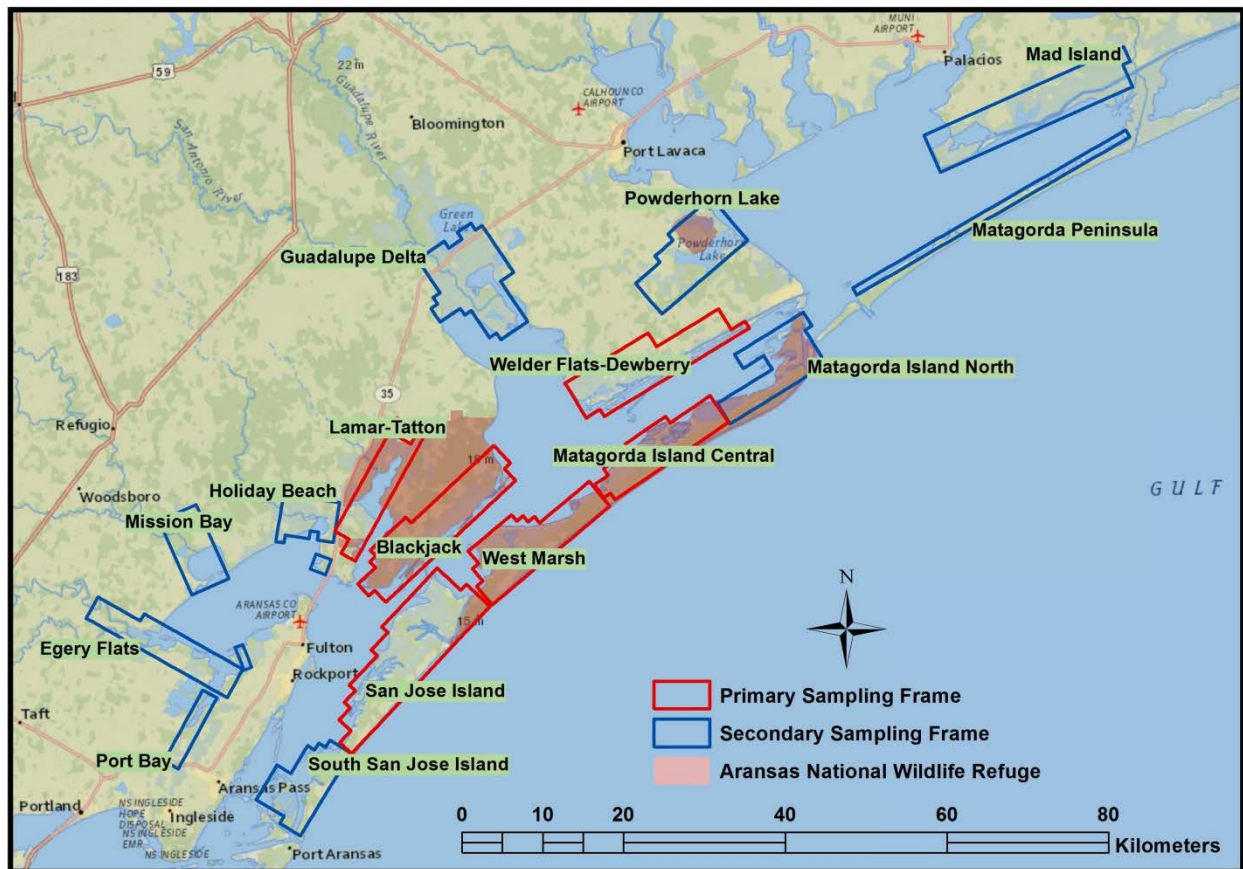


## Whooping Crane Survey Results: Winter 2017–2018

505 Wild Whooping Cranes Estimated (95% CI = 439.2–576.6)

The U.S. Fish and Wildlife Service estimated the abundance of whooping cranes in the Aransas-Wood Buffalo population for the winter of 2017–2018. Survey results indicated 505 whooping cranes (95% CI = 439.2–576.6; CV = 0.069) inhabited the primary survey area (Figure 1). This estimate included at least 49 juveniles (95% CI = 42.0–58.0; CV = 0.085) and 183 adult pairs (95% CI = 160.0–209.7; CV = 0.069). Recruitment of juveniles into the winter flock was 10.8 chicks (95% CI = 9.7–11.9; CV = 0.056) per 100 adults. The precision of this year’s abundance estimate achieved the target set in the [whooping crane inventory and monitoring protocol](#) (i.e., CV < 0.10).



**Figure 1. The sampling area used to monitor whooping crane abundance on their wintering grounds along the Texas coast of the Gulf of Mexico, USA.**

This season (winter 2017–2018) the U.S. Fish and Wildlife Service continued to use a Quest Kodiak aircraft but shifted surveys from December to late-January through early-February. The Kodiak aircraft has better visibility than the Cessna used in the past, which improves survey data and results in a more accurate population estimate. The U.S. Fish and Wildlife Service intends to continue using the Kodiak, or other aircraft with improved visibility, for future surveys.

Evidence over the last few years from migration reports and telemetry data indicated that not all whooping cranes arrive on the wintering grounds along the Texas coast by mid-December as past data had suggested ([see page 19 in whooping crane inventory and monitoring protocol](#)). This required the U.S. Fish and Wildlife Service to move surveys later in the winter (i.e., January or February) to obtain more complete estimates. Although this past winter’s estimate from the early February survey is 17% greater than the past winter’s estimate obtained in December, this does not mean that the whooping crane population experienced above average growth (Table 1; Figure 2). Instead, the winter 2016–2017 abundance estimate from December was likely not capturing the entire whooping crane population, given that some birds had not completed migration yet. The U.S. Fish and Wildlife Service intends to continue conducting future survey during late-January through early-February in order to maximize the proportion of the population within the primary survey area.

**Table 1. Preliminary whooping crane abundance estimates for the Aransas-Wood Buffalo population on their wintering grounds, winter 2011–2012 through winter 2017–2018.**

Survey year <sup>a</sup>	Survey month	Aircraft	Abundance <sup>a</sup>	CV	95% CI		No. assumed beyond primary survey area <sup>b</sup>
					LCL	UCL	
Earlier in Winter							
winter 2011–2012	January	Cessna	254	0.126	198	324	13
winter 2012–2013	December	Cessna	257	0.186	178	362	22
winter 2013–2014	December	Cessna	304	0.078	260	354	6
winter 2014–2015	December	Cessna	308	0.067	267	350	6
winter 2015–2016	December	Cessna	329	0.073	293	371	9
winter 2016–2017	December	Kodiak	431	0.101	371	493	6
Later in Winter							
winter 2015–2016	March	Kodiak	463	0.095	392	549	8
winter 2016–2017	March	Kodiak	489	0.116	428	555	6
winter 2017–2018	February	Kodiak	505	0.069	439	576	21

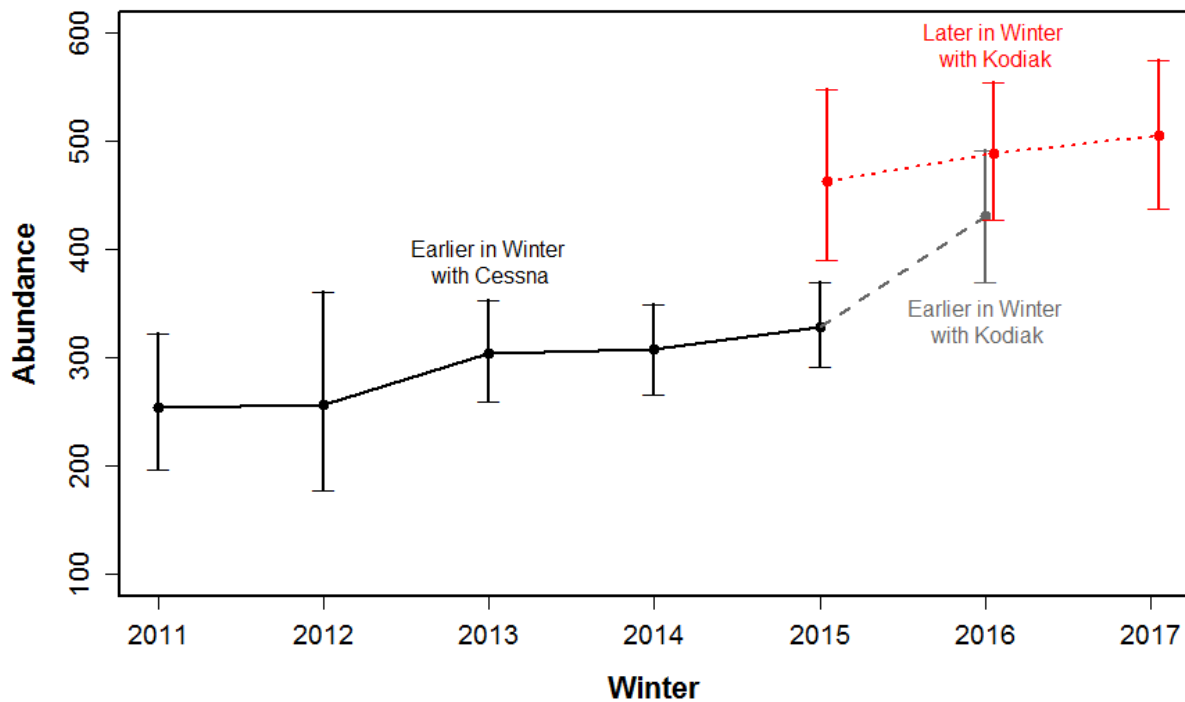
<sup>a</sup> Estimated whooping crane abundance in the primary sampling area using aerial surveys and hierarchical distance sampling. CV = coefficient of variation, CI = confidence interval, LCL = lower confidence limit, and UCL = upper confidence limit.

<sup>b</sup> Provides our best understanding of the number of whooping cranes, at the time of the aerial surveys, that were outside of the primary survey areas. This information was based on data from Texas Whooper Watch, Ebird reports, the whooping crane GPS tracking study, and aerial surveys conducted in the secondary survey areas.

During winter 2017–2018, the primary survey area (approximately 153,950 acres; Figure 1) was surveyed multiple times during January 31 through February 5, 2018. San Jose Island and West Marsh were surveyed four times and Blackjack, Lamar-Tatton, Matagorda Island Central, and Welder Flats-Dewberry were surveyed three times. During the same period, the secondary survey area (approximately 169,300 acres; Figure 1) was surveyed to monitor ongoing expansion of the whooping crane’s occupied winter range. Due to poor weather conditions, only six of the secondary survey areas were surveyed. Matagorda Island North was surveyed on February 1, 2018 and South San Jose Island, Port Bay, Egery Flats, Mission Bay and Holiday Beach were surveyed on February 4, 2018.

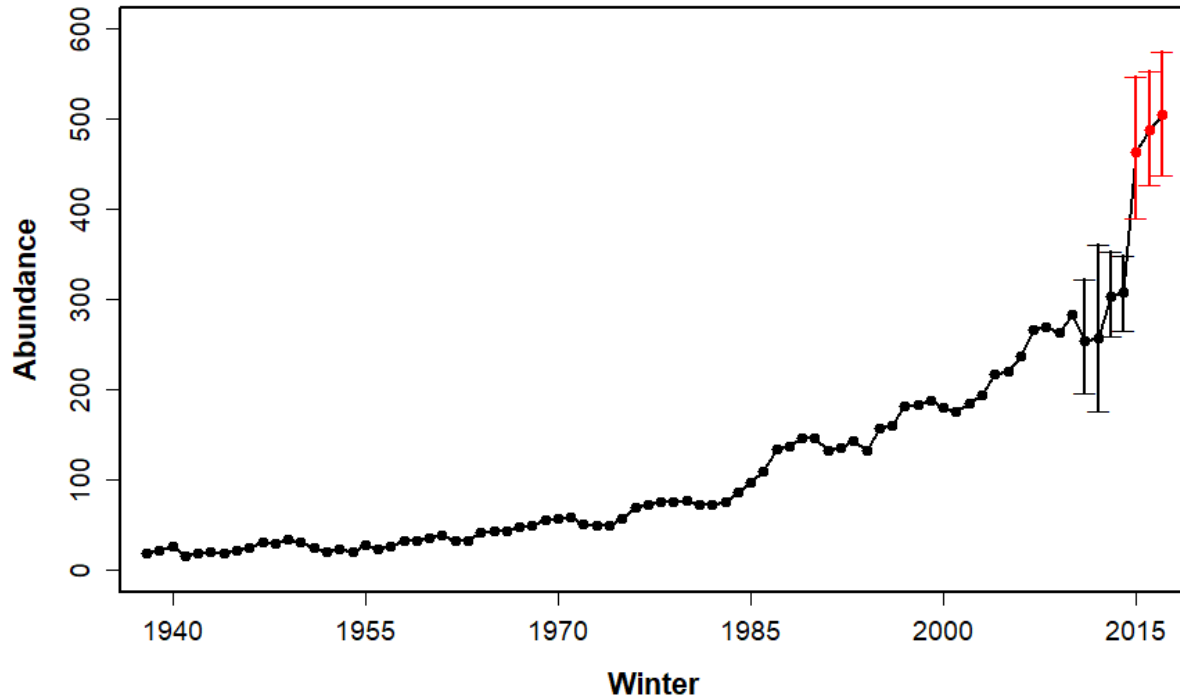
In anticipation of needing to move surveys later into the overwintering period and to train new observers, the U.S. Fish and Wildlife Service conducted test surveys in early March during winters 2015–2016 and 2016–2017. These tests were conducted with the Kodiak aircraft (Figure 2). Using data from early March 2016, the U.S. Fish and Wildlife Service estimated the abundance of whooping cranes as 463 (95% CI = 392.0–549.2; CV = 0.095) for the winter of 2015–2016 (Table 1). Using data from early March 2017, the U.S. Fish and Wildlife Service estimated the abundance of whooping cranes as 489 (95% CI = 428.6–555.1; CV = 0.116) for the winter of 2016–2017 (Table 1).

During March 2017 (winter 2016–2017), the primary survey area was surveyed three times during March 1 through March 3, 2017. During March 2016 (winter 2015–2016), the primary survey area was surveyed multiple times during March 2 through March 4, 2016. Blackjack, Lamar-Tatton, and West Marsh were surveyed three times and San Jose Island, Matagorda Island Central, and Welder Flats-Dewberry were surveyed twice during March 2016. None of the secondary survey areas were surveyed during these times.



**Figure 2. Surveys conducted by from the Cessna aircraft were likely biased low due to reduced visibility. The Kodiak provides for improved visibility and moving surveys later into the overwintering period allows for a greater proportion of the population to complete migration.**

The long-term growth rate in the whooping crane population has averaged 4.55% ( $n = 76$ ; 95% CI = 1.86–7.09%) prior to adjusting survey timing in winter 2015-2016. After adjusting survey timing to later in winter, the average growth rate is 4.44% ( $n = 2$ ). Therefore, the long-term growth of the Aransas-Wood Buffalo whooping crane population continues (Figure 3) and estimates of growth are likely unaffected by the methodological changes in the aerial survey.



**Figure 3. Time-series of whooping crane abundance estimates for the Aransas-Wood Buffalo population beginning in winter 1938–1939. Starting in winter 2011–2012, the precision of abundance estimates were displayed as 95% confidence intervals and during years prior, precision was unknown. In winter 2015–2016 (red), the USFWS began using a Quest Kodiak aircraft later in the overwintering period. This resulted in estimates that are more accurate because it allowed for improved visibility and a larger proportion of the population to complete migration.**

For each of the late-winter test surveys, recruitment of juveniles into the winter flock was underestimated. For the winter of 2015–2016, we estimated 5.4 juveniles per 100 adults in March and 13.0 juveniles per 100 adults in December. For the winter of 2016–2017, we estimated 3.1 juveniles per 100 adults in March and 13.1 juveniles per 100 adults in December. By March, most of the characteristic tawny plumage of juvenile whooping cranes has been lost making it difficult to distinguish juveniles from adults. Thus, in an attempt to conduct the surveys during a period in which most individuals have arrived in the primary survey area plus maintain the ability of observers to distinguish between juveniles and adults, the U.S. Fish and Wildlife Service conducted the winter 2017–2018 surveys during late-January through early-February.

During the survey periods, some whooping cranes were observed outside of the primary survey area. These data were based on information from [Texas Whooper Watch](#), [Ebird](#) reports, the whooping crane GPS tracking study, and aerial surveys conducted in the secondary survey areas.

Tables 2 and 3 provide our best understanding of whooping cranes outside the primary survey areas during each survey period. Some birds may have been missed. It is impossible to be certain that individuals did not move between these locations and to/from the primary survey area during the survey period.

**Table 2. Whooping cranes documented outside of the primary survey area during surveys conducted in winters 2015–2016 (March 2016) and 2016–2017 (March 2017); secondary survey areas were not surveyed with aircraft.**

Survey	General area	Data source	Adults	Chicks	Total	Notes
March 2016	Matagorda County (near Palacios, Texas; Mad Island secondary survey area was not surveyed)	Ebird ( <a href="https://ebird.org/view/checklist/S27998254">https://ebird.org/view/checklist/S27998254</a> )	1	0	1	Single adult reported 6 times on March 4, 2016.
	Aransas County (near Holiday Beach, Texas; Holiday Beach secondary survey area was not surveyed)	Ebird ( <a href="https://ebird.org/view/checklist/S27956661">https://ebird.org/view/checklist/S27956661</a> )	2	0	2	Adult pair reported on March 3, 2018.
	Aransas County (Lamar, Texas; Goose Island State Park)	Ebird ( <a href="https://ebird.org/view/checklist/S27936638">https://ebird.org/view/checklist/S27936638</a> )	1	0	1	Single Adult reported on March 2, 2016.
	Aransas County (Lamar, Texas; residential area)	Ebird ( <a href="https://ebird.org/view/checklist/S27970555">https://ebird.org/view/checklist/S27970555</a> )	4	0	4	Six separate reports of between 2 and 6 whooping cranes. The median count is used.
March 2017	Aransas County (near Bayside, Texas; Egery Flats secondary survey area was not surveyed)	Ebird ( <a href="https://ebird.org/view/checklist/S34932387">https://ebird.org/view/checklist/S34932387</a> )	1	0	1	Single adult reported on March 2, 2017.
	Aransas County (Lamar, Texas; Goose Island State Park)	Ebird ( <a href="https://ebird.org/view/checklist/S34943383">https://ebird.org/view/checklist/S34943383</a> )	2	0	2	Adult pair reported on March 3, 2017.
	Aransas County (Lamar, Texas; residential area)	Ebird ( <a href="https://ebird.org/view/checklist/S34925402">https://ebird.org/view/checklist/S34925402</a> )	3	0	3	Three separate reports of 3 whooping cranes.

**Table 3. Whooping cranes documented outside of the primary survey area during January 31 through February 5, 2018. Aerial survey of Matagorda Island North, Port Bay, South San Jose Island, Egery Flats, Mission Bay and Holiday beach secondary survey was conducted once during the survey period.**

General area	Data source	Adults	Chicks	Total	Notes
Matagorda Island North (secondary survey area)	Aerial survey	6	1	7	One adult pair with a chick and two adult pairs detected once on February 1, 2018.
Nueces County (Port Aransas, Texas; Nature Preserve)	Ebird ( <a href="https://ebird.org/view/checklist/S42139183">https://ebird.org/view/checklist/S42139183</a> )	2	0	2	One adult pair reported multiple times between January 10, 2018 and February 25, 2018.
Matagorda County (near Palacios, Texas; Mad Island secondary survey area was not surveyed)	Ebird ( <a href="https://ebird.org/view/checklist/S42392179">https://ebird.org/view/checklist/S42392179</a> )	2	0	2	Adult pair reported on January 31 and February 2, 2018.
Calhoun County (near Magnolia Beach, Texas; Powderhorn Lake secondary survey area was not surveyed)	Ebird ( <a href="https://ebird.org/view/checklist/S42440371">https://ebird.org/view/checklist/S42440371</a> )	2	1	3	Adult pair with a chick detected on January 31, 2018.
Aransas County (Lamar, Texas; Goose Island State Park and residential area)	Ebird ( <a href="https://ebird.org/view/checklist/S42432598">https://ebird.org/view/checklist/S42432598</a> )	5	1	6	Ten separate reports between 2 and 10 whooping cranes. The median count is used.
Briscoe County (near Silvertown, Texas)	Ebird ( <a href="https://ebird.org/view/checklist/S42594130">https://ebird.org/view/checklist/S42594130</a> )	1	0	1	Single adult reported with large flock of sandhill cranes on February 8, 2018.

*The data and results presented in this report are preliminary and subject to revision. This information is distributed solely for the purpose of providing the most recent information from aerial surveys. This information does not represent and should not be construed to represent any U.S. Fish and Wildlife Service determination or policy.*

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