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NORTHERN PIKE TAGGING STUDY
BLACK RIVER, LA CROSSE COUNTY, WISCONSIN

1964-1965

by

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NORTHERN PIKE TAGGING STUDY IN THE BLACK RIVER

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Introduction

The northern pike is an important game fish in the Mississippi River and tributaries. However, little information is available concerning movement of this species, catch rates, and spawning areas in the Upper Mississippi River, particularly in the vicinity of La Crosse, Wisconsin. The purpose of this study was to obtain this information in an area of intensive sport fishing.

Description of Area

The tagging site was located in the Black River just below the Onalaska Spillway (Figure 1). The Onalaska Spillway is part of the dike associated with Lock and Dam No. 7 on the Mississippi River and at all but the highest river stages serves as an effective barrier to upstream movements of fish. The Black River joins the Mississippi River 5.1 miles downstream from the spillway. This point of confluence is four miles below Lock and Dam No. 7.

Population centers are located adjacent to and close downstream from the study area. During spring, when northern pike and other fish concentrate below the spillway, the area is closed to all fishing to prevent illegal snagging of northern pike. This closed period usually coincides with the general closed season on the Wisconsin-Minnesota boundary waters. With the exception of the closed season, the spillway area is fished continually, with heavy pressure all summer and again in winter during the ice cover season.

Several large marsh areas are located along the east shore of the Black River within 2 miles of the tagging site. These marshes are normally flooded during spring high water periods, although the extent of flooding varies with water levels on the Mississippi River and the Black River. These marshes are used by northern pike for spawning purposes.

Methods and Procedures

From April 3-27, 1964, a total of 384 northern pike were tagged below the Onalaska Spillway and in the adjacent marshes. The fish were captured mostly with trap nets, although a few were taken with a boomshocker.

The northern pike were anesthetized with MS222 to inhibit activity and prevent injury to the fish and the handler. A small hole was opened near the edge of the operculum with a sharp tool, and a monel metal strap tag was inserted through this hole and crimped with tagging pliers. On fish less than 26 inches, a #3 tag measuring $1\frac{1}{2} \times 1/8$ was usually used; on larger fish, a #4 tag, $1\frac{1}{2} \times 3/16$ inches was employed. The tags were numbered consecutively.

The tagging operation normally took less than 30 seconds, and in no case was the fish out of the water more than 2 minutes. Data collected from each fish included total length, sex, and state of maturity.

To encourage tag returns, a \$5.00 reward was offered for each tag. This information was disseminated to the public by means of newspaper and T.V. releases, letters to sportsmen's clubs, and posters placed at strategic locations.

Characteristics of Northern Pike during Tagging

Size distribution of the northern pike ranged from 11.3 to 40.0 inches total length, with 73 percent between 20.0 to 29.9 inches (Table 1). Fifty-five percent were males, 38 percent female, and 7 percent unknown (mostly spent).

No hard males were examined--all were ripe or spent. Sixty-nine percent of the females were assumed to be green (abdomens swollen, but did not extrude eggs)--the rest either ripe or spent. The smallest ripe male was 11.3 inches--the smallest ripe female was 20.0 inches (Table 2).

Of the 384 fish tagged, 247 were captured near the Onalaska Spillway and 137 in the marshes immediately downstream. Sixteen fish tagged below the spillway were subsequently recaptured in the marshes, but no fish tagged in the marshes were recaptured upstream below the spillway.

Water temperature at the beginning of the spawning run was 39 degrees F. in the Black River. At this time, all males were ripe, and nearly all females were still green. The first ripe fish (male) captured in the spawning marsh was on April 10, when the water temperature was 53 degrees. The first ripe female was taken there on April 16, with the peak of migration into the spawning marshes reached on April 24, when the water temperature was 61 degrees. Water temperatures in the marsh were consistently 4 to 10 degrees higher than in the Black River itself, and by April 17 few fish were captured outside the marsh (Table 3).

Results of Tagging Study

As of December 31, 1965, a total of 85 tags (22.1 percent) were returned. As indicated in Table 4, 78 of the tags were returned in 1964, while only 7 were brought in during 1965. Fifty percent of the returns occurred in May 1964--the first month after tagging and the month when the fishing season opened. Most of the remaining tags were returned in June and July of that year.

Ninety-two percent of the returned fish were caught in the Black River within 5 miles of the tagging site (Table 5). Four fish were taken in the Mississippi River in the tailwater of the Dresbach Dam (Lock and Dam No. 7) approximately 9 river miles from the tagging area. One fish was taken 21 miles downstream near Stoddard, Wisconsin, one was taken in the La Crosse River at West Salem 20 miles away, and one was caught in Lake Onalaska about $\frac{1}{2}$ mile above the tagging site. This fish may have traveled through or over the spillway, but it most likely moved out into the Mississippi River and upstream through the Dresbach Dam.

Of the 85 fish returned, 55 percent were caught in the immediate vicinity of tagging at the spillway (Table 3). Twenty-six percent were returned from Area B located from 1.6 to 2.2 miles downstream from the tagging site in the vicinity of the Interstate 90 bridge, 7 percent from Area C located 3.2 to 3.8 miles from the tagging area near the Clinton Street Bridge, and 4 percent from Area D about 5 miles downstream near the CMSP&P Railroad bridge.

The northern pike showed extensive movement during the second year of the study. Although only 7 tags were returned, 3 of these were from out of the Black River, and two (from the La Crosse River and the Mississippi River near Stoddard) showed the greatest movement of any fish in the study (Table 3).

Table 1 shows the size distribution of fish returned compared to fish released. Although 9.4 percent of fish tagged were less than 20 inches, only 3.5 percent were returned in that size range. On the other hand, a higher percentage of fish over 20 inches was returned than were tagged. This may indicate either a higher tagging and post-tagging mortality of the smaller fish, or a differential susceptibility to capture.

Discussion of Findings

Location and periodicity of tag returns indicate that the northern pike (1) concentrate below the Onalaska Spillway prior to spawning, (2) move into the nearby marshes to spawn, and (3) remain mostly in the Black River for much of the summer. After July, tag returns dropped off to almost nothing, which indicates that they may have moved out of the area of heavy fishing pressure in the Black River.

The small number of tags returned during the second year is undoubtedly due in part to the effects of the record floods in the spring of 1965. Fishing pressure during the early part of the season was extremely light. In addition it is probable that the high water distributed the northern pike to normally inaccessible areas, and eliminated the usual concentrations of fish below the Onalaska Spillway.

The 20.3 percent return during the first year is quite substantial and points up the intensive angling pressure which exists in the Black River. It is likely that the \$5.00 reward increased this pressure somewhat. Nevertheless, if untagged fish were creelied at the same rate as tagged fish, it is probable that only approximately 20 to 25 percent of the northern pike population is being harvested.

Table 3 shows clear evidence that a large percentage of the northern pike move into the spawning marshes. As the catch diminished in the spillway area of the Black River, it increased substantially in the marsh area. Most of the northern pike captured in the marsh were ripe. In addition, a number of northern pike tagged early in the study near the Spillway were later recaptured in ripe condition in the marsh, indicating a downstream movement into the Black River marshes.

SUMMARY

During April 1964, 384 northern pike were tagged in the Black River near the Onalaska Spillway. The fish were taken with trap nets and boomshocker, and tagged with strap tags attached to the operculum. A \$5.00 reward was offered for each tag returned.

Size range of the northern pike was from 11.3 to 40.0 inches, with 73 percent between 20.0 and 29.9 inches.

As of December 31, 1965, 85 tags (22.1 percent) were returned. Of these, seven were returned in 1965.

Ninety-two percent of the returned tags were taken in the Black River within 5 miles of the tagging site.

The longest recorded movement was 21 miles (downstream to the vicinity of Stoddard, Wisconsin). Another fish traveled 20 miles up the La Crosse River to West Salem, Wisconsin. Both of these fish were captured in 1965.

Results of the study indicate that northern pike congregate below the Onalaska Spillway prior to spawning, spawn in the marshes near the Spillway, and remain mostly in the Black River until late summer.

Figure 1

MAP OF BLACK RIVER AND POOL 8 OF MISSISSIPPI RIVER
SHOWING TAGGING AND RECOVERY SITES OF NORTHERN PIKE

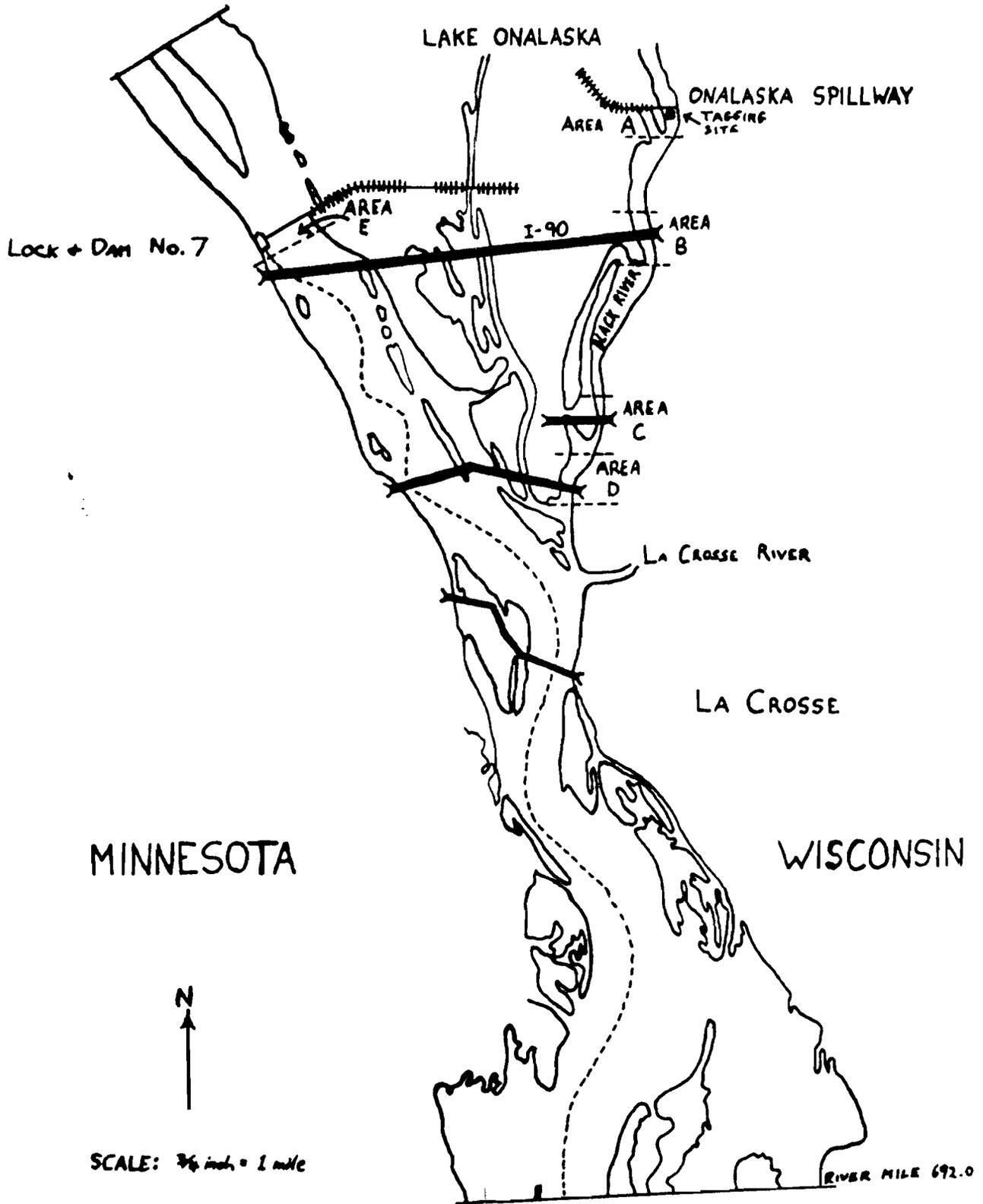


Table 1. Length-Frequency of Northern Pike Tagged and Returned

<u>Total Length (inches)</u>	<u>No. Fish Tagged</u>	<u>No. Fish Returned</u>
11.0 - 11.9	2	-
12.0 - 12.9	2	-
13.0 - 13.9	6	2
14.0 - 14.9	3	-
15.0 - 15.9	-	-
16.0 - 16.9	2	-
17.0 - 17.9	5	-
18.0 - 18.9	4	-
19.0 - 19.9	12	1
20.0 - 20.9	21	5
21.0 - 21.9	38	9
22.0 - 22.9	23	6
23.0 - 23.9	23	5
24.0 - 24.9	35	6
25.0 - 25.9	39	6
26.0 - 26.9	25	7
27.0 - 27.9	33	10
28.0 - 28.9	22	5
29.0 - 29.9	20	4
30.0 - 30.9	15	5
31.0 - 31.9	10	4
32.0 - 32.9	9	2
33.0 - 33.9	9	1
34.0 - 34.9	12	2
35.0 - 35.9	6	3
36.0 - 36.9	4	1
37.0 - 37.9	1	1
38.0 - 38.9	1	-
39.0 - 39.9	1	-
40.0 - 40.9	1	-
Total	<u>384</u>	<u>85</u>

	<u>No. Tagged</u>	<u>Percent</u>	<u>No. Returned</u>	<u>Percent</u>
Less than 20.0 inches	36	9.4	3	3.5
Between 20.0 - 29.9 inches	279	72.7	63	74.1
Greater than 29.9 inches	69	17.9	19	22.4

Table 2. State of Maturity of Northern Pike Tagged in Relation to Size

<u>Total Length (inches)</u>	<u>Ripe Male</u>	<u>Green Female</u>	<u>Ripe Female</u>	<u>Unknown or spent</u>
11.0 - 11.9	2	-	-	-
12.0 - 12.9	2	-	-	-
13.0 - 13.9	2	-	-	4
14.0 - 14.9	3	-	-	-
15.0 - 15.9	-	-	-	-
16.0 - 16.9	2	-	-	-
17.0 - 17.9	4	-	-	1
18.0 - 18.9	4	-	-	-
19.0 - 19.9	9	2	-	1
20.0 - 20.9	15	2	2	2
21.0 - 21.9	24	8	3	3
22.0 - 22.9	15	3	4	1
23.0 - 23.9	18	3	2	-
24.0 - 24.9	23	7	3	2
25.0 - 25.9	29	4	3	3
26.0 - 26.9	20	2	1	2
27.0 - 27.9	13	8	6	6
28.0 - 28.9	11	6	5	-
29.0 - 29.9	8	10	2	-
30.0 - 30.9	3	11	1	-
31.0 - 31.9	1	6	2	1
32.0 - 32.9	1	6	2	-
33.0 - 33.9	1	7	1	-
34.0 - 34.9	-	7	3	2
35.0 - 35.9	-	4	2	-
36.0 - 36.9	-	3	1	-
37.0 - 37.9	-	1	-	-
38.0 - 38.9	-	1	-	-
39.0 - 39.9	-	1	-	-
40.0 - 40.9	-	1	-	-
Total	<u>210</u>	<u>103</u>	<u>43</u>	<u>28</u>

Table 3. State of Maturity of Northern Pike in Relation to Date Tagged.

Date	Water Temperature	<u>Onalaska Spillway</u>				Water Temperature	<u>Marsh Area</u>			
		Ripe Male	Green Female	Ripe Female	Unknown		Ripe Male	Green Female	Ripe Female	Unknown
4-3-64	39	17	7	1	2	-	-	-	-	-
4	38	17	5	1	1	-	-	-	-	-
5	40	10	9	2	-	-	-	-	-	-
6	40	12	6	1	-	-	-	-	-	-
7	40	7	3	1	-	-	-	-	-	-
8	41	6	3	-	-	-	-	-	-	-
9	42	1	1	-	1	-	-	-	-	-
10	42	2	4	1	-	53	2	-	-	-
11	45	7	5	1	-	-	-	-	-	-
12	48	8	6	-	1	-	-	-	-	-
13	50	7	6	1	-	-	-	-	-	-
14	47	3	7	-	1	47	2	2	-	1
15	47	13	9	3	6	44	4	-	-	2
16	49	10	12	2	2	52	9	2	1	-
17	53	2	9	2	3	63	22	1	2	1
20	-	-	-	-	-	55	11	3	7	-
21	-	-	-	-	-	53	3	-	2	1
24	-	-	-	-	-	61	32	3	14	4
27	-	-	-	-	-	61	3	-	1	2
Totals		122	92	16	17		88	11	27	11

Table 4. Tag Returns by Month and Year.

	May	June	July	August	September	October	November	Total
1964	43	14	17	3	-	-	1	78
1965	2	1	2	1	1	-	-	7
Total	45	15	19	4	1	-	1	85

Table 5. Location of Tag Returns (See Figure 1 for Map).

	1964	1965	Total No. Returned	Percent
Area A (Onalaska Spillway 0.5 miles)	47	-	47	55.3
Area B (Interstate 90 Bridge 2.2 miles)	20	2	22	25.9
Area C (Clinton Street Bridge 3.8 miles)	4	2	6	7.0
Area D (C.M.S.P.&P. Bridge 5 miles)	3	-	3	3.6
Area E (Dresbach Dam tailwater 9 miles)	3	1	4	4.6
Other Locations:				
(Lake Onalaska 0.5 miles)	1	-	1	1.2
(Stoddard, Wisconsin 21 miles)	-	1	1	1.2
(La Crosse River, West Salem 20 miles)	-	1	1	1.2
Total	78	7	85	

Table 6. Tag Returns by Month and Location.

Location	<u>1964</u>					<u>1965</u>				
	May	June	July	Aug.	Nov.	May	June	July	Aug.	Sept.
Area A	32	6	7	1	1	-	-	-	-	-
Area B	5	5	8	2	-	-	1	1	-	-
Area C	1	1	2	-	-	-	-	1	1	-
Area D	1	2	-	-	-	-	-	-	-	-
Area E	3	-	-	-	-	-	-	-	-	1
Lake Onalaska	1	-	-	-	-	-	-	-	-	-
Stoddard	-	-	-	-	-	1	-	-	-	-
West Salem	-	-	-	-	-	1	-	-	-	-
Total	<u>43</u>	<u>14</u>	<u>17</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>1</u>