Whooping Crane Status

2023 BREEDING SEASON TO 2024 SPRING MIGRATION

By Kevin McAbee, Whooping Crane Recovery Coordinator, US Fish & Wildlife Service and John Conkin, Wildlife Biologist, Canadian Wildlife Service

February 2025

Executive Summary

Whooping cranes (*Grus americana*) are one of the rarest and most intensively monitored bird species in North America. The Aransas-Wood Buffalo Population (AWBP), which breeds in northern Canada and winters in coastal Texas, is the only remaining wild, self-sustaining population of whooping cranes. During the summer 2023 breeding season, surveys of the AWBP detected 99 nests and 40 chicks. Winter abundance estimates were not conducted in winter 2023-24.

In addition to the AWBP, reintroduction efforts of many government agencies and non-governmental organizations have established populations of whooping cranes in Wisconsin and Louisiana, while a discontinued reintroduction program in Florida still harbors birds on the landscape. These reintroduction efforts are supported by conservation breeding centers where whooping cranes are reared for reintroduction. Whooping cranes under human care, including on display, breeding pairs, and non-breeding individuals, are managed as a population under the American Zoological Association (AZA) Saving Animals From Extinction (SAFE) program. During the winter of 2023-2024, there were 162 cranes in reintroduced populations (Table 1) and 144 cranes managed under human care (Table 2), representing a slight overall increase from 163 and 134 cranes from the previous year. Reintroduced populations continued to see low levels of wild recruitment and population size is maintained via captive chick introduction. The captive breeding capacity of the SAFE is currently less than is desired to support the SAFE and reintroduced populations. Efforts are ongoing by partners to increase the capacity of chick production to support all of these populations.

Aransas-Wood Buffalo Population

The Aransas-Wood Buffalo Population (AWBP) of whooping cranes is the only remaining wild, self-sustaining whooping crane population. The AWBP breeds during the summer in and around Wood Buffalo National Park (WBNP) in the Canadian jurisdictions of Alberta and the Northwest Territories and migrates >2,400 miles through the Canadian prairies and US Great Plains to the mid-coast of Texas to spend the winter. Whooping cranes from the AWBP were reduced to a mere 16 individuals in 1941 and rebounded to about 536 during the 2022-2023 winter, representing a > 4% long term growth rate. The ongoing recovery of this whooping crane population is perhaps one of the greatest endangered species success stories. A wide variety of local, state, federal and private conservation organizations are actively involved in planning and implementing whooping crane conservation efforts.

2023 Breeding Season[1]

Despite below-average annual precipitation prior to the breeding season, water levels in whooping crane breeding areas were sufficient for nesting cranes during May and June 2023. However, warm temperatures and scant

[1] For the full update, see the attached report prepared by Canadian Wildlife Service.

precipitation throughout the breeding season led to substantial reduction in water levels during chick-rearing and fledging periods. During fieldwork in July and August, observers noted that water had receded significantly from May-levels and some breeding-area ponds were dry.

Persistently dry and warm conditions contributed to an extreme wildfire season in the Northwest Territories and WBNP. Despite extensive fire activity in portions of the whooping crane breeding range, burning inside nesting areas was relatively minimal. Fires occurred in the Nyarling River and Seton Creek nesting areas, but not near active breeding territories. An extensive fire affecting the Salt Plains and Lobstick Creek nesting areas during August likely affected habitat in two breeding territories, but fire-related mortality of whooping cranes is not suspected.

Aerial surveys to estimate abundance of breeding pairs with and without nests were conducted from May 21-25, 2023. Surveys detected 99 nests and 14 pairs without nests. Thirty-four nests were outside the area designated as critical habitat (CH) under Canada's Species at Risk Act, and 19 of those were outside WBNP. Of the nests outside WBNP, where CH has not yet been identified, 18 were north of the Nyarling River and one was on Salt River First Nation reserve lands (i.e., Lobstick Creek) east of WBNP.

Aerial surveys to estimate abundance of juveniles were conducted July 27-30 and Aug 6, 2023. Observers detected 40 juveniles in 38 family groups and 42-49 pairs without juveniles. Of the 38 family groups, 36 were pairs with one juvenile and two were pairs with two juveniles. Using information collected during the breeding pair and juvenile surveys, we determined that annual productivity was 0.40 juveniles per nest which is below the 20-year average of 0.50 juveniles per nest.

2023 Fall Migration

Information from cranes marked with satellite transmitters indicates that the 2023 fall migration initiated as early as August 18. Visual observations for Canada were first reported in Saskatchewan on August 26. Reporting increased substantially after September 9 and peaked during the 2nd week of October. The highest counts occurred in the Rural Municipality of Leask, Saskatchewan where >60 individuals were reported in individual counts. The last visual observation was on 28 October, though data from birds marked with satellite transmitters confirms that whooping cranes were present in Canada as late as November 16.

The migration in the U.S. started slightly earlier than typical years. The first migrating whooping cranes were reported in North Dakota on September 15. However, only a handful of singles, pairs, or family groups were detected through October 24. The last week of October produced the first major migration movement, when 20+ crane groups arrived in the U.S., including the first reports of larger congregations of whooping cranes. Many groups between 10 and 20 whooping cranes migrated together. The entire month of November saw this wave of migration push through the middle of the U.S. and into Southern states.

Fall 2023 delivered record setting observations in many ways. Five crane groups remained in the "traditional" whooping crane migration corridor into the month of December, with three crane groups remaining into January (Nebraska, Platte River; Kansas, Quivira National Wildlife Refuge; Oklahoma, Red River). In fact, one crane group stayed on the central Platte River in Nebraska for a record 73 days, through January 10. Another crane group was the last group to remain in habitat traditionally considered migratory, departing January 30, 2024. For context, this is only weeks before the first whooping cranes typically depart their wintering grounds in Texas. Fall 2023 demonstrated that whooping crane phenology and ecology are shifting as the species continues to show more variability in annual lifecycle patterns both spatially and temporally.

2023-2024 Wintering

Whooping cranes first arrived on the Texas coastal wintering grounds in and around Aransas NWR the week of November 1, 2023, which is within the typical arrival window. The majority of whooping cranes arrived before January. Aerial surveys to estimate abundance were not completed during winter 2023-2024. Distribution of whooping crane continues to expand, as birds inhabit the coast from Port Aransas to Matagorda, but continue to be most densely found in and around the units of Aransas NWR. Interestingly, an increasing number of individuals have been using inland areas for portions of the winter (Crouch et al. 2024), demonstrating the evolution of the species ecology as population numbers increase.

Winter habitat conditions were marked with dry habitats and elevated salinity. The 2023 annual precipitation total of 23 inches (recorded at Rockport Airport[2]) was below the thirty-year annual average of 35 inches and was the fourth lowest of 23 annual data points since 1993[3]. Precipitation in October and November was substantial, accounting for 40% of the annual rainfall, but arid after. San Antonio Bay salinities were near 35 parts-per-thousand (ppt) upon whooping crane arrival in November, and remained above 25 ppt until the end of January.

Staff at Aransas NWR were able to use prescribed fire to improve whooping crane foraging opportunities and overall costal prairie conditions during the 2023-2024 winter season. The refuge conducted prescribed burns on approximately 3,101 acres and mechanically mulched 466 acres of running live oak to enhance coastal prairie, while also benefiting whooping cranes secondary feeding areas. Approximately 609.16 acres of invasive Chinese tallow (*Triadica sebifera*) were treated in refuge wetlands to benefit habitat historically used by whooping cranes. Fresh water wetlands were also maintained by managing brush around their perimeter and maintenance of solar wells. Hurricane Harvey restoration efforts are still on going. One of the projects has been focused on repairing damaged culverts and a levee in the west marsh portion of Matagorda Island, which is a unit of the refuge. To date, we are nearly complete with one major repair and about 4-5 sites with minor work to are still to be conducted. This restoration effort impacts ~3,750 acres of costal marsh and prairie on Matagorda Island.

2024 Spring Migration

Spring 2024 migration started like most, with a few whooping crane departing the wintering grounds in February. An early single or two arrived on the Platte River at the beginning of March, along with the largest concentration of mid-continent sandhill cranes. While the public sightings tracking effort rarely identifies unique individuals, it is widely believed that many of these early arriving singles are sub-adults with near (rust remaining on head or neck) or full white plumage. While it is well known that public sightings data locations are biased by proximity to humans, it does still shed light on occupied habitat and the frequency/intensity of use.

Spring 2024 re-wrote the record books in central Nebraska on the Platte River. Over 200 whooping cranes were detected throughout the spring migration, far surpassing (nearly doubling) previous records. Almost 40% of the entire population were detected at this location in 2024. Large congregations and high proportions (20-30%) of the population have been documented before, at Federally designated critical habitats in Quivira NWR, Salt Plains NWR, and the Platte River bottoms. But nearly 40% of the population in one habitat complex or geographic region has typically only been observed on the fall staging grounds in Saskatchewan, Canada. After the first week of April, the mad dash had quieted down and only a handful of remaining crane groups were detected, the last being on May 4 in Kansas.

[2] National Weather Service station KRKP.
[3] Seven years of data are not available for this data station, including 2004 and 2013-2018.

As is typical, few visual observations were reported for Canada during spring migration. Detections via satellite telemetry indicate that whooping cranes were present in Canada by April 4, and that cranes arrived on the breeding grounds as early as April 18.

AWBP Whooping Crane Tracking Partnership

In 2009, a multi-agency, collaborative research and monitoring project to capture and mark whooping cranes was initiated to quantify behavior, movement, and habitat use of cranes during all aspects of their annual cycle. That project, which continued through 2016 (Phase 1), was carried out by the Whooping Crane Tracking Partnership (WCTP), a cooperative effort between five core partners: Canadian Wildlife Service (CWS), US Geological Survey (USGS), USFWS, the Crane Trust, and Platte River Recovery Implementation Program, with additional support from Parks Canada Agency (PCA), International Crane Foundation (ICF), and Gulf Coast Bird Observatory. Specific objectives were to: 1) advance knowledge of breeding, wintering, and migration ecology including threats to survival and population persistence; 2) disseminate research findings in reports, presentations, and peer-reviewed literature to provide reliable scientific knowledge for conservation, management, and recovery of whooping cranes; and 3) minimize negative effects of research activities to whooping cranes.

During Phase 1 of the WCTP, captured birds were fitted with a GPS/PTT (Global Positioning System/Platform Transmitting Terminal) satellite transmitter mounted on a two-piece leg band. Transmitters were programmed to record each bird's spatial location four times daily, recording both daytime and nighttime locations throughout the annual cycle. From December 2009 to February 2014, 68 whooping cranes were captured and marked with satellite transmitters; 37 adults and two juveniles were marked on the Texas Gulf Coast wintering grounds and 31 juveniles were marked during the breeding season in WBNP. Transmitters are expected to function for three to five years, but the number and frequency of GPS transmissions declines over time. By the end of 2018, Phase 1 transmitters were offline. Additional information on this project is available at the Platte River Program Whooping Crane Library.

Beginning in 2017, a renewed effort was made to capture whooping cranes and mark them with GPS tracking devices. This work is Phase 2 of the WCTP, which consists of four core partners: CWS, PCA, USFWS and USGS, with additional support from ICF, Calgary Zoo and the Joint Canada-Alberta Oil Sands Monitoring Program. Data collected through this project builds on monitoring conducted via satellite telemetry since 2010 and will be used to investigate potential risk to whooping cranes from industrial development (e.g., extraction of oil and gas, mining and wind power). During Phase 2, captured birds are fitted with GPS/GSM (GPS/Global System for Mobile Communication) transmitters and color leg bands. During 2017-2018, GPS/GSM transmitters were programmed to collect up to 48 GPS locations daily at equal time intervals and to upload location data to the GSM system every 24 hours. This data acquisition schedule allows for highly detailed information on diurnal and nocturnal (roosting) habitat use during all stages of the annual cycle, and on migratory behavior in spring and fall. Beginning in 2019, more frequent GPS location collections (up to 1440 locations daily) are programmed for certain locales (e.g., the oil sands region of Northern Alberta and in proximity to wind farms in U.S.) to allow fine-scale tracking of movement and habitat use through these specific areas of interest. From 2017 through 2023, WCTP partners marked 58 juvenile whooping cranes during the breeding season in WBNP and 53 adults and five juveniles on the Texas Gulf Coast during winter, for a total of 116 individuals.

Several scientific publications have resulted from WCTP activities. Please see the literature cited for a list of current publications.

Reintroduced Populations

Florida Non-Migratory Population

Whooping cranes were released in Florida from 1993 to 2004, with the goal of establishing a non-migratory population. Unfortunately, low productivity and high mortality prevented establishment of a self-sustaining population. Florida Fish and Wildlife Conservation Commission (FWC) ended intensive monitoring of the remaining 18 non-migratory cranes in June 2012. Since then, monitoring efforts have been opportunistic and relied heavily on public observations. A few pairs have continued to produce offspring.

As there are no plans for future reintroductions into this flock, a collaborative effort began in 2017 to translocate wild-hatched chicks and single cranes to Louisiana to aid in recovery efforts there. A partnership, consisting of FWC, Louisiana Department of Wildlife and Fisheries, White Oak Conservation, and the USFWS translocated the first two cranes in January 2019, another in November 2021, and two more in October 2022. Unfortunately, two of the five whooping cranes transferred from the discontinued Florida Non-migratory Population died during the report period, and a third was discovered with a severe, but non-fatal, leg injury. The remaining two cranes (both female) nested and successfully hatched at least one chick, one of which survived and fledged.

The Florida non-migratory population is now made up of five whooping cranes. There are plans to move a wild-hatched female to Louisiana, but capture has not been attempted. Following this translocation, the remaining four captive-reared cranes will continue to live out their lives in Florida.

Louisiana non-migratory flock[4]

The maximum size of the Louisiana Non-migratory Population (LNMP) as measured on June 30, 2024 was 82 fledged individuals (36 males, 34 females, 12 unknown) with 80 birds located in Louisiana and two of unknown or long term missing status. Additionally, there was one wild-hatched, pre-fledged chick on the landscape, not yet counted in the population totals. Based on location data generated via remote transmitters, cranes were documented in 24 parishes throughout Louisiana. Three LMNP cranes were documented in Texas during the report period, all spending just one night in the state before returning to Louisiana.

Four captive reared juvenile whooping cranes were received in early November 2023 from the Freeport-McMoRan Audubon Species Survival Center in New Orleans; three had been hatched and reared there while the remaining individual was raised at the Dallas Zoo. They were transported to the White Lake Wetlands Conservation Area in Vermilion Parish where they were banded and placed in the top-netted section of the release pen until their release five days later. Within a week, all four had left the marsh individually, with the two females quickly reuniting and remaining together. The two single male cranes both died within two months of release (one suspected predation, one due to gunshot). Additionally, five wild-hatched chicks from 2024 survived through the end of the report period.

During the 2024 breeding season, 15 pairs initiated 24 nests in seven different parishes in Louisiana, producing 15 wild-hatched chicks; seven pairs hatched one chick, three pairs hatched two, and one pair hatched two from two separate nesting efforts. All chicks hatched to their biological parents. Four chicks were confirmed fledged by the end of the report period and one was close to fledging at 71 days old (fledge later confirmed). Three pairs with chicks have successfully fledged chicks together in the past, one pair consisted of a female with rearing experience

[4] For the full 2023-24 report, see attached prepared by Louisiana Department of Wildlife and Fisheries

and an inexperienced male, and the last pair had some rearing experience together, with the female previously fledging chicks with a different mate.

Now in its 14th year, the Louisiana whooping crane reintroduction is focusing on the issues surrounding the high amount of embryo mortality that has been documented. We have collected two years of egg, eggshell and embryo samples, as well as a small number of samples from breeding females which our collaborators at the United States Geological Survey (USGS) Alaska Science Center will be examining. Despite the embryo mortality issue, we continue to see a small number pairs successfully hatching and fledging their own chicks in the wild.

Eastern Migratory Population[5]

The maximum size of the Eastern Migratory Population, as measured on January 1, 2024, was 75 whooping cranes. The majority spent the summer in Wisconsin, with the exception of two birds that spent the summer in Minnesota and South Dakota, separately. ICF recorded a total of 22 nests by 17 different pairs breeding in Wisconsin, not including hybrid sandhill-whooping crane nests. ICF collected eight eggs from four first nests for forced renesting, to encourage pairs to renest after black flies were no longer on the landscape. Additionally, they recovered two eggs from abandoned nests, and collected six additional eggs from partial clutch collection (took one egg from two two-egg clutches). In total, 18 eggs were brought into captivity for rearing and release. Seven chicks hatched from four first nests and one re-nest. One wild-hatched chick fledged and survived to migration.

ICF released five captive-reared whooping cranes into the wild. All five juveniles survived migration to the wintering grounds. There were three confirmed adult mortalities and one wild-hatched pre-fledged chick mortality during 2024.

Table 1. Estimated size of wild whooping crane populations in 2023-24.

Population	Date of Count	Male	Female	Unknown	Total	Breeding Pairs
Aransas-Wood Buffalo	January/May 2023	N/A	N/A	N/A	536	99
Eastern Migratory	January 2024	31	42	2	75	17
Louisiana Non-migratory	June 2024	36	34	12	82	15
Florida Non-migratory	June 2024	3	2	0	5	0
Total in wild populations					698	131

[5] For the full 2023 report, see attached prepared by International Crane Foundation

Table 2. Number of whooping cranes held at institutional members of American Zoological Association (AZA) Saving Animals From Extinction (SAFE) program on December 31, 2024. Institutions denoted with a star are designated as captive breeding centers.

Institution	Male	Female	Total
International Crane Foundation, Wisconsin*	23	23	47
Calgary Zoo, Alberta*	11	8	19
Audubon SSC (Species Survival Center), Louisiana*	10	6	16
Smithsonian Conservation Biology Institute, Virginia*	4	4	8
Dallas Zoo, Texas*	6	4	10
White Oak Conservation Center, Florida*	7	11	18
African Lion Safari, Ontario	2	2	4
Abilene Zoo, Texas	1	1	2
Audubon Zoo, Louisiana	1	1	2
Homosassa Springs Wildlife State Park, Florida	1	1	2
Houston Zoo, Texas	1	1	2
Milwaukee County Zoo, Wisconsin	1	1	2
Smithsonian National Zoo, Washington DC	1	1	2
Oklahoma City Zoo, Oklahoma	1	1	2
Northeastern Wisconsin Zoo, Wisconsin	1	1	2
San Antonio Zoological Gardens and Aquarium, Texas	1	1	2
Sylvan Heights Bird Park, North Carolina	1	1	2
Zoo New England, Massachusetts	1	1	2
Total in captive population	**74**	**70**	**144**

Acknowledgments

No one organization or individual is capable of providing all the necessary elements to recover the magnificent whooping crane. We see this recovery effort not only successful due to the great increase in the whooping crane population over the last 60 + years, but also the great deal of cooperation and collaboration that takes place amongst a wide variety of private, state and federal organizations alongside a slew of highly dedicated individuals. If not for everyone's continued effort to assist in the recovery of this species, it is likely that the species would have been extinct long ago. Our hope, as the biologists tasked by our respective agencies with the coordination of the recovery of this revered species, is that we can all continue to work together to ensure that the species is able to be removed from the endangered species list as recently occurred for the US national bird, the bald eagle. As the population continues to grow, a greater portion of the public will have opportunities to view and appreciate the majesty of the species. We want to thank all the organizations and individuals that contributed to this report along with the wide range of recovery efforts being undertaken. Special thanks to Matt Rabbe and Andy Stetter for providing summary write-ups to support this report.

Literature Cited

Canadian Wildlife Service. 2024. Recovery and Ecology of Endangered Whooping Cranes: Monitoring of the Aransas-Wood Buffalo Population during the 2023 Breeding Season. 10pp.

Louisiana Department of Wildlife and Fisheries, Wildlife Division. 2024. 2023-24 Louisiana Whooping Crane Report. 19pp.

Gordon, Nicki, Eleanor Laack, Hannah MacInnes, Alicia Ward, and Hillary Thompson. 2024. EMP Field Team Annual Report 2024. 12pp.

Publications and Open Data resulting from the Whooping Crane Tracking Partnership:

Baasch, D.M., P.D. Farrell, A.T. Pearse, D.A. Brandt, A.J. Caven, M.J. Harner, G.D. Wright, and K.L. Metzger. 2019. Avian Conservation and Ecology 10.5751/ACE-01317-140106

Butler, M.J., D.R. Stewart, G.M. Harris, M.T. Bidwell, and A.T. Pearse. 2022. Space use and site fidelity of wintering whooping cranes on the Texas Gulf Coast. Journal of Wildlife Management 10.1002/jwmg.22226

Crouch, C.G., A.J. Caven, M.R. Bradshaw, K.M. Fernald, M.J. Butler, and M.A. Kalisek. 2024. Space use and movements of inland wintering whooping cranes in the Aransas-Wood Buffalo population. Avian Conservation and Ecology 10.5751/ACE-02746-190216

Ellis, K.S, A.T. Pearse, D.A. Brandt, M.T. Bidwell, W. Harrell, M.J. Butler, and M. Post van der Burg. 2022. Balancing future renewable energy infrastructure siting and associated habitat loss for migrating whooping cranes. Frontiers in Ecology and Evolution 10.3389/fevo.2022.931260

Lehnen, S.E., S.E. Sesnie, M.J. Butler, A.T. Pearse, and K.L. Metzger. 2024. Management implications of habitat selection by whooping cranes (Grus americana) on the Texas coast. Ecosphere 10.1002/ecs2.4820

Niemuth, N.D., A.J. Ryba, A.T. Pearse, S.M. Kvas, D.A. Brandt, B. Wangler, J.E. Austin, and M.J. Carlisle. 2018. Opportunistically collected data reveal habitat selection by migrating whooping cranes in the U.S. Northern Plains. The Condor: Ornithological Applications 120:343–356.

Pearse, A.T., D.A. Brandt, W.C. Harrell, K.L. Metzger, D.M. Baasch, and T.J. Hefley. 2015. Whooping crane stopover site use intensity within the Great Plains, U.S. Geological Survey Open-File Report 2015–1166.

Pearse, A.T., M.J. Harner, D.M. Baasch. G.D. Wright, A.J. Caven, and K.L. Metzger. 2017. Evaluation of nocturnal roost and diurnal sites used by whooping cranes in the Great Plains, United States. U.S. Geological Survey Open-File Report 2016–1209.

Pearse, A.T., M. Rabbe, L.M. Juliusson, M.T. Bidwell, L. Craig-Moore, D.A. Brandt, and W. Harrell. 2018. Delineating and identifying long-term changes in whooping crane (Grus americana) migration corridor. PLoS ONE 13:e0192737.

Pearse, A.T., M. Rabbe, M.T. Bidwell, L.M. Juliusson, L. Craig-Moore, D.A. Brandt, and W. Harrell. 2018. Map of whooping crane migration corridor: U.S. Geological Survey data release 10.5066/F7FT8K74

Pearse, A.T., D.A. Brandt, B.K. Hartup, and M.T. Bidwell. 2018. Mortality in Aransas-Wood Buffalo whooping cranes: timing, location, and causes. Pages 125–138 in J.B. French, Jr., S.J. Converse, and J.E. Austin, editors, Whooping Cranes: Biology and Conservation. Biodiversity of the World: Conservation from Genes to Landscapes. Academic Press, San Diego, CA.

Pearse, A.T., K.L. Metzger, D.A. Brandt, M.T. Bidwell, M.J. Harner, D.M. Baasch and W. Harrell. 2020. Heterogeneity in migration strategies of whooping cranes. Condor 122:1.

Pearse, A.T., D.A. Brandt, D.M. Baasch, M.T. Bidwell, J.A. Conkin, M.J. Harner, W. Harrell, and K.L. Metzger. Location data for whooping cranes of the Aransas-Wood Buffalo population, 2009-2018: U.S. Geological Survey data release 10.5066/P9Y8KZJ9

Pearse, A.T., K.L. Metzger, D.A. Brandt, J.A. Shaffer, M.T. Bidwell, and W. Harrell. 2021. Migrating whooping cranes avoid wind-energy infrastructure when selecting stopover habitat. Ecological Applications 10.1002/eap.2324

Pearse, A.T., A.J. Caven, D.M. Baasch, M.T. Bidwell, J.A. Conkin, and D.A. Brandt. 2024. Flexible migration and habitat use strategies of an endangered waterbird during hydrological drought. Conservation Science and Practice 10.1111/csp2.13120

Pearse, A.T., A.J. Caven, D.M. Baasch, M.T. Bidwell, J.A. Conkin, and D.A. Brandt. 2024. Whooping crane stopover habitat use and migration movement data in relation to drought severity, 2010-2022: U.S. Geological Survey data release 10.5066/P9KDY2TX.

Recovery and Ecology of Endangered Whooping Cranes: Monitoring of the Aransas-Wood Buffalo Population during the 2023 Breeding Season

Canadian Wildlife Service
Prairie Region, Environment and Climate Change Canada
Government of Canada

Summary

Annual, long-term monitoring of the Aransas-Wood Buffalo Population of whooping cranes (*Grus americana*), which numbers approximately 536, is a key element of Canada's efforts to recover the species under the *Species at Risk Act*. In 2023, Parks Canada staff from Wood Buffalo National Park (WBNP) led surveys for whooping cranes in breeding areas in southern Northwest Territories and northern Alberta, in and adjacent to WBNP, with support from the Canadian Wildlife Service. Breeding pair surveys in May detected 99 nests; 14 pairs without nests were also observed. Thirty-four nests were outside the area designated as critical habitat and 19 of those were outside WBNP, representing the highest values for these metrics since monitoring began in 1966. Surveys in July-Aug detected 40 juveniles in 38 family groups. Annual productivity was 0.40 juveniles per nest, which is below the 20-year average of 0.50. Results of monitoring in 2023 highlight the continued increase in the breeding population (although still well below Canadian and international recovery goals) and the associated expansion of the breeding range outside WBNP and areas designated as critical habitat.

In addition to long-term monitoring of the breeding population, Canadian Wildlife Service worked collaboratively with partners in 2023 to conduct scientific activities designed to improve our knowledge of the ecology of whooping cranes. In May and June, we performed fieldwork to identify factors that may limit nest success of Aransas-Wood Buffalo Population whooping cranes by deploying remote cameras with time-lapse surveillance, autonomous recording units and water level loggers at 20 crane nests. We also continued efforts to monitor movement, behaviour and survival of whooping cranes throughout the annual cycle by capturing and banding 12 fledged juveniles in and near WBNP with coloured leg bands and GPS transmitters. Data collected through this project builds on existing baseline monitoring conducted via satellite telemetry since 2010 and is being used to investigate potential risk to cranes from industrial development.

Background and Rationale

The Government of Canada and its partners, via implementation of the Recovery Strategy for the Whooping Crane in Canada (hereafter RS, Environment Canada 2007) and the joint US-Canada International Recovery Plan (hereafter IRP, CWS and USFWS 2007), aims to protect, restore and manage the whooping crane to be self-sustaining in the wild by establishing 1,000 individuals in North America by 2035 (Environment Canada 2007). By reaching this goal and achieving other recovery criteria, the species may be considered for re-designation from Endangered to Threatened under the *Species at Risk Act* (SARA) in Canada, and under the *Endangered Species Act* in the United States. Coordination of activities designed to recover the species, including establishment and operation of a joint International Recovery Team, is

governed by a memorandum of understanding between the Canadian Wildlife Service (CWS) of Environment and Climate Change Canada (ECCC), Parks Canada Agency (PCA), the US Fish and Wildlife Service (USFWS) and the US Geological Survey (USGS).

The only naturally occurring population of whooping cranes, the migratory Aransas-Wood Buffalo Population (AWBP), which numbers about 536 individuals during winter 2022-23 (USFWS 2023), spends half of its annual cycle in Canada. During the summer breeding season, breeding adults and some non-breeding sub-adults reside in and adjacent to Wood Buffalo National Park (WBNP) in Alberta and the Northwest Territories. During fall, cranes spend up to six weeks staging in central Saskatchewan before migrating to the Texas Gulf Coast where they spend winter in and near the Aransas National Wildlife Refuge. During spring migration, cranes return to WBNP and adjacent areas via Saskatchewan, for initiation of breeding in May.

Annual monitoring of the AWBP by CWS and our partners is a key element of Canada's implementation of the RS and IRP and is specified in those documents as an activity required to achieve recovery goals. Data collected are used to (1) track progress towards recovery goals by estimating the abundance and productivity of breeding pairs annually; (2) identify and designate areas as critical habitat (CH) (i.e., areas vital to the survival or recovery of cranes) under SARA; and (3) predict future population dynamics and range expansion of the AWBP. Most breeding pairs nest inside WBNP, but the population has expanded its range outside the national park with up to 18 pairs nesting annually in the Northwest Territories, and up to two pairs on Salt River First Nation reserve lands.

Given the population's small size, we monitor almost all breeding individuals by conducting annual aerial surveys of (1) breeding pairs and nests in late spring and (2) juveniles in mid-summer. Information obtained from both surveys is used to derive metrics required by the RS and IRP to track progress towards recovery (i.e., number of breeding pairs, annual productivity). Aerial surveys are conducted in the core breeding areas within WBNP, and in areas outside the national park. This monitoring work has been conducted annually since 1966 by CWS, and in close cooperation with PCA since 2011.

Habitat Conditions in Breeding Areas

Annual precipitation at Fort Smith, Northwest Territories preceding the breeding season (May 2022 to April 2023) was 63% of the 60-year average (Environment and Climate Change Canada 2023). Despite below-average annual precipitation prior to the breeding season, water levels in the whooping crane breeding areas were sufficient for nesting cranes during May and June. However, warm temperatures (122% of the 60-year average) and scant precipitation (28% of the 60-year average) throughout the breeding season (May to September, Environment and Climate Change Canada 2023) led to substantial reduction in water levels during chick-rearing and fledging periods. During fieldwork in July and August, observers noted that water had receded significantly from May-levels and some breeding-area ponds were dry. Dry conditions typically translate to reduced whooping crane productivity due to reduced abundance of aquatic food sources and increased predation by terrestrial predators.

Persistently dry and warm conditions contributed to an extreme wildfire season in the Northwest Territories and WBNP. In the South Slave Region of the Northwest Territories, 1,775,523 ha were affected by wildfires (GNWT 2023). Inside WBNP, wildfire affected 930,145 ha or 20% of the park (vs. the 25-year average of 1.6%) and 18,182 ha or 4.5% of the area designated as critical habitat (vs. the 25-year average of 1.4%). Despite extensive fire activity in portions of the whooping crane breeding range, burning inside nesting areas was relatively

minimal. Fires occurred in the Nyarling River and Seton Creek nesting areas, but not in close proximity to active breeding territories. An extensive fire affecting the Salt Plains and Lobstick Creek nesting areas during August likely affected habitat in two breeding territories, but fire-related mortality of whooping cranes is not suspected (flightless young were not detected at those locations during surveys prior to fire activity).

Abundance of Breeding Pairs and Juveniles

In 2023, aerial surveys to estimate abundance of breeding pairs with and without nests were conducted May 21-25 using methods described in Johns (2010). Observers detected 99 nests and 14 pairs without nests (Table 1, Figure 1). Of the 99 nests, 34 were outside the area designated as containing CH and 19 of those were outside WBNP. Of the nests outside WBNP, where CH has not yet been identified, 18 were north of the Nyarling River and one was on Salt River First Nation reserve lands (i.e., Lobstick Creek) east of WBNP. Breeding pair surveys were conducted by Lori Parker, Alyssa Pryor, Katherine LaPointe and Nicolas Comerford (PCA), and Ronnie Schaefer and Earl Evans (local community members) using an EC-120 helicopter (Phoenix Heli-flight, Fort McMurray, AB).

Aerial surveys to estimate abundance of juveniles were conducted July 27-30 and August 6, 2023. Observers detected 40 juveniles in 38 family groups and 42-49 pairs without juveniles (Table 1). Of the 38 family groups, 36 were pairs with one juvenile and two were pairs with two juveniles. Using information collected during the breeding pair and juvenile surveys, we determined that annual productivity was 0.40 juveniles per nest which is well below the 20-year average of 0.50 (Figure 2). Juvenile surveys were done by Lori Parker, Alyssa Pryor, Katherine LaPointe and Nicolas Comerford (PCA), and Earl Evans and Cochise Paulette (local community members) using an EC-120 helicopter (Phoenix Heli-flight, Fort McMurray, AB).

Effects of Predation and Weather on Whooping Crane Nest Success

In 2019, we initiated a project designed to evaluate nest success of AWBP cranes and identify factors that may limit nest success using remote cameras with time-lapse surveillance, acoustic recorder units (ARUs) and water level gauges at nest sites. This project represents a multi-agency effort between ECCC, PCA, USFWS and Calgary Zoo/Wilder Institute with specific objectives to (1) determine nest failure and success rates; (2) quantify causes of nest failure (e.g., predation, weather) and associations with reproductive behaviour (e.g., incubation); (3) evaluate the impacts of variation in nest survival on recruitment rates and population growth.

To ensure that equipment placement does not adversely affect nest success, activities under this project are implemented using a staged approach. A pre-pilot study was conducted at 11 inactive nests in 2019 to confirm that deployment of equipment near whooping crane nests does not increase predator activity at nest sites, and a pilot study at 10 active nests in 2022 was used to evaluate other possible adverse effects to cranes such as heightened anxiety or nest abandonment. Analysis of remote camera imagery and audio recordings from ARUs during the pre-pilot effort indicate that predator activity is not increased at treatment sites with monitoring equipment placed near inactive nests, and nest abandonment and heighted anxiety was not observed at active nests sampled in 2022.

Given positive results of pre-pilot and pilot studies, ECCC and partners proceeded with the full study by deploying monitoring equipment at active 20 nests in May 2023. Preliminary analysis of sampled nests indicates that 15 hatched at least one egg, one was depredated (black

bear), and four were abandoned during late stages of incubation (two of these were presumed to have infertile eggs). In 2023, project fieldwork was conducted by Mark Bidwell, John Conkin, Maureen Freemark, Susari Malala Irungal Bandaralage, and Lukas Mundy (ECCC), Hannah Edwards (Calgary Zoo/Wilder Institute), and Mike Forsberg.

Capture and Banding of Fledged Juveniles

In 2009, a multi-agency, collaborative project to capture and mark whooping cranes was initiated to monitor movement, behaviour and survival of cranes during all aspects of their annual cycle. That project, which continued through 2016, was carried out by the Whooping Crane Tracking Partnership (WCTP, Phase 1), a cooperative effort between five core partners: ECCC, USGS, USFWS, the Crane Trust and Platte River Recovery Implementation Program, with support from PCA, the International Crane Foundation (ICF) and the Gulf Coast Bird Observatory. Specific objectives were to 1) advance knowledge of breeding, wintering and migration ecology including threats to survival and population persistence; 2) disseminate research findings in reports, presentations and peer-reviewed literature to provide reliable scientific knowledge for conservation, management and recovery of whooping cranes; and 3) minimize negative effects of research activities to whooping cranes.

During Phase 1 of the WCTP, captured birds were fitted with a GPS/PTT (Global Positioning System/Platform Transmitting Terminal) satellite transmitter and unique colour leg bands. Transmitters were programmed to record each bird's spatial location four times daily, logging both daytime and nighttime locations throughout the annual cycle. From December 2009 to February 2014, 68 whooping cranes were captured and marked with transmitters; 37 adults and two juveniles were marked on the Texas Gulf Coast wintering grounds and 31 juveniles were marked during the breeding season in WBNP.

Beginning in 2017, a renewed effort was made to capture whooping cranes and mark them with GPS tracking devices. This work is Phase 2 of the WCTP, which consists of core partners, ECCC, PCA, USFWS and USGS, with support from ICF, Calgary Zoo and the Joint Canada-Alberta Oil Sands Monitoring Program. Data collected through this project will build on existing baseline monitoring conducted under Phase 1 and will be used to investigate potential risk to whooping cranes from industrial development. During Phase 2, captured birds are fitted with GPS/GSM (GPS/Global System for Mobile Communication) transmitters with Global Positioning System capabilities and colour leg bands. During 2017 and 2018, GPS/GSM transmitters were programmed to collect up to 48 GPS locations daily at equal time intervals and to upload location data to the GSM system every 24 hours. This data acquisition schedule allows for highly detailed information on diurnal and nocturnal (roosting) habitat use during all stages of the annual cycle, and on migratory behaviour in spring and fall. Beginning in 2019, more frequent GPS location collections (up to 1440 locations daily) were programmed for certain locales (e.g., the oil sands region of Northern Alberta and in proximity to wind farms in U.S.) to allow fine-scale tracking of movement and habitat use through these specific areas of interest. From 2017 through 2022, ECCC and WCTP partners marked 46 juvenile whooping cranes during the breeding season in and near WBNP, and USFWS and WCTP partners marked 53 adults and five juveniles during winter on the Texas Gulf Coast.

In August 2023, ECCC and WTCP partners again marked juveniles in and around WBNP. Family groups with young suitable for capture were located during juvenile fledging success surveys. During capture attempts, the helicopter circled to find a suitable landing spot to position the capture crew on the ground (typically 200-300 meters from the family group). The

ground team consisted of John Conkin (ECCC), Valerie Edwards and Dr. Sandra Black, DVM (Calgary Zoo), and Alyssa Pryor (PCA); an observer (Lori Parker, PCA) remained in the helicopter to provide direction to the ground team via radio. From August 2 to 5, 12 cranes were captured and banded with a satellite transmitter. For marked cranes, blood and feather samples were collected and basic biometric measurements (culmen, wing chord, tarsus and weight) were taken. Finally, Dr. Black performed a general assessment of the health of each bird before it was released. Capture activities were conducted using an AS350B2 helicopter operated by Phoenix Heli-flight.

Management Considerations

We confirmed nesting by 99 pairs in late spring, producing an average of 0.40 juveniles per nest by mid-summer. While the number of confirmed nests has increased steadily since surveys began in 1966, it also varies annually (Figure 2) possibly in response to environmental conditions during the breeding season. The ratio of juveniles to nests, which is an estimate of breeding success for the population, also varies annually (Figure 2) in response to environmental conditions but also in a periodic manner that tracks the 10-year boreal hare-lynx cycle (Boyce et al. 2005) likely because of periodicity in abundance of predators (e.g., wolves, lynx, red fox).

The 2023 nest count is among the highest on record and reflects the gradual but steady increase in the breeding population over time (Figure 2). Even so, the AWBP is many years away from achieving the Canadian down-listing goal of 250 productive pairs (Environment Canada 2007). Recovery of the species currently depends on growth of the AWBP, so monitoring should continue until recovery goals are reached (CWS & USFWS 2007). Thirty-four nests were detected outside the area designated as CH (Environment Canada 2007) under SARA, and 19 of these were outside WBNP, representing the highest values for these metrics and emphasizing the continued expansion of the AWBP's breeding range outside WBNP and areas designated as CH. The first nest outside WBNP was detected in 1982 on reserve lands of the Salt River First Nation, east of WBNP, and in 1998 cranes were detected nesting north of WBNP, in the Northwest Territories. Up to 35% of nests occur outside CH annually, as defined in the current recovery strategy. Although cranes are protected under SARA and the *Migratory Birds Convention Act* wherever they occur, breeding habitat is not formally protected under federal legislation unless it is identified as CH. SARA prohibits destruction of CH in federal protected areas (e.g., WBNP) and includes measures that could protect CH in other areas. Moreover, up to 20% of nests occur outside WBNP annually, and these nests and associated habitat are not protected under the *Canada National Parks Act* or related regulations. Because the breeding range of whooping cranes has expanded outside existing CH into areas that could be impacted by human development, ECCC supports efforts to update CH identification to ensure it more closely corresponds to current and probable future breeding ranges of the species.

Acknowledgements

Financial and logistical support was provided by Environment and Climate Change Canada, Parks Canada, Calgary Zoo/Wilder Institute, United States Fish and Wildlife Service and United States Geological Survey. Activities were conducted under Environment and Climate Change Canada Scientific Permit SC-NR-2022-NT-001, Environment and Climate Change Canada Western & Northern Animal Care Committee Permit 23MB01, Environment and Climate Change Canada Permit to Capture and Band Migratory Birds 10975, Northwest

Territories Wildlife Research Permit WL501043, Northwest Territories Wildlife Care Committee Permit NWTWCC2022-003 and Parks Canada Agency Research and Collection Permit WB-2022-41918.

Literature cited

Boyce M.S., Lele S.R. & Johns B.W. 2005. Whooping crane recruitment enhanced by egg removal. Biological Conservation, 126:395-401.

COSEWIC. 2010. COSEWIC assessment and status report on the Whooping Crane *Grus americana* in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa. https://wildlife-species.canada.ca/species-risk-registry/virtual_sara/files/cosewic/sr_Whooping%20Crane_0810_e.pdf

CWS (Canadian Wildlife Service) and USFWS (U.S. Fish and Wildlife Service). 2007. International recovery plan for the whooping crane. 162 pp. https://www.fws.gov/uploadedFiles/WHCR%20RP%20Final%207-21-2006.pdf h

Environment Canada. 2007. Recovery Strategy for the Whooping Crane (*Grus americana*) in Canada. vii + 27 pp. Retrieved in Oct 2015 from: http://www.sararegistry.gc.ca/virtual_sara/files/plans/rs_whooping_crane_final_1007_e.pdf

Environment and Climate Change Canada. 2023. Historical Climate Data. Meteorological Service, Government of Canada. http://climate.weather.gc.ca/index_e.html#access

GNWT (Government of the Northwest Territories). 2023. Wildfire Update. Department of Environment and Climate Change. Retrieved in Oct 2023 from: https://www.gov.nt.ca/ecc/en/services/wildfire-update

Johns, B. 2010. Aerial survey techniques for breeding whooping cranes. Proceedings of the North American Crane Workshop 11:83-88.

USFWS (United States Fish and Wildlife Service). 2023. Whooping Crane Survey Results: Winter 2022-2023. https://www.fws.gov/sites/default/files/documents/WHCR%20Update%20Winter%202022-2023.pdf

Table 1. The number and type of observations of whooping cranes that were detected during breeding pair and juvenile surveys in May and July-Aug 2023, respectively.

Observation type	May	July-Aug
Nests	99	n/a
Adults on or near nests	132	n/a
Pairs without nests	14	n/a
Pairs with juveniles	n/a	38
Juveniles	n/a	40
Pairs without juveniles	n/a	42-49
Lone cranes	40-43	14
Total cranes	204-207	214-228

Notes:
(i) Because cranes may move over the duration of the survey, ranges reflect the possible number of unique individuals or unique pairs. The main objectives of the surveys are to obtain estimates of (a) nests and (b) pairs with juveniles, which are reported with more precision.

(ii) Many lone cranes observed in May are likely mates of adults detected on nests.

Figure 1. Density per 100 km^2 of whooping crane pairs, with and without nests, detected during the breeding pair survey in May 2023.

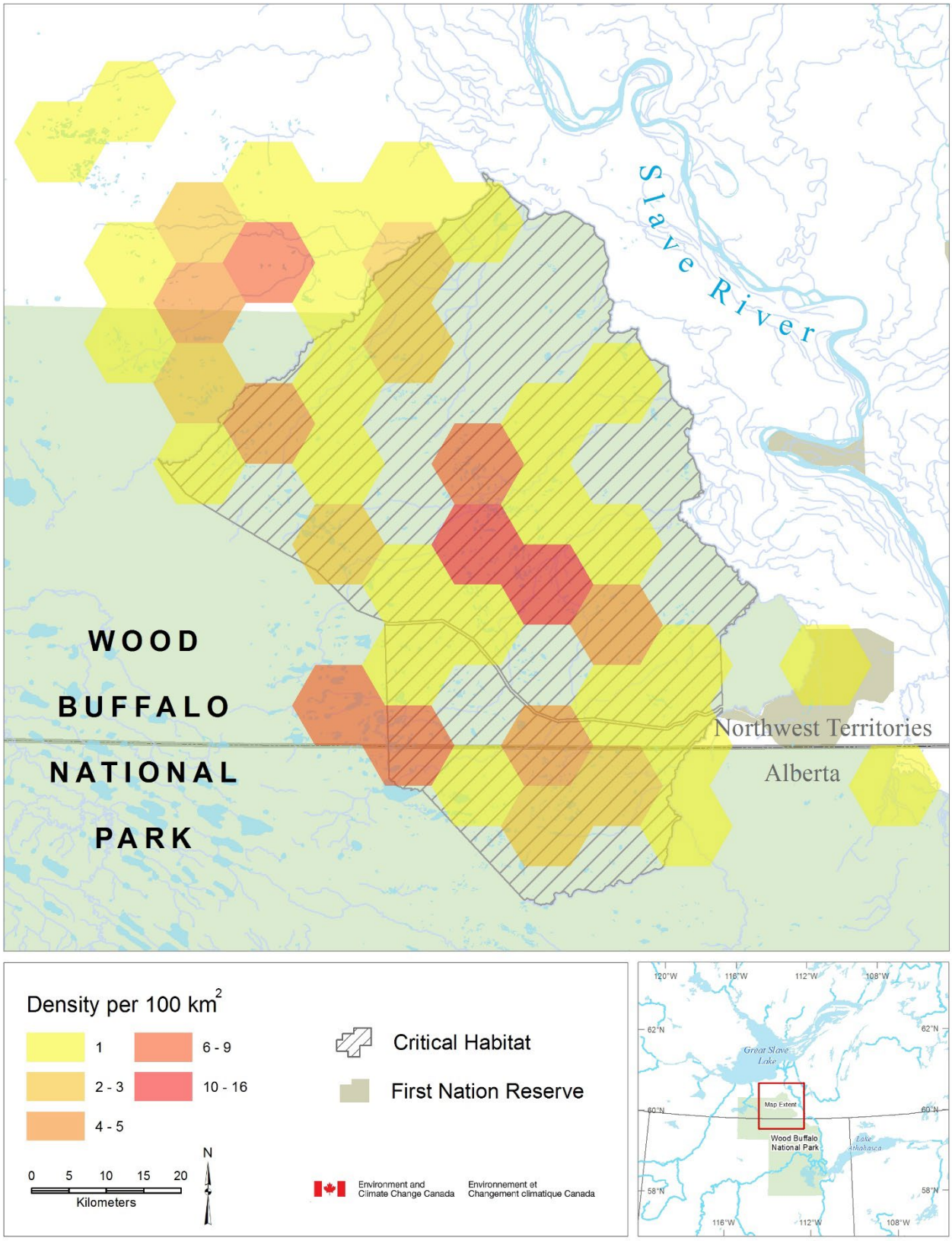
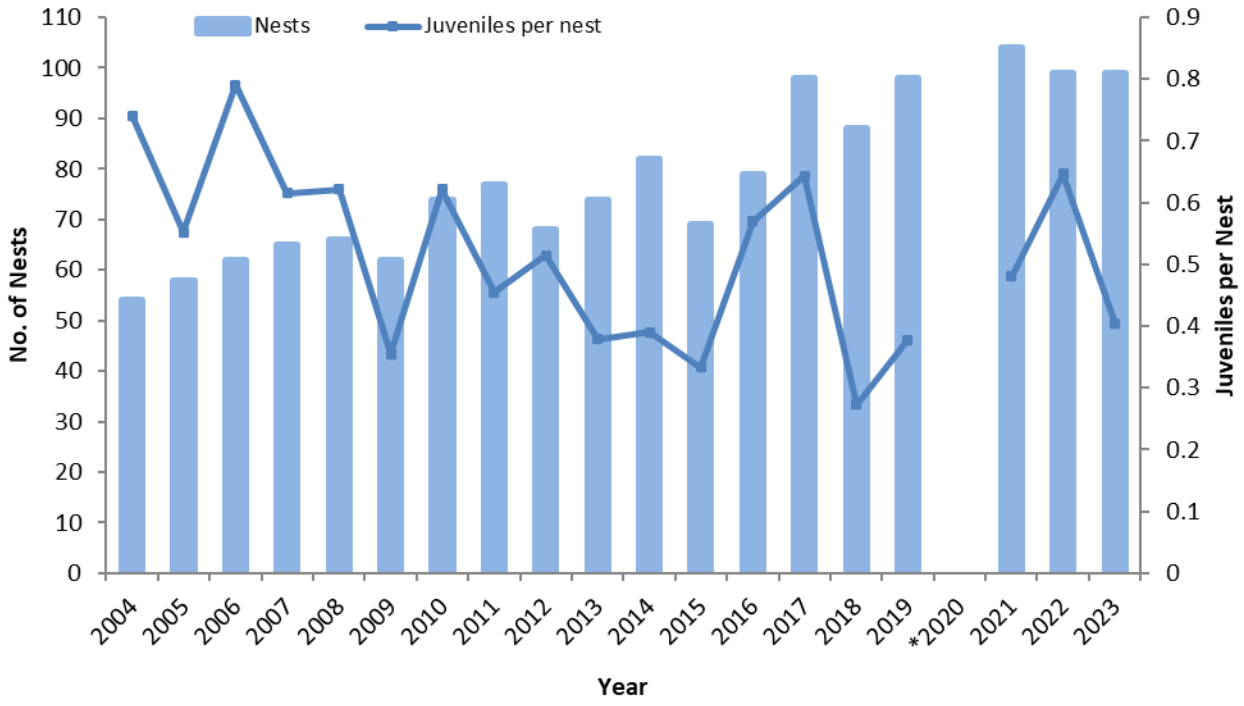


Figure 2. The number of whooping crane nests, and juveniles per nest, detected during aerial surveys from 2004-2023. The number of nests and juveniles are estimated during breeding pair (May) and juvenile (July-August) surveys, respectively; the number of juveniles per nest is calculated using information from both surveys. *Aerial surveys were not conducted during 2020 due to restrictions related to the COVID-19 pandemic.



Appendix A. List of acronyms used in this report.

Acronym	Description
AWBP	Aransas-Wood Buffalo Population
CH	Critical Habitat
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service
ECCC	Environment and Climate Change Canada
IRP	US-Canada International Recovery Plan
PCA	Parks Canada Agency
RS	Recovery Strategy for the Whooping Crane in Canada
SARA	Species at Risk Act
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WBNP	Wood Buffalo National Park

2023-2024 Louisiana Whooping Crane Report

Louisiana Department of Wildlife and Fisheries

Wildlife Division

1 July 2023 through 30 June 2024

EXECUTIVE SUMMARY

The maximum size of the Louisiana non-migratory population at the end of the report period was 82 individuals (36 males, 34 females, 12 unknown) with 80 birds located in Louisiana and two of unknown or long term missing status. This total does not include one wild-hatched juvenile that was close to fledging (71 days old), but fledge was not confirmed until shortly after the end of the report period. Based on location data generated via remote transmitters, we documented cranes in 24 parishes throughout Louisiana. Only three cranes were documented in Texas during the report period, all spending just one night in the state before returning to Louisiana.

Unfortunately, two of the five whooping cranes transferred from the discontinued Florida non-migratory population died during the report period, and a third was discovered with a severe, but non-fatal, leg injury. The remaining two cranes (both female) nested and successfully hatched at least one chick, one of which survived and fledged shortly after the end of the period covered by this report.

Four captive reared juvenile whooping cranes (2 parent-reared males, 2 costume reared females) were received in early November 2023 from the Freeport-McMoRan Audubon Species Survival Center in New Orleans. Three had been hatched and reared at this location and one had been reared by a pair of captive cranes at the Dallas Zoo's Whooping Crane Center of Texas and transported to New Orleans on 27 September where he was socialized with the other chicks. They were transported to the White Lake Wetlands Conservation Area (WLWCA) in Vermilion Parish on 7 November, banded and placed in the top-netted section of the release pen until their release five days later. Within a week, all four had left the marsh individually, with the two females quickly reuniting and remaining together. The two single male cranes both died within two months of release (one suspected predation, one due to gunshot). Additionally, five wild-hatched chicks from 2024 survived through the end of the report period.

During the 2024 breeding season, 15 pairs initiated 24 nests in seven different parishes in Louisiana, producing 15 wild-hatched chicks; seven pairs hatched one chick, three pairs hatched two, and one pair hatched two from two separate nesting efforts. All chicks hatched to their biological parents. Four chicks were confirmed fledged by the end of the report period and one was close to fledging at 71 days old (fledge later confirmed). Three pairs with chicks have successfully fledged chicks together in the past, one pair consisted of a female with rearing experience and an inexperienced male, and the last pair had some rearing experience together, with the female previously fledging chicks with a different mate.

Now in its 14th year, the Louisiana whooping crane reintroduction is focusing on the issues surrounding the high amount of embryo mortality that has been documented. We have collected two years of egg, eggshell and embryo samples, as well as a small number of samples from breeding females which our collaborators at the United States Geological Survey (USGS) Alaska Science Center will be examining. Despite the embryo mortality issue, we continue to see a small number pairs successfully hatching and fledging their own chicks in the wild.

DISTRIBUTION

Whooping cranes were monitored via remote tracking devices and in real time via very high frequency (VHF) transmitters in order to record movement, assess behaviors indicative of nesting and molting, and document the general health and survival of the population. Remote monitoring was accomplished using three types of GPS transmitters: two developed by Microwave Telemetry, Inc.: 22-g solar Argos/GPS platform transmitter terminals (PTT) and 25-g solar Global System for Mobile Communications (GSM)/GPS transmitters along with a newer GPS/GSM design developed by Ornitela. The PTTs are programmed to collect data three times per day (06:00, 14:00, and 22:00 GMT) and transmit data every 48 hours. The Microwave GSM transmitters collect numerous location points throughout the day and transmit data approximately once per day, whenever cranes are within range of cell towers. The Ornitela transmitters can be programmed to collect and transmit data at different times, even after deployment. Programming for these transmitters varied but was set mainly to collect a data point every hour or half an hour throughout the day (with decreased collection for transmitters that had lower battery levels) and transmit data two to three times per day. Based on the data collected, cranes were documented in 24 parishes in Louisiana and seven counties in Texas during the reporting period. Distribution maps can be found in Figures 1 and 2.

Use of Distant Locations

No cranes were documented using locations greater than 325 kilometers (approximately a one-day flight) from the release area during the report period.

MOLTING

In 2024, molting was confirmed in three individuals: L10-15 (nine-year-old female), L4-21 (three-year-old male), and a wild-hatched, unbanded bird (two- or three-year-old, unknown sex) that died due to a vehicle collision while in molt. We strongly suspect a number of other cranes also molted during the report period based on extended periods of limited movement during the spring and summer when molting takes place, feather condition in past years, and previous suspected or confirmed molts along with behavior of their mates. These include L3-22 and one member of each of the following pairs: L11-17/L7-11, L16-17/L6-16, and LW3-18/L21-17.

CAPTURES

Five captures of free-flying cranes were made on 18 days of attempts from 3 November 2023 – 11 April 2024. Three captures were hand grabs and two were via a leg noose. All captures were for the purpose of banding or transmitter replacement. More information can found in Table 1.

PAIRING AND REPRODUCTION

During the 11th year of nesting by the Louisiana flock, a total of 24 nests by 15 pairs were confirmed in seven parishes (Acadia, Allen, Avoyelles, Calcasieu, Cameron, Jefferson Davis, and Vermilion) in central and southwestern Louisiana in 2024 (Figure 3). All pairs consisted of individuals who had previous experience nesting together. One pair that nested in 2021 and remain together have not been documented nesting again. One additional pair (both wild-hatched and unbanded) were observed sitting on a platform in Rapides Parish during a single observation, however due to severe weather which resulted in movement of the platform across the field, presence of eggs was unable to be confirmed and this possible nest is not counted in the nesting totals. Two additional pairs were observed with platforms but did not lay eggs.

Eighteen nests from 10 pairs were located on private agricultural properties, all but two (1 fallow, 1 rice) in actively crawfished fields, while the remaining six nests from five pairs were located in marsh habitats; two in the WLWCA marsh and three in marsh habitat on private property. First nesting attempts were initiated in January (1), February (4), March (7), and April (3). Re-nesting attempts were initiated an estimated average of 17 days after the first nest attempt was completed or a chick disappeared (two instances) and occurred during March (1), April (2) and May (3). Two third nesting attempts were initiated in April (1) and May (1) and a fourth attempt was initiated in June. Nesting season ran

from 23 January, with the initiation of the first nest, until 26 June, when a single (rotten) egg was pulled from a fourth nest attempt a week prior to full term incubation.

A minimum of 42 eggs were produced in 2024. Twenty-nine eggs were confirmed fertile, of which 12 died prior to hatch (5 early dead, 2 mid-dead, 5 late dead) and 16 successfully hatched; 15 in the wild and one in captivity. One additional egg is presumed to have hatched based on evidence found at the nest, but with no additional evidence of a chick, it is not included in the chick totals. Four other intact eggs were collected and were determined to be non-viable and the remaining nine eggs disappeared or broke at the nest.

Of the 24 confirmed nests, four were incubated to full term or beyond with no hatch, five were abandoned or failed prior to full term, 12 successfully hatched 15 chicks, one nest had eggs replaced with a dummy egg but was then later abandoned, one outcome is unknown (but is a presumed hatch) and a single egg from one nest was pulled prior to full term. Up to three nest failures may have been caused by severe weather conditions and a lack of vegetation for nest maintenance may have also contributed to failure in two of these cases.

The remaining two females who were translocated from the discontinued Florida reintroduction project both nested in 2024. The older female (LF1-98) nested with her mate, L10-18, in Jefferson Davis Parish. They successfully hatched their single egg, and their chick (LW9-24) remained alive and was close to fledging by the end of the report period (71 days old). Female LFW12-15 and mate L5-18 had one nest attempt in Cameron Parish, successfully hatching at least one of their two eggs, however the chick (LW12-24) disappeared shortly after hatch. Of note, this is the first time this pair is known to have had a fertile egg, despite four previous nesting attempts during 2021-2023.

Summary of breeding history from 2014 to 2024 is displayed in Table 2, and complete nesting histories can be found in Appendix A.

Chicks

In 2024, 15 chicks hatched to 11 pairs (seven pairs hatched one chick; three pairs hatched two and one pair hatched two from two different nesting attempts). All chicks hatched to their biological parents and five (from five pairs) ultimately survived to fledging, with fledging of one confirmed shortly after the end of the reporting period. Earliest confirmed fledging (one chick) occurred by/on 74 days old. The remaining ten chicks disappeared or died between 0-15 days of age.

Four chick deaths were confirmed via discovery of remains or evidence from trail cameras placed at nests:

LW2-24: hatched 23 February in Calcasieu Parish to pair L6-16 & L16-17. Trail camera photos show the chick disappeared on 2 March after leaving the nest with its family in the morning and not returning that evening.

LW7-24: hatched on 7 April in Jefferson Davis Parish to pair L5-14 & L12-16. Trail camera photos show that strong winds moved the nest from its original location on the morning of 10 April, and the chick's carcass and the unhatched second egg were located the following day, floating in the water along one of the fields' levees.

LW10-24: hatched on 22 April in Jefferson Davis Parish to pair L12-17 & LW1-18. Trail camera photos show the family at the nest for roost on the evening of 27 April when a large snake (unknown species) disturbed them, crawling onto the nest shortly after 9pm. The chick was no longer seen after the snake left.

LW15-24: hatched on 16 June in Jefferson Davis Parish to pair L12-17 & LW1-18. Trail camera photos show the chick moving around on the nest and then floating, dead, in the water at the edge of the nest later that same day.

Pair Information

Pair, as used in this section, refers to consistent association between a male and a female that were observed copulating, nest building, or were together mainly exclusive of other individuals for at least 30 days.

Formed	Dissolved
LW5-21/L7-22, September	L9-19/L7-22, July, death of male
L8-16/L4-19, October	LW6-21/Wild, summer
L8-14/L4-21, December	L4-19/FW12-19, October, death of female
Wild/Wild, January	L13-14/L6-15, March, death of male
L8-14/LW2-20, March/April	L8-14/L4-21, March/April
L6-15/L4-21, June	L15-17/L17-17, June, death of male
	Wild/Wild, June, death of one member

In addition to the 15 pairs who laid eggs in 2024, two other pairs were observed with platforms but did not lay eggs: L13-16/LW3-17 in Cameron Parish and L25-16/L6-19 in Vermilion Parish.

Current Population Structure

The population contained a maximum of 82 individuals as of 30 June 2024.

Confirmed breeding pairs (i.e., have produced eggs): 18
LF1-98/L10-18, L2-11/L13-11, L3-11/L1-13, L7-11/L11-17, L11-11/L1-19, L2-12/L3-14, L5-14/L12-16, L2-15/L11-15, L10-15/L19-16, LFW12-15/L5-18, L6-16/L16-17, L17-16/L9-18, L23-16/L3-17, L9-17/L12-18, L12-17/LW1-18, L14-17/L3-21, L21-17/LW3-18, L7-18/L3-19

Pairs that built platforms in 2024: 2
L13-16/LW3-17, L25-16/L6-19

Pairs without confirmed breeding activity or newly formed pairs: 7
L1-12/L10-19, L8-14/LW2-20, L6-15/L4-21, L8-16/L4-19, L10-17/L6-18, L1-18/LW7-21(?), LW5-21/L7-22

Unpaired adult males: 7
L6-13, LFW29-16, L8-19, LW6-21, L3-22, L4-22, LW4-22

Unpaired adult females: 5
L17-17, L1-22, L2-22, L9-22, L10-22

Long-term missing and/or suspected dead: 1
L13-18

Unbanded wild-hatched: maximum of 4*
LW14-21, LW5-22, LW9-22, LW11-22, LW13-22

*five cranes are listed but one (unknown ID) was found dead during the report period

Yearlings (HY2023): 7
L2-23, L3-23, LW1-23, LW3-23, LW4-23, LW9-23, LW14-23

Wild-fledged juveniles: 4
LW1-24, LW3-24, LW4-24, LW6-24

Unfledged wild-hatched juveniles not yet counted in population (fledging occurred after the reporting period): 1
LW9-24

Camera Deployments

Trail cameras were deployed near a subset of nests to help supplement nest and chick monitoring efforts. Cameras were deployed at nine different nests (5 first attempts, 3 second attempts, 1 third attempt) at 2-16 days into the incubation period (average = 9.5 days). Programming differed among them; however, most were programmed to take a photo every 1, 3 or 5 minutes for most of the day and night. As usual, cranes tolerated the disturbance well, remaining off nest for a maximum of 10-66 minutes (average 37 minutes). Cameras were deployed an average distance of 4.91 meters from the nest.

Heavy Metal Screening and Egg Swabbing

Heavy metal testing of blood and feather samples is ongoing. Since we began screening for lead in 2017, 54 unique individuals have been tested with no concerning levels detected thus far. The same 54 individuals have also been screened for mercury with results from 13 samples noted to be at the "high-normal" end of the range; however, the database for crane results is noted to be small. None of these individuals exhibited any signs of illness, and other test results were generally normal and indicative of a healthy bird. Seven of the individuals noted to have a "high-normal" result have been tested two or more times with three having a higher level at a later testing date and four having a lower level result at a later testing date. Feathers from 51 cranes have been tested for arsenic, with all results within normal limits so far. We plan to continue this testing to increase the number of cranes in our database and to compare samples from the same individuals in order to document changes over time.

The 2024 breeding season marked the second and likely final year of specific sample collection from eggs for the purpose of investigating bacterial infection as a possible cause of the high level of embryo mortality. During the early stages of incubation, samples were collected from eggshells using sterile swabs at nests where cameras were also deployed. Eggs that were past full term or abandoned and otherwise intact, were also swabbed at collection. Upon examination of any intact, unhatched eggs, content samples were collected. Finally, if the egg contained a large enough dead embryo, liver samples were also saved. Ten eggs swabbed during early incubation ultimately hatched, though one hatched in captivity and one died within several hours of hatching for unknown reasons. Twenty-four contained dead embryos and 20 were later confirmed non-viable or were of unknown fertility due to breaking or disappearing prior to collection. Sixteen eggs were swabbed twice; once early in incubation and once after collection. Samples (4 cloacal swabs from breeding females, 9 liver samples from late dead embryos, content from 38 eggs, and 73 eggshell swabs from 56 unique eggs) were shipped to our partners at the USGS Alaska Science Center for analysis, which is expected to begin in late 2024.

SURVIVAL

As of 30 June 2024, 167 juvenile whooping cranes have been released in Louisiana since 2011. Additionally, 29 wild-hatched chicks have fledged (1 each in 2016, 2017, and 2020; 5 in 2018; 4 in 2021; 8 in 2022; 5 in 2023 and 4 in 2024) and three adult females and two adult males were relocated to Louisiana from the discontinued Florida reintroduction. One additional wild-hatched chick fledged shortly after the end of the reporting period. In total, 201 whooping cranes have been a part of the reintroduction during the 13.5 years of the project, and as of the end of this report period, a maximum of 82 (40.8%) individuals survive.

Mortality and Morbidity

The following nine mortalities were recorded during the report period:

L9-19: male, Cameron Parish, Louisiana, ~July, unknown
LFW28-16: male, Vermilion Parish, Louisiana, ~10 September, unknown
LFW12-19: female, Vermilion Parish, Louisiana, 20 October, powerline collision
L1-23: juvenile male, Cameron Parish, Louisiana, 17 December, suspected predation
L4-23: juvenile male, Evangeline Parish, Louisiana, 7 January, gunshot (case remains open with substantial monetary reward offered for information, but no significant leads)
L8-22: female, Vermilion Parish, Louisiana, 12 January, predation
L13-14: male, Vermilion Parish, Louisiana, ~31 March, gunshot
L15-17: male, Vermilion Parish, Louisiana, 15 June, unknown
Wild-hatched (2021 or 2022): unknown sex, Rapides Parish, Louisiana, ~21 June, vehicle collision of molting bird

One crane disappeared, is presumed dead, and has been removed from the population totals:

L3-13: Male L3-13 was last observed on 9 August 2023. His mate was observed without him on 14 August and eventually paired with another male. He carried a nonfunctional VHF transmitter.

One long-term missing crane was removed from the population totals during the report period:

L2-21: Male L2-21 was last observed at the White Lake WCA, Vermilion Parish, on 31 May 2022. He carried only a VHF transmitter.

One crane was observed with a significant injury, however continued to move around and has been able to survive:

LFW29-16: Male LFW29-16 was reported with an injury to his right leg on 10 February 2024. Further observations indicate that he had lost control of any movement in that leg at and below the hock.

Through the end of the reporting period, there have been 119 mortalities since the start of the reintroduction; 90 confirmed by recovery of remains and 29 others inferred based on supporting evidence or long-term missing status. Pre-fledged wild-hatched chicks are not included in these totals. Of mortalities where remains were recovered, the primary contributing factor of death could not be determined in 24 cases (26.7%) due to severely degraded or minimal remains recovered. The primary known or suspected cause of mortality in the remaining cases (n = 66) was trauma (26.7%), followed by predation (21.1%) and gunshot (18.9%). Sixteen trauma mortalities (17.8% of mortalities where remains were recovered) are attributed to collisions with power lines or fences.

EDUCATION, OUTREACH, AND MEDIA

Outreach by LDWF

LDWF's traveling whooping crane display continued to make its way around the state and was housed at eight separate locations in five different parishes, reaching 3,437 individuals (self-reported via a signature at the display) during the reporting period. Additionally, LDWF staff reached over 1,200 individuals through a variety of presentations at children's summer and 4-H camps, National Hunting and Fishing Day, the Port Aransas Whooping Crane Festival, as well as several presentations for various interested organizations. There were also several news stories produced about the crane program on Louisiana Public Broadcasting as well as local Lafayette and New Orleans news stations. LDWF whooping crane biologists also participated in two documentary films about whooping cranes that should both be released in late 2024 or early 2025 and participated in a podcast (*DETOURS*) by the Baton Rouge based Country Roads magazine. Finally, in coordination with the Louisiana Wildlife and Fisheries Foundation, a first of its kind whooping crane art show and contest was held in order to generate awareness about the project and raise money to support the ongoing reintroduction. Over 60 adult art pieces were submitted along with 54 student entries from all grade levels (Figure 4).

Social media continues to be a popular and effective format for sharing information and updates on the project with those who are interested as well as the general public who may come across these sites. The LDWF Whooping Crane Facebook and Instagram pages remain popular with 25,537 and 987 followers respectively.

Outreach by the International Crane Foundation

Our partners with the International Crane Foundation (ICF) continued their outreach work in Louisiana, reaching almost 3,000 individuals through 42 different presentations and events.

ICF's library program for elementary school age children (initiated in spring 2023) continued into the spring and early summer 2024 with close to 30 programs reaching almost 400 children and 171 adults. To go along with the library programs, ICF developed a whooping crane bookmark (Figure 5) to hand out to participants as well as a post-program survey to gauge the reception of the program and the knowledge and attitudes of the adults who attended with the children. Some of the knowledge and attitude questions were the same previously asked in the survey conducted by Louisiana State University.

ICF is also planning to expand their outreach to gun owners through the creation of some new outreach material that will be distributed to gun shops, shooting ranges, and LDWF license vendors in the Lafayette and Baton Rouge areas, with plans to further expand distribution next year.

RESEARCH PRODUCTS

Publications

Sime, M. J., H. L. Thompson, E. K. Szyszkoski, S. E. Zimorski, T. A. Dellinger, and S. M. Schmidt. 2024. Power-line collisions in reintroduced whooping cranes (Grus americana). Southeastern Naturalist 23:194-211.

Presentations

Szyszkoski, E. K. *and S. E. Zimorski. 2023. Nest success rates and survival of wild-hatched whooping crane chicks in Louisiana. 16th North American Crane Workshop, Baraboo, WI, and Louisiana Department of Wildlife and Fisheries Research and Management Symposium, Baton Rouge, LA. Oral presentation.*

Zimorski, S. E. *and E. K. Szyszkoski. 2023. A first record for the species – Louisiana whooping crane pair renests after successfully fledging a chick. 16th North American Crane Workshop, Baraboo, WI. Oral presentation.*

Zimorski, S. E.*, E. K. Szyszkoski, T. Dellinger, W. Brooks, and A. Schumann. 2023. Translocating non-migratory adult whooping cranes from Florida to Louisiana. 16th North American Crane Workshop, Baraboo, WI. Oral presentation.*

Table 1. Summary of captures of free-flying whooping cranes in the Louisiana non-migratory population, 1 July 2023 - 30 June 2024.

ID	Sex	Date	Method	Reason	Parish/County	
LW1-23	M	12/6/2023	leg noose	initial banding	Calcasieu	
L16-17	F	12/6/2023	hand grab	transmitter replacement	Calcasieu	
L11-17	M	12/12/2023	hand grab	transmitter replacement	Avoyelles	
L19-16	M	12/13/2023	hand grab	transmitter replacement	Acadia	
L3-11	F	4/11/2024	leg noose	transmitter replacement	Allen	at overdue nest

Table 2. Breeding history of egg laying pairs in the Louisiana non-migratory population of whooping cranes through 30 June 2023. Only confirmed nests are included in totals and only specific details for pairs active during the report period are shown.

Male	Female	Pair formed	Number of nest attempts/year											Chicks[j]		Egg information[h]				Pair dissolved
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Hatch	Fledge[f]	Infertile/ nonviable	Fertile		Unk[a]	
																	Dead	Hatch		
Former pairs (20)		≤ Dec 2024	2	3	5	11	6	7	5	16	5			21, 2[b]	7	35	22	21	19	< Jan 2023
L2-11	L13-11	Apr 2015		1	2	4	1	2	1	2	1	2	1	3[b]		8	9	2	10	
L1-13	L3-11	May 2015		1	2	3	2	3	2	3	2	3	4	1, 5[b]	4	6	23[e]	4	13	
L12-16	L5-14	Jan 2018					2	4	7[g]	5[g]	4	3	3	3	1	7	15	3	16	
L13-14	L6-15	Jan 2018					1	1		1	1	1		5	2			5	5	Mar 2024[c]
L19-16	L10-15	Feb 2018					1	4	2	1	2	2	1	8, 2[b]	3	6	7	8	1	
L3-13	L8-14	July 2018						2	1	2	1	2		3	2	4	1	1	4	Aug 2023[d]
L6-16	L16-17	Dec 2018						1	1	2	2	1	1	5	2	1	5	6	2	
L3-14	L2-12	Jan 2019						1		1				0		2	1			
L11-17	L7-11	Jan 2019						2	3	2	1	2	2	5	4	8	3	5	7	
L10-18	F1-98	Feb 2020								1	2	1	1	1, 2[b]	1[f]		3	2	2	
L5-18	FW12-15	Aug 2020								1	2	1	1	1		6		1	3	
L23-16	L3-17	Oct 2020								1	1	2	1	4	1	1	1	4	1[i]	
LW1-18	L12-17	Dec 2020								1	2	3	2	3, 1[b]			7	3	4	
L3-19	L7-18	Mar 2021								2	0		2	0		2	2		1[i]	
L21-17	LW3-18	Jan 2020									1	1	2	0		4			3	
L2-15	L11-15	Feb 2022										2				1			2	
L17-16	L9-18	Oct 2022										1	1	3				3	1	
L9-17	L12-18	Fall 2022										1					1		1[i]	
L1-19	L11-11	Jan 2023										1	1	2	2		1	2	1	
L4-19	FW12-19	Mar 2023										1				1				Oct 2023[c]
L3-21	L14-17	Mar 2023										1	1	2	1		1	3		
Totals			**2**	**5**	**9**	**18**	**13**	**27**	**22**	**41**	**27**	**31**	**24**	**67, 15[b]**	**30**	**92**	**102**	**73**	**96**	

[a] Includes eggs that disappeared, were broken, or fertility could not be determined upon examination.
[b] Hatched from fertile egg(s) swapped into the nest while the pair's own eggs were removed.
[c] Death or injury of one member of the pair.
[d] Disappearance of one or both members of the pair.
[e] One fertile/viable egg pulled at day 8-10 died while hatching at captive center.
[f] Fledging date may be just shortly after the end of the report period.
[g] Number of nests are determined by number of new platforms containing an egg even if timing indicates eggs are from the same clutch.
[h] Eggs laid by Louisiana cranes, including those pulled from nests prior to full term and their outcome in captivity.
[i] Egg likely fertile but outcome (hatch/no hatch) unconfirmed.
[j] Only includes chicks that were hatched in the wild, regardless of egg source.

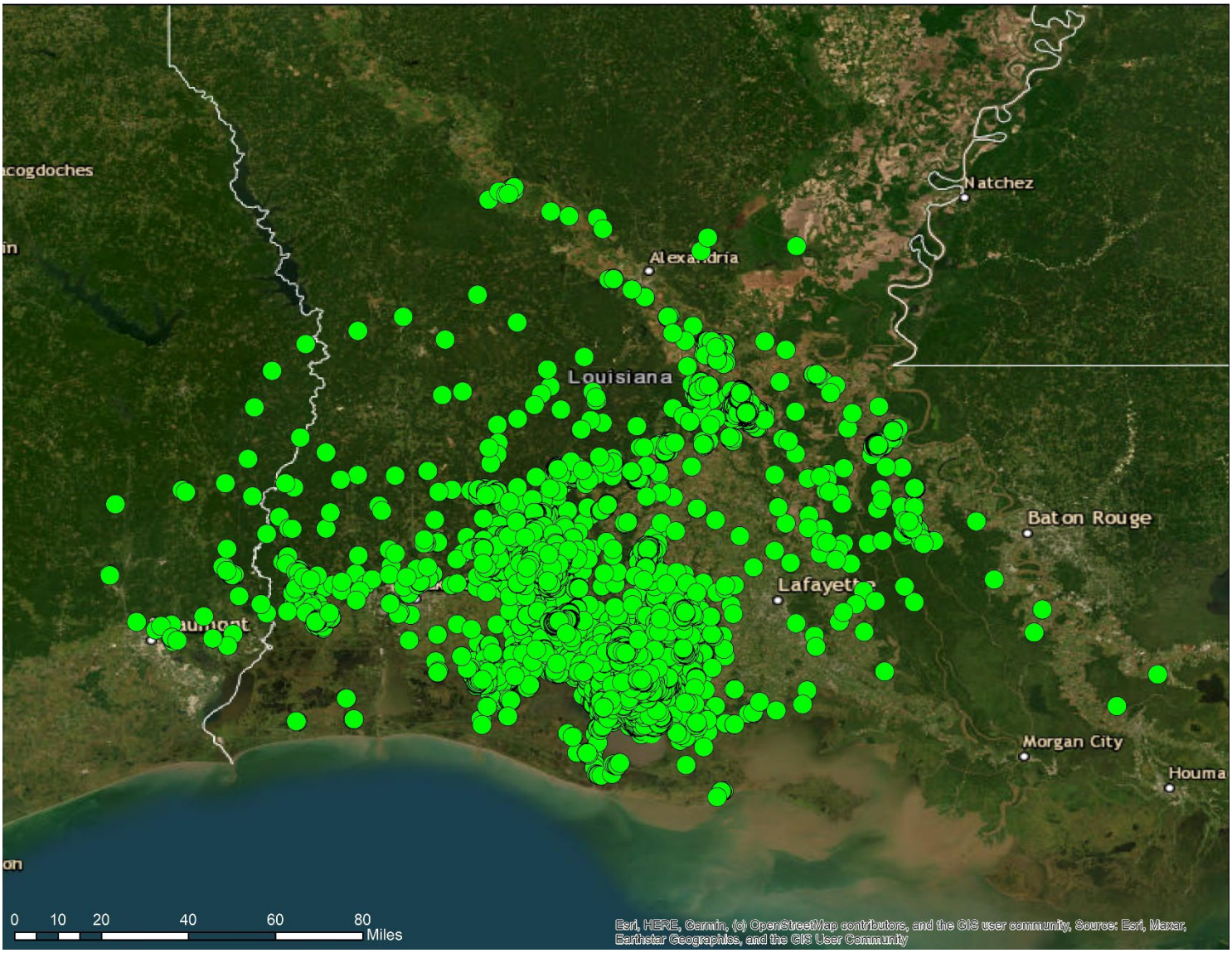


Figure 1. Location data collected from remote transmitters of reintroduced whooping cranes, 1 July 2023 – 30 June 2024.

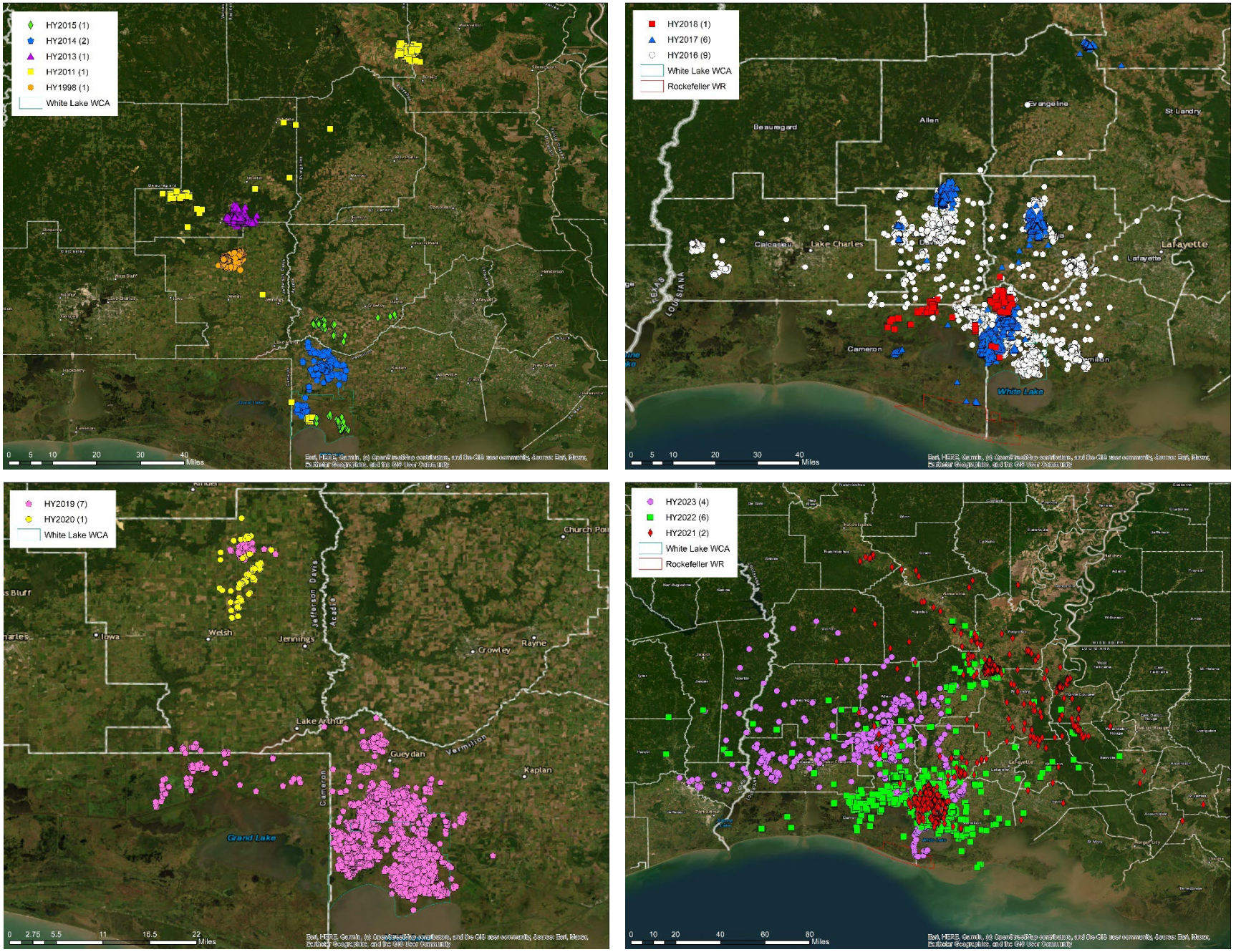


Figure 2. Location data of reintroduced whooping cranes in Louisiana by hatch year, 1 July 2023 – 30 June 2024. Number of cranes contributing to data points in parenthesis.

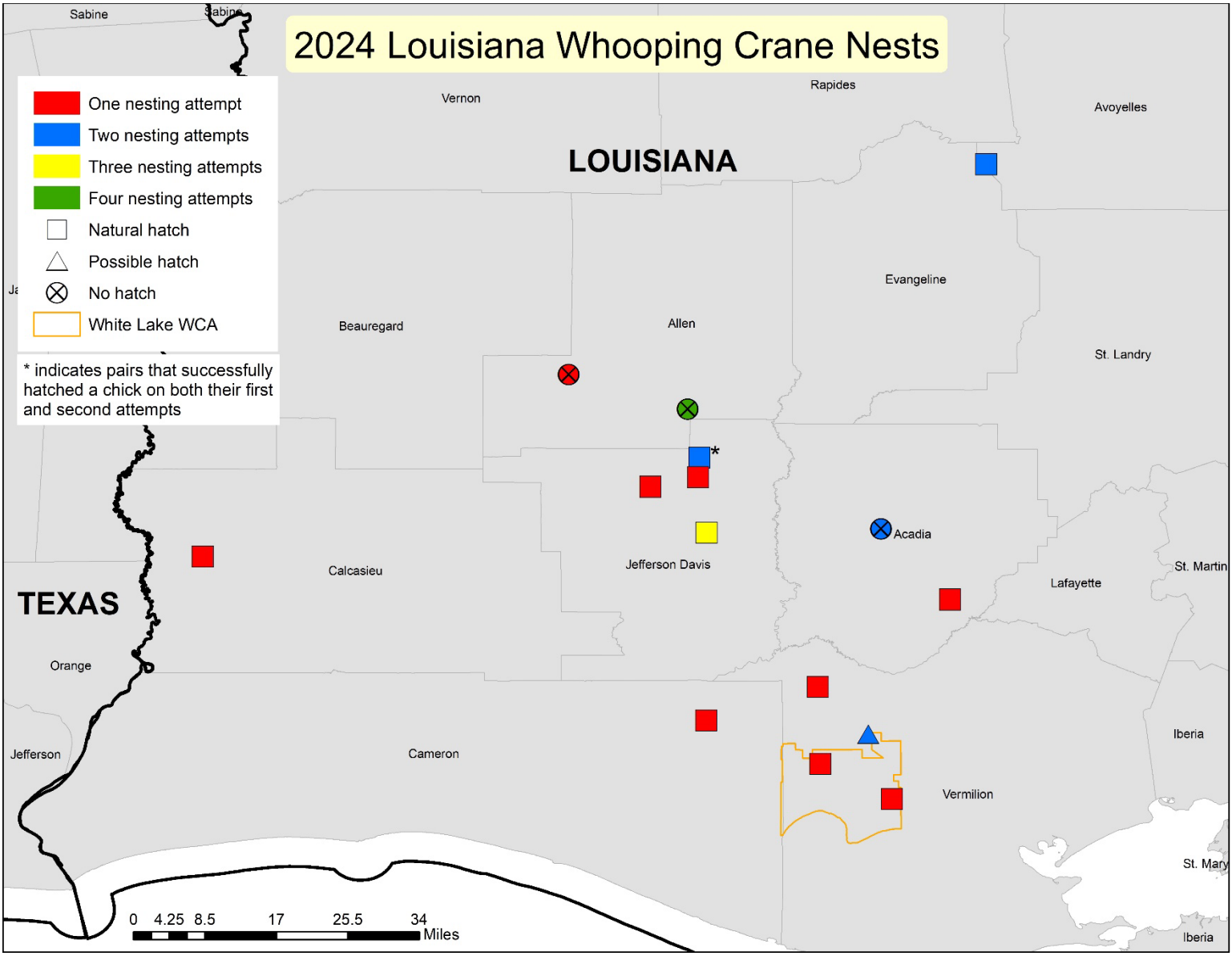


Figure 3. Approximate locations of Louisiana whooping crane nests in 2024.

Figure 4. Children and adult art submissions on display for the whooping crane art show and contest.

Figure 5. Bookmark created by the International Crane Foundation to go along with their library program presentations.

APPENDIX A: Complete Nesting History of the Reintroduced Louisiana Whooping Crane Population

First nests of the season by Whooping Crane pairs in the reintroduced Louisiana non-migratory population, 2014-24.

Year	Male	Female	Parish	Initiation	No. eggs	Outcome of nest, fate of eggs	Days of incubation	Days to renest
2014	L8-11	L7-11	Avoyelles	24 Mar	2	Full term; collected 30 Apr (2 non-viable)	37	18
2015	L8-11	L7-11	Avoyelles	28 Feb	2	Full term; collected 9 Apr (2 non-viable)	40	18
2015	L1-11	L6-11	Vermilion	3/4 Apr	2	Flooded by/on 13 Apr; 1 intact (EDE) & fragments coll. 16 April	9-10	No renest
2015	L2-11	L13-11	Allen	6-14 May	1-2	Failed; shell fragment coll. 12 June	27-37	No renest
2015	L1-13	L3-11	Allen	16-28 May	2	Abandoned by ~13 June PM; 1 coll. 17 June, (non-viable); 1 not found	16-28	No renest
2016	L1-13	L3-11	Allen	12 Feb	2	Full term; collected 21 Mar (1 MDE, 1 LDE)	39	17-21
2016	L8-11	L7-11	Avoyelles	28 Feb	2	Full term; collected 5 Apr (2 non-viable)	38	18
2016	L8-13	L6-12	Jefferson-Davis	~12 Mar	2	Hatched 11 & 13 Apr (W1 & W2)	33	No renest
2016	L2-11	L13-11	Allen	8-14 Mar	1	Failed/collected 4 Apr (human disturbance); LDE	22-28	31-36
2016	L10-11	L11-11	Jefferson-Davis	1-4 Apr	1	Full term; no fragments/eggs found 3 May	30-33	15-16
2017	L8-11	L7-11	Avoyelles	11 Feb	2	Full term; collected 17 Mar (2 non-viable)	34	19-20
2017	L8-13	L6-12	Jefferson-Davis	11-14 Feb	2	Full term; 1 broke 19 Mar, 2nd coll. 20 Mar (non-viable)	34-37	26-28
2017	L1-13	L3-11	Allen	17 Feb	1	Full term; collected 22 Mar (non-viable)	33	17-18
2017	L10-11	L11-11	Jefferson-Davis	18-21 Feb	1	Full term; collected 27 Mar (LDE)	34-37	18-21
2017	L2-11	L13-11	Allen	4-15 Mar	1-2	Failed ~23 Mar; 1 coll. from water 19 Apr (non-viable)	8-19	17-18
2017	L3-13	L11-12	Vermilion	15-17 Mar	1	Full term; collected 25 Apr (non-viable)	39-41	20
2017	L14-12	L2-12	Vermilion	~27 Mar	1	Hatched ~26 Apr (W2)	30	No renest
2017	L1-11	L6-11	Vermilion	16 Mar-4 Apr	1-2	Abandoned by 18 April; 1 found 18 Apr (EDE)	14-33	No renest
2018	L10-11	L11-11	Jefferson-Davis	10-12 Feb	2	Full term, DL egg 19 Feb-20 Mar, 1 coll. 19 Feb (MDE); 1 gone 16 Mar	36-38	No renest
2018	L12-16	L5-14	Jefferson-Davis	16-19 Feb	1-2	Full term; eggs disappeared by ~24 Mar	32-35	15
2018	L8-11	L7-11	Avoyelles	21-22 Feb	2	Full term; DL egg 28 Feb-28 Mar, 1 coll. 28 Feb; 1 coll. 28 Mar (2 infertile)	34-35	18
2018	L1-13	L3-11	Allen	25-27 Feb	2	DL egg 6 Mar-3 Apr, 1 coll. 6 Mar (EDE); 1 coll. 3 Apr (EDE)	35-37	18
2018	L2-11	L13-11	Allen	~15 Mar	2	Failed by 3 Apr; 1 found in water (MDE), 2nd broken on nest	~19	No renest
2018	L8-13	L6-12	Jefferson-Davis	~20-21 Mar	2	Hatched 18 & 20 Apr (W1 & W2)	~30-31	No renest
2018	L19-16	L10-15	Acadia	~15 Apr	2	Coll. 3 May (inf); gave hatched chick (W4)/shell & non-viable egg (L7/8-11's)	18	No renest
2018	L13-14	L6-15	Vermilion	~7 May	2	Abandoned 4 June, both broken 11 June (unk fertility)	28	No renest
2018	L2-15	L7-14	Vermilion	~8 May	2	Abandoned 25 May, collected 30 May (infertile, EDE)	~17	No renest
2019	L12-16	L5-14	Jefferson-Davis	13 Feb	2	Full term; DL egg 24 Feb-12 Mar, 1 viable removed & ret. to nest 12 Mar (LDE), 1 hatch 17 Mar (W1)	33	~16 (after chick)
2019	L1-13	L3-11	Allen	14 Feb	2	Full term; DL egg 24 Feb – 12 Mar, 1 viable removed & ret. on 12 Mar but LDE, 1 broke 15 Mar, abandoned by 17 Mar	29-30	16
2019	L19-16	L10-15	Acadia	18 Feb	2	Abandoned/coll. 25 Feb (human disturbance); 1 EDE, 1 non-viable	7	11
2019	L2-15	L7-14	Vermilion	18 Feb	2	Full term; 1 hatched 20-21 Mar (W2), 2nd gone by 29 Mar	30-31	No renest
2019	L11-17	L7-11	Avoyelles	18 Feb	3	Full term; DL egg 25 Feb-20 Mar, two pulled, 1 viable ret. to nest 20 Mar but disappeared 25-26 Mar	~35-36	18-20
2019	L3-13	L8-14	Vermilion	14-26 Feb	1	Full term; coll. 1 Apr (non-viable)	~34	14-22
2019	L6-16	L16-17	Calcasieu	9/10 Mar	2	Full term; frags found in water 16 Apr	Up to 37	No renest
2019	L8-13	L11-11	Jefferson-Davis	15 Mar	2	Full term; 1 hatch 16 Apr (W3); 1 broke on nest	34	19 (after chick)
2019	L3-14	L2-12	Vermilion	15-17 Mar	2	Abandoned 12 Apr; 2 eggs (1 viable, later LDE; 1 non-viable) coll. 15 Apr	26-28	No renest
2019	L2-11	L13-11	Allen	19 Mar	1	Abandoned/coll. 3 Apr (human disturbance); MDE	15	18
2019	L12-14	L8-15	Vermilion	22 Mar	2	Flooded/abandoned ~5 April; coll. 8 Apr (1 EDE, 1 non-viable)	13-14	27
2019	L13-14	L6-15	Vermilion	24 Mar	2	Failed due to unk reasons (possibly deer?) 10 Apr; frags coll. 12 Apr	19	No renest
2019	L13-16	L14-16	Cameron	22-29 Mar	unk	Failed due to unk reasons 12-22 April; no frag found	14-30	No renest
2020	L12-16	L5-14	Jefferson Davis	2 Feb	2	Full term; DL egg 7 Feb-6 Mar (3 egg nest); 1 broke 29 Feb, 1 broke 8 Mar	35	17
2020	L11-17	L7-11	Avoyelles	3 Feb	1	Full term; coll. 9 Mar (non-viable)	35	19
2020	L23-16	L11-15	Vermilion	8 Feb	1	Coll. 13 Mar (LDE, malpositioned)	~34	No renest
2020	L3-13	L8-14	Vermilion	15-29 Feb	1-2	Poss full term; membrane found on nest 2 Apr (possible hatch?)	UNK	UNK
2020	L1-13	L3-11	Allen	19-26 Feb	1	Full term; coll. 30 Mar (MDE)	33-40	17-19
2020	L6-16	L16-17	Calcasieu	22 Feb	1	DL egg 11 Mar-25 Mar; nest elevated 11 Mar; hatch 23 Apr (W1)	30	No renest
2020	L19-16	L10-15	Acadia	27 Feb	2	Full term; coll. 2 Apr (LDE, non-viable)	35	17
2020	L2-11	L13-11	Allen	27 Feb-3 Mar	2	Failed by 30 Mar; no eggs/frag. found 1 Apr	≤27-32	No renest
2020	L8-13	L11-11	Jefferson Davis	28 Feb	2	1 hatch 31 Mar (W2); 1 coll. 6 Apr (non-viable)	32	No renest
2020	L13-16	L14-16	Cameron	~18 Mar	1-2	Hatch ~19 Apr (W3, 1 found)	30	No renest
2020	L22-17	L8-16	Chambers, TX	31 Mar	1-2	Hatch ~30 Apr (W4, 1 assumed)	30	No renest
2020	L26-16	L16-16	Cameron	27 Apr	1-2	Failed 18 May; fragments found 29 June	21	No renest
2021	L1-13	L3-11	Allen	2-7 Feb	1-2	Poss full term; rotten egg remains found 12 Mar	25-35	13-21
2021	L11-17	L7-11	Avoyelles	13 Feb	2	Abandoned due to hard freeze; coll. 19 Feb (unk fertility)	5-6	15-16
2021	L13-16	L14-16	Cameron	~11 Feb	2	Hatch 13 & 15 March (W1 & W2)	32	No renest
2021	L3-13	L8-14	Vermilion	13/14 Feb	unk	Failed 13 March; no eggs/fragments found	27-28	18

2021	L12-16	L5-14	Jefferson Davis	23 Feb	2	Full term; 1 broke 25 Mar, 1 coll. 30 Mar (MDE)	35	13
2021	L8-13	L11-11	Jefferson Davis	24 Feb	2	Full term; DL egg added 4 Mar; 1 broke 23 Mar, 1 coll. 30 Mar (EDE)	34	12
2021	L17-16	L8-15	Vermilion	~25 Feb	2	Hatch 28 & 30 Mar (W3 & W4)	32	No renest
2021	L3-14	L2-12	Vermilion	28 Feb	1	Full term; coll. 9 Apr (non-viable)	40	No renest
2021	L6-16	L16-17	Calcasieu	2 Mar	1	Full term; added DL egg 12 Mar; coll. 5 Apr (non-viable)	34	30
2021	L19-16	L10-15	Acadia	3 Mar	2	1 hatch 4 Apr (W5); 1 coll. from water 9 Apr (LDE)	32	No renest
2021	L6-13	L10-17	Vermilion	27 Feb-6 Mar	1-2	Full term; rotten egg remains found 14 Apr	34-42	No renest
2021	L2-11	L13-11	Allen	9 Mar	2	Full term; 1 coll. 15 Apr (LDE); remains of second found	37	12
2021	L22-17	L8-16	Chambers, TX	9 Mar	1-2	1 hatch 8 Apr (W8 – based on membrane found)	30	19 (after chick)
2021	L26-16	L16-16	Cameron	12 Mar	2	1 hatch 11 Apr (W9); 1 coll. 5 May (non-viable)	30	No renest
2021	L13-14	L6-15	Vermilion	~14 Mar	2	Hatch ~13 & 15 Apr (W10 & W11)	32	No renest
2021	L5-18	FW12-15	Cameron	11-17 Mar	2	Full term; coll. 26 Apr (both non-viable)	40-46	No renest
2021	LW1-18	L12-17	Jefferson Davis	20 Mar	1-2	1 hatch 21 Apr (W12)	32	No renest
2021	L15-17	L9-16	Vermilion	22 Mar	1	Abandoned 10 Apr (suspect weather related); coll. 15 Apr (MDE)	19	30
2021	L24-16	L14-17	Jefferson, TX	24-29 Mar	1-2	Failed 14 Apr (likely due to levee breach); fragments coll. 13 May	16-21	18-19
2021	L9-17	L23-17	Vermilion	20-31 Mar	1-2	Failed <20 Apr (unlikely full term); fragments coll. 28 Apr	19-30	≤27
2021	L3-19	L7-18	Vermilion	5 Apr	1	Full term; broke on nest (non-viable); fragments coll. 6 May	30	17
2021	L23-16	L3-17	Vermilion	28 Apr-2 May	1	Failed 26 May (suspect water level related); coll. 2 June (non-viable)	24-28	No renest
2021	L10-18	F1-98	Acadia	14 May	1	Flooded 17 May; coll. from water 20 May (unk fertility)	3	No renest
2022	L13-14	L6-15	Vermilion	~12 Feb	2	Hatch ~14 & 16 Mar (W1 & W2)	32	No renest
2022	L1-13	L3-11	Allen	12 Feb	2	1 hatch 16 Mar (W3); 1 coll. 24 Mar (LDE)	32	18 (after chick)
2022	L11-17	L7-11	Avoyelles	14 Feb	2	1 hatch ~18 Mar (W4); 1 coll. 21 Mar (non-viable)	32	No renest
2022	L23-16	L3-17	Vermilion	16 Feb	2	Hatch ~18 & 20 Mar (W5 & W6)	32	No renest
2022	L26-16	L10-17	Cameron	~17 Feb	2	Hatch ~19 & 21 Mar (W7 & W8)	32	No renest
2022	L3-13	L8-14	Vermilion	17 Feb	2	1 hatch ~21 Mar (W9); 1 disappeared	32	No renest
2022	L8-13	L11-11	Jefferson Davis	20 Feb	2	1 hatch 24 Mar (W10); 1 coll. 28 Mar (MDE)	32	No renest
2022	L6-16	L16-17	Calcasieu	21 Feb	2	Full term; coll. 28 Mar (EDE, malpositioned LDE)	35	24
2022	L17-16	L9-16	Vermilion	~28 Feb	1	1 hatch ~30 Mar (W11)	30	No renest
2022	L24-16	L14-17	Jefferson, TX	2 Mar	2	Full term; coll. 8 Apr (non-viable)	37	18
2022	L12-16	L5-14	Jefferson Davis	3 Mar	2	Full term; coll. 8 Apr (malpositioned LDE, fragments only)	36	14
2022	L19-16	L10-15	Acadia	7 Mar	1-2	1 hatch ~8 Apr (W12)	32	17 (after chick)
2022	L5-18	FW12-15	Cameron	22 Feb-10 Mar	2	Full term; coll. 19 Apr (non-viable)	40-56	17-27
2022	L10-18	F1-98	Jefferson Davis	15 Mar	2	DL egg 16 Mar-12 Apr; 1 cracked (EDE) & fragments coll. 12 Apr	28	21
2022	L2-11	L13-11	Allen	17 Mar	2	Full term; coll. 21 Apr (1 LDE, 1 fragments only)	34	No renest
2022	LW1-18	L12-17	Jefferson Davis	17-23 Mar	2	Full term; fragments only found at nest 25 Apr	32-38	15-17
2022	L21-17	LW3-18	Acadia	14-16 Apr	2*	Failed on/by 13 May; 1 coll. 16 May (non-viable); 2nd had likely been seen	20-29	No renest
2023	L6-16	L16-17	Calcasieu	1 Feb	2	Hatch 4 & 5 March (W1 & W2)	32	No renest
2023	L11-17	L7-11	Avoyelles	1-3 Feb	2	1 hatch 4 March (W3); 1 coll. 8 March (non-viable)	30	25 (after fledge)
2023	L1-19	L11-11	Jefferson Davis	5 Feb	2	1 hatch 9 March (W4); 2nd not found	32	No renest
2023	L3-13	L8-14	Vermilion	~17 Feb	1-2	1 hatch ~19 Mar (W5)	30	11-27 (after chick)
2023	L1-13	L3-11	Allen	17/18 Feb	2	Abandoned 13 Mar; 1 broke 9 Mar; 1 coll. 15 Mar (LDE)	~28	14
2023	L12-16	L5-14	Jefferson Davis	~25 Feb	1	Abandoned 4 March; coll. 6 March (nonviable-too young?)	~7?	32-35
2023	L19-16	L10-15	Acadia	3 March	2	Hatch 2 & 4 April (W6 & W7)	32	16 (after chick)
2023	L5-18	FW12-15	Cameron	21 Feb-6 Mar	2	Full term; coll. 17 Apr (1 non-viable, 1 rotten egg contents on nest)	42-55	No renest
2023	L23-16	L3-17	Vermilion	8-14 Mar	2	Full term; abandoned by 18 Apr; coll. 19 Apr (1 LDE, 1 frag only)	~30	12-15
2023	LW1-18	L12-17	Jefferson Davis	<15 Mar	2	Full term; 1 broke 13 Apr, 1 abandoned 14 Apr & coll. 19 Apr (EDE)	≥31	15-19
2023	L2-15	L11-15	Vermilion	22-24 Mar	2	Abandoned by 31 Mar (eggs predated)	2-8	19-24
2023	L2-11	L13-11	Allen	22 Mar	2	Abandoned 2 Apr; 1 intact coll. 4 Apr (non-viable), 1 broken on nest	11	24
2023	L21-17	LW3-18	Acadia	25-29 Mar	1	Full term; collected 2 May (non-viable)	34-38	No renest
2023	L13-14	L6-15	Vermilion	28-30 Mar	2	1 hatch ~30 Apr (W8); 2nd disappeared	32	No renest
2023	L4-19	FW12-19	Vermilion	3 Apr	1	Abandoned 18 Apr; coll. 19 Apr (non-viable)	15	No renest
2023	L3-21	L14-17	Vermilion	16 Apr	2	Egg swap 11 May, unk outcome (off nest next AM, no chick); 1 hatch at ASSC, 1 LDE	25	No renest
2023	L10-18	F1-98	Jefferson Davis	16 Apr	1	Dummy egg 19 May; egg swap 23 May, hatch 24 May (W11); pulled EDE	38	No renest
2023	L9-17	L12-18	Vermilion	19-28 Apr	2	1 poss. hatch based on membrane (no ID given); 1 LDE	~30	No renest
2023	L17-16	L9-18	Vermilion	26 Apr	2	1 hatch 26 May (W13); 1 not found	30	No renest
2024	L6-16	L16-17	Calcasieu	23 Jan	2	Hatch 22 & 23 Feb (W1 & W2)	31	No renest
2024	L1-19	L11-11	Jefferson Davis	5 Feb	2	1 hatch 6 Mar (W3); 1 coll. 12 Mar (LDE)	30	No renest
2024	L1-13	L3-11	Allen	10 Feb	2	Eggs pulled/dummy left 20 Feb (1 hatch ASSC, 1 MDE); abandoned 24 Feb	14	11
2024	L3-21	L14-17	Vermilion	10 Feb	2	Hatch 11 & 13 Mar (W4 & W5)	32	No renest
2024	L11-17	L7-11	Avoyelles	16 Feb	2	Full term; 1 disappeared by 18 Mar, 1 coll. 21 Mar (non-viable)	34	13
2024	L19-16	L10-15	Acadia	2 Mar	2	1 hatch ~1 Apr (W6); 1 coll. 6 Apr (LDE)	30	No renest
2024	L12-16	L5-14	Jefferson Davis	6 Mar	2	1 hatch 7 Apr (W7); 1 coll. 11 Apr (LDE)	32	17 (after chick)
2024	L23-16	L3-17	Vermilion	8-10 Mar	1-2	1 hatch ~7 Apr (W8)	30	No renest
2024	L3-19	L7-18	Vermilion	9/10 Mar	1-2	Full term; 1 poss. hatch based on membrane (no ID given)	30	~24
2024	L21-17	LW3-18	Acadia	16 Mar	2	Full term; 1 broke 17-19 Apr; 1 coll. 19 Apr (non-viable)	34	18-19
2024	L10-18	F1-98	Jefferson Davis	21 Mar	1	1 hatch 20 Apr (W9)	30	No renest
2024	LW1-18	L12-17	Jefferson Davis	21 Mar	2	1 died while hatching 21 Apr; 1 hatch 22 Apr (W10)	32	19 (after chick)

2024	L5-18	FW12-15	Cameron	2/3 Apr	2	1 hatch ~5 May (W12); 1 disappeared	32	No renest
2024	L17-16	L9-18	Vermilion	4 Apr	2	Hatch 4 & 6 May (W13 & W14)	32	No renest
2024	L2-11	L13-11	Allen	22 Apr	1	Failed 18 May; rotten egg contents on nest	26	No renest

Subsequent nesting attempts by Whooping Crane pairs in the reintroduced Louisiana non-migratory population, 2014-24.

Year	Male	Female	Parish	Initiation	No. eggs	Outcome of nest, Fate of eggs	Days of incubation	Days to next nest
Second nest attempts (renests)								
2014	L8-11	L7-11	Avoyelles	19 May	2	Full term, collected 26 June, both infertile	38	No 3rd nest
2015	L8-11	L7-11	Avoyelles	28 Apr	2	Full term, collected 4 June, both infertile	37	No 3rd nest
2016	L1-13	L3-11	Allen	8-11 Apr	2	Full term, 1 gone ~12 May, 2nd gone 15 May; 1 LDE coll. from water, 16 May	33-37	No 3rd nest
2016	L8-11	L7-11	Avoyelles	24 Apr	2	Full term, failed/abandoned 26-28 May; 1 coll. From water 1 June, infertile	32-34	No 3rd nest
2016	L2-11	L13-11	Allen	6-11 May	2	Poss. full term, failed/abandoned 3-6 June; 1 infertile coll. from water 6 June	23-31	No 3rd nest
2016	L10-11	L11-11	Jefferson-Davis	18/19 May	1	Full term, collected 21 June, infertile	34-35	No 3rd nest
2017	L8-11	L7-11	Avoyelles	5/6 Apr	2	Egg swap 12 Apr; pulled 2 infertile, gave pipped egg (W1)	6-7	15-16 (after chick)
2017	L1-13	L3-11	Allen	8/9 Apr	2	Failed/abandoned 3/4 May likely due to flooding rains, eggs disappeared	24-26	15-17
2017	L2-11	L13-11	Allen	~9 Apr	2	Failed 16/17 Apr, 1 intact infertile egg & 1 broken coll. from water 19 Apr	~7-8	12-16
2017	L10-11	L11-11	Jefferson-Davis	14-17 Apr	1	Swap 5 May, pulled egg (F but died – malpositioned), gave pipped egg (W3)	18-21	No 3rd nest
2017	L8-13	L6-12	Jefferson-Davis	15-17 Apr	1	Full term, collected 19 May, 1 LDE (malpositioned)	32-34	No 3rd nest
2017	L3-13	L11-12	Vermilion	~15 May	2	Full term, collected 23 June, 1 fertile mid-late DE & egg shell in water	39	No 3rd nest
2018	L12-16	L5-14	Jefferson-Davis	8 Apr	2	Full term; DL egg 12 Apr-3 May, coll. 1 & put back 3 May (LDE), 1 hatch 9 May (W5)	33	No 3rd nest
2018	L8-11	L7-11	Avoyelles	15 Apr	2	Failed 25-26 April, nest very small; both infertile	10-11	8-9
2018	L1-13	L3-11	Allen	21 Apr	2	Egg swap/hatch 1 May (W3), 2 coll. – 1 EDE, 1 F LDE -died while hatching at ASSC	10	No 3rd nest
2019	L19-16	L10-15	Acadia	8 March	1	Full term, collected 12 Apr (no dev)	35	14
2019	L1-13	L3-11	Allen	2 April	2	Gave peeping egg 17 Apr (2-12/3-14's) but LDE, replaced with plaster egg 22 Apr. Failed due to snake predation 23 Apr. DL egg 10-17 April; pulled eggs LDE	21	~15
2019	L11-17	L7-11	Avoyelles	15 April	2	Full term, disappeared on/by 16 May	30	No 3rd nest
2019	L3-13	L8-14	Vermilion	15-23 April	2	Full term, coll. 24 May (no dev)	31-39	No 3rd nest
2019	L2-11	L13-11	Allen	21 April	2	Egg swap 6 May, hatch 7 May (W4), pulled eggs both hatched in captivity	16	No 3rd nest
2019	L12-16	L5-14	Jefferson Davis	23 April	1	Flooded 25 April, 1 egg found	2	1
2019	L12-14	L8-15	Vermilion	~2 May	1	Abandoned by 21 May, poss. due to flooding 19 May	17-19	No 3rd nest
2019	L8-13	L11-11	Jefferson Davis	7 May	2	Flooded 10 May, abandoned by 11 May, frags coll. 31 May	3-4	12-13
2020	L12-16	L5-14	Jefferson Davis	25 Mar	1	Abandoned 27 Mar; coll. 30 Mar (nonviable)	2	6
2020	L11-17	L7-11	Avoyelles	28 Mar	2	Abandoned 25 Apr (1 egg gone); 1 coll. 28 Apr (LDE)	28	32
2020	L1-13	L3-11	Allen	16-18 Apr	2	Full term; coll. 22 May (1 LDE, 1 MDE)	34-36	No 3rd nest
2020	L19-16	L10-15	Acadia	19 Apr	2	Hatched 19 & 21 May (W5 & W6)	32	No 3rd nest
2021	L11-17	L7-11	Avoyelles	6 Mar	2	Hatch 5 & 7 April (W6 & W7)	32	No 3rd nest
2021	L1-13	L3-11	Allen	22-26 Mar	2	Full term; 1 broke 25 Apr; 1 coll. 29 Apr (LDE)	34-38	16-22
2021	L3-13	L8-14	Vermilion	31 Mar	2	Full term; coll. 5 May (1 LDE, 1 non-viable)	35	No 3rd nest
2021	L8-13	L11-11	Jefferson Davis	11 April	2	Full term; 1 broke 14 May; 1 coll. 17 May (LDE)	36	15
2021	L12-16	L5-14	Jefferson Davis	12 April	2	Full term; coll. 17 May (1 LDE, 1 non-viable)	35	17
2021	L2-11	L13-11	Allen	27 Apr	2	Coll. 26 May for egg swap (1 LDE, 1 EDE); swapped egg hatch 26 May (W13)	29	No 3rd nest
2021	L22-17	L8-16	Chambers, TX	1 May	unk	Failed on/by 10 May for unk reasons; no eggs/fragments found	9	No 3rd nest
2021	L6-16	L16-17	Calcasieu	5 May	2	Full term; eggs into water on 29 Mar & 6 June; coll. 8 June (1 MDE, 1 LDE)	32	No 3rd nest
2021	L15-17	L9-16	Vermilion	10 May	2	Abandoned 28 May (poss. water issues); coll. 2 June (1 MDE, 1 LDE)	18	No 3rd nest
2021	L24-16	L14-17	Jefferson, TX	2/3 May	2	Abandoned 18 May; coll. 19 May (1 EDE, 1 MDE)	15-16	17
2021	L9-17	L23-17	Vermilion	29 Apr-6 May	1	Abandoned by 24 May (likely due to rain/flooding); coll. 25 May (non-viable)	17-24	No 3rd nest
2021	L3-19	L7-18	Vermilion	~22 May	1-2	Failed 13 May (likely due to non-viable egg); fragments coll. 16 June	~22	No 3rd nest
2022	L1-13	L3-11	Allen	9 Apr	2	Egg swap 4 May (1 hatch ASSC, 1 EDE); swapped egg (EMP) hatch 5 May (W13)	25	No 3rd nest
2022	L6-16	L16-17	Calcasieu	21 Apr	2	Pulled 20 May due to forecast water issues; both placed into F1-98/10-18 nest (1 hatch 23 May, 1 LDE)	29	No 3rd nest
2022	L24-16	L14-17	Jefferson, TX	26 Apr	2	Failed 18 May; 1 coll. from water 20 May (MDE) & 1 fragments only	22	No 3rd nest
2022	L12-16	L5-14	Jefferson Davis	22 Apr	2	Flooded 1/2 May; coll. from water 4 May (1 EDE, 1 unk)	10-11	11-12
2022	L19-16	L10-15	Acadia	21 May	1	Pulled 6 June at landowner request (MDE)	16	No 3rd nest
2022	L5-18	FW12-15	Cameron	6-16 May	2	Abandoned ≤12 June (no water); 1 intact (nonviable), 1 broken coll. 14 June	16-37	No 3rd nest
2022	L10-18	F1-98	Jefferson Davis	3 May	2	Egg swap 20 May; swapped egg (L16-17's) hatch 23 May (W14); 1 LDE, 1 swapped into 12-17/W1-18 renest 3 June	20	No 3rd nest
2022	LW1-18	L12-17	Jefferson Davis	9-11 May	2	Egg swap 3 June (1 EDE, 1 MDE); swapped egg (F1-98's) hatch 4 June (W15)	23-25	No 3rd nest
2023	L1-13	L3-11	Allen	27 Mar	2	Abandoned 6 Apr; 1 disappeared 4 Apr; 2nd coll. from water 8 Apr (non-viable)	9	13
2023	L12-16	L5-14	Jefferson Davis	5-8 Apr	2	Failed 19 Apr (nest fell apart); coll. from water 21 Apr (both EDE)	11-14	16
2023	L2-15	L11-15	Vermilion	≤19 Apr	1	Abandoned ~21 Apr; coll. 26 Apr (nonviable, too young?)	2+	No 3rd nest
2023	L3-13	L8-14	Vermilion	25-28 Apr	2	1 hatch ~27 May (W14); 2nd not coll.	30-32	No 3rd nest
2023	L23-16	L3-17	Vermilion	25-28 Apr	1	Hatch ~26 May (W12)	30	No 3rd nest

2023	L2-11	L13-11	Allen	26 Apr	2	Egg swap/hatch 12 May (W10); pulled eggs both MDE	16	No 3rd nest
2023	LW1-18	L12-17	Jefferson Davis	29 Apr-3 May	1-2	Failed by 11 May; 1 broken egg coll. from water 12 May	≤11	3-15
2023	L19-16	L10-15	Acadia	17 May	2	1 hatch 18 June (W15); 2nd not found	32	No 3rd nest
2023	L11-17	L7-11	Avoyelles	9 June	1	Full term; coll. 13 July (MDE)	34	No 3rd nest
2024	L1-13	L3-11	Allen	6 Mar	2	Full term; DL egg 19 Mar-11 Apr; 1 coll. 19 Mar (EDE); 1 removed by female 6 Apr	35	15
2024	L11-17	L7-11	Avoyelles	3 Apr	2	1 hatch 3 May (W11); 1 disappeared by 1 May	30	No 3rd nest
2024	L12-16	L5-14	Jefferson Davis	27 Apr	2	Failed 5 May (likely rain related); coll. from water 6 May (1 EDE, 1 non-viable)	8	11
2024	L3-19	L7-18	Vermilion	3 May	2	Abandoned 28/29 May; coll. 5 June (2 EDE)	25/26	No 3rd nest
2024	L21-17	LW3-18	Acadia	7/8 May	2	Failed 5 June; 1 replaced w DL egg 24 May (non-viable); 1 not found	28/29	No 3rd nest
2024	LW1-18	L12-17	Jefferson Davis	16 May	2	1 hatch 16 June (W15); 1 coll. 18 June (MDE)	31	No 3rd nest
Third nest attempts								
2017	L2-11	L13-11	Allen	29 Apr-2 May	2	Failed 3-5 May, collected 9 May, 1 infertile & shell fragment	2-6	12-14
2017	L8-11	L7-11	Avoyelles	15 May	2	Full term, egg swap 20 June, abandoned 21 June, 2 pulled eggs infertile	37	No 4th nest
2017	L1-13	L3-11	Allen	19/20 May	2	Full term, floated 15 June - 1 infertile removed, 1 coll. 26 June (infertile)	37-38	No 4th nest
2018	L8-11	L7-11	Avoyelles	4 May	2	Abandoned AM 11 May; egg swap unsuccessful; 1 inf, 1 unk (put in 10-15 nest)	7	No 4th nest
2019	L12-16	L5-14	Jefferson Davis	~26 April	1	Failed, likely clutch mate of single renest egg, coll. 31 May (broken)	1	~14
2019	L19-16	L10-15	Acadia	26 April	2	Egg swap 3 May, failed by 4 May possibly due to storms, 1 EDE, 1 hatch ASSC	7-8	11
2019	L1-13	L3-11	Allen	8 May	2	Egg/chick (W6) swap 22 May (2/13-11 egg), 1 unk, 1 hatch at WO	14	No 4th nest
2019	L8-13	L11-11	Jefferson Davis	23 May	1-2	Failed unk reasons 28 May, frag coll. 31 May	5	No 4th nest
2020	L12-16	L5-14	Jefferson Davis	2 Apr	1	Abandoned 3 Apr; coll. 6 Apr (nonviable)	1	15
2020	L11-17	L7-11	Avoyelles	27 May	2	Abandoned 5 June; 2 coll. from water 9 June (nonviable)	9	No 4th nest
2021	L1-13	L3-11	Allen	15-21 May	2	Coll. 26 May for egg swap; transfer to ASSC 27 May (2 MDE); swapped egg hatched 28 May (W14)	7-13	No 4th nest
2021	L8-13	L11-11	Jefferson Davis	1 June	2	Coll. 11 June for egg swap; transfer to ASSC 16 June (2 MDE); swapped egg died at hatch on 14 June	13	No 4th nest
2021	L12-16	L5-14	Jefferson Davis	3 June	1	Failed; coll. from water 8 June (unk fertility); laid 2nd egg of clutch on new plat	~3	~3
2021	L24-16	L14-17	Jefferson, TX	4 June	2	1 hatch 3 July (W15); 2nd disappeared	30	No 4th nest
2022	L12-16	L5-14	Jefferson Davis	13 May	1-2	Flooded 22 May; 1 egg coll. from water 24 May (EDE)	9	13
2023	L1-13	L3-11	Allen	19 Apr	2	Egg swap/hatch 9 May (W9); 1 MDE, 1 LDE (died 16 May at ASSC)	20	No 4th nest
2023	L12-16	L5-14	Jefferson Davis	5 May	2	Full term; 1 broke 6 June, 1 coll. 9 June (LDE)	35	No 4th nest
2023	LW1-18	L12-17	Jefferson Davis	13-19 May	2	Abandoned 29 May; coll. 30 May (both EDE)	10-16	No 4th nest
2024	L1-13	L3-11	Allen	26 Apr	2	Failed (weather) 16 May; eggs not found	20	18
2024	L12-16	L5-14	Jefferson Davis	16 May	1	Full term; coll. 20 June (LDE)	35	No 4th nest
Fourth - Seventh nest attempts								
2017	L2-11	L13-11	Allen	17 May	2	4th nest; full term, collected 20 June, both infertile	34	NA
2019	L12-16	L5-14	Jefferson Davis	9/10 May	1-2	4th nest; Failed 28-30 May, fragments coll. 31 May	18-20	NA
2019	L19-16	L10-15	Acadia	15 May	2	4th nest; Chick swap 20 May (W5 – 2/13-11 egg), both LDE in captivity	5	NA
2020	L12-16	L5-14	Jefferson Davis	~18 Apr	1	4th nest; abandoned ~20 Apr; coll. 19 May (nonviable)	2	UNK
2020	L12-16	L5-14	Jefferson Davis	UNK	1	5th nest; coll. 12 May (nonviable)	UNK	UNK
2020	L12-16	L5-14	Jefferson Davis	2 May	2	6th nest; abandoned 9 May; 1 coll. 12 May (EDE), 1 broken on nest	7	16
2020	L12-16	L5-14	Jefferson Davis	25 May	unk	7th nest; failed 3 June; no eggs/fragments found on 8 June	9	NA
2021	L12-16	L5-14	Jefferson Davis	~5 June	1	Nest 3.5; new platform but second egg from 3rd nest attempt; abandoned ~8 June; coll. 8 June (unk fertility)	~2	5
2021	L12-16	L5-14	Jefferson Davis	13 June	1	4th nest: Abandoned 17 June; coll. 21 June (unk fertility)	4	NA
2022	L12-16	L5-14	Jefferson Davis	4 June	2	4th nest; abandoned 11 June; coll. 13 June (1 unk, 1 fragments only)	7	NA
2024	L1-13	L3-11	Allen	3 June	1	4th nest; pulled 3 July (EDE)	23	NA

EMP FIELD TEAM ANNUAL REPORT 2024

Prepared by Nicki Gordon, Eleanor Laack, Hannah MacInnes, Alicia Ward, and Hillary Thompson, International Crane Foundation

Executive Summary

Highlights related to monitoring and management of the EMP from 2024 include:

- During 2024, there were 68-75 Whooping Cranes in the Eastern Migratory Population. The majority spent the summer in Wisconsin, except for 2 birds that traveled to South Dakota and 1 bird that spent the summer in Minnesota (Fig. 1).

- We recorded a total of 22 nests by 17 different pairs breeding in Wisconsin. This does not include 2 nests of a hybrid pair in Dodge County, Wisconsin. We collected 8 eggs from 4 first nests for forced renesting, to encourage the pair to renest after black flies were no longer on the landscape. Additionally, we recovered 2 eggs from an abandoned nest and collected 6 additional eggs from 5 first nests and 1 renest with 2 egg clutches. In total we brought 18 eggs into captivity for rearing and release. Seven chicks hatched from 4 first nests and 1 re-nest (Table 2). One wild-hatched chick fledged and survived to migration (Table 3).

- 12 adults were captured for transmitter replacement and 1 wild-hatched chick was captured for initial banding. One young Whooping Crane was captured due to inappropriate use of habitat in suburban Chicago and translocated to Horicon NWR.

- We released 5 captive-reared Whooping cranes into the wild. One was parent-reared (from ICF) and 4 were costume-reared (from ICF). All 5 juveniles survived migration and are on the wintering grounds. The parent-reared crane is with adult Whooping Cranes and the 4 costume-reared juveniles are in separate locations throughout the flyway.

- There were 3 confirmed adult mortalities (plus 1 wild-hatched pre-fledged chick) during 2024, due to various causes. Additionally, 8 cranes were classified as long-term missing during 2024.

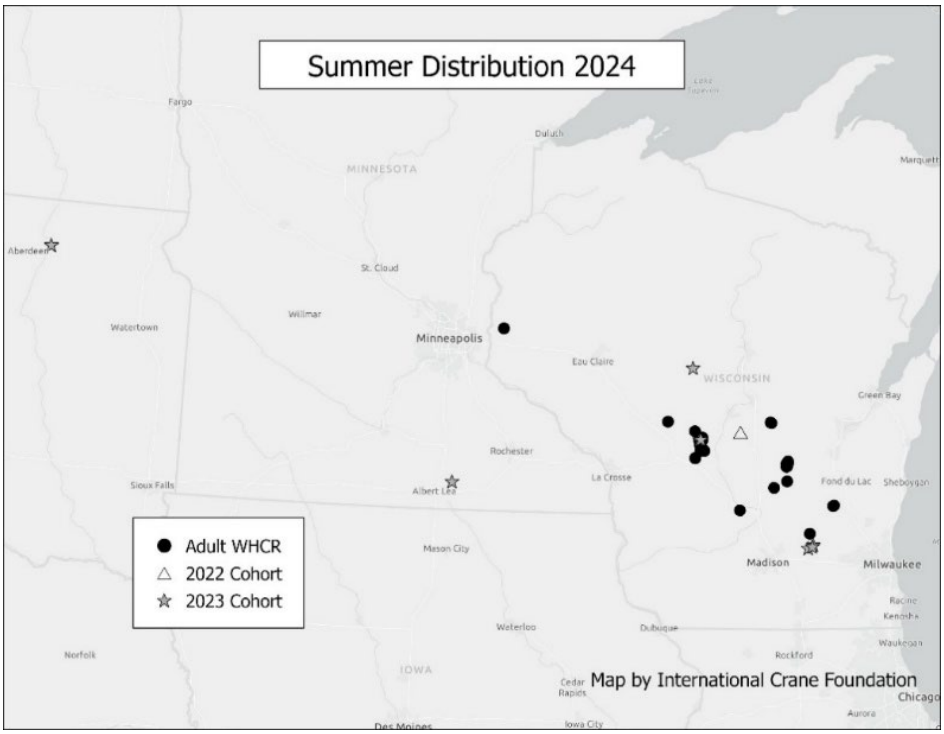


Figure 1. Summer distribution of the Eastern Migratory Population of Whooping Cranes during 2024. At least 61 cranes spent the summer in Wisconsin, 1 was in Minnesota, and 2 were in South Dakota.

Winter 2023-24

The estimated population size as of 1 January 2024 was 75 (42 F, 31 M, 2 U). The final wintering locations of Whooping Cranes in the EMP during winter 2023-24 were as follows (Fig. 2): 2 in Georgia, 6 in Illinois, 29 in Indiana, 8 in Kentucky, and 18 in Alabama. There were 12 in unknown locations, including 1 family group and 1 pair who wintered in unknown areas, and 7 birds who were later classified as long-term missing.

Winter distribution as of 10 January 2025

The maximum population size as of 10 January 2025 was 70 (36 F, 31 M, 3 U). The distribution of these birds is as follows (Fig. 3): 19 birds in Alabama, 2 in Tennessee, 7 in Kentucky, 3 in Illinois, 23 in Indiana, 2 in Georgia, and 2 in Florida. There were 12 in unknown locations, 2 of which have not been seen south of the breeding grounds.

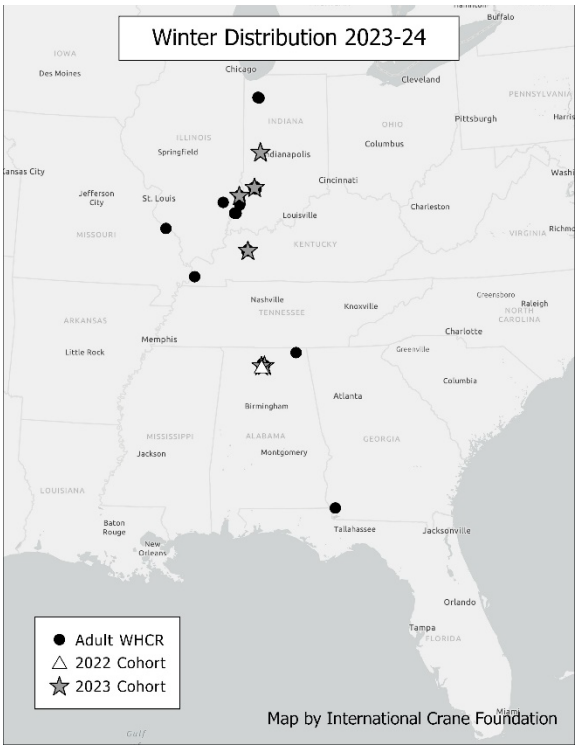


Figure 2. Distribution of wintering Whooping Cranes in the EMP 2023-24

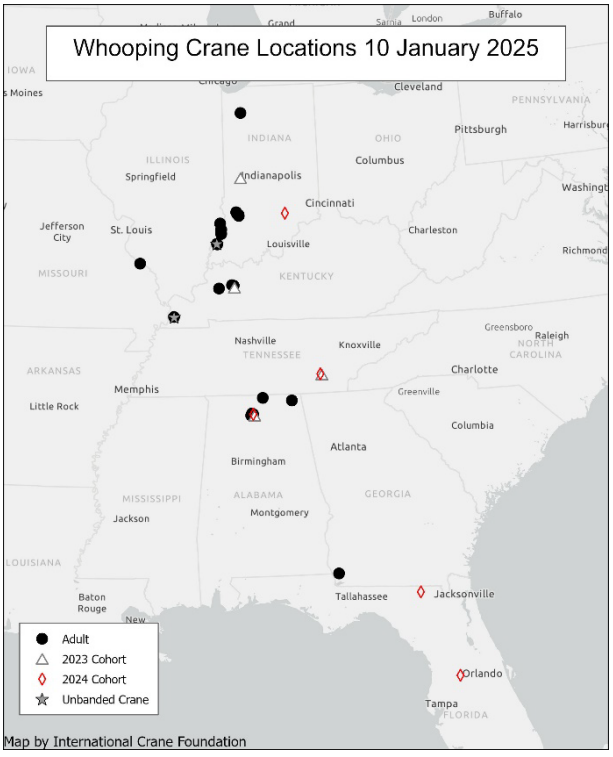


Figure 2. Distribution of wintering Whooping Cranes in the EMP as of 10 Jan 2025.

Captures and Banding in 2024

- Captures for transmitter replacement:
    - 2-04, Juneau County, Wisconsin, 10 April
    - 16-23, Cook County, Illinois, 23 April
        - Captured due to inappropriate use of habitat in suburban Chicago. Tagged with GPS transmitter, then translocated to Horicon NWR.
    - 1-11, St. Croix County, Wisconsin, 4 September
    - 4-17, Sauk County, Wisconsin, 9 September
    - 15-11, Juneau County, Wisconsin, 8 October
    - 6-15, Juneau County, Wisconsin, 8 October
    - 4-12, Green Lake County, Wisconsin, 9 October
    - 37-07, Juneau County, Wisconsin, 11 October
    - 79-19, Dodge County, Wisconsin, 11 October
    - 4-14, Lee County, Illinois, 14 October
    - 12-03, Juneau County, Wisconsin, 7 November
    - 4-13, Putnam County, Illinois, 18 November
- Captures of pre-fledged wild-hatched chick (transmitter and bands):
    - W3-24, Juneau County, Wisconsin, 10 July
- Banding prior to release for captive-reared birds:
    - 24-24, 25-24, 26-24, 27-24, 28-24, ICF, 10 September
    - 29-24, ICF, 13 September

Releases of captive-reared cranes

Five captive-reared juvenile cranes were released in Wisconsin into the Eastern Migratory Population during 2024. One of these was parent-reared (29-24) and four were costume-reared (24-24, 25-24, 27-24, 28-24) at the International Crane Foundation. The costume-reared cranes were transferred to a pen on September 18th at Horicon National Wildlife Refuge, where they were then released at the end of October 2024.

- 29-24 (M) was parent-reared at the International Crane Foundation then released at White River Marsh State Wildlife Area on 9 October 2024 near an established pair (67-15 and 3-17). 29-24 associated quickly with a single adult in the area (38-17) as well as two adult pairs (W3-17/W2-21 and 3-14/4-12). 29-24 migrated with W3-17 and W2-21 to Wheeler National Wildlife Refuge in Morgan County, Alabama, where he wintered with the pair.
- 24-24 (F), along with 25-24 (F) and 27-24 (M), quickly moved south to Lake Geneva. In November 24-24 and 25-24 were seen together and 27-24 was seen alone at Jasper-Pulaski Fish and Wildlife Area in Jasper County, Indiana. In December 24-24 migrated to Hiwassee Wildlife Refuge in Meigs County, Tennessee, and occasionally associated with 16-23. Meanwhile, 25-24 and 27-24 headed south together to Hamilton County, Florida. Soon after, 27-24 parted ways from 25-24 and continued south to Lake County, Florida.
- 28-24 (M) remained at Horicon through mid-November and was seen briefly associating with two adults in the area (16-11 and 79-19) before migrating south with them to Jasper-Pulaski Fish and Wildlife Area in late November. 28-24 later split from the two adults at the end of

November, but has remained in Indiana, moving among various counties including Jasper, Jackson, Washington, and La Porte.

Survival

- The total number of birds (both captive releases and wild-hatched chicks) coming into this population since 2001 is 354 cranes (Fig. 4), of which 70 (20%) may be alive as of 1 January 2025 (Fig. 5). There have been 316 captive raised Whooping Cranes released since the beginning of the reintroduction in 2001. This number does not include the 17 HY2006 ultralight-led juveniles that died during confinement in a storm and one HY2007 ultralight-led juvenile that was removed from the project prior to release. There have been 38 wild-hatched chicks that survived to fledging (see Reproduction section below).
- There were 3 confirmed mortalities of post-fledged cranes recorded in 2024 (pre-fledge wild-hatched chicks born in 2024 – see below, Table 1, Fig. 6):
    - 18-23 (F) - remains collected on 10 January 2024 in Putnam County, IN, suspected powerline or fence collision
    - 63-15 (M) confirmed dead on 16 February 2024 in Randolph County, IL, suspected predation based on GSM data
    - 15-23 (F) confirmed dead on 5 July 2024 in Brown County, SD, suspected powerline collision based on PTT data
- There were 1 confirmed mortalities of pre-fledged cranes recorded in 2024:
    - W3-24 (F) remains collected 23 July 2024 in Juneau County, WI, suspected predation based on GSM data
- There were 8 cranes classified as long-term missing during 2024.
    - 5-10 (F) was last seen August 2023 in Portage County, WI.
    - 24-17 (F) was last seen July 2024 in Sauk County, WI. Later her mate was seen alone and then re-paired and migrated without her.
    - 68-15 (F) was last seen November 2023 in Barry County, MI.
    - W1-18 (F) was last seen July 2023 in Juneau County, WI.
    - 77-18 (M) was last seen March 2023 in Green Lake County, WI.
    - 9-05(M) and 13-03 (F) were last seen March 2023 in Greene County, IN. GSP data showed 13-03 coming back to WI, but she was never visually confirmed.
    - 2-17 (F) was last seen August 2023 in Juneau County, WI.

Table 1. Causes of death for fledged, wild-hatched and captive-reared Whooping Cranes in the Eastern Migratory Population. We did not include confirmed mortalities for wild-hatched pre-fledged chicks. "Other" causes of mortality included euthanasia due to injuries, hemorrhages, capture myopathy, emaciation, and egg binding.

Cause of Death	Number of cases cumulatively 2001-2022	Number of cases 2024
Predation – confirmed or suspected	42	1
Impact Trauma – confirmed or suspected power line collision	12	2
Impact Trauma – other (vehicle or aircraft collision, unknown source of trauma)	12	0
Gunshot	14	0
Disease (including lead poisoning)	8	0
Other	15	0
Unknown	78	0
Total confirmed mortalities	181	3

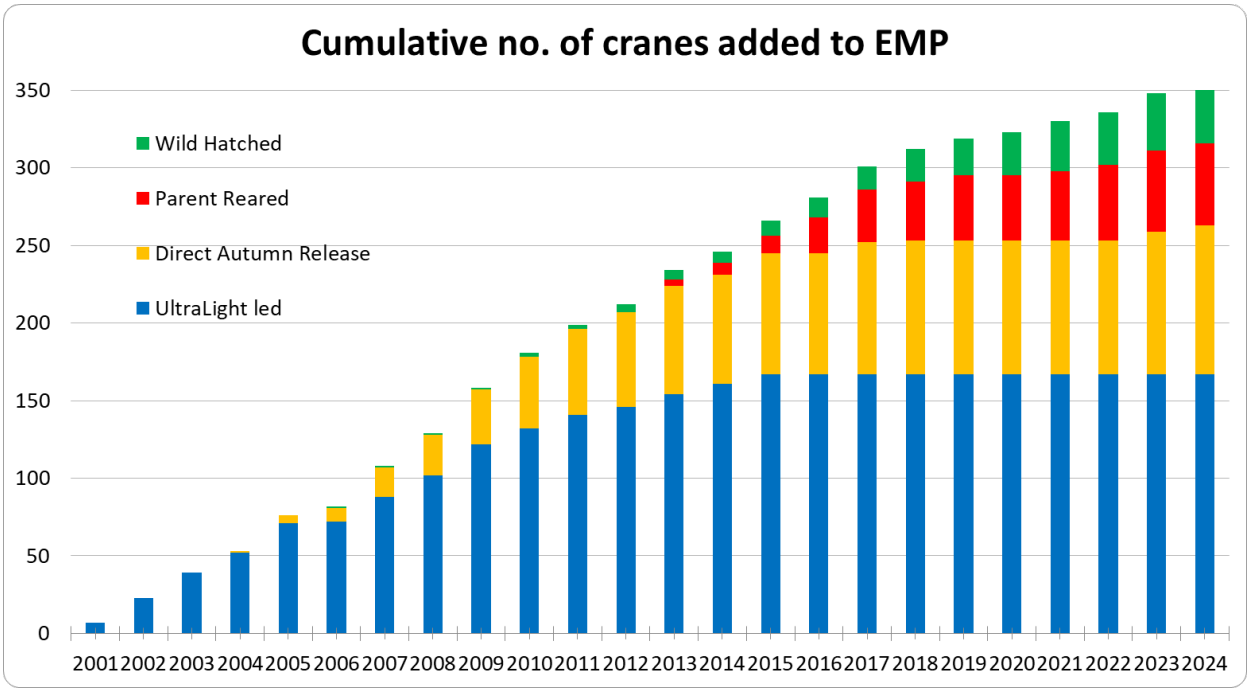


Figure 3. Cumulative number of cranes added to the Eastern Migratory Population by rearing method since 2001. As of 2024, there have been 167 UltraLight led, 96 Direct Autumn Release, 53 Parent Reared, and 38 Wild Hatched Whooping Cranes added to the EMP.

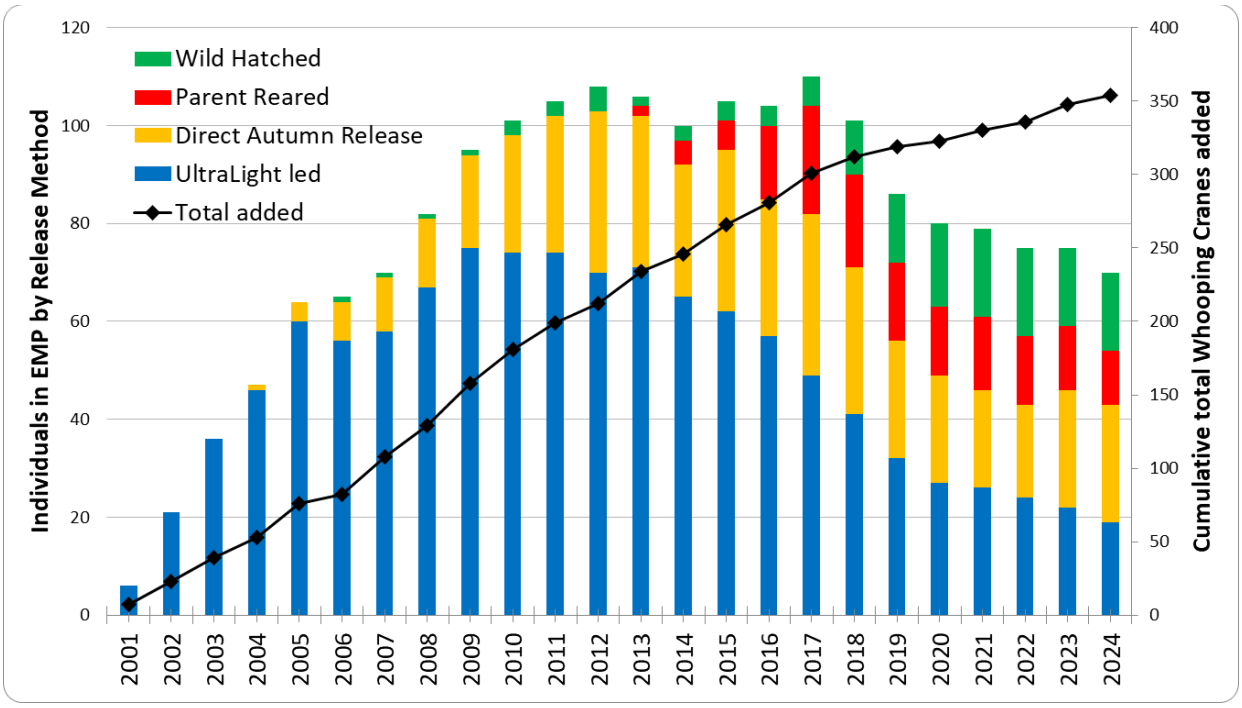


Figure 4. Population size of EMP by rearing method. As of 1 January 2025, there were 70 birds recorded in the EMP (left axis; 31 M, 36 F, 3 U). Black line indicates the total birds released (or wild-fledged) into the population cumulatively (right axis).

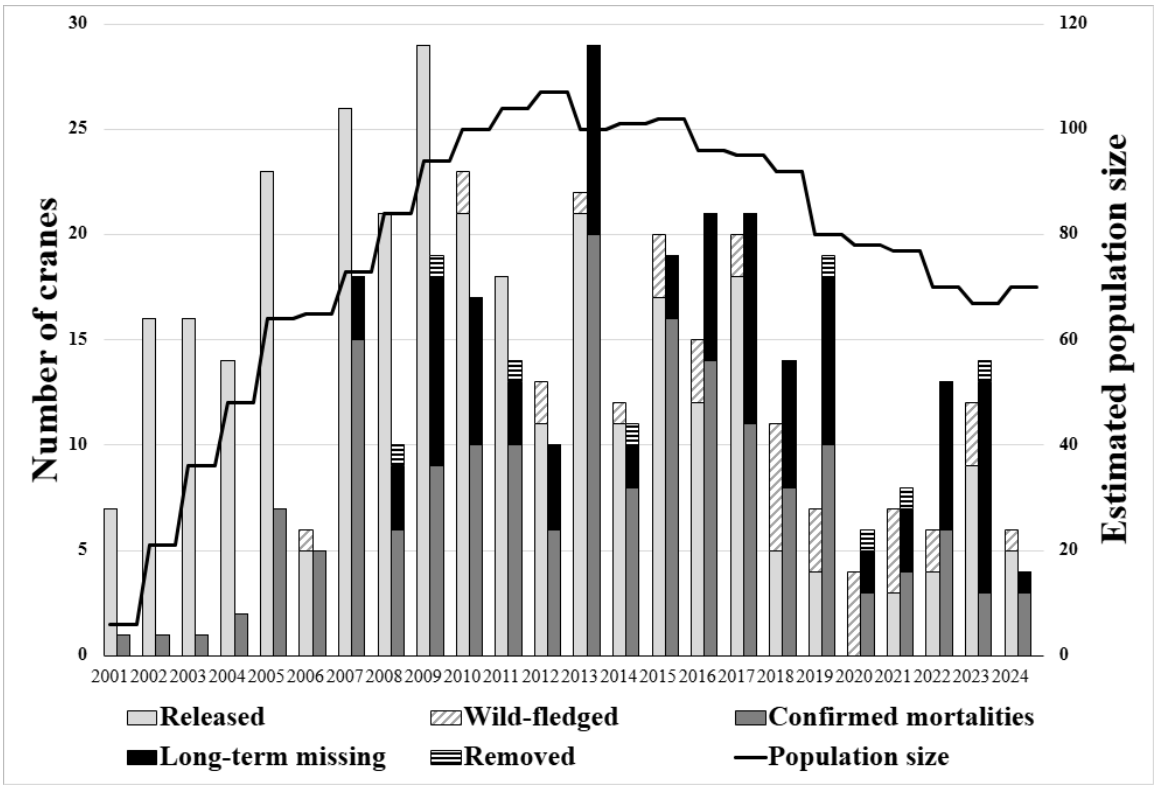


Figure 5. Estimated population size of the Eastern Migratory Population of Whooping Cranes from 2001-24 (right axis). The number of cranes added into the population each year are shown in a stacked bar on the left, those subtracted on the right bar (left axis).

Reproduction

- This year we recorded a total of 22 nests by 17 different Whooping Crane pairs breeding in Wisconsin. The numbers reported here are the total we observed but there may have been a few missed nests or young chicks.
- We collected 8 eggs from 4 first nests for forced renesting, to encourage pairs to renest after black flies were gone. We recovered 2 eggs from an abandoned nest and collected 6 eggs from 5 first nests and 1 renest with 2 egg clutches. In total we brought 18 eggs into captivity for rearing and release.
- Ten nests failed due to a variety of known and unknown causes (predation by raccoon, abandonment, an unknown, Table 2). Additionally, 3 nests were incubated full term. One nest's egg was a late dead embryo and for two nests we could not confirm if the eggs hatched but those pairs were confirmed later without chicks.
- There was 1 hybrid Sandhill-Whooping Crane pair in Dodge County, Wisconsin, that nested twice, and the eggs from both nests were destroyed (Table 2).
- 7 chicks hatched from 4 first nests and 1 re-nest (Table 2). One wild-hatched chick fledged and survived to migration (Table 3).
- At the end of 2024, there have been a total of 455 nests (357 first nests, and 98 re-nests). 202 chicks hatched in the wild, of which 38 have fledged. As of 1 January 2025, 16 of those survive in the wild (Tables 3 and 4, Fig. 7).

Table 2. Nesting summary for 2024. Asterisks indicate a re-nest. Active nest management was implemented to reduce the impact of black fly disturbance. Some nests with two-egg clutches had one egg removed as a part of Partial Clutch Collection (PCC) to increase the number of eggs and chicks raised in captivity for release into reintroduced populations.

Female	Male	Nest Outcome	Date Completed	County	Chicks	Notes
6_17	16_04	Failed - abandoned	10 Apr	Juneau		Black flies. 2 eggs collected
6_17	16_04	Failed* - unknown	8 May	Juneau		
36_09	W5_18	Active nest management	10 Apr	Juneau		2 eggs collected
36_09	W5_18	Unknown* – full term	14 Jun	Juneau		
12_03	12_05	Active nest management	14 Apr	Juneau		2 eggs collected
12_03	12_05	Hatched*	27 May	Juneau	W6	PCC
15_11	W6_18	Active nest management	14 Apr	Juneau		2 eggs collected
15_11	W6_18	Failed* - unknown	22 May	Juneau		Male last seen 30 May
W3_17	W2_21	Failed – unknown	21 Apr	Green Lake		Possibly black flies
3_14	4_12	Active nest management	25 Apr	Green Lake		2 eggs collected
12_11	5_11	Hatched	30 Apr	Juneau	W1, W2	W1 fledged
10_15	4_13	Failed – predated	30 Apr	Green Lake		PCC, 1 egg predated
7_11	85_21	Hatched	6 May	Juneau	W3, W4	
W1_19	1_17	Failed – abandoned	7 May	Portage		PCC
42_09	37_07	Failed – unknown	30 Apr	Juneau		
24_08	13_02	Failed – predated	11 May	Juneau		1 egg collected, swapped with 1 12_03/12_05 egg
W14_19	2_04	Failed – unknown	15 May	Juneau		
67_15	3_17	Unknown – full term	23 May	Green Lake		PCC
24_17	4_17	Hatched	21 May	Sauk	W5	PCC
W3_10	7_07	Hatched	26 May	Juneau	W7	PCC
73_18	3_04	Unknown – full term	11 June	Juneau		2 eggs collected, swapped with 1 13_02/24_08 egg
SACR	16-11	Failed - management	24 Apr	Dodge		Replaced hybrid eggs with dummy eggs but birds abandoned.
SACR	16-11	Failed* - management	11 June	Dodge		Removed hybrid eggs from the nest.

Table 3. Nest initiation dates, number of nests, number of chicks hatched, and number of chicks fledged 2005-2024. This does not include hybrid nests or chicks, nor does it include same-sex pairs. There was one same-sex female pair that nested in 2020, was given fertile eggs, and hatched a chick that did not fledge. This chick is included in the number of chicks hatched, but the nest is not included in nest totals.

Year	First Nest Initiation	# First Nests	# Re-nests	Total Nests	# Hatched	# Fledged
2005	16 Apr	2	0	2	0	0
2006	5-6 Apr	5	1	6	2	1
2007	3 Apr	4	1	5	0	0
2008	7 Apr	11	0	11	0	0
2009	2 Apr	12	5	17	2	0
2010	<1 Apr	12	5	17	7	2
2011	3-4 Apr	20	2	22	4	0
2012	<26 Mar	22	7	29	9	2
2013	15 Apr	21	2	23	3	1
2014	7 Apr	25	3	28	13	1
2015	1-3 Apr	27	9	36	24	3
2016	29-31 Mar	25	16	41	24	3*
2017	30 Mar	25	10	35	18	2
2018	8 Apr	17	6	23	10	6*
2019	30 Mar	25	11	36	19	3
2020	25 Mar	20	3	23	18	4
2021	<31 Mar	21	2	23	14	4
2022	30 Mar - 2 Apr	24	7	31	14	2
2023	30 Mar	22	3	25	14	3
2024	31 Mar	17	5	22	7	1
Total		357	98	455	202	38

*One chick was old enough to have fledged when it died, but flights were never observed.

Table 4. Pairs that have successfully fledged chicks with years of fledging

Sire	Dam	Year(s)				
11-02	17-02	2006				
3-04	9-03	2010	2013	2015		
12-02	19-04	2010	2012	2014		
9-05	13-03	2012	2019			
10-09	17-07	2015				
2-04	25-09	2015	2021			
29-09	12-03	2016				
12-05	12-03	2019	2020	2021		
1-04	8-05	2016				
12-02	4-11	2016*				
14-08	24-08	2017	2018**			
13-02	24-08	2020	2023			
24-09	42-09	2017	2018			
11-15	42-09	2020				
5-11	12-11	2018	2019	2022	2023	2024
4-08	23-10	2018				
8-04	W3-10	2018				
1-04	16-07	2018				
63-15	38-17	2020				
18-03	36-09	2021				
4-12	3-14	2021				
1-17	W1-19	2022				
29-08	15-11	2023				

*12-02 died before chick fledged. Chick was old enough to have fledged when it died, but flights were never observed. 4-11 was found shot at her wintering area at the beginning of 2017.

** 14-08 disappeared before chick fledged and 14-08 is believed to be dead. The chick (W9-18) was old enough to have fledged when it died, but flights were never observed.

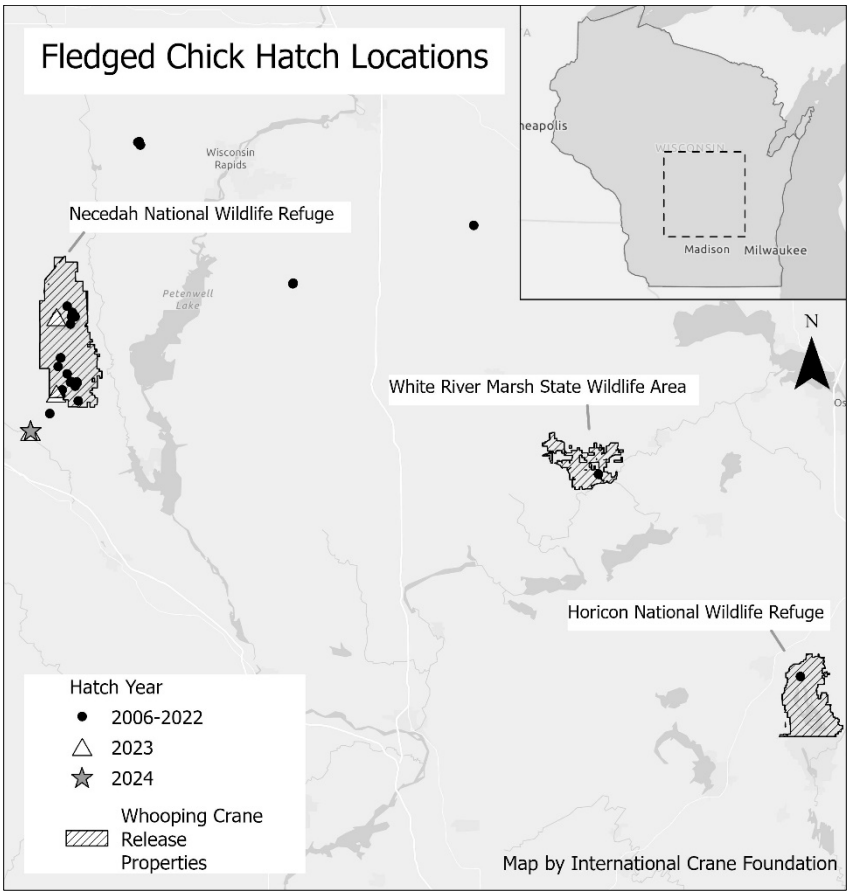


Figure 6. Map of hatch locations of wild fledged Whooping Crane chicks from 2006-2024 in the Eastern Migratory Population with an inset map of Wisconsin highlighting the focal area.

Research

During 2024, members of the Field Team had research papers in the review process and accepted for publication, and one completed MS thesis. Below are research products (done by Field Team members or partners) that were published during 2024, or were previously unreported in an annual report, that focus on the Eastern Migratory Population.

Caven, A. J., H. L. Thompson, D. M. Baasch, B. K. Hartup, A. Hegg, S. M. Schmidt, I. Louque, C. Allen, C. Crouch, C. Davis, J. Jorgensen, J. E. Austin, B. Ostrom, R. Beilfuss, G. Archibald, and A. E. Lacy. 2023. Biological Case Against Downlisting the Whooping Crane and for Improving Implementation under the Endangered Species Act. School of Natural Resources: Faculty Publications. 1655. https://digitalcommons.unl.edu/natrespapers/1655

Gordon, N. M. 2024. Predator Occupancy on the Breeding Grounds of the Eastern Migratory Population of Whooping Cranes (*Grus americana*). Thesis, University of Wisconsin, Madison, USA.

Jaworski, J. A., B. N. Strobel, S. A. Dubay. 2023. Short-term effects of camera trap installation on incubation constancy in cranes. Canadian Journal of Zoology 101:896-903.

Mendgen, P., S. J. Converse, A. T. Pearse, C. S. Teitelbaum, and T. Mueller. 2023. Differential shortstopping behaviour in whooping cranes: habitat or social learning? Global Ecology and Conservation 41:e02365.

Sime, M. J., H. L. Thompson, S. E. Zimorski, E. K. Szyszkoski, T. A. Dellinger, and S. M. Schmidt. 2024. Power line collisions of reintroduced whooping cranes. Southeastern Naturalist 23(2):194-211.