

15:38

26, 42

+

15:55

26, 38

+

5S Clear

16:03

25, 37

+

16:06

26, 39

+

5-XI

10:30

28, 38

+

35° 75%

10SW 50% CIR

10:45

28, 38

0

29.75 ✓

11:00

✓✓

0

11:35

✓✓

0

11-XI

9:00

26, 40

0

34° 75%

5N Clear
ice 1"

10:10

26, 40

0

30.10 ✓

XI-16
 13:25 27,40 0
 13:53 ✓✓ ✓
 14:05 ✓✓
 15:07 ✓✓
 15:30 ✓✓

XI-21
 12:08 27,40

25-XI
 9:45 26,38

30-XI
 16:40 26,40 0
 17:05 26,40 0

9-XII
 13:10 27,41 0

15-XII
 10:10 26,40 0

18-XII
 12:55 26,40 0
 13:30 26,40 0

23-XII
 11:05 27,41

30-XII
 13:15 26,38

10-I
 13:30 26,40

13-I
 09:45 27,40
 10:15 27,40

31-I
 10:30 23,39

19-II
 12:30 26,42

20-II
 26,42

65
 S'10 clear
 4" ice 1/2" snow

3N 100% 1/15 SNOW

calm 100% 1/15 SNOW
 29.51V

clear 5SW 4" snow
 7" ice 29.92V

10SW 100% STR
 29.89V

5SW 100% STR
 29.70V

SW 5 Clear 29.70V

clear 10NW 29.90

100% STR calm
 SNOW

100% STR calm
 29.70V

clear.

80% STR.

26-II

8:30

25,38

0

9:00

25,38

0

3-III

13:15

24,40

0

13:45

24,40

0

6-III

11:45

25,40

0

12:00

25,40

0

12-III

05:30

28,43

0

05:45

28,43

0

14-III

8:00

27,40

0

8:30

27,40

0

20-III

14:00

26,38

0

14:20

26,38

0

24-III

10:30

24,36

10:45

24,36

27-III

18:00

22,28

+

18:30

22,28

r

4-IV

7:45

26,45

8:00

26,45

9-IV

9:00

32,43

9:30

32,43

14-IV

6:00

38,52

+

6:15

38,52

+

15:00

37,52

+

15:30

38,52

+

ice out april 12

spawning?
at 3'

46°, 20% clear calm

48°, 80% 20% CUM calm

15-IV

8:00

40, 49

+

at 3' 48° 80%

054

calm 159.5 TC

67

8:30

40, 49

+

17-IV

21:00

41, 48

+

at 3' 53° 0%

calm clear

21:30

41, 48

+

20-IV

10:00

38, 52

+

at 3' 56° 80%

clear calm.

10:30

37, 52

+

24-IV

13:00

30, 42

0

at 3' 57° 80%

30% CIR SW

13:30

30, 42

0

27-IV

12:30

26, 39

+

at 3' 59° 80%

40% CIR 4 SW

12:50

25, 39

+

14-IX 11:00	33,50 33,51	Captured		
11:10	✓✓	released		
12:50	29,47 30,48	moving		100% cumulostratus ↑ mist 5-N 0'-66, 3'-66'
15-IX 9:30	34,39 34,40 34,41 34,44 34,43 35,39 35,40 35,41 35,42 35,43; 35,44	Moving Minor 10:24	area of heavy weeds	90% cumulus ↑ clearing 10N 0'-65, 3'-64, 6'-64
16-IX 15:45	31,40	resting		calm, clear 0'-70, 3'-65
18-IX 15:20 15:30	29,43	Idle - 50' from shore at edge of heavy lily pad bed in 6' water Soft, weedy bottom Swarms of minnows.		
21-IX 11:15 11:30	41,43 42,41	moving		50% cumulus wind 10N 41,43 0'-61 3'-61 light inten. 80% @ 3' 75-3' 42,41
22-IX 15:55 16:00 16:05 16:10	40,41 40,42 40,40 40,41	✓✓ ✓✓ ✓✓	Heavy p. granosa " contact	5% alto cumulus 5 SW → 0'-59, 3'-59, 75%.
23-IX 10:55 11:00 11:05 11:10 11:15 11:20 11:25 11:30	41,44 40,43 39,40 41,43 41,39 41,43 41,44 40,44	✓✓ ✓✓	3% cumulus 15N ↑	0'-60, 3'-58, 80%.

28-IX

17:30

40,43

Resting

20 SW 100% CUM

0°-55° 3' 55" 70%

17:35

✓✓

✓✓

17:40

✓✓

17:45

✓✓

Moving

✓✓

100% CIR

✓✓

17:50

41,43

✓✓

17:55

41,43

✓✓

18:00

41,43

✓✓

18:05

41,42

✓✓

18:10

41,42

resting

18:15

41,42

✓✓

30 IX

14:00

44,40

resting

10 SW Clear

55° 85%

14:15

✓✓

29.71 →

14:25

✓✓

14:30

14:40

14:45

14:50

2-X 11:00

43,43

5 NINE 10% Cirrus

60° 80%

29.95 →

16:00

40,48

+

16:05

40,47

+

16:10

46,48

+

16:15

40,45

+

16:20

41,44

+

16:25

40,45

0

16:30

40,45

0

16:35

40,45

0

3-X 11:00

41,43

0

10 SE 25% CIR

58° 80%

11:15

✓✓

✓✓

✓✓

29.95 →

11:30

✓✓

✓✓

✓✓

50% CIR

✓✓

13:16

✓✓

0

✓✓

✓✓

13:30

✓✓

✓✓

✓✓

5-X

15:00

✓✓

0

10 W 75% STC

3' 590 70%

15:15

✓✓

✓

29.84 →

9-X

08:45

✓✓

0

Calm 100% FOG

3'-52°- 50%

09:00

40,40

+

30.01 →

09:05

40,40

0

09:15

✓✓

0

10:25

✓✓

0

3N

✓✓

✓✓

805
 ♂ 31.5" 7#

X-23
 14:30 31,49
 14:45 24,31
 captured
 released

X-26
 13:55 19,32 +
 14:08 17,31 +
 14:20 14,30 +
 14:25 13,29 +
 51% 100% CUM
 SNOW 30.317

3' 430 65%

30-X
 11:55 22,43 0
 12:05 22,43 0
 12:35 22,42 0
 440 75%

60% ALS 5 NE
 29.85 →
 25% ALS

I-XI
 14:25 23,41 0
 14:37 23,41 0
 14:45 23,40 +
 14:52 22,38 +
 14:54 24,38 +
 15:03 23,37 +
 15:15 22,37 0
 16:10 22,39 5
 17:30 22,37 0
 410 75%

25% ALS 105
 30.04 →

5-XI
 10:50 23,43 +
 11:00 23,43 0
 11:05 23,43 6
 350 75%

50% CIR 10SW

II-XI
 10:30 36,42 0
 10:45 36,42 0
 340 75% 30.107

clear 5 N
 1" ice

XI-16
 13:35 31,49 0
 15:10 ✓
 15:35 ✓

510 clear
 4" ice 1/2" SNOW

XI-21
 12:10 23,36

N3 100NIS SNOW

XI-25
 9:50 23,38

calm 100% NIS 51000
 29.504

30-XI
 16:50 25,43 +
 17:10 25,41 +
 17:20 24,42 +
 17:30 23,42 +
 18:00 23,38 +

9-XII
 13:20 33,45 0
 13:45 33,45 0

15-XII
 10:05 27,41 0
 10:20 27,41 0

18-XII
 13:15 25,35 0
 13:45 25,35 0

23-XII
 11:15 27,41

30-XII
 13:30 23,37

10-I
 13:40 23,37

13-I
 10:30 24,29

31-I
 10:00 20,27

19-II
 12:45 24,37

20-II
 14:30 23,38

26-II
 09:30 24,30 +
 10:10 23,28 +
 10:30 21,25 +
 10:50 22,27 +
 11:10 21,27 +
 11:50 21,22 +
 14:10 22,26 +
 15:00 24,30 +

Clear SSW
 4" Snow 7" ice
 29.92 →

10 SW 100% STR
 29.89 ↓

SW 5 100% STR
 29.70 →

SW 5 Clear 29.70 ↓

29.80 ↑ Clear

29.80 ↑ Clear
 10 NW

29.90 ↑ Clear

100% STR Calm
 Snow
 100% STR Calm
 29.70 ↑

Clear

80% STC.

50% CUM 10W

15% cum "

3-III

14:00	16, 13	+
14:30	16, 14	+
15:00	15, 14	+

806

113

100% ALS
calm

6-III

12:30	12, 26
12:45	12, 26

12-III

7:00	22, 38
7:30	22, 38

14-III

10:00	24, 39
10:30	24, 39

20-III

15:10	22, 39
15:30	22, 39

24-III

9:45	22, 39	+
10:15	22, 40	+

27-III

18:45	24, 44	0
19:00	24, 44	0

4-IV

9:30	24, 42
10:00	24, 42

9-IV

8:30	25, 36	+
8:45	25, 37	+

ice out April 12

14-IV

6:45	39, 51	+
7:00	39, 51	+
16:00	39, 51	+
16:30	39, 52	+

spawning?

at 3'	47°	40%
"	"	55%
"	48°	80%
"	"	95%

clear calm.

25% CAM calm.

15-IV

9:00	38, 52
9:30	38, 52

at 3' 48° 80%

calm 15% STC

17-IV					
23:00	37,51	+	at 3'	53° 07%	calm clear.
23:00	37,51	+			
20-IV					
10:45	38,44	+	at 3'	56° 80%	calm clear
11:50	38,42	+			
24-IV					
12:00	28,45	+	at 3'	57° 80%	20% CIR 5W
12:30	27,44	+			
27-IV					
13:15	27,46	0	at 3'	58° 80%	40% CIR 4SW
13:45	27,46	0			

Transmitter # 710 (711)

29" 5#

151

14 IX 11:5 20,33 Captured

11:25 20,33 released

13:00 20,33 ?

poor signal 100% SN
 cumulostratus 0'-66"
 3'-66" →
 misting

15 IX ✓✓ signal poor unable to determine exact location

21 IX 10:40 25,30

5 10 90% strato - cumulus

75% cumulus wind 10 N
 0'-62" 3'-62"
 1% li. inten. @ 3'

22 IX 14:50 13,31

0' 61, 3' 61; 75%

15:35 12,28

10% strato cumulus

23 IX 9:45 12,30 moving

10% cumulus

0'-60, 3'-60, 75%

9:50 12,29

9:55 12,28

10 N

10:30 11,25

11,26

15 N

28 IX 17:00 17,31 resting

20 SW 10% CUM

0'-56, 3'-56 70%

18:00 ✓✓

✓✓ ✓✓ CLR

60%

18:10 ✓✓

✓✓

18:15 ✓✓

18:20 ✓✓

30 IX 13:30 11,29 resting

10 SW clear

3' 58" 80%
 29.71 →

13:40

13:55

14:00

14:10

14:20

14:30

14:35

14:40

14:45

11,30 +

✓✓ 0

✓✓ 0

11,31 +

11,31 0

11,31 0

2-X	12,30	+	3 NNE	100% cumu	3'-59 75%
15:45					29.95 →
15:50	13,30	+			
16:00	13,31	+			
16:05	13,30	+			
16:10	14,30	+			
16:15	12,30	+			
16:20	12,30	+			

Good signal

3-X	11:45	10,27	0	10S	50% CIR	3' 59° - 75%
	12:00	10,27	0			29.95 →
	12:15	10,27	0			
	12:50	10,27	0	15S		
	13:00	10,27	0			

5-X	15:15	9,26	+	10 W	75% STC	3' 58° 75%
	15:20	9,26	0			
	15:45	✓✓	+			

9-X	09:30	9,26	+	calm	100% FOG	3'-52° 70%
	09:35	10,26	+			
	09:40	9,26	0			
	09:45	10,26	+			
	09:50	10,26	0			
	10:05	10,26	+	3 N	✓✓	✓✓
	10:10	10,27	+			
	10:12	11,26	+			
	10:15	11,28	+			
	10:46	12,29	+			
	10:50	12,30	+			
	10:55	12,29	+			

13-X	13:05	11,29	0	20 NW	50% cum	3'-54° - 70%
	13:20	11,29	0			29.80 →
	13:35	11,29	0			

15-X	14:00	12,30	+	15 NW	100 STC Ppt.	3'-53 - 60%
	14:04	11,29	+			
	14:08	12,30	+			
	14:15	11,30	+			
	14:18	12,30	+			
	15:35	11,29	+			
	15:40					

17-X

12:02	15, 31	+
12:07	13, 30	+
12:12	12, 30	+
12:16	12, 29	+
12:47	12, 30	+
12:54	11, 29	+
13:00	12, 30	+

10N 50% CUM
30.22 →

3'- 51° 75%

153

75%

20-X

14:07	13, 30	+
14:12	12, 30	+
14:18	11, 29	+
14:27	12, 29	+
15:05	13, 30	+
15:20	13, 30	0
15:40	13, 30	0
16:00	13, 30	0

S10 100% VIS
S10W3'- 49° 55%
30.02 →

18:05	11, 29	+
18:20	11, 29	0
18:35	11, 29	0
19:45	14, 30	+
20:10	16, 30	+
20:20	13, 29	+
22:10	11, 28	0
22:20	11, 28	0
22:35	11, 28	0

Calm 100 VIS

3'- 49 20% 29.90 V

20

10

SNOW

"

"

0

0

0

21-X

10:00	11, 28	+
10:10	10, 26	+
10:20	11, 26	+
10:30	11, 26	+

15NW 100% CUM
29.73 V

3'- 48° 65%

22-X 10, 26 0

10W Clear
29.90 V

3'- 46 80%

11:00	10, 26	0
11:10	10, 26	0
11:25	10, 25	+
11:50	11, 25	+
11:55	10, 25	+

23-X

13:40	10, 26	+
-------	--------	---

5N 100 CIR
30.05 →

3'- 44 70%

26-X

14:05	10,25	+
14:15	10,25	+
14:25	10,24	+
14:35	10,24	+

5N 100% CUM
SNOW 30.317

3'-43, 65%

30-X

10:13	10,26	+
10:18	11,27	+
10:22	11,28	+
11:40	12,28	+

3'-41 75%

5NE 50% ALC
29.85→

1-XI

16:25	11,30	0
16:30	11,30	0
17:22	11,30	+
17:25	11,29	+
17:27	11,28	+

3'-40 55%

3 S clear
30.04→45%
0%

calm clear

5-X

12:00	7,21	+
12:05	7,20	+

38 75%

15 SW 50% CIR

11-XI

9:20	11,24	+
9:45	11,23	+

340 75%
30.1075N clear
1" ice

XI-16

14:18	14,30	+
14:25	13,28	+
14:56	11,26	+

10 S clear
4" ice 1/2" SNOW

XI-21

12:20 12,25

3N 100% NIS SNOW

XI-25

Unable to locate signal

Cloud Type

Clear - 0

Cirrus - 1

Cirrocumulus - 2

Cirrostratus - 3

Altostratus - 4

Alto cumulus - 5

Stratus - 6

Nimbostratus - 7

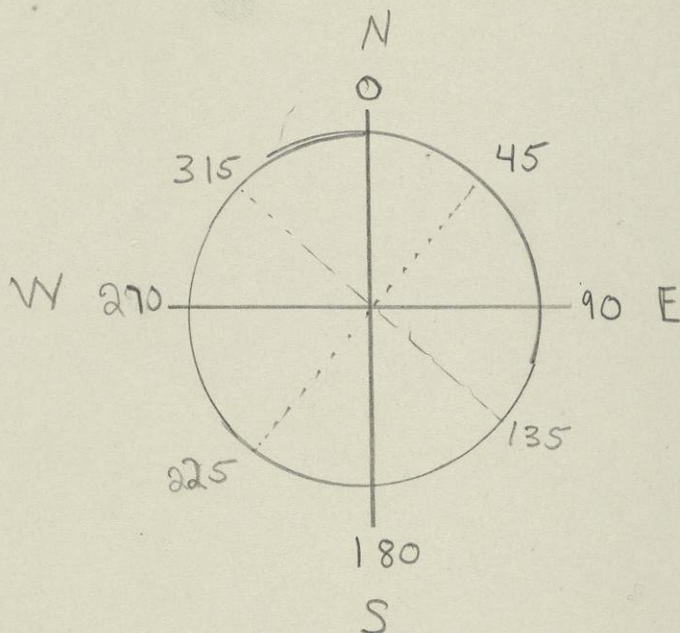
Stratocumulus - 8

Cumulonimbus - 9

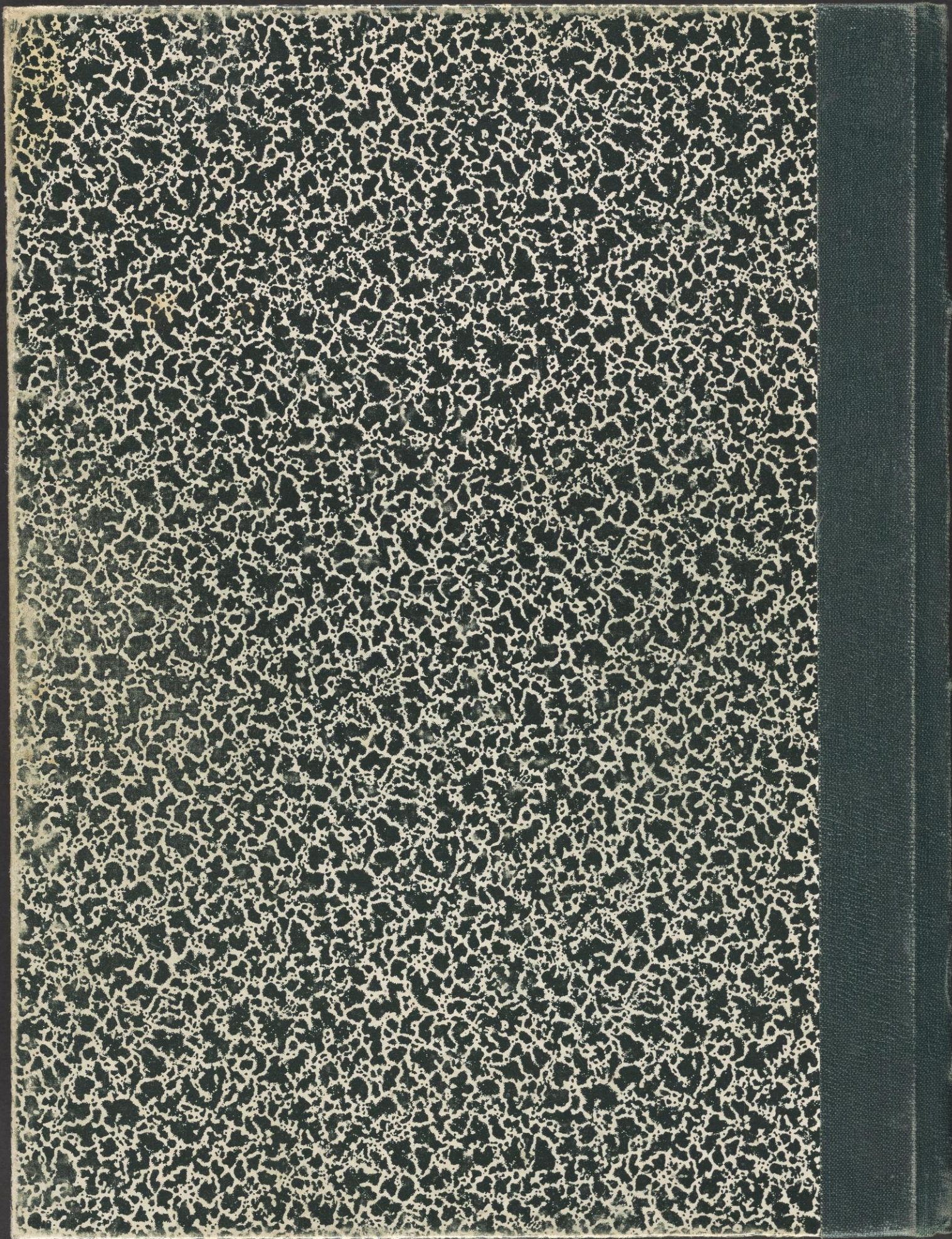
Cumulus - 10

Wind direction

N - 0







Mike Dombek

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10 $\frac{1}{8}$ x 7 $\frac{7}{8}$ • 53-110



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294-6936

Muskellunge lake data analysis.

County codes.

1 Ashland	20 Cass
2 Douglas	21 Beltrami
3 Oneida	22 Itasca
4 Price	
5 Rush	31 Iron
6 Sawyer	32 Baraga
7 Taylor	33 Gogebic
8 Vilas	
9 Forest	
10 Washburn	
11 Iron	
12 Brumette	
13 Bayfield	

Drainage Codes.

1. Chippewa R.
2. Wisconsin R.
3. Mississippi R.
4. Menominee R. L. Mich
5. St. Croix R.
6. L. Superior.

To natural reproduction

100	6	5
99-75	5	4
74-50	4	3
49-25	3	2
24-1	2	1
0	1	0

Notes on Lake Data Analysis

1. Analyze data using PROC GLM Reproduction = other parameters

Analysis Blocked By Drainage Basin

Parameter	$P_r > F_{.05=18}$.01 = 12	$P_r > F_{.05=19}$ w/o Minn. .01 = 13	$P_r > F$ Mushie lake only	r whole set $n=100$	r Mushie lake only $n=77$
Drainage Lake	.008	.018	.0004	+ .35	+ .19
Seepage Lake	.001	.003	.0001	- .33	- .21
Alkalinity	.013	.051		+ .36	+ .37
Muskegon	.0001	.0001	.032	+ .69	.33
N. Pike	.0001	.019	.0001	- .18	
B. Crappie	.030	.023			- .39
Longnose gar	.020				- .37
Shoreline length	.019	.0001		+ .19	
SDF	.0001	.0001	.0001		
No. inflow	.049		.026	- .22	- .41
Up.	.006			+ .38	+ .31
pH	.024	.039		+ .27	+ .23
Watershed	.0001	.0001	.0001		
Wetland	.0003	.0003	.0007		
Outflow	.0001	.0001	.002	+ .35	+ .32
Direct drainage	.0001	.0001	.0001		
Wet marsh	.0001	.0001	.0001	+ .20	
Wet woody	.008	.0608	.004		
Area		.0001		+ .19	
Length		.041		+ .21	
Width		.0001		+ .26	
Litha		.0001		+ .20	
Sm. bass			.002		- .21
Black Bullhead			.013		- .26
CFAC HA			.007		- .28
Dwell HA			.047		
Marsh			.044		
Wooded			.044		
Woodsy HA			.002		
Total				+ .26	

Feb. 16

Bubbled N_2 into 30+2 carboy via 3 air stones

time	DO ppm
------	--------

0	9.0
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Feb. 18, 1983

Expt. to determine time for DO in dialysis tubes to reach equilibrium with ambient deoxygenated water at 7, 14 and 21°

Egg survival expt.

March 31, '82

collected substrates and water from Little Malibu Bay,
Lake Okaloosa.

April 8.

Begin setting up experiment.

Acid wash 42 + 7 2 qt ball jars.

Treatments	Replications					
	1	2	3	4	5	6
1 Sand						
2 Sand & Gravel						
3 Muck						
4 Vegetation (<i>Ceratophyllum</i>)						
5 Wood						
6 Dead leaves (<i>Salix</i> & <i>Quercus</i>)						
7 Control - no substrate						
8 Control - screen						

Ran SAS PROC PLAN; FACTORS=6 TRT=7;
for randomization

Block	Trts					
6	6	4	2	1	3	5
4	2	5	3	6	7	1
3	3	7	5	2	1	4
5	2	7	6	4	5	1
2	1	6	5	3	7	2
1	5	4	1	6	7	3

sand & gravel, sand, & muck placed in jars to a depth of 5 cm.

25 gm wet weight vegetation & dead leaves placed in jars.

~ 175 gm wood 2.5 cm x 7.5 cm placed on boiled & cleaned sand in jars.

April 9, 1982

Measure of D.O. of jars w/ substrate since 7 Nov. 81
kept in environmental chamber at 55°F 13°C

Substrate D.O.

Muck	5.0
Muck	6.0
Muck & sand	6.2
Muck	4.0
Muck	5.1
sand	10.0
sand & gravel	11.0
Dead Vegetation	1.8
Dead Vegetation	2.0
Control	10.0

Measured with
YSI O₂ meter

April 12, 1982

Fill jars w/ lake water to begin stabilization for egg expt.

April 26 set up egg experiment

april 28, DO in jars w/ eggs -

Substrate (jar)	Sample	location	DO			
sand	1	0	3.68			
	1	0	3.71	4.26		
	1	5	4.03			.210 .222
	1	5	4.03	(4.0)		.210
Gravel	2	0	3.01			.157
	2	0	3.05	(3.9)		.159
	2	5	3.76			.144
	2	5	3.76			.196
	2	5	3.76			.186
Muck	3	0	.15	(.2)		
	3	0	.24			.021
	3	5	.35	.63		.018 .033
	3	5	.46	(.1)		.024
Veg	4	0	.14			.024
	4	0	.13			.007
	4	5	.17	.35		.009 .018
	4	5	.13			.007
Wood	5	0	1.77	(1.0)		.061
	5	0	1.24	2.84		.065
	5	5	2.09			.109 .148
	5	5	2.80			.146
leaves	6	0	0.	(0)		
	6	0	0.			
	6	5	.17			.009 .033
	6	5	.17			.009
no substrate	7	0	4.05	(4.02)		.211
	7	0	3.38			.176
	7	5	3.94	4.88		.205 .254
	7	5	4.42	(4.2)		.230
screen	8	0	4.09			
	8	0	4.21			
	8	5	3.82			
	8	5	4.12			

April 30.

- Noticed what appeared to be inhibition of fungal growth on dead egg over organics especially dead leaves. Even tho low D.O. had killed eggs. Perhaps in proper D.O. is available over these substrates egg survival is enhanced.

Abundant fungal growth on dead eggs on sand, control and sand & gravel.

- Noticed some organization of the egg droplets around animal pole and what appeared to be primitive streak forming on some eggs.

May 1 Primitive streak was now used as a marker for living eggs. Noted fungal growth over which had increased since previous day. Observed eggs under binocular microscope.

May 2 Primitive streak clearly visible on living eggs. Fungus appeared to be related to mortality in controls and sand and sand and gravel. Does low or 0 D.O. inhibit fungus? Yes called Dr Tiffany.

May 3 Egg mortality has leveled off. Profuse fungal growth on non organic substrates. Perhaps a balance between DO and fungal growth is optimum. Some cephalization visible but no eyespots.

D.O. measures in jars by eggs

DO.														
jar	tit	Day	8	50	jar	tit	Day	8	50	jar	tit	Day	8	50
1	1	12	2	3.7	4.0	1	6	4	0	0	2	3	4	.2
1	1	1	2	3.8	4.0	1	6	4	0	0	2	3	4	.2
1	1	1	2	3.6	3.9	1	6	4	0	.1	2	3	4	.3
1	1	2	2	3.7	3.9	1	7	4	3.9	4.0	2	4	4	.1
1	1	2	2	3.9	4.0	1	7	4	3.8	4.0	2	4	4	.0
1	1	2	2	3.9	4.0	1	7	4	3.9	3.9	2	4	4	.1
1	1	3	2	.1	.6	1	8	4	3.9	4.1	2	5	4	1.0
1	1	3	2	.2	.6	1	8	4	4.1	4.2	2	5	4	1.3
1	1	3	2	.3	.5	1	8	4	4.1	4.3	2	5	4	1.4
1	1	4	2	.1	.1						2	6	4	0
1	1	4	2	.1	.2	2	1	2	3.8	3.9	2	6	4	0
1	1	4	2	.1	.1	2	1	2	3.7	3.9	2	6	4	0
1	1	5	2	1.1	2.2	2	1	2	3.7	4.1	2	7	4	4.2
1	1	5	2	1.2	2.3	2	2	2	3.7	4.1	2	7	4	4.1
1	3	5	2	1.2	2.2	2	2	2	3.7	4.0	2	7	4	3.9
1	1	6	2	0	.1	2	2	2	3.9	3.9	2	8	4	4.1
1	1	6	2	0	.1	2	3	2	.1	.7	2	8	4	4.1
1	3	6	2	0	0	2	3	2	.3	.7	2	8	4	4.0
1	1	7	2	3.9	3.9	2	3	2	.3	.6				
1	1	7	2	4.0	3.9	2	4	2	.1	.1				
1	1	7	2	3.9	4.1	2	4	2	0	0				
1	1	8	2	4.1	4.1	2	4	2	.1	0				
1	1	8	2	3.9	4.1	2	5	2	1.0	2.4				
1	1	8	2	4.0	4.0	2	5	2	1.3	2.1				
1	1					2	5	2	1.3	2.3				
1	1	1	4	3.6	3.9	2	6	2	0	.1				
1	1	1	4	3.6	4.0	2	6	2	0	.2				
1	1	1	4	3.8	4.1	2	6	2	0	0				
1	1	2	4	3.8	3.9	2	7	2	3.9	4.2				
1	1	2	4	3.8	3.9	2	7	2	4.1	4.1				
1	1	2	4	3.7	4.0	2	7	2	4.1	4.1				
1	1	3	4	.1	.5	2	8	2	4.1	4.2				
1	1	3	4	.2	.5	2	8	2	4.0	4.1				
1	1	3	4	.2	.6	2	8	2	4.2	4.1				
1	1	4	4	.1	.1									
1	1	4	4	.1	.1	2	1	4	3.7	3.8				
1	1	4	4	.2	.1	2	1	4	3.7	4.0				
1	1	5	4	1.0	2.0	2	1	4	3.6	4.0				
1	1	5	4	1.1	1.9	2	2	4	3.8	3.9				
1	1	5	4	1.1	2.2	2	2	4	3.8	3.9				
						2	2	4	3.9	4.0				

May 12, 1982 - 9:30 Setting up transects on Black I.

S. Creek Bay

Water Temp

12.4°C

13.6°C

mouth of creek

10 m S of creek's mouth along shore

Uniform bottom in S-Creek Bay
Nuphar, Nymphaea & Brasenia
just sprouting

Flocculent pulpy peat material.
some Ceratophyllum.

Sorting of woody material at
mouth of creek due to current
Some leaves along shoreline only

14.0° middle of Bay

11:00 12.8°C at creek mouth - Creek cooler than lake.

11:30 14.4°C Temp near Thermograph - Standard

15:00 13.6°C Thermograph W. side of N. Bay Standard

lite rain calm.

3 sample sites across creek.

15:40 13.4°C Thermograph E N. Bay Standard

16:00 14.5°C Thermograph on Post in Narrows

Little diversity in N. Bay

17:30 14.0°C Thermograph - on stump near dam.

May 13, 1982 Moose Lake - Setting transects Formers Creek
Overcast - lite rain overcast

5 sample sites in Formers Creek

May 14, 1982 Cattail Bay

2 sample sites set.

checked sample boxes set in Formers Creek - looked good.
11:00 16°C - water temp, clear, hot.

May 14, 1982

Testing equipment at Black 2.

pH 7.6

Redox +110-50

D.O. 5.99 5.91

Practice near camp site

Standard for Redox probe w/ Zobells
+185 mV

LAKE	Transect	Site	Dist. from shore	Depth	Date	Time	ODO
Black	For NE, NB	2			5-14	16:00	7.5
					"	"	7.4
							8.3

MAY 15

50cm	5-15	7:00	3.7
			3.8
			3.8

1

7:15	0.8
	0.7
	0.8

across dp.

1

8:00	1.6
	2.2
	1.7

2

8:30	4.6
	4.5

3

1m

95

9:00	4.5
	4.6
	4.6

mv

5.00 0 pH, 5 pH
6.5
6.7
6.1

abundant Nitella flexilis

3.8 6.3 6.3
3.8
4.0

2.5 6.3 6.3
2.5
2.2

samples verified: 1/15 & 1/19 no tubing

4.2 6.3 6.2
4.2
4.2

4.5 6.2 6.3
4.7

in stream channel

2.7 5.9 5.9
2.0
1.6

adj to bog

MAY 15

Take	Location	Transect	Sites	m from shore Distance	Depth cm	Weg height	Bottom
Black	N. Bay						
1	1-NB	1	2	20	15	15cm	95% Nitella 5% Bladderwort
1	1	1	1	2	70	20cm	95% Ceratophyllum 5% Bladderwort
1	1	2	1	1	60		5% ceratophyllum 5% wood 90% organic
					55		95% bare organic
					60		5% ceratophyllum 95% bare organic 3% ceratophyllum
1	1	2	2	20	70		98% bare organic 2% ceratophyllum
1	1	2	3	1	80		98% fibrous organic
					90		2% microphyllum
					85		
May 21	2	3	1	5			

11:00

Bottom completely covered with
macrophytes. ~~Fibrous~~
organic flocculent substrate

120, 130, 100, 110, 95, 80, 90, 100, 70
100, 120, 100, 120, 100, 90, 95, 100, 30
90, 110, 100, 140, 130, 100, 100, 110, 70

155, 130, 125, 140, 130, 100, 100, 120, 100
100, 60, 70, 70, 40, 30, 50, 40, 30
100, 90, 80, 80, 40, 10, 30, 10, 30

Fibrous bottom material
11:30

90, 90, 80, 80, 100, 80, 80, 40, 80
20, -20, -20, -40, -50, -50, -30, -40, +50
10, -20, -20, -40, -50, -50, -30, -40, +10
-40, -40, -40, -60, -70, -70, -50, -50, -10

13:00

-40, -70, -50, -30, -30, -30, -10, -30, -20
-100, -120, -120, -110, -150, -140, -170, -160, -40
-50, -50, -60, -50, -40, 40, -50, -60, -40

13:20

in current of
stream

-10, -10, 10, 20, 20, 40, 30, 30, 40
-20, 0, 30, 20, 20, 10, 0, 50, 50
-30, -10, 10, 20, 20, 10, 20, 30, 50

13:35

May 17, 82

Time	Loc	Location	Transect	Site	m from shore	Depth (cm)	Height of cm mangroves	Bottom D.O.	5 cm D.O.	Bottom P.H.	5 cm P.H.
9:00	1	2	1	1	1	55	5.89	1.09	5.9	6.2	6.2
						58	.88	1.1	5.9		
						54	.111	2.1	6.0		
10:00	1	2	1	2	12	95	0.141	2.7	6.3	6.0	6.3
						95	.174	3.3	6.5		
						95	.176	3.4	6.1		
10:45	1	2	2	1	3	50	0.001	0.1	3.1	5.8	5.7
						50	.103	2.2	3.6		
						55	.151	3.2	3.6		
11:30	1	2	3	3	13	90	.140	3.0	4.4	5.7	5.8
					10	95	.147	3.1	4.3		
					10	95	.174	3.7	4.8		
12:00	1	2	3	2	4		.147	3.1	4.9	6.0	6.3
							.179	3.8	5.3		
							.184	3.9	5.2		
1:30	1	2	2	2	3	45	.104				
7:00	1	2	3	1	5	15	.269		.266	6.6	
							.255		.270		
							.274		.278		
7:30	1	1	3	1	5	30	.213		.261	6.2	6.7
							.261		.271		
									.254		
8:00	1	1	3	2	8	90	.094		.185	6.0	6.1
							.128		.192		
							.177		.193		

Redox Potentials

Bottom type 90

1	2	3	4	5	6	7	8	9	Temp	
									18.6°	20% Dead leaves 50 Ceratophyllum 30 Bladderwort
									18.6°	5% erect dd
									16.5°	Bottom Nuphar stems 5% " " " laying on bottom
									15.5	Bottom 2% wood
									12.5	surface 78% bare organic
									15.5	95% bare organic
									18.5	5% debris from water city
									18.0	
									19.0	5% wood 1% Cladophora 3% bare organic 89% organic detritus
80	50	160	150	130	140	140	-200	160	13.5	100% detrital plant material
110	60	80	60	40	70	150	240	220	11.6	
120	80	100	80	80	100	120	130	160		
50	160	170	180	200	210	210	220	210	13.5	40% bare 50% leaves 10% wood.
110	150	180	200	210	210	220	230	210		
120	130	180	200	210	220	220	240	220		
180	190	210	210	210	260	200	230	240	13.5	5% wood
10	70	190	180	200	200	210	240	240	13.5	2% dead weeds
40	90	170	170	180	190	200	220	230	13.5	grasses
100	130	160	170	170	160	170	150	160	12.5	95% soft organic
80	90	140	140	140	130	130	130	130		Potential of N2O 160
70	110	120	130	80	110	150	190	100		soft bottom 100% veg. Nilella Ceratophyllum myriophyllum.

MAY 18
Time

Time	Sal	Section	Transect	Site	M. from shore	Depth cm	Height (kg)	Bottom P.O	5cm P.O	Bottom P.P	50cm P.P	
13:30	2	1	3	1	4	60		.238 5.1	.276 5.9	6.4	6.5	-
						55		.250 5.3	.273 5.8			
						60		.288 6.1	.274 5.8			
14:30	2	1	3	2	8			.288 6.1	.251 6.0	6.5	6.5	-
								.283 6.0	.268 5.7			
								.281 6.0	.274 5.8			
5-19 6:00	2	2	1	1	6	40	20	.258	.274	6.4	6.6	
								.261	.268			
								.268	.277			
7:00	2	2	1	2	9	70	25	.265	.272	6.5	6.6	
7:30	2	2	1	3	18	95	0	.263	.283	6.1	6.1	
								.272	.288			
									.272			
10:15	2	1	1	1	3	45	35	.264	.267	6.4	6.3	
								.262	.265			
								.298	.286			
11:00	2	1	1	2	9	80	35	.250	.274	6.4	6.3	
								.232	.285			
								.239	.284			
15:00	2	1	2	1	3	50	0	.381	.383	6.3	6.2	
								.360	.357			
								.380	.354			
15:30	2	1	2	2	12	92		.212	.314	6.2	6.2	
								.250	.276			
									.299			

+200
+235

Redox Potentials

Water
Temp.

Comments

1	2	3	4	5	6	7	8	9		
-10	+35	70	50	90	100	100	90	20	18.5	Surf.
60	70	80	80	90	120	110	110	50	18.2	bottom
70	120	100	90	100	120	90	90	40		
										95% Bare 2% Ceratophyllum 3% down cattail Clouded Cyclops? observed.
-80	10	60	90	50	100	80	90	50	18.5	
0	80	90	100	60	130	50	200	150	18.2	bottom
110	180	170	200	200	230	190	210	70		
30	120	160	140	140	160	140	150	40	17.5	
60	210	180	130	140	160	150	150	70	17.0	
90	210	200	160	150	170	160	160	80		70 bare 9% Equisetum 2% wood 1% cattail
30	140	160	110	90	110	130	140	50		
30	110	140	100	120	140	130	150	70	17.0	
120	170	180	160	150	170	140	150	60	17.0	85% bare 5% Equisetum 10% wood
150	170	170	150	140	160	140	180	50	17.0	15% wood
30	120	160	140	140	160	150	170	20	17.0	15% rock
100	160	180	150	130	160	150	150	30		60 Bare
-60	60	50	70	100	100	70	100	-40	17.6	5% Equisetum
50	50	60	80	60	90	70	100	-60	17.0	5% dead veg.
-70	10	50	30	30	60	30	60	-50		90% bare
-90	-20	-20	-60	-30	+10	0	+30	-70	17.5	2% Equisetum
20	150	130	70	90	130	70	90	-30	17.5	5% dead veg.
20	160	150	90	100	130	70	100	-30		8% wood 85% bare.
-50	70	60	50	70	60	50	90	0	18.3	10% wood
-30	40	30	10	20	20	20	50	-30	17.9	20% dead veg. - cattail
-10	30	30	10	10	10	0	30	-30		30 bare.
-40	70	100	70	80	110	90	120	50	18.0	2% cattail dead
10	80	40	40	50	110	100	110	50	17.0	98% bare.
70	130	80	60	70	140	120	130	50		spring seepage.

Time	LAKE	Location	Thickest	site	M. from shore	depth cm	height of obj cm	Bottom D.O.	5cm D.O.	Bottom p/H	5cm p/H
16:30	2	1	2	3	from 19 m from shore	98	(6:30) 241 205	238 246		6 - 2	6 - 2

2 2 2 1

5-20
6:00 2 1 1 1

Report
283
277
294
268
269

7:00 2 1 3 1

Report
278
279
272

5-20
9:00 2 1 5 1 3 45

10:00 2 1 5 2 8 95

2 1 4 2 24 105

10:30 2 1 4 1 4 45

13:00 2 2 3 1 3 55

13:30 2 2 3 1 3 55

2 2 3 2 12 110

1	2	3	4	5	6	7	8	9	Temp	Comments
										← Spring?
-10	80	60	20	20	40	40	90	-10	18° ⁵ (15)	15% wood
-30	10	30	0	10	30	30	60	-20	18° ⁶ (14)	85% bare soft organic
-20	60	70	50	70	110	80	110	-20		
60	130	120	70	80	100	50	60	-110		
60	130	150	100	90	110	70	80	-100		
40	130	140	90	90	110	100	140	-50		
									15° ² 15.5° ⁶	
-110	-90	-100	-100	-100	-130	-130	-120	-110	16°	clean sand.
-200	-200	+130	-100	-50	60	100	110	100	16°	98% bare
-80	40	60	36	50	60	60	70	40		8% wood
										2% dead leaves, catclaw etc
+160	220	230	230	250	230	220	220	180	16°	20% wood
+150	240	250	260	250	250	230	230	200		clean sand w/ some diatogenic
+180	230	230	230	250	250	240	240	190		
(+20) 160										
-170	-50	-60	-60	-50	-60	-50	-40	-100	16° ⁵	95% bare
-120	10	30	40	40	30	40	50	-10	14.5	5% wood
-120	-100	-70	-70	-50	-40	-40	-40	-60		
-100	-80	-50	-50	-60	-50	-50	-40	-90	16° ⁵	16% low sand
+200	200	190	190	190	200	200	210	170	15.5	8% wood
+10	0	-10	0	+10	+10	0	-10	-50		1 dead neg leaves
-20	-10	-10	-10	0	+20	+20	+10	-10		
+10	120	210	230	230	230	230	230	210	16.5°	10% rock
30	190	230	220	220	220	220	230	190	16.5	5% dead neg, catclaw
20	100	160	150	190	210	210	220	200		Equisetum stems 1' " " /m ²
+50	150	150	180	240	250	240	250	210		5% wood
0	+80	160	190	180	210	250	250	220	16.5°	15% wood
-20	70	160	170	170	210	220	230	220	16.5°	5% rock
										20% wood debris, chips mixed w organic

Time	LAKE	LOCATION	TRANSECT	SITE	M. from Shore	Depth cm	Height of Vegetation cm	Bottom D.O.	5 cm D.O.	Bottom PH	5 cm PH
May 21											
6:30	1	2	2	2	5	45cm		.104	.204		
	1	2	3	1							
May 28	3	1	1	1	5	75	40	.009 .044 .016	.076 .088 .172	6.9	6.9
6:30											
7:30	3	1	1	2	4	80		0 0 0	.012 .034 .044	6.7	6.8
8:00	3	1	1	3	4	75	80	.034 .048 .067	.183 .164 .168	7.0	7.4
8:45	3	1	1	4	3	75	35	0 0 0	0 0 .052	6.6	6.9
											Red H ₂ O 30
9:30	3	1	5	5	1	50		.043 .061 .053	.143 .114 .145	6.7	6.9
10:15	3	1	6	1	3	50		.261 .325 .313	.326 .338 by probe	7.3	7.5
10:30	3	1	6	2	8	70		.320 .319 .316	.355 .357 .345	7.5	7.6

-5	2	3	4	0	6	7	8	+5	Temp	Comments	
1				5				9			
80	150	160	150	130	140	140	-200	+160	13	Ceratophyllum 2 mms	
110	60	80	60	40	70	150	240	220	11.2 b	100% detrital plant material	
120	80	180	80	80	100	120	130	160		? spring seepage off of S. Creek mouth appears to be mostly organic	
-40	-30	-10	-10	-20	-20	10	0	60	18.2 B	100% P. Robineii	
-40	-40	-30	-10	-20	-40	-10	50	80	19.1 S	Soft bottom	
-50	-40	-40	-30	-0	-10	10	30	50			
-40	0	10	60	60	50	50	70	140	19.4 B		
-60	-60	-20	0	10	20	10	60	90	22.0 S		
-50	-40	-20	0	10	0	0	50	90			
100	190	240	220	200	250	210	180	250	67.0 S	surface DO .323	
70	70	100	120	110	120	110	200	170	66.5 b		
70	100	150	130	130	160	150	200	200			
Red H ₂ O 30	70	80	80	50	150	40	-10	+10	0	68°	surface temp 20.0
	-110	-40	-40	-50	-40	-50	-80	-90	-50	67	15.5°
	-150	-100	-80	-80	-90	-70	-70	-70	-40		spring seepage
	-50	-60	0	-50	-60	+40	-20	-30	-30		100% P. Robineii
	-90	-70	-70	-30	-30	-50	-30	-30	+30	19.2°	Surface DO .230
	-100	-70	-70	-40	-40	-30	-10	0	+30	16.9°	90% organic debris
	-90	-30	-30	-20	0	+20	+30	+50	+70		10 P. Robineii
	-70	40	110	110	120	130	120	140	140	16.5 S	Encroaching log
	20	80	110	110	140	130	140	150	150	16.5 B	Elodea
	-60	50	70	100	100	100	130	150	170		surface DO .335
+20	110	120	120	140	130	120	140	140	17.0 S		
0	100	120	120	110	120	120	150	140	16.5 B		
0	100	150	140	120	120	120	150	140			

Time	for for	for	turnover	site	m from shore	Depth cm	Height m	Bottom DO	5 cm DO	Bottom pH	5 cm pH
5-20 14:00	2	2	2	2	12	100					
14:30	2	2	2	1	4	35					

(14)

5

190

20

40

10

16

		Redox		Potentials					Temp	Comments
1	2	3	4	5	6	7	8	9		
(140)	H ₂ O									
50	210	210	220	220	220	210	220	210	16.5	10% wood
190	190	220	220	230	230	220	230	200	16.5	2% rock
20	90	150	160	150	140	150	150	90		small woody particles on soft organic substrate
400	410	200	250	200	220	220	210	210	17.0	95% sand.
100	240	210	240	230	250	240	240	210	17.0	high content of clay in samples.
160	200	210	210	160	190	200	230	220		2% rock
										2% wood
										1% dead cattail
										log jam area of cattail bay

Comments from tape.

May 17, 9:00 South Creek Bay:
Heavy overcast - rain stopped fog
water temp at boat landing 19°C

Transect 1 - site 1 bottom - solid w/ mineral material underlying
complete cover^{mat} of Myriophyllum, Ceratophyllum, Utricularia
poor site for egg deposition, eggs would fall between plants and
die do to low DO.

Transect 1 site 2

bottom material - very fine flocculant material decomposed organic

bottom 70 - 90% bare

5% erect old water lily stems

5% old water lily stems lying down

harder than north creek bay

Maybe spring seepage in this area.

Bottom water temp 16.5°C

Surface 18.5°C

Stratification of D.O. noted.

1-2-2-1

Bottom flocculant organic

2% wood

98% organic

Temp bottom 15.5

Surface 17.5

apparent spring seepage.

13 m from west shore

10 m from south shore

95% bare organic some water lilies sprouting
5% debris - dead vegetation.

La Motte pH Meter - Model HA
readability to 0.05

June 2 6 fly traps set 3 S. Creek Bay
3 W. Bay H₂O temp 16°C
bottom 14°C

Fry traps - Black Lake set 6-3, 82 2 nights 3 traps each site.

	South Creek	Seigneurie	North Bay
Bluegill	67	2-6" (3-5)	6
Pumpkinseed	51	3-5"	39
Yellow perch	10	2-6"	2
Golden shiner	18	3-5"	
Black Croppie	4	3-7"	2
Rock Bass	4	3-5"	
Yellow Bullhead			3
Black Bullhead			2
Four darter	1	1	
Johnny Darter			

Water temp 18°C

Observed 20+" muskie next to bog in N. Bay

Nets set at transects in N. Bay & S. Creek Bay.

Many Bluegill & Pseed beds on sand and among brush in area of S. Creek Bay; transect 3.

Seine S. Cr. Bay recorded above all other attempts at seining were unsuccessful

										Redox Potentials									
Date	Lake	Location	Transect	Site	M from shore	Depth cm	Bottom DO	5 cm $\uparrow$ bottom DO	Bottom pH	5 cm $\uparrow$ bottom pH	1	2	3	4	5	6	7	8	9
5-15-82	1	1	1	1	2	70	8	2.5	6.3	6.3	155	130	125	140	130	100	100	120	100
7:15							7	2.5			100	60	70	70	40	30	50	40	30
							8	2.2			100	90	80	80	40	10	30	10	30
13 5																			
X																			
							(8)	(2.4)											

Redox potentials taken at 11:00

Neg. height 20 cm

Fibrous bottom materials

95% *Ceratophyllum*

5% *Utricularia*

Thermograph placed at this site

Site just off 2 logs adj. to bog shoreline with some *Myrica*, leather leaf, *Carex* spp

Adj. to encroaching bog

5 cm $\uparrow$ D.O. taken without tubing to verify D.O. in tubing 2.2

2.3

Substrate samples 2

Sand 45.3

Co. silt 17.7

Fi. silt 18.4

Clay 18.6

pH 5.3

O.C. 27.1

O.M. 46.6

Redox over gravel substrate

1	2	3	4	5	6	7	8	9
180	200	290	250	270	210	190	190	190
180	200	290	250	270	210	200	200	200
110	180	290	240	270	200	200	200	200

DATE Time	LAKE	Location	Transect	site	m from shore	Depth cm		Bottom DO	5cm ↑ DO	Bottom pH	5cm ↑ pH	Redox Potentials										Pa ti
						Bottom DO	5cm ↑ DO					1	2	3	4	5	6	7	8	9		
5-14	1	1	1	2	20	75	7.5	6.5				120	130	100	110	95	80	90	100	70	5	
16:00							7.4 (7.7)	6.7 (6.3)				100	120	100	120	100	90	95	100	30	6	
							8.3	6.1				90	110	100	140	130	100	100	110	70	*	
5-15							3.7	3.8		6.3	6.3											
7:00							3.8	3.8														
							(3.8)	4.0														
							(3.9)															

D.O.'s to determine daily variation due to photosynthesis

abundant Nitella flexilis Vegetation height 15cm
 95% Nitella flexilis
 5% Utricularia

Bottom completely covered by macrophytes

Fibrous - pulpy organic substrate

Redox taken at 11:00

Bottom D.O. Dialysis tubes slightly higher resting on veg.

Difficult to determine where bottom begins

2 substrate samples.

Sand	26.3
G. silt	19.9
Fi silt	27.1
Clay	26.7
pH	5.7
D.C.	21.1
O.M.	36.3

Date Time	Lake Location Transect site	m from shore	depth cm	Redox Potentials										1	2	3	4	5	6	7	8	9
				0	0	5 cm	0	0	5 cm	0	5 cm	0	5 cm									
5-15 6:45	1	1	3	30	80	0.9	3.8	6.3	6.3	110	100	100	90	100	80	90	100	70	X			

Veg height 15 cm
 95% *Nitella flexilis*
 5% *Utricularia*

Bottom completely covered by macrophytes
 Fibrous-pulpy organic substrate

Difficult to determine where bottom begins.

2 substrate samples

Sand	35.6
C. silt	17.0
Fi silt	21.3
Clay	26.1
pH	4.9
O.C.	15.5
O.M.	26.7

D	Date	Lake	Location	Transect	site	m from shore	depth cm	DO				Redox Potentials									
								Bottom	DO	5cm ↑	DO	Bottom	pH	5cm ↑	pH	1	2	3	4	5	6
5-16	5-15	1	1	2	1	1	60	1.6	4.2	6.2	6.3	}	90	90	80	80	100	80	80	40	80
	8:00							2.2	4.2				20	-20	-20	-40	-50	-50	-30	-40	50
								1.7	4.2				10	-20	-20	-40	-50	-50	-30	-40	+10
5								(1.8)	(4.2)				-40	-40	-40	-60	-70	-70	-50	-50	-10
7													-20	20	90	80	90	30	40	60	130
												-70	30	100	100	110	60	60	90	150	
												-20	30	110	110	120	80	100	100	150	

5% ceratophyllum
 5% wood
 90% organic (bare)

redox taken at 13:00
 14:30 June 2 ←

This site adj. to encroaching bog with a few scattered logs & beaver cuttings in area.

This transect goes across the stream channel.

Surface temp 15.0°
 Bottom temp 17.5°

suspect influence of spring seepage or ground water seepage.

2 substrate samples

Sand 49.5
 Co. silt 18.3
 Fi silt 15.0
 Clay 17.2
 pH 5.6
 O.C. 11.4
 O.M. 19.6

Date Time	Lake Location Transect Site	m from shore	depth cm	REDOX Potentials												
				Bottom DO	5cm ↑ DO	Bottom pH	5cm ↑ pH	1	2	3	4	5	6	7	8	9
5-15	1 1 2 2	50	70	4.6	4.5	6.3	6.3	-40	-70	-50	-30	-30	-30	-10	-30	-20
18:30				4.5 (4.6)	4.7 (4.6)			-100 -50	-120 -50	-120 -60	-110 -50	-150 -40	-140 -40	-170 -50	-160 -60	-40 -40*

This site is in the stream channel

Redox taken at 13:20

98% bare organic
2% *Ceratophyllum*

Flow at this site is ≈ 0.1 m/sec.

I suspect the current is the key reason stratification of O_2 does not occur

It appears that the very soft and unstable bottom in this area would be an unfavorable site for egg survival, however if the bottom were hard the D.O. here would be suitable for egg survival.

It is possible that if eggs are deposited in this area they may drift due to the current.

2 substrate sample

Sand	35.5
Co. silt	15.6
Fi silt	28.8
Clay	20.1
pH	4.7
O.C.	12.2
O.M.	21.0

Date Time	Lake Location Transect	Site	m	from shore	depth cm	Redox Potential													
						Bottom D.O.	D.O. 5'	Bottom pH	5cm pH	1	2	3	4	5	6	7	8	9	
5-15	1	1	2	3	1	85	2.7	4.5	5.9	6.2	-16	-10	10	20	20	40	30	30	40
9:00							2.0	4.6			-20	0	30	20	20	10	0	50	50
							2.6	4.6			-30	-10	10	20	20	10	20	50	50
							(2.4)	(4.6)			50	70	150	150	140	110	110	120	170
											50	70	140	140	140	140	100	120	150
											60	70	150	150	150	110	110	120	160

→ Redox taken at 13:30
6-2 14:30

98% Fibrous organic
2% Myriophyllum

site adjacent to bog island

suspect slight influence from current of creek at this site.

2 substrate samples

sand	31.7
Co. silt	33.1
Fi silt	19.1
Clay	16.1
pH	5.1
O.C.	29.9
O.M.	51.4

Redox Potentials

Date Time	Lake Location Transect Site	m from shore	depth cm	0 DO	5cm ↑ DO	0 pH	5cm pH	1	2	3	4	5	6	7	8	9
5-17 7:30	1 3 1	.5	30	1.6 1.3 <u>1.4</u>	5.6 5.3 <u>5.4</u>	6.0	6.2	180 16 40 30 -100 -20	190 70 90 150 -60 -70	210 190 170 280 0 80	216 186 170 240 20 80	210 200 180 250 30 90	200 200 190 200 -60 30	200 210 200 190 -60 30	230 240 220 210 -40 60	240 240 230 210 150 170

Surface Temp 13.5
Bottom temp 13.5

→ Redox taken 6-2, 14:00

5% wood

5% dead macrophytes sedges

90% bare organic very soft flocculent

Site just N of big dead white pine

Some clumps of bog along shore w/ Myrica

Eggs would sink down into bottom & die

2 substrate samples

Sand 39.7
Co. Silt 22.2
Fi. Silt 17.8
Clay 20.3
pH 5.9
O.C. 21.8
O.M. 37.5

Date Time	Lake Location Transect site	m from shore	depth cm						Redox Potentials								
				0 DO	5cm DO	0 pH	5cm pH		1	2	3	4	5	6	7	8	9
5-17				2.0	3.9	6.0	6.1		106	130	160	176	170	160	170	150	160
8:00	1	1	3 2	12	90	2.7	4.1		80	90	140	140	140	130	130	130	130
						2.7	4.1		70	110	120	130	80	110	150	190	100
						(2.5)	(4.0)										

Surface temp 13.8
Bottom temp 12.50

Redox potential of H_2O 160

soft flocculant bottom, organic fibrous
100% macrophytes
Ceratophyllum
Najas
Myriophyllum
Few lilies sprouting

Similar to other transects in N. Bay

2 substrate samples

Sand	24.0
Co. Silt	22.0
Fi Silt	26.9
Clay	27.1
pH	5.1
% O.C.	4.0
% O.M	6.9

Redox

Date	Lake	Location	Transect	Site	m from shore	depth cm	0	0.0	5 cm	0.0	0.4	5 cm	1	2	3	4	5	6	7	8	9
5-17							1.9	5.9	6.0	6.2	70	110	120	140	140	150	190	180	200		
9:00	1	2	1	1	1	57	1.1	5.9													
							2.1	6.0													
							(1.7)	(5.9)													

Height of macrophytes 5 cm

Surface temp 18.6°
Bottom temp 16.5°

Water temp at boat landing 19.0°

20% Dead leaves

50% Ceratophyllum

30% Utricularia

Rain stopped, fog

Organic & mineral bottom covered by mat of macrophytes

Poor site for egg deposition, eggs would fall between debris, low P.O. area

2' substrate samples

Sand 79.2

Ca Silt 7.0

Fi Silt 3.9

Clay 9.9

pH 5.0

O.C. 8.2

O.M. 14.2

Redox

Date	Lake location	Transect	Site	m from shore	depth cm	0	2.0	5 cm	0.0	0 pH	5 cm pH	1	2	3	4	5	6	7	8	9
5-17						2.7	6.3	6.0	6.3	-70	30	70	80	100	110	140	160	180		
10:00	1	2	1	2	15	95	3.3	6.5												
							3.4	6.1												
							(3.1)	(6.3)												

Surface temp 18.6° ? Spring seepage
 Bottom temp 16.5° ✓ temperature of creek

95% bare organic
 5% standing & down water life stems decomposing

Bottom material very fine flocculent material decomposing material
 " harder than N. Bay

2 substrate samples

Sand 74.7
 Co. Silt 7.8
 Fi Silt 6.5
 Clay 11.0
 pH 4.9
 % O.C. 9.7
 % O.M. 16.7

Redox

Date	Lake	Location	Transect	Site	m from shore	depth cm	0 D.O.	5 cm D.O.	# OR	5 cm pH	1	2	3	4	5	6	7	8	9
5-17							2.2	3.1	5.7	5.9	20	20	40	70	100	110	140	180	190 X
10:45	1	2	2	1	3	52	0.1	3.6			40	70	200	130	140	100	110	230	160
							3.2	3.6			20	60	50	120	130	110	110	210	170
							(1.8)	(3.4)			-40	30	100	90	80	60	70	190	170

Surface Temp 17.5 ✓ spring seepage
 Bottom Temp 15.5

5% wood

95 bare organic flocculent

2 substrate samples

Sand 57.9
 Co Silt 15.6
 Fi Silt 12.9
 Clay 14.2
 pH 5.5
 % O.C. 9.2
 % O.M. 15.9

70 *
0
0
0
0

} 6-2 14.45

(18) (20)

Date Time	Lake Location	Transsect site	m from shore	depth cm	Redox													
					0	0.0	5 cm	0.0	0 pH	5 pH	1	2	3	4	5	6	7	8
5-21					2.2	4.3	5.9	6.1	80	150	160	150	130	140	140	200	160	*
6:30	1	2	2	2	13	45	2.0	4.4	110	60	80	60	40	70	150	840	280	
							1.9	4.2	120	80	100	80	80	100	120	130	160	
							(2.0)	(4.3)										

Surface temp 13°C ✓ spring seepage Redox in 30 Bells +220
 Bottom temp 11°C

5% detrital macrophyte material - 3 Cratophyllum & Myriophyllum
 95% flocculent organic

Frost this A.M. Clear N wind 5 mph
 off Creek mouth

Water lilies just sprouting

Bottom material appears to be organic but more firm than N. Bay.

2 substrate samples

Sand	68.3
Co. Silt	12.6
Fi. Silt	8.3
Clay	10.8
pH	5.6
% O.C.	3.2
% O.M.	5.4

Date Time	Lake Location Transect site	m from shore	depth cm	Redox Potentials															
				0	5cm	0 pH	5cm	1	2	3	4	5	6	7	8	9			
5-21	1 2 3 1	.5	15	5.6	5.5	6.6	6.6	50	160	170	180	200	210	210	220	210	X		
7:00				5.4	5.7			110	150	190	200	210	210	220	230	210			
				5.8	5.9			120	130	180	200	210	220	220	240	220			
				(5.6)	(5.7)			-40	60	140	140	140	90	90	110	140			
								-40	20	70	70	80	50	60	90	150			
								60	40	90	90	110	80	90	120	160			

Surface temp 13.5
Bottom temp 13.5

40% bare sand.

50% dead leaves - 1 layer deep only

10% wood.

Some Myrica in area

Hard sandy substrate goes out $\approx$ 3 m from shore

Sorting of substrates due to wave action in this area, in fetch of N wind.

2 substrate samples

Sand	91.8
Co. Silt	4.6
Fi. Silt	1.5
Clay	2.1
pH	5.5
% O.C.	4.9
% O.M.	8.4

10 X
10
00
6
30
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} G-2 14:45

Date Time	Lake	Location	Transect	site	m from shore	depth cm	Redox Potentials												
							0	2.0	5 cm	2.0	0	5 cm	1	2	3	4	5	6	7
5-17							3.1	4.9	6.0	6.3	40	50	70	70	110	120	150	170	210
12:00	1	2	3	2	4	45	3.8	5.3											
							3.9	5.2											
							(3.6)	(5.1)											

90% organic detritus
 5% bare organic silt
 5% wood

Surface temp 19°
 Bottom temp 18°

2 substrate samples

Sand 78.4
 Co. silt 8.3
 Fi silt 5.2
 Clay 8.1
 pit 5.4
 % O.C. 4.8
 % O.M. 8.3

Date Time	Lake Location transect site	m from shore	depth cm	Redox Potentials															
				0	0.0	5 cm	0.0	0.4	5 cm	0.4	1	2	3	4	5	6	7	8	9
5-17	1 2 3 3	17	95	3.0	4.3	5.7	5.8	20	70	80	100	130	150	150	190	800			
11:30				3.1	4.4														
				3.7	4.8														
				(3.2)	(4.5)														

Surface temp 18.5
Bottom temp 15.5

95% Bare organic silt
5% detritus from water lily stems

2 substrate samples

Sand 78.9
Co. Silt 11.5
Fi Silt 3.2
Clay 6.4
pH 5.3
% O.C. 1.2
% O.M. 2.1

June 4, 82 Moose Z. Campground landing

Observed 6 YOY muskellunge suspended near surface in patch of Logittaria & Vallisneria. They lay very still and suddenly dart after food. Other YOY species observed and collected for later identification.

Muskies have a cryptic form, look like sticks or dead grass.

Water scorpions collected in area.

YOY muskie collected in cattail Bay, fish among Equisetum and log jams in .3 m depth or less.

Potential here for early life history study w/ sufficient no. of fish present for growth studies.

YOY muskie collected in Farmer's Creek area.

Fry traps set Moose Z. June 4 3 sets each site = 9 net nights.

Cattail Bay

Yellow Bullhead	4 (4-7")
Rock bass	1 5"
Yellow perch	11 (2-5")
Redhorse	5 (12-16")
Walleye	
Bluegill	3 (7-8 1/2")

Farmer's Creek

2	(7")
5	(4-6")
4	(2-5")
2	(6, 8")
1	4"

Black L., North Bay
Location 1

Thermograph

2,1

3,1
3,2

2,2

2,3

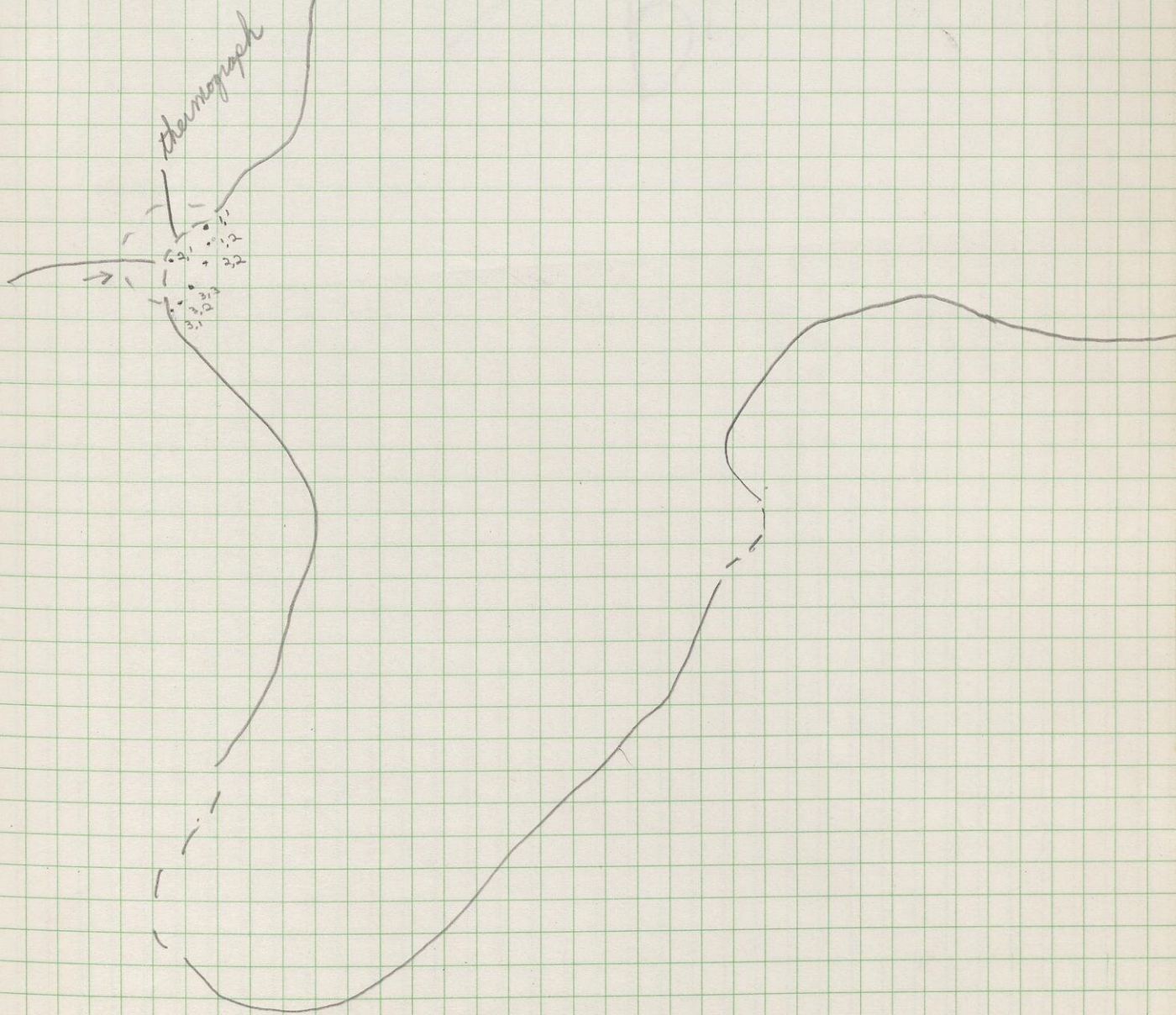
13

12

11

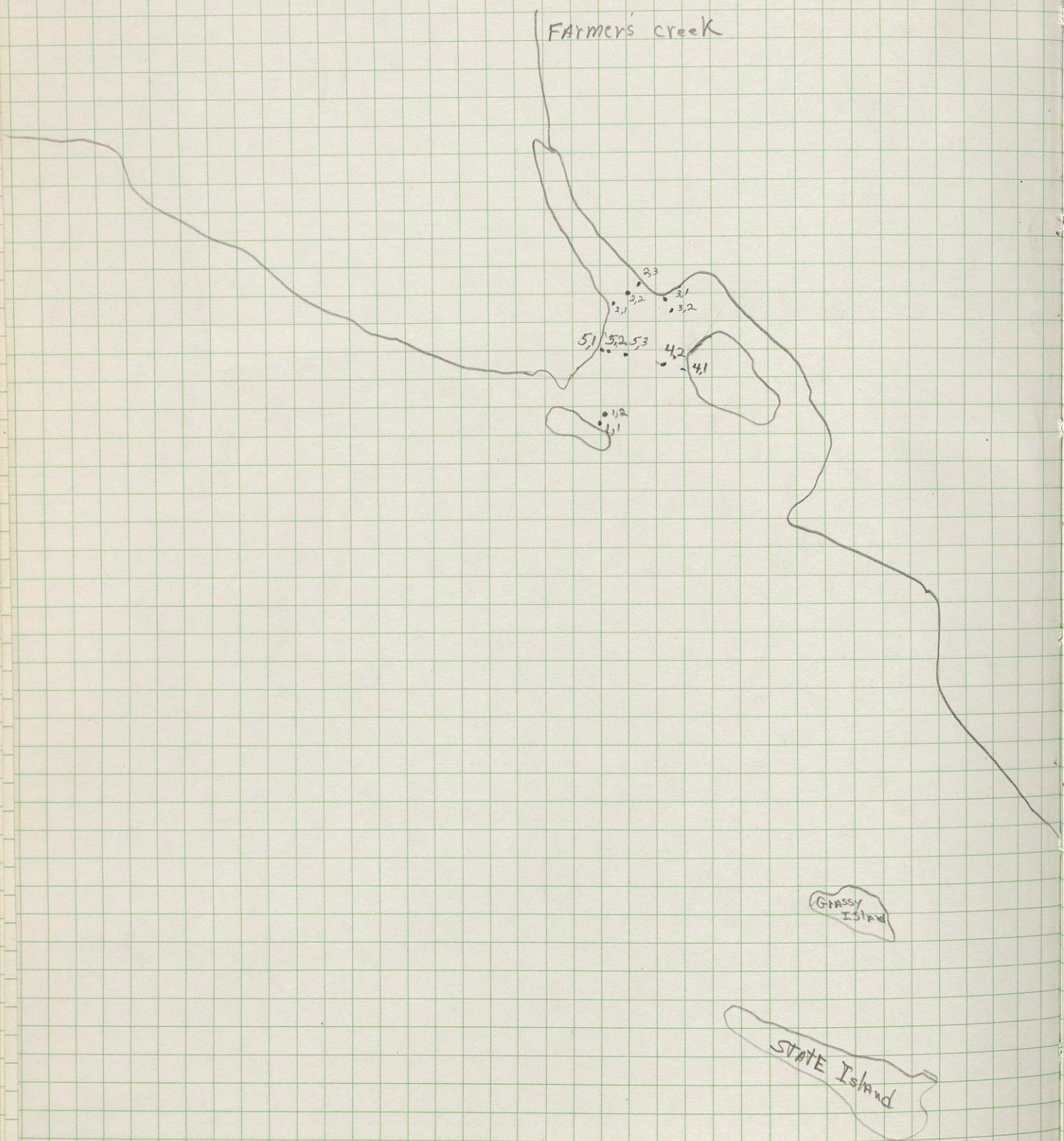
thermograph

Black Lake, South Creek Bay
Location 2



2" = 150 m.
5 cm = 150 m, 1 cm = 30 m.

Moose Lake, Farmer's Creek.
Lake 2 Location 1



10cm = 500m.

Moose L. Cattail Bay
Lake 2 Location 2

Wolf Island

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3/2
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out-
house
Island

1 cm = 50

10 cm = 500 m

Date Time	Lake	Location	Transect	site	m from shore	depth cm	Redox												
							0	20	50	100	5 cm pH	1	2	3	4	5	6	7	8
5-19	2	1	1	1	3	45	6.5	6.5	6.4	6.3	-60	60	50	70	160	180	70	100	-40
							(6.4)	6.5	(6.2)		50	50	60	30	60	90	70	100	-50
10:15							6.3	6.1			-70	10	50	30	30	60	30	60	+60
5-20							6.0	6.3											
6:00							5.9	5.7											
							(5.9)	5.7											
							(5.9)												

Surface temp 17.0 5-20 15.0°
 Bottom temp 17.0 6:00 15.5°

5% *Equisetum* beginning to emerge
 5% dead macrophytes
 90% Bare

veg height 35 cm

large # of *Daphnia* observed

June 1, Very dense growth of *Equisetum*
 Observed 3 15-20" muskellunge among horsetails

Sand 63.5
 Co. Silt 29.4
 Fi. Silt 3.8
 Clay 3.3
 pH 5.4
 % O.C. 1.1
 % O.M. 2.0

Date Time	Lake Location Transect site	m from shore	depth cm	Redox Potential															
				0	2.0	5 cm	10.0	0 H	5 cm	1	2	3	4	5	6	7	8	9	
5.14	2 / 1 / 2	9	80	5.3	5.8	6.4	6.4	-90	-20	-20	-60	-30	10	0	30	-76			
				4.9	6.0			20	150	130	70	90	130	70	90	-30			
11:00				(5.1)	6.0			20	160	150	90	100	130	70	100	+30	≠		
3:20					(5.9)														
6:																			

Surface temp 17.5
Bottom Temp 17.5

29% Equestrium
89% Wood
59% dead macrophytes
85% bare

veg. height 35 cm

Sand 73.8
Co. Silt 21.0
Fi. silt 3.7
Clay 1.5
pH 5.4
% O.C. 8.2
% O.M. 14.0

Date Time	Lake Location Transect site	m from shore	depth cm	Redox Potential															
				0 cm	0 cm	5 cm	0 cm	5 cm	1	2	3	4	5	6	7	8	9		
5-19	2 1 2 1	3	50	8.1	8.1	6.3	6.3		-50	70	60	50	70	60	50	90	0		
15:00				8.1	7.6				-30	40	30	10	20	20	20	50	+30		
				8.1	7.5				-10	30	30	10	10	10	0	30	+30		
				(8.1)	(7.7)														

Surface temp 18.3
Bottom Temp 17.9

90% overcast
S wind 5 mph

✓ groundwater seepage

10% wood
20% dead macrophytes (Typha)
70% bare

Sand 51.3
Co. Silt 21.6
Fi Silt 17.4
Clay 9.7
pH 5.1
% O.C. 2.9
% O.M. 5.0

Date Time	Lake Location Transect site	m from shore	depth cm	Redox Potential															Date Time
				0	10	5 cm	10 cm	0 H	5 cm	1	2	3	4	5	6	7	8	9	
5-19	2122	20	92	4.5	6.7	6.2	6.2	-10	70	168	70	80	110	90	120	50	5-19		
15:30				5.3	5.9			16	80	40	40	50	110	100	110	50	* 16:00		
					6.4			70	130	80	60	70	140	120	130	50	6:00		
				(4.9)	(6.3)														

Surface temp 18
Bottom temp 17

suspect spring seepage - bottom samples were colder than H₂O.

98% bare
2% dead typha stems

Sampled stringy algae taken for ident

Sand	77.6
Co. Silt	18.4
Fi Silt	3.9
Clay	0.7
pH	5.1
% O.C.	31.1
% O.M.	53.5

Date Time	Lake Location	Transect	Site	m from shore	depth cm	Redox Potential														
						0 cm	0.0	5 cm	0.0	0 ft pH	5 cm pH	1	2	3	4	5	6	7	8	9
5-19	21	2	3	19+S	98	(6.2)	(6.2)					-10	80	60	20	20	40	40	90	-10
16:30				29+N								-30	10	30	0	10	30	30	60	-20
6:30						4.5	5.1	6.2	6.2	-20	60	70	50	70	110	80	110	+20	*	*
						4.4	5.2													
						(4.5)	(5.1)													

Surface Temp 15
Bottom Temp 14

suspect spring seepage.

15% wood

85% bare soft organic

Sand 45.0
Co. Silt 29.2
Fi. Silt 9.9
Clay 15.9
pH 5.9
% O.C. 12.0
% O.M. 30.6

Date Time	Lake Location Transect site	m from shore	depth cm	Redox Potentials														
				0	0.5	5 cm	0	5 cm	1	2	3	4	5	6	7	8	9	
5-18	2131	4	55	5.1	5.9	6.5	6.5	-10	35	70	50	90	100	100	90	20		
13:30				5.3	5.8			60	70	80	80	90	120	110	110	50		
				6.1	5.8			70	120	100	90	100	120	90	90	40		
5-19				5.9														
7:00				5.1	5.5													
				5.1														

Surface temp 18.5
Bottom temp 18.2

95% bare
5% Dead veg. *Typha*
Ceratophyllum

Very abundant crustaceans observed - sample collected

Collected along shoreline
Bottom firm compared to Black.

Thermograph placed at site 13:30 ~~std~~ temp 18.5°

Sand	73.1
Co. silt	10.5
Fi silt	5.5
Clay	10.9
pH	5.5
% O.C.	21.2
% O.M.	36.4

Date Time	Lake Location	Transect site	m from shore	depth cm	0.0	5cm D.O.	0.4 pH	5cm pH	1	2	3	4	5	6	7	8	9
5-18 14:30	2132	12	80	6.1	6.0	6.5	6.5	-80	10	60	90	50	100	80	90	50	
				6.0	5.7			0	80	90	100	60	150	150	800	150	7
				6.0	5.8			110	180	170	800	800	830	190	210	70	
				(6.0)	(5.8)												

Surface Temp 18.5
Bottom Temp 18.2

Redox 8:00 A.M 5-20

95% bare
5% wood.

Sand 69.6
Co. Silt 11.0
Fi. silt 6.2
Clay 13.2
pH 5.7
% O.C. 3.9
% O.M 6.8

Date Time	Lake Location Transect	site	m from shore	depth cm	Redox Potential										Dot Time		
					0 D.O.	5cm. D.O.	0 pH	5cm pH	1	2	3	4	5	6		7	8
5-20	2141	4	45	(5.5)	(5.6)	6.6	6.6	-100	-80	-50	-50	-60	-50	-50	-40	-90	5-2
10:30								10	200	190	190	190	200	200	210	170	10:
								200	0	-10	0	10	+10	0	-10	-50	
								-20	-10	-10	-10	0	+20	20	+10	-10	

Surface Temp 16.0°
Bottom Temp 15.5°

Water Temp at mouth of Forner's Creek 12°C

95% bare clean sand
4% wood
1% dead leaves.

Abundant *Daphnia*

sample collected
specimens of fry collected

Sand 93.4
Co. Silt 4.4
Fi Silt 0.8
Clay 1.4
pH 5.6
% O.C. 0.4
% O.M. 0.7

Date Time	Lake Location Transect site	m to shore	depth cm	Redox Potential														
				0	0.0	5 cm	10.0	0.4	5 cm	1	2	3	4	5	6	7	8	9
5-20	2 1 4 2			(5.7)	(5.7)	6.6	6.6	-170	-50	-60	-60	-50	-60	-50	-40	-100		
10:15		24	105					-120	10	30	40	40	30	40	50	+10 X		
								-120	-100	-70	-70	-50	-40	-40	-40	-60		

Surface Temp 16
Bottom Temp 14.5

Redox of water 20
✓ spring seepage

95% bare
5% wood

Directly across bay from transect 5

Sand 81.7
Co. Silt 9.0
Fi Silt 4.0
Clay 5.3
pH 5.6
% O.C. 0
% O.M. 0

Date Time	Lake Location Transect Site	m from shore	depth cm	Redox Potential										Date Time			
				0 D.O.	5 cm D.O.	0 pH	5 cm pH	1	2	3	4	5	6		7	8	9
5-20 9:00	2 1 5 1	3	45	(6.8)	(6.9)	6.5	6.5	-110 -200 -80	-90 -200 40	-100 -130 60	-100 -100 50	-100 -50 50	-130 60 60	-130 100 60	-120 110 70	-110 100 40*	5- 9:

Redox in Zo Belli +235

Surface temp 16.°
Bottom temp 16.°

90% bare clean sand
8% wood
2% dead leaves & cattail stems

abundant Daphnia

sand	96.7
Co. silt	2.0
Fi silt	0.4
clay	0.9
pH	5.6
% O.C.	00
% O.M.	00

Date Time	Lake Location Transect Site	m from shore depth	Redox Potential													
			0 D.O.	5 cm D.O.	0 ft pH	5 cm pH	1	2	3	4	5	6	7	8	9	
1/10 5:20	2152	8	95	(6.3)	(6.3)	6.5	6.5	160	220	230	236	250	230	220	220	180
100 9:30								150	240	250	260	250	250	230	230	200
40*								180	230	230	230	250	250	240	240	190

Surface temp 16°
Bottom temp 16°

90% Cloudy
N. Wind 15 mph

20% Wood
80% Clean sand w/ some organic

Abundant Pophnia

Sand	93.3
Co. silt	3.9
Fi silt	1.4
Clay	1.4
pH	5.3
% O. C.	0.8
% O. M.	1.3

Date Time	Lake Location Transect site	m from shore	depth cm	Redox Potentials															Do Tm
				0 D.O.	5cm D.O.	0 ft pH	5cm pH	1	2	3	4	5	6	7	8	9			
5-19 6:00	2 2 1 1	6	40	5.5	5.8	6.5	6.5	30	120	160	140	140	160	140	150	40	*	5	
				5.6	5.6			60	210	180	130	140	160	150	150	70		.7	
				5.7	5.8			90	210	200	160	150	170	160	160	80			
				(5.6)	(5.7)														

20 cm macrophyte height

Surface temp 17°
Bottom temp 17°

90% bare sand?
7% Equisetum
2% Wood
1% cattail

little cover on bottom
dense patches of Daphnia not present

Sand 69.1
Co. silt 12.5
Fi. silt 8.7
Clay 9.7
pH 5.4
% O.C. 0.9
% O.M. 1.6

Date Time	Lake Location Transect	site	m To shore	depth cm	Redox Potential											
					0 D.O.	5 cm D.O.	0 pH	5 cm pH	1	2	3	4	5	6	7	8
* 5-19	2212	9	70	(5.6)	(5.8)	6.5	6.5	30	140	160	110	90	110	130	140	50
7:00								30	110	140	100	120	140	130	150	70 *
								120	170	180	160	150	170	140	150	60

25 cm macrophyte height

Surface temp 17°
Bottom temp 17°

85% bare
5% Equisetum
10% Wood

Sand 77.4
Co. Silt 9.4
Fi Silt 5.2
Clay 8.0
pH 5.3
% O.C. 3.1
% O.M. 5.3

Date Time	Lake Location Transect Site	m to shore	depth cm	Redox Potentials												
				0 D.O.	5 cm D.O.	0 pH	5 cm pH	1	2	3	4	5	6	7	8	9
5-19	2213	18	95	5.6	6.0	6.1	6.1	150	170	170	150	140	160	140	180	50
7:30				5.8	6.1			30	120	160	140	140	160	150	170	20+
				(5.7)	(6.0)			100	160	180	150	130	160	150	150	30

Surface temp 17.0
 Bottom temp 17.0

Re redox is substrate more D.O. rich than H₂O

15% Wood
 15% rock
 60% bare

Site of thermograph

sand 71.7
 Co. silt 11.8
 Fi silt 7.1
 clay 9.4
 pH 5.5
 % O.C. 1.4
 % O.M. 2.4

Date Time	Lake Location Transect site	m from shore	depth cm	Redox Potential										10						
				0	0.0	5 cm	0.0	0	pH	5 cm	pH	1	2		3	4	5	6	7	8
5-20	2	2	2	1	4	35	(5.8)	(5.9)	6.3	6.3	-400	110	200	250	200	220	220	210	210	5-
14:00											100	240	210	240	230	250	240	240	210	14
											160	200	210	210	160	190	200	230	220	

Surface temp 17°
Bottom temp 17°

90% Bare sand? clay?
5% Wood
3% Rock
2% Dead Typha stems

high content of clay in samples.
log jam area of Cattail Bay

✓ back of Cattail Bay for spring seepage

sand	77.6
Co. silt	9.8
Fi silt	6.0
Clay	6.6
pH	5.1
20.c.	0.3
20.m.	0.5

Date Time	Lake Location Transect site	m To shore	depth cm	Redox Potential															
				0	0.0	5 cm	10	0	pH	5 cm	pH	1	2	3	4	5	6	7	8
5-20	2 2 2 2	15	100	(5.6)	(5.7)	6.3	6.3	50	210	210	220	220	220	210	220	210	220	210	
14:30								190	190	220	220	230	230	220	230	200			
								20	90	150	160	150	140	150	150	190			

Surface temp 16.5°
Bottom temp 16.5°

140 - redox of H₂O

10% Wood

2% rock

88% Bare - organic w/d

Small wood particles on soft organic substrate

abundant Daphnia

Sand 63.3

Co. silt 13.6

Fi silt 11.5

Clay 11.6

pH 5.3

% O.C. 4.8

% O.M. 8.3

Date Time	Lake Location Transect	site	m to shore	depth cm	Redox					Potential					Date Time		
					0	0.0.	5 cm	0.0.	0.4	1	2	3	4	5		6	7
5-20	2231	3	55	(67)	(68)	6.6	6.6	10	120	210	230	230	230	230	230	210	5-20
13:30								30	190	230	220	220	220	220	230	190	14:30
								20	100	160	150	190	210	210	220	200	

Surface temp 16.5
Bottom temp 16.5

10% rock
5% dead macrophytes - *Lythra* & *Equisetum* stems
15% wood
70% bare - clay
18 living *Equisetum* / m²

Abundant *Daphnia*

Sand 63.2
Co. silt 15.3
F. silt 14.5
Clay 7.6
pH 4.4
% O.C. 0.6
% O.M. 1.0

Date Time	Lake Location Transect Site	m to shore	depth cm	° D.O.	5 cm D.O.	° pH	5 cm pH	Redox Potential									
								1	2	3	4	5	6	7	8	9	
5-20 14:00	2 2 3 2	12	110	(6.3)	(6.4)	(6.5)	6.5	50	150	150	180	240	250	240	250	210	*
								0	80	160	190	180	210	250	250	220	
								-20	70	160	170	170	210	220	230	220	

Surface temp 16.5°
Bottom temp 16.5°

P. Cloudy
N. Wind 10 mph

15% wood
5% rock
80% bare organic mtd
wood chips (debris mixed w/ organic)

Sand 35.0
Co. silt 19.0
Fi silt 25.1
Clay 20.9
pH 5.2
% O.C. 26.8
% O.M. 46.2

June 4, 82. Moose Z. Campground landing

Observed 6 YOY muskellunge suspended near surface in patch of Sagittaria & Vallisneria. They lay very still and suddenly dart off the food. Other YOY species observed and collected for later identification.

Muskies have a cryptic form, look like sticks or dead grass.

Water scorpions collected in area.

YOY muskie collected in cattail Bay, fish among Equisetum and log jams in .3 m depth or less.

Potential here for early life history study w/ sufficient no. of fish present for growth studies.

YOY muskie collected in Farmer's Creek area.

Frytraps set Moose Z. June 4 3 set each site = 9 net nights.

	Cattail Bay	Farmer's Creek
Yellow Bullhead	4 (4-7")	2 (7")
Rock bass	1 5"	5 (4-6")
Yellow perch	11 (2-5")	4 (2-5")
Redhorse	5 (12-16")	
White sucker		2 (6, 8")
Bluegill	3 (7-8 1/2")	1 4"

May 4, 1983 Leech L. Minnesota, w/ Bob Strand,
Minnesota DNR Research Biologist

Set up 6 sample stations 2 transects / with 3 sites each
on Steamboat Bay spawning area.

Set 6 sampling stations 1 transect parallel to shore
at Leech Bay spawning area.

also helped Bob set nets for musky egg take operations

A.M. very windy & cold & overcast 40's

P.M. clearing, warmer, decreased winds

May 5, 1983

Ran 2 sample sites 8-9:30 AM in Leech, no DO differences
over either 100% Chara or 100 bare mud.

after noon - Ran 6 stations in Steamboat Bay, no low DO
or stratification.

Spawning areas very uniform, either 100% Chara or
100 bare. apparently no BOD from mud. Perhaps
Chara mats act as egg mats to support eggs

Weather clear 5 mph from S

May 6, 1983 Finished 4 samples in Leech Bay clear

10 mph NE Wind. 1 ripe ♀ musky in net in Steamboat Bay
set off cattail point. Water temp 54

Little diversity in Leech L. spawning sites either 100% Chara or
bare mud.

May 10, 1983 Iron Lake Michigan by Dell Selzer

Set out 3 transects of 3 sample sites each on Iron I.

Most areas very similar with hard sand or sand and gravel. Some areas have carex spp. and a small plant collected for ID. plant similar to plant which was observed on Grimes I.

Iron Lake is lake no 5 Trans 3 NW most transect
see map

Weather clear calm

3, 1 5:45 AM air temp 4C

20% debris - carex stems, 15% carex 5% rock

3, 2 6:45 100% bare sand & gravel, tightly compacted on hard bottom. Small plant growing on bottom very small monocot like *

3, 3 100% bare sand, no organic or plant material

2, 1 bottom completely covered with woody material pulpy peat 20j to farm. Riparian veg is alder. bottom fairly firm w/ much sand

2, 2 7:45 AM very flocculent organic pulpy-like peat

2, 3 100% flocculent organic material sites 2 & 3 don't appear to be the type of bottom which would support eggs

from lab

1,1

Bullrush stems littered on bottom 100% detritus over
hard sand no BOD

1,2

80% sand 20% bullrush stems

1,3

Thin layer of debris over hard sand 5% horsetail stems.

May 17, 1983

Set out sample stations on Tomahawk L. near Dick Wendt's boat house. Wendt is Woodruff area fish manager for past 27 years & avid fisherman. He has observed muskies spawning here for many years. ♀ accompanied by 1-3 males, activity centered in area of stumps with some debris and grassy-like rooted veg. Dick thinks that the cores-grass are areas of egg deposition or at least has observed splashing in these areas - photos taken. This area also thaws very early in spring. apparently movement of water from spring seepage areas around bog.

Dick feels that the intense splashing etc of the spawning act covers the eggs previously deposited. This statement should be published. Several adult muskellunge observed in area. Set up 2 transects w/ 3 stations each.

#1 - nearest boat house.

Lake #6, Bay #1

5/18

Trans 1 #1

Trans 1 #2 6:30 A.M. clear calm vegetation - same monardella?
as in #3

Trans 1 #3 Substrate - flocculent organic muck with grassy appearing plant covering most of bottom, specimen collected for ID. air temp 2.5 monardella? occasional lily pad sprouting m.

Trane 2 #1 abundant monocot? a few stems of bladderwort & monocot making a straw-like mat covering bottom.

2 #2 } monocot very abundant, dead but stand erect. these sites

2 #3 }

also Bowfin nests were common in area.

May 18, 1983

- Spawning site in Thoroughfare below Madeline I and above Munagua I. Location where DNR nets muskies for egg source for Woodruff hatchery.

Sample sites set 5/18/83 several adult muskies seen in area.

- Transect nearest road, farthest from Joe Kelly's landing is transect 1.
- This area is highly eutrophic with deep flocculent organic muck.

May 19, 1983 6:00 A.M. air temp 7°C overcast - light rain

Lake 7 Bay 1

Trans 1 #1 very flocculent material

Trans 1 #2 Filamentous algae (Sperozoya ?) covering bottom. Decomposing lily pads & some newly sprouting lily pads. As bottom is disturbed bubbles are released

1 3 flocculent muck - broken down cattail stems in area occasional log in area

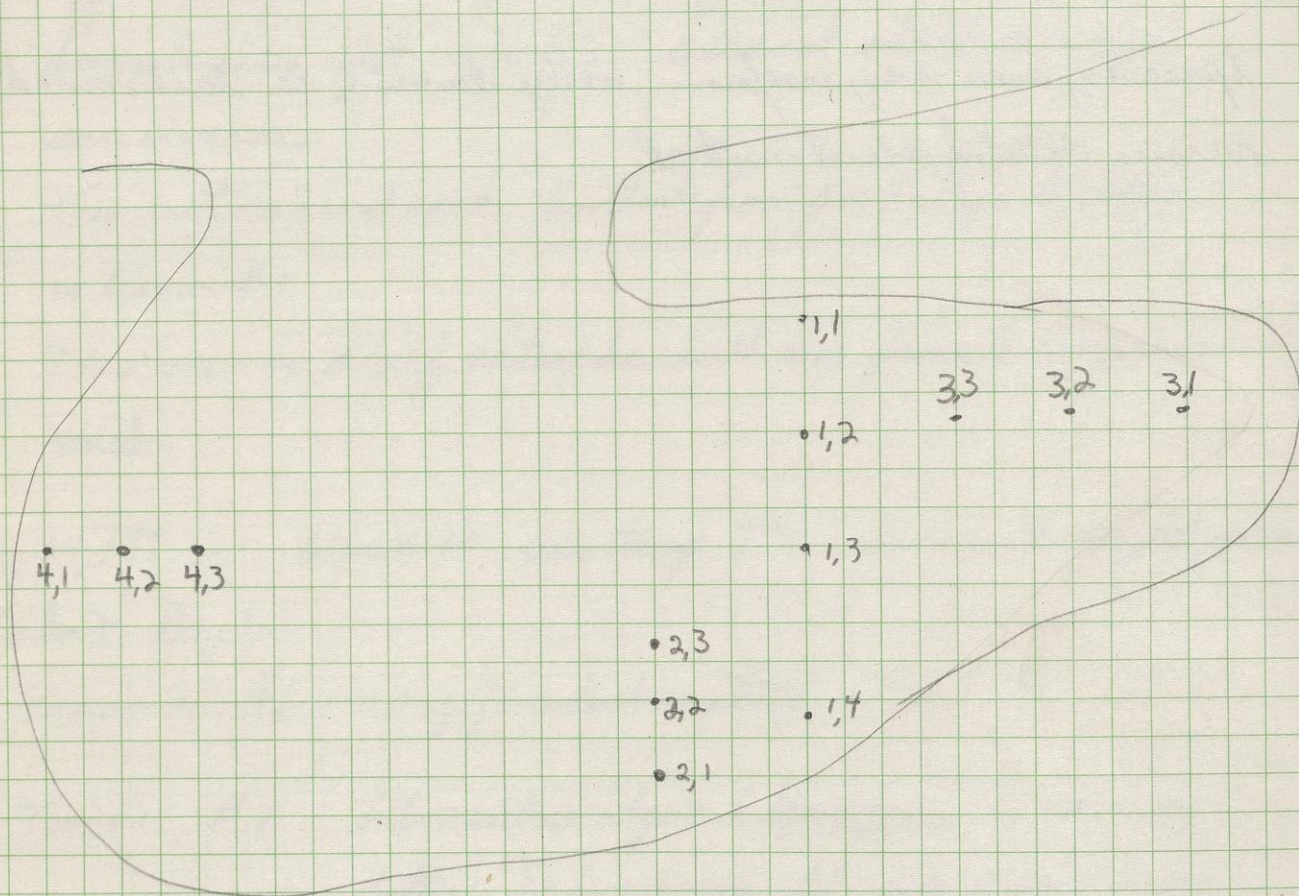
2 1 obj to clump of cattails & sedges - bare flocculent organic.

Trans 2 #2 85% dead Potamogeton spp. similar
to P. robinsonii in area sample taken
for IO. Very soft bottom

Spawning area very uniform. only diversity is bare muck
versus detrital plant material.

Chippewa & Lowage Lake 8

1st Bay immediately west of mouth of Hay Creek



May 24

Set out sampling sites in Chippewa Flowage
w/ Bob Hollingsworth.

May 27

Transects 1 & 3 are quite similar, a small
monocot (*Carex*) growing on bottom. There is
some debris but layer is generally $< 2''$ deep over
sand

Transects 3 & 4 are similar to Moose Lake
with thin layer of debris over sand. log and wood
along shoreline

Lac Courte Ornelles
Muskie Bay
Lake 3 Location 1



1cm = 60 m

2" = 300 m

5cm = 300 m

Date Time	Lake	Location	Transect	side	m to shore	depth cm	Redox Potential														
							0	1.0	5cm	1.0	0	5cm	1	2	3	4	5	6	7	8	9
5-28	3	1	1	1	5	75	0.2	1.6	6.8	6.9	-40	-30	-10	-10	-20	-20	10	0	60		
							0.3	1.9			-40	-40	-30	-10	-20	-40	-10	50	80*		
7:00							0.3	3.7			-50	-40	-40	-30	0	-10	10	30	50		
							(0.3)	(1.8)													

Veg. height 40cm

littorogenic bottom

100% Potamogeton Robbinsii

Floculent organic over sand, may have been recently deposited?
Does this correlate with development of Bay and disappearance of rice

Some floating algae (Bluegreen) with bubbly appearance.
Cultural eutrophication? like on Iowa Lake

Sand	95.2
Co. silt	3.5
Fi silt	0.4
Clay	0.9
pH	5.6
% O.C	4.1
% O.M	7.0

Redox Potentials

Date Time	Lake Location Transect Site	m from shore	depth cm	0 D.O.	5 cm D.O.	0 ft pH	5 cm pH	1	2	3	4	5	6	7	8	9
5-28 7:30	3121	4	80	0	0.3	6.7	6.8	-40	0	10	60	60	50	50	70	140
				0	0.7			-60	-60	-20	0	10	20	10	60	90
				0	0.9			-60	-40	-20	0	10	0	0	30	90
				⊙	⊙0.6											

Redox taken 11:15

Surface temp 22.0
Bottom temp 19.4

Bottom flocculent fibrous organic covering sand 2+ inches

70% *P. Robbinsii*
a few stems of *Clodea*
30% bare

Many uprooted *P. Robbinsii*

abundant bluegill beds w/ organic material cleaned away
Strategy may eliminate low D.O. problem Repro Turtles

Sand 92.5
Co. silt 4.7
Fi silt 0.5
Clay 2.3
pH 4.7
% O.C. 4.7
% O.M. 8.1

Redox Potential

Date Time	Lake Location Transect Site	m To shore	depth cm	0 D.O.	5 cm D.O.	0 ft pH	5 cm pH	1	2	3	4	5	6	7	8	9
5-28 8:00	3131	4	75	0.7	3.9	7.0	7.4	100	190	240	220	200	250	210	180	250
				1.0	3.5			70	70	100	120	110	120	110	200	170
				1.4	3.6			70	100	150	130	130	160	180	200	200*
				(1.0)	(3.7)											

Surface D.O. w/o tubing (6.9)

Surface temp 66.0
Bottom temp 66.5

100% P. Robbinsii

Sand 96.7
Co. silt 3.3
Fi. silt 0
Clay 0
pH 4.7
% O.C. 1.3
% O.M. 2.2

Redox Potentials

Date Time	Lake Location	Transect Site	M from shore	depth cm	0	0.0.	5 cm	0.0.	0 ft	5 cm	1	2	3	4	5	6	7	8	9
5-28 8:45	3	1	4	1	3	75	0	0	6.6	6.9	76	80	80	50	150	40	10	-10	0
							0	0			-110	-40	-40	-50	-40	-50	-80	-90	-50
							0	1.1			-150	-100	-80	-80	-90	-70	-70	-70	-40
							0	0.4			-50	-60	0	-50	-60	-20	+40	-30	-30

Surface temp 20.0
 Bottom temp 15.5

100% P. Robbinsii

Sand 93.5
 Co. silt 4.5
 Fi. silt 0.7
 Clay 1.3
 pH 4.7
 % O.C. 3.6
 % O.M. 6.2

Redox Potentials

Date Time	Lake Location Transect site	m to shore	depth cm	0 D.O.	5cm D.O.	0 pH	5cm pH	1	2	3	4	5	6	7	8	9
5-28				0.9	3.0	6.7	6.9	-90	-70	-70	-30	-30	-50	-30	-30	30
9:30	3151	1	50	1.3	2.4			-100	-70	-70	-40	-40	-30	-10	0	30
				1.1	3.1			-90	-30	-30	-20	0	+20	+30	50	70+
				(1.1)	(2.8)											

Surface D.O. w/o tubing 4.9

Surface temp 19.2

Bottom temp 16.9

90% fibrous organic debris

10% P. Robbinsii

Encroaching bog adj.

Redox Potentials

Date Time	Lake Location Transect site	m from shore	depth cm	0 D.O.	5cm D.O.	0.4 pH	5cm pH	1	2	3	4	5	6	7	8	9	Date Time
5-28 10:15	3161	3	50	5.7	6.9	7.3	7.5	-70	40	110	110	120	130	120	140	140	5-28 10:15
				5.0	7.2			80	80	110	110	140	130	140	150	150	
				6.7	(7.1)			-60	50	70	100	100	160	130	150	170	
				(5.8)													

Surface D.O. w/o tubing 7.1

Surface temp 16.5

Bottom temp 16.5

50% bare sand

50% organic debris

P. Robbinsii

Ceratophyllum

Sand 95.3

Co. silt 6.4

Fi silt 1.0

Clay 3.3

pH 5.4

% O.C. 2.6

% O.M. 4.4

Date Time	Lake Location Transect Site	m to shore	depth cm	Redox Potentials															
				0 D.O.	5 cm D.O.	0 pH	5 cm pH	1	2	3	4	5	6	7	8	9			
5-28	3 1 6 2	8	70	6.8	7.6	7.5	7.6	20	110	120	120	140	130	120	140	140	x		
10:30				6.8	7.6			0	100	120	120	110	120	120	150	140			
170				6.7	7.3			0	100	150	140	120	120	120	150	140			
				(6.8)	(7.5)														

Surface temp 17.0
Bottom temp 16.5

less than 10% weed cover

P. crispus veg height 30 cm
P. amplifolius

Bottom sand

Sand 95.6
Co. silt 6.5
Fi silt 1.6
Clay 2.9
pH 6.1
% O.C. 2.5
% O.M. 4.3

Comments re: Lac Courte Oreilles

Clear Calm day.

air temp 10:00 70°F

sighted 20+ gar spawning in area
abundant bluegills beginning spawning activities

Most of the *P. Robbinsii* is uprooted & floating

D.O. at surface at landing pt 13:00 10.6 mg/l tubing
apparently photosynthesis is going on

Bottom colder in most areas - groundwater seepage may be responsible
for initial early thawing of ice.

Muskie Bay 20+ years ago had abundant growth of wild rice
Weed composition of area has changed. → low D.O. muck

In some areas 1st 3 transects sand is overlain with 2-5 cm.
of fibrous organic

Muskie Bay is 100+ acres.

Muskies sighted spawning in Bay within past 2 weeks to past
2 days.

A resident once watched a pair of muskie spawning as late as
July.

appears that total mortality of eggs deposited in area would occur

transect 6 a small area of sand where D.O. levels are sufficient
for egg survival but no cover or protection from predation.

an example of what cultural eutrophication can do to spawning sites

about 15 miles



IBM

FORTRAN Coding Form

GX28-7327-6 U/M 050**
Printed in U.S.A.

PROGRAM		PROGRAMMER		DATE		PUNCHING INSTRUCTIONS		GRAPHIC		PAGE		OF		CARD ELECTRO NUMBER*	
STATION NUMBER	DATE	TIME	DISTANCE TO SHORE (M)	DEPTH (CM)	8mm D.O.	50mm D.O.	8mm PH	50mm PH	FORTRAN STATEMENT	CO. HLT	Fi Silt	Clay	Substrate PH	% O.C.	IDENTIFICATION SEQUENCE
1111	135	0715	2	70	0.8	2.4	6.3	6.3	45.3	17.7	18.4	18.6	5.3	27.1	1
1112	135	0700	20	75	0.8	3.9	6.3	6.3	26.3	19.9	27.1	26.7	5.7	21.1	1
1113	135	0645	30	80	0.9	3.8	6.3	6.3	35.3	17.0	21.3	26.1	4.9	15.5	1
1121	135	0800	1	60	1.8	4.2	6.2	6.3	49.5	18.3	15.0	17.2	5.6	11.4	1
1122	135	0830	50	70	4.6	4.6	6.3	6.3	35.5	15.6	28.8	20.1	4.7	12.2	1
1123	135	0700	1	85	2.4	4.6	5.9	6.2	31.7	33.1	19.1	16.1	5.1	29.9	1
1131	137	0730	1	30	1.4	5.4	6.0	6.2	39.7	22.2	17.8	20.3	5.9	21.8	1
1132	137	0800	12	90	2.5	4.0	6.0	6.1	24.0	22.0	26.9	27.1	5.1	4.0	1
1121	137	0900	1	57	1.7	5.9	6.0	6.2	79.2	7.0	3.9	9.9	5.0	8.2	1
1212	137	1000	15	95	3.1	6.3	6.0	6.3	74.7	7.8	6.5	11.0	4.9	9.7	1
1221	137	1045	3	52	1.8	3.4	5.7	5.9	57.9	15.0	12.9	14.2	5.5	9.2	1
1222	141	0630	13	45	2.0	4.3	5.9	6.1	68.3	12.6	8.3	10.8	5.6	3.2	1
1231	141	0700	1	15	5.6	5.7	6.6	6.6	91.8	4.6	1.5	2.1	5.5	4.9	1
1232	137	1200	4	45	3.6	5.1	6.0	6.3	78.4	8.3	5.2	8.1	5.4	4.8	1
1233	137	1130	17	95	3.2	4.5	5.7	5.8	78.9	11.5	3.2	6.4	5.3	1.2	1
3111	148	0700	5	75	0.3	1.8	6.8	6.9	95.2	3.5	0.4	0.9	5.6	4.1	1
3121	148	0730	4	80	0.0	0.6	6.7	6.8	92.5	4.7	0.5	2.3	4.7	4.7	1
3131	148	0800	4	75	1.0	3.7	7.0	7.4	96.7	3.3	0.0	0.0	4.7	1.3	1
3141	148	0845	3	75	0.0	0.4	6.6	6.9	93.5	4.5	0.7	1.3	4.7	3.6	1
3151	148	0930	1	50	1.1	2.8	6.7	6.9	0.0	0.0	0.0	0.0	4.9	58.1	1
3161	148	1015	3	50	5.8	7.1	7.3	7.5	95.3	0.4	1.0	3.3	5.4	2.6	1
3162	148	1030	8	70	6.8	7.5	7.5	7.6	95.6	0.5	1.6	2.9	6.1	2.5	1

*A standard card form, IBM electro 888157, is available for punching statements from this form.

**Number of forms per pad may vary slightly

U4576 Dornbeck
ø = ok

Wants THURS, NOV. 11
FORTRAN Coding Form

GX28-7327-6 U/M 050**
Printed in U.S.A.

PROGRAM	PUNCHING INSTRUCTIONS	GRAPHIC						PAGE	OF
PROGRAMMER		PUNCH							CARD ELECTRO NUMBER*

[illegible]

*A standard card form, IBM electro 888157, is available for punching statements from this form.

**Number of forms per pad may vary slightly

IBM

FORTTRAN Coding Form

GX28-7327-6 U/M 050**

Printed in U.S.A.

PROGRAM	PUNCHING INSTRUCTIONS	GRAPHIC									PAGE	OF
PROGRAMMER		PUNCH									CARD ELECTRO NUMBER*	

[illegible]

* A standard card form, IBM electro 888157, is available for punching statements from this form.

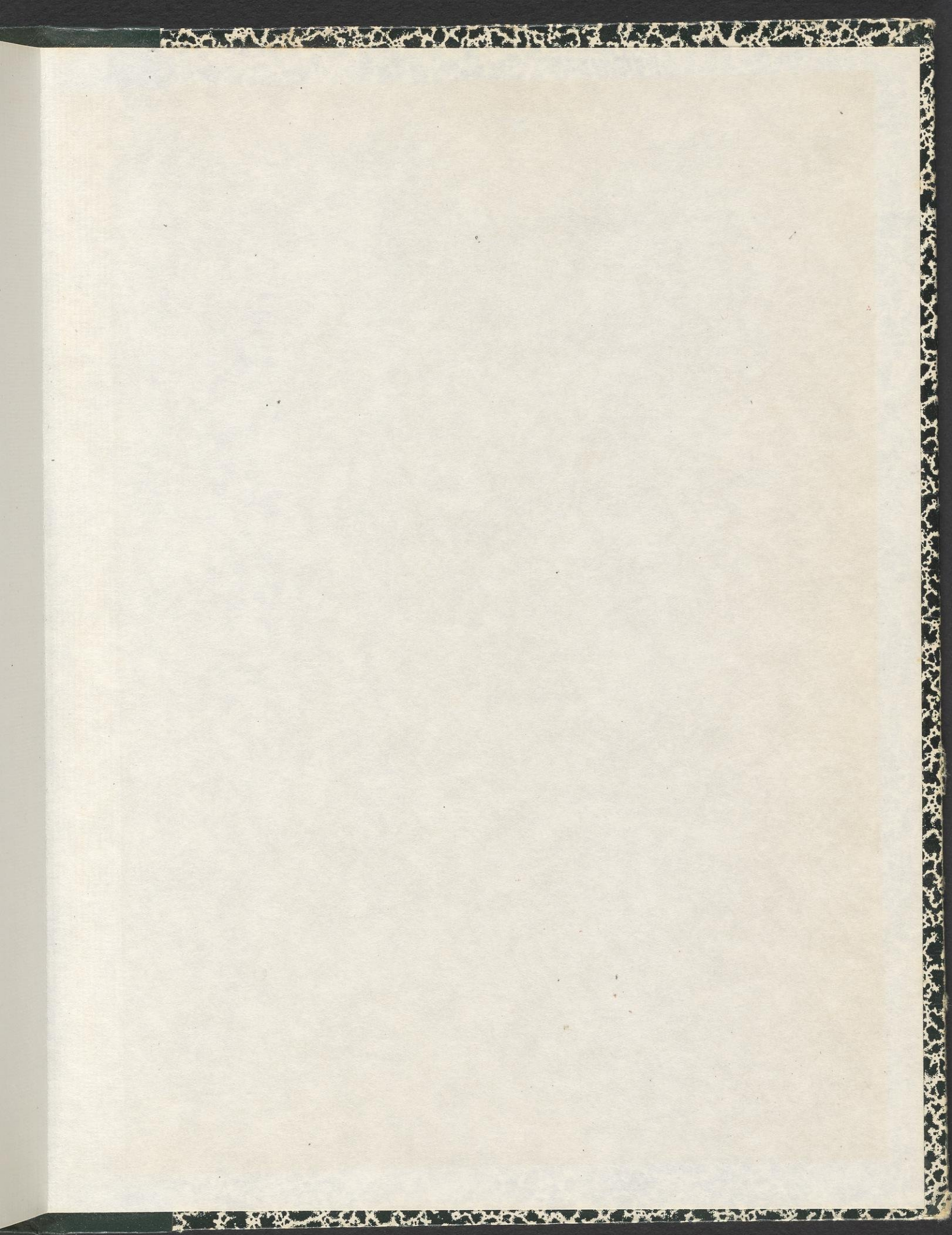
**Number of forms per pad may vary slightly

Location	STATEMENT NUMBER	Julian Date	Time	m to shore	depth cm	8 mm DO	50 mm DO	8 mm pH	50 mm pH	FORAN STATEMENT	pond	60 hilt	70 hilt	clay	sum pH	0% O.C.	IDENTIFICATION SEQUENCE	Col
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[illegible]

C0siLT 43-46 FiSiLT 48-51 CLAY 53-56 PHSUBSTR 58-60 DC 62-65 CARD 80

ϕ = letter O
O = numeric O



NUMBER	SHEET COUNT	RULING
53-008	60	WIDE
53-108	60	5 x 5 QUAD
53-208	60	PLAIN
53-010	96	WIDE
53-110	96	5 x 5 QUAD
53-210	96	PLAIN
53-012	96	WIDE & MARGIN