FALL AND WINTER USE OF THE LEXINGTON RESERVOIRS BY WATERBIRDS

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INTRODUCTION — The distribution of transient and wintering aquatic birds is well studied in many parts of Kentucky. Narrative descriptions of waterbirds occurring on natural waterbodies such as the Falls of the Ohio (Stamm and Summerfield 1952, Stamm *et al.* 1960) and the transient lakes at Woodburn (Shadowen 1972) have greatly added to the distributional picture of birds within the state. For thirty years, Gordon Wilson supplied bird-use information on the transient lakes at Woodburn (*e.g.* Wilson 1929, 1956). Artificial impoundments from the Cumberland Plateau (Altman 1982, Harm 1973) to the Pennyroyal (Powell 1960) have also received the attention of Kentucky birders. More recent studies at the Clark Fish Hatchery (Busroe 1985), the Falls of the Ohio (Palmer-Ball 1986), and the refuges of western Kentucky (*e.g.* Logsdon 1986) have quantified waterbird use of the state's artificial and natural waters. Bellrose (1976) suggested that a minor fall waterfowl migration corridor (62,000 - 200,000) exists across central Kentucky. However, this area has received little attention. This paper documents the abundance and occurrence of fall-transient and wintering waterbirds using impoundments in the Bluegrass region of Kentucky.

STUDY AREA — The Lexington reservoirs are located on the southeastern edge of Lexington, Fayette County, Kentucky. They were constructed between 1884 and 1913 to serve as water storage facilities for the Kentucky-American Water Company. Of the four existing reservoirs, three were surveyed for the presence of waterbirds. Reservoir #2 covers 80 acres (32.4 ha) and has an average depth of 12.5 feet (3.81 m). Reservoir #3 covers 90 acres (36.4 ha) and has an average depth of 14.5 feet (4.42 m). Reservoir #4 covers 270 acres (109 ha) and has an average depth of 8.5 feet (2.59 m). Combined, the three reservoirs encompass 440 acres (178 ha) of which 70% was surveyed. Surveys were not conducted on reservoir #1 due to its proximity to a major roadway. Currently, reservoir #4 is leased to the city of Lexington and is bordered by a municipal park, undeveloped woodlots, and agricultural fields. Residential development is rapidly encroaching on the fringes of this impoundment. Reservoirs #2 and #3 were sold in 1964 to private developers and are presently surrounded by homes.

METHODS — Quantitative surveys of all waterbirds were conducted by the same, single observer from October 1, 1984 to February 24, 1985. In addition, surveys of non-anseriform waterbirds were conducted from August 1 to September 30, 1985. Intervals between surveys varied from 4 to 10 days, depending on logistics. Surveys were thus treated as a random sample of survey-days from the total number of days in the sampling period. Observation periods lasted about one hour (somewhat dependent on the number of birds present) and occurred between 1400 and 1800 hours. Surveys were always conducted from the same points along the reservoirs' shorelines. Species and numbers were recorded for waterfowl and waterfowl-like birds and presence or absence was scored for all other species associated with aquatic habitats. Species identification was accomplished using a 22X spotting scope.

Quantitative analysis of waterbird data consisted of calculating means (birds/survey) and standard errors (SE) using formulae derived for simple random sampling. These parameters were estimated for the entire period as well as for monthly periods. Under the sampling plan, means may be interpreted as the number of birds present on the reservoir (the area sampled) during any instance in time during the period. Using this parametric approach, species were ranked in abundance according to their mean values. Additionally, variance estimates associated with the mean (standard errors) revealed information on the certainty of finding numbers of waterbirds that are proximate to their mean. Coefficients of variation (CV = standard error/mean) were also calculated. The CV is a relative measure of the amount of variation. Thus, high CVs indicate a large variance associated with the mean. Coefficients of variation were used to examine the stability of waterbird numbers during any particular monthly period or for the entire period.

Waterfowl were qualitatively assigned a status code, either winter resident, transient or both, based on whether or not they occurred on the reservoirs during maximum ice cover in January. Species that were not assessed quantitatively were scored as present or absent on a monthly basis.

RESULTS and DISCUSSION — During the period of October 1, 1984 to February 28, 1985, 32 surveys were conducted. Eight surveys were made during August and September, 1985. Forty-nine species of nine families were recorded: loons (1), grebes (2), comorants (1), herons (5), geese and ducks (20) rails (1), shorebirds (13), gulls and terns (5) and kingfishers (1). All nomenclature follows the 6th edition of the A.O.U. Checklist. Four additional species of waterfowl were observed outside the study period (Table 1). All species found at the reservoirs were those expected to be encountered west of the Cumberland Plateau (Mengel 1965, Monroe *et al.* 1988). The number of species was slightly higher than Busroe's (1985) observation of 43 species from a Cumberland Plateau site. Mallards were by far the most common species, accounting for 54% of the estimated mean for all species (Table 1). American Coots were the next most abundant species (17% of the total species mean). Although the observation of a single flock of 557 is no record for the state, it seems an impressive number for central Kentucky. Analysis of means for higher taxa of waterbirds (excluding mallards) shows that use by coots and dabbling ducks is higher than the combined use of the remaining taxa (Table 2).

Inspection of the coefficients of variation in Table 1 shows that several species pass through the Bluegrass rapidly and occasionally in substantial numbers. For example, Common Loons, Lesser Scaups and Red-breasted Mergansers were among the 12 most abundant species; yet they have coefficients of variation of 0.69, 0.76, and 0.97 respectively. Maximum counts for these species indicate that the high mean was due to a single, large flock. Pursuing the reverse condition of transients, CVs were examined on a monthly basis to find if there were periods of temporary residency in the species using the reservoirs. Table 3 depicts months for species when the monthly CV was lower than the overall CV (because standard error and hence CV is dependent on the number of surveys, the overall CV would be expected to be lower). From this table, it is easy tc see that several species of waterbirds either linger after the majority of its kind move on (American Coot, Lesser Scaup, American Black Duck) or take up a temporary residence that is disturbed as environmental conditions change (Green-winged Teal, Common Goldeneye, Northern Shoveler). These latter species may be thought of as facultative winterers. As

long as weather and ice conditions stay favorable, they will probably winter on the reservoirs. The aberrance apparent in the Blue-winged Teal pattern is due to the early fall migration of this species.

Table 1. Mean abundance (birds/survey) of waterfowl and waterfowl-like birds occurring on the Lexington Reservoirs from October 1984 - February 1985. Species are ranked from high to low abundance.

Species	Mean	SE[a]	CV[b]	Max[c]	% (Mean)[d]	Status[e]
Mallard	177.9	11.2	0.06	346	54.2	W
American Coot	57.0	20.4	0.36	557	17.4	T,W
Green-winged Teal	17.6	3.5	0.20	65	5.4	T
Lesser Scaup	14.0	10.7	0.76	345	4.3	T,W
American Black Duck	11.2	3.7	0.33	103	3.4	W
Canada Goose	7.2	2.5	0.35	60	2.2	W
Red-breasted Merganser	7.2	7.0	0.97	226	2.2	T
Ring-necked Duck	4.8	1.8	0.37	42	1.5	T,W
Ruddy Duck	4.7	1.0	0.22	22	1.4	T,W
Hooded Merganser	4.6	1.4	0.30	28	1.4	T
American Wigeon	4.6	1.3	0.27	28	1.4	T,W
Pied-billed Grebe	4.2	0.6	0.14	12	1.3	T,W
Common Loon	4.1	2.8	0.69	90	1.2	T
Gadwall	2.6	0.5	0.20	8	0.8	T,W
Northern Shoveler	2.2	0.7	0.32	14	0.7	W
Common Goldeneye	1.4	0.5	0.32	9	0.4	T
Blue-winged Teal	0.8	0.5	0.56	14	0.3	T
Horned Grebe	0.8	0.3	0.37	7	0.2	T
Bufflehead	0.8	0.3	0.40	7	0.2	W
Redhead	0.4	0.3	0.82	10	0.1	T
Wood Duck	0.2	0.1	0.60	3	0.1	T
Northern Pintail	0.1	0.1	1.00	2	<0.1	T
Canvasback	<0.1	<0.1	1.00	1	<0.1	T
Greater Scaup	<0.1	<0.1	1.00	1	<0.1	T
Snow Goose	**					
Oldsquaw	**					
White-winged Scoter	**					
Common Merganser	**					
All Species	328	27.5	0.08	1004	100	

** denotes observed at the reservoir outside of the study period.

a standard error of the mean

b coefficient of variation

c maximum number recorded during a single survey

d percentage of the mean abundance for all species

e status: T=transient, W=wintering

Table 2. Mean abundance (birds/survey), standard error (SE), percentage of all species' mean abundance (%(Mean)), percentage of all species' standard error (%(SE))and number of species (SPP) for higher taxons of waterbirds occurring on the Lexington Reservoirs from October 1984 - February 1985.

Taxon	Mean	SE	% (Mean)	% (SE)	SPP
Loons	4.1	2.8	1.2	0.9	1
Grebes	5.0	0.6	1.5	0.2	2
Geese	7.2	2.5	2.2	0.8	1
Wood Ducks	0.2	0.1	0.1	<0.1	1
Dabblers	216.9	12.4	66.1	3.8	8
Dabblers (w/o mallards)	39.0	5.3	11.9	1.6	7
Divers	19.3	10.9	5.9	3.3	5
Mergansers	14.0	7.1	4.3	2.2	4
Stiff-tails	4.7	1.0	1.4	0.3	1
Rails	57.0	20.3	17.4	5.3	1
All Species	328	27.5	100		24

Table 3. Mean Abundance (birds/survey) for species where monthly CV is less than the overall CV and is less than 0.5. Presented are overall mean, CV, month where the fore-mentioned criteria apply and monthly mean, CV, by species.

Species	Overall Mean	Overall CV	Month	Mean	CV
Green-winged Teal	17.6	0.20	NOV	39.6	0.15
American Black Duck	11.2	0.33	JAN	12.2	0.26
			FEB	10.4	0.14
Blue-winged Teal	0.8	0.56	OCT	3.3	0.47
Northern Shoveler	2.2	0.32	JAN	5.0	0.21
Lesser Scaup	14.0	0.76	DEC	3.2	0.47
Common Goldeneye	1.4	0.32	DEC	4.7	0.26
American Coot	57.0	0.36	NOV	38.0	0.19
			DEC	27.3	0.19
			JAN	35.4	0.20
			FEB	16.6	0.30

Temporal patterns of dabbling ducks (excluding mallards), diving ducks and mergansers are plotted in Figure 1. General migration patterns corresponded with those described for the entire state (Monroe *et al.* 1988). Heaviest use by dabblers occurred in November, whereas merganser use was most prevalent in December. Overall, diving ducks were fairly scarce on the reservoirs. A large flock of Lesser Scaup encountered in October accounted for the high number displayed in this month. Species diversity of waterfowl peaked during December (Figure 2). Palmer-Ball (1986) also found a peak in waterfowl diversity at the Falls of the Ohio during December.

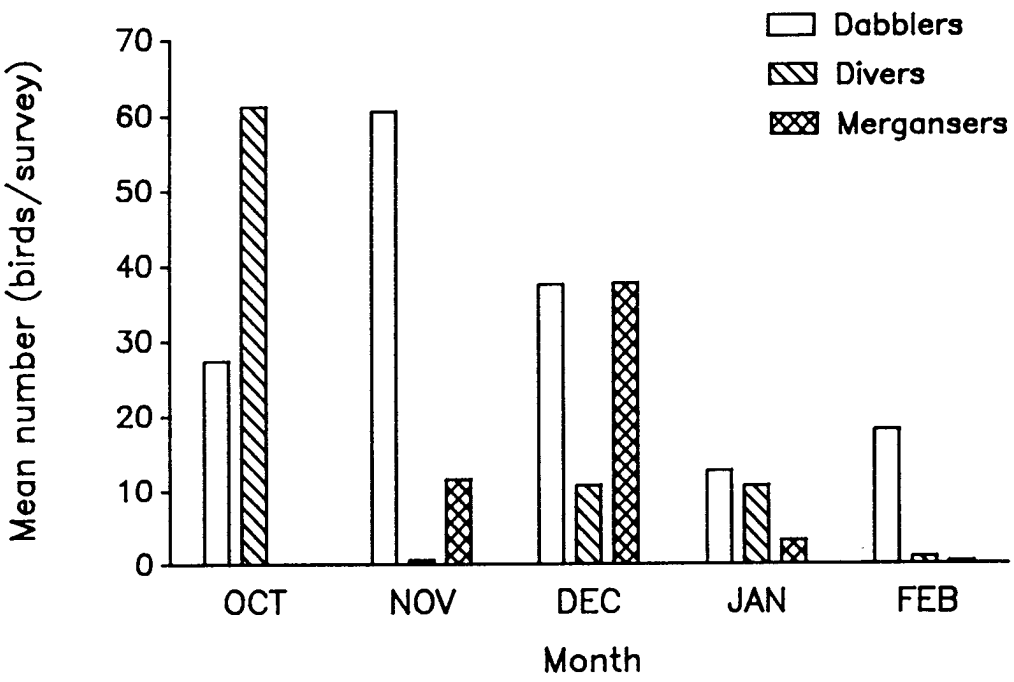

Figure 1. Average monthly numbers (birds/survey) of dabblers (without Mallards), divers, and mergansers on the Lexington reservoirs.

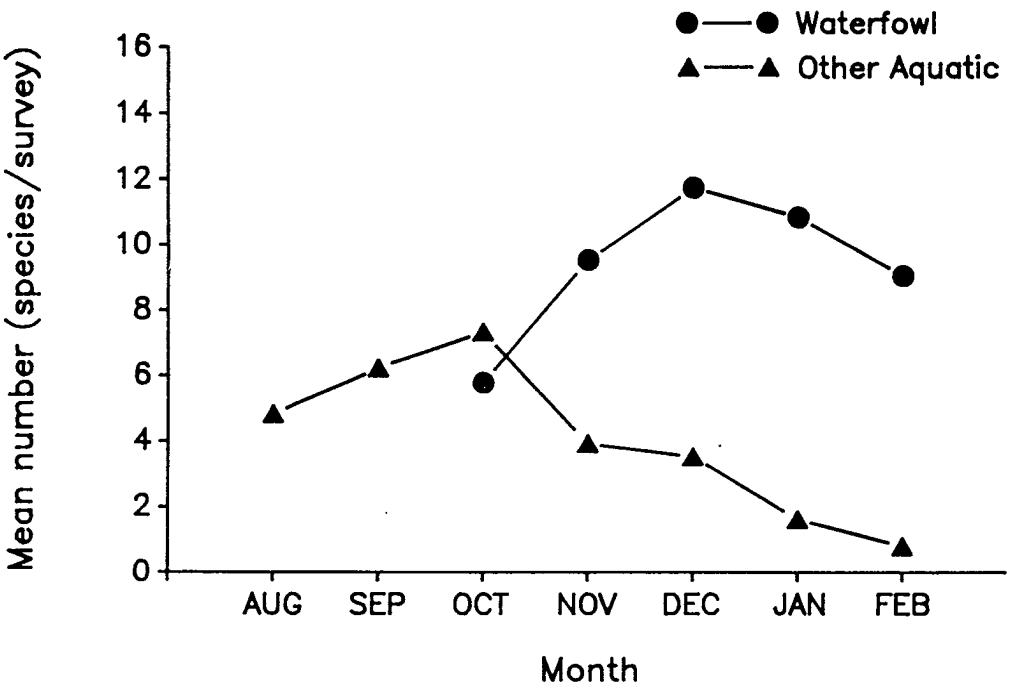

Figure 2. Average monthly numbers (species/survey) of waterfowl and other aquatic species found on the Lexington reservoirs.

Of the 25 species of aquatic birds assessed quantitatively, 52% of the species observed were shorebirds (Table 4). Although numerous species used the reservoirs as a migration stop-over, few remained to winter here. The most consistent users of the reservoirs in mid-winter were Great Blue Herons. A roost was located on the unpopulated side of reservoir #4. The maximum number of species was found in October (Figure 2). Several species of shorebirds arrived during the last week of October and lingered into early November. Peak species diversity at the reservoirs occurred somewhat later than at the Falls of the Ohio (Palmer-Ball 1986).

It is apparent that the variety of waterbird species found on Lexington reservoirs is comparable to many sites in the state. Although numbers of birds are well below the magnitude found in western Kentucky, waterbird use is still substantial. In the current day of continuing wetland loss, minor wetland sites may take on increased importance. Unfortunately, as development continues around Lexington, the ability of the reservoirs to provide waterbirds with a suitable resting or wintering site may change. It is hoped that this study will aid future workers in gauging such alterations.

Table 4. Monthly occurrence (+ denotes presence, — denotes absence) of other aquatic birds found on Lexington Reservoirs from October 1984 - February 1985, August - September 1985.

Species	AUG	SEP	OCT	NOV	DEC	JAN	FEB
Double-crested Cormorant	—	—	+	+	—	—	—
Great Blue Heron	+	+	+	+	+	+	+
Great Egret	—	—	—	—	+	—	—
Little Blue Heron	—	+	+	—	—	—	—
Green-backed Heron	+	+	+	—	—	—	—
Black-crowned Night-Heron	+	+	+	—	—	—	—
Semipalmated Plover	—	+	+	—	—	—	—
Killdeer	+	+	+	+	+	+	+
Greater Yellowlegs	+	+	+	+	—	—	—
Lesser Yellowlegs	+	+	+	+	—	—	—
Solitary Sandpiper	+	+	+	—	—	—	—
Spotted Sandpiper	+	+	—	—	—	—	—
Semipalmated Sandpiper	+	+	—	—	—	—	—
Least Sandpiper	+	+	+	—	—	—	—
Baird's Sandpiper	—	+	+	—	—	—	—
Pectoral Sandpiper	—	+	+	—	—	—	—
Dunlin	—	—	+	+	—	—	—
Stilt Sandpiper	+	+	+	—	—	—	—
Common Snipe	—	—	+	—	—	—	—
Bonaparte's Gull	—	—	—	—	+	+	—
Ring-billed Gull	—	—	+	+	+	+	+
Herring Gull	—	—	—	+	+	—	—
Common Tern	—	—	+	—	—	—	—
Forster's Tern	—	—	+	—	—	—	—
Belted Kingfisher	+	+	+	+	+	+	+

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LITERATURE CITED

Altman, R. 1982. Waterfowl utilization of a small lake in the Knobs region of Kentucky. Kentucky Warbler 58:38-40.

Bellrose, F. C. 1976. Ducks, Geese and Swans of North America 2nd edition. Stackpole Books, Harrisburg, PA. 544 pp.

Busroe, F. M. 1985. Avian species attracted to and utilizing the Minor E. Clark Fish Hatchery. Kentucky Warbler 61:23-27.

Harm, R. 1973. Notes from Bell County. Kentucky Warbler 49:16-17.

Logsdon, C. W. 1986. Winter waterfowl on the Swan Pond Wildlife Area. Kentucky Warbler 62:30-31.

Monroe, B. L., A. L. Stamm and B. L. Palmer-Ball, Jr. 1988. Annotated Checklist of the Birds of Kentucky. Kentucky Ornithological Society. 84 pp.

Mengel, R. M. 1965. The Birds of Kentucky. American Ornithologists' Union, Ornithological Monograph No. 3. 581 pp.

Palmer-Ball, B., Jr. and R. R. Hannan. 1986. Resident and Migrant Bird Study, McAlpine Locks and Dam. Technical Report, Department of the Army, Louisville District, Corps of Engineers, 147 pp.

Powell, A. L. 1960. Some birds of the Owensboro lakes. Kentucky Warbler 36:23-27.

Shadowen, H. E. 1972. A season at the transient lakes near Bowling Green. Kentucky Warbler 48:48-49.

Stamm, A. L., L. C. Brecher and H. B. Lovell. 1960. The 1959 autumn season at the Falls of the Ohio. Kentucky Warbler 36:3-8.

Stamm, A. L. and D. Summerfield. 1952. Water birds at the Ohio Falls during the autumn season. Kentucky Warbler 28:39-44.

Wilson, G. 1929. Bird life of a transient lake in Kentucky. Wilson Bull. 41:177-185.

Wilson, G. 1956. The Woodburn lakes — 1951-1956. Kentucky Warbler 32:59-61.

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THE SPRING SEASON OF 1989

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The spring season of 1989 was in sharp contrast to that of 1988. There was a scarcity of rain in 1988 while rainfall this spring was above normal for all three months. The heavy rains throughout the state caused rivers and streams to overflow. The transient lakes in Warren County were unusually high and provided excellent habitat for waterfowl.

March and April were warm and on average temperatures were above normal. The southerly winds and warm fronts in March triggered a few species of transient swallows to arrive unusually early. May, usually warmer than April, was cooler than normal. The cool weather in May may have influenced some species to linger beyond normal departure dates. The strongest migration movements occurred April 17-18, May 3-8 and May 21-26.