

THE CANVAS-BACK IN MINNESOTA

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INTRODUCTION

As a part of the migratory game bird investigations conducted under a State Pittman-Robertson Research Project, a study was made of the Canvas-back (*Aythya valisineria*) in Minnesota. Certain phases of the duck's life history lend themselves admirably to intensive investigation. This is particularly true during migration when the Canvas-backs concentrate in large numbers on only a few lakes in the state. Intensive studies were made of the spring and fall migrations of 1941-1943 on Lake Christina, near Ashby in Grant County, Minnesota. Other studies, carried on over a large part of the state, provided general information about the species.

HISTORY

Since a discussion of the Canvas-back in Minnesota would not be complete without a review of Lake Christina, a brief history and description are presented. Before 1900, no Canvas-backs were ever seen on any of the lakes in the Ashby region. Redheads and blue-bills (scaup ducks), however, were common. After 1900, 'Cans' began to appear on Lake Christina. From that date on, the number using the lake has increased yearly up to the present time. There have been years when a large part of the Canvas-back migration missed Lake Christina, but each following year the birds were back again in great numbers. One possible reason for this increased use of Lake Christina is the deterioration of Heron Lake in southern Minnesota, Pomme de Terre in west-central Minnesota, and Lake Shetek in the southwestern part of the state, due to the increase of carp and the drouth of the 1930's.

There is little information concerning the waterfowl found on Lake Christina prior to 1870, but it is quite possible that at an earlier date the Canvas-backs used it to the same extent as they do today.

The lake is attractive to the Canvas-backs, due apparently to the following conditions. It is large, having a surface area of 4,023 acres. It is shallow, having an average depth of only five feet. There is almost no emergent vegetation. Tremendous volumes of sago pondweed (*Potamogeton pectinatus*), widgeon grass (*Ruppia occidentalis*), and spiny naiad (*Najas marina*) occur there. Oddly enough, there is no wild celery (*Vallisneria spiralis*). These conditions allow the birds to feed, rest, and carry on courting activities over the entire

area of the lake with little danger of disturbance. The lack of emergent vegetation makes it impossible for hunters and predators to approach unobserved. In this respect the lake provides an outstanding illustration of the importance of continuing the present prohibition of open-water shooting as provided by Minnesota game laws.

No lake, which the writer has seen, contains a greater volume of the preferred types of submerged aquatic waterfowl food plants than Lake Christina. Because of the very limited distribution of widgeon grass in Minnesota, it was formerly thought that its presence in large quantities in the lake made the waters unusually attractive. Subsequent examinations of eighty-eight Canvas-backs, however, revealed that the seeds and tubers of sago pondweed occurred in ninety-five per cent of the gizzards while widgeon grass was present in only trace amounts.

This food preference seems to be further evidence that the sago pondweed is an outstanding duck-food plant. Its abundance in Lake Christina is undoubtedly one of the most attractive features of the lake.

SPRING MIGRATION

The Canvas-backs appear in Minnesota as soon as the lakes and marshes begin to open up in the spring. When the Meadow Larks and Red-winged Blackbirds arrive, the 'Cans' are not far behind. In 1941, the first birds were seen on April 4, near Minneapolis; in 1942, on March 29, near the same place; and in 1943, on April 1, at Shakopee near Minneapolis.

The distribution of the Canvas-back in Minnesota in the spring is limited almost entirely to the area around Ashby. Approximately fifty thousand Canvas-backs gather in this area sometime during the month of April each year. Only small flocks, seldom numbering more than several dozen birds, may be seen each year on other areas scattered over the state. Occasionally, a large flock of birds has been reported on one of the many lakes near Wilmar, in south-central Minnesota, but they stay only a day or two and then move on, presumably to the region around Ashby.

Intensive studies indicate that the Canvas-backs migrate through Minnesota in definite waves. In 1942, the migration as observed on Lake Christina occurred in three rather definite movements. The first wave, less distinct than the others, was spread over five or six days. The second wave was more marked and occurred between April 5 and 10. During this time a peak in the numbers of migrants was apparent but of short duration. A third wave appeared

on April 17, which brought the population to another peak that lasted one day. The number of remaining birds gradually dwindled until May 1, when only a few paired birds were left. By May 15, all migrating Canvas-backs usually have left the state.

The actual population of Canvas-backs on Lake Christina during April, 1942, was as follows: April 4—2,000; April 5—5,520; April 6—3,000; April 8—6,000; April 9—9,250; April 10—10,400; April 11—26,400; April 12—31,000; April 13—28,500; April 14—12,500; April 16—6,350; April 17—25,000; and April 18—2,500.

COURTSHIP

Some time was spent studying the progress of the Canvas-back courtship on Lake Christina in 1942. Not until two days after the first flight appeared could any pairs be distinguished. On April 9, five days after the first arrivals, it was estimated that ten per cent of the birds were paired. Pairing increased until April 16, when it was estimated that sixty-five per cent of the birds were mated. The first flight left the lake on April 16, and the second flight arrived two days later. The percentage of birds which appeared to be paired dropped to eighteen per cent immediately after the first wave departed. Because the second flight stayed on the lake only one day, it was impossible to trace further progression of the courtship.

In 1943, the first birds arrived at Lake Christina on April 11. Out of a flock of 2,000 Canvas-backs, only four pairs were seen. Each day following the initial count, the number of pairs increased until April 18, when it was estimated that fifty per cent of the population were paired. Although there were fewer present on the lake in 1943, the same trend in courtship was observed, thus substantiating the findings of the year before.

In the first flights, practically all of the courting parties, which at this early stage contain from six to ten drakes to one hen, are engaged in prenuptial courting activities. As the season progresses, the courting parties diminish in size until, at the peak of the migration, many have but three or four males to one hen. It is sometimes difficult to distinguish the courting parties as units because of the rapid shifting of attendance of the males from a female in one party to a female in another.

Several days after arrival, when the birds have paired, they separate from the main flock and swim about mostly by themselves. This separation becomes very marked near the peak of the migration; and it is not unusual to see a flock of several thousand birds in close association about 100 yards off shore, all very actively engaged in

pre-nuptial courting antics. Separated from the main flock are many pairs of birds loafing together along the shores, obviously enjoying each other's company, others diving and flying short distances almost in unison, and still others trying to defend their solitude against encroachment by lone, wandering, less fortunate males. Copulation apparently occurs soon after pairing. The first mating act was observed in 1942 on April 14. In 1943 it was seen on April 10, and was noted to occur frequently after those dates both years.

This study of the Canvas-back courtship verified in almost every detail the excellent description of that behavior presented by Hochbaum (1944). It differed in only two respects—the size of the courting parties and the dates of the first observed copulation. The evidence, as presented here, indicates that the part of the continental Canvas-back population migrating through Minnesota in the spring begins its courtship here. The majority of the birds are paired when they leave the state.

SEX RATIOS

When the first flight of Canvas-backs came into Lake Christina in April, 1942, the sex ratio, as shown in Table 1, was predominantly in favor of the male—2.3 males to one female. As the season advanced, the sex ratio became more even. At the peak of the migration it was 1.2 males to one female. This seems to indicate that there is a differential movement, with the males flying northward ahead of the females and waiting on the courting grounds for the latter to arrive. The average sex ratio of 1.6 males to one female, as seen in Minnesota birds, is slightly more disproportionate than that reported by Hochbaum in Manitoba (1944).

NESTING

The Canvas-back has never been an important nesting duck in Minnesota. The two most important nesting areas at the turn of the last century were Heron Lake, in Jackson County, and Thief Lake, in Marshall County. Dr. T. S. Roberts visited both areas and found nests and broods of Canvas-backs on Heron Lake in 1898, and in 1900 observed many broods on Thief Lake. It was his opinion that Thief Lake was a more important Canvas-back nesting ground than Heron Lake at the time he visited the areas. There are few records of nests in other parts of the state for this species.

At present it nests in the state in comparatively insignificant numbers. Systematic brood counts conducted by the writer in 1942 on sixteen areas scattered over the prairie region of the state yielded only thirteen broods and forty-six adults, including maternal hens

on five of sixteen areas. The number of young Canvas-backs represented only two per cent of the total young of all species of ducks observed on the same areas. It was, however, an increase over 1941, when only six broods were seen on one area out of ten studied. Further evidence of nesting in 1942 was furnished by observers who reported seeing broods of Canvas-backs on lakes where they have never found this species before during the summer. Until recent years no Canvas-backs were known to have nested on Lake Christina, but now a few pairs have been staying all summer, and at least two instances of nesting have been reported by reliable observers.

In 1943 and 1944, further observations were made on nesting 'Cans.' In 1943, nine broods and thirty-five adults were seen on two of seven areas. The number of young represented 7.3 per cent of the total young of all species of ducks seen. In 1944, only two broods were seen on one out of four areas.

FALL MIGRATION AND HUNTING

It is probable that Minnesota lies in the principal migration route of the Canvas-back, for its flight from the prairie provinces of Canada is largely south and east to the wintering grounds along the Gulf of Mexico and the Atlantic coast. This is further supported by the fact that about six per cent of the continental Canvas-back population stops in the spring on Lake Christina (Lincoln, 1942). Little is known of the movements of these birds to and from Minnesota.

Of eleven banded at Thief Lake in the early fall of 1942, four were recovered. An adult female, banded on August 28, was shot at Lake Christina on September 30, 1942. A juvenile female, banded on September 5, was shot at Fergus Falls, Minnesota, on October 8, 1942. A juvenile male, banded on September 5, was shot at Savannah, Georgia, on December 30, 1942. A juvenile female, banded on September 15, was killed in Calvert County, Maryland, on December 16, 1942.

The Canvas-back migration in the fall is quite similar to the movement as reported by Hochbaum at Delta, Manitoba (1944), except that the arrival and departure dates differ as would be expected in view of the difference in latitude of the two areas. Usually the fall migration is an orderly movement. The birds appear on Lake Christina between October 5 and 10, and the peak of the migration occurs about October 15. The birds begin to leave the lake approximately on October 25, and by the end of the month all of them have left the region. There are some variations which are apparently caused by weather conditions. When there is stormy weather in Canada,

Canvas-backs appear on the Minnesota lakes in late September. In the fall of 1942, the first birds arrived on Lake Christina on September 23. After that date they poured into the lake until a peak population was reached on October 17, when there were an estimated sixty thousand Canvas-backs. On the 21st, the weather became stormy, and the ducks began to leave the lake in large numbers. About ten thousand remained until the 25th, when the lake froze over.

One striking difference between the fall and spring migrations on Lake Christina was in the flock formations. In the spring each species remained in a fairly compact group. The Canvas-backs formed a ribbon all around the lake shore. The Coots gathered in large flocks farther out in the lake as well as in flocks near the shore. The Redheads formed long strings usually out in the middle of the lake. The Ring-necks, Lesser Scaups, and 'puddle ducks' concentrated in the bays. In the fall, however, this segregation was not apparent. The birds united far out in the middle of the lake in a large, heterogeneous flock. Perhaps this distribution of the species may be explained by the courting activities carried on in the spring and the lack of these activities in the fall. The distribution may be influenced also by the condition of the feed beds during the two seasons.

The wintering areas studied by the author in Minnesota have never had Canvas-backs, and there are few records of this species wintering in the state.

SEX AND AGE OF BIRDS IN HUNTERS' BAGS

A bag tally of the Canvas-backs shot on Lake Christina was made in the fall of 1942. The object was to determine the sex and age ratios of the birds. The data are presented in Tables 2 and 3. The sex ratio was much more even than that reported by Hochbaum (1942) of birds shot on the Delta marshes. At Christina the sex ratio of adults was one male to 1.2 females, while at Delta, in 1941, it was one male to 2.2 females. The sex ratio of both juveniles and adults taken at Delta was one male to 1.8 females, but at Ashby the ratio was one male to 1.05 females.

Comparing the age ratios of Canvas-backs shot at Lake Christina and at Delta, it was found that the proportions were almost the same. During 1939, 1940, and 1941, the age ratio at Delta was one adult to 5.7 young and one adult hen to 8.2 young. The Christina ratio was one adult to 5.5 young. The adult hen-juvenile ratio of one to 10.1 seems too high to be a true reflection of the Canvas-back's yearly increase. It is quite possible that this ratio bears out the

contention of the old-time hunters that the young birds are easier to shoot because they decoy more readily than the old 'white backs,' and because they tend to fly lower over the points and the passes. However, this supposed difference was not observed by the writer. It is true, he shot more young birds than old, but no flight or decoying differences were noted in the age classes.

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SUMMARY

In 1941 and 1942, a study of the spring and fall migrations of Canvas-backs was made at Lake Christina near Ashby, Minnesota. Approximately six per cent of the continental population of Canvas-backs stops on migration at Lake Christina. The lake is attractive to the birds apparently because it is large and shallow, with no emergent vegetation, and contains a tremendous volume of sago pondweed, widgeon grass, and spiny naiad. Of eighty-eight Canvas-back gizzards examined, ninety-five per cent contained sago pondweed; widgeon grass was found in only trace amounts.

The spring migration of Canvas-backs at Lake Christina in 1942 occurred in three definite movements. The first, less distinct than the others, was spread out over six days. The second occurred between April 5-10, and the third on the 17th when 25,000 birds were counted.

On April 9, 1942, ten per cent of the Canvas-backs on Lake Christina were paired; on the 16th, 65 per cent were paired. On April 11, 1943, only four pairs were seen in a flock of 2,000 birds; by April 18, fifty per cent of the birds were paired. Once paired, the birds separate from the main flock. The separation becomes marked near the peak of the migration when several thousand birds may be seen in close association about 100 yards off shore, all engaged in prenuptial courting antics. In 1942, the first copulation was seen on April 14; in 1943, on April 10.

The sex ratio of the first flight of Canvas-backs in April, 1942, was 2.3 males to one female. At the migration peak it was 1.2 males to one female. The average ratio was 1.6 males to one female.

Brood counts made in 1941 through 1944 indicated that the Canvas-back as a nesting species has increased in Minnesota during the last few years.

The fall migration of the Canvas-backs at Lake Christina is an orderly movement. The birds arrive between October 5 and 10, reach a peak about the 15th, and begin to leave the lake about the 25th. By the end of the month all have left.

Of eleven Canvas-backs banded at Thief Lake in the fall of 1942, four were recovered the same fall—one at Lake Christina on September 30, one at Fergus Falls, Minnesota, on October 8, one in Calvert County, Maryland, on December 16, and one at Savannah, Georgia, on December 30.

A bag tally of Canvas-backs shot on Lake Christina, in the fall of 1942, was made to determine the sex and age ratios of birds. The sex ratio of adults was one male to 1.2 females and of juveniles, one male to 1.05 females. The age ratio was one adult to 5.5 juveniles. The ratio of adult hens to juveniles was one to 10.1; this seems too high to be a true reflection of the Canvas-backs' yearly increase.

TABLE 1

SEX RATIOS OF CANVAS-BACKS ON LAKE CHRISTINA, MINNESOTA, APRIL 4-18, 1942

Date	Male	Female	Ratio	Total	Estimated percentage paired
4	355	157	2.2 : 1	512	—
5	200	80	2.5 : 1	280	0
6	470	273	1.7 : 1	743	0
7	120	48	2.5 : 1	168	—
8	101	57	1.7 : 1	158	—
9	503	282	1.7 : 1	785	10
10	818	501	1.6 : 1	1,319	25
11	1,174	795	1.4 : 1	1,969	30
12	241	191	1.2 : 1	432	—
13	386	258	1.4 : 1	644	32
14	268	196	1.3 : 1	464	38
15	110	75	1.4 : 1	185	50
16	314	192	1.6 : 1	506	65
17	292	205	1.4 : 1	497	18
18	175	99	1.7 : 1	274	—
Total	5,527	3,409	1.6 : 1	8,936	

TABLE 2

SEX RATIO OF CANVAS-BACKS SHOT AT ASHBY, MINNESOTA, 1942

Juveniles			Adults			Total		
Male	Female	Ratio	Male	Female	Ratio	Male	Female	Ratio
200	205	1 : 1.02	33	40	1 : 1.2	233	245	1 : 1.05

TABLE 3

AGE RATIO OF CANVAS-BACKS SHOT AT ASHBY, MINNESOTA, 1942

<i>Adult Both sexes</i>	<i>Juvenile</i>	<i>Ratio</i>	<i>Adult female</i>	<i>Juvenile</i>	<i>Ratio</i>
73	405	1 : 5.5	40	405	1 : 10.1

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