An updated minimum estimate of the global Sandhill Crane population

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Abstract.—Population estimates provide important information for wildlife species management and drive decision-making regarding strategic habitat protection, conservation status (e.g., State Wildlife Action Plans), and hunting regulations. Sandhill Cranes (*Grus* [*Antigone*] *canadensis*) apparently represent the most abundant Gruidae species globally, but few documents integrate abundance estimates and trends for distinct population segments and subspecies. This investigation estimates the minimum population sizes for all six migratory populations and three non-migratory subspecies using 5-year maximum values from existing survey data following Caven et al. (2020). The percent annual growth rate of populations are also estimated using log-transformed bivariate ordinary least squares regression models in the absence of published population trends. The results of this investigation suggest that there are *at least* 1.45 million Sandhill Cranes in the world, which roughly equals the population of all other 14 extant crane species combined. Despite these impressive numbers, Sandhill Crane populations pale in comparison to those of several other large-bodied waterbirds (e.g., Snow Geese number ~16 million).

The Mid-continent Population represents the largest segment and comprises nearly 88% of all Sandhill Cranes globally, while the two smallest populations, the Cuban (*G. c. nesiotes*) and Mississippi (*G. c. pulla*) subspecies, respectively account for less than 0.1% combined. Annual population growth rates were apparently low for non-migratory subspecies (mean ≈0%) but relatively high for migratory populations (mean ≈3%). This literature and data review highlights uncertainties regarding the status of the Cuban Sandhill Crane, the Florida Sandhill Crane (*G. c. pratensis*), and the Central Valley Population (CVP) of Greater Sandhill Cranes (*G. c. tabida*), which winters in California. Based on small populations and low growth rates, conservation efforts should likely focus on non-migratory populations and the CVP. However, habitat protection and restoration at important wintering and stopover areas for larger populations (e.g., Muleshoe National Wildlife Refuge, TX; Platte River, NE) also remains important as high Sandhill Crane concentrations could result in significant disease outbreaks and subsequent mortality, especially considering the emergence of highly pathogenic avian influenza (H5N1/8).

INTRODUCTION

From a conservation planning perspective, it is essential to regularly update population, subpopulation, metapopulation, and subspecies abundance estimates for species of conservation concern and interest. Population estimates drive habitat protection, wildlife management, hunting regulations, species recovery plans, and research objectives (Nichols 2014; USFWS 2019, 2021; Seamans 2021). However, these important efforts too often depend on outdated data, summaries, and analyses (Fuller et al. 2020). As one of just 15 extant species of cranes in the world and ostensibly the most abundant, the Sandhill Crane (*Grus* [*Antigone*] *canadensis*; SACR) serves as an ambassador for this charismatic family of birds (Gruidae) and the natural landscapes they inhabit such as wetlands (Krapu et al. 2019). The global population of SACRs includes regional subpopulations and subspecies that are highly successful in terms of growth and resilience as well as those facing many challenges (USFWS 2019, 2021; Krapu et al. 2019; Caven et al. 2020). Given the importance of SACR populations to wildlife managers and the public, we summarize the most current and robust minimum population estimates for the species across all extant populations (including metapopulations, subpopulations, and subspecies).

METHODS

Most large-scale coordinated population survey efforts are undertaken annually over a short period (in the spring or fall as SACRs aggregate, just after the breeding season, or during migration) and annual abundance estimates tend to be driven more by migration chronology on any given year than by true fluctuations in the population for most survey programs (Pearse et al. 2015, Fronczak et al. 2017, Caven et al. 2020). Federally coordinated abundance estimation efforts generally use a 3-year running average to estimate SACR abundance (Seamans 2021). However, most of the biases in the survey approaches employed tend to drive abundance estimates downward (e.g., percentage of cranes in the survey area, detectability of cranes, sufficient survey effort; Pearse et al. 2015, Fronczak et al. 2017, Caven et al. 2020). Additionally, as *K*-selected species with high adult survival and relatively low productivity, SACR populations tend to be relatively stable from a biological perspective, but often make leaps in years when environmental conditions support higher-than-average recruitment (Layne 1983, Wheeler et al. 2021).

Given the relatively stable nature of the SACR's typical population structure and the propensity of coordinated survey efforts to systematically underestimate abundance, recommendations by Caven et al. (2020) that 5-year maximum counts provide the most robust minimum estimates for SACR populations were followed in this investigation. Also, given the uncertainty and confidence intervals associated with most abundance estimates, estimated minimum populations were reported to the nearest "significant digit" (i.e., "significant figure"). This generally means that very large populations were rounded to the nearest 1,000, medium-sized populations to the nearest 100, and small populations to the nearest 10.

When available, trends published in the scientific and professional literature were reported in the following updates of SACR populations. However, in cases where data was publicly available but recent trend estimates had not been produced, log-transformed bivariate ordinary least squares regression models using program R were developed to estimate the percent annual growth rate of populations (Xiao 2011, Rossiter 2016, R Core Team 2020). Parameter estimates (*B*) pertaining to log-transformed population trends were converted to percent change in population per year following Benoit (2011).

RESULTS & DISCUSSION

Mid-continent Population (migratory)**:** ≥1,270,000; increasing.

Caven et al. (2020) estimated that there were 1,048,000 SACRs in the Central Platte River Valley (CPRV) and another 222,000 in the North Platte River Valley (NPRV) at the peak of migration in 2018 and 2019. This equates to about 1.27 million SACRs in NE at the peak of migration. Confidence estimates derived from multiple model-based predictions indicate there is likely between 1.1 million and 1.4 million SACRs in NE at the peak of spring migration. These estimates were derived using data from multiple aerial survey and PTT-tracked crane databases (Crane Trust, USFWS, Rainwater Basin Joint Venture, and USGS) with coverage spanning most of the locations SACRs roost in the CPRV and NPRV (Caven et al. 2020). However, there may be as many as 1.5 million SACRs in the Mid-continent Population (MCP) alone given that the vast majority stage within the CPRV and NPRV (Krapu et al. 2011) and on average only 86% are present there during the peak of migration (range = 71 to 94%; Pearse et al. 2015).

The USFWS's three-year average photo-corrected estimate for the MCP 2018-21 was 911,357 and 964,195 including supplemental transects from outside of NE. However, Caven et al. (2020) demonstrates that the USFWS's three-year adjusted count is a systematic underestimate because low counts from years when the survey is completed outside of peak abundance drive down the 3-year average. The highest count recorded by the USFWS annual survey was 1,005,612 in NE and 1,047,120 including supplemental survey areas in the spring of 2018 (Seamans et al. 2021). Given that the USFWS survey does not cover all the places SACRs roost in NE or the Central Flyway at large, 1,050,000 is an absolute minimum estimate for the MCP. However, given the additional spatial coverage included in data summaries and analyses by Caven et al. (2020), 1,270,000 is likely a more robust minimum estimate.

Caven et al. (2020) estimated a 3.7% growth rate in the MCP from the USFWS aerial survey data.

Eastern Population (migratory)**:** ≥97,800; increasing.

The Eastern Population (EP) is estimated through ground counts of cranes departing roosts at known staging areas in the fall (late October) throughout the EP range. The survey is conducted annually by agency personnel and volunteers (Seamans et al. 2021, USFWS 2021). The 2020 estimate was 94,879 SACRs. However, the highest count recorded to date was 97,751 in 2018.

Like the MCP survey, the limitations of the EP survey process likely bias abundance estimates downward for the EP. For instance, Fronczak et al. (2017) estimated that 29-31% of tracked SACRs that breed in WI and the lower peninsula of MI were outside of the cooperative fall abundance survey area at the time it was conducted. Though efforts have been made to add survey areas over the years (USFWS 2021), current abundance estimates may be as much as ~30% low.

Amundson and Johnson (2010) estimated a 3.9% population growth rate from 1979-2009, and recent USFWS data suggests an even larger population growth rate of 4.4%. Both of these estimates represent relatively high growth rates, and given that the latter is not a published estimate, we assume the growth rate is likely somewhere between 3.9-4.4% ($\bar{x}$ = 4.2%).

Rocky Mountain Population (migratory)**:** $\geq$25,600; stable to slightly increasing.

The abundance of the Rocky Mountain Population (RMP) is estimated through a 5-state September pre-migration survey of >60 early fall staging areas (PFC and CFC 2016, Seamans 2021). This survey was initiated experimentally in 1987 and 1992 but became consistently operational in 1995. The highest count recorded per this effort was 25,636 SACRs in 2020, resulting in a recent 3-year average of 22,909 SACRs (Thorpe et al. 2020, Seamans 2021). The highest count previous to 2020 was 24,330 RMP SACRs in 2015.

Seamans (2021) highlights a recruitment rate of about 9.7% from 2003-2020 for the RMP but provides no estimation of the long-term growth rate. Data since 1997 was analyzed using ordinary least squares regression models in program R (R Core Team 2020) and found that the RMP appears to be growing at a low but significant rate of just under 1% per year (B = 0.81±0.22%, t = 3.65, p = 0.001, $R^2_{adj.}$ = 0.31). However, the RMP growth rate from 2010 to 2020 was about 2.6% per year (B = 2.63±1.14%, t = 2.28, p = 0.048, $R^2_{adj.}$ = 0.30).

Pacific Coast Population (migratory): $\geq$36,100; increasing, and
Central Valley Population (migratory): $\geq$8,600; apparently stable.

SACR abundance is estimated through mid-winter aerial survey efforts in the Central Valley of California (Skalos and Weaver 2020, Olson 2021). These surveys are generally coordinated by the California Department of Fish and Game and have been ongoing in some form since 1955 with periodic gaps (significant gaps in the 1970s). The survey effort is focused on multiple taxa including waterfowl and cranes. It does not cover all the places cranes or waterfowl use but focuses on areas of concentrated waterfowl habitat (e.g., flooded agriculture and functional wetlands). Focal survey areas of the Central Valley include the Sacramento Valley, San Joaquin Valley, Suisun Basin, Yolo-Delta, and Tulare Basin (Gerber et al. 2020, Skalos and Weaver 2020, Olson 2021).

The Pacific Coast Population (PCP), which consists of mostly Lesser (*G. c. canadensis*) and a small number of Canadian SACRs (*G. c. rowani*) overlaps with Central Valley Population (CVP) of Greater SACRs (*G. c. tabida*) on their respective wintering grounds in the Central Valley of California where abundance estimates are collected (Ivey et al. 2016, Gerber et al. 2020, Olson 2021).

Therefore, it can be challenging to determine trends for the individual populations. Additionally, in 2015 methods were updated to follow set transects that better incorporate upland habitats; data before and after these methodological changes are not directly comparable (PFC 2020).

An analyses of available data using program R indicated no trend in population growth in the Central Valley since 2015, likely as a result of insufficient data given relatively large interannual fluctuations in abundance. However, OLS regression analyses of total counts from 1982 to 2014 indicated robust growth in this population (B = 5.56±1.23%, t = 4.44, p = 0.001, $R^2_{adj.}$ = 0.37). The author would suggest that most of this growth was reflective of increases in Lesser SACRs in the PCP, although some growth may reflect improvements in survey implementation (PCF 2020).

The 2020 SACR abundance estimate for the Central Valley was 41,788; however, the highest count to date was recorded in 2018 (44,695) and the most recent 3-year average was 43,496 SACRs. Survey data from Ivey et al. (2016) suggests that the composition of SACRs in the Central Valley of California was about 80.7% Lesser and 19.3% Greater subspecies (per totals presented in Table 3, pp. 7). However, Ivey et al. (2014) reported slightly different ratio estimates per ground-based flock surveys (73% Lesser, 23% Greater, 2% Canadian). Extrapolations based on the highest count in the last 5 years for the Central Valley and ratios from Ivey et al. (2016) would indicate that CVP of Greater SACRs likely totals about 8,600 individuals and the PCP of Lesser [and some Canadian] SACRs likely totaled 36,100 individuals, with about 2,200 of those being *G. c. rowani* per Gerber et al. (2020).

These population estimates are inherently conservative as data indicates that some PCP [Canadian] SACRs winter outside California's Central Valley (~1,400 wintering in the Lower Columbia River Bottomlands, WA; Stinson 2017). Krapu et al. (2019) suggest there are about 5,000 putative Canadian SACRs in the PCP in total. Some survey efforts have suggested that the CVP is larger than 8,600 SACRs, but these efforts have relied on correction factors derived from estimates of the ratio of Greater to Lesser SACRs gathered by a wide variety of personnel including volunteers and may therefore be unreliable (WCCWG 2000, Gerber et al. 2020). Gerber et al. (2020) indicate that the CVP likely numbered 8,000 SACRs in the early-mid-1990s indicating very little change in that population of Greater SACRs over the last ~30 years.

Lower Colorado River Valley Population (migratory): ≥5,900; stable to slightly increasing.

SACRs in this population have been counted via a coordinated aerial cruise survey of four major wintering areas since 1998, including Cibola NWR, Colorado River Indian Tribes wetland areas, Sonny Bono Salton Sea NWR, and the Gila River Delta (Seamans 2021). These areas are thought to encompass >90% of the SACRs in the Lower Colorado River Valley (LCRV) population (Seamans 2021). The highest count of this population (5,883) was recorded in 2021 and the 3-year average was 3,915 SACRs. These surveys represent raw estimates not corrected for detection probability or observer bias and therefore are likely to represent underestimates.

We analyzed LCRV SACR survey data from 1998-2021 using ordinary least squares regression models in program R (R Core Team 2020) and found that the LCRV population appears to be growing at about 2% annually (2.08±0.77%, t = 2.70, p = 0.013, $R^2_{adj.}$ = 0.21). Research indicates that this population may be somewhat integrated with the RMP (Collins et al. 2016).

Cuban Sandhill Cranes (Endangered, non-migratory): ~700; apparently stable to slightly increasing.

Galvez-Aguilera and Chavez-Ramirez (2010) conducted a country-wide survey of Cuban SACRs (*G. c. nesiotes*) between 1994 and 2002 and estimated that there were about 526 SACRs in the country. Galvez et al. (2018) provided an update to this estimate including some newer data from a subset of sites (Isla de la Juventud, Ciego de Ávila, Las Guayaberas, and Zapata Swamp) from 2004 to 2015 and suggested that there were ≥550 Cuban SACRs at that time. Finally, Brenner (*In Review*), summarizing data from Gálvez-Aguilera et al. (*In Review*) indicated that there were nearly 700 SACRs (696) in Cuba as of 2017. Taken together, research suggests that Cuban SACRs may be increasing or stable at a subset of larger high-quality sites that host the majority of the Cuban SACR population, but that smaller concentrations may actually be decreasing throughout their remaining range (Galvez-Aguilera and Chavez-Ramirez 2010).

If Cuban SACRs increased from ~526 to ~696 from 1994 to 2017 it would equate to about a 1.2% annual growth rate. However, these numbers remain highly uncertain and there is a need for a forward-looking census and long-term population monitoring framework. This subspecies is listed as endangered under the US Endangered Species Act (USFWS 1976).

Mississippi Sandhill Cranes (Endangered, non-migratory): ~130; stable (with supplementation).

The population of Mississippi SACRs (*Grus canadensis pulla;* MS SACR) is monitored annually in the fall through volunteer-supported ground counts at the 7,810-ha Mississippi Sandhill Crane National Wildlife Refuge and the surrounding area (Hereford and Dedrickson 2018, USFWS 2019). Since 1993 the MS SACR population has fluctuated from the mid-90s to the mid-130s (Hereford and Dedrickson 2018, USFWS 2019). The highest number of MS SACRs observed in the wild was 135 in 1993 following robust releases of captive-reared birds begun in the 1980s and led by the U.S. Geological Survey's Patuxent Wildlife Research Center (Gee and Hereford 1995).

Extrapolating on the two data points from 1993 (135) and 2018 (129), the imputed linear annual population growth rate would be very near zero (-0.18%). However, 5 of the 8 years in which the population exceeded 120 individuals from 1983 to 2018 occurred from 2014 to 2018. Additional years when the population exceeded 120 individuals included 2004-2005 and 1993. Despite the long-term trend being relatively flat since the early 1990s, data from 2013 to 2018 show a positive trend (B = 2.01±0.65%, t = 3.07, p = 0.0374, $R^2_{adj.}$ = 0.63). Moreover, it appears that this positive trend began in the late-2000s (~2008) following declines associated with Hurricane Katrina in 2005 (Woolley et al. 2022).

Wild-fledged chick recruitment continues to occur steadily, but adult mortality remains nearly double that in the average year. From 2013 to 2018 on average (±SE) the MS SACR population fledged 5.8±0.2 wild-hatched chicks and released 10.2±2.7 captive-reared chicks into the population but lost 11.2±0.8 adults, which is about 8.1±0.6% of the population, annually to mortality (USFWS 2019). Therefore, population gains are somewhat artificial and are the result of supplementation by captive-reared MS SACRs. The population is ultimately below replacement considering natural recruitment and the adult mortality rate. This subspecies is listed as endangered under the US Endangered Species Act (USFWS 1973).

Florida Sandhill Cranes (non-migratory): 5,400; apparently stable.

There is not a regularly conducted and comprehensive survey of the Florida SACR (FL SACR) population given its relatively large size and diffuse distribution throughout much of the state. However, the recruitment rate is estimated annually in the fall via driven transects. FL SACR abundance and trends therein have been estimated through multiple different approaches to date. For example, Nesbitt and Hatchitt (2008) estimated the population based on suitable available habitat mapped within the state in conjunction with FL SACR occurrence records from the Florida Breeding Bird Atlas. They estimated a significant decline in available habitat and assumed a commensurate decline in the number of FL SACRs from about 7,142 in 1974 to approximately 4,594 in 2003. However, Cox et al. (2020) suggest based on trends derived from Breeding Bird Survey (BBS) data from 1966–2016 that the FL SACR population is stable or growing. Cox et al. (2020) determined that of 42 BBS routes ~57% were stable, ~40% increased, and ~2% decreased. Cox et al. (2020) also estimated that the average annual recruitment rate (11.8%±1.0) corresponded to that of a stable or growing population of SACRs. The countervailing trends of habitat loss and increasing abundance on many survey routes leaves much uncertainty regarding the status of the FL SACR population. Meine and Archibald (1996) indicated about 25 years ago that the FL SACR was likely stable with local increases and declines throughout the subspecies' range. This may remain true today. USFWS (2018) presented a series of population estimates from 1974 to 2017 for the FL SACR (Table 3-1). We integrated similarly timed subspecies estimates from Okefenokee National Wildlife Refuge, GA, with corresponding estimates for the state of Florida. An analysis of these various FL SACR population estimates over time demonstrated no significant trend (B = -0.52±0.56%, t = 0.94, p = 0.375, $R^2_{adj.}$ = -0.013).

Given the lack of detectible trend, the best assessment of the population may be the average of all available estimates. We calculated the average of all estimates and confidence intervals presented in Table 3-1 in USFWS (2018). When estimates were presented as a range we took the center-point as the approximate population and included half the range as a confidence interval. Rounding to the nearest 100 individuals this effort produced an estimate of 5,400±800 FL

SACRs. Interestingly, this corresponds directly to the estimate provided by Krapu et al. (2019).

Conclusions

My estimates suggest that there are *at least* 1.45 million SACRs worldwide (Table 1). However, upper estimates could be as high as 1.68 million correcting for downward biases in currently applied survey techniques following Caven et al. (2020). These results imply that SACRs comprise over 50% of the total number of cranes in the world per recent abundance estimates for all 15 extant Gruidae species (~2,710,000; ICF 2022).

This is not meant to imply that SACRs are *too* abundant from an ecological perspective, but that cranes as a family are relatively modest in number. For comparison, the global Snow Goose (*Anser* [*Chen*] *caerulescens*) population itself is estimated at about 16,000,000, or about 11 times more abundant than SACRs (PIF 2022). Considering the estimated global populations of other species of geese that occur in North America, such as the Canada Goose (*Branta canadensis*; 7,100,000), Greater White-fronted Goose (*Anser albifrons*; 5,500,000), Cacking Goose (*Branta hutchinsii*; 4,500,000), and Ross's Goose (*Anser* [*Chen*] *rossii*; 2,100,000), it is clear that crane species, including SACRs, are comparatively less abundant than several other large-bodied waterbird taxa (PIF 2022).

SACRs are increasing in abundance and represent the most successful species of crane globally in terms of population (ICF 2022). However, they have yet to reclaim a significant portion of their pre-settlement breeding range (Walkinshaw 1949). The abundance of agricultural waste grains likely serves to bolster winter survival and can support SACRs [and Common Cranes (*Grus grus*)] at densities that likely surpass those of historic populations in some areas (Caven et al. 2019, Hemminger et al. 2022, Zink 2022). In the short term, we would expect most migratory SACR populations to continue growing. However, long-term growth could be limited by several threats in the coming decades including habitat loss, changes in agricultural practices (movements away from cereal grains), overappropriation of surface water, increased energy infrastructure (e.g., powerlines), disease, and climate change (Jenkins et al. 2010, McIntyre et al. 2014, Krapu et al. 2019, CMS & FOA 2022, Stokstad 2022).

About 87.6% of the world's SACRs are in the Mid-continent Population, with the next largest being the Eastern Population at 6.7%. The two smallest populations are the Mississippi SACR and the Cuban SACR, which together total just 0.06% of the world's SACRs. Migratory populations of SACR together account for about 99.6% of the SACRs in the world. Annual population growth rates were apparently low for non-migratory subspecies (subsp.) but relatively high for migratory populations based on analyses completed herein and the published literature (Table 1).

This literature and data review indicates that additional population research is needed to determine the status of the Florida SACR subsp., the Cuban SACR subsp., and the Central Valley Population (CVP) of Greater SACRs. Though biologically small, the Mississippi SACR population receives relatively intensive monitoring and conservation support, so uncertainty is comparatively low for this subsp. (Hereford and Dedrickson 2018, Woolley et al. 2022). Uncertainty surrounding trends in these small populations could lead to delayed conservation intervention if any of them begin to decline significantly or rapidly. Research to improve estimates of the CVP will also likely benefit the Pacific Coast Population (PCP), which overlaps the CPV on the wintering range but is comprised of Lesser SACRs and some Canadian SACRs. Assessments of these populations through aerial surveys will likely require a correction factor developed via ground surveys to accurately estimate the two populations' proportional abundance (Ivey et al. 2014, 2016).

Given their low growth rates and relatively small, estimated populations, the CVP as well as the Florida, Cuban, and Mississippi SACR subspecies should likely be prioritized for conservation efforts. However, continued monitoring and ecological research on large populations remains highly important as well given their role maintaining the resilience of the global SACR population as a whole. Our results suggest that $\geq$45% of the world's *cranes* are present within the North Platte and Central Platte River Valleys at the peak of spring migration annually. Continued habitat restoration in that region aimed at redistributing high densities of Sandhill Cranes [and spreading out Whooping Cranes] could be highly important to the species' continued success considering the emergent risk of new avian diseases such as highly pathogenic avian influenza (H5N1/8), which has proven deadly to concentrations of cranes in the Middle East and East Asia (CMS & FAO 2022, Stokstad 2022).

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Table 1. Distinct Sandhill Crane population segments and subspecies including population name (Population), taxonomy (*Genus species subspecies*), migratory status (Migratory), minimum estimated abundance (Abundance), the percentage of Sandhill Cranes represented by each population (Percent Global), estimated annual growth rate (point estimate; Growth Rate), estimated population trend and associated statistical significance (Trend), population and trend certainty (Pop. & Trend Certainty), and the primary data source(s) for the population (Source).

Population	***Taxonomy***	**Migratory**	**Abundance**	**Percent Global**	**Growth Rate**	**Trend**	**Pop. & Trend Certainty**	**Source**
Mid-continent Population	*G. c. canadensis*, *G. c. rowani*, & *G. c. tabida*	X	1,270,000	87.57%	3.7%	Increasing (Sig.)	High	Caven et al. 2020
Eastern Population	*G. c. tabida*	X	97,800	6.74%	4.2%	Increasing (Sig.)	Moderately High	Seamans 2021
Pacific Coast Population	*G. c. canadensis*, *G. c. rowani*	X	36,100	2.49%	5.6%	Increasing (Sig.)	Moderate	Ivey et al. 2014, Olson 2021
Rocky Mountain Population	*G. c. tabida*	X	25,600	1.77%	0.8%	Stable-Slightly Increasing (Sig.)	Moderately High	Seamans 2021
Central Valley Population	*G. c. tabida*	X	8,600	0.59%	0.3%	Stable (Not Sig.)	Moderately Low	Ivey et al. 2014, Olson 2021
Lower Colorado River Valley Population	*G. c. tabida*	X	5,900	0.41%	2.1%	Stable-Slightly Increasing (Sig.)	Moderately High	Seamans 2021
Florida Sandhill Crane subsp.	*G. c. pratensis*		5,400	0.37%	-0.5%	Stable (Not Sig.)	Low	USFWS 2018, Cox et al. 2020
Cuban Sandhill Crane subsp.	*G. c. nesiotes*		700	0.05%	1.2%	Stable-Slightly Increasing (Not Sig.)	Low	Galvez et al. 2018, Brenner *In Review*
Mississippi Sandhill Crane subsp.	*G. c. pulla*		130	0.01%	-0.2%	Stable (with supplementation; Not Sig.)	High	USFWS 2019
Totals or Averages	**-**		**1,450,230**	**100.00%**	**1.9%**	**-**	**-**	**-**