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Report 160

SURVEY OF HAMLIN LAKE, MASON COUNTY, WITH RECOMMEN-  
DATIONS FOR IMPROVING THE FISHING.

Size and Location Hamlin Lake, by far the largest lake in Mason County, is located a few miles north of Ludington. A good road leads to the lake. The lake has an area of about 4982 acres when at normal summer height. Its maximum mid-channel length from the south end of Lower Hamlin to the east end of upper Hamlin is approximately 10-1/8 miles. Maximum width, including the outlet bay is 1 7/8 miles. The lake consists of two bodies of water connected by the Narrows. The lower of these runs north and south while the upper lies in an east and west direction. Numerous bayous of various sizes occur along the shore line at various places. Active sand dunes encroach on the west side of the lower lake, Lake Michigan is a short distance west of Hamlin Lake.

Origin and Dam The original lake was much smaller than the present body of water. A dam was placed in the outlet during lumbering days. This flooded considerable land adjacent to the original lake. It is reported that when the timber was pretty well removed, and the timber which stood in the water and marsh area formed by damming the outlet remained to be cut, the dam sprang a leak, was washed out, and the remaining timber, then again out of water, was removed. It is stated that many fish were left stranded with the "going out" of the dam. Since then a good concrete dam has been erected. This has a head of 13 to 14 feet. It is owned by the Hamlin Dam Association. After some controversy it was agreed to hold the water at a certain maximum level and to lower it in winter. Discussion on raising and lowering of the water will be made later.

Inlets and Outlets Only one large inlet enters the lake. The Sauble River, a trout stream, has its mouth at the extreme east end of the upper lake. A few small streams enter some of the bayous, but most of these are insignificant. Near the east end of the upper lake some large springs empty into the lake thru a single stream. The most western bayou on the north shore of the upper lake is fed by a small trout stream. Each of the three larger bayous on the lower Hamlin receive a stream or streams. Most of these are quite small. A few other inlets (of little significance) occur.

Water The water is fairly clear. No evidence of injurious pollution occurs. Algae (pond scum) appears at times and heavy water-bloom in late summer is reported. It is not regarded as an ideal lake for swimming, though a considerable amount of swimming is carried on.

Use of water An old slab dock in the outlet bay indicates that the lake was once extensively used in connection with lumbering. During the summer a mail boat makes daily delivery. A state park was recently established along most of the west shore of the lake. This park includes the dune area between Lake Michigan and

Hamlin Lake, and also the outlet. It occupies a very picturesque region, and will doubtless be extensively used for camping.

Resort development is extensive. Numerous boat liveries, summer homes, inns and cottages and a few stores, line the east shore of the lower lake, and the south shore of the upper lake. A small amount of development, including a prominent summer hotel and an inn, are located on the other shores. Boats, cottages, outboard motors, fishing tackle, and guides are available.

Portions of the shore are not suitable for resort development. Wherever conditions are favorable for cottages, development is fairly extensive.

Temperature Temperature in shallow water varies considerably with air temperature, with proximity to the mouth of cold streams, and with several other conditions.

Temperatures taken in the deepest part of the lake (between North Bayou and the outlet bay) indicated that no definite thermal stratification occurs. The surface was found to be 67 degrees (air temperature 61 degrees) while the bottom was 58 degrees.

The entire water is relatively warm. Conditions during the summer are not very favorable for cold water fishes. Extremely few trout are taken in the lake. These species evidently run up the Sauble River even though some are planted at the dam. Some evidence for such an immigration has come out of the tagging experiments.

Oxygen Oxygen was found to be almost uniform at all depths. It is fairly high. The lake is capable of supporting fish life even at the bottom. Waves reach a considerable height and the water is often rough.

#### Other Chemical

Conditions. The water is fairly soft and is quite alkaline at all depths. No carbon dioxide was found even at the bottom. Chemically, the lake is well suited for fish life.

Depth A large portion of the lake is shallow. The Upper Lake is almost all less than 10 feet deep and much of it is not over 5 or 6 feet in depth. Weeds extend to the surface over almost all of this portion of Hamlin Lake. The North Bayou and the Middle Bayou are both quite shallow. The South Bayou reaches a depth of at least 30 ft. A very wide shoal area extends along the east side of Lower Hamlin Lake. The shoal is also fairly wide in some other portions. The many small bayous are all quite shallow. Lost Lake, really just another Bayou, is also so shallow that the bottom can be seen everywhere.

A fairly narrow stretch about midway between the east and west shores of the Lower Lake is over 50 feet deep. The maximum depth found was about 54 feet. A number of bars extend into the lake but soundings could not be made thoroughly enough in the limited time available to accurately locate the limits of these bars.

Bottom In the deeper parts of the lake the bottom is of pulpy peat. Pulpy peat is also thick in the deeper parts of South Bayou. The other bayous have sand along the margins and also have sand under the pulpy peat which occurs beyond the margins. Many of the bayous have pulpy peat covering the sand in a layer only a few inches thick. These bayous were originally dry land and have not been submerged long enough for the accumulation of a thick layer of peat. Since the bayous contain

many weeds the formation of peat is evidently fairly rapid. Lower Hamlin has a wide sand margin around most of its shore.

Vegetation Weeds are abundant in the entire upper Lake, in almost all of the smaller bayous, and in the North Bayou and Middle Bayou. Very little vegetation is present along the east side of the Lower lake but considerable is found in the shallower portions of the west side, especially near where the sand dunes touch the lake.

Taken as a whole, Hamlin Lake contains an abundance of vegetation. Some portions of the shoal, however, are barren of weeds.

An unusually large variety of weeds are present. Locations of weeds beds are shown on the map, and the kind and abundance of weeds at various places are listed on vegetation cards.

Natural Food Hamlin is unusually rich in insect life. Large hatches of mayflies continued for almost two weeks, during our survey. The swarms of these mayflies, seen and the thousands of discarded skins indicate that burrowing mayfly larvae (Hexagenia) must be present in the lake in exceptionally large numbers. On most of the hundreds of stumps which emerge in the bayous, the discarded skins of dragon fly larvae were seen. Twenty or thirty skins were sometimes seen on one stump, and every stump had a few.

Minnows were found to be abundant in certain portions of the lake and quite rare in other portions. Relatively few were taken on the east shore of the lower lake while the west shore contained an abundance.

Minnows were extremely plentiful just below the dam. These of course, have no access to the lake.

It is reported that the spot-tailed minnows (locally called the chub) swarm on the shoal by the thousands when they spawn in the spring. Many of these are caught and retained for bait (some of these were seen).

Crayfish, clams, and snails are fairly abundant in places.

Small perch are quite plentiful. These undoubtedly serve to a large extent as food for the larger fishes.

Some trout perch were taken in deeper water.

Hamlin Lake has food enough to supply a large fish population.

Productivity Much of the sandy shoal is relatively unproductive. All other parts of the lake, however, including the bayous and the upper lake, as well as the parts beyond the shoal in the lower lake are quite rich. The lake as a whole may be considered very productive.

Spawning There are some good spawning areas in the Upper Lake. Middle Bayou and South Bayou also had quite a few beds.

Grounds Only a very few beds were found in North Bayou. The many smaller bayous on the west shore contained some nests. The three large bayous are posted until bass season opens. Generally the spawning is on sand. Some vegetation and wood chips are found in some of the nests; others apparently are made on almost pure sand.

Species of Fish Present Hamlin Lake contains an unusual variety of fish. Of over 120 lakes investigated in detail during the last few seasons, none were found to contain so great a variety of species as is found in Hamlin Lake. Very few, if any, were found to contain so great an abundance of fish (proportionally). A few species which are reported present on good authority were not

taken by the party. Experimental netting was reduced to a minimum for obvious reasons.

Game Fish Game fish present include large-mouth bass, small-mouth bass, perch, muskellunge, northern pike, wall-eyed pike, rock bass, calico bass, pumpkinseed sunfish, and bluegills. Although the lake is not suited for trout in the summer, some trout may be found near the mouths of the trout streams and some very likely enter the lake in winter. Brook, brown and rainbow trout are very likely present in limited numbers at certain times and in certain places. A very few trout are reported to have been taken in the lake. Perch are very abundant. This may be due, in part at least, to the fact that planting of perch has been unusually heavy. Nearly one million perch fingerlings were planted during last fall. These run up the river and can be obtained at the dam with relatively little effort. Large perch are still taken. Not enough time has elapsed to give indications of dwarfing as the result of the excess planting.

Northern pike (called "pickerel" locally) were found to be quite numerous. It is reported, however, that the pike are on the decrease and that pike fishing is not so good as it was formerly.

A limited number of muskellunge are taken from Hamlin Lake each year.

Rock-bass appeared to be quite abundant in some portions of the lake. These reach a fair size.

Large-mouth bass are much more abundant than small-mouth bass. They are reported to be increasing rapidly. Many fine yearling bass were seen in the bayous. This year's hatch had an early start and it appears that a fairly large number of fingerlings are now present. The decrease in northern pike may have a direct bearing on the increase in bass. It is reported that yearling bass were more abundant this season than they have been in years. Local residents apparently look with favor on the increase in bass although some are displeased with the decrease in northern pike. Net sets indicate that the pike are still quite numerous and the poorer pike fishing may be due, partly, to the extremely large planting of perch, which are no doubt preyed upon the pike.

Some fine wall-eyes (called "pike" locally) are taken and quite a few appear to be present.

Generally few calico bass (black crappies) are taken, but it is reported that a certain fisherman almost invariably gets a good mess of these fish. Apparently they are plentiful only in certain small areas and are taken, in fair numbers, only by those who have located such areas.

Pumpkinseed sunfish are quite common, especially in some of the bayous. They reach a fair size. Bluegills are present but cannot be considered abundant.

Course Fish. Several kinds of suckers (including mullet) were taken. Carp are present but do not appear to be abundant. Catfish are reported but were not seen by us. Sheepheads are quite common and reach a very large size. A number of them are taken on tackle each year. Brown and yellow bullheads are common in portions of the lake.

Obnoxious Fish Per

Obnoxious fish. Long-nosed gar are common but are not as abundant as the dogfish. No lawyers were found. A number of dogfish are taken annually on hook and line. The sheepheads and carp are also considered objectionable by the local residents.

Forage Fish. A considerable number of species of forage fish were taken. They are quite abundant in parts of the lake. Sand shiners abound along the dunes in the summer. Spot-tail shiners swarm inshore during the spawning season, but later retire to deep water (where trout-perch also occur). But during most of the summer, minnows are scarce along the east side of the lake. Among the minnows which do occur, blunt-nose minnows are included.

Cover The bayous of the lake contains much more natural cover than is found in most lakes in the state. This is due to the more or less unusual situation which has already been mentioned. Trees grew to the original border of the lake. After the dam was constructed much of the tree covered areas were under water. The trees were cut but hundreds of stumps remain in the bayous, and also inshore along portions of the present lake. Some are still fastened into the soil while others are floating or stranded. Many are partly or completely water logged. Quite a few logs lie among the stumps in certain places.

The protection provided by the stumps does not compare with the protection afforded by brush shelters but it is, nevertheless, of considerable importance.

Much of the shore of the main lake is quite devoid of cover. In some portions, vegetation provides the only protection.

As resort development continues more and more stumps are being removed to "clean up" places near cottages and also as a source of fire wood.

Predators. Some fish eating birds, including kingfishers and great blue herons were seen. These are not especially abundant.

Gar and dogfish, especially the latter, are common. Turtles are fairly abundant.

Laws and Regulations Hamlin Lake is designated as a pike lake. Northern pike, wall-eyes, and perch predominate. The three large bayous (North, Middle, and South) are closed to fishing in the spring until the bass season opens. Almost all the bayous have some spawning beds.

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#### RECOMMENDATIONS.

1. Regulation of Water Level The problem whether or not the water level of Hamlin Lake should be lowered each winter (and early spring) is one of the most debated of local questions. We point out some advantages and disadvantages of drop-

ping the level in the winter:

Advantages of lowering water level in winter

1. Protecting boat houses and docks along shore from the violent ice action. To avoid this would involve material expense in removing or reconstructing these structures, or in making them ice proof. Any effort to raise the lake level before the ice has completely gone out (to better spawning conditions for the pike or for other reasons) would merely accentuate the difficulty.
2. Providing enough outflow into Lake Michigan in early spring so as to attract Great Lakes fish up the outlet where they can be seined to restock.
3. Protecting lake improvement work (brush shelters and gravel for spawning) from ice action. For this purpose a drop of three feet would be desirable.
4. Draining of some shallow bayous where fish would likely winter kill.

Disadvantages of lowering water level in winter.

1. Killing some fish by stranding these in shallow bayous. This loss has perhaps been overestimated, and is in part at least offset by draining fish out of other shallow bayous to prevent winter killing.
2. Destroying some fish food in lake. This is probably not very serious, as we found food plentiful in the lake.
3. Preventing northern pike from reaching their best spawning grounds (flooded marshes).
4. Flooding over the grounds where the pike do spawn, so as to expose the spawn to destruction by minnows.
5. Eliminating shelter for small fish about the stumps up the bayous. This would be compensated for by the protection given by brush shelters in the lake.

In our opinion the advantages of lowering the lake level in the winter appear to outweigh the disadvantages. The benefit and detriment to fish life due to the lake lowering, so far as we can see, about balance. The advantages in saving the boat houses and docks are therefore net gains.

The lake level should not be changed before the ice goes out, because this would break up the ice and endanger lakeside developments. The lake, after the ice goes out, can hardly be raised fast enough to flood the pickerel spawning marshes. There is therefore no strong reason, from the standpoint of fish life, why the whole normal run-off should not be sent down the outlet to attract fish from Lake Michigan.

In order to assure suitable spawning facilities for black bass, the normal summer level should be built up by May 1st. and be maintained until late fall, to give small fish the benefit of rich bayou feeding to prepare them for the long winter.

2. Stocking The current practice of seining adult fish in the outlet stream is an ideal method for upbuilding the fish supply of Hamlin Lake. The seining of perch at the outlet in the fall is also sound practice, but the planting of nearly a million in the lake in one year is not. The continuation of such excessive stocking with perch is almost certain to lead to the dwarfing of the perch, and will probably also reduce the growth of the bass and blue gills, because they compete for the same kind of food.

Putting adult trout over the dam is also sound practice as this will help to stock the Sauble River.

We estimate the planting needs of Hamlin Lake to be as follows.

Stocking needs of Hamlin Lake.

	If fry are planted	If fingerlings are planted	If adults are planted
Wall-eyed Pike	250,000	25,000	2,500
Perch	1,000,000	100,000	10,000
Small-mouth Bass	350,000	35,000	3,500
Large-mouth Bass	150,000	15,000	1,500
Bluegills	250,000	25,000	2,500

In constructing this planting budget, we have figured 10 fry as equivalent to 1 fingerling, and 10 fingerlings as equivalent to 1 adult. Each adult walleye put over the dam may be counted as taken the place of 10 fingerlings or 100 fry. Thus if 1000 walleye adults are put over, the fingerling plant is reducable to 15,000, or if these are unavailable, the fry plant may be reduced to 150,000.

The lake in our opinion is not suitable for lake trout. It is possible that brown or rainbow trout will increase, by dropping down from the Sauble River. The direct stocking of the lake with fingerlings of any species of trout is not in our opinion desirable.

It is the present policy of the Department of Conservation, we are informed, not to stock "pike lakes" with bass. This policy increases the need (1) for protecting the bayous as refuges until the bass season opens, and for putting bass over the dam. If bass and bluegills are not available for planting, the desirability of giving the young of these species protection by brush shelters is increased, as is also the need for better spawning conditions for bass and bluegills.

3. Fish Refuges As long as this lake is continued as a pike lake, the protection of the bayous as refuge areas will work to the advantage of the bass. If the Upper Lake could be separated as a refuge, say above a line joining the tip of Grosse Point with the tip of the hook point northeast thereof, the bass would be given very considerable protection during the pike fishing season prior to the opening of bass fishing. It might simplify regulations to restrict the designation of pike lake to Lower Hamlin Lake proper, leaving Upper Hamlin Lake an undesignated lake ("bass lake").

4. Fish Privileges It will no doubt be to the general good to retain Hamlin perpetually as a public lake. The new state park will assure this.

5. Predator Control The control of obnoxious predaceous fishes is

apparently called for. The abundance of pike in the lake, themselves predators, makes important the holding down of the undesired fish predators, especially dogfish and gars. Special spearing parties (under Conservation officer supervision) would perhaps be the best method of reducing numbers.

We did not find evidence that carp were sufficiently numerous to warrant attempts to seine them out. Furthermore, they will mostly congregate in shallow water, where the stumps will prevent seining. Gill-netting or trammel-netting for carp would no doubt be destructive to the game fish also. Surface gill-netting for gars would undoubtedly kill many walleyes.

6. Gravel Spawn      The bass spawning would be greatly benefited by hauling in gravel into the bayou and the Upper Lake. It would be best to install the gravel largely in the waters not open for spring fishing. It should be put in depths of 1 to 6 feet, in beds where the bottom is firm and in boxes where the bottom is soft (for directions see general report). As a final figure, to be reached as soon as practicable, we recommend 200 spawning beds and boxes for South Bayou, 200 for Middle Bayou, 400 for North Bayou, 1000 in the several bays and bayous of the Upper Lake, and about 700 in other bays and bayous of the main lake. Installing 250 beds per year for 10 years would do the job.

7. Food Increase.      To supply more minnow food for the game fish we recommend constructing slab spawning devices (see general report). The slabs can presumably be had at the old slab dock near the outlet. We suggest that 50 slabs devices like the one figured be installed in the South Bayou, 50 for middle bayou, 100 for North Bayou, 300 for the bays and bayous of Upper Lake and 300 for the bays and bayous on the west shore of the lake. These might be put in like the spawning beds over a period of about ten years.

These spawning slabs should build up the stock of shore minnows when they are deficient, to the benefit of the fish and the fishing. When or if the minnow food supply for the game fish appears generally insufficient, we would recommend supplying this added need by bringing in Great Lake shiners when they swarm the shores in the late fall, winter or early spring, in numbers not to exceed 200,000 per year. This appeals to us as a better practice than to swamp the lake with fingerling perch for the same purpose.

8. Vegetation.      The unusual irregularity of the shore line, especially the numerous bayous, provide optimum conditions for the growth of weed beds. In general, vegetation is now quite abundant. The placing of brush shelters in the lower lake should encourage the growth of weed beds where none now occur.

Control  
Control of vegetation is usually accompanied by considerable difficulty. The coarse vegetation can be controlled by the use of sodium arsenite but the killing of the weeds is detrimental to the food and the decay of the killed vegetation may be injurious to fish life. Unless used in the right amount the arsenite is also very apt to kill fish. The algae are controlled by the use of copper sulphate but much of this small (often microscopic) vegetation would require more of the chemical than the fish could stand and the killing of the fish would accompany the killing of the algae.

Cutting of vegetation is often resorted to. This is not so injurious as the use of chemicals. In general, however, weeds are



desirable for providing food, oxygen, proper habitats for insects, etc. and the cutting of vegetation is therefor discouraged.

The water bloom, often mistaken for pollen of the larger plants, is a small microscopic plant. Cutting of the weeds would not remove this bloom. The bloom has a disagreeable odor at times and is more-over less undesirable but no way of removing it, without also injuring fish life, can be suggested.

It is recommended that: 1. Chemical treatment be avoided, 2. that no weeds be planted, and 3. that the cutting of weeds be limited to the cutting of lanes for boats.

9. Brush Shelters. Brush shelters are quite desirable even where some vegetation occurs. Remarks on the construction of these shelters are given in the general report. One demonstration shelter was built in Middle Bayou. Messrs. Jerome and Mr. Peterson witnessed the work and understand the method of construction used. Since logs and brush are both readily available a large number of heaps can be constructed with relatively little difficulty.

The following number of shelters are recommended:

Middle and South Bayous	20 each
North Bayou	10 each
Upper Hamlin	100 each
Lower Hamlin	150 each
Total	280 shelters.

This would involve construction of only 28 shelters per year if spread over a period of ten years.

It is recommended that some shelters be placed in water about 3 feet deep, that others be placed in water from 5 to 10 feet deep and that still others be placed in water over 10 feet deep. Those placed in the very shallow water would be above ice level in the winter, the others would be below the ice. Of the 150 shelters recommended for the lower lake it is advised that 25 be placed in water about 3 feet deep, that 100 be placed in water 5 to 10 feet deep and that the other 25 be placed in water over 10 feet deep. Those in very shallow water are excellent in the summer but offer no protection in winter when shelter is most needed. For this reason only a relatively small number of shelters are recommended to be placed in water 3 feet deep. The shelters should be spread around the lake at more or less regular intervals.

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