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History of the Seward-Branched Oak Lake

Christmas Bird Count, 1993-2020

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The Seward-Branched Oak Lake Christmas Bird Count (Seward-BOL CBC) began in 1993 and has been conducted every year since then except for 2010 for a total of 27 counts. Weather conditions prevented the count on the selected date in 2010 and a backup date could not be set up. The count was started for several reasons. The area west of Lincoln has a diversity of habitats including all or part of four public lakes (Branched Oak, Pawnee, Twin Lakes, and Meadowlark) as well as a diversity of terrestrial habitats on both public and private land. The circle is close to Lincoln, which has a large birding community from which to recruit volunteers to help on the count. It was also the intent to provide Seward residents who feed birds an opportunity to become involved. To accomplish these goals, the center of the 15-mile-diameter circle was located a half mile south and half mile east of Garland (Figure 1).

The map shows the circle divided into blocks which are assigned to people helping with the count. Including both field observers and feeder watchers, over 145 people have participated in one or more counts since the count started. To date, all counts have been done between December 14-20 (the first week of the count period). This has been intentional because lakes in the count circle are more likely to have open water with water-associated bird species present.

Audubon (<https://www.audubon.org/conservation/science/christmas-bird-count>) requires that the following data be entered for a Christmas bird count: species observed including number tallied, number of parties and people in the field and at feeders, and time and miles in the field (divided into time and miles on foot and in vehicles; also included are 12 other modes of transportation not used on the Seward-BOL count). In addition, time and miles spent searching for owls and other nocturnal species before sunset/after sundown (categorized as nocturnal birding) is required and is not included in total field time. Count start time and end time are also required. The following weather-related data are requested: high and low temperatures, wind speed and direction, cloud cover, presence/absence of rain or snow, snow depth, lake and stream conditions (open, frozen or partly-open/partly-frozen). Birds not seen on the count day but seen within 3 days of the count are included in the final report. They are not included in total counts or number of species seen and are listed as count week species.

CBC data have been analyzed across wide geographical ranges and habitats. When comparing data from multiple counts, several problems with CBC data known to influence data analysis have been pointed out, including number of participants, hours in the field, nature of habitat, modes of travel, skill level of observers, and

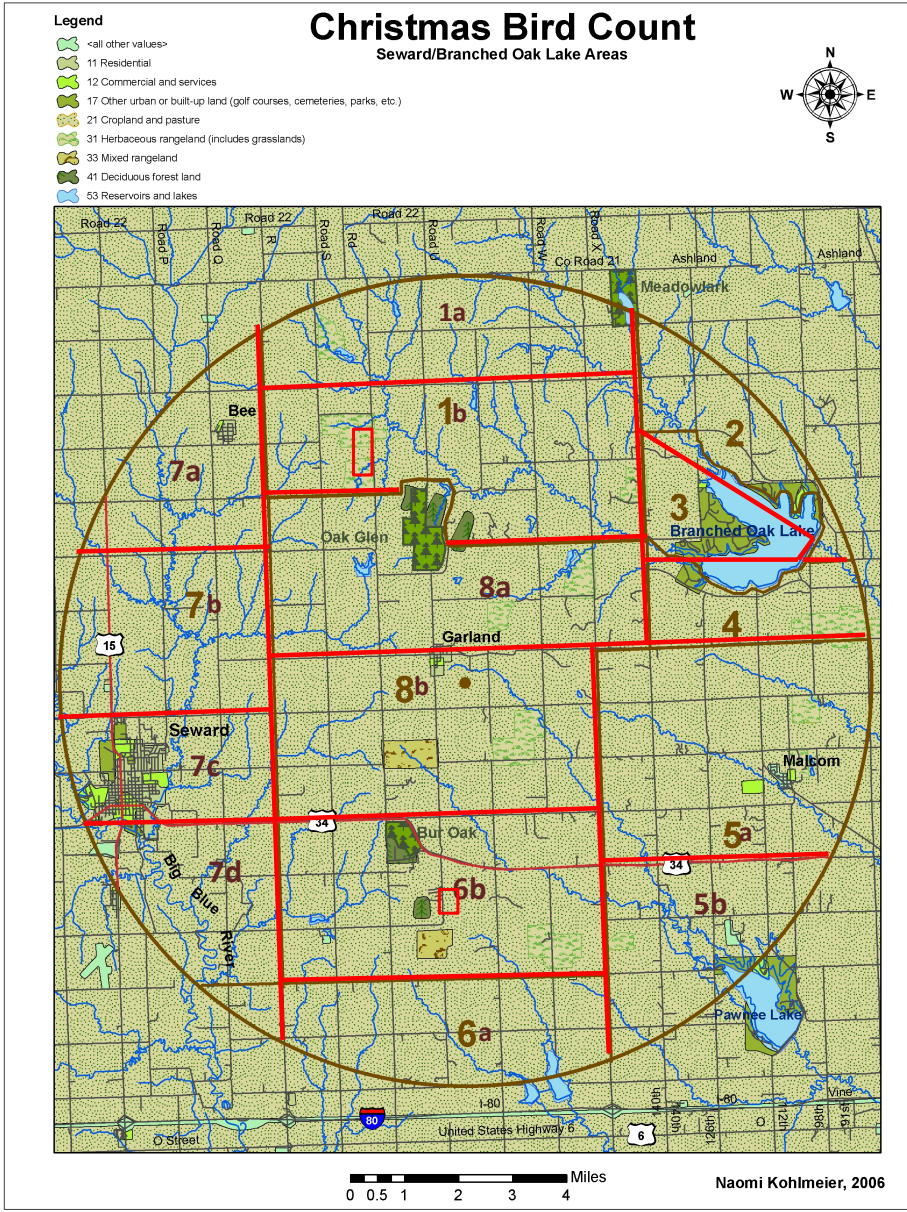


Figure 1. Map of Seward-Branded Oak Lake CBC circle. The circle is divided into blocks outlined in gray which are assigned volunteers. If observers see a noteworthy bird species while driving through another block, they typically make note of that to let the person assigned to that block or the compiler know so that the species is not counted twice. The two small rectangles outlined in light gray (in 1b and 6b) are on private property and require permission from owners to access the property.

climate and weather conditions, to mention a few (Dunn et al. 2005). Looking at a single count over time controls for some of these issues. A common approach in dealing with variation in observer hours is to convert count data to number seen/observer hour. The number of total observer hours per count on the Seward-BOL CBC ranged from 42.5 to 83.75 hours over the years. Species count data were converted to number/observer hour using Excel. Data were analyzed using the Pearson correlation coefficient (r) to look for patterns (linear relationships) over the 27 years of the count. The Pearson correlation coefficient (r) was also used to look for correlations between count data and temperature and for correlations between different species.

The 130 species seen on count day since the count began are listed in Table 1. Table 1 includes one additional bird, meadowlark species. Eastern and Western Meadowlarks can be difficult to differentiate in winter, and therefore meadowlarks are frequently tallied as meadowlark species. Although meadowlark species have been recorded on all 27 counts, Western Meadowlark has been documented on only 8 counts and Eastern Meadowlark on only one count.

Somewhat surprisingly, no significant correlation was found between temperature recorded on count day and any bird count data including number of species tallied, total number of individuals, or total counts for any individual species. The highest total count for all species was 46,620 in 2002 and the lowest total count was 5300 in 2016. The average number of birds seen per count is 12,799 while the median number of birds tallied is 11,452. The average is higher than the median because of three counts in which more than 40,000 birds were tallied skewing the average higher (The next highest was 21,842). The highest counts for an individual species on a count were 30,806 Snow Geese in 2002 and 30,672 Mallards in 1997 (Table 1). These numbers are exceptional given that only two other times in the history of the count did any species total exceed 10,000 (28,910 Snow Geese in 2001 and 10,118 Canada Geese in 1996). Twenty-six species have been seen on all 27 counts while 18 species have been seen on only one count (Table 1). One possible reason for species having occurred on only one count is that they are seasonally rare (i.e., Long-billed Dowitcher, Peregrine Falcon, Gray Catbird, Savannah Sparrow, Lincoln's Sparrow, Yellow-headed Blackbird, and Baltimore Oriole). Another possible reason would be species that are out of range (i.e., Greater Prairie Chicken, Northern Goshawk, White-winged Dove, Tufted Titmouse, and Pine Grosbeak). Three gull species (California, Iceland, and Glaucous) which have been regular on the Lake McConaughy CBC are likely less common at lakes in the Seward-BOL CBC circle due to lake sizes and lakes freezing over. Historical CBC records through 2019 can be accessed on the Audubon website (<https://www.audubon.org/conservation/science/christmas-bird-count>), so several of the above species were checked to see how often they had been tallied on other Nebraska CBCs. Pine Grosbeak has been recorded on 7 counts in Nebraska from 1951-2019 suggesting it is a rare species for the region that occasionally shows up on counts. White-winged Dove has been recorded on 12 counts in Nebraska; the first time was in 2005, and then one was seen during count week at Scotts Bluff in 2009. The other 10 times were 2014-2019, supporting the view that White-winged Doves have been expanding their range north. Gray Catbird has been recorded on 5 counts in Nebraska (2002, 2009, 2016-2018). Given they were in relatively recent years, this may be due to milder winters because

Table 1. Species seen on Seward-Branched Oak Lake CBC Species list is organized by number of counts on which species were recorded. The second column is the number of counts on which the species was seen, the third column is the high count tallied for a species, and the fourth column is the average for the history of the count. The list includes only species recorded on the count day. Six additional species were recorded as count week only species. These species include Black Scoter (2020), Pectoral Sandpiper (2001), Common Loon (2020), Bohemian Waxwing (2000), LeConte's Sparrow (2020), and Brewer's Blackbird (1998). [Table continued on following page.]

Species	Counts	High	Avg	Species	Counts	High	Avg
Canada Goose	27	10118	1832	Song Sparrow	27	49	13.7
Mallard	27	30672	3137	Northern Cardinal	27	199	114
Sharp-shinned Hawk	27	11	4.5	Meadowlark species	27	302	65.7
Red-tailed Hawk	27	114	54.8	House Finch	27	188	80.3
Rock Pigeon	27	358	93.4	American Goldfinch	27	705	339.8
Red-bellied Woodpecker	27	88	47	House Sparrow	27	690	296.3
Downy Woodpecker	27	116	58.5	Northern Bobwhite	26	106	34.4
Hairy Woodpecker	27	23	13	Ring-necked Pheasant	26	110	20
Northern Flicker	27	129	66.2	Northern Harrier	26	30	10.3
American Kestrel	27	29	8.7	Bald Eagle	26	23	4.8
Northern Shrike	27	14	6.6	Rough-legged Hawk	26	17	4.2
Blue Jay	27	226	135.5	Great Horned Owl	26	22	8.5
American Crow	27	1273	488.9	Brown Creeper	26	18	7.8
Black-capped Chickadee	27	238	93	Red-winged Blackbird	26	5731	526.1
White-breasted Nuthatch	27	89	60	Mourning Dove	25	42	13.8
American Robin	27	6148	1037	Barned Owl	25	10	3
European Starling	27	3275	1085	Golden-crowned Kinglet	25	38	11.4
Cedar Waxwing	27	619	174.6	Eastern Bluebird	25	286	94.7
American Tree Sparrow	27	2216	684.6	Eastern Screech-Owl	24	11	3.5
Harris's Sparrow	27	212	67.6	Belted Kingfisher	24	10	2.5

Table 1. Species seen on Seward-Branched Oak CBC, continued.

Species	Counts	High	Avg	Species	Counts	High	Avg
Horned Lark	24	660	74	Rusty Blackbird	16	80	12.2
Red-breasted Nuthatch	24	28	7.3	Gadwall	15	157	10.8
Pine Siskin	24	552	42.4	Townsend's Solitaire	15	7	1.7
Common Merganser	22	1835	281.3	Spotted Towhee	15	12	1.7
Cooper's Hawk	22	6	2.6	Northern Pintail	14	18	3.3
Common Goldeneye	21	218	55.4	Hooded Merganser	14	24	5.9
Yellow-bellied Sapsucker	21	6	1.2	Cackling Goose	13	261	40.4
Purple Finch	21	111	21.6	Green-winged Teal	13	102	7.3
Dark-eyed Junco (all races)	27	1611	709.3	Common Grackle	13	31	2.3
Ring-billed Gull	19	1395	205.3	American Wigeon	12	15	2.5
Herring Gull	19	103	27.3	Black-billed Magpie	11	25	2.6
Long-eared Owl	19	14	3.1	Lapland Longspur	11	97	10.4
Merlin	18	5	1.5	Brown-headed Cowbird	11	41	3.6
Carolina Wren	18	9	1.4	Lesser Scaup	10	47	4
White-crowned Sparrow	18	9	2.5	Ruddy Duck	10	40	2.7
Snow Goose	17	30806	2578	Greater White-fronted Goose	9	35	3.6
Wild Turkey	17	350	31.7	Ross's Goose	9	8	1.2
Yellow-rumped Warbler	17	51	9.3	American Coot	9	149	8.9
Fox Sparrow	17	17	3.5	Red-headed Woodpecker	9	7	0.9
White-throated Sparrow	17	34	3.7	Red-breasted Merganser	8	6	0.9
Great Blue Heron	16	7	1.5	Double-crested Cormorant	8	14	1.8
Eurasian Collared-Dove	16	145	17.6	Hermit Thrush	8	3	0.5
Winter Wren	16	7	1	Western Meadowlark	8	16	1.8

Table 1. Species seen on Seward-Branched Oak CBC, continued.

Species	Counts	High	Avg	Species	Counts	High	Avg
Northern Shoveler	7	104	6.8	Wilson's Snipe	2	4	0.2
Bufflehead	7	2	0.4	Bonaparte's Gull	2	2	0
Prairie Falcon	6	3	0.3	Lesser Black-backed Gull	2	1	0.1
Red Crossbill	6	91	5.5	Loggerhead Shrike	2	1	0.1
Canvasback	5	25	2.1	Greater Scaup	1	1	0
Redhead	5	8	0.7	Greater Prairie-Chicken	1	2	0.1
American White Pelican	5	3	0.3	Northern Goshawk	1	1	0
Killdeer	5	12	0.8	Long-billed Dowitcher	1	1	0
Pied-billed Grebe	4	4	0.3	California Gull	1	3	0.1
Short-eared Owl	4	2	0.2	Iceland Gull	1	1	0
Ruby-crowned Kinglet	4	1	0.2	Glaucois Gull	1	1	0
Field Sparrow	4	2	0.2	White-winged Dove	1	1	0
Eastern Towhee	4	4	0.3	Peregrine Falcon	1	1	0
Common Redpoll	4	35	1.5	Tufted Titmouse	1	1	0
Trumpeter Swan	3	4	0.4	Gray Catbird	1	1	0
Ring-necked Duck	3	15	0.7	Snow Bunting	1	7	0.3
Brown Thrasher	3	1	0.1	Savannah Sparrow	1	2	0.1
Northern Mockingbird	3	1	0.1	Lincoln's Sparrow	1	2	0.1
Swamp Sparrow	3	2	0.3	Eastern Meadowlark	1	1	0
Wood Duck	2	1	0.1	Yellow-headed Blackbird	1	2	0.1
White-winged Scoter	2	1	0	Baltimore Oriole	1	1	0
Horned Grebe	2	2	0.1	Pine Grosbeak	1	1	0
Red-shouldered Hawk	2	1	0.1				

of climate change. Baltimore Orioles had been recorded on only three counts in Nebraska (1971, 1979, 2014). Long-billed Dowitcher (seen in 1998) was the rarest of the one-count wonders on the Seward-BOL CBC, having occurred on no other CBCs in Nebraska. Long-billed Dowitchers have occurred on 3 counts in Kansas, 2 in Missouri, and 13 in Oklahoma. They regularly overwinter in southern Texas: (<https://ebird.org/map/lobdow?bmo=12&emo=1&byr=1990&eyr=2021&env.minX=-97.996&env.minY=23.802&env.maxX=-88.807&env.maxY=30.925&gp=true>).

Table 2 shows 10 species that increased on Seward-BOL CBC counts over the years. Several species might have increased due to range expansion, including Red-bellied Woodpecker, House Finch, Bald Eagle, Eurasian Collared-Dove, Barred Owl, and Cooper's Hawk (Johnsgard, Shane 2009; Silcock, Jorgensen 2020). Prior to 1970,

Table 2. Species with significant increases over count history. Based on Pearson correlation used to calculate the correlation between number per observation hour and year; r-values were considered significant if $r > |0.471|$ based on sample sizes $n = 27$ and $\alpha = 0.01$.

Species	Correlation (r-value)
Eastern Bluebird	0.857
Northern Flicker*	0.716
Red-bellied Woodpecker	0.672
House Finch	0.611
Bald Eagle	0.568
Eurasian Collared-Dove	0.547
Northern Cardinal	0.544
Barred Owl	0.530
White-breasted Nuthatch	0.509
Cooper's Hawk	0.474

*Northern Flicker includes all forms (red-shafted, yellow-shafted, and orange-shafted)

Eastern Bluebird populations declined due to competition from House Sparrows and European Starlings, which is well documented and led to conservation programs (<https://abcbirds.org/bird/eastern-bluebird/>). Since that time Eastern Bluebird populations have increased across much of their range, a trend which is supported by Seward-BOL CBC data. Interestingly, studies have shown that Eastern Bluebirds may be vulnerable to harsh winters (Sauer, JR, Droege S, 1990; Wetzel DP, Krupa JJ, 2013). Time will tell if the harsh Nebraska winter in 2020-2021 impacts Eastern Bluebird counts on Nebraska CBCs. Although Northern Cardinals increased on the Seward-BOL CBC, Breeding Bird Survey (BBS) data in Nebraska showed no change (Sauer et al. (2017), and Johnsgard and Shane (2009) found that CBC population trends varied across the Great Plains. Northern Flicker population trends varied in other studies as well. Sauer et al. (2017) found no change in BBS data, and Johnsgard and Shane (2009) stated that Northern Flickers increased in the Great Plains although BBS data showed declines nationally. White-breasted Nuthatch increases were

supported by data from Sauer et al. (2017) and Johnsgard and Shane (2009). Silcock and Jorgensen (2020) noted that eBird reports for White-breasted Nuthatches have been up in winter months.

Count data for two species that both increased, Red-bellied Woodpecker and Northern Flicker, were correlated with each other ($r = 0.77$; Figure 2). Downy Woodpecker and Hairy Woodpecker count data had slight decreases (not significant; $r = -0.20$ and $r = -0.03$, respectively), but were positively correlated with each other ($r = 0.53$). Research in the eastern U.S. has shown that woodpeckers and other bark foraging species populations increased due to the emerald ash borer invasion (Koenig et al. 2013). Koenig et al. found that Downy Woodpecker, Hairy Woodpecker, Red-bellied Woodpecker, and White-breasted Nuthatch all preyed on emerald ash borer with Red-bellied Woodpecker and White-breasted Nuthatch increasing significantly while Downy and Hairy Woodpecker populations fluctuated. Interestingly, population changes similar to these were seen in these four species on the Seward-BOL CBC. Ash borers were first detected in Nebraska in 2016 (<https://neinvasives.com/species/insects/emerald-ash-borer>) suggesting emerald ash borers were not the cause for the patterns in these four species seen on the Seward-BOL CBC.

Figure 2. Graph of Red-bellied Woodpecker and Northern Flicker count data over 27-year history of count showing strong correlation ($r = 0.77$) between the two species.

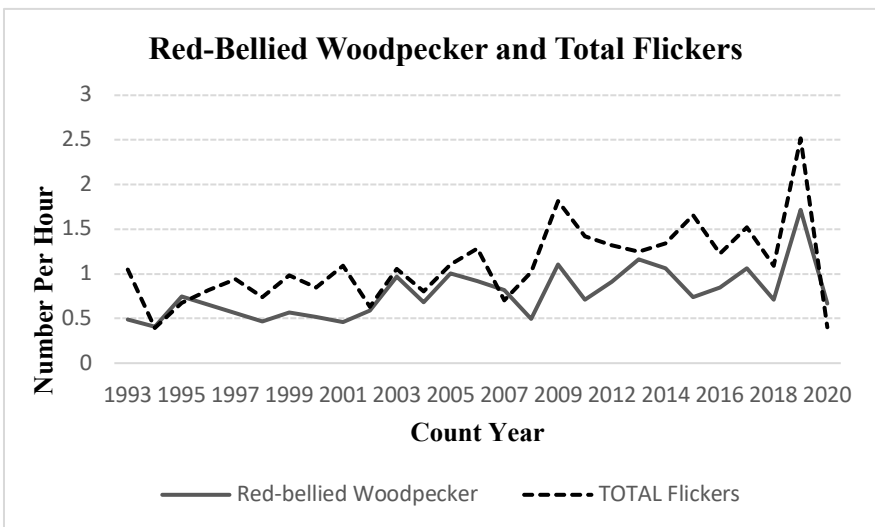


Table 3 shows 5 species with significant declines on Seward-BOL CBC counts. Four of the 5 species were likely impacted by West Nile virus (WNV). Black-billed Magpies were recorded on 12 of the first 15 counts with a high tally of 25 in 1993. The last magpie was recorded on the Seward-BOL CBC in 2007.

Table 3. Species with significant decreases over count history. Based on Pearson correlation which was used to calculate the correlation between number per observation hour and year; r-values were considered significant if $r > |0.471|$ based on sample sizes $n = 27$ and $\alpha = 0.01$.

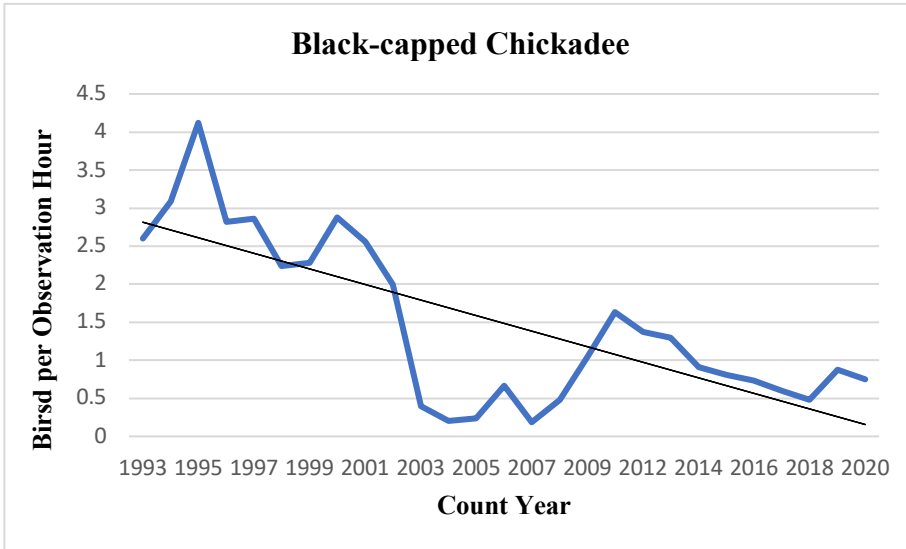
Species	Correlation (r-value)
Black-capped Chickadee	-0.730
American Crow	-0.677
Black-billed Magpie	-0.594
Eastern Screech-Owl*	-0.577
Northern Bobwhite**	-0.459

*Eastern Screech-Owl correlation was calculated using actual count data because Audubon does not include nocturnal observation hours when calculating birds per observation hour data

**Northern Bobwhite was included although it was not significant at $\alpha = 0.01$; it was significant at $\alpha = 0.05$

Black-billed Magpies have declined throughout much of Nebraska and it is a species of concern in the state. Silcock and Jorgensen (2020) provide an excellent discussion on Black-billed Magpies in Nebraska. It is not likely they will be seen again on the Seward-BOL CBC. American Crow and Black-capped Chickadee declines due to WNV are supported by research in the eastern U.S. (Bonter and Hochachka 2003; LaDeau et al. 2007). Black-capped Chickadees averaged 169 birds per count 1993-2002 never dropping below 122. In 2003, Black-capped Chickadees plummeted to 28 followed by 11 birds in 2004. They have not been above 100 since the downfall although they came close in 2011 at 99 birds. Figure 3 shows Black-capped Chickadee numbers on the count with a sharp drop in 2002-03, a gradual recovery from 2007-2011, and then another drop in 2012. This data parallels WNV human cases in the U.S. reported by the CDC (Roehrig 2013). Silcock and Jorgensen (2020) provide an excellent discussion on Black-capped Chickadee population declines in Nebraska based on CBC data. As a nocturnal species, Eastern Screech-Owl populations are more challenging to assess, and there are few data showing population declines in the Midwest. Neither Sauer et al. (2017) nor Johnsgard and Shane (2009) found changes in Eastern Screech-Owl populations. In BONO, Silcock and Jorgensen (2020) share the following comment regarding Eastern Screech-Owl populations made by Wayne Mollhoff: “And as to numbers, they took a big hit, along with many other species, when West Nile Virus hit us about 15 years ago. Their losses were much greater than the Great Horned Owls, which were more often found sick simply because they are so much more noticeable”. Studies have shown that Northern Bobwhite declines were due to habitat loss and pesticide use (American Bird Conservancy 2017). Nebraska Game and Parks data showed that Northern Bobwhite populations declined statewide and in 5 of 6 regions from 2015-2019 ([http://outdoornebraska.gov/wp-content/uploads/2020/09/Upland-Outlook-2020.Final .pdf](http://outdoornebraska.gov/wp-content/uploads/2020/09/Upland-Outlook-2020.Final.pdf)). Since Northern Bobwhite is an upland game species, Nebraska Game and Parks monitors and manages its populations and habitat and have been taking necessary measures to ensure a stable population.

Figure 3. Black-capped Chickadee CBC data for 27-year history of count. This data correlates well to peaks in West Nile virus bird deaths and human infections in 2002 and 2012. The dashed line is a trendline showing the overall decline during the period.



In conclusion, analyzing CBC data from a single count over 27 years turned out to be a challenging but informative task. There is always a sense that there is more to see and find if you look at the data a little more. For the most part, species that increased and species that decreased during the count history were consistent with data from other studies. In some cases, analyzing the data raises more questions than answers. For example, it is not clear why Red-Bellied Woodpeckers and Northern Flickers both increased and were correlated with each other, but neither Downy Woodpeckers nor Hairy Woodpeckers increased although they were correlated with each other. Eastern Screech-Owl is another species that has declined and could be studied to better understand possible population changes. I encourage other Nebraska CBC birdwatchers to analyze their data and see what the data reveals.

Acknowledgments

The Seward-BOL CBC would not be successful without the help of many people over the years. With 145+ people having covered blocks in the field and/or watched feeders, it is not possible to list all who have helped. In the early years several people including Larry Einemann, Tom Labeledz, and Russ Benedict played an important part finding birding hot spots in their blocks that continue to be productive today. Gene Brott and Mary Ann Steinbeck played an important role in recruiting and coordinating feeder watchers in Seward. Larry Einemann has participated in every count since the beginning and has found a number of excellent birds. Most memorable to me was a Pine Grosbeak in 2004. Christmas Bird Counts are more successful when people can cover the same territories for multiple years. The following people have covered blocks on the Seward-BOL CBC for 10 or more years: Tom Labeledz, Joel

Jorgensen. John Carlini/Shari Schwartz, Don and Janis Paseka, and Ruth Stearns. Naomi Kohlmeier created the count circle map (Figure 1). Thanks are due to William Flack and Mark Brogie for their review of this manuscript.

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