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Recent Changes in Winter Bird Numbers at Lincoln, Nebraska

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In 1998 I summarized historic Christmas Bird Count data for Lincoln and Scottsbluff (Johnsgard, 1998), since these two sites provide the longest continuous count records for any Nebraska locations. Eight more years of data have since accumulated, during which there has been an increasing awareness of the perceived effects of global warming (Inkley, 2004) on bird populations. The purpose of this paper is to compare the data for the past eight years (1998-2005) with earlier counts for Lincoln, two of which were first performed in the early 1900's, but which have been conducted in unbroken sequence since 1947. These data, originally available only as printed annual summaries, are now easily accessible from the web site of the National Audubon Society (www.audubon.org/bird/cbc).

METHODS

Table 1 provides a list of the bird species reported over the 1947–2005 counting period in the Lincoln count circle (NELI), including totals and yearly averages of all the birds seen during each of the two selected intervals. The final column is a comparison of the average number of individuals reported during the first (1947-1997) period with the average number reported during the second (1998-2005) period, expressed as a positive (or negative, where indicated) percent change. A few species that have been reported only once were excluded from this summary.

Obviously, the number of persons participating in these counts has gradually increased over time, as has the quality of optics and average bird-identification capabilities. As a result, even with stable populations, somewhat greater average numbers of birds reported per year can be expected to develop over time. Thus, the many minor increases in average species count totals that were tallied for the 1998-2005 period relative to the 1947-1997 period do not provide convincing evidence of actual population increases.

To compensate for this inflationary trend, only increases of at least 400 percent in average count totals were subjectively assumed by me to reflect significantly increased local winter populations. Increases of this magnitude in the average annual numbers per species reported over the last eight years relative to the 1947-1997 count period are shown in bold type in Table 1, although other species with smaller proportional increases might be noted and regarded as significant.

RESULTS

Discounting some species of which only 20 or fewer were counted over the original 51-year period such as the Gadwall, Blue-winged Teal, Northern Shoveler, Canvasback, Ruddy Duck and Great-tailed Grackle, the greatest proportional population increases since 1998 have occurred in the Eastern Bluebird (2960%), Ring-billed Gull (1970%), Yellow-rumped Warbler (1600%), Wild Turkey (1600%), American Coot (1270%), Lesser Scaup (1040%), Canada Goose (660%) and House Finch (640%).

The greatest numerical increases in average annual total counts have occurred in the Canada Goose (2986), Mallard (532), Ring-billed Gull (387), American Robin (241), Dark-eyed Junco (238), Rock Pigeon (217), and Red-winged Blackbird (179).

Species with counts showing decreases of at least 80% of the earlier period's average count are underlined in Table 1. Once again, species such as American Bittern, Osprey, Goshawk and Ferruginous Hawk, which were counted in very small numbers during the original period, were discounted. The greatest proportional declines have occurred in Lapland Longspur (100%), Brown-headed Cowbird (100%), Long-eared Owl (100%), Brewer's Blackbird (100%), Common Redpoll (100%), Evening Grosbeak (100%), Short-eared Owl (100%), Townsend's Solitaire (100%), Red Crossbill (90%), and Horned Lark (80%), Brown Thrasher (80%) and Swamp Sparrow (80%). Many of these are overwintering migrants in the Lincoln area, whose numbers are likely to be strongly affected by relative winter severity.

The greatest numerical decreases in average total annual counts have occurred in the European Starling (2028), House Sparrow (1279), Lapland Longspur (517) and Horned Lark (131). Of these, the reductions for the slightly migratory European Starling and the sedentary House Sparrow are most surprising, and are greater than declining national population trends (respectively -0.9% and -2.5% annually) would predict, according to recent North American Breeding Bird Survey population trends (www.mbr-pwrc.usgs.gov:80/cgi-bin/guild04/pl).

DISCUSSION

One of the possible reasons for these altered winter bird compositions in eastern Nebraska has been a series of mild falls recently, a presumed corollary of global warming. As a result, lakes and wetlands have often remained ice-free well into December, and have allowed water-dependent birds to remain in the Lincoln vicinity longer than before. Water-dependent species that were reported on the Lincoln count for the first time between 1998 and 2005 include three ducks and three sandpipers, plus the Western Grebe and Marsh Wren. There have also been substantially larger numbers of water-dependent species reported between 1998 and 2005 than had been reported in the original period. These include 12 ducks, three geese and two gulls, plus the Great Blue Heron, Bald Eagle, American Coot and Red-winged Blackbird. Another possible contributing factor is the creation of lakes and the use of artificial means to keep those lakes ice-free over the winter.

According to National Oceanographic and Atmospheric Administration data, the mean winter (December-February) temperature for Nebraska from 1947 to

1997 was 25.2°F. From 1998 to 2005, the mean winter temperature for Nebraska was 28.7°F. (http://climvis.ncdc.naa.gov)

Another reflection of warmer winters recently may be an increase in terrestrial birds that normally would winter in more southern states (see distribution maps in Root, 1988). The apparent increases in the Eastern Bluebird, Golden-crowned Kinglet, Cedar Waxwing and Yellow-rumped Warbler may be a reflection of this trend. There are also three cases of newly reported or increasing species that are the result of regional or local range expansions. These are the successfully (!) re-introduced Wild Turkey, the northwardly expanding Great-tailed Grackle, and the House Finch, which since the early 1980's has gradually been supplanting the House Sparrow as the primary urban-adapted bird in North America. (The House Finch is declining annually at a rate of 2.5%, and the House Finch is increasing at an annual rate of 1.15%.)

Just as there have been apparent population increases resulting from southern species moving into the Lincoln area from more southerly wintering grounds, there have also been some decreases in recent species counts that are possibly the result of some relatively cold-tolerant birds shifting their wintering areas farther to the north. Possible examples include the Bohemian Waxwing, Lapland Longspur, Snow Bunting, Pine Grosbeak, Evening Grosbeak, Common Redpoll and Red Crossbill. All these species are now rare winter visitors around Lincoln.

Additionally, some apparent species decreases in the Lincoln counts may be related to ecological changes such as increased local urbanization, and additionally may also reflect national population declines. These factors might help explain declines in the Horned Lark, Brown-headed Cowbird, House Sparrow, Western Meadowlarks and almost all the owls. Nearly all of these species have been exhibiting significant national population declines since the 1960's, judging from 1966-2004 Breeding Bird Survey data (www.mbr-wrc.usgs.gov80/cgi-bin/guild/04.p1).

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Table 1. Total Birds Reported & Average Species Totals/Year, Lincoln Christmas Counts

	1947–1997 Total	1947–1997 Avg./Year*	1998–2005 Total	1998–2005 Avg./Year*	Percent Change*
Greater White-fronted Goose	12	0.24	9	1.13	380%
Snow Goose	1762	34.55	1208	151.00	340%
Canada Goose	23093	452.80	27514	3439.25	660%
Wood Duck	12	0.24	1	0.13	-50%
Gadwall	7	0.14	122	15.25	11010%
American Wigeon	15	0.29	14	1.75	500%
American Black Duck			1	0.13	
Mallard	12996	254.82	6296	787.00	210%
Green-winged Teal	41	0.80	7	0.88	10%
Blue-winged Teal	4	0.08	8	1.00	1180%
Northern Shoveler	1	0.02	16	2.00	10100%
Northern Pintail	2	0.04	1	0.13	220%
Canvasback	4	0.08	51	6.38	8030%
Redhead	25	0.49	13	1.63	230%
Lesser Scaup	49	0.96	88	11.00	1040%
Long-tailed Duck			1	0.13	
Bufflehead	32	0.63	9	1.13	80%
Common Goldeneye	335	6.57	167	20.88	220%
Hooded Merganser	2	0.04	2	0.25	540%
Red-breasted Merganser			1	0.13	
Common Merganser	2294	44.98	132	16.50	-60%
Ruddy Duck	1	0.02	12	1.50	7550%
Western Grebe			1	0.13	
Double-crested Cormorant	6	0.12	6	0.75	540%
Ring-necked Pheasant	1030	20.20	153	19.13	-10%
Wild Turkey	3	0.06	8	1.00	1600%
Northern Bobwhite	686	13.45	100	12.50	-10%
American Bittern	1	0.02			-100%
Great Blue Heron	41	0.80	24	3.00	270%
Osprey	1	0.02			-100%
Bald Eagle	9	0.18	8	1.00	470%

	1947–1997 Total	1947–1997 Avg./Year*	1998–2005 Total	1998–2005 Avg./Year*	Percent Change*
Northern Harrier	212	4.16	56	7.00	70%
Sharp-shinned Hawk	109	2.14	31	3.88	80%
Cooper's Hawk	30	0.59	21	2.63	350%
Goshawk	1	0.02			-100%
Red-tailed Hawk	1218	23.88	324	40.50	70%
Rough-legged Hawk	153	3.00	12	1.50	-50%
Ferruginous Hawk	1	0.02			-100%
American Kestrel	592	11.61	80	10.00	-10%
Merlin	17	0.33	5	0.63	90%
Peregrine Falcon	8	0.16			-100%
American Coot	14	0.27	30	3.75	1270%
Killdeer	57	1.12	14	1.75	60%
Spotted Sandpiper			2	0.25	
Least Sandpiper			1	0.13	
Pectoral Sandpiper			1	0.13	
Wilson's Snipe	22	0.43	1	0.13	-70%
Ring-billed Gull	1004	19.69	3255	406.88	1970%
Herring Gull	148	2.90	56	7.00	140%
Rock Pigeon **	6777	294.65	4094	511.75	70%
Mourning Dove	4465	87.55	689	86.13	-4%
Barn Owl	1	0.02			-100%
Eastern Screech-Owl	421	8.25	25	3.13	-60%
Great Horned Owl	496	9.73	33	4.13	-60%
Barred Owl	68	1.33	9	1.13	-20%
Long-eared Owl	399	7.82			-100%
Short-eared Owl	21	0.41			-100%
Belted Kingfisher	173	3.39	43	5.38	60%
Red-headed Woodpecker	90	1.76	6	0.75	-60%
Red-bellied Woodpecker	649	12.73	293	36.63	190%
Yellow-bellied Sapsucker	47	0.92	12	1.50	60%
Downy Woodpecker	2293	44.96	593	74.13	60%
Hairy Woodpecker	506	9.92	75	9.38	-10%
Northern Flicker	1120	21.96	249	31.13	40%
Northern Shrike	24	0.47	1	0.13	-70%

	1947–1997 Total	1947–1997 Avg./Year*	1998–2005 Total	1998–2005 Avg./Year*	Percent Change*
Loggerhead Shrike	50	0.98	10	1.25	30%
Blue Jay	7122	139.65	1208	151.00	10%
Black-billed Magpie	18	0.35	2	0.25	-30%
American Crow	16982	332.98	3801	475.13	40%
Horned Lark	8235	161.47	246	30.75	-80%
Black-capped Chickadee	9746	191.10	1268	158.50	-20%
Tufted Titmouse	170	3.33	9	1.13	-70%
Red-breasted Nuthatch	512	10.04	85	10.63	-4%
White-breasted Nuthatch	1784	34.98	413	51.63	50%
Brown Creeper	824	16.16	205	25.63	60%
Carolina Wren	23	0.45	17	2.13	370%
Winter Wren	17	0.33	2	0.25	-30%
Marsh Wren			1	0.13	
Golden-crowned Kinglet	1197	23.47	355	44.38	90%
Ruby-crowned Kinglet	9	0.18	1	0.13	-30%
Eastern Bluebird	34	0.67	163	20.38	2960%
Townsend's Solitaire	21	0.41			-100%
Hermit Thrush			6	0.75	
American Robin	4255	83.43	2595	324.38	290%
Northern Mockingbird	3	0.06			-100%
Brown Thrasher	28	0.55	1	0.13	-80%
European Starling	243077	4766.22	21908	2738.50	-40%
Bohemian Waxwing	6	0.12			-100%
Cedar Waxwing	2097	41.12	892	111.50	170%
Orange-crowned Warbler			1	0.13	
Yellow-rumped Warbler	3	0.06	8	1.00	1600%
Towhee spp.	88	1.73	16	2.00	20%
American Tree Sparrow	32625	639.71	5366	670.75	3%
Chipping Sparrow	1	0.02			-100%
Field Sparrow	9	0.18	1	0.13	-30%
Savannah Sparrow	1	0.02			-100%
Fox Sparrow	10	0.20	8	1.00	410%
Song Sparrow	792	15.53	69	8.63	-40%
Lincoln's Sparrow	3	0.06	1	0.13	110%

	1947–1997 Total	1947–1997 Avg./Year*	1998–2005 Total	1998–2005 Avg./Year*	Percent Change*
Swamp Sparrow	28	0.55	1	0.13	-80%
White-throated Sparrow	275	5.39	58	7.25	30%
Harris's Sparrow	8123	159.27	489	61.13	-60%
White-crowned Sparrow	162	3.18	32	4.00	30%
Dark-eyed Junco	24250	475.49	5704	713.00	50%
Lapland Longspur	26393	517.51	2	0.25	-100%
Smith's Longspur	5	0.10			-100%
Snow Bunting	19	0.37			-100%
Northern Cardinal	4688	91.92	1042	130.25	40%
Red-winged Blackbird	9332	182.98	2897	362.13	100%
Meadowlark spp.	5658	110.94	419	52.38	-50%
Rusty Blackbird	313	6.14	35	4.38	-30%
Brewer's Blackbird	330	6.47			-100%
Common Grackle	620	12.16	44	5.50	-50%
Great-tailed Grackle	2	0.04	13	1.63	4040%
Brown-headed Cowbird	3331	65.31	1	0.13	-100%
Pine Grosbeak	2	0.04			-100%
Purple Finch	983	19.27	61	7.63	-60%
House Finch	981	19.24	1140	142.50	640%
Red Crossbill	545	10.69	5	0.63	-90%
Common Redpoll	52	1.02			-100%
Pine Siskin	2178	42.71	106	13.25	-70%
American Goldfinch	12853	252.02	1532	191.50	-20%
Evening Grosbeak	28	0.55			-100%
House Sparrow	94773	1858.29	4638	579.75	-70%

* Averages and percentages displayed in this table have been rounded to the nearest 10%.

** Rock Pigeons were not counted prior to 1975; total and average are based on 1975–1997 period.