

SPRING FLIGHT OF THE DIVING DUCKS THROUGH NORTHWESTERN IOWA

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In the three-year period from 1938 to 1940 the writer has had the opportunity of observing the spring flight of diving ducks passing through northwestern Iowa. These observations supplement recent publications (Bennett, 1934, 1938; Spawn, 1935; Scott and Sooter, 1937; Low, 1939) on the migration of game birds through this state. Acknowledgment is made of supervision in this research by Dr. George O. Hendrickson, Iowa State College, and Thomas G. Scott, United States Fish and Wildlife Service, and of the cooperation of the Iowa State Conservation Commission and the American Wildlife Institute.

The lake and marsh region in which observations were made is in Clay and Palo Alto counties near Ruthven. Because of its proximity to Ruthven the area will be referred to as the Ruthven area. The lakes and marshes in this region are typical of those of the Wisconsin glacial drift and form part of the southern apex of the triangular pattern of lakes and marshes extending southward from southeastern North Dakota.

Observations were begun in mid-March each spring at which time the vanguard of the waterfowl had arrived. Although not the first ducks to reach Clay and Palo Alto counties on their spring flight, the diving ducks came between March 20 and 30.

Water levels in the lakes and sloughs at the commencement of spring migration in 1940 were 24 inches below those of the same date in 1939 and were approximately 16 inches below those of 1938. The two-foot drop in water level in 1940 eliminated or rendered unattractive a third of the potholes and marshes formerly supplying open water areas for the spring migrants.

The ice cleared from the large lakes and sloughs under observation on March 22 in 1938, March 26 in 1939, and on April 5 in 1940. Small, shallow-water areas were free of ice several days before the main lakes and marshes. The late date at which the ice melted from the lakes and marshes in 1939 and 1940 appeared to affect the diving ducks more than the shoal water species by excluding them from their food supply. Shoal-water ducks feeding in the corn fields were not so drastically affected by the generally frozen state of the lakes as were the divers. A close correlation between the arrival of the diving ducks and the opening of the water was noted for the three years. Reference to table 1, which shows the dates at which the birds were first observed, indicates a lag of about one week in the date of the arrival of most of the diving-duck species in 1940 as compared to 1938 and 1939.

Choice of habitat in the early part of the season was governed primarily by the availability of open water. As the lakes and marshes cleared of ice, the diving ducks moved to ever-deeper water. The presence of shallow potholes free of ice, no matter how small or how large, was apparently welcomed by all the ducks; both diving and "puddle" ducks concentrated to dabble and drink in the new water. It was not uncommon to see groups comprising Mallard (*Anas p. platyrhynchos*), Redhead (*Nyroca americana*), Lesser Scaup (*Nyroca affinis*), Blue-winged Teal (*Querquedula discors*), American Pintail (*Dafila acuta tzitzihoo*), and Baldpate (*Mareca americana*) in pools only four or five feet in diameter.

The water areas first available were marshes bordered by closely grazed pasture where cattle trampling during the previous season had left muddy shorelines. Into these edges poured thousands of waterfowl at the first thaw of the season. From then on the diving and shoal-water ducks took more and more divergent courses as the former

sought the ever deepening water as ice melted, while the shoal-water ducks were content to dabble in the shallow water at the edges of ponds.

The first diving ducks to arrive were not seen to feed in corn fields as were the majority of the mallards and pintails, but sought, instead, a small spring which remained open throughout the winter. After the "first flight" of approximately 50 Redheads on March 21, 1940, no diving ducks were observed until March 29. On that date the first Ring-necked Duck (*Nyroca collaris*), Lesser Scaup, Canvas-back (*Nyroca valisineria*), and American Golden-eye (*Glaucionetta clangula americana*) were seen.

Abnormally cold weather persisted in northwestern Iowa from March 21 to April 1 and similar conditions farther south might have been responsible for the difference of one week to ten days in the arrival of the diving ducks in 1940. However, as pointed out by Lincoln (1939) the relationship between local weather conditions and the flight of the migrant birds is not always close.

Dates of departure of the diving ducks from the Ruthven area did not differ greatly in the three years. Those on which the various species were last observed are given in table 1. Since four of the seven species nest in Iowa, dates on which the last migrants were observed could not be determined and these birds are indicated in the table as "nesting."

TABLE 1
Spring flight of the diving ducks through Clay and Palo Alto
counties, Iowa, in 1938, 1939 and 1940

Species	Date First Observed			Date Last Observed			Date of main flight		
	1938	1939	1940	1938	1939	1940	1938	1939	1940
Redhead	Mar. 20	Mar. 22	Mar. 21	Nesting	Nesting	Nesting	Mar. 24- Apr. 18	Apr. 11- Apr. 18	Apr. 15-
Ring-necked duck	Mar. 20	Mar. 22	Mar. 29	May 12	Apr. 29	May 8	Mar. 28- Apr. 1	Mar. 25- Apr. 4	Apr. 1- Apr. 8
Canvas-back	Mar. 15	Mar. 22	Mar. 29	Nesting	Nesting	May 15 Nesting	Apr. 18	Mar. 25- Mar. 28	Apr. 1- Apr. 15
Lesser scaup duck	Mar. 15	Mar. 21	Mar. 29	Nesting	Nesting	Nesting	Apr. 1- Apr. 22	Apr. 1- Apr. 15	Apr. 8- Apr. 15
American golden-eye	Mar. 19	Mar. 21	Mar. 29	Apr. 13	Mar. 21	May 2	Apr. 3	Mar. 21	Apr. 8- Apr. 15
Buffle-head	Apr. 9	Mar. 27	Apr. 2	May 9	Apr. 29	May 6	Apr. 1	Apr. 1	Apr. 8
Ruddy duck	Apr. 14	Mar. 23	Apr. 2	Nesting	Nesting	Nesting	Apr. 29	May 2	May 6

After the water areas had cleared of ice in late March or early April, the selection of certain lakes and marshes by the diving ducks appeared rather definite. Those with water depths of about 18 inches to 5 feet were frequented by the majority of the diving ducks, although deep-water lakes also were used for resting in raft formations at night. During severe storms water areas having protective cover in the form of high banks, wooded shores, or dense stands of emergent vegetation were eagerly sought by all of the ducks. Hardstem bulrush (*Scirpus acutus*), cattail (*Typha angustifolia*, *T. latifolia*), river bulrush (*Scirpus fluviatilis*), reed (*Phragmites communis*), and giant bur-reed (*Sparganium eurycarpum*), appeared to offer the greatest protection to the ducks under these conditions. Willows (*Salix* spp.), cottonwoods (*Populus* spp.), and oaks (*Quercus* spp.) with understories of ragweeds (*Ambrosia* spp.) were the kinds of shore vegetation utilized as a windbreak during the storms and high winds. As the migration neared an end, diving ducks remaining to nest were more frequently found in bays of the larger

lakes partly protected by willows or cottonwoods. In these bays, where the wind was checked and submerged foods were abundant, courtship and mating took place.

In general, the various species of diving ducks chose similar water areas on their spring migrations and often mingled freely. About the first of April, separate rafts of Scaup, Redhead, and Canvas-back were observed on the waters of Lost Island, Trumbull, Mud, and Virgin lakes, whereas toward the middle of the month mixed flocks of ducks were observed. It was not an uncommon sight to see all seven of the species of diving ducks in a water area not more than a hundred yards square. However, toward the end of the migration period stray individuals were observed flying from group to group in search of their particular kind. This was well demonstrated by an instance in which a male Redhead alighted in the midst of a group of Canvas-backs. After swimming through the flock, it flew to a second group and to yet a third, finally alighting in a group of Redheads in which it immediately became an indistinguishable unit. Small groups of Ruddy Ducks (*Erismatura jamaicensis rubida*) and Buffle-heads (*Charitonetta albeola*) remained in groups even in the midst of larger flocks of Canvas-backs, Scaups and Ring-necked Ducks.

TABLE 2
Sex ratios of diving ducks during spring migrations through northwest Iowa
(Figures in parentheses are numbers of migrants counted for sex ratios.)

Species	1938	1939	1940	3-year total
	Male : female	Male : female	Male : female	Male : female
Redhead	1.45-1 (511-303)	1.43-1 (1,050-743)	1.23-1 (438-355)	1.42-1 (1,999-1,401)
Ring-necked duck	1.48-1 (421-284)	1.76-1 (484-218)	1.43-1 (107-75)	1.77-1 (1,012-577)
Canvas-back	2.04-1 (233-144)	2.14-1 (208-97)	1.84-1 (96-52)	2.04-1 (537-263)
Lesser scaup	2.14-1 (1,984-923)	2.20-1 (494-224)	2.44-1 (330-135)	2.19-1 (2,808-1,282)
Buffle-head	1.42-1 (151-106)	2.10-1 (21-10)	1.73-1 (147-85)	1.58-1 (319-201)
Ruddy duck	1.25-1 (307-245)	1.89-1 (123-65)	1.59-1 (67-42)	1.41-1 (497-353)

The unbalanced sex ratio among ducks has been discussed by Lincoln (1932), McIlhenny (1934, 1940), and Furniss (1935). Large numbers of wintering ducks banded in southern Louisiana formed the basis for McIlhenny's conclusions, whereas Furniss chose a marsh and pothole nesting habitat in Saskatchewan as an area in which to make sex ratio counts. A record kept of the spring migrant ducks through the Ruthven area, 1938-1940, showed a difference in the sex ratio similar to those noted by the above-mentioned investigators. Tri-weekly observations were made on four lakes and ten marshes, the smallest being 10 acres in area and the largest 1200 acres. No attempt was made to determine the sex of all the ducks observed. Small flocks and rafts were counted, but where the ducks could not be tabulated individually, no record was made. Counts on the species infrequent in the Ruthven area are included even though the numbers were small, and where few birds of a species were observed, the sex of all was recorded so far as could be accurately determined. The numbers of ducks upon which the sex ratios were based (table 2) do not indicate in all instances the relative abundance of the species.

The number of males regularly exceeded that of the females in all species. Of special interest is the absence of any large variation in the sex ratio from year to year within a species. Table 3 presents a comparison of the male : female ratio as observed on the

wintering grounds in Louisiana, during the spring migration through northwest Iowa, and on the nesting grounds in Canada. The largest variation appears in the Ring-necked Duck. More than three and one-third times as many males as females occur on the wintering grounds, and nearly twice as many males as females in migration, while on the nesting grounds of Saskatchewan the males only slightly exceeded the females. A high excess of Ruddy Duck males (2.3:1) was noted on the nesting grounds of Canada as compared to the ratio (1.4:1) that prevailed during the spring flight through Iowa.

TABLE 3

Sex ratios of diving ducks on the nesting grounds (Saskatchewan, 1935-1937), spring migration (Iowa, 1938-1940), and wintering grounds (Louisiana, 1934-1938). Figures in parentheses are numbers of birds counted for sex ratios.

Species	Ratios at Ruthven, Iowa, 1938-40 Male : female	Ratios at Avery Island, Louisiana, 1934-1938 Male : female	Ratios at Saskatchewan, Canada, 1935-1938 Male : female
Redhead	1.42-1 (1,999-1,401)	1.14-1 (72-63)
Ring-necked duck	1.77-1 (1,012-577)	3.35-1 (4,711-1,405)	1.15-1 (30-26)
Canvas-back	2.04-1 (537-263)	1.74-1 (343-197)	1.26-1 (216-171)
Lesser scaup duck	2.19-1 (2,808-1,282)	2.22-1 (5,761-2,595)	1.56-1 (696-446)
Buffle-head	1.58-1 (319-201)	1.80-1 (34-19)
American golden-eye	2.23-1 (29-13)	1.13-1 (35-31)
Ruddy duck	1.41-1 (497-353)	2.29-1 (96-42)

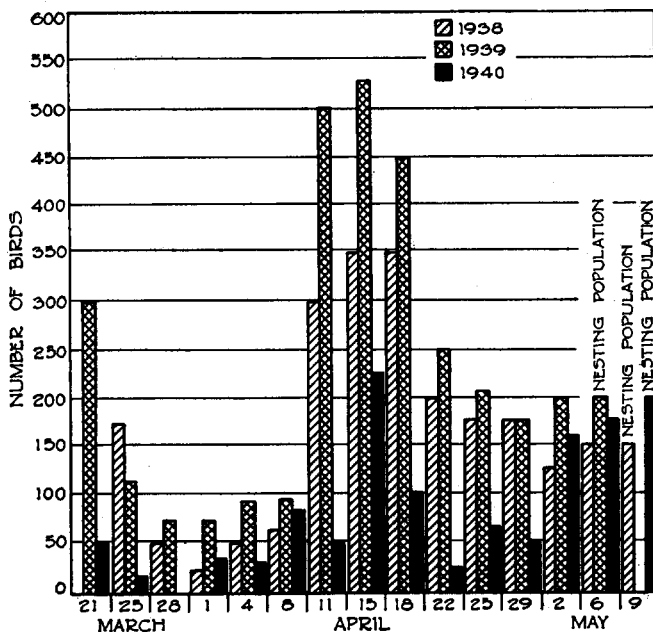


Fig. 33. Spring flight of the Redhead in northwestern Iowa.

The following are the principal points of interest in the spring flights of each of the seven species of diving ducks frequenting the Ruthven area in the years 1938, 1939, and 1940.

The Redhead migration was rather irregular; the earliest bird was noted March 21. In all three years the numbers observed dropped immediately after March 21 to a small vanguard and increased again from April 11 to 18, the period of the principal flight (fig. 33). In 1940 the numbers, as shown in the figure, were not more than half those of the preceding years, 1938 and 1939, until near the end of the flight. The numbers of migrant Redheads reached a peak on April 15, 1940, and then dropped sharply. At the end of the spring flight of 1940 the numbers had increased until the nesting population remaining in the Ruthven area was only slightly under the resident populations of 1938 and 1939. Whether these Redheads came in from the south at the end of the season or returned after flying farther north is problematical.

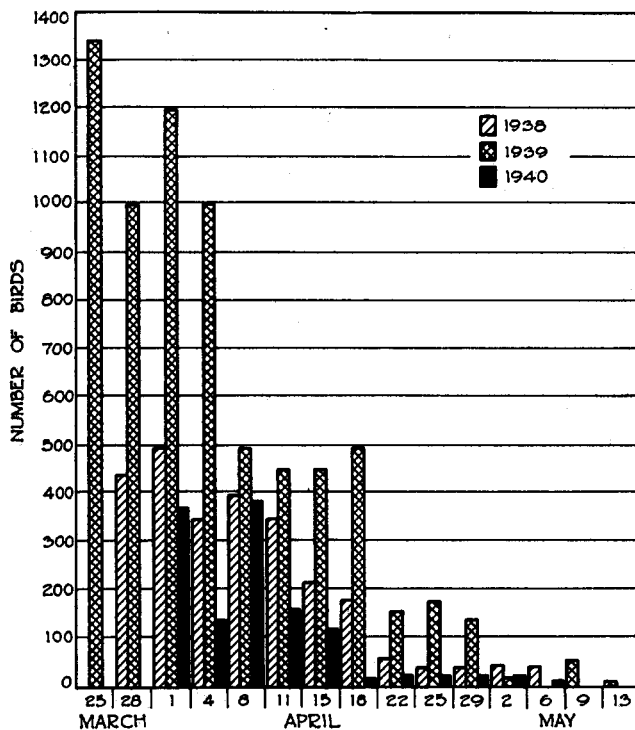


Fig. 34. Spring flight of the Ring-necked Duck in northwestern Iowa.

Migrating Redheads were observed in the protected bays and marshes in a sex ratio of 1.42 males to 1 female. Courtship was well advanced and mating had often taken place when the birds arrived.

Bays of the large lakes presented favorable habitat for the Redhead. Study of one of the favored resting and feeding sites revealed that the two-acre bay held water approximately 48 inches deep and was surrounded by willows and poplars on the east, west, and south shores while the north side of the bay opened into the lake. Approximately 25 per cent of the water was covered with dry dead vegetation of the previous season or with willows in the following proportions:

Narrow-leaved cattail: 20 per cent; emerging 4 inches above water; matted in clumps.
 Hardstem bulrush: 70 per cent; emerging 18 inches above water.
 Willows: 10 per cent; emerging 4-6 feet above water.

The spring flight of the Ring-necked Duck in 1939 far exceeded that of either 1938 or 1940. This species was first observed on March 20 in 1938, March 22 in 1939, and March 29 in 1940. The peak numbers (fig. 34) were reached on March 25, 1939, when approximately 1500 to 1800 ducks were in the lakes and marshes. It was conservatively estimated upon the basis of daily counts that approximately 12,000 Ring-necked Ducks were observed in 1939, 10,000 in 1938, and 5000 in 1940. The late opening of the lakes and marshes may have been responsible for the decline in numbers in 1940. The height of the spring flight extended from March 20 to April 4 in 1939 and varied but slightly in 1938. The 1940 migration was about 10 days later, April 1 to 8. The numbers of these birds gradually decreased as the flight season passed. May 12 in 1938 and April 29 in 1939 were the dates on which Ring-necked Ducks were last observed in the Ruthven area.

Ring-necked Ducks in spring flight associated principally with the Scaups, Canvas-backs, and Redheads, although a few were observed with Buffle-heads, Mallards, and Pintails.

In contrast to the other spring migrant diving ducks, which showed no great yearly fluctuations, the Canvas-back came in numbers nearly ten times greater in 1940 than in 1938 and 1939. Reference to figure 35 and table 1 shows that the spring flights were at their height on approximately April 18, March 25 to 28, and April 1 and 15, in the 1938, 1939 and 1940 seasons, respectively. A few individuals were noted with

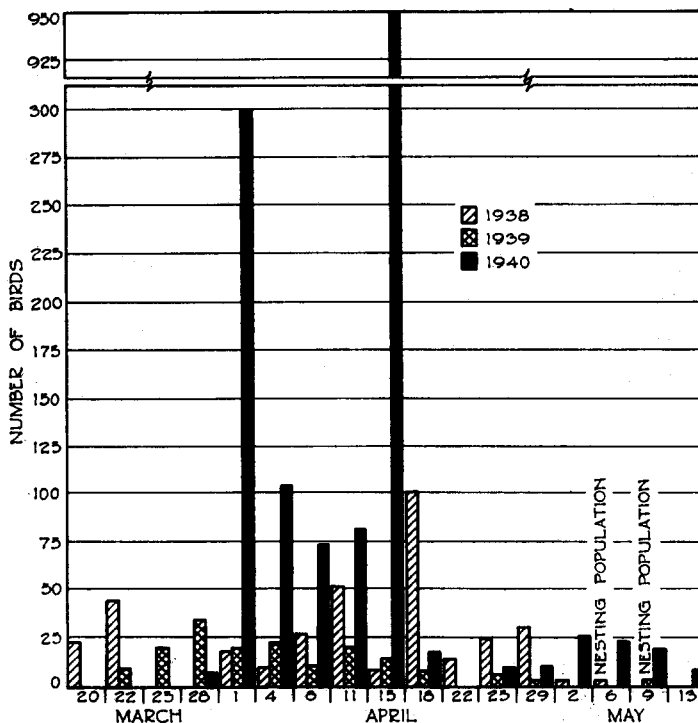


Fig. 35. Spring flight of the Canvas-back in northwestern Iowa.

Scaups and Ring-necked Ducks, but the majority of the Canvas-backs traveled in unmixed flocks.

Virgin Lake, a body of approximately 450 acres, well filled with submerged food plants but having no emergent plants, and Trumbull Lake (1250 acres), similar in all respects to Virgin Lake, were the two lakes upon which the Canvas-backs concentrated in the course of the spring flights. Both were about 4 to 6 feet deep with muddy bottoms, unobstructed views, and plenty of food plants. On April 15, Virgin Lake held approximately 500, and Trumbull Lake held 400, Canvas-backs. On the night of April 17, 90 per cent of the birds departed. This leaving was correlated with a rapid rise in temperature.

Although no nests were found in the three nesting seasons, broods of Canvas-backs were observed in Barringer's Slough, outlet of Lost Island Lake, in 1938 and 1940, and a brood was seen in a 40-acre bay of Lost Island Lake in 1939. However, in 1934 a Canvas-back nest was found in Barringer's Slough (Bennett, 1937).

In total numbers observed the Lesser Scaup far exceeded all the other diving ducks for the three spring flight seasons. The 1938 flight of this species was greater than those of 1939 and 1940, the latter being the lightest of all.

There was a difference of fifteen days between the date of first arrival in 1938 (March 15) and that of 1940 (March 29). Approximately 40,000 scaups were observed in 1938, 25,000 in 1939, and 20,000 in 1940. The main migration period, April 1 to 20, was approximately the same each year. Numbers of migrants in 1939 and 1940 gradually increased to the climax of the flight on April 8 and then gradually decreased, whereas in 1938 the ducks came in their top numbers almost overnight and fluctuated only slightly through a period of three weeks.

The scaups were abundant on all the larger bodies of water of the region, particularly Lost Island Lake, Trumbull Lake, Mud Lake, and Round Lake. These ducks in the main chose areas of smaller size in which to rest and feed during migration than

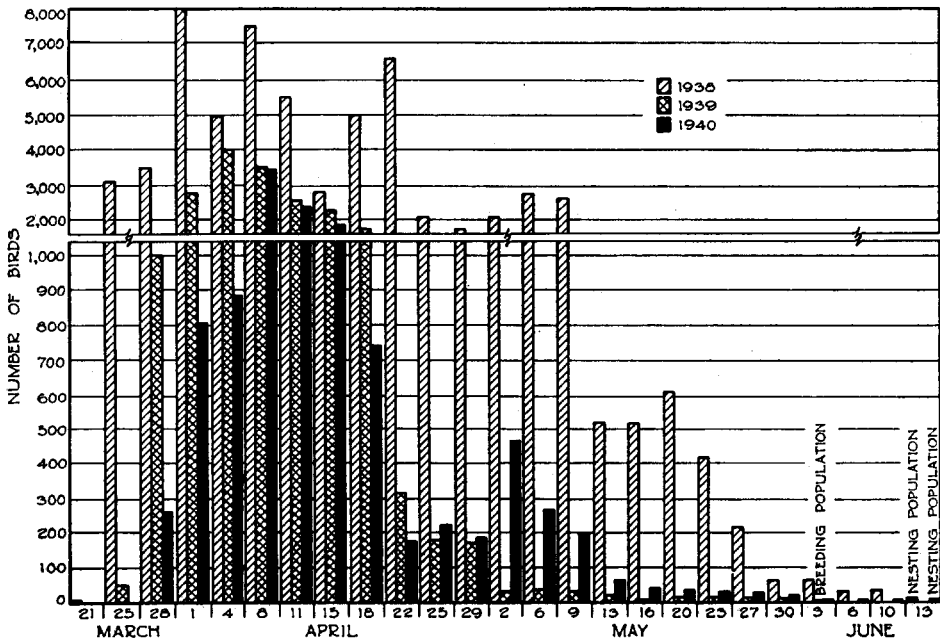


Fig. 36. Spring flight of the Lesser Scaup Duck in northwestern Iowa.

did the Canvas-backs. A favorite haunt of the scaup was the west end of Mud Lake, a partly open body of water protected by oak, willow, and poplar trees on the bank and dead hardstem bulrush, reed, and cattail at the water's edge. The shift from shallow water lakes to deep water lakes as the ice melted was particularly noticeable in this species. Scaups were observed to associate with every species of duck passing through the Ruthven area, but like the Canvas-back migrated largely in unmixed flocks. Sex ratios varied but slightly from year to year; an average of 2.14 males to 1 female was recorded.

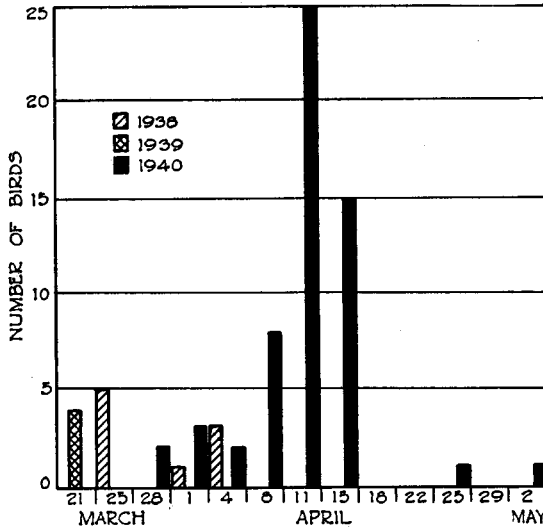


Fig. 37. Spring flight of the American Golden-eye in northwestern Iowa.

The Golden-eye did not pass through the Ruthven area in any great numbers in the three-year period of observation. Reference to figure 37 shows that numbers of the Golden-eye in 1940 far exceeded those observed in 1938 and 1939. Nine birds were seen in 1938, 4 in 1939, and 52 in 1940. The height of the spring migration season could not be detected accurately in 1938 and 1939 because of the small numbers observed. However, March 19 and 21 were dates when most individuals were observed in those two years. In 1940 the birds came to the Ruthven area on March 29 along with the majority of the diving ducks, but the peak of the migration was not until April 11 to 15. The larger open lakes were much preferred by spring migrant Golden-eyes. The 1200-acre Lost Island Lake attracted the largest number and Trumbull Lake (1150 acres) appeared to be second choice. Both of these lakes were free of emergent vegetation and offered good feeding conditions. Golden-eyes were frequently observed feeding in water 2 to 6 feet deep within from 5 to 20 yards of the shore. High winds and cold weather did not drive these ducks to the shelter of banks or vegetation.

The sex ratio of the Golden-eye for the three-year period of observation was 2.37 males to 1 female. Courtship was not detected in the Ruthven area, but pairs were observed that evidently had mated before their arrival. Except when in fairly large groups (10 or more) the Golden-eyes intermingled and associated with Scaups, Ring-necked Ducks, Canvas-backs and Redheads, although pairs were often observed alone on large open bodies of water.

March 27, 1939, was the earliest date on which the Buffle-head was observed and May 9, 1938, the latest. Main flights were on April 1 in 1938 and 1939, and April 8

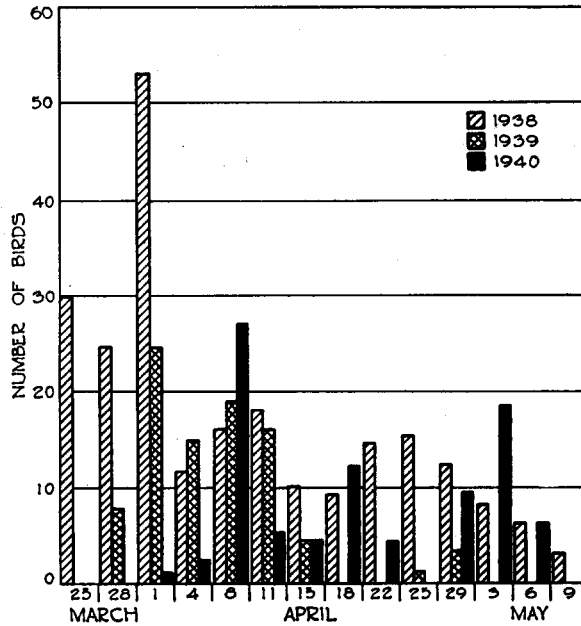


Fig. 38. Spring flight of the Buffle-head in northwestern Iowa.

in 1940. Approximately 200 birds were observed each spring. Buffle-heads were not observed in large flocks but in groups of 5 to 10 individuals. Courtship was carried on in earnest within these small groups. The sex ratio of the Buffle-heads observed was 1.66 males to 1 female. What appeared to be non-breeding juveniles were in evidence

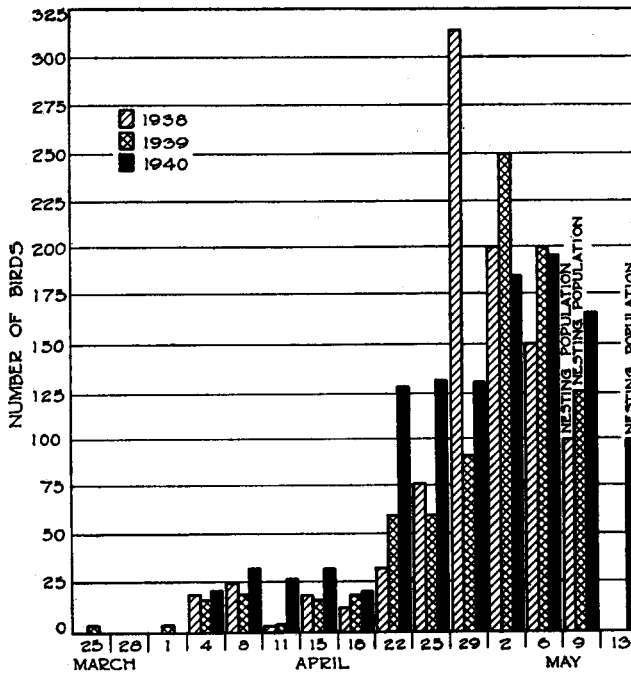


Fig. 39. Spring flight of the Ruddy Duck in northwestern Iowa.

within these groups. These birds flew and swam with the group but played no part in the courtship.

Buffle-heads were observed in the same habitat occupied by the Scaup, Canvas-back and Ring-necked Ducks. However, this species scattered a great deal over the lakes and deeper marshes with no concentrations at any point. Lost Island Lake, Round Lake, and Trumbull Lake were favored waters in which the Buffle-heads were observed courting and resting.

Although not belonging to the subfamily Nyrocinae, the Ruddy Duck (subfamily Erismaturinae) is included in this discussion because of its close association with the other diving ducks. The spring flight of the Ruddy Ducks involved a gradual increase in numbers from the date of their first appearance, March 23 in 1939, to the peak of the migration, April 29 to May 6. Migrating largely at night, the birds were often observed in early morning in large concentrations on areas that were free of Ruddy Ducks the previous day. At the height of migration Ruddy Ducks traveled together in flocks numbering up to 200, but they were observed resting and feeding alone or in groups with an occasional Canvas-back, Scaup, or Redhead on the open water of Trumbull and Lost Island lakes. All did not travel in large flocks, however, for many migrated in pairs or small groups of three or four and frequented vegetation-covered water. Apparently these pairs and small groups remained to breed in the Ruthven area.

The sex ratio of the Ruddy Duck was 1.4 males to 1 female for the three years. There was little variation in the total numbers of Ruddy Ducks migrating through the Ruthven area during the period of observation. Approximately 1000 were observed each spring, of which about 50 pairs remained to nest.

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