

INSTITUTE FOR FISHERIES RESEARCH
UNIVERSITY MUSEUMS
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN

April 22, 1930

Report No. 9

Memorandum to Mr. P. S. Lovejoy regarding investigations carried on by Canuto Manuel of the Museum of Zoology on the Relation of the common tern and the Bonaparte gull to the commercial fisheries of Saginaw Bay.

The investigation relating to the life history of the common tern was started last year. A period of 49 days, from the later part of May to the later part of July was spent with the birds at Lone Tree Island and at Sand Point where they had their colonies. During this period, many other places in Saginaw Bay were visited.

Many more interesting results could have been obtained had it not been for the excessive rise of water. This unfavorable condition washed away the nests and was perhaps responsible for the early desertion of the colony by the birds. This unusual circumstance makes the continuation of the work very desirable.

Aside from the interesting biological results obtained, facts concerning the economic value of the birds have been revealed. The details of the manner of their feeding, especially during the breeding season, was noted very carefully. To verify the observations, shooting of the birds was done to obtain fresh stomachs.

Of those birds examined from Lone Tree Island, the fish diet consists of: eight perch from five stomachs, 28 trout-perch from 25 stomachs, seven lake shiners from seven stomachs, four spot-tail minnows from three stomachs and a few stickle-backs from a few other stomachs. The insect diet consists of 523 red-thorax carpenter ant from 26 stomachs, 41 mayflies from two stomachs, 85 carabeid beetles from ten stomachs and a few other insects of minor item. From Sand Point, the fish item consists of 30 perch

from three stomachs, 14 trout perch from 12 stomachs, 11 lake shiners from five stomachs. The insect food consists primarily of mayfly and a few ^{fragments of} dragon fly naiads. In one stomach, fragments of algae were found. It is interesting to note that in one stomach, 27 perch were recovered, replacing seven cubic centimeters of water. It can then be seen how small the fish are when they are picked up by the bird. From the above statement, it will be noted that trout perch are the fish most commonly represented in the diet of this bird, being found in more stomachs than any other single item. The question, however, arises, do the birds pick them up dead or alive? Dr. C. L. Hubbs and Dr. W. Koelz, of the Museum of Zoology, maintain that the trout perch holds to deep water during the feeding hours of the tern. If the fish were picked up from the shallow water as has been my observation, then the possibility is that they were washed to the shore dead and then secured by the birds. Dr. Hubbs and Dr. Koelz claim, however, that sometimes during the early summer, this fish goes to the shore at night to feed. How late at night do they go is not definitely known. This could be found by occasional seining at night to determine the fish fauna of the shore at different times during the night. It is true that the birds stay until dark and begins to show up again as soon as there is a little sign of light. Whether they have a chance to meet the school of the trout perch on their way back to the deep water is a question. Another fact that makes the story more complicated is that trout perch were recovered from the stomach of the birds that were shot between 2:00 and 4:00 o'clock in the afternoon. If the trout-perch are picked up dead, then it is probable that many of the perch eaten are also picked up dead.

The recovery of a great number of red-thorax carpenter ants and carabeid beetles is also interesting. They were devoured by the bird when these insects are plentiful on the shore during the spring. This species of ant builds its nest in the timbers of buildings and in logs and trunks of trees. Whether the insects were secured at rest or on the wing remains to be determined, although there is an indication that they are

caught while flying, for, particularly the ants could be seen in big swarms late in the afternoon.

At Sand Point, where the work was done early in the summer when the mayflies were abundant, that insect constitutes an item in the bird's diet.

A superficial study of the feeding habits of the Bonaparte's gull was made last fall at the suggestion of the authorities interested in the investigation. No further work can be done with this bird other than observe them while they are in Michigan waters. In other words, in Saginaw Bay, their feeding habits can be studied only during their northern migration in the spring and on their way back in the fall. The food eaten by this bird in the fall in Saginaw Bay has been determined. The food eaten during the spring flight remains to be determined.

A total of 37 Bonaparte gull stomachs with contents were examined. Those that did not contain anything were not considered. Of the items recovered, Notropis atherinoides, (Lake shiner) represents the largest amount with 3281 individuals replacing 1370 cc. of the commercial fishes, perch was the only one represented, with five individuals replacing 9.5 cc. A trace of chitinous material indicative of insect diet was recovered from one of the birds, but whether it was from the stomach of the fish that was devoured by the bird or ^{if} it was taken directly by the bird cannot be ascertained.

It is not claimed to draw a final conclusion ^{on} the present study, but it appears that the contention about the bird's destructiveness to the commercial fisheries is more apparent than real. It might be possible that a s depletion of commercial fishes becomes noticeable in Saginaw Bay, the blame is laid on the birds. In this connection, Dr. J. Metzelaar's studies on the food of the lawyer, Lota maculosa, might be mentioned. By comparison of his statement issued in connection with the report of the pike perch, Stizostedium vitreum, with my finds in last year's work, it becomes evident at the minimum that the ratio of destructiveness to the commercial fishes is one of the

common tern to at least 200 of the lawyer.

In view of the interesting results obtained from last year's work, it is contemplated that more intensive work be done this year. Early arrival of both the common tern and the Bonaparte's gull is being watched and studies will immediately be resumed. Seining at intervals to determine the fish fauna of the region where the birds occur will also be made. More food studies on the fish are needed to corroborate last year's result in this respect. Because the work, especially the seining, is not possible for one man alone, the services of one or more men will be needed from time to time. Local help in the seining can probably be hired, if or when men from the Department of Conservation or Institute for Fisheries Research are not available. The part time services of a collector to assist in obtaining more bird stomachs would very materially add to the value of the work.

While Sebewaing, Bay Port or Sand Point will again be the basis of this year's work, it is also planned to make a trip soon to other points in Saginaw Bay where the birds are known to occur. In order to carry out the plan successfully, it is recommended that some means of transportation both on the water and on land be furnished.

This year's work will probably start with the middle of spring and continue to the early part of next fall. It is estimated that about \$400.00 will be necessary for field expenses this year.

It is hoped and expected that the work can be carried on vigorously this year, so that the conclusions will be definite enough to solve the problem beyond question or denial.

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Copy To F.A. Westerman

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A total of 87 Bonaparte gull stomachs with contents were examined. Those that did not contain anything were not considered. Of the items recovered, Notropis atherinoides, (Lake shiner) represents the largest amount with 3281 individuals replacing 1370 cc. of the commercial fishes, perch was the only one represented, with five individuals replacing 9.5 cc. A trace of chitinous material indicative of insect diet was recovered from one of the birds, but whether it was from the stomach of the fish that was devoured by the bird or if it was taken directly by the bird cannot be ascertained.

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