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FURTHER OBSERVATIONS ON THE SPAWNING HABITS AND
SURVIVAL OF YOUNG NORTHERN PIKE (ESOX LUCIUS)
IN FRENCHMAN AND TWIN LAKES, CHIPPEWA COUNTY

by

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A preliminary study of this subject was undertaken in late April, May, and June, 1942, in Frenchman and Twin Lakes, Chippewa County (IFR Report No. 867). Dr. E. W. Roelofs placed a one-way fish weir in the intermittent inlet stream of Frenchman Lake, made surveys of the marshes and adjacent areas in Frenchman Lake, obtained weather data for comparison, reported inspection of the marshes from time to time, and came to several conclusions.

The investigation carried on in 1947 was made in an attempt to fill the gaps in the earlier study, especially the number of fish migrating upstream, to make further investigations in the marshes and adjacent areas in the lake for evidences of stranding, to determine, where possible, the causes for the non-return of fish from the marshes, to supplement Dr. Roelofs' study with another year's observations on the length of life that the intermittent streams enjoy and overall weather conditions affecting spawning and the length of time that the marshes were under water.



In preparation for this further study, the reports and data by Dr. E. Roelofs were utilized and his procedures, insofar as possible, were followed.

On April 3, 1947, I installed the same weir that was used by Dr. Roelofs, placing it this time in the creek just below the culvert. The ice in Frenchman Lake was honeycombed and fairly well rotted. There was a small area of open water at the mouth of the stream, and three adult pike were noted in this pool below the weir. The lake temperature was 34° F., and the stream temperature 38° F.

Arrangements were completed for Mr. F. Gardner, employee of Mr. P. DeGraaf, to operate the weir during this investigation. The comments accompanying the tables of upstream and downstream movements are Mr. Gardner's.

On April 3, 1947, I also made a preliminary survey of the marshes, using the map given by Dr. Roelofs, which was copied from an aerial photograph furnished by Mr. DeGraaf. At that time there was 1.3 feet of snow on the ground, but judging from what could be seen it looked as though many marshes would be dry. Further observations proved this to be so.

It was noted that there was an extensive area of marsh just south of Area #9 which was not indicated on the map, but which was definitely suitable for pike spawning. At a later date, it was noted that pike were spawning in this area, and there was also spawning in Area #9.

The marshes which, in my opinion, were not suitable for spawning are as follows: Area #3, #4, #5, #7, #8, and #10. Lack of high water, together with the lack of the apparent requisite of marsh grass rendered these areas unsuitable.

Time and Extent of Spawning in 1947

As previously stated, three adult pike were observed in a pool below the weir on April 3. No upstream movement was observed between the time of installation and April 7, when the weir was washed out. The weir was replaced and staked down. On April 12, the same weir was again found to have been washed out and a slat affair was placed in the same locality on the ^{same} date. Cedar posts were driven into the stream beds, and one-inch slats were nailed to 2 X 4's. The space between the slats was approximately 1-1/2 inches.

On April 14, the first fish made its appearance. The weir did not catch every fish going through. On April 15, Mr. Gardner reported fish getting through and tried to improve the weir by placing additional slats in between the others and by tacking chicken wire over the upstream side. On April 17, Mr. Gardner estimated that 25 fish had escaped through the trap unmarked. On April 18, 19, and 20, a total of 39 pike were tagged and released upstream. The upstream run continued with small numbers reported tagged over until April 29 and 30, when 24 adults were tagged over. The upstream movement ceased on May 4.

On May 6, following 1.11" rainfall during the preceding 4 days, 43 adults (14 untagged) moved downstream. Between May 7-14, 53 adults (24 untagged) returned downstream. Between May 15-22, 3 adults came downstream; May 22 - June 9, 3 came downstream; June 10-24, 2 came downstream. The downstream movement ceased on June 24--71 days after the first fish passed through upstream and 50 days after the first one was reported coming down.

On May 13, 54 young pike were seen in the downstream trap. These young pike were marked by removing the dorsal fin and were then released.

The same procedure was followed for the remainder of the downstream migrants. Between June 11-13, approximately 600 young were allowed to collect in the weir and were removed to Thompson Hatchery. The downstream movement continued, with heavy numbers being clipped and passed over until the last week of June when the run began to taper off very noticeably. The weir's operation was officially terminated July 1, 1947. Mr. Gardner, on his insistence, continued operations until July 17, without salary, but was able to account for only 25 young pike between July 1 and 17.

The conclusions drawn are that in 1947 the upstream movement of adult spawners lasted approximately 21 days, the bulk of the adult downstream migration occurred in a space of 10 days, the first young appeared 29 days after the first adult went upstream and continued appearing in heavy numbers for a month and a half.

Other Observations and Conclusions

The upstream movement of pike follows an irregular pattern of leisurely rests and sudden short spurts. Each small hole, brush-covered area, culvert or thick patch of roadside weeds seemed to be a place for temporary rest. The pike would rest 15 to 20 minutes, then suddenly dart forward to the next cover. One was followed from the weir to the marsh below #9. It took over four hours for the fish to traverse this distance.

On April 24, five pair were noted spawning in the marsh just south of #9, and 14 pair were noted in #9 (the spawning act by some pairs was apparently gone through many times). One pair was noted in particular. They would drift in rather aimless fashion for a period of several minutes, side by side. Then would follow a brief period of thrashing movement.

They would turn slightly on their sides and remain in quivering suspension for several seconds, then would relax and glide on. This continued during a period of two hours that they were under observation.

It was noted that of all the pike observed spawning, none utilized the deeper portions of the marsh. All movements occurred on the shallower margins. A photograph was taken on May 14 of the area utilized by the pair observed. After a period of 21 days, there was still sufficient water to apparently support young fish life. Small pools had become isolated from the marsh at this time. It was noted that two areas in the marsh just south of #9, where pike spawned, were definitely isolated from the main marsh. By this date, the larger part of the adult population had moved downstream.

No adults were observed stranded in the marshes at any time. Mr. W. McDonald, local conservation officer at Trout Lake, checked the area frequently. He also was unable to find any evidence of stranded adults. Mr. Gardner was also asked to report any stranding that he might observe, but no such report was ever given me by him. The surrounding area was gone over very carefully for evidence, such as skeletons, but none were found. Some poaching took place, but the efforts were scattered and infrequent so far as was known.

Some loss of young and adult pike was apparent. Mr. Gardner reported one dead in the marsh, one with a big sore on the side, apparently bitten by a "hawk," and a couple hung up in the weeds on the way down. On May 22 - 24, he noted that the half dozen still in the marsh were more lively. Of the total 96 fish tagged going upstream, 65 returned. The explanations for the disappearance of the remainder is still unknown.

If Mr. Carbine's average figures for the number of eggs per female are applied to the known number of females migrating upstream to spawn,

the conclusion is that there was a great unexplained loss of young pike. During a two-week period when the young were being fin-clipped and released downstream from the weir, a small raft of fish ducks made the mouth of the stream their home and may have accounted for a great number of the returning young.

Based on the weather data from the Trout Lake Equipment Station, a few comparisons with the 1942 report can be made. Dr. Roelofs stated that the streams were reported to have dried up by the latter part of May. The 1942 report gave an incomplete report of but .27" rainfall for April. However, little significance should be attached to the April total. In the marsh areas where stranding was suspected, the small drainage areas involved would require a normal precipitation of some sort to maintain water in them. In both 1942 and 1947, the stream was not dried up at the conclusion of the investigations. The rainfall during May 1947, was less than in 1942 and but slightly less in June. Weather data covering other years was not available at the time of the writing of this report, for comparison.

According to Officer McDonald, there are at least fifteen streams draining marsh areas in the two lakes. Some pike apparently utilize every stream. Judging from the evidences of habitat requirements and fishing returns, the two lakes do not support a tremendous pike population. There is no evidence that they have declined in numbers in recent years. In view of these facts, the reports that a "ton" or "tons" of pike were stranded should be questioned.

Table 1.--Giving number of adult pike tagged and released from trap during upstream migration at Frenchman Creek, together with pertinent weather data. Figures given and comments are those of Mr. Gardner.

Date 1947	8:00 a.m.	Noon	6:00 p.m.	Total	Rainfall (inches)	Comments
April 3	0	0	0	0	1.3' snow on ground	Put screen weir in creek.
4	0	0	0	0		
5	0	0	0	0		Weir seems too light.
6	0	0	0	0		
7	0	0	0	0	1.5	Weir washed out.
8	0	0	0	0		
9	0	0	0	0		
10	0	0	0	0	Raining	
11	0	0	0	0	.44	
12	0	0	0	0		Put in slat weir.
13	0	0	0	0	Snow	First fish made appearance.
14	0	1	0	1	.31	
15	0	0	0	0		Fish getting through.
16	0	2	0	2		People hanging around marshes.
17	0	1	1	2		Estimate 25 fish have escaped.
18	0	14	6	20		At 8:00 p.m. weir kicked out.
19	0	10	3	13		
20	0	4	2	6		Unable to keep fish in weir--go back out.
21	0	0	0	0		
22	0	3	1	4		Fish seem to want to go back to lake each night.
23	0	0	2	2	.36	
24	0	1	2	3	.41	Fish showing more life and fight.
25	2	2	3	7	.01	
26	0	0	2	2	.22	
27	0	1	3	4		
28	0	0	3	3	T	
29	0	1	7	8	.05	
30	1	8	7	16		
May 1	0	3	0	3		
2	0	0	0	0	.45	Fish seem to stop during rain.
3	0	0	1	1	.45	
4 [↓]	0	0	1	1		Bear in vicinity.
Total	3	51	42	96

↓ Fish migration upstream stopped on this day.

Table 2.--Giving number of adult pike released from trap during downstream migration together with weather data. Figures and comments by Mr. Gardner.

Date 1947	8:00 a.m.	Noon	6:00 p.m.	Total	Rainfall (inches)	Comments
May 5	0	0	2	2 (1) [↓]	.21	Bear in vicinity.
6	0	43	0	42 (14)		14 adults fin-clipped, as no tags.
7	0	0	4	4 (1)	T	
8	0	14	0	14	T and snow	
9	0	7	5	12 (12)	T	No. 1442 dead in marsh.
10	0	12	0	12 (5)	T	Many fish badly beaten up.
11	0	0	0	0	.02	
12	0	4	2	6 (3)	.58	
13	0	0	3	3 (3)		
14	0	0	2	2		
15	0	0	0	0	.22	Fish still up. No in- clination to come down.
16	0	0	0	0		
17	0	0	1	1		About a dozen fish let down staying around mouth of creek.
18	0	0	1	1		
19	0	0	1	1		
20	0	0	0	0	.31	
21	0	0	0	0	.34	
22-24	0	0	0	0	.65	Saw about half-dozen still in marshes with light. Seem more lively than before.
25-30	0	0	0	0		
June 5	0	0	0	0	.98	
6	0	1	0	1		
7	0	0	0	0		
8	1	0	0	1 (1)		
9	1	0	0	1 (1)		
10-20	0	0	0	0	.74	
22	0	0	1	1		Big sore on side as if it had been bitten
23	0	0	0	0		
24	0	0	1	1	.13	
July 1	0	0	0	0	.74	
to 17	0	0	0	0		
Total	2	81	23	106 (41)

[↓] () indicates the percentage of the totals that had no jaw tag. The dorsal was removed on these.

Table 3.--Capture of young pike and brook stickleback in weir during downstream movement.

Date 1947	Stickleback	Pike	Date 1947	Stickleback	Pike
May 13	100	54	July 1	0	0
14	14	63	2	0	0
15	33	50	3	0	0
16	50	120	4	0	11
17	21	55	5	0	0
18	18	111	6	0	0
19	38	90	7	0	0
20	23	100	8	0	1
21	21	95	9	0	0
22	20	21	10	0	0
23	55	40	11	0	0
24	12	30	12	0	0
25	13	50	13	0	0
26	46	60	14	0	14
27	5	0	15	0	0
28	0	0	16	0	0
29	0	0	17	0	0
30	13	70			
June 1	0	7	Total	818	5,134
2	14	25			
3	59	60	↓	Delivered to Thompson Hatchery	
4	6	20			
5	11	30			
6	16	40			
7	11	35			
8	0	214			
9	27	50			
10	60	243			
11	36	0			
12	0	600↓			
13	0	0			
14	0	0			
15	0	157			
16	28	508			
17	12	302			
18	3	261			
19	1	222			
20	21	118			
21	3	229			
22	3	163			
23	9	172			
24	7	166			
25	0	110			
26	0	88			
27	0	32			
28	0	63			
29	0	118			
30	0	47			
		23			
		6			

Of the 106 fish which returned through the weir, 41 had no jaw tags. A total of 65 tagged fish out of 96 were counted through the weir going downstream, or 67.7 percent.

It is also noted that no fish moved downstream through the trap after June 24.

The tables 1 and 2 show, too, that the largest percentage of fish moving upstream and downstream were taken from the trap at the noon check-up. Apparently the pike do not move very much during the night as the total number of fish tagged over going upstream at 8:00 a.m. was 3. Coming downstream the total number in the trap at this same hour was only 2.

In the upstream migration the figures show a small percentage of difference in the number of fish tagged over at noon, and again at 6:00 p.m. Coming back downstream, however, almost 4 times as many were checked at noon as were checked at 6:00 p.m.

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