

26.7
10.3

DEPARTMENT OF COMMERCE AND LABOR.
BUREAU OF FISHERIES.

Economic Circular No. 3 : : : : : : : : : : Issued October 26, 1912

MUSSELS OF CENTRAL AND NORTHERN MINNESOTA.¹

As a part of the series of mussel investigations conducted by the United States Bureau of Fisheries, the lakes and rivers of central and northern Minnesota were examined in 1912 to ascertain the kinds and quantity of mussels they contained. As this was a preliminary survey or reconnaissance, no attempt was made to locate all of the mussel beds or to determine their exact boundaries. The results which are of interest to mussel fishermen and pearl-button manufacturers may be summarized as follows:

GENERAL CONDITIONS.

Practically all this portion of Minnesota is covered with bowlders, gravel, sand, and clay mixed indiscriminately, left by the melting of a great glacier which formerly swept over the State, and the inequalities of distribution of this glacial material have determined the location of most of the lakes and river valleys. Furthermore, the grinding action of the ice cut down the hills and filled in the valleys to a great extent, leaving a comparatively level surface. As a result, all the rivers and streams are very winding and have a rather slow current. The lakes are full of sand and gravel bars, and the bottom of both lakes and rivers is largely composed of sand and gravel, with a comparatively small proportion of mud. These conditions exert a marked influence on the mussels, and, taken in connection with the fact that the water is full of lime and clear, except in the rivers that drain from the Mesabi Iron Range, they make the entire region an exceptionally good one for mussel development.

For convenience the lakes and rivers are considered in six groups.

LAKE SUPERIOR DRAINAGE.

This contains no mussels of commercial value and practically none at all. From the St. Louis River, the largest in this drainage, mussels and fish are effectually shut out by the dam and falls at Carlton. And even if the fish had a clear passage, no mussels could thrive in the river below Floodwood on account of the immense number of logs driven down its waters every year.

¹ By Charles B. Wilson and Ernest Daughd, whose complete report will be published by the Bureau later.

ST. CROIX DRAINAGE.

Fish carrying mussels find a free passage from the Mississippi up the St. Croix and into its various tributaries. One of these, the Snake River, in Pine County, is full of fine mussels, as are also Cross Lake and Pekegama Lake, through which it flows. There are found here in great abundance the fat or grass mucket, the pocketbook, the butterfly, the three-ridge and the warty-back. The fat muckets are remarkably thick shelled and have a fine luster. In the latter part of July there were about two carloads of shells on each lake awaiting shipment. Although this locality has been reported as exhausted, the fishermen at work there had no difficulty in obtaining from 400 to 600 pounds of shells a day. It is also an exceptional region for pearls, many large and valuable ones having been obtained. Rush, Bald Eagle, White Bear, and Forest Lakes, in the same drainage, contain no mussels of commercial value.

There is a small blank factory in Pine City which uses most of the odd lots of shells obtained from the two lakes and Snake River.

RED-RIVER-OF-THE-NORTH DRAINAGE.

When the great ice sheet melted, a large lake was formed which filled the Red River Valley as far north as Lake Winnipeg. Its outlet was through Traverse and Big Stone Lakes, down the valley of the Minnesota River into the Mississippi. This lake is estimated to have lasted about a thousand years, and during that period the mussels had ample opportunity to migrate from the Mississippi up into the Red River. The latter was examined above and below Fergus Falls, at the outlets of West Lost and Ottertail Lakes, between Pine and Rush Lakes, between Little Pine and Pine Lakes, and at the inlet to Little Pine Lake. An abundance of good button shells was found at each of these places except the last. They included the fat or grass mucket, the pocketbook, the Wabash pig-toe (*Quadrula rhiginosa*), and the round pig-toe (*Q. coccinea*). A carload of these shells was shipped from Fergus Falls two years ago and proved to be good material. There are many more carloads available in the long stretches of river between the lakes of Ottertail County, and they are easily gathered, since the water in the river is nowhere very deep. The conditions in this river and in most of the lakes through which it flows are very favorable for commercial species of mussels. And there is every probability that other and more valuable species would thrive well if introduced here. For example, there are plenty of sand bars for the yellow sand-shell, gravel beds and running water for the common mucket, and excellent situations for the washboard, the niggerhead, the butterfly, and the pig-toes.

MINNESOTA RIVER DRAINAGE.

The Minnesota River itself is full of button mussels, as are most of its large tributaries, and many carloads are shipped from Granite Falls, Mankato, and other centers. These shells contain a large percentage of blue-points and three-ridges, and many of them are also spotted or thin at the tips, hence they do not appeal quite so strongly to the shell buyers.

And yet there is an abundance of good material here that is well worth utilizing. A blank factory at one or two of the central points on the main river would be able to use many tons of spotted and partially thin shells that are now rejected as not being worth the heavy freight rates down to Wisconsin and Iowa. Many of the lakes in Grant and Douglas Counties drain into the Minnesota River, but none of the 20 or more that were visited contained any commercial shells. Several of them, however, afford most desirable conditions for the propagation of valuable button mussels, as will be noted later.

MISSISSIPPI RIVER DRAINAGE.

The upper Mississippi includes by far the most important lakes and tributary rivers in the State. Beginning at the north there is an abundance of good button shells around Bemidji, both up the river above Lake Irving and down the river between Lake Bemidji and Cass Lake. One man collected 3 tons of fine muckets and pocketbooks in a very small area at the outlet of Lake Bemidji, and 2 or 3 carloads could be obtained with little difficulty. The shells are of good size and luster and very few of them are spotted. Here again is an excellent location for a blank factory.

Cass, Winnebigoishish, and Leech Lakes contain no commercial mussels, but two of the tributaries of Leech Lake were reported by a mussel fisherman to be full of good button shells. The first was Linda River, which runs through a lake of the same name and empties into Leech Lake on the south. The other was Laura River, the outlet of Laura Lake, which empties into the east arm of Leech Lake. The shells found were muckets and pocketbooks.

Prairie River rises near Hibbing and flows down in Itasca County, through Prairie Lake into the Mississippi just below Grand Rapids. Both the lower river and the lake were examined and found to contain an abundance of fat muckets of excellent quality. They are of good size and fine luster, and are not spotted. Fully two-thirds of the shell could be utilized for buttons. Farther up the river there are large beds containing the common mucket and the pocketbook, as well as the fat mucket.

The Crow Wing River, together with its tributaries, the Fishhook, Shell, Beloye, Leaf, and Long Prairie Rivers, form practically one continuous bed of mussels. These vary somewhat in the different localities examined, but are usually abundant and of excellent quality. Two or three carloads have been shipped from the Shell River at Menahga and proved to be of extra value—large and thick and fine-hatched muckets, fat muckets, and pocketbooks. Two fishermen are now at work endeavoring to get another carload before cold weather. One peculiarity of these mussels is that the best ones are found under a mass of algae and water weeds, and sometimes buried in the sand 2 feet or more, facts which offer a good suggestion for investigation of other localities. Another peculiarity is the thickening of the shells, even the paper shells and floaters being almost thick enough to cut buttons. Much of this river system is so far from railroads that the shells can hardly be used profitably, especially because, after hauling them to the railway, the freight charge of \$5 a ton to the nearest factory leaves very little return for the fishermen.

In talking the matter over with some of the musselmen, however, a way was suggested of obviating these difficulties. For \$200, the freight on a single car of shells, one could build and equip a small house boat for sawing out blanks. Floating with this down the river all the material could be used where it was obtained, spotted shells and shells with thin tips being as available as any others so long as there would be no freight to pay. For such an outfit the Crow Wing River system would furnish material for many years. It could be used also on the Prairie River, the Sauk River, and the upper Mississippi.

The Sauk River was visited at two places and found to be full of shells of fine appearance—muckets and pocketbooks. These are found all the way from Sauk Center to the Mississippi, a distance of 50 miles by the river. Upon testing, however, these shells proved to be brittle and unfit for buttons.

Clearwater Lake has some fine muckets and pocketbooks at the lower end, near the outlet; the Clearwater River, emptying out of it, was not visited, but was reported to be full of similar shells of fine quality and luster.

ISOLATED LAKES.

A large number of isolated lakes were visited, but no mussels of commercial value were found in any of them. Ideal conditions for the propagation of some of the most valuable mussel species exist, however, in several of the lakes. Buffalo and Pleasant Lakes in Wright County, Rice and Koronis Lakes in Stearns County, Osakis

Lake in Todd County, and Lake Lida in Ouellet County, and Lake Minnewaska at Glenwood in Pope County are very favorably situated as regards railroad facilities, natural surroundings and conditions, and the proper fish to serve as hosts for the young mussels. The State of Minnesota has a fish hatchery at Glenwood, on the shore of Lake Minnewaska. Every spring when the wall-eyed pike are seined out of the lake to get their spawn there are always caught with them in the net large numbers of sunfish and yellow perch. These are the best fish that could be obtained for carrying young mussels belonging to the mucket (*Lamprolites*) group. It would be a simple matter to load these fish with the young of some mussel possessing high commercial value before putting them back into the lake. It is confidently believed that in this way the lake could be stocked in a few years with an abundance of good button mussels, and it would be a simple matter to keep up the supply when once it was established. If the experiment proved successful at Glenwood, the other lakes could be similarly stocked. It is the isolation of these lakes and the fact that fish could not get into them out of the rivers at the proper season of the year that has prevented the mussels from becoming naturally established there.

RECOMMENDATIONS.

As a direct result of the information obtained during this preliminary survey, the following recommendations can be made:

1. Suitable fishways should be provided for the free passage of fish around the 85-foot power dam 4 miles below Fergus Falls on the Red River, around all the dams within the city itself, and around the power dam across the Mississippi 9 miles below Bemidji. Mussels multiply well only where there is an abundance of fish. If the fish are stopped by a dam the mussels above the dam may not be able to multiply, and hence will disappear after the first generation.

2. It will be advisable to try the introduction of certain mussels into such of the more conveniently situated lakes as seem best suited for them. The United States Biological Station at Fairport, Iowa, and the local State hatcheries can profitably combine in this. The successful introduction of valuable shells into even a few of Minnesota's countless lakes would not injure the fishing at all, but rather improve it, and would add materially to the resources of the State.

3. It would be advisable, by the introduction of valuable button shells, to increase the present percentage of mucket and pig-toe mussels in the Red River of the North and in the St. Croix and Minnesota River drainages. Only muckets could be propagated in the upper Mississippi, since the Falls of St. Anthony at Minneapolis

have formed a natural barrier to the pig-toe mussels, and there are probably no fish suitable to carry them in the upper river.

4. Small local blank factories, like the one at Pine City, should be encouraged. They utilize otherwise unmarketable material, clean up the small and odd lots of shells, and open up localities that could not be reached from the larger centers.

If made in the form of a house boat, such a blank factory would render available the rich resources of several river systems that otherwise must remain absolutely unattainable.

○