

# 2021 COORDINATED SPRING SURVEY OF MID-CONTINENT SANDHILL CRANES



Prepared by:  
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2021

COORDINATED SPRING SURVEY OF MID-CONTINENT SANDHILL CRANES

2021 TOTAL: 835,800

2021 AERIAL TRANSECT: 782,400

THREE-YEAR AVERAGE (2018-2021): 911,000  
(No survey in 2020)

SURVEY DATES: 24 March 2021

SURVEY PERSONNEL:

Aerial Survey

Observer/pilot: Terry Liddick, USFWS, DMBM, Spearfish, SD  
Observer: Jeff Drahot, USFWS, RB WMD, Kearney, NE  
Photographer: N/A 2021

Ground Surveys

(State Coordinators)

Kansas: Richard Schultheis, KDWPT, Emporia, KS  
Nebraska: Matthew Garrick, NGPC, Lincoln, NE  
North Dakota: Andy Dinges, NDGFD, Bismarck, ND  
Oklahoma: Jeff Neal, OKDWC, Arcadia, OK  
South Dakota: Rocco Murano, SDGFP, Brookings, SD  
Texas: Owen Fitzsimmons, TPWD, San Marcos, TX  
Wyoming: Noelle Smith, WYGFD, Casper, WY

ABSTRACT: The aerial transect portion of the coordinated spring survey of mid-continent sandhill cranes was conducted on 24 March in Nebraska's Central Platte and North Platte River valleys. The 2021 photo-corrected aerial estimate is 782,400 birds. Outside the traditional aerial transect portion, observers conducted ground surveys during the period 15 - 23 March. From these regions, observers in the Official Survey Area (OSA) of Nebraska, Kansas, Texas, Oklahoma and Wyoming reported an additional 53,451 cranes. The 2021 total estimate (835,850) decreased 20.9% from 2019. The current three-year average (2018 – 2021 with no survey in 2020), based on photo corrected estimates from aerial transects is 911,300.

METHODS: The annual target date for the coordinated survey was between the 22<sup>nd</sup> and 26<sup>th</sup>

of March. In 2021; the survey was accomplished on Wednesday, March 24th. The “traditional” aerial portion of the survey utilizes an ocular transect design with a sampling rate of approximately twenty-five percent. Sub-sampling crane flocks using digital photography allows determination of observer-specific estimation correction factors which are applied to estimates from the 54 aerial transects. Once again, Jeff Drahot, a Wildlife Biologist from Kearney, NE, performed duties as the front right seat observer. There was no photographer this year due to Covid-19 travel restrictions. Data collection outside the region of the aerial transects was directed and summarized by state coordinators. Using ground coverage, the state efforts focus in areas of traditional crane use/occurrence. Observations recorded outside the aerial transect region were not photo corrected. Survey coverage in 2021 was similar to 2019 and included changes adopted by the Central Management Unit Technical Committee (CMU) in 2018. Specific details regarding coverage, personnel, photography, habitat, and weather conditions are on file in the Spearfish, SD office of Flyway Biologist Terry Liddick.

RESULTS: On or prior to the survey target date, North Dakota had reported 8 cranes and South Dakota reported no cranes. Both states had no significant snow cover remaining and nearly all wetlands in North and South Dakota were still at only partially ice covered. The flight from Spearfish, SD to Kearney, NE to begin the survey revealed no snow cover and most of the observed wetlands were at ice free. Texas observers reported 38,123 cranes, down slightly from the 39,460 birds reported in 2019. Kansas reported over 1422 cranes, about 1000 less than they observed in 2019. Considering the geographic locations of reported birds from state coordinators and the disparate numbers of cranes reported in those locations from 2019, we feel that the 2019 survey was most likely timed well, and the migration appeared slightly advanced in 2021.

Temperatures during the winter of 2020-21 were well above average with well below average precipitation. Absent a ten day stretch in mid-February, most of the states in the survey were above average in temperature and below average in precipitation. There was no significant snow cover in North Dakota and South Dakota and the northern region of central and western Nebraska. The 2021 total estimate of mid-continent sandhill cranes is 835,850, which includes 782,400 birds (94% of the total) from the traditional aerial transect portion and 53,451 cranes from other regions in the OSA (Table 1). Of the 53,451 cranes from the other regions, 9,394 were in Nebraska in areas surrounding the transect surveyed area. This 782,400 indicates a 28.5% decrease from the 2019 survey. North and South Dakota both reported virtually no cranes in 2021, indicating that most cranes were still in the Central Platte River Valley on the survey date.

Flock estimation correction factors, which are applied to aerial estimates, were calculated from 2011-2019 historical average photo corrected values for both observers since a photographer was unable to participate in 2021 due to Covid-19 restrictions. Observer effort in 2021 is presented by state in Table 4. The current three-year average (2018 – 2021 with no survey being flown in 2020), based on the photo-corrected Nebraska aerial portion of the survey, is 911,000 cranes (Fig. 1) and is above the management objective (350,000 – 475,000) outlined in the Management Guidelines for the Mid-Continent Population of Sandhill Cranes (revised March 2018).

Appreciation is expressed to all coordinators, observers, and participants who assisted in the 2019 survey. Two long time contributors, Dr. Douglas Johnson (USGS) for his statistical

analysis and Mr. John Steiner (Jamestown, ND) for his photo processing and interpretation, continued their able assistance, patience, and support.

Terry S. Liddick  
July 2021

References:

Benning, D. S. and D. H. Johnson. 1987. Recent improvements to sandhill crane surveys in Nebraska's Central Platte Valley. pp 10 – 16 in J. C. Lewis (ed.), Proc. 1985 Crane Workshop, Platte River Whooping Crane Habitat Maint. Trust, Grand Island, NE.

Central Flyway Council, Pacific Flyway Council, and Mississippi Flyway Council. 2018. Management Guidelines for the Mid-continent Population of Sandhill Cranes. Special Report in files of the Central Flyway Representative, Denver, Colorado.

This report contains data tables and charts that may be large and complex. Readers that may need help reading and interpreting the data, or that may need data presented in an alternative format to facilitate reading and interpretation, should contact the U.S. Fish and Wildlife Service's Migratory Bird Survey Office (605-642-7730 ex 217).

Table 1. Distribution of Mid-continent Population Sandhill Cranes during the coordinated spring survey, 1974-2019 (rounded to nearest 100).

Survey Dates	Nebraska Central Platte Valley <sup>1</sup>						Other										TOTAL		
	Ocular Cruise	% <sup>2</sup>	Ocular Transect	% <sup>3</sup>	Ocular transect w/photo correction		Other NE	KS	TX	OK	WY	NM	CO	ND <sup>5</sup>	SD <sup>5</sup>	Ocular Cruise	Ocular Transect	Transect Photo	
					% <sup>3</sup>	% <sup>3</sup>											Uncorrected	Corrected	
3/24-31/74	162,600	92%	-	-	-	-	9,000	1,900	3,200	400	-	0	0	0	0	177,100	-	-	
3/25-30/75	223,600	98%	-	-	-	-	2,300	900	Tr	100	-	100	500	0	0	227,500	-	-	
3/22-26/76	147,500	97%	-	-	-	-	2,800	300	800	100	-	1,000	0	-	0	152,500	-	-	
3/13-23/77	173,400	79%	-	-	-	-	1,100	1,600	30,700	400	-	12,500	0	0	300	220,000	-	-	
3/20-24/78	149,800	94%	188,600	96%	-	-	2,200	700	4,900	0	-	2,300	0	-	0	159,900	196,400	-	
3/20-29/79	-	-	203,600	98%	-	-	2,600	1,100	0	1,500	-	0	500	0	0	-	207,300	-	
3/24-4/15/80	223,400	95%	254,400	96%	-	-	5,000	4,100	1,400	100	-	500	0	Tr	-	234,500	264,900	-	
3/22-28/81	-	-	248,900	86%	-	-	8,300	11,200	21,800	0	-	0	200	0	0	-	290,200	-	
3/22-27/82 <sup>4</sup>	-	-	348,000	95%	417,300	95%	7,100	2,000	7,800	0	-	100	2,800	0	Tr	-	364,900	437,100	
3/25-26/83	-	-	306,300	96%	343,400	97%	4,100	200	7,000	200	-	Tr	0	0	0	-	317,600	354,900	
3/25-30/84	-	-	222,700	92%	261,800	93%	18,100	900	800	1,100	-	Tr	0	0	Tr	-	242,500	282,700	
3/25-26/85	-	-	378,100	96%	514,800	97%	11,500	3,000	1,200	-	-	-	-	-	-	-	393,800	530,500	
3/25-26/86	-	-	317,000	99%	353,000	99%	1,000	200	2,100	-	-	-	Tr	Tr	-	-	320,300	356,300	
3/24-26/87	-	-	383,600	100%	416,100	100%	0	Tr	400	-	-	-	0	0	-	-	384,000	416,500	
3/21-25/88	-	-	386,900	98%	463,500	98%	0	0	7,700	-	-	-	0	0	-	-	394,600	471,200	
3/28-29/89	-	-	391,400	100%	392,000	100%	100	1,000	800	-	-	-	-	0	200	-	393,300	393,900	
3/27-28/90	-	-	386,000	94%	412,200	97%	11,000	5,200	10,300	-	-	-	Tr	Tr	-	-	412,500	438,700	
3/25-26/91	-	-	297,800	100%	340,600	100%	100	800	200	-	-	-	0	200	-	-	298,900	341,700	
3/19-25/92	-	-	257,700	95%	406,500	97%	12,200	300	1,100	-	-	-	200	Tr	-	-	271,300	420,100	
3/23-24/93	-	-	253,800	79%	378,900	85%	16,800	37,700	13,500	-	-	-	0	-	-	-	321,800	446,900	
3/20-22/94	-	-	395,500	96%	477,200	97%	14,600	0	0	-	-	2,400	400	0	-	-	410,100	491,800	
3/28-30/95	-	-	273,400	90%	326,200	91%	30,400	0	0	-	-	6,700	200	0	-	-	303,800	356,600	
3/25-26/96	-	-	318,900	98%	520,000	99%	7,600	0	0	-	-	3,900	0	0	-	-	326,500	527,600	
3/20-26/97	-	-	350,900	96%	534,600	97%	16,200	100	0	-	-	-	Tr	Tr	-	-	367,200	550,900	
3/24-26/98	-	-	337,200	96%	530,800	97%	13,600	100	0	-	-	-	0	Tr	-	-	350,900	544,500	
3/22-25/99	-	-	219,800	68%	284,900	73%	3,500	100,000	0	-	-	-	0	500	-	-	323,300	388,400	
3/10-29/00	-	-	484,600	92%	490,100	92%	16,900	26,100	500	-	-	-	100	800	-	-	528,100	533,600	
3/25-27/01	-	-	387,300	87%	413,500	88%	10,500	42,300	3,500	-	-	-	0	Tr	-	-	443,600	469,800	
3/25-27/02	-	-	309,000	90%	315,000	90%	17,100	15,100	1,200	5,800	-	-	Tr	0	-	-	342,400	348,400	
3/22-27/03	-	-	300,900	90%	348,000	91%	24,800	4,100	3,800	-	-	-	Tr	400	-	-	333,600	380,700	
3/22-25/04	-	-	365,400	95%	426,500	95%	17,700	1,200	2,200	100	-	-	50	600	-	-	386,500	447,600	
3/5 - 25/05	-	-	412,300	91%	491,900	93%	27,100	2,900	8,700	2,600	-	-	Tr	500	-	-	451,000	530,600	
3/15-29/06	-	-	178,600	70%	216,800	74%	70,000	2,100	5,500	-	-	-	Tr	Tr	-	-	256,200	294,400	
3/12-27/07	-	-	307,100	91%	384,100	93%	20,400	3,600	5,900	-	-	-	2,000	8,700	-	-	337,000	414,000	
3/24-26/08	-	-	474,100	95%	545,900	96%	24,500	1,100	0	-	-	-	0	1,600	-	-	499,700	571,500	
3/21-26/09	-	-	457,400	92%	565,300	93%	29,900	Tr	10,800	-	-	-	100	4,800	-	-	498,100	606,000	
3/23-26/10	-	-	455,100	91%	691,500	94%	17,600	1,300	28,000	-	-	-	0	2,100	-	-	502,000	738,400	
3/20-24/11	-	-	347,500	90%	482,800	93%	18,800	3,500	14,300	4,700	-	-	0	100	-	-	384,100	519,400	
3/27-30/12	-	-	253,800	94%	339,600	95%	12,900	Tr	4,200	-	-	-	970	14,600	-	-	270,900	356,700	
3/25-27/13	-	-	745,900	97%	867,100	97%	16,080	279	9,740	1,800	-	-	0	400	-	-	771,999	893,199	
3/24-26/14	-	-	402,200	91%	617,900	94%	24,390	5,996	7,534	239	-	-	0	11,973	-	-	440,120	655,820	
3/23-25/15	-	-	326,000	83%	386,500	85%	24,545	4,479	37,121	2,195	-	-	324	8,723	-	-	392,145	452,645	
3/22-23/16	-	-	272,300	91%	405,700	94%	11,218	261	16,500	175	-	-	548	8,412	-	-	300,279	433,679	
3/21-3/22/17	-	-	436,700	94%	568,400	95%	18,674	180	9,193	16	-	-	79	-	-	-	464,747	596,447	
3/22/18	-	-	516,400	93%	1,005,600	96%	12,137	1,058	23,906	932	3475	-	0	-	-	-	553,501	1,047,108	
3/22/19	-	-	633,800	92%	946,000	94%	16,818	2,423	39,460	777	4140	-	0	0	-	-	692,501	1,009,618	
No Suevey 2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3/24/21	-	-	487,400	91%	782,400	94%	9,394	1,422	38,123	0	4512	-	-	8	0	-	536,339	835,851	

<sup>1</sup> Utilizing various survey techniques within Nebraska's Central Platte Valley.

<sup>2</sup> Percent of total M-C population index.

<sup>3</sup> % of cranes counted in aerial transect portion of survey

<sup>4</sup> Vertical photo transect conducted in 1982. Within MCPV, index was 490,100 and including Other 509,900.

<sup>5</sup> Crane sightings for North and South Dakota from 1985 and later are noted for over flight monitoring purposes and are not included in totals.

<sup>6</sup> OK, NM, CO were eliminated from the Official Survey Area in 1985 by the Central Flyway CMU; crane sightings are noted for informational purposes only.

Tr <50 cranes

<sup>7</sup>Wyoming and Oklahoma were incorporated into the official survey area in 2018 by the Central Flyway CMU

**Figure 1. Annual and three-year average photo-corrected ocular transect spring population indices and population objective thresholds for Mid-Continent sandhill cranes.**

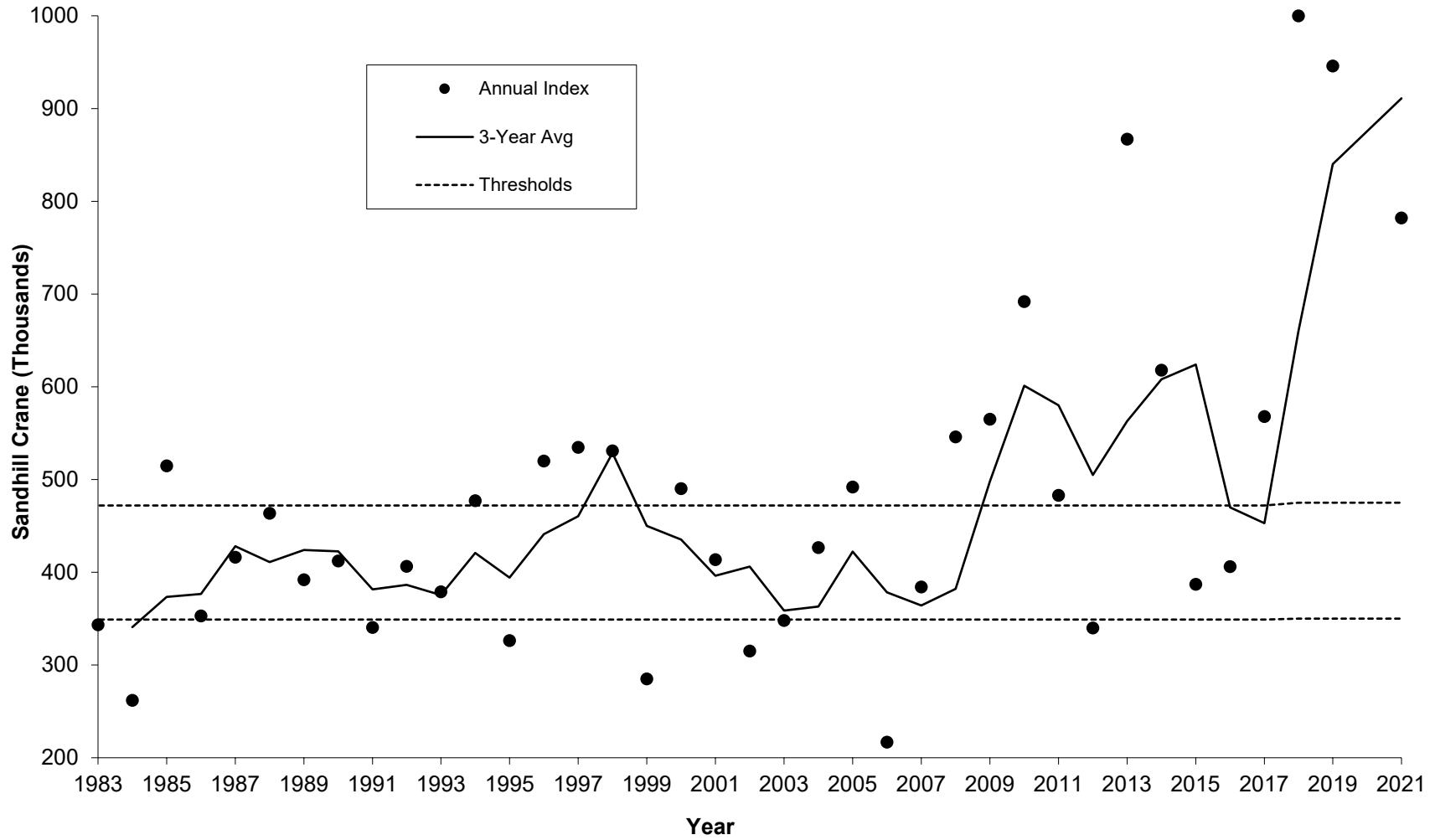


Table 2. Results of ocular transect survey for Mid-Continent Population Sandhill Cranes in the Central Platte Valley of Nebraska during the coordinated spring surveys.

<u>YEAR</u>	<u>Population Index</u>	<u>Standard Error</u>	
1978	188,582	± 23,948	(± 12.7%)
1979	203,574	± 24,968	(± 12.1%)
1980	254,417	± 51,738	(± 20.3%)
1981	248,882	± 31,957	(± 12.8%)
1982	347,996	± 33,353	(± 9.6%)
1983	306,316	± 21,257	(± 6.9%)
1984	222,710	± 17,466	(± 7.8%)
1985	378,127	± 34,230	(± 9.1%)
1986	317,025	± 32,461	(± 10.2%)
1987	383,581	± 53,508	(± 13.9%)
1988	386,853	± 35,775	(± 9.2%)
1989	391,353	± 44,066	(± 11.2%)
1990	385,950	± 40,585	(± 10.5%)
1991	297,831	± 27,551	(± 9.2%)
1992	257,709	± 24,551	(± 9.5%)
1993	253,799	± 29,896	(± 11.2%)
1994	395,543	± 40,430	(± 10.2%)
1995	273,376	± 30,316	(± 11.1%)
1996	318,514	± 36,182	(± 11.3%)
1997	350,932	± 58,925	(± 16.7%)
1998	337,203	± 39,505	(± 11.7%)
1999	219,794	± 32,164	(± 14.6%)
2000	484,585	± 57,598	(± 11.9%)
2001	387,336	± 47,679	(± 12.3%)
2002	309,029	± 34,399	(± 11.1%)
2003	300,918	± 32,869	(± 10.9%)
2004	365,370	± 31,001	(± 8.5%)
2005	412,285	± 32,482	(± 7.8%)
2006	178,564	± 13,156	(± 7.4%)
2007	307,094	± 27,245	(± 8.9%)
2008	474,051	± 52,201	(± 11.0%)
2009	457,436	± 39,355	(± 8.6%)
2010	455,104	± 44,324	(± 9.7%)
2011	347,501	± 26,841	(± 7.7%)
2012	253,783	± 18,261	(± 7.2%)
2013	745,854	± 77,801	(± 10.4%)
2014	402,228	± 33,616	(± 8.4%)
2015	326,053	± 24,491	(± 7.5%)
2016	272,250	± 30,692	(± 11.3%)
2017	436,671	± 42,331	(± 9.7%)
2018	516,397	± 46,206	(± 8.9%)
2019	633,839	± 85,277	(± 13.5%)
2021	487,418	± 138,697	(± 28.5%)

Table 3. Results of ocular transect survey with photo correction for Mid-Continent Sandhill Crane population in the Central PlatteValley of Nebraska during the coordinated spring survey

<u>YEAR</u>	<u>Population Index</u>	<u>Standard Error</u>	
1982	417,263	± 42,331	(± 10.1%)
1983	343,378	± 31,674	(± 9.2%)
1984	261,802	± 24,198	(± 9.2%)
1985	514,763	± 49,650	(± 9.6%)
1986	353,040	± 37,340	(± 10.6%)
1987	416,058	± 65,588	(± 15.7%)
1988	463,457	± 53,213	(± 11.4%)
1989	391,995	± 51,349	(± 13.0%)
1990	412,154	± 50,496	(± 12.2%)
1991	340,645	± 33,897	(± 10.0%)
1992	406,457	± 50,644	(± 12.4%)
1993	378,883	± 50,454	(± 13.3%)
1994	477,215	± 50,910	(± 10.7%)
1995	326,181	± 35,256	(± 10.8%)
1996	519,984	± 62,582	(± 12.0%)
1997	534,630	± 86,889	(± 16.2%)
1998	530,848	± 79,164	(± 14.9%)
1999	284,858	± 35,599	(± 12.5%)
2000	490,118	± 71,754	(± 14.6%)
2001	413,498	± 64,221	(± 15.5%)
2002	315,044	± 42,218	(± 13.4%)
2003	348,023	± 41,263	(± 11.9%)
2004	426,534	± 43,337	(± 10.2%)
2005	491,915	± 47,392	(± 9.6%)
2006	216,810	± 18,054	(± 8.3%)
2007	384,118	± 39,637	(± 10.3%)
2008	545,884	± 76,107	(± 13.9%)
2009	565,257	± 50,923	(± 9.0%)
2010	691,534	± 85,236	(± 12.3%)
2011	482,797	± 44,851	(± 9.2%)
2012	339,642	± 31,609	(± 9.7%)
2013	867,061	± 126,196	(± 14.5%)
2014	617,903	± 60,551	(± 9.8%)
2015	386,471	± 49,504	(± 12.8%)
2016	405,716	± 44,935	(± 11.1%)
2017	568,369	± 72,987	(± 12.8%)
2018	1,005,612	± 105,654	(± 10.5%)
2019	945,996	± 133,127	(± 14.1%)
2021	782,462	± 309,357	(± 39.5%)



Table 4. Coordinated spring Mid-Continent Population Sandhill Crane survey effort by state - 2019

State	Date	Coverage Means		Effort (Miles)		Observer Agency Affiliation		
		Aircraft	Ground	Air	Ground	Federal	State	Volunteer
ND*	15-23-Mar-21	0	8	0	1830	11	4	0
SD*	23-Mar-21	-	4	0	0	0	4	0
NE	24-Mar-121	1	1	700	100	0	2	1
KS	23-Mar-21	-	12	0	432	3	10	0
TX	23-Mar-19	-	10	0	897	2	8	0
OK	23-Mar-19	0	10	0	567	2	8	0
WY	23-Mar-21	0	1	0	30	0	2	0
Total		1	46	700	3856	18	38	1

\* Monitors for over flights on or prior to scheduled survey date.