

WATERFOWL POPULATION AT CLEVELAND, OHIO,
WINTER OF 1939-40

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INTRODUCTION

IN the fall of 1939 the Herrick Ornithological Society of Western Reserve University undertook an extensive survey of the Lake Erie waterfowl population in the Cleveland region. This census is the first of its kind that has been attempted in this area. Although a number of records of the waterfowl of this region has been made in previous winters, these records have been scattered and incomplete with obvious gaps making them inadequate for any exact population study. It was desired to find the order of migration, the true wintering population, the composition of this population and the factors governing it.

Using methods common to field-population studies, the members of this group attempted to take a complete census of waterbirds every seventh day from November 5, 1939, to March 31, 1940. This program was varied only when weather conditions seriously hampered visibility. The month of November was included in order to present a picture of the usual fall migration, and to find its influence in determining the winter population. Also the order of arrival could thus be noted. The unusual ice conditions of Lake Erie, described below, made it necessary to prolong the study to probably abnormal length. Weekly counts were discontinued when a sufficient increase in numbers was observed to indicate that the winter birds were being supplanted or their numbers considerably augmented by migrants. Actual counts were made in the great majority of cases. However, when the rafts were too dense, or the fowl flying too rapidly, estimates were made, based on counts by tens. In these instances more than one observer participated.

The area selected was a fifteen-mile section of waterfront including the city of Cleveland, and extending into the residential sections both to the east and to the west. This area was covered by from one to five observers in an automobile every Sunday, beginning shortly after dawn. The least amount of waterfront noise and activity was encountered at that time. The recent completion of a lakefront highway makes virtually the entire Cleveland waterfront accessible. A few preliminary field trips showed that the ducks regularly frequented from three to twelve definite areas, depending on the ice, and that intervening areas were practically devoid of birds. This condition

persisted throughout the study. These areas were always visited in the same sequence and at the same time of day. The possible margin of error should be allowed for in this as in any bird census. Difficulty in making an exact count of the birds seen, as a result of poor visibility or the distance of the birds from the observers, presented a frequent variable. Changing ice conditions added further difficulty by concentrating or scattering the ducks.

In the preparation of the following data much valuable assistance was obtained through the cooperation of Miss Isabelle Hellwig, and M. T. Jollie, both in executing the necessary field work and in recording and analyzing the resultant data. This study was further made possible through the active interest of Dr. J. Paul Visscher, head of the department of biology at Western Reserve University who made available the department automobile, the recent gift of Mrs. S. Prentiss Baldwin.

THE AREA STUDIED

The area studied included fifteen miles of the south shore of Lake Erie from the Municipal Sewage Disposal Plant at East 140th Street or White City Park, southwestward eight miles to the mouth of the Cuyahoga River, west seven miles to a promontory approximately 100 yards west of the mouth of Rocky River.

Beginning one mile west of the mouth of the Cuyahoga, a stone breakwater extends five miles to the northeast, parallel to the shore, forming a channel one-half mile wide.

Three miles at the east end of the area and over four at the west end are characterized by a sheer bluff about 100 feet in height. The intervening area is filled-in land about ten feet above the water level.

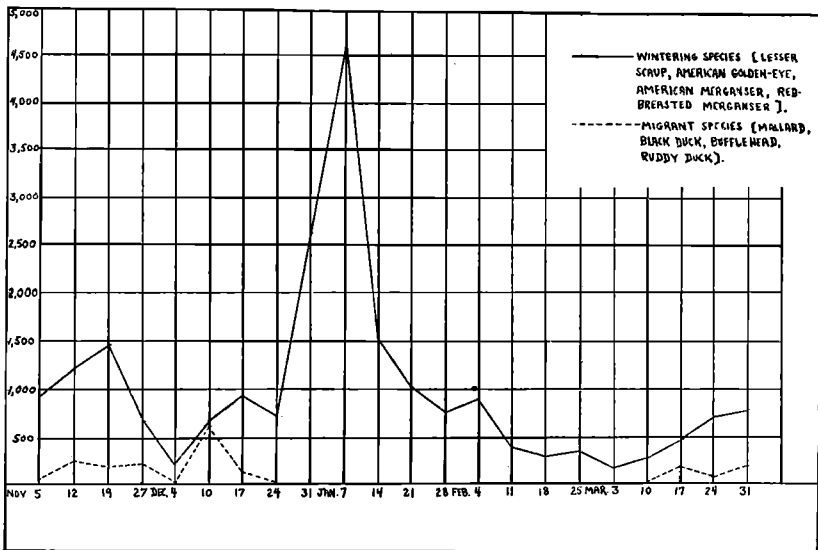
The entire shore is urban and suburban in aspect, and is further characterized by lack of any marshes or semi-aquatic growth.

ICE CONDITIONS

Ice conditions were found a perplexing factor, since they could not be adequately described or measured, and weekly changes exerted influence on duck population.

No ice was on the lake during November or December, and the migration of surface-feeding ducks (*Anatinae*) and some diving ducks (*Nyrocinæ*) proceeded in a normal manner. However, the lake froze as far as the eye could reach in the first week of January, and it is assumed that the rest of Lake Erie and the Great Lakes did likewise, closing all harbors, bays and other shallow waters. This coincided exactly with a heavy migration of diving ducks.

The area under consideration remained frozen from the first week of January through the third week of March. Open water was found at all times at three points where warm water is emptied into the lake from two illuminating plants and a sewage-disposal plant. The size of these areas varied from one-quarter to one-eighth of an acre, roughly estimated. South winds occasionally caused fissures in the ice not protected by the breakwater, and these were frequented by ducks as often as they occurred.



TEXT-FIG. 1.—Fluctuations in abundance of wintering and migrant waterfowl on Lake Erie at Cleveland, Ohio, 1939-40.

As yet no satisfactory method of measuring the ice formations has been found; however, the changing conditions are represented in a remarkable way by a graph of the duck population after January 1 (Text-fig. 1).

THE FALL MIGRATION

At the initiation of this survey evidence of the usual fall migration was obtained in the form of records of the Loon (*Gavia immer*), Pintail (*Dafila acuta tzitzihoo*), and large numbers of Horned Grebes (*Colymbus auritus*). The number of these birds observed after November 4 was very small, suggesting the closing of an early-fall migration period (see Text-fig. 1).

Later migrants included the Mallard (*Anas p. platyrhynchos*); Black Duck (*Anas rubripes*), Buffle-head (*Charitonetta albeola*), and Ruddy Duck (*Erismatura jamaicensis rubida*), whose numbers increased after the first of November until December 10, when a peak occurred. From mid-December on, migrant species were virtually absent.

In mid-November a large number of Lesser Scaup Ducks (*Nyroca affinis*), occurred for a short time, indicating a fall migration by some members of this species.

THE WINTERING POPULATION

After December 17, no migrant species were observed in consequential numbers until March 17, a period of three months. During this period the population was composed chiefly of Lesser Scaups, American Mergansers (*Mergus merganser americanus*), Red-breasted Mergansers (*Mergus serrator*), and American Golden-eyes (*Glaucionetta clangula americana*), given in the order of abundance.

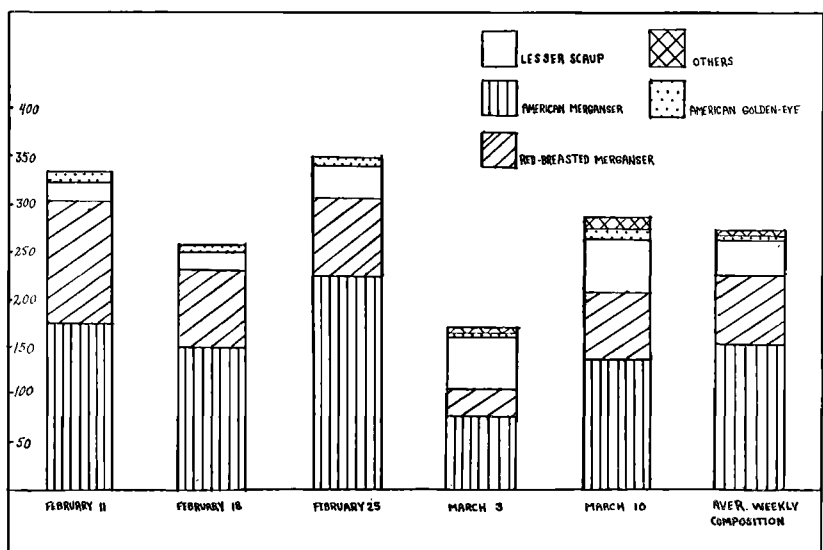
The numbers of these birds increased through December, reaching a high of 2628 individuals on December 31. The first week of January was marked by the freezing of the lake at Cleveland as far out as one could see. The few open areas available were literally covered with ducks and on January 7, 5417 waterfowl were counted, the largest number recorded on any one day. The suggestion is offered that the freezing of bays, inland lakes, and other shallow waters throughout the Great Lakes area may have forced out large numbers of ducks which otherwise would have wintered. This is in view of the fact that of the ducks identified on January 1 (4653), 97.7% were Lesser Scaups and American Mergansers. On this day long strings of American Mergansers were seen migrating eastward, 1500 being counted. The steady encroachment of ice on the available habitat was reflected in the sharply decreasing numbers of these species throughout January and early February.

Beginning February 11, a new and static phase of the population began. At this time there was no open water in the area studied except at three places on the east side of the city where warm water is poured into the lake by utilities and sewage-disposal plants. The combined surface of these areas varied from one-quarter to one acre approximately. The population in these areas remained rather constant for five weeks, averaging 279 birds per survey. The stability of the composition of this population indicates that it was relatively free from migratory disturbance (Text-fig. 2). This is called the true winter population.

THE TRUE WINTER POPULATION

The birds recorded from February 11 through March 10 represent those individuals of the species described herein as wintering species, which actually remained at Cleveland after the minimum area of open water was reached. This number seems to have been physically limited by the available habitat.

Barring the artificial conditions created by the pouring of warm water into Lake Erie, no waterfowl would have occurred in the area



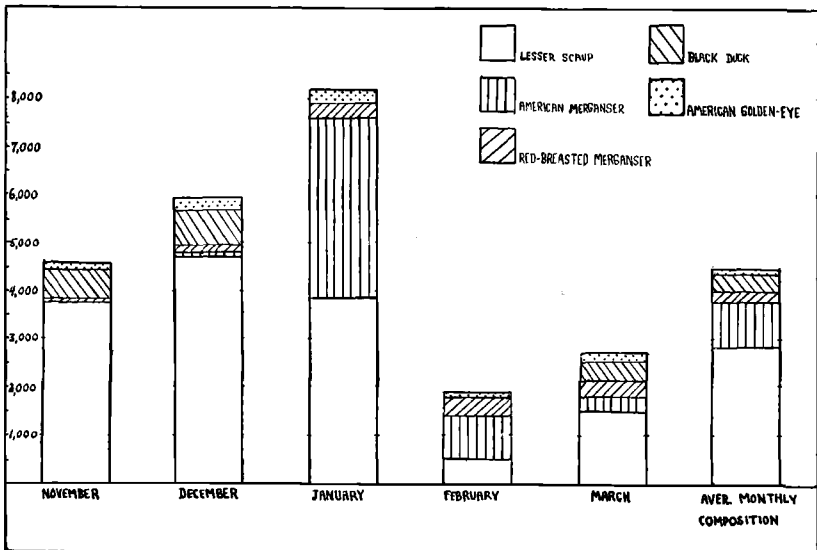
TEXT-FIG. 2.—Weekly analysis of the composition of the true wintering population.

at this period. This population which spent the most rigorous weeks of an abnormally long and cold winter here may indicate something of the relative resistance of the various species of wintering ducks. It is significant to observe that 82.1% of this population were mergansers, fish-eating ducks. Hence, food habits may explain the differences in the composition of the true wintering population (Text-fig. 2) and the general population observed throughout the winter (Text-fig. 3).

The greatest known cause of mortality in this population was a water intake at a powerhouse which accounted for at least 100 ducks. As these open-water areas were close to shore, the birds were continually exposed to missiles and occasional gunshots of vandals. The last factor doubtless drove away the more wary birds. Hungry gulls

prevented the determination of the cause of death by quickly disposing of all dead ducks.

Unfortunately no records were kept on sex ratio; however, when this constant population occurred and was observed repeatedly, it was evident that adult males comprised less than 10% of all ducks seen. In the American Golden-eye the ratio of adult males to females and immature birds was most nearly even. Approximate ratios for the Lesser Scaup were: adult males 1, females and immature 3; and for both mergansers: adult males 1, females and immature 24.



TEXT-FIG. 3.—General winter population analyzed by months, demonstrating its non-uniform composition.

In March many of the immature birds were observed changing into adult male plumage. These ratios were markedly different from those observed in the general winter population, and may present a factor governing the composition of the true winter population. On January 21, for example, a flock of 400 Lesser Scaups was seen, of which probably 300 were adult males. Again, on January 7, a flock of 1500 American Mergansers was seen, all of which were adult males. There is strong indication here of partial segregation of adult males, females, and immature birds (for example, comparatively many more adult-male Golden-eyes winter in the Cleveland region than adult male American Mergansers).

SPRING MIGRATION

The first indications of spring waterfowl activity were observed on March 3, when eight Black Ducks were seen, and on March 10, when a male Canvasback (*Nyroca valisineria*) was recorded.

Open water became gradually more available, and on March 17 the population had increased by over 61% of the true winter population, due to the influx of Lesser Scaups, Black Ducks, and Goldeneyes. This upward trend continued until the end of the study on March 31.

UNUSUAL SPECIES RECORDED

Below are listed species not previously mentioned which were recorded during the course of this survey, but whose occurrence is only incidental.

Canada Goose (*Branta canadensis*): March 31, one.

Redhead (*Nyroca americana*): January 7, one; 21, one.

Greater Scaup (*Nyroca marila*): January 21, one; February 18, one; March 10, one; 17, one.

Old-squaw (*Clangula hyemalis*): December 17, one; 24, one; January 21, one; 28, one.

White-winged Scoter (*Melanitta deglandi*): January 7, one; March 10, one; 17, one.

DISCUSSION

A study of waterfowl at Cleveland in the winter of 1939-40 showed two principal migration peaks in the fall and early winter. The first occurred on December 10, and was the peak for Mallards, Black Ducks, Buffle-heads, and Ruddy Ducks, called migrant species in this paper. A second and much greater peak occurred on January 7, when Lesser Scaups, American Golden-eyes, American and Red-breasted Mergansers reached their greatest abundance. These are called wintering species. Considerable spring migration was initiated on March 17.

A true wintering population exists, consisting of birds actually remaining at Cleveland throughout the winter. This minimum is guaranteed by artificially maintained open water. Since the size and composition of this population was relatively stable, migratory disturbance was seemingly absent from February 10 through March 11. The composition of this population was much different from that of the general winter population, which was probably more or less migratory (Text-fig. 4).

Factors governing the composition of waterfowl flocks off Cleveland are not all known. However, the lack of consequential numbers of dabbling ducks, except the Black Duck, is apparently due to the ab-

sence of suitable feeding grounds. The Black Duck seems not adverse to deeper waters, hence occurs in considerable numbers.

Fish-eating ducks seem to have a distinct advantage in maintaining their numbers in the face of the very adverse conditions caused by the low temperatures and limited feeding grounds prevailing in February and March. This is reflected in an analysis of the true wintering population (Text-fig. 4).

	MALLARD	BLACK DUCK	LESSER SCAUP	AMERICAN GOLDEN-EYE	BUFFLEHEAD	RUDDY DUCK	AMERICAN MERGANSER	RED-BREASTED MERGANSER	
GENERAL WINTER POPULATION	00.2 %	07.9 %	62.3 %	02.9 %	00.1 %	00.2 %	20.9 %	05.5 %	100.0 %
TRUE WINTER POPULATION	00.7 %	00.4 %	14.3 %	02.3 %	00.2 %	00.0 %	53.8 %	28.3 %	100.0 %

TEXT-FIG. 4.—The compositions of the true and general winter populations compared.

The degree of freezing of Lake Erie in different years, which varies greatly, is expected to produce equal changes in the duck population. The coincidence of the influx of wintering species with the freezing of the lake suggests to us that these species may remain widely dispersed throughout the Great Lakes when no considerable freeze occurs.

Of the fifteen species of Anseres observed throughout the winter, four are classified as wintering species, four as migrants, and seven as incidental.

The above analyses are based on 23,000 field identifications.

The facts which have been presented in this study are considered an introduction to a problem the complete analysis of which will depend upon repeated observations in future years.

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