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Status of Waterfowl in Inland North Carolina

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Until recently inland North Carolina, unglaciated and geologically old, had almost no lakes. In the last few decades inland Carolina has been honeycombed with ponds and artificial lakes, which have been a part of reservoir and progressive agricultural programs. This man-made change has made inland Carolina a wintering ground for a surprisingly great number of waterfowl. The 1940 census lists the area of ponds and inlands waters as about 197 square miles in counties west of an arbitrary line taken through Murfreesboro, Witherington, Washington, Kinston, Wallace, and Lake Waccamaw. This line eliminates the extensive sound waters and coastal duck and geese concentrations, which are not considered here. At various points, in the last ten years particularly, bird observers have noted this gratifying addition to local faunas and reported their observations. In the following data are included, among others, the observation of W. Anderson, E. E. Brown, F. R. Brown, T. D. Burleigh, C. S. Brimley, H. H. Brimley, A. Breckenridge, J. S. Cairns, J. Carr, Mrs. E. B. Clarkson, J. Coffey, C. Coker, W. Craft, F. H. Craighill, W. Craven, W. Fox, R. E. Gregory, J. Grey, N. Hairston, W. H. Hamnet, E. M. Hodel, R. Holmes, M. E. Huger, G. B. Lay, E. Mitchell, N. McCullough, E. P. Odum, H. T. Odum, R. Overing, T. L. Quay, T. G. Pearson, H. Rankin, E. Seeman, A. D. Shaftesbury, G. F. Shepherd, R. C. Simpson, G. Smith, Q. Scarborough, J. L. Stephens, E. Taylor, B. Thomas, R. B. Wallace, F. Williams, D. L. Wray, and T. Zapf.

An attempt is made here to obtain a very rough estimate of the status of each species, the numbers of waterfowl, and to summarize the migration data on hand. It is recognized that the amount and sampling of the data are such as to limit the detail from which conclusions may be drawn.

Forty winter censuses from central North Carolina have been tabulated and summarized in the accompanying table I, to give some idea of: (1) abundance, (2) frequency of occurrence, and (3) flock size of each species. Comparison has been made between each species on each of the above characteristics by placing numbers to indicate the order of each species respectively (Columns II, V, VII).

TABLE I.—ABUNDANCE, OCCURRENCE, AND FLOCK SIZE OF WATERFOWL WINTERING IN CENTRAL NORTH CAROLINA

From 40 winter censuses including: Chapel Hill, 25; Raleigh, 9; Greensboro, 5; Rocky Mount, 5; Winston-Salem, 3; Laurinburg, 2; and Badin Lake, 1; from November 25 to March 3—1932 to 1946. (a).

Species of Occurring Waterfowl	I Average Number per observation day	II Order of Abundance	III Crude estimate of numbers wintering inland	IV % of days occurring	V Order of Frequency	VI Average number per observation day (that it occurred)	VII Order of Flock Size
Common Loon	*	26	16	4	24	1.0	25
Red-throated Loon	*	27	8	2	27	1.0	26
Horned Grebe	*	25	15	4	25	1.0	27
Pied-billed Grebe	1.2	11	477	48	5	2.1	20
Double-crested Cormorant	.1	22	40	4	23	1.5	23
(b) Whistling Swan	.4	20	158	4	26	9.0	8
(c) Canada Goose	12.2	4	4751	10	19	126.0	1
Mallard	21.4	2	8511	82	2	26.1	4
Black Duck	23.5	1	9346	84	1	27.9	3
Gadwall	.4	18	158	16	16	2.2	19
Baldpate	1.1	13	437	22	12	4.9	14
Pintail	1.2	12	477	18	13	6.9	12
Green-winged Teal	.4	19	158	8	20	4.5	15
Shoveller	.1	24	40	6	21	1.6	22
Wood Duck	5.1	6	2025	26	8	19.7	5
Red-head	.7	17	278	22	11	3.0	18
Ring-necked Duck	18.4	3	7106	62	3	29.7	2
Canvasback	.7	16	278	18	14	3.6	17
(d) Scaup	5.9	5	2343	34	7	10.8	7
Golden-eye	.7	15	278	18	15	6.9	13
Bufflehead	2.8	8	1112	40	6	7.1	10
Old Squaw	.1	23	40	6	22	1.0	24

Ruddy Duck	.9	14	357	24	10	3.8	16
Hooded Merganser	4.3	7	1708	54	4	8.0	9
American Merganser	2.4	9	953	24	9	7.0	11
Red-breasted Merganser	1.7	10	675	12	17	16.5	6
Coot	.2	21	79	10	18	1.8	21
	106.0						

* Close to zero.

(a) Blue-winged Teal and Greater Snow Goose are sporadically found in inland N. C. in winter but did not occur in the censuses used.

(b) Numbers are probably much too high due to presence of the same nine birds on two censuses.

(c) Geese are almost all concentrated in a few places such as Yadkin river lakes, Winston-Salem ponds, and Ansonville. Most of the censuses in this table are not of these areas so that the estimates of numbers are probably low. As many as 3,000 have been counted at one time; 10,000 is one estimate applied by Fish and Wildlife service to the Yadkin river region at one time.

(d) Both Lesser and Greater Scaup occur inland. Without reliable methods of observational distinction no attempt is made to separate the two species in the above table.

The table is mostly self explanatory. In column III, the numbers are comparative and proportional to the estimates in column I. The total numbers of waterfowl wintering in inland North Carolina has been estimated by averaging the number of waterfowl per square mile on studied bodies of water in one locality and extending to the state. The average number of waterfowl (ducks, geese, loons, grebes, swans, cormorants, coots) observed per day on 25 winter censuses at Chapel Hill, N. C., from November 25th to March 3rd, between 1932 and 1946, was 64.3. The area of water surveyed on each side of these is roughly .3 square miles. Thus the wintering waterfowl population in this area was 214 birds per square mile. With about 197 square miles of fresh water in inland Carolina (defined above), this approach to a crude estimate gives $214 \times 197 = 42{,}158$ birds in inland N. C. This is a considerable number and makes these waterfowl now important in inland wildlife management. The crude estimate of wintering numbers has been extended to each species by ratio in column III. For example, the number of Black Ducks per day in column I of table I (23.5) is to the average number of all ducks per day (106) as x, the unknown number of Black Ducks in inland North Carolina, is to the total estimated waterfowl in this area, 42,158. Then x equals 9,346 Black Ducks in inland North Carolina.

There are some basic fallacies in these estimates of state populations. There are large variations in food conditions in different lakes that make generalizations from one set of lakes incorrect. Large variations in the amount of human disturbance to the waterfowl cause large differences in duck populations. The number of ducks per acre varies with the size and shape of the lake.

Abundance or numerousness refers to the total numbers as opposed to frequency, which indicates how often a species is found or the likelihood of finding it on any trip. Figures in column VI are the average number of birds per day that the species in question occured. Roughly this is a measure of the flocking tendency. These numbers are not so good a measure of flocking tendency among species that do not occur in large flocks. Any bird like Pied-billed Grebe that occurs singly will tend to show up the same as an uncommon bird occuring in small

flocks, such as Gadwall, because several singly occurring Grebes would be lumped together in the census totals of the data used to make the table I above. It should be kept in mind that the flocking tendencies are not applicable outside of the area studied. The size of the flocks depends not only on the birds' inherent behaviour but on the numbers present. Small numbers limit the flock size regardless of the bird's characteristic behaviour. For example, Redheads and Canvasbacks are scarce in inland North Carolina and therefore can occur only in small flocks instead of huge rafts which are sometimes characteristic of these species in other areas.

All occuring species may be conveniently put in classes according to (1) abundance, (2) frequency of occurance, and (3) flock size shown in Table I above.

WINTER STATUS

Class I—Numerous, common (frequently occurring), large flocks. Black Duck, Mallard, Ring-necked Duck.

Class II—Numerous, concentrated (infrequent), large flocks. Canada Goose.

Class III—Few, common, very small flocks or singly. Pied-billed Grebe.

Class IV—Few, rare and sporadic, small flocks or singly. Common Loon, Red-throated Loon, Horned Grebe, Double-creasted Cormorant, Green-winged Teal, Blue-winged Teal, Shoveller, Old Squaw, Snow Goose.

Class V—Moderately numerous, fairly common, small flocks. All other species listed in Table I.

Referring still to Table I, note that column IV can be used as a guide to observers in evaluating the unusualness of their observations. However, the percentages cannot be directly applied by any observer to what he will see on any one lake because the data is a composite of large lakes with many ducks and much variety, and small ponds with few ducks. The value of the column is in the comparison of species. In the whole table, the accuracy and value of the figures is probably greatest for the numerous species. There is not sufficient data to make the status of the scarcer species clear. However, as a general indication all values are useful.

The figures of Table I having to do with abundance (column III) are probably too low. First of all, the ducks occurring along streams and tiniest ponds are not included. Also, the area of inland water has been growing since 1940 with formation of new lakes. In this it is assumed that new water areas will attract new ducks from coastal and other areas. Although this assumption may be invalid, it is substantiated by the constancy of populations on some studied inland lakes at a time when national duck populations have declined markedly. It seems reasonable also that ducks will fill their northern winter range first wherever it is suitable. In this connection an interesting observation was made in February, 1940, when a hard freeze coated inland water solidly with ice for over a week. The ducks at Chapel Hill did not depart or decrease. Some kept a hole open in the center of the lake; others spread into the free water of creek rapids throughout the countryside. Too, inland lakes often have habitats and cover like the northern nesting grounds. It is most important that some newly constructed lakes seem to acquire a winter waterfowl population immediately if disturbance isn't great.

Table II is a summary of the data on hand on dates of arrivals and departures. (Additional signficant dates undoubtedly exist in personal records of many observers and should be published.) Some of the dates are obviously no indication of the migration departures or arrivals but are included in scarce species when the bird was never observed in the early or late parts of the wintering season. Blanks in the table mean that pertinent data are not available to the writer. Breeding information, sporadic summer data, and special winter dates are included:

TABLE II.—WATERFOWL DATA FOR INLAND NORTH CAROLINA
NOTE: Parentheses () indicate unusual dates.

Species	*Chapel Hill*	*Raleigh*	*Greensboro*	*Asheville*	*Others*
Common Loon		17 Nov.-22 May	13 May		Durham, 11 June
Red-throated Loon	21 Dec.	1 December		18 Nov.-26 March	Charlotte, 1 Nov.
Horned Grebe	12 Nov.-9 Apr.	2 Oct.-18 April	6 January	1 Aug.-4 April	
Pied-billed Grebe	21 July-6 May	5 Sept.-20 May			Rocky Mt., 22 April
Double-crested Cormorant	5 Nov.-21 May	31 Oct.-4 May	19 May		Durham, Winter '27
Whistling Swan		(11 & 28 Dec.)	(January, 1914)		Ansonville, 9 Oct.-4 Apr.
Canada Goose	11 Nov.	24 Nov.-11 Dec.	16 October	29 October	An'ville, 31 Dec.-10 Feb.
Snow Goose (Gr.)					
Mallard	23 Oct.-7 May	16 Oct.-29 April	22 December	31 Oct.-21 March	
Black Duck	5 Oct.-10 May	23 Oct.-1 July	19 October	3 Oct.-16 March	
		(5 Sept.; 1, 17 June)			
Gadwall	22 Dec.-30 March	9 Nov.-4 April	10 Dec.-27 April	2 Oct.-24 March	
Baldpate	24 Nov.-28 April	27 Oct.-25 April	27 Oct.-24 March	6 Nov.-29 April	
		(14 June)			
Pintail	13 Nov.-2 April	24 Nov.-17 March	25 Nov.-17 April		Charlotte (11 Apr.)
Green-winged Teal	17 Nov.-28 Dec.	1 Dec.-13 April			
Blue-winged Teal	12 Sept.-19 Sept.	5 Sept.-7 May	2 Sept.-18 Sept.	23 April	
	22 Mar-4 May	(19 Feb.)	19 May		
	(27 Dec.)				
Shoveller		18 Nov.-17 April	25 Nov.-17 April	1 April	
Wood Duck	Young out of nest:				Lumberton: 8 eggs
	18 April-7 May				22 May
					Rocky Mt., 2 broods
					young, 1 May
					Durham, 31 July
Red-head	26 Dec. 4 May	23 Nov.-11 Jan.	16 Dec.-27 April		
Ring-neck Duck	21 Nov.-24 April	26 Oct.-15 April	25 Nov.-30 March	7 November	
Canvasback	27 Oct.-10 March	23 Nov.-28 Feb.			
Scaup	6 Nov.-6 May	26 Oct.-(1 June)	27 Oct.-8 May	8 Oct.-10 April	
			(4 Aug.-24 July)		
Golden-eye	17 Nov.-2 Apr.	18 Nov.-5 May	29 Dec.-27 April		
Bufflehead	17 Nov.-24 March	22 Nov.-15 April	29 Nov.-27 Jan.	8 April	Highlands, 1 Nov.
Old Squaw	23 December	18 Nov.-30 March			
Ruddy Duck	24 Dec.-4 Feb.	26 Oct.-17 April	27 Oct.-10 Mar.	24 Oct.-2 April	
Hooded Merganser	5 Nov.-28 April	4 Nov.-15 March	25 Dec.-27 April		Rocky Mt., female &
					young, 9 May
American Merganser	22 Dec.-4 May	11 Dec.-11 April	25 Dec.-27 April		
Red-breasted Merganser	23 Dec.-24 April	18 Nov.-8 May	18 Nov.-5 May	16 November	
Coot	27 Oct.-24 April	26 Oct.-1 March	2 March		

Most of the waterfowl occurring are winter residents. The dates above indicate the arrival of the earliest individuals of most species in late October and early November. Departure of the stragglers occurs in last of April or May. In 1940 at Chapel Hill the number of ducks present doubled during the spring migration, with a peak of numbers on March 16th. Following are notable exceptions to the generalization above.

Wood Ducks breed regularly at least in the eastern section of inland North Carolina. Large flocks of Wood Ducks may occur in this region in winter. Double-crested Cormorant, Black Duck, Baldpate, Red-head, Scaup, and Common Loon have been recorded inland in summer. Snow Geese are generally coastal but occur sporadically inland as at Ansonville in winter.

Blue-winged Teal occur mainly as spring and fall transients, although a few turn up in inland North Carolina in winter; some winter regularly in South Carolina. Hooded Merganser is a scarce breeder inland. Because of the irregularity of stragglers, these dates cannot be used to compare migrations of different species except where differences are large and the data are consistent. However, it seems clear that of the six most frequently occurring species, the order of arrivals in most localities is probably: Pied-billed Grebe, Black Duck, Mallard, Ring-necked Duck, Hooded Merganser, Bufflehead. The order of departure of these species is probably: Bufflehead, Ring-necked Duck, Hooded Merganser, Mallard, Black Duck, Pied-billed Grebe.

Summary

1. Using 25 winter censuses at Chapel Hill an estimate of 42,000 wintering waterfowl is made for inland North Carolina.

2. Using data of 40 censuses from central North Carolina, the waterfowl are seen to have definite species variations in abundance, frequency, and flocking tendency, that fit the species into 5 classes. The estimates of numbers are extended to each species.

3. Accumulated migration data clarifies the status of many waterfowl. Most are winter residents, a few species breed, one is mostly transient, and a few have been found sporadically as in summer.

Sources

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