

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

---

Proceedings of the North American Crane  
Workshop

North American Crane Working Group

---

2016

# A REVIEW OF FALL SANDHILL CRANE MIGRATION THROUGH INDIANA

Allisyn-Marie T. Y. Gillet

Follow this and additional works at: <http://digitalcommons.unl.edu/nacwgproc>

 Part of the [Behavior and Ethology Commons](#), [Biodiversity Commons](#), [Ornithology Commons](#), [Population Biology Commons](#), and the [Terrestrial and Aquatic Ecology Commons](#)

---

This Article is brought to you for free and open access by the North American Crane Working Group at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Proceedings of the North American Crane Workshop by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

## A REVIEW OF FALL SANDHILL CRANE MIGRATION THROUGH INDIANA

ALLISYN-MARIE T. Y. GILLET,<sup>1</sup> Indiana Division of Fish and Wildlife, Bloomington Field Office, 5596 E. State Route 46, Bloomington, IN 47401, USA

**Abstract:** The Indiana Division of Fish and Wildlife conducts surveys from October to December to collect long-term data on greater sandhill cranes (*Grus canadensis tabida*). Results from these censuses contribute to a fall index of the Eastern Population, which informs wildlife management decisions and research priorities. Recent findings from the annual U. S. Fish and Wildlife Service Fall Sandhill Crane Migration Survey demonstrate a decline in the number of cranes observed at fall staging areas throughout Indiana since 1979. However, nationwide data exhibit a trend of population increase. I provide evidence to show that the apparent decline in the number of greater sandhill cranes migrating through Indiana does not indicate an actual decline in the Eastern Population but is a consequence of poor detection due to cranes migrating later each year. As a result, I suggest that survey periods be changed to later dates in the coming years to accommodate for this shift in migration chronology.

### PROCEEDINGS OF THE NORTH AMERICAN CRANE WORKSHOP 13:42-46

**Key words:** climate change, greater sandhill crane, *Grus canadensis tabida*, Indiana, migration, migration delay.

During the 18th and 19th centuries, loss of wetland habitat through agricultural expansion and European settlement led to the rapid decline of greater sandhill cranes (*Grus canadensis tabida*) throughout North America (Meine and Archibald 1996, Van Horn et al. 2010). These threats, in combination with unregulated hunting, nearly drove the Eastern Population (EP) to extirpation. However, conservation measures throughout the 1900s, such as the Migratory Bird Treaty Act of 1918 and various pieces of legislation to protect wetlands (e.g., Clean Water Act of 1977, North American Wetlands Conservation Act of 1989), resulted in a resurgence of the population in recent years. Between 1966 and 2007, the North American Breeding Bird Survey showed a significant expansion of the EP in the upper Midwest with an average growth of 9.6% per year (Van Horn et al. 2010). Likewise, the Ontario Breeding Bird Atlas (BBA) documented a rise in the likelihood of detecting a breeding sandhill crane from 12% in the first BBA (1981-1985) to 33% in the second BBA (2001-2005) (Van Horn et al. 2010). The EP is now conservatively estimated at 80,000 to 100,000 cranes (Van Horn et al. 2010).

A similar history can be told of the EP sandhill cranes breeding in Indiana. Sandhill cranes were considered occasional summer residents nesting in northwest Indiana in the late 1800s (Castrale and Bergens 2000). Loss of wetlands through the early 1900s resulted in an absence of breeding cranes in Indiana for 53 years (Mumford and Keller 1984, Castrale and Bergens 2000). Not until 1982 was a nest reported again in northern

Indiana and since then, the breeding population has steadily increased and expanded in range (Castrale and Bergens 2000). Records from the first Indiana BBA (1985-1990) report 7 blocks with confirmed breeding evidence in 4 counties in the northeastern corner of the state (Castrale et al. 1998). Twenty years later, the second BBA (2005-2011) lists 35 blocks with confirmed breeding evidence in 14 counties scattered throughout the north and reaching the western border in Newton County (USGS 2015). Castrale and Bergens (2000) suggest the westward expansion of nesting cranes was the result of a growing breeding population from nearby Michigan. Furthermore, recent reports suggest a southward expansion based on successful nesting at Wilbur Wright Fish and Wildlife Area (FWA) in Henry County and nesting attempts at Goose Pond FWA in Greene County (A. Kearns, Indiana Department of Natural Resources, personal communication).

It is evident that the protection of wetland habitat and the regulation of hunting have contributed to the recovery of sandhill cranes. However, as the population continues to increase and expand into areas of poor and declining habitat, human-wildlife conflicts will certainly increase. In addition, disease and other risks associated with living in a human-altered landscape will increase (Meine and Archibald 1996). Without periodic surveillance of the population, responsible management of sandhill cranes to address issues such as these would not be possible.

As a commitment to the U. S. Fish and Wildlife Service (USFWS), the Indiana Division of Fish and Wildlife (DFW) conducts surveys from October to November to collect long-term data on greater sandhill cranes. Results from these censuses contribute to a fall

<sup>1</sup> E-mail: AGillett@dnr.in.gov

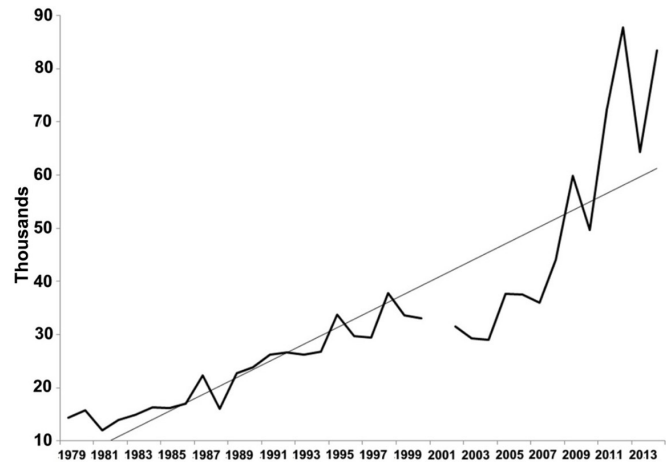
index of the EP, which informs wildlife management decisions and research priorities. This index is by no means a statistically accurate estimate of population size, but instead measures relative abundance to detect population trends (Van Horn et al. 2010). The Indiana DFW also conducts surveys at Jasper-Pulaski FWA from October to December to provide additional support in tracking the population. A large portion of the EP rests and refuels during the fall migratory season in the Kankakee River Valley in northwest Indiana, particularly, at or near Jasper-Pulaski FWA. With peak numbers reaching greater than 30,000 cranes in the past, counts at Jasper-Pulaski FWA provide a reliable proxy that contributes to the status of the EP.

Together, these surveys fulfill state monitoring requirements that inform management needs and assist in the early detection of threats to the population. Data from the 2015 USFWS fall sandhill crane survey and the fall crane surveys at Jasper-Pulaski FWA are discussed herein. Both surveys have been conducted for many decades (USFWS since 1979, Jasper-Pulaski FWA since 1967) and provide long-term data to detect population trends.

## METHODS

### Statewide USFWS Fall Sandhill Crane Survey

The USFWS fall survey is a long-term survey established in 1979 which consists of efforts by volunteers and state and federal agencies from the Atlantic and Mississippi flyways (Wisconsin, Michigan, Indiana, Tennessee, Georgia, and Florida) (Fronczak 2014). The main goal of the survey is to provide an estimate of the size and trend of the EP cranes and is focused on counting cranes that concentrate in Indiana, Michigan, and Wisconsin during fall migration (Fronczak 2014). The survey was initially designed to begin the last week of October when cranes were concentrated in the 3 latter states (Van Horn et al. 2010). The initial survey conducted in 1979 counted 14,385 cranes and recent counts in 2014 have increased to 83,479 cranes with a 3-year average of 78,532 cranes for 2012-2014 (S. Kelly, USFWS, personal communication; Figure 1). Despite the significant rise in cranes observed during this period, the survey greatly underestimates the number of EP cranes. A study by Fronczak (2014) that tracked migrating cranes found that between 21% and 31% of tagged cranes were not in staging areas



**Figure 1.** Number of sandhill cranes observed in the Eastern Population during the USFWS fall surveys from 1979 to 2014 (S. Kelly, USFWS, personal communication). No survey was conducted in 2001.

included in the USFWS survey. In an attempt to detect these cranes, a second period count in November was initiated in 2014. A larger portion of the EP cranes is expected to be associated with staging areas at this time (Fronczak 2014).

To coincide with these changes, Indiana surveyors counted sandhill cranes during 2 survey periods (28 October-4 November and 9-13 November) in 2015. Surveyors were strongly encouraged to conduct the survey on the first day of each period, herein named target dates. If surveys were conducted on days other than the target dates, results were listed under the target date if the survey day fell within its respective survey period. Twenty-three surveyors were placed at 17 locations throughout the state; more locations concentrated in the north, thus maximizing the potential to detect most of the population as they are beginning their southward migration through Indiana. Surveyors were encouraged to conduct 1-hour long counts starting either 30 minutes before sunrise or 30 minutes before sunset in order to observe cranes leaving or entering their roosts. Surveyors then completed a standard form, indicating time, GPS location, weather conditions, number of cranes, methods, and habitat type found at the site. The length, timing, and methods used to conduct the counts were at the discretion of the surveyor, thus there was little consistency in protocol. The nature of this article is to ultimately report the number of cranes observed, without correlating count data to hours of effort, methodology, habitat type, and other variables.

## Fall Sandhill Crane Counts at Jasper-Pulaski FWA

Greater sandhill cranes were counted once per week from 6 October to 6 December 2015 at Jasper-Pulaski FWA. In total, 11 surveys were conducted during this period. Four to 5 observers were stationed at the observation deck (41.14036°N, 86.92343°W) and counted cranes that left the nearby roost. On average, the survey lasted 2 to 3 hours in the morning.

## RESULTS

### Statewide USFWS Fall Sandhill Crane Survey

The first day of the USFWS sandhill crane survey was overcast with occasional rain. Most of Indiana encountered rain storms throughout the day, which were associated with Hurricane Patricia. Temperatures ranged from 1.7 to 12.8°C (35 to 55°F). A total of 8,593 cranes was detected (Table 1).

Weather conditions were calm and partly cloudy to sunny on the second target date of the USFWS survey. Temperatures varied between -1.7 and 11.1°C (29 and

52°F) depending on the time of day. Notable changes in crane numbers over the past year included Pigeon River FWA, which received nearly double the amount of cranes seen the previous year on the same target date. A total of 10,920 cranes was observed (Table 1).

Overall, Pigeon River FWA, private agricultural fields south of Kingsbury FWA, and Jasper-Pulaski FWA were major sites with cranes in 2015, and 1,635, 2,700, and 14,830 individuals were counted in those areas, respectively. A new site, the Northern Indiana Public Service Company (NIPSCO) power plant, had 4,150 cranes counted there and will be considered an important survey site in future counts. The total number of observed cranes in 2015 was 19,513 (Table 1).

### Fall Sandhill Crane Counts at Jasper-Pulaski FWA

A steady rise in the number of cranes migrating through Jasper-Pulaski FWA was reported in October by property staff: 3,400 observed on 6 October, 5,000 on 13 October, 6,526 on 20 October, and 7,010 on 29 October. November censuses demonstrated alternating rise and fall of numbers with 8,890 observed on 5 November,

**Table 1. Number of cranes observed at each location during 2 survey periods (28 October and 6 November target dates), Fall Sandhill Crane Survey, U.S. Fish and Wildlife Service, 2015. Counties are listed in order from north to south. N/A = no data available for 2014.**

County	Location	28 Oct	9 Nov	Change from 2014
Elkhart	Lieber Preserve/Pipewort Pond	2	2	+4
Elkhart	Boot Lake	88	159	N/A
LaGrange/Steuben	Pigeon River FWA	287	1,348	+550
LaPorte	Kingsbury FWA	0	0 <sup>c</sup>	-8
LaPorte	Farm fields south of Kingsbury FWA	1,200	1,500	+796
Kosciusko	Tri-County FWA	0	0	N/A
Kosciusko	Pisgah Marsh/Durham Lake	34	45	N/A
Jasper/Pulaski	Jasper-Pulaski FWA	7,010 <sup>a</sup>	7,820 <sup>c</sup>	+912
Jasper	NIPSCO power plant	1,516 <sup>b</sup>	2,634 <sup>d</sup>	N/A
Newton	Willow Slough FWA	6	3	+8
Henry	Blue River/Knightstown Reservoir	0	0	0
Johnson	Atterbury FWA	0	0	0
Franklin/ Union	Brookville Reservoir	0	0	0
Monroe	Monroe Reservoir	0	0	-5
Greene	Goose Pond FWA	0	88	+88
Jackson	Muscatatuck National Wildlife Refuge	0	0	-185
Jackson	Ewing Bottoms	0	0	0
	TOTAL	8,593	10,920	+2,297

<sup>a</sup> Surveyed 29 Oct.

<sup>b</sup> Surveyed 30 Oct.

<sup>c</sup> Surveyed 10 Nov.

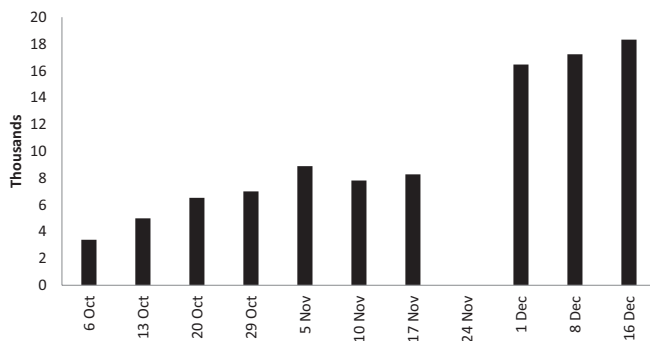
<sup>d</sup> Surveyed 13 Nov.

7,820 on 10 November, 8,282 on 17 November, and 6,000 to 8,000 on 24 November. This was atypical, as in previous years, the number of observed cranes continuously rose until the peak count was reached. An accurate count could not be determined on 24 November because of foggy conditions. Larger totals were observed in the following weeks: 16,470 on 1 December, 17,235 on 8 December, and 18,330 on 16 December (Figure 2).

The last day of the count was 16 December, so it remains uncertain whether peak numbers were reached after this date. Because of this, 16 December will be treated in the analysis as the date when peak numbers were reached.

### DISCUSSION

During the 2015 USFWS fall sandhill crane survey, most cranes were counted at properties in northern Indiana, suggesting that sandhill cranes were beginning their journey through the state. Eight of 10 northern properties received cranes, whereas 1 of 7 did in central and southern Indiana. Arrivals of cranes were also expected to be delayed given an unseasonably mild fall in 2015. Thus, numbers were expected to be lower than those of the previous year. The count of 2015 instead exceeded the previous year by 2,297 individuals. Elevated numbers of cranes likely derived from a new site (i.e., NIPSCO power plant) being added to the list of survey locations (Table 1). The NIPSCO power plant has recently provided a roosting site near Jasper-Pulaski FWA (a major stopover site) that is becoming more popular among cranes. Without the addition of the NIPSCO power plant site, altogether 15,363 cranes would have been observed in 2015, 1,853 cranes below that of the



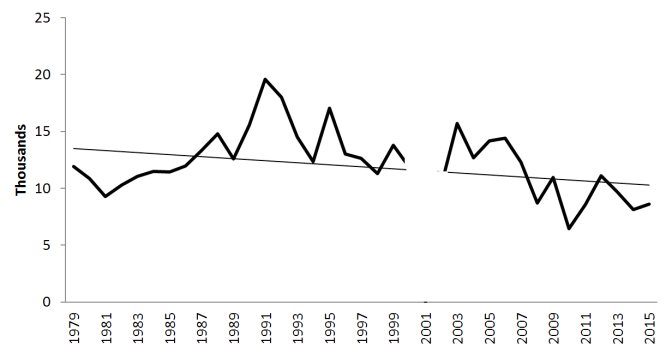
**Figure 2.** Number of sandhill cranes found during surveys at Jasper-Pulaski FWA, Indiana, fall 2015. Fog prevented an accurate count on 24 November 2015.

previous year. Increasing detection is a goal that is strived for each year to improve the precision of these surveys.

A single rise in crane numbers does not imply a consistent upward trend of the population. This can be determined by long-term data, which provide patterns of population changes over time. Figure 3 demonstrates the number of cranes observed in Indiana during the fall USFWS survey since 1979. Although the trend is negative, I do not conjecture that the EP is steadily declining. An opposing trend of population expansion is apparent in the multi-state data provided by the USFWS (Figure 1). Instead, the apparent overall decline may be the result of poor detection due to cranes migrating later each year.

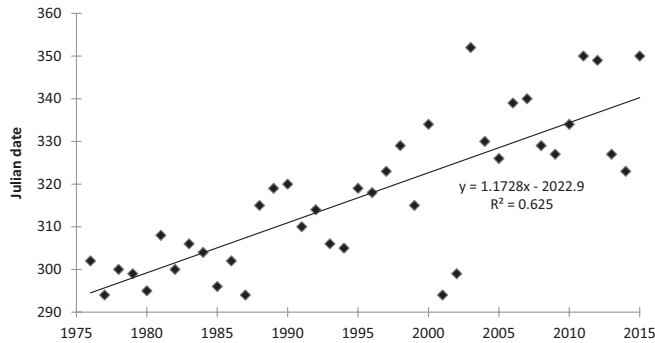
A delay in migration is evident in survey data from Jasper-Pulaski FWA. Peak numbers were expected to occur during November (J. Bergens, Indiana Department of Natural Resources, personal communication), but instead were reached in early December in 2015 (Figure 2). This, I conjecture, is due to a late migration caused by unseasonably mild weather. Further evidence of a delayed migration is shown in Figure 4, which demonstrates that, on average, peak numbers of migrating cranes have been delayed by 1.17 days each year since 1976 (J. Bergens, Indiana Department of Natural Resources, unpublished data).

Fall migration times are shifting to later dates. This, in turn, may prevent surveyors from detecting cranes since more cranes are remaining in the summer breeding areas for a longer period of time instead of moving to staging areas where they could be counted during the surveys. Lacy et al. (2015) suggested that, during mild winters, cranes tend to initiate migration later and stage farther north. This likely explains the apparent decline



**Figure 3.** Number of sandhill cranes migrating through Indiana from 1979 to 2015 during the fall USFWS survey. No survey was conducted in 2001. Data from the second survey period in 2014 and 2015 are excluded.





**Figure 4.** Julian dates of peak counts of sandhill cranes at Jasper-Pulaski FWA, Indiana, from 1976 to 2015 (J. Bergens, Indiana Department of Natural Resources, personal communication). Regression shows mean increase of 1.17 days per year since 1976. Julian dates of 290 to 360 = 17 October to 26 December in a normal calendar year.

in cranes detected during the USFWS fall survey since 1979. However, the USFWS survey has not altered the dates of its first target survey period. I suggest that survey periods be changed to later dates in the coming years to accommodate this shift in migration. When data from this year are added to the historical data and long-term changes in weather patterns are considered, I suspect that the data will show that there have been no drastic changes in the status of the EP of sandhill cranes. Rather, the data will show that the EP is expanding at a steady rate.

In addition, a 3-year roadside sandhill crane productivity study was concluded in 2015 within the Kankakee River Valley. Juveniles and adults were counted throughout private agricultural fields near Jasper-Pulaski FWA. Results from these surveys show that annual sandhill crane productivity averaged 9%, comparable to levels observed in the early 1980s within the same area (D. Fronczak, USFWS, personal communication). From the annual USFWS census data and the productivity survey, the EP of greater sandhill cranes appears stable.

## ACKNOWLEDGMENTS

I thank all of the volunteers, DFW property managers, and USFWS staff that participated in this

survey. With the coordinated efforts and dedicated hard work of our participants, these data were compiled swiftly and efficiently. Thank you J. Bergens and DFW staff who reported weekly on the status of the sandhill crane migration through Jasper-Pulaski FWA. Special thanks to D. Fronczak for inviting me to participate in the productivity survey and providing a summary of its results. Also, thanks to D. Fronczak and D. Slack for editing this report. Wildlife Diversity efforts were funded by State Wildlife Grants and the Indiana Nongame Fund through donations to the state income tax checkoff.

## LITERATURE CITED

- Castrale, J. S., and J. Bergens. 2000. Status of sandhill cranes in Indiana. Proceedings of the North American Crane Workshop 8:220.
- Castrale, J. S., E. M. Hopkins, C. E. Keller, and S. T. Crocoll. 1998. Atlas of breeding birds of Indiana. Indiana Department of Natural Resources, Division of Fish and Wildlife, Indianapolis, USA.
- Fronczak, D. L. 2014. Distribution, migration chronology, and survival rates of Eastern Population sandhill cranes. Thesis, University of Minnesota, Minneapolis, USA.
- Lacy, A. E., J. A. Barzen, D. M. Moore, and K. E. Norris. 2015. Changes in the number and distribution of greater sandhill cranes in the Eastern Population. *Journal of Field Ornithology* 86:317–325.
- Meine, C. D., and G. W. Archibald. 1996. The cranes: status survey and conservation action plan. IUCN, Gland, Switzerland, and Cambridge, United Kingdom.
- Mumford, R. E., and C. E. Keller. 1984. The birds of Indiana. Indiana University Press, Bloomington, USA.
- U.S. Geological Survey Patuxent Wildlife Research Center [USGS]. 2015. Breeding bird atlas explorer (online resource). <<http://www.pwrc.usgs.gov/bba>>. Accessed 3 Dec 2015.
- Van Horn, K., T. White, W. Akins, T. Cooper, S. Kelly, R. Urbanek, D. Holm, D. Sherman, D. Aborn, J. Suckow, K. Cleveland, and R. Brook. 2010. Management plan for the Eastern Population of sandhill cranes. Unpublished report by Ad Hoc Eastern Population Sandhill Crane Committee to Atlantic and Mississippi Flyway Councils, USA.