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NORTHERN PIKE INVESTIGATIONS CONDUCTED AT HOUGHTON LAKE, 1942

by

W. F. Carbine

In 1939 and 1940 all northern pike adults that ran up Peterson's ditch to spawn were tagged, and part of the young pike that returned to the lake were fin-clipped (see Institute Reports 583 and 687). In order to check the upstream run of pike for comparison with that of former years and to obtain additional scale samples, especially from marked pike, a weir was installed again in Peterson's in 1942.

The present investigation was confined mainly to the drainage ditches that flow into the North Bay of Houghton Lake at Peterson's Resort, and to certain marsh areas on Muddy and North Bays that are used for spawning by northern pike. Peterson's drainage ditch system has undergone some changes since 1940, therefore the map prepared in 1940 has been revised (see Figure 1). As in former years, only the first four ditches were under observation. The two culverts connecting Ditches I and V were plugged to prevent the movement of pike into the area under observation.

A weir constructed of plaster lath was installed on March 25 in Ditch I (Figure 1) at about the same location as used in former years.

Thanks are due Mr. Robert Frank who made observations and kept the records on the run at Peterson's and other marsh areas used by spawning pike. Mr. John Peterson deserves credit for assistance offered during the course of the investigation.

Houghton Lake had an extremely high water level this past winter and spring. Previous to about the middle of March the ditches were either dry (except for a covering of snow) or what water was present was frozen to the bottom. On March 17, Mr. John Peterson dug all of the snow out of Ditch I from the road to the lake in order to start a flow as soon as it began to thaw. There was still a good layer of snow covering the ditches and the ice on the lake when the first pike started to run on March 25. According to Mr. Peterson, the open spot in the ice cover at the mouth of the ditch opened on March 21. The size of this open spot increased daily. The complete break-up of the ice in North Bay occurred on April 11.

Measurements and sex determinations were made for all northern pike on their upstream migration. At the same time each fish was jaw tagged.

The spawning run of northern pike covered a period of 17 days (March 25 to April 10, Table 1). Only one fish entered the weir after April 6. The run of northern pike undoubtedly would have lasted longer and more fish would have entered the ditch to spawn, but, sometime during the night of April 5-6, the water started to run from the lake into the ditch. This change in the current probably accounted for the sudden stop of the run of pike.

A total of 130 northern pike was taken in the weir as compared with the 378 taken in 1939 and the 118 in 1940. Although there were fewer fish taken this year than in 1939, and more than in 1940, the run would undoubtedly have been heavier in 1942 if the current had not changed.

The largest number of upstream migrants taken in one day was 24, on April 2. Until April 1 the run was composed mainly of occasional stragglers. One possible explanation for the scattered run previous to April 1 may have been caused by Mr. Peterson in opening up the ditch on March 17, thus causing a flow of water to enter the lake at an earlier date than would normally have occurred.

The majority of the northern pike entered the weir between 6 P.M. and midnight. The next largest number ran between midnight and 8 A.M. Very few fish entered the ditch during the day. This compares favorably with the observations that were made in 1939 and 1940.

The total lengths of the male northern pike varied from 15.4 to 28 inches, and averaged 20.5 inches. The lengths of the females varied from 15.7 to 42.9 inches, and averaged 22.4 inches.

The total lengths of the female northern pike taken in 1939 varied from 19.1 to 37.5 inches in total length and averaged 23.5 inches, while the males varied from 12.3 to 26.6 inches, with an average of 21.2 inches. In 1940 the average total length of the female northern pike was 23.2 inches with a range of 15.1 to 35.9 inches, while that of the males was 19.8 inches with a range of 12.1 to 26.8 inches.

The average size of the males and females this year was therefore not greatly different from preceding years.

No increase or decrease in the average size of either males or females was noted during the entire run.

Fish of both sexes entered the weir on each day of the run except on the first and last days. Males comprised 54 per cent of the run (70 males and 60 females, Table 1). The sex ratio was 117 males per 100 females. Of the 60 females that entered the ditches to spawn, 4 were preserved for further study. Consequently, only 70 males and 56 females were allowed to spawn (125 males per 100 females). In 1939 the sex ratio was 188 males to 100 females and in 1940 it was 136 males to 100 females. The ratio of males to females in 1942 was therefore somewhat lower than in the other two years.

In 1939 and 1940, the majority (around 90 per cent) of the males and females were ripe to the extent that milt and eggs dropped from most fish when they were picked up. In 1942, only 28 per cent of the females were ripe and 100 per cent of the males were ripe. The fact that fewer females were ripe may have been due to the fact that the run started at an earlier date because the ditch was opened sooner than usual.

Because the current had changed (flowing from the lake into the ditches), the normal return run was not really expected. But between April 6 and 18 (April 18 was the last day that Mr. Robert Frank, who was taking the records at Houghton Lake, was on the job), 38 adult pike returned to the lake. After April 18 the culverts were unplugged and it is likely that most of the adult pike made their way to the Muskegon River by following the current.

On May 6 to 8 the writer returned to Houghton Lake to make a further check-up on the success of the northern pike hatch. Upon arriving at Peterson's Resort it was found that Mr. Peterson had installed a pike fry trap near the culvert in Ditch I at the junction of Ditches I and II. Up to and including May 6, Mr. Peterson had placed over 4,000 northern pike fry in Houghton Lake. He estimated [1] that approximately half again as many pike were getting through the screen and would therefore go to the Muskegon River. This indicates that an unusually high percentage of the young pike had survived long enough to get out of the marshes. In 1939 only 7,239 young pike reached the lake and many more adults spawned in that year than in 1942. In 1940 only 1,495 young pike migrated from the marshes into the lake and approximately the same number of adults spawned that year as in 1942. One of the best explanations that can be offered for this unusually high percentage survival is that the water level of Houghton Lake and of the ditches (and in the marshes) was higher in 1942 than in former years, and remained high until all eggs hatched and until the majority of the young had been able to leave. On May 6, 7 and 8 the writer cruised the ditches several times and found that young pike were still exceedingly abundant. It was often possible to pick up two pike fry with one sweep of a fine meshed scap net. Sometimes as many as 10 or 15 small pike fry could be seen at one time. On May 7 the pike fry varied from newly hatched individuals to some that were about 1 1/4 inches in length.

On May 8 the writer lifted the minnow trap that was attached to the pike fry weir. Besides taking 21 pike, 4 mudminnows (each having 4 young pike in its stomach) and 5 small pumpkinseed sunfish having a total of 12 small pike in their stomachs were also removed from the trap. It is probably not fair to assume from this that mudminnows and sunfish are serious predators of young pike, but the record indicates that these fish can and will feed on young pike when they are readily available.

Besides the observations that were made on Peterson's ditches, the following northern pike spawning areas were visited by the writer between March 25 and 31:

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[1] Estimate arrived at by counting the number of pike fry that were able to get through the screen and the number that were caught in the trap during one two-hour period.

1. Muskegon River
2. Blood Creek (E. Bay)
3. Townline ditch
4. Triple K ditch
5. Denton Creek
6. Knappen Creek
7. Spring Creek
8. Cut Stream
9. O. Michelson canal and marsh
10. Bebee canal
11. Hartwick swamp
12. Burnt Point marsh
13. South Heights ditch
14. Sanford's marsh
15. State Police Post marsh

Other pike spawning areas are present around Houghton Lake, but those listed above were the only ones accessible and therefore the only ones visited. The first eleven areas listed above were open to pike spawning before the first of April. Many of the marsh areas are only used by spawning pike during periods of extremely high lake level.

Mr. Frank made observations between April 1 and 18 on certain of the spawning areas listed above. He actually saw northern pike spawning in the following: Bebee canal, Hartwick swamp, O. Michelson marsh and canal, Burnt Point marsh, Sanford's marsh and the State Police Post marsh.

On May 6, 7, and 8 the writer saw young pike in all of the above marshes and found that the young pike were migrating from these marshes into the lake.

Because of the extremely high lake level during the period that the adult northern pike were running, and because the lake level remained high until after May 8, the northern pike adults had a chance to spawn successfully and return to the lake. This high water level also permitted the successful hatching of the eggs that were deposited. All during the period of hatching the water level raised instead of lowered. By May 8 the young northern pike had been migrating from the ditches to the lake for a period of about two weeks. This means that the fry hatched in other marshes had also been running for about the same length of time. In 1939 and 1940 it was found that between 80 and 90 per cent of the young pike left the marshes during the first 20 days of the run. Accordingly it seems logical to assume that the majority of the young northern pike that hatched in the marshes under observation in 1942 had, or would have had, sufficient time to move out of the marshes before the water level went down enough to leave them stranded. On May 8 the water in the marshes under observation was still sufficient to provide safe passage of young pike for a week or ten days, perhaps even longer in some.

From observations that have been made, it is apparent that very few young or adult northern pike were stranded in the marshes this year. Consequently more young pike have probably reached the lake than for a good many years. It will be extremely interesting to follow this investigation for several years to determine whether the excellent hatch and survival of young northern pike this year will result in improved pike fishing during the next few years.

INSTITUTE FOR FISHERIES RESEARCH

By W. F. Carbine

Report approved by: A. S. Hazzard

Report typed by: R. Bauch

Table 1
Houghton Lake--1942
The daily (upstream) run of northern pike spawners in Peterson's Ditch

Date	Number of males	Number of females	Total
March 25	1	...	1
March 26	1	5	6
March 27	9	3	12
March 28	5	4	9
March 29	4	3	7
March 30	3	1	4
March 31	7	2	9
April 1	7	9	16
April 2	12	12	24
April 3	12	7	19
April 4	3	6	9
April 5	3	6	9
April 6	3	1	4
April 10	...	1	1
Totals	70	60	130

Average T.L. of males--519.7 mm. (20.5 inches)

Average T.L. of females--567.8 mm. (22.4 inches)

Houghton Lake--1942
Spawning (upstream) run of adult northern pike
in Peterson's ditch

Date	Tag number	S.L.	T.L.	Sex	
March 25	32651	346	401	♂ R	
March 26	32652	439	513	♀ R	
	32653	432	501	♀ G	
	32654	456	537	♀ G	
	32655	361	421	♂ R	
	32656	398	469	♀ G	
	12325	455	531	♀ G	Recovery--tagged in 1940.
March 27	...	460	550	♀ G	Saved for egg count.
	4367	690	710	♂ R	Recovery--(Tagged in 1939 and recovered at Peterson's in 1940).
	32657	472	552	♂ R	
	32658	433	513	♂ R	
	32659	437	510	♀ G	
	32660	461	543	♂ R	
	32661	438	510	♂ R	
	32662	550	635	♀ G	
	32663	420	494	♂ R	
	32664	447	528	♂ R	
	32665	382	449	♂ R	
	32666	478	559	♂ R	
March 28	12270	470	550	♂ R	Recovery--tagged in 1940.
	32667	396	460	♂ R	
	32668	445	528	♀ G	
	32669	387	446	♀ R	
	32670	420	485	♂ R	
	32671	390	451	♂ R	
	32672	420	489	♂ R	
	32673	450	523	♀ G	
	32674	444	519	♀ G	
March 29	...	370	432	♀ G	Saved for egg count.
	4266	447	525	♂ R	Recovery--(Tagged in 1939 and recovered at Peterson's in 1940).
	32776	455	529	♂ R	
	32675	482	560	♀ G	
	32676	405	475	♂ R	
	32677	467	545	♂ R	
	32678	510	593	♀ R	
March 30	32679	540	622	♀ R	
	32680	410	480	♂ R	
	32681	492	517	♂ R	
	32682	410	472	♂ R	
March 31	32683	361	418	♀ G	
	32684	500	582	♂ R	
	32685	468	550	♂ R	
	32686	480	555	♂ R	
	32687	353	410	♂ R	
	32688	493	573	♀ G	
	32689	460	540	♂ R	
	32690	503	586	♂ R	
	32691	510	590	♂ R	
April 1	32692	410	479	♂ R	
	32693	411	478	♂ R	

(Continued)

Houghton Lake--1942
The daily (upstream) run of northern pike spawners
in Peterson's Ditch
(Continued)

Date	Tag number	S.L.	T.L.	Sex	
April 1	32694	560	645	♀ R	
	32695	543	630	♀ R	
	32696	422	490	♀ R	
	32697	485	560	♀ R	
	32698	515	601	♂ R	
	32699	492	575	♀ G	
	32700	462	541	♂ R	
	32701	437	512	♂ R	
	32702	573	660	♀ R	
	32703	440	510	♀ R	
	12278	623	720	♀ R	Recovery--tagged in 1940.
April 2	4485	670	765	♀ R	Recovery--tagged in 1939, recovered in 1940.
	32704	428	503	♀ G	
	32705	500	582	♀ R	
	32706	530	615	♀ R	
	32707	568	653	♀ R	
	32708	429	502	♂ R	
	32709	466	542	♀ G	
	32710	448	520	♂ R	
	32711	472	562	♂ R	
	32712	428	502	♂ R	
	32713	440	510	♂ R	
	32714	337	392	♂ R	
	32715	462	538	♀ R	
	32716	418	480	♀ G	
	32717	394	460	♀ G	
	32718	428	502	♂ R	
	32719	473	547	♂ R	
	32720	411	483	♂ R	
	32721	411	480	♂ R	
	32722	498	577	♂ R	
	32723	415	490	♂ R	Found dead in ditch--had been speared.
	32724	533	632	♀ R	
	32725	492	571	♀ G	
	...	333	398	♀ G	Saved for egg count.
April 3	32726	460	538	♂ R	
	32727	358	415	♂ R	
	32728	462	535	♂ R	
	32729	509	599	♂ R	
	32730	545	643	♀ G	
	32731	508	590	♀ G	
	32732	483	564	♂ R	
	32733	409	479	♂ R	
	32734	475	557	♂ R	
	32735	456	535	♂ R	
	32736	517	602	♀ G	
	32737	464	554	♀ G	
	32738	439	511	♀ G	
	32739	495	581	♂ R	
	32740	389	454	♂ R	

(Continued)

Houghton Lake--1942
The daily (upstream) run of northern pike spawners
in Peterson's Ditch
(Continued)

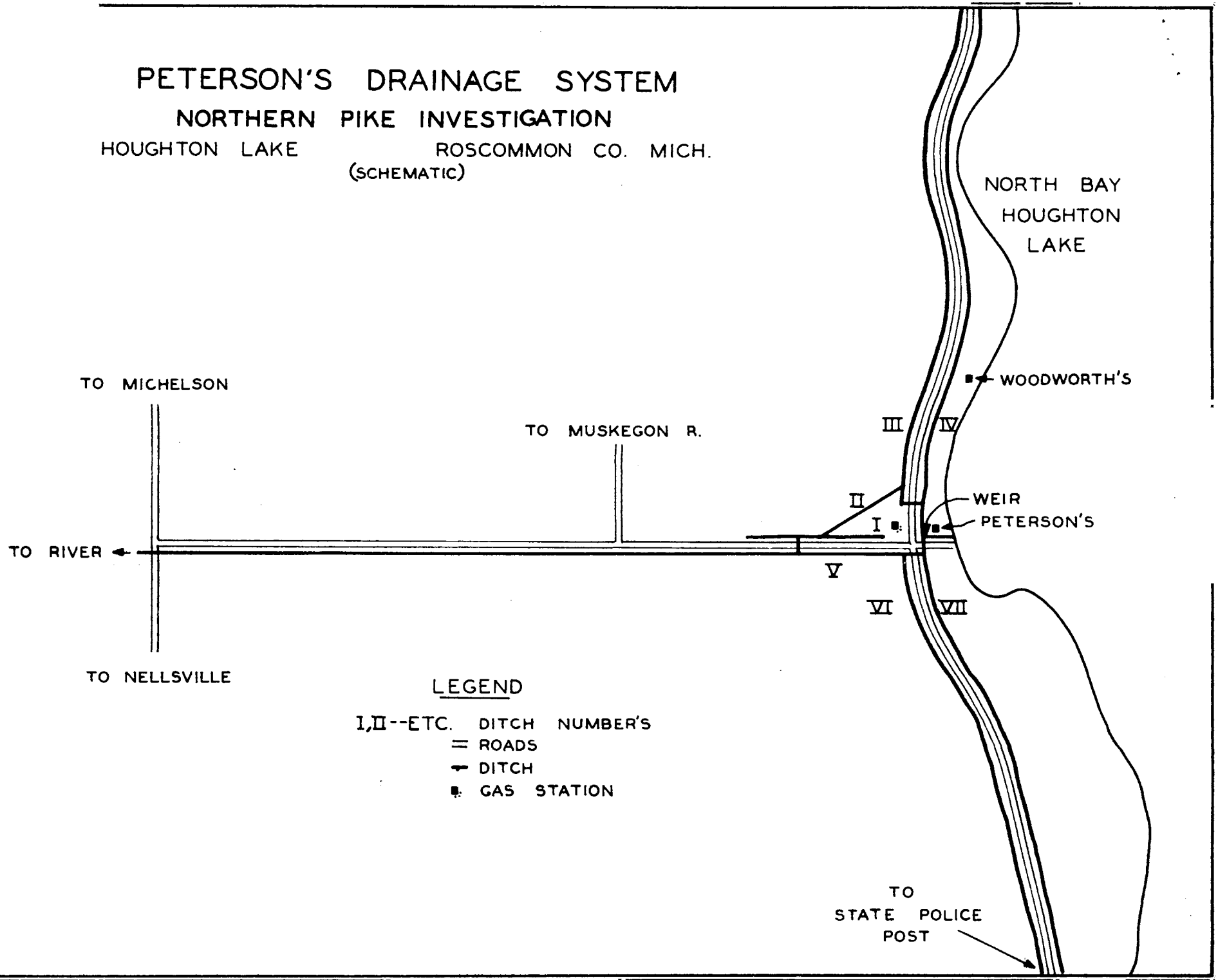
Date	Tag number	S.L.	T.L.	Sex	
April 3	32741	517	600	♀ G	
	32742	400	470	♂ R	
	32743	465	540	♂ R	
	32744	440	515	♀ G	
April 4	...	348	405	♀ G	Saved for egg count.
	32745	540	635	♂ R	
	32746	486	571	♂ R	
	32747	445	519	♀ G	
	32748	400	470	♀ G	
	32749	437	519	♂ R	
	32750	477	561	♀ R	
	20476	953	1091	♀ G	
	20477	690	803	♀ G	Recovery--tagged first in 1939, recovered in 1940 and retagged 1942 (was carrying #4460)
April 5	32751	398	466	♀ G	
	32752	497	580	♀ G	
	32753	480	565	♀ G	
	32754	520	610	♀ G	
	32755	453	532	♀ G	
	32756	413	490	♂ R	
	32757	462	540	♂ R	
	32758	493	580	♀ G	
	32759	377	445	♂ R	
April 6	12316	483	560	♂ R	Recovery--tagged in 1940.
	32760	448	524	♂ R	
	32761	457	535	♂ R	
	32762	543	635	♀ ?	
	32763	410	480	♂ R	Retagged--lost tag while in ditch.
April 10	32764	463	536	♀ G	
April 12	32765	468	542	♂ R	Caught going downstream--not tagged going up.
April 13	32766	475	595	♂ R	" " " " " " "
April 14	32767	628	718	♀ Spent	" " " " " " "
April 18	32768	468	550	♂	Retagged--lost tag while in ditch.

PETERSON'S DRAINAGE SYSTEM

NORTHERN PIKE INVESTIGATION

HOUGHTON LAKE ROSCOMMON CO. MICH.

(SCHEMATIC)



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