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Founding Members of the WCEP:

**International Crane Foundation
Operation Migration Inc.
Wisconsin Natural Resources Foundation
International Whooping Crane Recovery Team
National Fish & Wildlife Foundation
United States Fish & Wildlife Service
U.S.G.S. Patuxent Wildlife Research Center, and
National Wildlife Health Center
Wisconsin Department of Natural Resources**



2004 In Review

In an effort to ensure the continued survival of Whooping cranes (*Grus americana*) the Whooping Crane Eastern Partnership (WCEP) is conducting a multi-year reintroduction project in eastern North America. To establish this population in a migratory situation and to encourage wild behaviour, each new generation of captive-hatched cranes is costumed-reared, isolated from human environments and conditioned to follow custom modified ultralight aircraft. Using this method the cranes are guided by the aircraft in autumn along a 1200-mile, pre-determined migration route from the Necedah National Wildlife Refuge in Wisconsin to the Chassahowitzka National Wildlife Refuge in Florida.

Thirty-three sub-adult Whooping cranes that were led along this route during the first three project years continue to select suitable habitat, avoid humans, and migrate unaided twice each year. An additional 14 sub-adults successfully made their first migration in the fall of 2004, which brings the total of whooping cranes reintroduced to eastern North America to forty-seven (47). A number of prior year birds will be approaching breeding age and we hope to observe the first attempts at pairing, and quite possibly nesting behavior this coming year. The goal of the project is to establish a discrete, self-sustaining population of at least 125 birds containing a minimum of twenty-five (25) breeding pairs as proposed by the Canada/United States Whooping Crane Recovery Team. This pioneering flock will augment the only naturally occurring population that migrates in the west, between northern Canada and southern United States, and the non-migratory flock reintroduced into central Florida beginning in 1993.

There were a number of challenges again this year including: 1) weather conditions that slowed the ultralight migration to a record 64 days, 2) loss of two prior year sub-adults, 3) late migration of prior year birds due to a very warm early fall and winter and 4) subsequent dispersal of a small number of those birds along the migratory route. However, these challenges were addressed by the partnership and the project has seen another successfully year overall. Future challenges include: 1) continued consideration of moving the ultralight migration route to the West to avoid the Appalachian mountains, 2) changes in winter pen management to deal with overlap of ultralight birds and prior year sub adults, 3) future genetic management of the population and 4) possible initiation of a supplemental release technique teaching birds to migrate by releasing them with experienced adults, and 5) continuing difficulty to meet project funding goals each year.

The project continues to receive enthusiastic governmental, public and private support and has stimulated interest in protecting and restoring habitats for whooping cranes, other birds and associated wetland species along the route and has also been a strong focus of environmental education efforts. The Power of Partnership continues to effectively support our collective efforts to restore this endangered species and symbol of international conservation to Eastern North America.

2004 FIELD SEASON

Joseph W. Duff, Operation Migration Inc.

EARLY CONDITIONING:

Between 20 April and 5 June, twenty-four (24) Whooping crane chicks were hatched at USGS Patuxent Wildlife Research Center (PWCR). Twenty-one (21) were from the Patuxent captive flock. The International Crane Foundation (ICF) provided two (2) and the San Antonio Zoo captive propagation center provided one (1) egg. Unfortunately, the SA Zoo chick died shortly after hatching; three (3) chicks were removed from the study due to a variety of health issues, including aspergillosis and subsequently died. Three (3) others were considered genetically valuable and held back for addition to the captive population, and one (1) was removed from the study because of a deformed maxilla. (See pg. 39 - Health Team Report)

This natural attrition left a total of sixteen (16) Whooping cranes (eleven males/five females) with an age spread of 46 days. In addition to the health issues mentioned there were developmental leg and wing problems in approximately twelve birds that required special treatment and handling. This extra burden, coupled with the age spread meant a heavy workload for the rearing team that included staff from PWRC and Operation Migration Inc. (OM).

The chicks were first introduced to the aircraft at an average age of 7.69 days and overall, received an average of 7.76 hours of conditioning using a variety of techniques from the broadcast of engine noise recordings, to circle pen training, and following the aircraft in an open field. As they began to socialize they were divided into three cohorts of 7, 6 and 3 individuals respectively based on age. During this period they had access to the pond pens for an average of 56.44 hours.

The need to transport birds at a specific time in their early development and the significant age spread meant three separate shipments were required. On 19 June Cohort One (C1) was moved to Necedah National Wildlife Refuge (NNWR) courtesy of Windway Capital. The other two groups followed on 30 June and 15 July. All the birds were shipped in compliance with the USGS Patuxent WRC, Protocol For Transporting Cranes. The birds were contained in individual crates designed and supplied by OM. Two oversize crates were also provided this year in an effort to minimize damage to the blood feathers of larger birds.

SUMMER TRAINING:

Immediately after their arrival, the birds were moved the Annex facility on the refuge for an abbreviated medical exam that included weight, fecal sample collection and a full body radiograph. These procedures are performed while the chicks are still in their shipping containers. Three birds were found to have ingested foreign objects and had to be transported to the University of Wisconsin in Madison for endoscopic procedures. (See pg. 39 - Health Team Report)

The cranes were housed at the three separate facilities, all located within closed areas of the refuge. Over the winter the refuge staff completed several modification to the sites. These included construction of wider access gates with steel doorframes. The new metal structure prevents the gates from distorting with age, ensuring they work consistently. The wider entrance reduces the stress to the birds as several try to move through a small opening at one time during early morning releases. Improvements were made to the entrance at the East Site and an extension was added to the aircraft training area at the North Site.

High water levels during the early part of the season threatened to make the East and North Sites unusable, however, John Olsen of NNWR was able to make adjustments that reduced the levels in time for the arrival of the second two cohorts. Precipitation was higher than normal over the summer and helped reduce the build up of coliform bacteria at the pen sites. It also minimized the difficulties in providing fresh water to the pens that we experienced in 2003.

During their time at Necedah NWR, C1 spent 117 days at NNWR and they were trained on 72 occasions. Cohort Two (C2) was trained with the aircraft on 58 of 103 days and the youngest group, Cohort Three (C3) worked with the aircraft on 42 of the 88 days of their stay. Each group received 32.08 hours, 25.16 hours and 17.58 hours of training respectively. Over the summer season, they were able to water roost an average of 76.13 nights.*

On 10 August, number 22-04 was transported to the University of Wisconsin in Madison after it was observed swallowing a plastic tie-wrap. The foreign object was successfully removed using an endoscopic procedure but the bird suffered a compound leg fracture during the return trip. It was immediately returned to Madison but died shortly after arrival. A necropsy revealed that the fracture had severed an artery. (*See pg. 39 – Health Team Report*)

Number 18-04 began to lose primary flight feathers on 17 August. The cause of the loss has not been determined but it became necessary for Dr Barry Hartup of the International Crane Foundation to remove several more. The loss of these feathers compromised the bird's ability to fly and train with its flockmates. Although efforts were made to ground train the bird separately, it began to lose interest in the aircraft and handlers. The additional herding required to move the bird into and out of the pen compounded the problem. The crane was removed from the study on 2 October and subsequently released with older, experienced Whooping cranes at NNWR once its feathers regenerated. On 7 November 2004, long after the ultralight-led migration was underway, #18-04 began a southward migration in the company of crane #07-03 and successfully arrived in the vicinity of the wintering grounds on 3 January 2005. This is the first bird to be released using this supplemental method and the results are very encouraging. (*See pg. 24 - Monitoring Team section*)

The pre-migration health check and banding took place on 6 and 7 September. A handler dressed in a white costume herded individual birds to the gate where they were passed to handlers dressed in grey costumes. After a visual inspection of the head and mouth, the birds were hooded for the remainder of the exam. Temporary snap-on radio and identification bands were used to simplify the process. (These bands were replaced with more permanent markings after the birds arrived in Florida). The complete exam, from the time the birds were collected until they were returned to the pen, took an average of 9 minutes. A few birds appear to experience minor lameness after the exam, likely due to exertion while being confined or the unfamiliarity of the radio antenna.

Using the grey costumes and a radio band that is faster to attach, has greatly reduced the negative impact this procedure has on the birds. In the past, it has taken up to two weeks for us to regain their confidence on the ground and in the air. Using these new procedures the birds are performing normally after only a few days.

For the purposes of this study and to facilitate comparisons to previous years we have defined "fledging" as the point in time when all the birds from a cohort are able to fly short circuits around the pen area. Cohorts one, two and three fledged on 17 July, 2 August, 16 September respectively, however, individual birds may have been able to sustain flight for short periods well before these dates.

* *Note: It is difficult to determine if the birds are actually roosting on water without disturbing the flock and influencing their behaviour. This calculation represents the number of nights the birds had access to, or were locked into, the wet portion of the pen and may not accurately depict the number of times the birds actually roosted in water.*

Prior to beginning the fall migration it is necessary to mix the individual cohorts to create one flock. Typically, when this merging begins, changes in behaviour such as aggression are often noted. The integration is attempted when one of the cohorts is able to fly well enough to cover the distance between sites. Logically we would start with the oldest group, which is the first to fly, and mix them with C1. However, when the youngest birds are eventually introduced they would face a well-established flock of older and larger birds. Confronting these odds, they may never integrate properly. To avoid this situation we mix C2 and C3 first and let them establish a new dominance structure. Later we can add the oldest birds that now face a larger group in an unfamiliar pen. This seems to balance the odds and minimizes the amount of hostility.

To accomplish the integration the birds are led by air to the new location where they are housed in pens separated by a chain link fence. This allows them to interact without causing injury. We also spend time with them outside the pen where they are too preoccupied to be antagonistic. Once they begin to socialize, the divider is removed and they are monitored for signs of stress. The assignment of sites for each cohort at the beginning of the season allows us to do the final integration at the larger East Site where the pens can be divided into as many as four sections. On 9 September, all the birds from C2 and C3 were allowed access to both the wet and dry areas of the pen with little signs of aggression. On 18 September, C1 was led to the East Site and penned beside the recently combined, C2/3. When the handlers arrived at the pen for early morning training on 20 September, it was discovered that the gate joining the two pens had opened and the birds had mixed themselves. There were no signs of aggression or stress and the complete group was given access to all pen areas. The next day the entire group flew together for the first time.

Despite the successful social integration of all the birds, C3 was too young to keep up with the ever-increasing durations of the exercise flights. Number 14-04, of C2, had developed a bad habit of turning back but this was corrected by adding this bird to the two birds (19-04 & 20-04) in the youngest group.

ULTRALIGHT-GUIDED SOUTHWARD MIGRATION:

The target date for the start of migration 2004 was set for 9 October. This is the date when all the equipment and the crew are assembled at Necedah NWR and ready to begin. However, the actual departure date is dictated by the weather. This past season we were able to begin on October 10, which was the earliest we have left the Refuge. Unfortunately, this advantage was soon eroded by poor flying conditions. Weather delayed the migration on several occasions including four periods of 6- days or more that we were grounded. The 2004 migration lasted longer than any of the previous three and we arrived at the southern terminus after 64 days on December 12.

Despite the many delays the birds were well prepared, and their extended confinement in the travel pen did not seem to diminish their enthusiasm for the aircraft. On the occasions when we were not able to fly for 6 days or more the birds would be reluctant to leave the area. The corraling necessary to get them headed in the right direction and following the aircraft properly, could add 40 to 50 minutes to a flight and many times the ground crew would have to pick up stragglers. However, once we began to fly regularly they became more attentive and could cover greater distances. The longest flight was 157 miles in just over three hours.

As always the first day of migration is difficult. The birds are reluctant to leave the refuge and often return to the pen. Attempting to corral them, the pilots become spread out and our resources are divided. This past season was no different and only 7 birds covered the 24 miles to the first stop. As number 19-04 matured it developed stress bars in many feathers to the point where it actually appears dishevelled in the air. Its ability to fly seemed to be compromised and it often became tired and dropped out before the end of a migration leg. Deteriorating weather and heavy turbulence seemed to cause the most problems. In these conditions the birds have difficulty following the aircraft and many could not keep up. Four birds flew the entire migration with the aircraft.

In past years the Appalachian Mountains in Tennessee have been our most difficult obstacle. We have to force climb the cranes 2500 feet to clear the Cumberland Ridge and many of them would have to be crated to the next stop. This season we developed a new stopover 15 miles north of the ridge. This gave us 30 minutes or more to slowly climb the flock to altitude and we cleared the ridge with all the birds in line following one aircraft. We have also had many problems leaving the Hiwassee State Refuge, which happens to be the very next stop. Hiwassee offers the first opportunity for the birds to roost in water since the start of the migration and they are often reluctant to leave. We did have to corral the flock and it took a number of attempts to encourage them to follow, but all the birds made the flight to the next stopover.

As usual we experienced a lot of rain and fog and in a number of regions water levels were so high that our travel pen trailer had to be towed out of isolated fields by cooperative landowners using large tractors. At one location in Georgia we set up the pen in anticipation of moving the birds the following day and had to retrieve it after four days because it was submerged in more than two feet of water.

High winds are not only a problem in the air but also make it difficult to secure the aircraft on the ground. On the morning of 1 December we found that despite having checked several times through the night, one aircraft had been caught by a gust and was upside down and against a tree. We spent the day making repairs and it was airworthy by the next morning.

Several times during the migration the weather deteriorated while we were airborne. The resulting turbulences made it impossible for the birds to get any benefit from the wing-tip vortices and they began to tire quickly. On two notable occasions birds dropped out and soon fell far behind. Bright sun and haze made it difficult for the top cover pilots to track the errant birds. In these conditions the cranes revert to their natural technique of thermalling and can stay airborne for hours with little effort. In unfamiliar territory they remain airborne all day until the thermal activity begins to degrade just before sunset.

On 14 November, Mark Nipper, Tatiana Zhuchkova and Joe Duff using two vehicles successfully tracked number 12-04 over much of southern Indiana and northern Kentucky for 7 hours on the ground assisted by Sara Zimorski (ICF) and Mike Brakes (Windway Capital) in the Windway tracking aircraft. On 26 November, Mark Nipper, Tatiana Zhuchkova, Richard Van Heuvelen and Charlie Shafer tracked number 02-04 for 7 hours. Earlier in the search they had assistance from Mike Lyons and Bill Lishman in the top cover aircraft. They found the bird only eight miles from the starting point just after sunset.

The Whooping cranes from the previous years did not begin their southward migration until late in the season and the WCEP Monitoring Team was concerned that they would arrive at the Florida release area after the ultralight-led cranes. It was felt that the older birds would be encouraged to stay by the presence of the handlers and the feed provided for the younger birds. During a period of poor flying weather, and while the migration team was grounded in north Florida, we took the opportunity to assist the International Crane Foundation and the Chassahowitzka National Wildlife Refuge staff to build a temporary enclosure outside the release pen. This addition was top-netted and is used to effectively contain the younger birds, thereby removing the attraction of feed from the older birds, and protecting the chicks from any aggression.

The pen construction took five days, during which, only one was flyable. On that morning we attempted to launch the birds but found number 06-04 down in the pen surrounded by many loose feathers. It was obvious the bird was incapacitated and had sustained attack from aggressive flockmates. The flight was aborted and the bird was moved to the University of Florida at Gainesville where it was euthanized. Bacterial infection was initially suspected so that morning the birds were released to an isolated area and monitored while the pen was disinfected and relocated 100 metres away, onto fresh ground. It was later determined that the bird died of Eastern Equine Encephalitis.

On 12 December we made the final 78-mile flight to the release pen at Chassahowitzka NWR. During this flight we flew over a large crowd of 1500 people who had gathered to witness the arrival of the fourth generation of WCEP Whooping cranes.

Migration 2004 covered 1204.4 statute miles and lasted 64-days. We flew on 21-days and the remainder of the time; we were the guests of many generous landowners while waiting out the weather. We would like to thank them for their contribution. Without their support this study would not be possible.

PROPOSED IMPROVEMENTS FOR 2005:

During this extended migration the birds were held in the travel pens for extended periods. Although they were released to exercise even when we were not able to fly, we noted signs of boredom, displaced aggression and beak rubbing as the birds attempted to get out. We are unfortunately victims of weather and there is little we can do about the length of the migration. However we intend to rebuild our travel enclosures to provide a softer fencing material to minimize beak abrasion injuries. We will also discuss options for relieving boredom in captive situation with the propagation centres. Most of the facilities at the Necedah National Wildlife Refuge are complete and few changes are required for the next season.

OUR DEDICATED VOLUNTEERS MAKE IT HAPPEN!

During the migration, OM relies heavily on volunteers. Most notably, Don and Paula Lounsbury have used their own motorhome and aircraft to provide top cover for the migrations since well before the inception of WCEP. They provide aviation weather reports and communicate with air traffic control. They are our connection to the ground crew when we are out of radio range; they guide us around restricted airspace and track errant birds when they drop out of formation with the ultralights. They have found us isolated fields in which to land when we needed to be on the ground, talked all the pilots into the same location so the birds are all together and brought the ground crew to our rescue. Despite our great admiration we like it best when we don't hear from Don and Paula while we are flying. It means everything is as it should be but when things begin to fall apart they are there -- always.

Gerald Murphy offered his services in any capacity by email several months ago but we never had the pleasure of meeting him. Late this past summer we were desperately short of a driver and asked him to join us. Working 7-days a week for over two months and living in tight quarters requires a certain personality and we had no idea if Gerald would fit in. But our fears were completely unfounded and Gerald has become a friend to the entire crew. He has a quiet and pleasant manner that makes you feel like an old friend and a willingness to take on any task; from electrical repairs to setting up the travel pen in the pouring rain. He expertly guided one of our large trucks while pulling a 32-foot trailer over winding country roads and was the first to pitch in no matter what was needed. Gerald met his wife Ann in grade school and they have been married for 44 years. The 2004 southward migration is very likely the longest they have been apart and we would like to thank Ann for letting us borrow him.

Walter Sturgeon has over 30 year experience caring for cranes. He had been the President of the Whooping Crane Conservation Association many times and is again their President Elect. He is also the Assistant Curator of the North Carolina State Museum of Natural Sciences in Raleigh. His many research trips to the high Arctic are evidence of his sense of adventure and when he called us to volunteer we jumped at the opportunity. Walter filled in as a driver and bird handler helping to release the birds for early morning flights. He never complained about the long hours, hard work or the lumpy couch nor did he miss an occasion to help out when needed.

Tatiana Zhuchkova was not a volunteer but she came with credentials that deserved far more than the stipend we paid her. Tatiana is an aviculturist with the Oka Reserve in the Russian Federation and highly experienced in raising cranes including Siberians. Although there are more Siberians than Whooping cranes their numbers are declining and they are in more danger of extinction. There are plans to conduct a reintroduction similar to this one using hang gliders but the obstacles are many. Tatiana joined us for the 2004 season to learn our techniques but it is hard to say who learned more from whom. She began her stay with us at Patuxent WRC and moved with the birds to Necedah. Unfortunately, her travel visa expired and she was forced to leave us just before the end of the migration. The success of this season is in part because of her efforts.

When the migration began this season Don and Paul Lounsbury were still in the midst of a major aircraft engine overhaul and were unable to join us for the first two weeks. Bill and Marilyn Stoeckmann volunteered to fly top cover and did an admirable job of getting us through some long flights in bad weather. More importantly Bill's quick wit helped lighten the day when things looked bleak.

Tom Pelfry had a hangar full of classic airplanes, until we started dropping in a few years ago. Now trikes have replaced most of his collection and he spends a lot more time flying "low and slow" ultralights than he did before. Tom took time away from his business to help us out for a few weeks when the migration began. He donated the permanent pen we use at our Hiwassee State Refuge stopover and has offered a safe and isolated haven for the project Whooping cranes since the reintroduction began in 2001.

Sandy and Jerry Ulrikson ran away with the migration-circus this past season. Residents of Tennessee, they became friends of OM a few seasons ago when they met Heather at the Hiwassee Wildlife Refuge in their home state. In 2003 they organized a state-wide walk-a-thon to support the project. Last year they followed along in their fifth-wheel trailer for the last half of migration but this season they became a big part of the OM Team. They sold their waterfront property in Tennessee and traded the trailer for a monster Motorhome. Sandy drives the motorhome, while Jerry navigates one of our trucks and trailer and serves on the ground support team; setting up pens and pitching in with whatever needs doing. Once on location Sandy becomes an outreach contact answering questions, selling sweatshirts, and promoting the cause with whomever will listen. They seem content with their new lifestyle and we could not be happier to be part of it.

Field Team during early training at the U.S.G.S. Patuxent Wildlife Research Center

Dan Sprague PWRC
Brain Clauss PWRC
Barb Clauss PWRC

Mark Nipper OM
Vicki Trabold OM
Tatiana Zhuchkova OM

Field Team during training at Necedah National Wildlife Refuge

Joe Duff, OM
Richard van Heuvelen, OM
Brooke Pennypacker, OM
Mark Nipper, OM
Vicki Trabold, OM
Tatiana Zhuchkova, OM

Sara Zimorski, ICF
On rotation
Brian Clauss, PWRC
Barb Niccolai, PWRC
Charlie Shafer, PWRC
Robert Doyle, PWRC

Migration Team

Joe Duff – Pilot, OM
Richard van Heuvelen – Pilot, OM
Brooke Pennypacker – Pilot, OM
Mark Nipper - Ground Crew Chief, OM
Vicki Trabold – Biotech, OM
Tatiana Zhuchkova – Aviculturist, OM
Heather Ray – Outreach, OM
Joan Garland – Outreach, ICF
Sandy Ulrikson – Outreach, OM
Jerry Ulrikson – Ground Support, OM
Gerald Murphy – Ground Support, OM
Don & Paula Lounsbury – Top-cover, OM

Bill & Marilyn Stoeckmann – Top-cover, WI, OM
Mike Lyons & Bill Lishman Top-cover, TN, OM
On Rotation
Dan Sprague, PWRC
Robert Doyle, PWRC
Charlie Shafer, PWRC



Appendix A - 2004 WCEP Whooping Crane Identification Table.

PWRC ID #	WCEP ID #	USFWS Band # (BBL)	Temp. Transmitter Freq. (MHz)	Temp. Colour Code	Permanent Transmitter Freq. (MHz)	Colour codes (left - right)	Sex	Hatch Date	Death date	Cohort	Stud book #	Origin	Sire	Dam	
02-04001	1-04	599-37449	164.134	White	165.105	R/G/W - W/G	M	4/20/04		1	1744	B22#1	1133	1135	
02-04002	2-04	599-37450	164.083	Black	164.334	W/R/W - W/G	M	4/21/04		1	1745	B4#1	1127	1154	
02-04003	3-04	599-37451	165.905	Red	164.644	G/R/W - W/G	M	4/21/04		1	1746	B22#2	1133	1135	
02-04004	4-04	Died prior to shipping							4/22/04	4/23/04	-	1747	SAZ#1	1175	1188
02-04005	5-04	599-37452	164.034	Blue	165.022	R/W/G - W/G	M	4/24/04		1	1748	B13#2	1114	1119	
02-04006	6-04	599-37453	165.705	Yellow	Died – Migration. EEE		F	5/04/04	12/11/04	1	1749	B11#1	1144	1136	
02-04007	7-04	599-37453	164.095	White	165.043	W/R/G - W/G	M	5/05/04		1	1750	B11#2	1144	1136	
02-04008	8-04	599-37454	165.723	Black	165.064	G/R/G - W/G	M	5/06/04		1	1751	B22#3	1133	1135	
02-04009	9-04	Removed from study. Extreme misalignment of maxilla						F	5/07/04		-	1752	B22#4	1133	1135
02-04010	10-04	Genetically valuable, retained in captive flock						F	5/07/04		-	1753	B4#2	1127	1154
02-04011	11-04	Removed from study – Health issues - Died						F	5/09/04	7/21/04	-	1754	ICF#1	1041	1101
02-04012	12-04	599-37455	165.923	Green	164.414	G/W/R - W/G	M	5/09/04		2	1755	B4#3	1127	1154	
02-04013	13-03	Genetically valuable, retained in captive flock						F	5/12/04		-	1756	S29#2	1130	1292
02-04014	14-04	599-37456	165.783	White	164.966	R/W/R - W/G	M	5/14/04		2	1757	S29#3	1130	1292	
02-04015	15-04	599-37446	164.105	Yellow	165.123	R/G (PTT) - W/G	F	5/16/04		2	1758	B11#3	1144	1136	
02-04016	16-04	599-37457	165.864	Blue	165.593	W/G/R - W/G	M	5/17/04		2	1759	B11#4	1144	1136	
02-04017	17-04	599-37458	165.884	Green	164.872	R/G/R - W/G	M	5/17/04		2	1760	B22#5	1133	1135	
02-04018	18-04	599-34057	164.154	Red	164.576	R/W(PTT) - W/G	M	5/19/04		2	1761	B22#6	1133	1135	
02-04024	19-04	599-37447	165.845	White	165.495	W/R(PTT) - W/G	F	5/29/04		3	1762	ICF#2	1128 or 1100	1263	
02-04025	20-04	599-37448	164.113	Yellow	165.522	G/R(PTT) - W/G	F	6/03/04		3	1763	B22#8	1133	1135	
02-04028	21-04	Died prior to shipping						F	6/3/04	6/17/04	-	1764	B15#4	1162	1167
02-04029	22-04	Died - Necedah						F	6/5/04	8/10/04	3	1765	B24#2	1213	1163
02-04031	23-04	Genetically valuable, retained in captive flock						F	6/6/04		-	1766	B15#5	1162	1167
02-04032	24-04	Died prior to shipping						F	6/9/04	7/6/04	-	1767	B11#5	1144	1136

Appendix B. Early Imprinting and Conditioning While at U.S.G.S. Patuxent Wildlife Research Center

Chick ID#	Age (days) first exp. to AC	Engine revving (min.)	Total Time Foraging w/puppet (min.)	Total Time Foraging w/trike (min.)	Total Time CP Training (min.)	Total Time Open Field Training (min.)	Socialized w/chicks & trike (min.)	Socialized w/chicks. No AC (hrs)	Pond Exposure (hrs.)	No. of times handled
01-04	8	5	245	0	199	295	427	44.00	61.39	99
02-04	7	5	235	0	195	290	347	26.00	61.75	55
03-04	7	5	380	0	235	305	410	56.42	62.67	52
05-04	6	0	435	35	240	295	432	64.30	58.18	65
06-04	7	0	308	20	183	255	395	49.46	56.95	55
07-04	7	0	303	0	185	240	360	42.76	167.68 ?	52
08-04	8	0	263	15	170	255	465	61.54	57.04	42
12-04	9	0	455	300	350	180	460	51.48	56.68	53
14-04	8	0	615	10	300	157	437	56.66	56.85	67
15-04	6	0	595	5	165	157	417	62.66	53.38	43
16-04	8	0	275	0	217	0	10	6.80	7.58	113
17-04	8	0	479	0	162	166	350	56.66	56.68	56
18-04	8	0	825	0	233	157	412	61.58	58.16	46
19-04	6	0	643	105	345	165	110	24.85	29.60	63
20-04	9	0	755	0	300	140	270	31.05	29.60	110
22-04	11	0	600	0	272	140	350	31.01	28.85	73
Mean	7.69 days	0.937 min.	463.18 min.	30.62 min.	234.44 min.	199.81 min.	358.87 min.	45.45 hrs.	56.44 hrs.	62.25

Appendix C. Comparison of Training History of First Four Generations of WCEP Whooping Cranes

Event	2001	2002	2003	2004
First -- last hatch date	May 7 -- May 24	Apr. 12 -- May 21	Apr 21 -- May 23	Apr 20 -- Jun 5
Age spread	17 Days	39 Days	32 Days	46 Days
Gender	4F 6M	10F 7M	6F 11M	5F 11M
Age at first exposure to aircraft	6.60 days	9.05 days	8.38 days	7.69 days
Avg. hours of training while at PWRC	7 hrs 18 min	11 hrs 56 min	11 hrs 2 min	7 hrs 45 min
Pond exposure at PWRC	19hrs 6min	180 hrs 40 min	21hrs 42min	55 hrs 26 min
Total chicks trans. to NNWR	10	17	17	16
Avg. age at shipping	55.6 days	53.5 44.6 days	51 43 days	52.7 45.6 41 days
Shipping Date (m/dd)	7/10	6/12 - 6/27	6/19 - 7/1	6/19 - 6/30 - 7/15
Cohort One (C1)	1,2,3,5,6	1,2,3,4,5,7,8	1,2,3,4,5,6,	1,2,3,5,6,7,8
Cohort Two (C2)	4,7,9,10,11	9,10,11,12	7,9,10,11	12,14,15,16,17,18
Cohort Three (C3)	NA	13,14,15,16,17,18	12,13,14,16,17,18,19	19,20,22
Total days at NNWR	98	112 107	118 106	117 103 88
Num. days trained at NNWR	41	52	69	57.3
Num. nights water-roosting avail.	9	82.2	99	76.13
Fledging Date C1, C2, C3 (m/dd)	7/29 8/6	7/18 7/24 7/30	7/19 7/22 7/30	7/17 8/02 9/16
Pre-migration health check (m/dd)	9/11	8/26,27 & 29	8/27	9/5 & 6
Cohorts united	Sept 5	Aug 25 Sept 16	Aug 14 Aug 29	Sept. 6 Sept. 21
Longest pre-migration flight	27 min	24 min	33 min	47 min
Migration departure	Oct 17	Oct 13	Oct 16	Oct 10
Num. cranes began migration	8	17	16	14
Total migration distance (statute miles)	1227.28	1204	1191	1204.4
Total Flight Time	35 hrs 46 min	38 hrs 36 min	31 hrs 53 min	33 hrs 7 min
Total stopovers/flight days	26	22	20	21
Total days to complete migration	50	49	54	64
Longest flight distance	94.7 Miles	107.2 Miles	200 Miles	157 Miles
Longest flight duration	2 hrs 9 min	2 hrs 15 min	3 hrs 3 min	3 hrs
Arrival Date	Dec 5	Nov 30	Dec 8	Dec 12
Total cranes to complete migration	7 (1 crated)	16	16	13
Total cranes to fly entire migration	3	4	5	4
Departure from Chassahowitzka NWR	Apr 9	Apr 1	Mar 30 April 7	TBD
Total days at winter habitat	126	121	113 121	TBD
Total cranes to survive 1st winter	5	16	16	TBD
Total to return to Wisconsin	5	14 (1 [†] - 1 [†])	11	TBD
Num. of birds lost/removed fr. study	<u>5</u>	<u>2</u>	<u>3</u>	<u>3</u>
Cause:	1 Powerline Impact	Capture Myopathy	Aircraft Strike	Compound fracture
2	Capture Myopathy	Aircraft Strike	Undetermined	Encephalitis
3	Predation		Undetermined	
4	Predation			
5	Handling injury			
Num. of surviving birds	5	14	14	13 + 1 [§]

[†] 09-02 Retrieved fr. Ohio.

^{*} 14-02 Summered in Illinois.

[§] 18-04 Removed from study 2 Oct - Released with wild birds - Began migration 7 November / Arrived central FL 3 January 2005

Appendix D. Training History and Disposition

WCEP #	Gender	Hatch Date	Training at PWRC (min/hrs)	Pond Experience at PWRC (hours)	Shipping Date	Age at Shipping (days)	Cohort	Days at NNWR	Days trained at NNWR	Hours trained at NNWR	Access to water roosting at NNWR (Days)	Migration segments not completed, crated to next stop. Dist. indicates total miles missed	Disposition
01-04	M	4/20	499 / 8.31	61.39	6/16	57	1	117	77	32.08	101	Seg. 1: 24.8m	Wintering in Florida
02-04	M	4/21	490 / 8.16	61.75	6/16	56	1	117	77	32.08	101	Seg. 1,2,11: 75.2m	Wintering in Florida
03-04	M	4/21	545 / 9.08	62.67	6/16	56	1	117	77	32.08	101	Completed mig.	Wintering in Florida
05-04	M	4/24	319 / 5.31	58.18	6/16	53	1	117	77	32.08	101	Completed mig.	Wintering in Florida
06-04	F	5/4	435 / 7.25	56.95	6/16	43	1	117	77	32.08	101	Completed mig.	Died 12/11/04 EEE
07-04	M	5/5	425 / 7.08	167.68	6/16	42	1	117	77	32.08	97	Seg. 1,2,7: 139.8m	Wintering in Florida
08-04	M	5/5	425 / 7.08	57.04	6/16	42	1	117	77	32.08	101	Seg. 1: 24.8m	Wintering in Florida
12-04	M	5/9	530 / 8.83	56.68	6/30	52	2	103	58	25.16	55	Seg. 16: 49.2m	Wintering in Florida
14-04	M	5/14	457 / 7.61	56.85	6/30	47	2	103	58	25.16	56	Seg. 1,5,7: 179.5m	Wintering in Florida
15-04	F	5/16	322 / 5.36	53.38	6/30	45	2	103	58	25.16	54	Completed mig.	Wintering in Florida
16-04	M	5/17	100 / 1.66	7.58	6/30	44	2	103	58	25.16	48	Seg. 7: 92.3m	Wintering in Florida
17-04	M	5/17	328 / 5.46	56.68	6/30	44	2	103	58	25.16	48	Seg. 7: 92.3m	Wintering in Florida
18-04	M	5/19	390 / 6.50	58.16	6/30	42	2	103	58	25.16	48	*Removed from study 10/1/04. Deformed primary feathers	
19-04	F	5/29	510 / 8.50	29.60	7/15	48	3	88	42	17.58	65	Seg. 1,5,11: 114.9m	Wintering in Florida
20-04	F	6/3	440 / 7.33	29.60	7/15	42	3	88	42	17.58	65	Seg. 1,5:87.2m	Wintering in Florida
22-04	F	6/5	412 / 6.86	28.85	7/15	40	3	88	42	17.58	n/a	Died 8/10/04 Compound fracture/ severed artery	
mean			414.19/6.90	56.44		47.06		106	63.31	26.76	76.13	Total surviving (1/13/05): 13+1** 14	

*** #18-04 Removed from ultralight study 10/1/04 migrated in company of older Whooping cranes and arrived in the area of the wintering pen 1/03/05

MONITORING REPORT 2004

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This account documents the biology of reintroduced whooping cranes in the eastern migratory flock from winter 2003/04 through 4 January 2005. Movements and geographic distribution are emphasized. Identification information for all whooping cranes currently in the eastern migratory population appears in Appendix A.

This report is a product of the Whooping Crane Eastern Partnership (WCEP), which was established in 1999 to reintroduce a migratory population of whooping cranes to the eastern United States. The nine founding members are the Canada-U.S. Whooping Crane Recovery Team, U.S. Fish and Wildlife Service (USFWS), USGS Patuxent Wildlife Research Center, USGS National Wildlife Health Center, Wisconsin Department of Natural Resources (WDNR), Operation Migration, Inc. (OM), International Crane Foundation (ICF), National Fish and Wildlife Foundation, and the Natural Resources Foundation of Wisconsin. Many additional organizations and individuals have played an important role in the reintroduction, and the efforts of all participants are acknowledged as vital to the success of the project.

We wish to especially thank the following individuals who were specifically involved with monitoring: Mark Nipper (OM), Sara Zimorski (ICF), Marianne Wellington (ICF), Denise Maidens (ICF), Jesse Kroese (ICF), Nick Winstead (Louisiana Cooperative Fish and Wildlife Research Unit), and Julia Watson (ICF). Additional assistance was provided by Beth Goodman (WDNR); Rich King, Bill Peterson, Shawn Papon, John Kasbohm, Jennifer Coches, and Craig Watson (USFWS); Peggy Cox, Ray Adams, and Damien Ossi (Florida, Michigan, and North Carolina Audubon Societies); Kurt Pindel and Paul Forrest (USDA Forest Service); Tyson Edwards (Michigan DNR); Marty Folk and Kathy Chappell (Florida Fish and Wildlife Conservation Commission); Dean Harrigal (South Carolina DNR); Gary Hulst; Tami Brinkman; Howard Foster; Greg Troupe; and Walt Sturgeon. We also particularly thank Jim Bergens (Jasper-Pulaski FWA, Indiana DNR) and Wally Akins (Hiwassee Wildlife Refuge, Tennessee Wildlife Resources Agency) for monitoring cranes at key migration stopover areas. To the many other individuals and staff of cooperating agencies who supported the monitoring effort, we also give our sincere thanks.

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WINTER 2003/04

HY2001-02 COHORTS

Of these 20 whooping cranes, 14 had returned to the Chassahowitzka pensite during 16-30 November 2003 and then moved to inland sites. Final wintering locations were in the following counties of peninsular Florida: Pasco (9), Citrus (4), Sumter (2), Suwannee (2), Lake (1), and Alachua (1) (Fig. 1 and Appendix B, Table 1). The latter 2 cranes wintered with migratory sandhill cranes. The wintering site of no. 7-01 (nonfunctional transmitter) was not found. Three of the birds in Citrus County were nos. 5-01, 4-02, and 18-02. After returning to Chassahowitzka NWR in November, they left the pensite area before

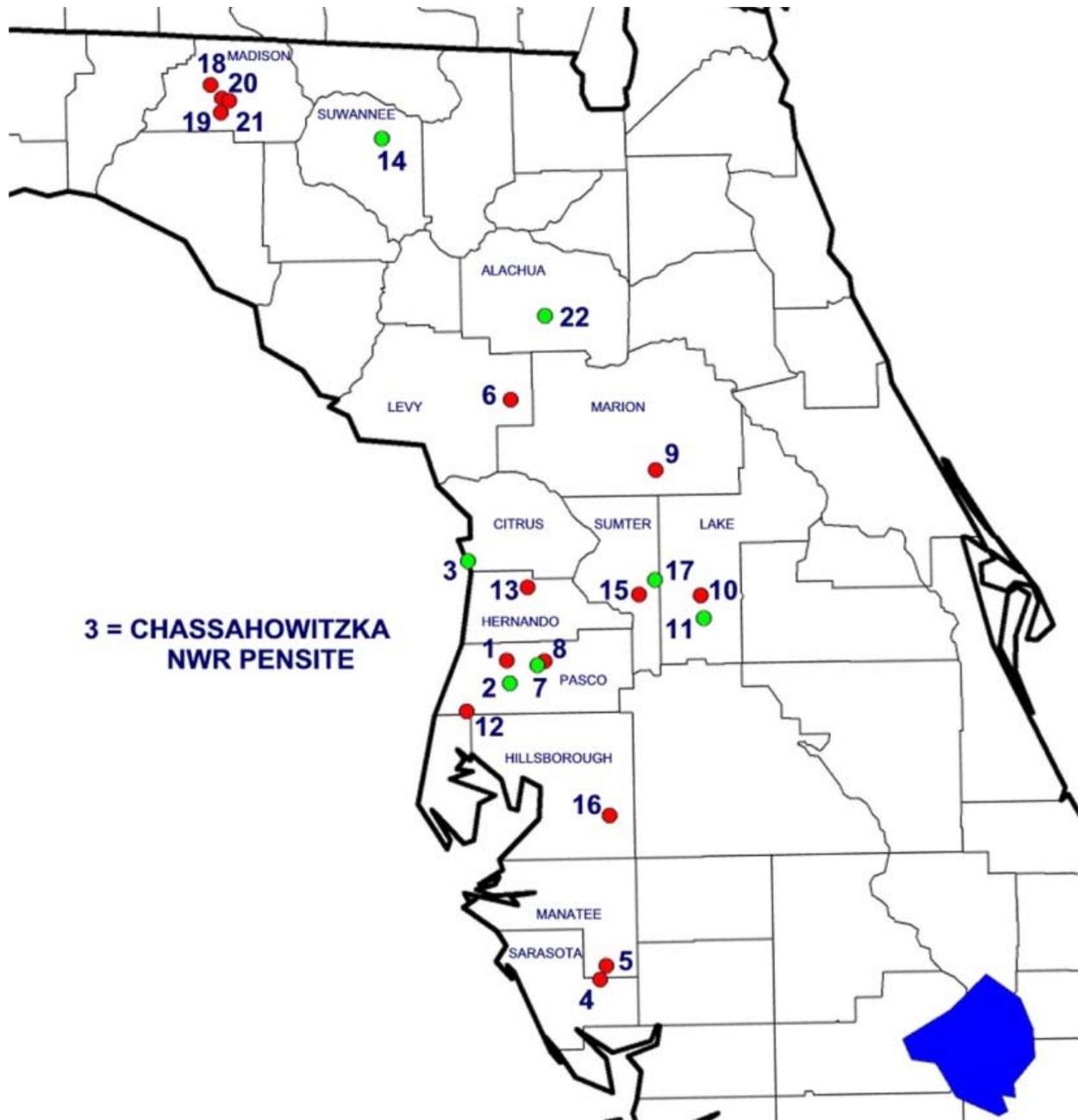


Fig. 1. Locations of HY2001 and HY2002 whooping cranes, peninsular Florida, winter 2003/04. Green = final winter locations. Red = earlier winter locations, including post-migratory wandering. Key to map appears in Appendix B, Table 1.

arrival of the HY2003 juveniles and moved to ranchland in nearby Hernando County. They returned to the pensite on 8 January and, with pelleted feed supplied for the juveniles, they remained. The remaining bird in Citrus County was no. 14-02. She was the fifteenth bird to return to the Chassahowitzka pensite during the winter and arrived from Hixtown Swamp, Madison County, on 7 February. The other whooping cranes (in Pasco, Sumter, and Suwannee Counties) were all wintering on ranchland. Those in Pasco and Sumter Counties shared the areas with small numbers of nonmigratory sandhills. Whooping cranes remained sedentary on their final selected wintering areas.

HY2003 COHORT

The flock of 16 juveniles, led by Operation Migration ultralight aircraft, arrived at the release pen on Chassahowitzka NWR on 8 December. They were initially held in a topnetted holding pen within the larger pen. They were colorbanded and equipped with permanent transmitters on 11-12 December. On 14 December the temporary holding pen was removed, and the chicks were allowed to roam freely. Like the HY2002 cohort during the previous winter, they adapted well to the pensite and used the area within 0.5 miles of the pen.

The return of the dominant male no. 5-01 and his 2 female associates on 8 January disrupted occupation of the pensite by the juveniles. The older birds, especially no. 5-01, harassed the juveniles, chased them in and from the pen, and dominated the feeding station. Establishment of an additional feeding station and gradual social tolerance in the flock resulted in a manageable, though not optimal, situation during the remainder of the winter.

SPRING MIGRATION

HY2001 AND HY2002 COHORTS

The first of the older birds to begin migration was the flock of 6 from a ranch in Pasco County on 13 March (Fig. 2 and Appendix B, Table 2). The last to migrate was no. 14-02, the only bird remaining at the Chassahowitzka pensite after all 16 HY2003 and 3 older birds had departed. Migration was for the most part directly to Central Wisconsin. The most notable exception was the pair of females nos. 3-02 and 15-02, who went as far west as central Minnesota before returning to Necedah NWR. These birds had spent the previous summer in South Dakota.

HY2003 COHORT

Migration began when 8 birds (nos. 1, 3, 5, 9, 12, 16, 18, and 19) left the Chassahowitzka pensite on 30 March (Fig. 2 and Appendix B, Table 3). Strong westerly winds early in migration pushed them east of the optimal route. They stopped for several days in two areas (in North Carolina and Ohio) with poor habitat and close proximity to people. On 9 April they left the latter site and separated into 2 groups in flight. One group of 5 birds attempted to resume migration. The remaining group of 3 birds returned to another nearby area in Ohio.

The 5 birds were on a direct heading to Central Wisconsin but were blocked by a major obstacle when they encountered Lake Michigan. After one overnight stop, they returned to Ohio, where they settled on farmland with moderate proximity to people for 25 days. They resumed migration again on 6 May and were again blocked by Lake Michigan. They found Walkinshaw Wetlands, Oceana County, Michigan, on 10 May and eventually settled there for the summer.

The group of 3 birds in Ohio resumed migration on 25 April. After encountering Lake Michigan they landed nearby on a cranberry farm in Van Buren County, Michigan. No. 12 had her mandibles wedged in an aluminum can top which she had apparently picked up in Ohio. A costumed caretaker was able to

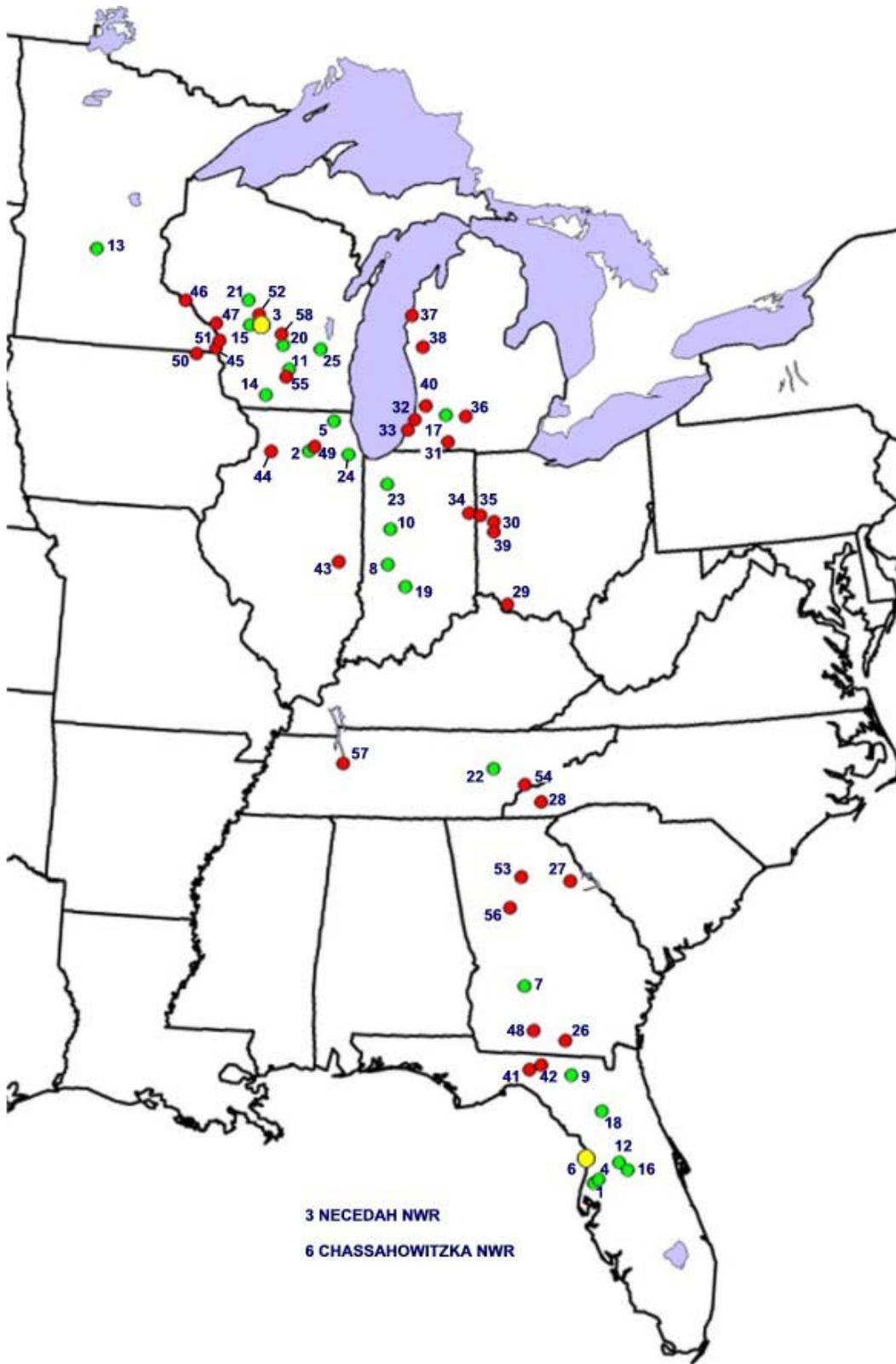


Fig. 2. Migration stops of reintroduced whooping cranes in the eastern migratory population, spring 2004. Key to map appears in Appendix B, Tables 2 and 3. Green = HY2001 and HY2002. Red = HY2003.

capture the bird and remove this potentially fatal item. After a few days in the cranberry wetlands, the group of 3 moved to Highbanks Refuge, Allegan SGA, Allegan County.

The remaining 8 birds began migration from the Chassahowitzka pensite on 7 April. On the second day of migration, they encountered severe thunderstorms and separated into 5 groups (3, 2, 1, 1, and 1 birds). No. 11 reached the Necedah NWR area on 17 April. Nos. 10 and 13 followed on 18 April. Four other birds arrived 12-20 May, and no. 7 finally completed migration to Necedah NWR on 2 June.

SPRING, SUMMER, AND FALL STAGING

Locations and associations between completion of spring migration and departure on fall migration appear in Figs. 3 and 4 and in Appendix B, Table 4. Many of the wintering/spring migration groups of HY2001 and HY2002 whooping cranes dissolved just after completion of spring migration. Female no. 2-02, associated with male no. 13-02 since the previous summer, paired with male no. 1-01. Female no. 18-02, after unsuccessfully trying to drive female no. 4-02 from the triad composed of these 2 females and male no. 5-01 during the winter, left the group, leaving nos. 5-01 and 4-02 as a potential future breeding pair. Female no. 9-02 separated from males nos. 11-02 and 12-02 and then associated with no. 18-02 through the summer. Male no. 16-02 separated from female no. 17-02.

Male no. 6-01 and female no. 7-01 returned to areas occupied in previous years in Jackson/Clark Counties and on/near Horicon NWR, respectively. They associated with sandhill cranes. Female no. 1-02, who had summered in Minnesota in 2003, summered with sandhills in Lower Michigan in 2004. No. 17-02 exhibited widespread movements during April, as far northeast as Navarino SWA in Shawano County and as far west as Fish Lake SWA in Burnett County.

A subadult group containing as many as 10 whooping cranes formed in the Mill Bluff area during spring. A subadult group containing as many as 8 whooping cranes formed in the Bee Cut area of Necedah NWR during summer.

Most of the population summered in Central Wisconsin. Of the 8 juveniles that were blocked from returning to Wisconsin by Lake Michigan on spring migration, 3 eventually found their way around the lake by late July. The other 5 settled at Walkinshaw Wetlands in west-central Lower Michigan, and 4 of these survived the summer. By fall they had moved to farmland about 20 miles north in Mason County.

Unlike the previous year, large subadult flocks did not persist during fall staging in Wisconsin and subsequent migration. Whooping cranes migrated singly, as pairs, or in groups of 3. Many migrated with sandhills for at least the first part of migration.

FALL MIGRATION AND WINTER 2004/05

HY2001-03 COHORTS

Chronology and stopover and winter locations of migrating birds appear in Fig. 5 and in Appendix B, Table 5. As of 4 January, 20 birds were in Florida, 4 were in Tennessee, 4 were in South Carolina, 3 were in North Carolina, and the locations of 3 were unknown. The latter 10 birds were all from the HY2003 cohort. See summary below, COMPARISON OF 2003 AND 2004 FALL MIGRATIONS AND SUBSEQUENT WINTERING.

HY2004 COHORT

This cohort contained 11 males and only 3 females, greatly contributing to the skewed population sex ratio in favor of males. The disparate sex ratio of released birds will need to be corrected in future

releases to avoid a significant delay in progress toward establishing a self-sustaining population.

Because of flight feather development problems, no. 18-04 did not complete training necessary to follow ultralight aircraft on migration. He was therefore released with older cranes on Necedah NWR and migrated successfully to Florida (see below, FALL RELEASE OF WHOOPING CRANE NO. 18-04).

The flock consisting of the remaining 13 juveniles, led by Operation Migration ultralight aircraft, arrived at the release pen on Chassahowitzka NWR on 12 December. They were held in a topnetted enclosure constructed just outside the northwest corner of the main pen. They were colorbanded and equipped with permanent transmitters on 13-14 December. Through 4 January they have been allowed out of the enclosure only when costumed caretakers were present or when no older cranes were present. This practice is planned to continue until most of the older returning cranes have left the pensite to winter inland.

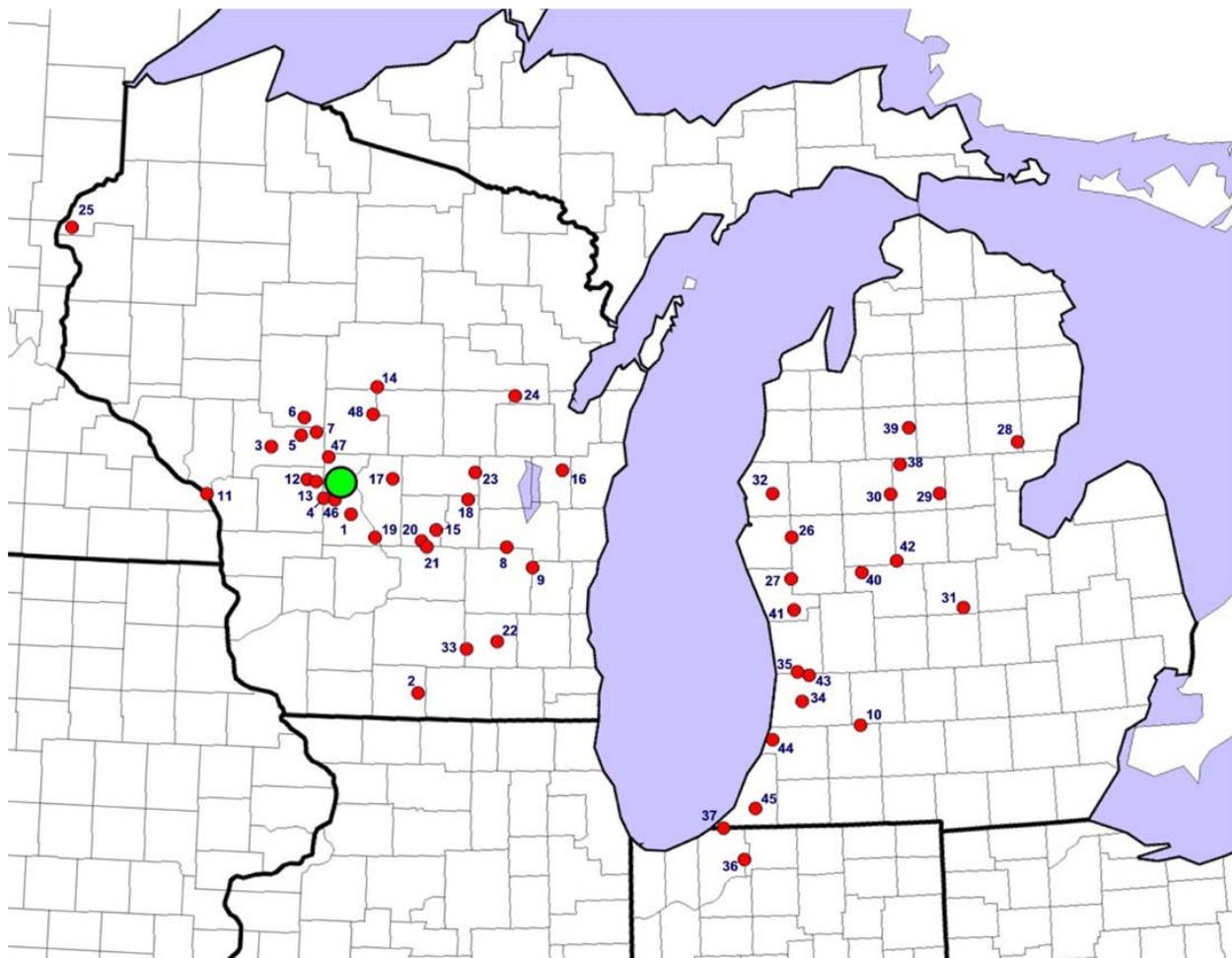


Fig. 3. Distribution of summering whooping cranes in the reintroduced eastern migratory population, 2004. Spring wandering and fall staging locations are also included. Key to codes appears in Appendix B, Table 4. Green circle represents Necedah NWR and adjacent locations including Yellow River Cranberry and Little Yellow River.

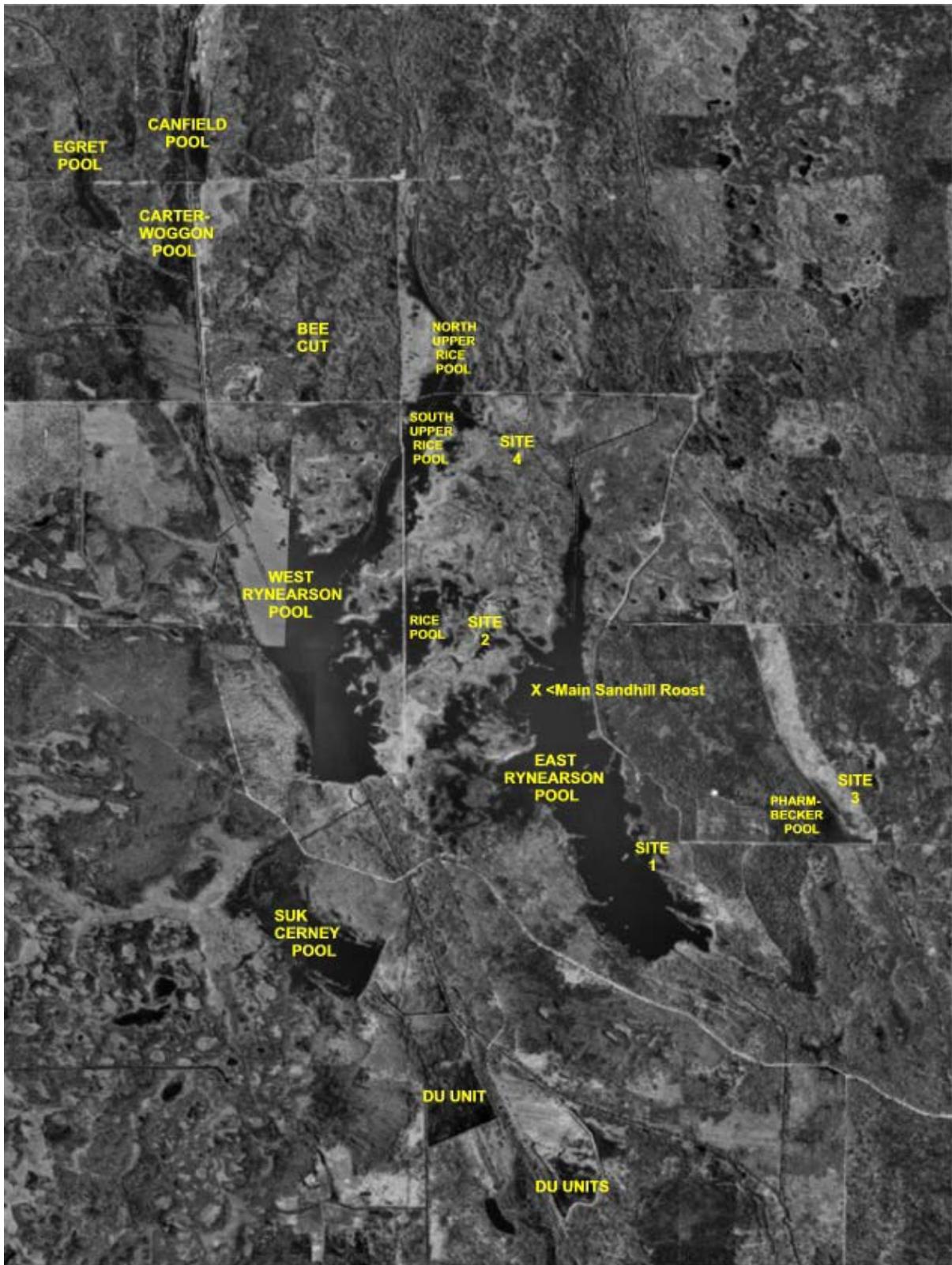


Fig. 4. Areas used by reintroduced whooping cranes on southern Necedah NWR, summer 2004.

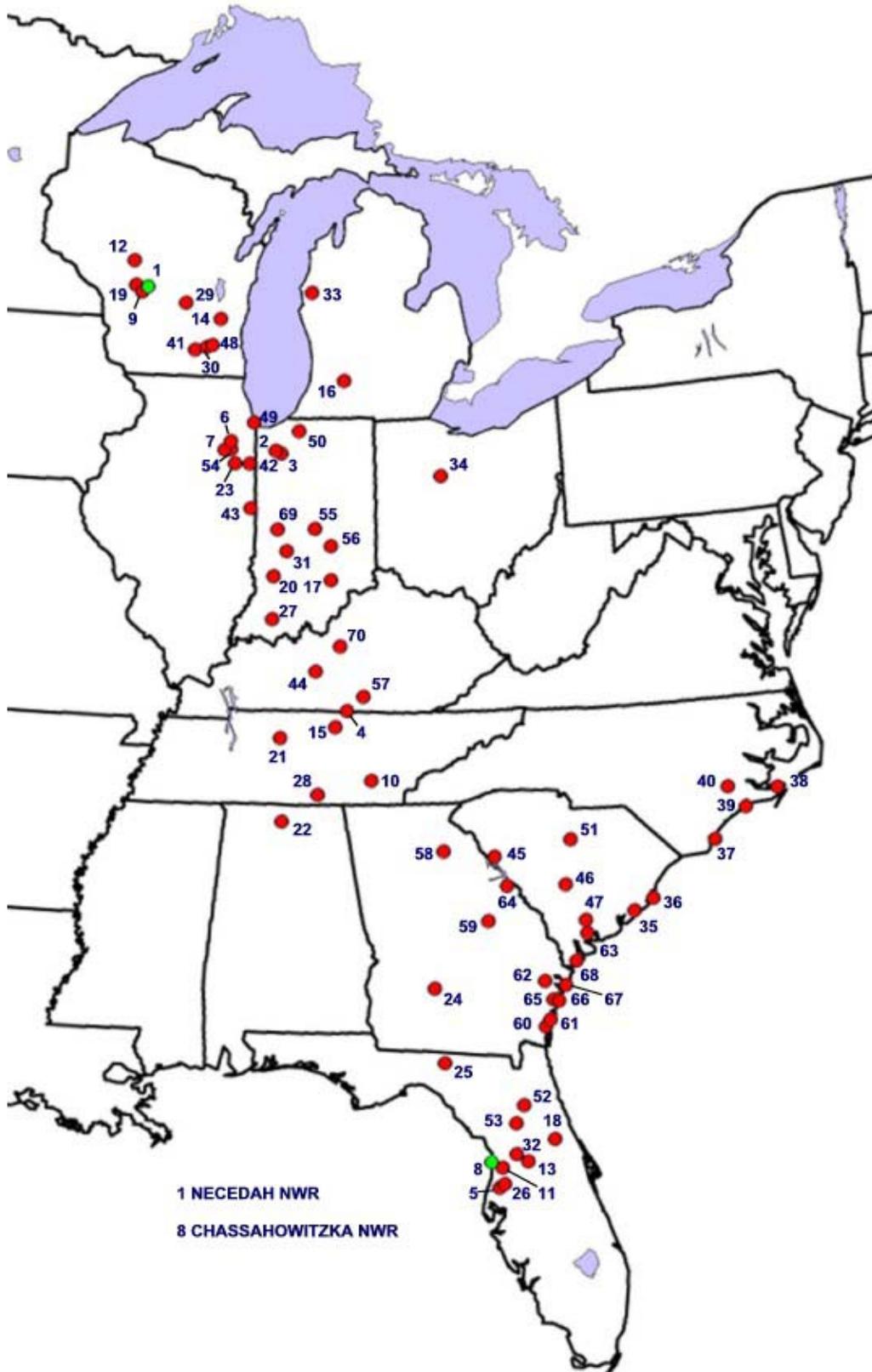


Fig. 5. Migration stops and wintering areas of reintroduced whooping cranes, fall migration 2004 and winter 2004/05. Key to codes appears in Appendix B, Table 5.

SURVIVAL

Of 53 juvenile whooping cranes so far released in this reintroduction, 6 birds have died (Table 5). Two birds were killed by bobcats shortly after release on Chassahowitzka NWR during the first year of the project. Changes in winter management protocol were made, and no additional mortalities occurred at this release site. In August 2003 a bird developed capture myopathy and was euthanized after she did not respond to treatment. The capture and transport of this bird from South Dakota to Wisconsin filled a request external to the project and occurred under extreme heat and other circumstances under which captures would not normally be attempted. Two of 5 birds that were blocked from returning to Wisconsin by Lake Michigan died during the year. One of these mortalities occurred during summer and is under investigation. The other mortality resulted from bobcat predation after the 4 remaining birds migrated and reached the South Carolina coast.

The mortality of no. 15-02 while on migration in Alabama during December 2004 was particularly troubling. Existing management options are available and can be applied to avoid some of the situations resulting in earlier mortalities. However, maintaining the monitoring effort necessary to ensure adequate protection of a bird on inaccessible private land at a migration stop which could not have been predicted beforehand would always be difficult and largely beyond the scope of project monitoring staff. Some type of outreach effort, though difficult to implement proactively under these circumstances, may be needed.

Table 5. Mortalities of reintroduced whooping cranes after release, eastern migratory population, 2001-04.

Crane no.	Sex	Release date	Mortality date	Location	Source
4-01	M	7 Dec 2001	17 Dec 2001	Chassahowitzka NWR, Citrus Co., Florida	Bobcat predation
10-01	F	7 Dec 2001	10 Jan 2002	Chassahowitzka NWR, Citrus Co., Florida	Bobcat predation
7-02	F	3 Dec 2002	30 Aug 2003	n. a.	Euthanized after capture myopathy
19-03	M	14 Dec 2003	~23 July 2004	near Walkinshaw Wetlands, Oceana Co., Michigan	Under investigation
5-03	M	14 Dec 2003	13 Nov 2004	Cape Romain NWR, Charleston Co., South Carolina	Bobcat predation
15-02	F	3 Dec 2002	23 Dec 2004	near Salem Corner, Limestone Co., Alabama	Under investigation

DISTRIBUTION

With few but significant exceptions (see below), released whooping cranes generally summered in or near the core reintroduction area in Central Wisconsin, and they migrated within the corridor between Wisconsin and Florida (Figs. 2 and 5). Migration routes used generally consisted of the mainstream eastern greater sandhill crane migration route, i.e., on a line from northwestern Indiana to north-central Florida, plus areas on a direct line from west-central Wisconsin to the west-central Florida Gulf Coast. This westward bias, relative to the sandhill route, could be related to the approximately direct route used by ultralight aircraft to lead birds on their first migration between Wisconsin and Florida (rather than heading through the major stopover area at Jasper-Pulaski FWA [J-P] in northwestern Indiana) and/or to the relatively direct migration behavior exhibited in previous migrations by whooping cranes as compared to sandhills. The latter usually stopped over for extended periods at key areas such as J-P.

As in the previous year, male whooping cranes demonstrated strong homing and natal site fidelity, while

females tended to disperse unless they were associated with males. Spring wandering was greatly reduced in 2004 in comparison to 2003. This occurred because there were fewer yearling females in the population, and most females were associated with males. Most extensive spring wandering was exhibited by a pair of yearling females (nos. 3-03 and 12-03) in Lower Michigan. Some older females, particularly nos. 9-02 and 18-02, 17-02, and 2-01 also demonstrated significant wandering.

There continued to be a northern latitude limit, between 45 and 46 degrees, which whooping cranes have approached at widespread geographical locations in spring and summer but have not continued beyond. During 2003 the three most northern locations were in Oconto County, Wisconsin (45.04 deg), Anoka County, Minnesota (45.32 deg), and Day County, South Dakota (45.16 deg). The most northerly location in the project so far was by female no. 17-02 during spring wandering 2004 in Burnett County, Wisconsin (45.69 deg).

Eight yearlings began migration from Florida on 30 March. They took a track east of the migration route used by previous migrants. The 8 birds separated into 2 groups in Ohio. Following this separation, each group made course corrections that would have taken them to Central Wisconsin. However, because the course corrections were made so far north, both groups encountered Lake Michigan. One group of 5 birds returned to Ohio and resumed migration again later with the same result. This group never circumvented the barrier, and these birds settled in west-central Lower Michigan for the summer. The other group (3 birds), after spending more time in southwestern Lower Michigan, were eventually able to find their way around the lake and return to Central Wisconsin in late July.

Both of these groups that had been in Michigan also demonstrated an eastward bias in the subsequent fall migration. The group of 3 eventually made appropriate course corrections and returned to the winter site at Chassahowitzka NWR. The remaining group of 4 birds (1 bird had died in July) migrated through Ohio to the central South Carolina coast, where they encountered the Atlantic Ocean. One bird was killed by a bobcat at this site, and, as if confused, the remaining 3 birds (1 male and 2 females) flew northeastward along the South and North Carolina coasts, sometimes several miles out over open ocean. After proceeding 231 miles up the coast, they turned inward to settle in an agricultural area with little available wetland. This location was 432 miles east of Hiwassee Wildlife Refuge, Tennessee, and far outside the wintering range of the wild sandhill crane population or any other project whooping cranes.

Many whooping cranes wintered in west-central Florida, most notably in previous wintering areas in Pasco County. Significant exceptions were the yearlings from Michigan noted above and 4 yearling males that had summered in Central Wisconsin but settled in southern South Carolina after migrating there in 3 independent groups of 2, 1, and 1. These latter birds, though near the coast, were using mainly freshwater habitats. Also, as of 4 January 2005, 4 older whooping cranes were apparently wintering at two locations in Tennessee, and the wintering locations of 3 yearlings had not been found.

HABITAT USE

All whooping cranes roosted in suitable wetlands most of the time. The exceptions continued to be with yearlings that were not associated with sandhill cranes. A group of 3 whooping cranes in Michigan was noted roosting on land on one occasion.

Like sandhills, whooping cranes fed in grain fields near the roost sites. Use was greatest in spring and fall, and harvested cornfields were preferred feeding areas. Whooping cranes, in contrast to sandhills, preferred wetlands for foraging, especially in summer. Sandhills roosted in wetlands, but frequently flew to forage in uplands or croplands during the day while whooping cranes often remained in wetlands for most or all of the day. Whooping cranes spent much of the day foraging, unlike sandhills, which foraged mainly in the morning and evening and frequently loafed for much of the day. Whooping cranes, while feeding on grain, tubers, rhizomes, blueberries, and terrestrial insects, especially grasshoppers, as did sandhills, appeared to have a much broader diet including more animal material such as fish, frogs, and

aquatic invertebrates. As they were for sandhill cranes, mudflats or shallows on drawn down pools were a preferred habitat for whooping cranes. During 2004 a large blueberry crop on the Bee Cut provided a major food source during mid-summer on Necedah NWR and encouraged formation of a subadult flock of up to 8 birds at this site.

Stopover habitat used by migrating whooping cranes was opportunistic and highly variable. This habitat ranged from extensive, permanent wetlands to relatively small stock ponds. Sites used were generally safe from predators and satisfied short-term habitat requirements. An exception was an exposed tidal flat near woody cover in South Carolina, where 1 of 4 birds that had migrated from Michigan was killed. Unlike previous migrations, whooping cranes in fall 2004 often remained at the same stopover sites for extended periods, even when weather conditions were suitable for migration. Concern has grown regarding risk of shooting of whooping cranes at stopover sites during open waterfowl seasons, especially in areas west of the mainstream sandhill crane route and where snow geese are being hunted.

Throughout the year whooping cranes preferred open country, e.g., grassland and savanna, lacking much woody cover and with numerous shallow wetlands. During winter cattle ranches provided this habitat and were the main areas selected by the majority of wintering whooping cranes returning to Florida.

COMPARISON OF 2003 AND 2004 FALL MIGRATIONS AND SUBSEQUENT WINTERING

Chassahowitzka NWR provides an excellent release site for juveniles because the pensite is not accessible by the public, naive juveniles can be effectively protected from predators, physical facilities are excellent, and movements of juveniles can be controlled because habitat conditions limit dispersal. Most previously released whooping cranes have not, however, returned and remained to winter on the Central Gulf Coast after their first winter. Primarily tidal fluctuations, but also high salinity, unstable or rocky bottom substrates, and general habitat dominance by needlerush, have presented challenges to habitation of the area by whooping cranes. Safe and usable roosting habitat is not consistently available at any given coastal site.

During winter 2003/04 most returning older birds exhibited a post-migration wandering period of a few weeks and then settled on a final wintering site inland on which they remained until spring migration. This sedentary wintering pattern was similar to that exhibited by migratory sandhill cranes. Fall migration 2004 and subsequent wintering were markedly different than the previous fall migration:

- (1) Beginning of fall migration was protracted with more birds leaving later, the last on 11 December.
- (2) Although actual flight days were similar, time to complete migration was generally much longer with typically weeks spent at extended stopover sites.
- (3) The migration was much more dispersed and biased eastward, especially for yearlings on their first unassisted fall migration.
- (4) Winter homing to the Central Gulf Coast and inland areas of west-central Florida was reduced. As of 4 January 2005, most yearlings had not demonstrated fidelity to their juvenile winter location.

Details appear below.

FALL MIGRATION 2003 AND WINTER 2003/04

Of 18 whooping cranes with fully functional transmitters, all migrated by an approximately direct route toward Chassahowitzka NWR, 7 November - 2 December. All birds arrived in Florida. Migration of individual birds or groups was completed in 5-23 days of which 4-8 were flight days.

Of these 18 trackable whooping cranes, 15 returned to the release site at Chassahowitzka NWR. These 15 birds were in groups of 2, 3, 8, 1, and 1. Three other trackable birds did not return to the Central Gulf

Coast. Of 2 untrackable birds, 1 (no. 6-01) wintered in large sandhill crane flocks in north-central Florida and probably did not return to the coastal wetlands. This HY2001 bird also did not return in the previous winter. No wintering data are available for the other untrackable bird (no. 7-01), but she was never observed at the pensite in winter 2003/04.

Fourteen of the birds returning to the pensite arrived on 16-30 November and spent 2-10 nights on the refuge before leaving to winter at inland sites. This initial return period to Chassahowitzka also contained one 4-day trip inland for the group of 8 birds and one 1-day trip inland for the group of 3 birds. The peak count on Chassahowitzka was 12 whooping cranes on 30 November. While on the refuge, the birds used areas within 0.5 miles of the pen as well as salt grass habitat on the northwest shore of Flatrock Bay 1.5-2.0 miles west of the pen. By 2 December 2003, all of these 14 birds had left Chassahowitzka and moved to inland sites. The HY2003 juveniles being led by ultralight aircraft did not arrive until 8 December, therefore the older birds were gone before arrival of the juveniles and supplied feed.

The remaining bird of the 15 returning birds (no. 14-02) arrived on 7 February 2004. She had spent the earlier part of the winter at Hixtown Swamp, Madison County, and returned to the Chassahowitzka pensite apparently after wintering sandhill cranes at the latter site began leaving the area. With supplied food and other whooping cranes then present at the site, she stayed for the remainder of the winter.

On 8 January a group of 3 birds (nos. 5-01, 4-02, and 18-02) returned again to the pen. These birds had been wintering only 13 miles away, closer to the pen than any of the other older whooping cranes. Leader of this group was no. 5-01. In 2002 he had arrived at the pensite 2 days before arrival of the HY2002 juveniles led by ultralight aircraft. He was therefore still there when the younger birds arrived and the feeding station in the pen became operable. He joined the juvenile flock as dominant member and remained for the winter. When he returned in January 2004, he exhibited territorial intentions. With supplemental food and other whooping cranes present, no. 5-01 and his 2 female associates stayed for the remainder of the winter. They dominated the feeding station, harassed the juveniles, and sometimes drove the juveniles from the pen just before dark. Sometimes these juveniles could be retrieved with difficulty and herded back into the pen by costumed caretakers. At other times they could not be retrieved; fortunately none were lost to predation during the few latter episodes. Addition of two feeders near the constructed oyster bar lessened aggression at the feeding station and provided an effective management strategy.

FALL MIGRATION 2004 AND WINTER 2004/05

Migrating cranes first left Wisconsin on 7 November. As of 4 January 2005 only 3 HY2003 birds had arrived at Chassahowitzka (on 2 January). However, older birds were arriving late as well. For example, no. 5-02, accompanied by no. 18-04, also did not arrive on St. Martins Marsh, just north of the Chassahowitzka pensite, until 2 January. Migration of individual birds or groups to the Central Gulf Coast was completed in 5-58 days of which 5-7 were flight days. The migration was dispersed, especially for yearlings. A group of birds that had summered in Lower Michigan migrated and were wintering outside both the range of other project whooping cranes and the wild sandhill population.

On 4 January 2005 there were 34 freely migrating whooping cranes in the eastern migratory population: 5 HY2001, 14 HY2002, 14 HY2003, and 1 HY2004. Of the 19 HY2001-02 birds and 1 HY2004 juvenile (the latter associated with a HY2002 bird during the southern part of migration), 12 of 20 whooping cranes returned to or near the release site at Chassahowitzka NWR by 4 January. These 12 birds were in groups of 1, 2, 3, 2, 2, and 2. They arrived 15 November (estimated) - 2 January and spent 1-11 days in the saltmarsh before leaving to winter at inland sites. The 13 ultralight-led juveniles arrived at the pen on 12 December. They were held in a topnetted enclosure when costumed caretakers were not present and older birds were at the pensite. Older birds were also not given free access to supplied feed. All arrivals of the freely migrating birds occurred after arrival of the ultralight-led cohort except for no. 14-02, who left the site on 25 December and did not return, and nos. 5-01 and 4-02, who had an alternate local

winter site and returned frequently. The other 8 birds, i.e., those that did not return to the Central Gulf Coast saltmarsh, were wintering or were at extended stops in Lake (1), Pasco (2), and Volusia (1) Counties, Florida, and Franklin County (3) and Hiwassee Wildlife Refuge (1), Tennessee.

Of the 14 HY2003 birds, only 1 group of 3 had returned to the Chassahowitzka pensite by 4 January. These returned on 2 January. The remaining 8 birds were wintering or at extended stops in Volusia County, Florida (1 with a HY2002 bird), southern South Carolina (4 birds in 3 groups), east-central North Carolina (3 remaining birds from group that summered in Lower Michigan).

INTERACTIONS AMONG WHOOPING CRANES

Potential breeding pair bonds appear to have formed between nos. 1-01 and 2-02, 5-01 and 4-02, and possibly 2-01 and 8-02. Pair bonds may also likely form within the HY2002 triads containing nos. 3, 15 (recently dead), and 16; 9, 13, and 18; and 11, 12, and 17.

A large subadult flock formed during spring at Mill Bluff State Park. This flock formed a pool for formation of smaller groups or pairs.

Concentrated food supply appeared to encourage formation of subadult flocks. In fall 2003 a group of 8 whooping cranes were often feeding on fish and frogs trapped in receding waters of drawn down south Upper Rice Pool. The group then migrated intact from Necedah NWR to Chassahowitzka NWR. In summer 2004 another group of 8 whooping cranes formed in the Bee Cut area in response to the blueberry crop. After the crop was depleted, these individuals eventually separated and migrated as 4 different pairs.

HUMAN AVOIDANCE AND CONFLICTS WITH HUMAN ACTIVITY

In general, released whooping cranes satisfactorily avoided close proximity to humans and human structures. Inadequate human avoidance was notable by HY2003 cranes migrating east of the usual route and occurred along a small river in a residential area in North Carolina, yards behind human residences in Ohio, and immediately adjacent to public roads while in cropfields in Michigan. These naive cranes recently departed from the wintering area had little or no opportunity to learn from wild birds. They ignored much human activity and in some cases could be approached by curious onlookers to within a few meters. Avoidance behavior did improve, however, during the summer.

Some use of military grounds continued. The area of concern was Volk Field, a U.S. Air Force Base used for Air National Guard training, where a group of 3 birds (nos. 5-01, 4-02, and 18-02) selected a flooded ditch along the main runway as a preferred use site in spring and late summer 2003. Efforts of base personnel to haze the birds from the area were largely unsuccessful, and the birds became further habituated to humans and vehicles during these unsuccessful attempts. The problem was reduced in 2004, although nos. 5-01 and 4-02, now a potential breeding pair that summered at Sprague Pool, continued to visit the base during fall.

Of minor but not negligible concern was habituation to vehicles by whooping cranes on southern Necedah NWR. This is the natal area for reintroduced birds, and most of the whooping cranes have returned and attempted to crowd into this limited area. The cranes often use habitats near roads. Because most refuge and crane project traffic is necessary, this situation is expected to continue.

There is also concern about wintering sites in Florida. Two cattle ranches in Pasco County have become major wintering areas for project birds. One site is marginally close to human residences and contains nonmigratory sandhill cranes that tolerate people. Both ranches are in the process or face threats of being subdivided and developed.

There have been no significant conflicts noted between whooping cranes and farmers. No crop damage has been apparent, and most farmers have expressed positive interest in having whooping cranes on their property. There have been some instances of landowners denying permission to project personnel to enter their lands; however this denial appeared mainly due to privacy concerns, distrust of strangers, or distrust of personnel in government vehicles rather than antipathy toward the cranes.

INTERACTION WITH NONMIGRATORY WHOOPING CRANES

With one exception, there have been no observed interactions between members of the migratory and nonmigratory whooping crane flocks. Once settled on a winter site, migratory whooping cranes have been generally sedentary with a home range of 1-2 square miles or less. In winter 2004/05, no. 6-01 occupied two cattle ranches west of Okahumpka, Lake County. His roost site was one of the primary release sites used for the nonmigratory whooping crane reintroduction. He was the only migratory whooping crane on an area inhabited by nonmigratory whooping cranes. He occasionally associated with the latter birds but more typically remained with wintering migratory sandhills. [Addendum: No. 6-01 left this site during 6-11 January 2005 and moved to a site with wintering migratory sandhill cranes southwest of Gainesville, Alachua County, near the wintering area that he had occupied one year earlier.]

LAND OWNERSHIP

Whooping cranes have used a mixture of federal, state, and private lands during summer, migration, and winter based on the habitat these areas provide in the geographical area that the birds occupy. Some localities, such as cattle ranches on wintering grounds or cornfields in the north and on migration, are almost all privately owned. Whooping cranes often use areas containing extensive wetlands. These habitats tend to be on public lands such as National Wildlife Refuges and State Wildlife Areas. Wetland Reserve Program wetlands have also been frequently used where they are available.

EXPERIMENTAL SANDHILL CRANES

Transmitters on the isolation-reared sandhill cranes released in 2000 were largely or completely nonfunctional, and these birds could no longer be tracked. Birds observed during the year are listed below. Birds identified as OM had been led on their first migration by ultralight aircraft. Birds identified as Cohort 3 had been released directly into wild staging sandhill crane flocks in Central Wisconsin during fall.

OM #1 (male): Paired with a wild-hatched female near territory in eastern Sprague Pool area, Necedah NWR. Not visible until late August. Breeding status unknown.

OM #14 (male): Paired with a wild-hatched female in the eastern East Ryneerson Pool area, Necedah NWR. No apparent territory and often with other subadults.

Cohort 3 no. 6 (female): Paired with a wild-hatched male at Bear Bluff, Jackson County. Breeding status unknown.

Cohort 3 no. 7 (male): Paired with a wild-hatched female on territory in eastern East Ryneerson Pool area, Necedah NWR. Successfully hatched a chick, which survived until just before fledging and was then apparently killed by a predator.

Confirmed reproduction by 4-year-old Cohort 3 no. 7 adds to existing records of successful breeding by released costume/isolation-reared cranes and bodes well for successful reproduction by whooping cranes in Central Wisconsin.

FALL RELEASE OF WHOOPING CRANE NO. 18-04

Because of earlier flight feather abnormalities which were subsequently corrected, this juvenile did not complete training to follow ultralight aircraft. To save this valuable animal for the reintroduction, in late October he was released on Necedah NWR to migrate with wild cranes. Prior to release he was removed from his pen at Site 1 for daily flights, walks led by costumed caretakers in appropriate habitat, and socialization with older whooping cranes near the site. He was first released at Site 1 on 23 October and roosted that night with nos. 4-03 and 11-03 in a larger flock that also contained no. 7-03 and 36 sandhills. On 24 October he roosted with nos. 11-02, 12-02, and 17-02. However, he was reluctant to leave his home area, and when these other whooping cranes moved from near Site 1, he did not stay with them. Therefore, on 30 October he was transported 3 miles to Carter-Woggon Pool and released with nos. 5-02 and 6-03. He remained to roost there that night. During the following week he moved about the Rynearson Pools complex of southern Necedah NWR and associated with 7 different whooping cranes and numerous sandhill cranes. He departed together with no. 7-03 from just south of Necedah NWR on 7 November (Fig. 6). No. 18-04 landed to roost alone that night near Milligan, Parke County, Indiana. No. 7-03 continued southward and landed with 150-200 sandhills near Marco, Greene County, Indiana.

No. 18-04 resumed migration on 8 November. Through the day he joined various groups of southbound sandhills. At 1714, as roost time approached, he was observed flying with 50-60 sandhill cranes and whooping crane no. 7-01. No. 7-01 had a nonfunctional transmitter and was not trackable. No. 18-04 remained associated with no. 7-01 for most of the next 0.5 hours as the flock searched for a roost site. No. 18-04 then separated and landed alone to roost at Whites Bend, Cordell Hull Lake (Cumberland River), Jackson County, Tennessee. No. 7-01 roosted with ~20 sandhills 1.5 miles downriver. On 9 November no. 18-04 spent most of the day foraging at Whites Bend. He was with a great blue heron but no cranes. On 10 November he departed from the same site with ~40 sandhills, which he had probably roosted with the previous night. No. 18-04 landed at Hiwassee Wildlife Refuge, Meigs County, Tennessee, in early afternoon. He was observed later in the day with hundreds of sandhills at Armstrong Bend and roosted on Hiwassee Island. He stayed on the refuge during the remainder of the week as did whooping cranes nos. 7-01, 1-02, 5-01, 4-02, 5-02, and 6-03.

No. 18-04 casually associated with all of the older whooping cranes but initially did not appear to develop a strong association with any specific individual. However, by 5 December nos. 18-04, 5-02, and 6-03 were behaving as a closely associated group as they moved and foraged among the many thousands of sandhills. Nos. 1-02 and 6-03 left Hiwassee to resume migration on 12 December. They were found wintering together with migratory sandhills in Volusia County, Florida, on 23 December. Nos. 18-04 and 5-02 remained together at Hiwassee Wildlife Refuge. They resumed migration on 19 December. They roosted that night northwest of Ashburn, Turner County, Georgia. On 20 December they continued migration and landed to roost at the major sandhill crane wintering area at Hixtown Swamp, Madison County, Florida.

They departed Hixtown Swamp on 2 January. According to PTT readings for no. 18-04, they roosted in Central Gulf Coast saltmarsh near Game Creek/Greenleaf Bay on St. Martins Marsh Aquatic Preserve that night. On 3 January they passed over the pensite at Chassahowitzka NWR in late morning. They proceeded southbound to a wetland in a cattle pasture near Gowers Corner, Pasco County. This site contained wintering sandhills and was 2 miles north of no. 5-02's previous winter location. On the following day they moved to the nearby ranch where nos. 11-02, 12-02, and 17-02 were wintering. No. 18-04 became the first reintroduced whooping crane in the eastern migratory flock to complete his first migration by following older cranes rather than ultralight aircraft.

The successful migration of no. 18-04 demonstrated the efficiency and effectiveness of releasing costume/isolation-reared whooping cranes with older cranes during fall as a reintroduction technique. As



Fig. 6. Fall migration of whooping crane no. 18-04, 7 November 2004 - 3 January 2005. No. 18-04 was released at Necedah NWR during fall and migrated by following older cranes.

in previous experiments with sandhill cranes, these older birds led the juvenile to a suitable wintering site. No. 18-04 followed 3 different whooping cranes during the migration. He also spent some time alone and followed sandhill cranes along the route. As a result of this release technique, he was functioning as a wild bird integrated into the growing whooping crane population by the beginning of his first winter.

SUMMARY AND CONCLUSIONS

The winter management protocol continued to be effective in protecting newly released juvenile whooping cranes from predators and exposure to humans. Problems involving conflicts between newly released and older birds at the release site have been partially but not completely solved. Survival of all birds in the population remained high; however, 3 mortalities of HY2002-03 birds during the year raise new concerns related to management of birds encountering geographical barriers during migration, birds off the migration route, and risk of shooting, both intentional and during otherwise legal waterfowl hunting. Social behavior was normal, and pair bond formation was progressing. Potential first breeding will receive particular attention in spring 2005. Lack of opportunity for pair bonding because of excessive dispersal of some females may become a concern, especially in view of the current highly skewed sex ratio in favor of males. Habitat use, roosting, and foraging behavior of most birds were satisfactory. New graduate research projects focusing on habitat use have begun and will supplement the monitoring effort. Human avoidance was generally adequate but still a concern, especially for some yearlings during spring and early summer. Natal site fidelity remained high except for birds encountering Lake Michigan from the east on spring migration. As of 4 January 2005, winter site fidelity was high for most older birds but low for yearlings in winter 2004/05. The unassisted fall migration of no. 18-04 by following older cranes bodes well for future releases of juvenile whooping cranes with older cranes during fall in Central Wisconsin.

ADDENDUM

Nos. 2-03, 10-03, and 13-03 were found together near the Combahee Unit of ACE Basin NWR, Colleton County, South Carolina, during an aerial survey on 18 January 2005. No. 2-03 had last been recorded on 12 December as he resumed migration from a stop in Iroquois County, Illinois. Nos. 10-03 and 13-03 were last recorded at a stop in Nelson County, Kentucky, on 5 December but were no longer present when that site was next checked on 15 December. The area in South Carolina where the birds were found was last checked from the air on 18 December. With the discovery of these 3 individuals, the locations of all 47 members of the eastern migratory whooping crane population are currently known.

APPENDIX A. Whooping cranes in eastern migratory flock, 4 January 2005.

Hatch year	Crane no.	Sex	BBL Band no.	Frequency (MHz) ^a	Color code (left:right) ^b	PTT ID	Studbook no.		
							Own	Sire	Dam
2001	1	M	659-00215	164.465	L G/W:G/R/G		1629	1114 ^c	1119
2001	2	F	659-00201	164.273	L G/W:R		1630	1147	1142
2001	5	M	659-00213	164.556	L G/W:R/G		1633	1147	1142
2001	6	M	none	164.971sol	L G/W:R/G/R		1634	1162	1153
2001	7	F	659-00214	--	L G/W:W/R		1635	1127	1154
2002	1	F	599-32111	164.124	L R/W:L G (PTT)	--	1660	1133	1135
2002	2	F	599-32112	164.225	L R/W:G/W		1661	1133	1135
2002	3	F	599-32116	164.785	L R/W:W/G/W		1662	1114	1119
2002	4	F	599-32117	165.133	L R/W:R/G/W		1663	1114	1119
2002	5	M	599-32118	164.855sol	L R/W:G/R/W		1664	1133	1135
2002	8	M	599-32113	164.345	L R/W:W/G		1668	1144	1136
2002	9	F	599-32127	164.605	G/W:L R/W		1670	1133	1135
2002	11	M	599-32114	165.222	L R/W:R/G		1672	1147	1142
2002	12	M	599-32121	165.671sol	L R/W:W/R/G		1673	1114	1119
2002	13	M	599-32122	164.494	L R/W:G/R/G		1674	1127	1154
2002	14	F	599-32123	164.834	L R/W:G/W/R		1675	1128	1101
2002	16	M	599-32125	--	L R/W:R/G/R		1677	1147	1142
2002	17	F	599-32115	164.174	L R/W:G/R		1678	1144	1136
2002	18	F	599-32126	165.152	G:L R/W		1679	1128	1101
2003	1	F	599-34041	164.255	L W (PTT):L G/R	15050	1696	1175	1188
2003	2	M	599-34044	164.356	G/W:L G/R		1697	1133	1135
2003	3	F	599-34056	164.445	L G/R:W		1698	1144	1136
2003	4	M	599-34045	164.476	R/W:L G/R		1699	1144	1136
2003	6	M	599-34047	165.421	G/W/G:L G/R		1701	1133	1135
2003	7	M	599-34048	164.764	R/W/G:L G/R		1702	1133	1135
2003	9	F	599-34042	164.815	L W/G (PTT):L G/R	44263	1704	1144	1136
2003	10	M	599-34049	165.175	W/G/R:L G/R		1705	1175	1188
2003	11	M	599-34050	165.193	G/W/R:L G/R		1706	1127	1154
2003	12	F	599-34043	165.243	L W/R (PTT):L G/R	15330	1707	1133	1135
2003	13	F	599-34051	165.272	R/W/R:L G/R		1708	1133	1135
2003	16	M	599-34052	165.304	R/G/W:L G/R		1711	1144	1136
2003	17	M	599-34053	165.323	W/G/W:L G/R		1712	1144	1136
2003	18	M	599-34054	165.371	G/R/W:L G/R		1713	1147	1142
2004	1	M	599-37449	165.105	R/G/W:L W/G		1744	1133	1135
2004	2	M	599-37450	164.334	W/R/W:L W/G		1745	1127	1154
2004	3	M	599-37451	164.644	G/R/W:L W/G		1746	1133	1135
2004	5	M	599-37452	165.022	R/W/G:L W/G		1748	1114	1119
2004	7	M	599-37453	165.043	W/R/G:L W/G		1750	1144	1136
2004	8	M	599-37454	165.064	G/R/G:L W/G		1751	1133	1135
2004	12	M	599-37455	164.414	G/W/R:L W/G		1755	1127	1154
2004	14	M	599-37456	164.966	R/W/R:L W/G		1757	1130	1292
2004	15	F	599-37446	165.123	L R/G (PTT):L W/G	38636	1758	1144	1136
2004	16	M	599-37457	165.593	W/G/R:L W/G		1759	1144	1136
2004	17	M	599-37458	164.872	R/G/R:L W/G		1760	1133	1135
2004	18	M	599-34057	164.576	L R/W (PTT):L W/G	15045	1761	1133	1135
2004	19	F	599-37447	165.495	L W/R (PTT):L W/G	38637	1762	1128 ^d	1263
2004	20	F	599-37448	165.522	L G/R (PTT):L W/G	15331	1763	1133	1135

^a sol = solar/NiCad transmitter.

^b L = long (38mm) bands for transmitter attachment.

^c Sire could be either 1114 or 1144.

^d Sire could be either 1128 or 1100.

APPENDIX B. Table 1. Locations of HY2001 and HY2002 whooping cranes, winter 2003/04. Numerals in parentheses refer to points on Fig. 1.

No. 1-01:

(1) Crews Lake, Pasco County: 16 November - 12 January

Nos. 2-01, 5-02, 8-02, 16-02, 17-02, 9-02, 11-02, and 12-02:

- (3) Chassahowitzka NWR, Citrus County: 21-26 November
- (4) northwest of Big Slough, Sarasota County: 26-27 November
- (5) Coker Gully, Manatee County: 27 November
- (6) Lake Stafford, Levy County, 28 November - 30 November
- (3) Chassahowitzka NWR, Citrus County: 30 November - 1 December

No. 1-02:

(3) Chassahowitzka NWR, Citrus County: 29 November - 1 December

Nos. 2-01, 5-02, 8-02, 16-02, and 17-02:

(2) Five Mile Ranch, Pasco County: 1 December - 12 January

Nos. 1-01, 2-01, 5-02, 8-02, 16-02, and 17-02:

(2) Five Mile Ranch, Pasco County: 13 January - 13 (or 14) March

Nos. 1-02, 9-02, 11-02, and 12-02:

(7) Way Pond and vicinity, Pasco County: 1-4 December

Nos. 9-02, 11-02, and 12-02:

- (8) Bird Island Lakes, Pasco County: 4-6 December
- (7) Way Pond and vicinity, Pasco County: 6 December - 18 March

No. 1-02:

- (9) Bowers Lake, Marion County: 4-6 December
- (10) Cook Lake, east of Cherry Lake, Lake County, 6- ~23 December
- (11) wetland southwest of Lake Minnehaha, Lake County, by 26 December - 6 April

Nos. 5-01, 4-02, and 18-02:

- (3) Chassahowitzka NWR, Citrus County: 21-29 November
- (12) Triangle Area, Pasco County, 29-30 November
- (3) Chassahowitzka NWR, Citrus County: 30 November - 2 December
- (13) Stafford Lake, Hernando County: 2 December - 8 January
- (3) Chassahowitzka NWR, Citrus County: 8 January - 27 March

Nos. 2-02 and 13-02:

(14) Gum Slough, near Live Oak, Suwannee County: 21 November - 20 March

Nos. 3-02 and 15-02:

- (3) Chassahowitzka NWR, Citrus County: 16-19 November
- (15) near Oak Grove, Sumter County: 19-20 November
- (16) Chito Branch, near Lillibridge, Hillsborough County: 21-24 November
- (17) near Center Hill, Sumter County: 24 November - 7-10 April

No. 14-02:

Hixtown Swamp complex, including (18) north, (19) Sampala Swamp, (20) southeast, (21) Hankings Prairie and Piddlins Lake, Madison County: 2 December - 7 February

(3) Chassahowitzka NWR, Citrus County: 7 February - 8-13 April

No. 6-01:

(22) Gainesville/Paynes Prairie, Alachua County: by 3 January - 23 February

APPENDIX B. Table 2. Spring migration chronology of HY2001 and HY2002 whooping cranes, 2004. Numerals in parentheses refer to points on Fig. 2.

Nos. 1-01, 2-01, 5-02, 8-02, 16-02, and 17-02:

13 (or 14) March: Left wintering area on ranchland (1) south of Gowers Corner, Pasco County, Florida.
22 March: Undetermined roost location in Warrick, Vanderburgh, or Gibson County, Indiana (PTT readings).
23 March: Arrived at (2) Shabbona Lake State Park, DeKalb County, Illinois.
1 April: Left Shabbona Lake State Park and arrived at (3) Necedah NWR.

Nos. 9-02, 11-02, and 12-02:

18 March: Left wintering area on ranchland (4) near and including Way Pond, Pasco County, Florida.
26 March: Reported (5) near McHenry, McHenry County, Illinois. Apparently roosted there this and previous night.
27 March: Arrived at (3) Necedah NWR. Reported at East Rynearson Pool and Site 1 on 28 March.

Nos. 5-01, 4-02, and 18-02:

27 March: Left wintering area at pensite on (6) Chassahowitzka NWR, Citrus County, Florida, where they had been wintering with 16 HY2003 juveniles and no. 14-02. Roosted (7) along Cedar Creek, east side of Lake Blackshear, Crisp County, Georgia.
1 April: Roosted at lake (8) northwest of Greencastle, Putnam County, Indiana.
7 April: Reported on (3) Sprague Pool, Necedah NWR.

Nos. 2-02 and 13-02:

20 March: Left wintering area on ranchland (9) near Live Oak, Suwannee County, Florida. Undetermined roost location in Upson or Crawford County, Georgia.
24 March: In southeastern Indiana. May have roosted along East Fork of White River, Jackson County, on nights of 24-26 March (PTT readings).
28 March: Had moved to a restored wetland (10) near Wea Creek, Tippecanoe County, Indiana.
5 April: Left Wea Creek area.
6 April: Roosted (11) north of Waunakee, Dane County, Wisconsin.
7 April: Arrived on (3) East Rynearson Pool, Necedah NWR.

Nos. 3-02 and 15-02:

7-10 April (exact date undetermined): Left wintering area on ranchland (12) near Center Hill, Sumter County, Florida.
17 April: Reported from near (13) Kalkenbrenner Slough, Meeker County, Minnesota. Left following morning.
19 April: Arrived to roost at (3) Rattail Pool, Necedah NWR.

No. 14-02:

8-13 April (exact date undetermined): Left wintering area on (6) Chassahowitzka NWR, Citrus County, Florida.
17 April: Detected in flight at 1147 over northern Illinois. Roosted at (14) Yellowstone Lake, Lafayette County, Wisconsin.
3 May: Left Yellowstone Lake. Located flying over large cranberry reservoir/marsh (15) northeast of Tomah, Monroe County, Wisconsin. Proceeded to Cranmoor area, Wood County, did not land, and then returned to the previous site near Tomah to roost. Left area next morning but not tracked.

No. 1-02:

6 April: Left wintering area in wetland (16) southwest of Lake Minnehaha, Lake County, Florida.
Did not return to Central Wisconsin in 2004. Next found on 23 July (17) near Richland Junction, Kalamazoo County, Michigan.

No. 6-01:

23 February: Left wintering area on (18) Paynes Prairie, Alachua County, Florida, with migrating sandhills.
13 March: Reported in flight migrating with sandhills over (19) northern Monroe County, Indiana.
21 March: Observed at (20) Widow Green Marsh area, Marquette/Adams Counties, Wisconsin.
22 March: Found nearby in Adams County west of Oxford, Wisconsin.
28 April: Reported (21) southwest of Neillsville, Clark County, with sandhill cranes. Had been observed earlier by local residents.

No. 7-01:

This was the only eastern migratory whooping crane with a nonfunctional transmitter and the only project crane for which the wintering area was not determined.

13 March: Reported at roost location at (22) north end of Watts Bar Lake, Roane County, Tennessee.

26 March: Reported in Starke County, Indiana, adjacent to (23) Jasper-Pulaski SWA.

27 March: Reported at (24) Saganashkee Slough, Cook County, Illinois.

7 April: Reported at (25) Radke Pool, Horicon NWR, Fond du Lac County, Wisconsin.

APPENDIX B. Table 3. Spring migration chronology of HY2003 whooping cranes, 2004. Numerals in parentheses refer to points on Fig. 2. Times are EST/CDT.

Nos. 1, 3, 5, 9, 12, 16, 18, and 19:

30 March: From (6) Chassahowitzka NWR, Citrus County, Florida, to (26) Alapaha Lake, Lowndes County, Georgia.

31 March: To (27) upper Clark Creek, Wilkes County, Georgia.

1 April: To (28) Little Tennessee River, near Oak Grove, Macon County, North Carolina.

3 April: After being approached closely by people since arrival, the group was flushed this evening by more human disturbance. They flew after dark and could not be tracked by ground vehicle northward through the mountains.

5 April: To cow pasture (29) near Wiggonsville, Clermont County, Ohio.

6 April: To residential estate containing a large pond in (30) New Bremen, Auglaize County, Ohio. Landowner cooperative but proximity to human activity high.

9 April: The flock flew westward and separated into two groups south of Celina, Ohio, at 1225.

Nos. 1, 5, 9, 18, and 19:

9 April: To roost in marsh (31) near Nottawa, St. Joseph County, Michigan.

10 April: Encountered Lake Michigan at (32) South Haven, Van Buren County, Michigan, at 1140. Turned south at 1200. Landed at ~1310 in large marsh along the Paw Paw River at the (33) Brown Sanctuary, Sarett Nature Center, Berrien County, Michigan, where they remained to roost.

11 April: Flew southward and crossed the Indiana state line south of Galien, Michigan, at 1100. Proceeded southeastward and at 1520 landed in a grassy field near a flooding along the Wabash River (34) north of Geneva, Adams County, Indiana. At 1548 they resumed flight and then landed in similar habitat 1.5 miles east in Rainbow Bottom, Limberlost Nature Preserve. They again stayed only about 0.5 hours and then resumed flight. To cornfield/grassy area near large pond (35) west of Celina, Mercer County, Ohio.

6 May: To (36) on or near Baker Sanctuary, Calhoun County, Michigan.

7 May: Resumed attempted migration toward Wisconsin, encountered Lake Michigan, and then continued northbound along the east shore of the Lake to roost on (37) Manistee River SGA, south of Parkdale, Manistee County, Michigan. No location information available next two days.

10 May: Roost location on (38) Walkinshaw Wetlands, Huron-Manistee National Forest, Oceana/Newaygo Counties, Michigan.

Nos. 3, 12, and 16:

9 April: Retreated east and southward to harvested cornfield/small wetland (39) near Newport, Shelby County, Ohio.

25 April: Resumed migration and encountered Lake Michigan at (32) South Haven, Van Buren County, Michigan. Roosted on nearby cranberry farm.

30 April: To drawdown pool on (40) Highbanks Refuge, Allegan SGA, Allegan County, Michigan.

Nos. 2, 4, 6, 7, 10, 11, 13, and 17:

7 April: From (6) Chassahowitzka NWR, Citrus County, Florida, to cow pasture (41) northwest of Lamont, Jefferson County, Florida.

8 April: Resumed migration. Encountered thunderstorms northeast of Thomasville, Georgia, in early afternoon and separated into five groups.

Nos. 4, 6, and 17:

8 April: Retreated southward to (42) Hixtown Swamp, Madison, Florida.

9 April: Resumed migration. Flying northwest of Dawson, Georgia, at 1529. Roost location not determined.
10 April: Flying in northwestern Georgia or northeastern Alabama in late afternoon. Roost location not determined.
14 April: Signals at about noon in south-central Tennessee.
15 April: Detected in flight in west-central Kentucky at 1315. To roost on (43) Embarras River, northwest of Walnut Point Lake, Douglas County, Illinois.
16 April: To (44) Rock River, west of Rock Falls, Whiteside County, Illinois.
17 April: Flew after dark to (45) Crooked Creek, near Reno, Houston County, Minnesota.
23 April: Not detected during aerial check of last recorded location (45). They were last checked there on 20 April.
25 April: Three whooping cranes reported flying along the (46) Mississippi River in Pepin County, Wisconsin.

No. 4:

3 May: Found in flight during aerial survey; landed on (47) Van Loon Lake, Van Loon SWA, LaCrosse County. Same location when checked on 7 May.
15 May: To (29) West Branch Little Yellow River, Necedah NWR. MIGRATION COMPLETED.

Nos. 6 and 17:

3 May: Found in flight during aerial survey; landed along the (47) Black River, south of Grant Creek, Trempealeau County. Same location when checked on 7 May.
12 May: Arrived (3) East Rynearson Pool, Necedah NWR. MIGRATION COMPLETED.

Nos. 10 and 13:

8 April: To pond in cow pasture (48) southeast of Moultrie, Colquitt County, Georgia.
9 April: Resumed migration. Tracked as far as Coweta County, Georgia. Roost location not determined.
15 April: Found in flight at 1430 north of Old Hickory and Cordell Hull Lakes, north of Carthage, Tennessee. Roost location in Illinois not determined.
16 April: Resumed migration. To wetland (49) along Little Rock Creek south of DeKalb, DeKalb County, Illinois.
17 April: To pond (50) southwest of Hesper, Winneshiek County, Iowa.
18 April: To (51) Upper Mississippi NWFR, south of LaCrosse, LaCrosse County, Wisconsin. After a short stop in mid-morning, they continued to (52) eastern part of Meadow Valley Flowage, Juneau County, Wisconsin. They moved to (3) just west of Site 4, Upper Rice Pool, Necedah NWR, on the following morning. MIGRATION COMPLETED.

No. 11:

8 April: Roost location not determined.
9 April: To field (53) near Grayson, Gwinnett County, Georgia.
10 April: To (54) north of Abrams Creek, Cades Cove, Blount County, Tennessee, in Great Smoky Mountains National Park.
14 April: Detected flying southwest of London, Kentucky, near Laurel River Lake, at 1407. Not tracked further.
15 April: Observed in flight near Bedford, Indiana, at 1158. Roost location, estimated to be south of Kankakee, Illinois, near the Indiana border, was not determined.
16 April: To (55) Pheasant Branch Marsh, Dane County, Wisconsin.
17 April: To (3) Cutler Cranberry, Juneau County, Wisconsin, just west of Rynearson Pools, Necedah NWR. MIGRATION COMPLETED.

No. 7:

8 April: Roost location not determined.
9 April: To farm field (56) near Luella, Henry County, Georgia.
10 April: Resumed migration but not tracked.
14 April: Found in flight near Tullahoma, Tennessee, in late morning. To roost on (57) Duck River Unit of Tennessee NWR, Humphreys County, Tennessee.
15 April: Resumed migration. Not tracked, but later signals indicated possible roost location in or near Shelby County, Illinois.
16 April: Resumed migration. Several visual observations of bird in flight during the day, the last at 1350 south of Pontiac, Illinois. Not tracked further, but the last signal detected, at 1749, indicated possible roost location in northcentral Illinois.

2 June: To (3) south Upper Rice Pool, Necedah NWR. MIGRATION COMPLETED.

No. 2:

8 April: Roost location not determined.

9 April: To undetermined location north of Thomaston, Upson County, Georgia.

10 April: Resumed migration but not tracked.

15 April: Detected in flight along Cumberland River northwest of Nashville, Tennessee, at 1458.

16 April: Not tracked, but a signal indicated that the bird was in flight south of Bloomington, central Illinois, at 1340.

19 May: Detected in flight near Wautoma, Waushara County. Roosted (58) north of Patrick Lake, Adams County.

20 May: To and in undirected flight over Necedah NWR. Joined nos. 10 and 13-03 to roost in (3) cornfield south of Lemonweir River north of Volk Field. MIGRATION COMPLETED.

Appendix B. Table 4. Locations of reintroduced whooping cranes during spring, summer, and fall, 2004. Numerals in parentheses refer to points in Fig. 3. Unnumbered locations are on or in the immediate vicinity of Necedah NWR, and those in the Rynearson Pools complex appear in Fig. 4.

Nos. 1-01 and 2-02:

11-17 April: Paired, Rynearson Pools complex, Necedah NWR.

18-26 April, 4-9 May: (1) northeast of Mauston, Juneau County. Foraged in harvested cornfields; roosted in local wetlands.

26 April - 4 May, 9 May and thereafter: Established territory on southern south Upper Rice Pool. Remained on or near this territory until migrating on 28 November.

Nos. 2-01:

22-24 April: (2) Decatur Lake, Green County, Wisconsin.

24-26 April: (3) east of Black River Falls, Jackson County.

19 May: Returned to Necedah NWR and remained through summer. Molted on Upper Rice Pool. Joined subadult flock in and near Bee Cut. Formed discrete pair with no. 8-02 by mid-September. Migrated with no. 8-02 on 1 December.

Nos. 5-01 and 4-02:

~7 April: Separated from no. 18-02.

12-18 April: Returned to (4) Mill Bluff, frequent trips back to refuge through 13 June.

13 June -28 August: Remained at Sprague Pool.

28 August: Returned to (4) Mill Bluff, remained until migrating on 7 November.

No. 6-01:

22 March - 28 April: Arrived in summering area. Summered in and near (5) White Creek Reservoir area, Jackson County. By 16 September staging with sandhills in (6) Clark and (7) Jackson Counties. Migrated on 21 November.

No. 7-01:

Returned to (8) Radke Pool, Horicon NWR, by 7 April. Not recorded in area after 30 May.

Found on 12 October (9) near Theresea SWA, Washington County, staging with sandhills.

No. 1-02:

Did not return to Central Wisconsin in 2004. Next found on 23 July (10) near Richland Junction, Kalamazoo County, Michigan. Remained there with sandhills until migrating in early November.

Nos. 3-02, 15-02, and 16-02:

19 April: Nos. 3-02 and 15-02 returned to Necedah NWR and moved to (4) Mill Bluff on the next day.

24-25 April: (11) Lake Onalaska, LaCrosse County, Wis

Began associating with several other birds on 23 April in Necedah NWR and Mill Bluff areas.
Nos. 3, 15, and 16-02 formed discrete group by 24 May. Spent most of summer at Goose Pool, Necedah NWR.
Staged at Goose Pool/Sprague Pool and with sandhills at (12) Brandy Creek marsh and Pleasant Valley, Monroe County. Migrated on 21 November.

No. 5-02:

Disassociated from migration group by 19 April. Remained alone until 20 August, mainly in small marshes between Sprague and Ryneerson Pool complexes. Then joined subadult group (nos. 2-01, 8-02, 2-03, 4-03, 6-03, 11-03, 17-03) at Canfield Pool. Remained in Bee Cut/Canfield Pool/Carter-Woggon Pool area through fall. Eventually formed association with no. 6-03 and migrated with him on 7 November.

No. 8-02:

20 April - 15 May: Mainly (13) near Valley Junction, Monroe County.
15 May: Returned to south Upper Rice Pool, Necedah NWR, and remained mainly alone in vicinity until mid-August. Then joined Bee Cut subadult flock. Formed discrete pair with no. 8-02 by mid-September. Migrated with no. 8-02 on 1 December.

Nos. 9-02 and 18-02:

No. 9-02 disassociated from nos. 11-02 and 12-02 just after returning from migration. She joined no. 18-02 on ~7 April.
7-19 April: (14) Mead SWA, Marathon County.
19-20 April: (15) Fox River Marsh/Lake Puckaway, Marquette County.
22-23 April: (16) Brillion SWA, Calumet County.
26 April: Returned to (4) Mill Bluff area, joined other subadults there through July.
In various associations with other birds on Necedah NWR, Yellow River Cranberry, (17) Colburn SWA in late summer/early fall.
Alone mid-August-8 September: (18) Fox River marsh southwest of Berlin, Green Lake County.
24 October: formed discrete group with no. 13-02. Migrated together on 21 November.

Nos. 11-02 and 12-02:

Disassociated from no. 9-02 on 28 March, just after completing migration.
Remained in or near East Ryneerson Pool, Necedah NWR, through summer. Joined by no. 17-02 on 27 September and formed discrete group. Migrated together on 11 December.

No. 13-02:

Disassociated from no. 2-02 shortly after completing spring migration.
Joined subadult flock at (4) Mill Bluff. Remained mainly in northwest pool, even in daytime, of Mill Bluff State Park.
9 August: Returned to Ryneerson Pools, Necedah NWR, usually alone, often roosting with sandhills.
23 September: Returned to Mill Bluff.
5 October: Began associating with nos. 9-02 and 18-02 and quickly formed discrete group at Mill Bluff.
21 November: Group left on fall migration from south of Site 2, Necedah NWR, on 21 November.

No. 14-02:

25-26 June: Found at (19) Fox Point, Wisconsin River, Juneau County.
26 June - 1 August: (20) Fox River NWR and vicinity, Marquette County.
2-4 August: (21) Dates Millpond, Columbia County.
18 August - 31 October: (15) Fox River marsh/ Lake Puckaway area, Marquette County, with staging sandhills.
31 October - 7 November: (22) near Helenville, Jefferson County, with staging sandhills. Migrated from Wisconsin on 7 November.

No. 17-02:

Disassociated from winter/migration group shortly after arrival at Necedah NWR on 1 April.
6-7 April: (23) Poygan Marsh SWA, Waushara County.
8-21 April: (24) Navarino SWA, Shawano County.
22-25 April: (25) Fish Lake SWA, Burnett County.
By 30 April returned to Necedah NWR.
1 May: Joined subadult flock at (4) Mill Bluff.
At Mill Bluff with occasional trips to Necedah NWR through late May.
Through early August remained mainly in northwest pool of Mill Bluff State Park, even in daytime.

9 Aug: returned to Necedah NWR and roosted with main sandhill flock on East Ryneerson Pool, then returned to Mill Bluff.

16 Aug - 25 September: at northeastern Sprague Pool; alone during day, roosting with sandhills.

27 September: Joined nos. 11-02 and 12-02 and shortly formed discrete group. Migrated together on 11 December.

Nos. 1, 5, 9, 18, and 19-03:

Group was blocked from returning to Central Wisconsin by Lake Michigan.

10 May: Arrived (26) Walkinshaw Wetlands, Oceana County, Michigan. Area with temporary, unusually high water levels due to record spring rainfall. Foraged mainly on waste corn in nearby fields in Newaygo County. Made several brief flights from area to (27) Muskegon, (28) Ogemaw, (29) Clare, and (30) Osceola Counties but returned.

13-23 July: No. 19 died. Scavenged carcass recovered on 30 July contained lead shot in foot. Under investigation.

11 August: No. 9, associated with no. 19, rejoined other three birds after temporary separation.

12 August: Group moved eastward to (31) near Ashley, Gratiot County.

15 September: Moved back westward to (32) near Custer, Mason County. Remained there until migrating on 7 November.

No. 2-03:

24 May - 25 June: In subadult flock at (4) Mill Bluff.

25 June: Returned to Upper Rice Pool, Necedah NWR. Remained sometimes alone but often with other subadults, especially no. 6-03, through next several weeks. Became member of the subadult flock using the Bee Cut and adjacent wetlands during summer and fall.

17 October: Departed Necedah NWR with no. 17-03 in early migratory movement. Roosted (33) near Red Cedar Lake, Jefferson County, Wisconsin.

Nos. 3-03, 12-03, and 16-03:

Group was blocked from returning to Central Wisconsin by Lake Michigan.

30 April: Arrived on drawdown (34) Highbanks Refuge, Allegan SGA, Allegan County, Michigan.

~12 May: Nos. 3 and 12 separated from no. 16. Moved about to (35) Ottawa, (36) LaPorte (Indiana), (37) Berrien, (38) Clare, (39) Missaukee, (40) Montcalm, and (41) Muskegon Counties. Settled for longest period (1 June - 2 July) on farmland (42) near Blanchard, Isabella County.

No. 16 remained in Allegan County, mainly on farmland (43) near Oakland. Had injured leg, from which he fully recovered, when found at this location in late May.

10 July: Nos. 3 and 12 returned to Allegan County and rejoined no. 16 at (34) Highbanks Refuge. Refuge wetland was drained. Three birds moved about southwestern Lower Michigan in Allegan, (44) Van Buren, and (45) Berrien Counties.

26 July: The group, having finally circumvented Lake Michigan, returned to the Central Wisconsin.

28 July - 22 September: Yellow River Cranberry, Juneau County, Wisconsin.

23 September: Returned to Goose Pool, Necedah NWR, with several other subadults that had been on Yellow River Cranberry. Remained in Sprague Pool complex with occasional returns to Yellow River Cranberry until migrating on 20 November.

No. 4:

15 May: Arrived at West Branch Little Yellow River, Necedah NWR. Remained on Necedah NWR, mainly in Upper Rice Pool area.

28 May: Moved to (46) Lone Rock, Lemonweir River. Occasionally returned to Necedah NWR.

4 July: Returned to Necedah NWR; eventually joined subadult flock in vicinity of Bee Cut.

11 September: Formed exclusive association with no. 11. Migrated with no. 11 on 4 November.

No. 6:

12 May: Arrived East Ryneerson Pool, Necedah NWR.

14 May: In subadult flock at (4) Mill Bluff.

25 June: Returned to Necedah NWR. In various associations there, most often with no. 2-03. Became member of subadult flock using Bee Cut and vicinity. By 17 October closely associated with no. 5-02. Migrated with no. 5-02 on 7 November.

No. 7:

2 June: Arrived south Upper Rice Pool, Necedah NWR.

3 June: Began associating with no. 11 and using sites along the Little Yellow River south of the refuge.

22 July: Disassociated from no. 11 but continued to use Little Yellow River and associate with small numbers of

sandhill cranes. Often returned to southern East Rynearson Pool.

5 November: No. 18-04 followed no. 7 to usual site along Little Yellow River. Both birds migrated together on 7 November.

Nos. 10 and 13:

18 April: Arrived (47) eastern Meadow Valley Flowage. Returned to East Rynearson Pool, Necedah NWR, next day.

21 April - 18 May: (48) near Rudolph, Wood County.

18 May - 3 June: Rynearson Pools area and areas south of refuge.

4-15, 17-19 June: near Rudolph, Wood County, including Paul J. Olsen SWA.

20 June - 6 September: Suk Cerney Pool (except 24 July - 2 Aug when no. 13 separated and joined other whooping cranes in Rynearson Pools area).

12 September: Joined subadult flock on Yellow River Cranberry. Remained alone or associated with various other whooping cranes at Yellow River Cranberry, Sprague Pool, (17) Colburn SWA, Rynearson Pools, or (4) Mill Bluff until migrating on 7 November.

No. 11:

17 April: Arrived Cutler Cranberry, Juneau County. Moved to Little Yellow River south of refuge. Occasionally returned to refuge.

3 June: Led no. 7-03 to Little Yellow River. Continued to use these areas and occasionally returned to refuge.

22 July: Disassociated from no. 7-03. Joined other subadults on refuge. Roosted mainly in main sandhill roost on East Rynearson Pool through early August. Then joined subadult flock in Bee Cut and adjacent wetlands.

11 September: Associated mainly with no. 4-03. Migrated together on 4 November.

No. 17:

12 May: Arrived East Rynearson Pool, Necedah NWR.

14 May: Joined subadult flock at (4) Mill Bluff.

23 July: Returned to Necedah NWR. Usually roosted with sandhills and some whooping cranes on East Rynearson Pool through mid-August. Became member of subadult flock using Bee Cut and adjacent wetlands, although by mid-September he usually moved independently of other subadults.

17 October: Departed Necedah NWR with no. 17-03 in early migratory movement. Roosted (33) near Red Cedar Lake, Jefferson County, Wisconsin.

APPENDIX B. Table 5. Migration stops of reintroduced whooping cranes, fall migration 2004. Numerals in parentheses refer to points on Fig. 5.

Nos. 1-01 and 2-02:

28 November: Began migration from (1) on or near south Upper Rice Pool, Necedah NWR, Juneau County, Wisconsin. Arrived (2) near Wheatfield, Jasper County, Indiana.

16 December: Moved locally to (3) Jasper-Pulaski SWFA, Jasper/Pulaski Counties, Indiana.

17 December: Departed (3), not tracked, next stop undetermined.

18 December: Arrived (4) Vernon Bottom, Cumberland River, Monroe County, Kentucky, with sandhill cranes.

19 December: Departed (4), not tracked to undetermined stop in southern Georgia.

20 December: Arrived (5) File Mile Ranch, Pasco County, Florida.

MIGRATION COMPLETED in 23 days (5 flight days).

Nos. 2-01 and 8-02:

1 December: Began migration from (1) on or near Upper Rice Pool, Necedah NWR, Juneau County, Wisconsin. Arrived (6) Midewin National Tallgrass Prairie, Will County, Illinois, with one sandhill crane.

2 December: Moved locally to (7) Braidwood Lake area, Grundy/Will/Kankakee Counties, Illinois. At this site at least through 14 December.

23 December: Arrived in northeastern Alabama; stop undetermined.

29 December: Arrived (8) Chassahowitzka NWR pensite, Citrus County, Florida.

31 December: Departed (8). Arrived File Mile Ranch, Pasco County, Florida.

MIGRATION COMPLETED in 31 days (~6 flight days).

Nos. 5-01 and 4-02:

7 November: Began migration from (9) Mill Bluff, Juneau County, Wisconsin. Arrived (3) Jasper-Pulaski SWFA, Jasper/Pulaski Counties, Indiana.

8 November: Departed (3), undetermined stop in northcentral Kentucky.

9 November: Arrived (10) Hiwassee Wildlife Refuge, Meigs County, Tennessee.

24 November: Departed (10), not tracked.

25 November: Arrived (8) Chassahowitzka NWR pensite, Citrus County, Florida.

28 November: Departed (8). Moved locally to alternate winter site on ranch at (11) Stafford Lake, Hernando County, Florida.

MIGRATION COMPLETED in 19 days (5 flight days)

No. 6-01:

21 November: Began migration with sandhills from (12) Amundson Marsh, Jackson County/Shortville, Clark County, Wisconsin. Not tracked.

13 December: Arrived (13) cattle ranch southeast of Okahumpka, Lake County, Florida. Site of wintering migratory sandhill cranes and nonmigratory whooping cranes.

MIGRATION COMPLETED in 23 days (no. of flight days unknown)

No. 7-01:

Began migration (date unknown) from (14) vicinity of Theresa SWA, Washington County, Wisconsin. Not trackable.

8 November: Arrived (15) Whites Bend, Cordell Hull Lake, Jackson County, Tennessee, with sandhill cranes. Part of flight with no. 18-04.

10 November: Arrived by this date at (10) Hiwassee Wildlife Refuge, Meigs County, Tennessee.

MIGRATION AT EXTENDED STOP

No. 1-02:

2-7 November: Began migration with sandhills from (16) near Richland Junction, Kalamazoo/Barry Counties, Michigan, during this period. Not tracked.

7 November: Arrived (17) Muscatatuck NWR/Seymour area, Jackson County, Indiana. Exact site undetermined.

8 November: Departed (17). Arrived (10) Hiwassee Wildlife Refuge, Meigs County, Tennessee.

Nos. 1-02 and 6-03:

12 December: Departed (10). Not tracked.

23 December: Arrived by this date at (18) Fieser Dairy/Lake Woodruff NWR, Volusia County, Florida.

MIGRATION COMPLETED FOR NO. 1-02 in 46-51 days (no. of flight days unknown)

MIGRATION COMPLETED FOR NO. 6-03 in 46 days (no. of flight days unknown)

Nos. 3-02, 15-02, and 16-02:

21 November: Departed (19) Brandy Creek Marsh/North Tomah, Monroe County, Wisconsin. Not tracked.

25 November: Arrived (20) Beehunter Marsh WRP, Greene County, Indiana.

14 December: Departed (20). Arrived (21) Tidwell Creek/Cumberland River, Davidson County, Tennessee.

15 December: Departed (21). Arrived (22) near Salem Corner, Limestone County, Alabama.

23 December: No. 15-02 died in private waterfowl hunting area. Outcome of investigation pending. Nos. 3-02 and 16-02 remained (22) at least through this night.

28 December: Nos. 3-02 and 16-02 arrived at (8) Chassahowitzka NWR pensite, Citrus County, Florida.

29 December: Nos. 3-02 and 16-02 departed (8). Arrived (5) File Mile Ranch, Pasco, Florida.

MIGRATION COMPLETED FOR NOS. 3-02 AND 16-02 in 39 days (~7 flight days)

Nos. 5-02 and 6-03:

7 November: Departed (1) Site 1, Necedah NWR, Juneau County, Wisconsin. Arrived (23) west of Chebanse, Iroquois County, Illinois.

10 November: Arrived (10) Hiwassee Wildlife Refuge, Meigs County, Tennessee.

Nos. 5-02 and 18-04:

19 December: Departed (10). Arrived (24) northwest of Ashburn, Turner County, Georgia.

20 December: Departed (24). Arrived (25) Hixtown Swamp, Madison County, Florida.

2 January: Departed (25). Arrived (8) near Game Creek, St. Martins Marsh Aquatic Preserve, Citrus County, Florida.

3 January: Departed (8). Arrived ranch at Gowers Corner, Pasco County, Florida.

4 January: Moved locally to (26) ranch northeast of Gowers Corner, Pasco County, Florida.
MIGRATION COMPLETED in 59 days (7 flight days)

Nos. 9-02, 13-02, and 18-02:

21 November: Departed (1) near Site 2, Necedah NWR, Juneau County, Wisconsin. Not tracked.
25 November: Arrived (27) southeast of Stendel, Pike County, Indiana.
28 November: Departed (27). Arrived (28) southeast of Tims Ford Lake, Franklin County, Tennessee.
MIGRATION AT EXTENDED STOP

Nos. 11-02, 12-02, and 17-02:

11 December: Departed (1) Necedah Lake, Juneau County, Wisconsin. Arrived (23) west of Chebanse, Iroquois County, Illinois.
15 December: Arrived (8) Chassahowitzka NWR pensite, Citrus County, Florida.
26 December: Departed (8). Arrived (26) ranch northeast of Gowers Corner, Pasco County, Florida.
MIGRATION TO CHASSAHOWITZKA COMPLETED in 5 days (5 flight days)
MIGRATION TO FINAL WINTERING SITE COMPLETED in 16 days (6 flight days)

No. 14-02:

31 October: Departed (29) northwest of Lake Puckaway, Marquette County, Wisconsin. Arrived (30) near Helenville, Jefferson County; with staging sandhills.
7 November: Departed (30). Arrived (31) near Cagle's Mill Lake, Owen County, Indiana.
15 November (estimated): Arrived (8) Chassahowitzka NWR pensite.
25 November: Departed (8).
27 November: Found (32) ranch near Rutland, Sumter County, Florida.
MIGRATION FROM WISCONSIN TO CHASSAHOWITZKA COMPLETED in ~39 days (no. of flight days unknown)
MIGRATION TO FINAL WINTERING SITE COMPLETED in ~49 days (no. of flight days unknown)

Nos. 1-03, 5-03, 9-03, and 18-03:

7 November: Departed (33) northeast of Custer, Mason County, Michigan. Arrived (34) Killdeer Plains SWA, Wyandot County, Ohio.
11 November: Arrive (35) Saltpond Creek, Cape Romain NWR, Charleston County, South Carolina.
12 November: No. 5-02 killed by bobcat.
14 November: Nos. 1-03, 9-03, and 18-03 found (36) Tom Yawkey Wildlife Center Heritage Preserve, Georgetown County, South Carolina.
15 November: Departed (36). Arrived (37) Masonboro Island, New Hanover County, North Carolina.
16 November: Found (38) eastern Carteret County, North Carolina. Exact location undetermined.
17 November: Departed (38). Arrived (39) Hammocks Beach (approximate), Onslow County, North Carolina.
20 November: Arrived (40) northeast of Comfort/Trent River, Jones County, North Carolina.
MIGRATION AT EXTENDED STOP

Nos. 2-03 and 17-03:

17 October: Departed Bee Cut, Necedah NWR, Juneau County. Arrived (41) southwest of Red Cedar Lake, Jefferson County, Wisconsin.

No. 2-03:

24 October: Departed (41).
26 October: Found (42) northwest of Beaverville, Iroquois County, Illinois.
12 December: Departed from near (42). Not tracked.

No. 17-03:

7 November: Departed (41). Arrived (43) Lake Vermilion, Vermilion County, Illinois.
8 November: Departed (43). Arrived (44) Nolin Lake, Grayson/Edmonson Counties, Kentucky.
9 November: Departed (44). Arrived (45) near Belcher Crossroads, McCormick County, South Carolina.
10 November: Departed (45). Arrived (46) near Orangeburg, Orangeburg County, South Carolina.
14 November: Found (47) Gracefield Plantation, east of Walterboro, Colleton County, South Carolina.
MIGRATION AT EXTENDED STOP

Nos. 3-03, 12-03, and 16-03:

20 November: Departed (1) Sprague Pool, Necedah NWR, Juneau County, Wisconsin. Arrived (48) Goose Lake, south of Concord, Jefferson County, Wisconsin.
21 November: Departed (48). Arrived (49) Lake Calumet, Cook County, Illinois.
22 November: Departed (49). Arrived (50) southeast of Fish Lake, LaPorte County, Indiana.
22 December: PTT location (51) Sawneys Creek, Fairfield County, South Carolina.
25 December: Arrived at undetermined PTT location in northeastern Florida.
26 December: PTT location (52) Ashley Prairie, Putnam County, Florida.
27 December: Arrived (53) Hawthorn Prairie, Marion County, Florida.
2 January: Departed (53). Arrived (8) Chassahowitzka NWR pensite, Citrus County, Florida.
MIGRATION COMPLETED in 44 days (no. flight days unknown)

Nos. 4-03 and 11-03:

4 November: Departed (1) Canfield Pool, Necedah NWR, Juneau County, Wisconsin. Arrived (54) southeast of Custer Park, Will County, Illinois.
5 November: Departed (54). Arrived (55) White River, Indianapolis, Marion County, Indiana.
6 November: Departed (55). Arrived (56) near Shelbyville, Shelby County, Indiana.
7 November: Departed (56). Arrived (17) Muscatatuck NWR, Jackson County, Indiana.
8 November: Departed (17). Arrived (57) Lake Cumberland (approximate), Russell County, Kentucky.
9 November: Departed (57). Arrived (58) North Oconee River, south of Commerce, Jackson County, Georgia.
10 November: Departed (58). Arrived (59) near Davisboro, Washington County, Georgia.
14 November: Found (60) Jointer Creek, Glynn County, Georgia.
15 November: Departed (60). Arrived (61) St. Simons Island, Glynn County, Georgia.
16 November: Departed (61). Arrived (62) northeast of McIntosh, Liberty County, Georgia.
25 November: Departed (62) on or after this date.
18 December: Found (63) Donnelley WMA, ACE Basin, Colleton County, South Carolina.
MIGRATION AT EXTENDED STOP

Nos. 7-03 and 18-04:

7 November: Departed (1) Little Yellow River, south of Necedah NWR, Juneau County, Wisconsin.

No. 7-03:

7 November: Arrived (20) with sandhills near Marco, Greene County, Indiana.
9 November: Arrived (64) near Lewiston, Columbia County, Georgia.
10 November: Departed (64). Arrived (65) Bellville Point, McIntosh County, Georgia.
11 November: Departed (65). Arrived (66) Blackbeard Island, McIntosh County, Georgia.
14 November: Found (67) Ossabaw Island WMA, Chatham County, Georgia.
17 November: Found (68) Bull Island, Beaufort County, South Carolina.
MIGRATION AT EXTENDED STOP

No. 18-04:

7 November: Separated from no. 7-03 in flight. Arrived alone (69) South Fork Little Raccoon Creek, Parke County, Indiana.
8 November: Departed (69). Part of flight with no. 7-01, but separated before landing. Arrived alone (15) Whites Bend, Cordell Hull Lake, Jackson County, Tennessee.
10 November: Departed (15) with sandhills. Arrived (10) Hiwassee Wildlife Refuge, Meigs County, Tennessee. (See under Nos. 5-02 and 18-04 above for completion of migration.)

Nos. 10-03 and 13-03:

7 November: Departed (9) Georgeson Farms, Juneau County, Wisconsin. Arrived at undetermined location in Kankakee County, Illinois, southeast of (54).
13 November: Found (70) John C. Williams SWMA, southeast of Boston, Nelson County, Kentucky.
6-15 December: Departed (70) during this period. Not tracked.

HEALTH MANAGEMENT - 2004

WCEP Health Team: Barry Hartup (ICF), Julie Langenberg (WDNR), Kim Miller (USGS NWHC), Glenn Olsen (USGS PWRC), Marilyn Spalding (UF-Gainesville)

SUMMARY OF WHOOPING CRANE HEALTH MONITORING 2004

Mortality & Birds Withdrawn from WCEP

- 04-04: 23 April 2004, difficulty hatching, died 12 hours after hatching.
- 06-04: 11 December 2004, Gilchrist Co FL, euthanized after 48 hr illness (necropsy revealed EEE infection, enteritis, septicemia).
- 09-04: 10 May 2004, @ 9d upper bill injured; significant deviation from normal.
- 10-04: June 2004, female, genetically valuable was held back.
- 11-04: 23 July 2004, euthanized, leg rotation at proximal tarsometatarsus, chronic aspergillosis.
- 21-04: 17 June 2004, @12d, 107g, poor condition from an early age, bacterial sepsis of yolk sac with most of yolk material not absorbed, severe aspergillosis pneumonia.
- 22-04: August 10, 2004, fell in crate during return to Necedah following endoscopic retrieval of foreign body. Fractured femur and lacerated femoral artery.
- 19-03: Late July 2004, died in Oceana Co. MI, unknown, under investigation.
- 05-03: 12 or 13 November 2004, Cape Romaine NWR, SC, undetermined, bobcat predation suspected.
- 15-02: 23 December 2004, Limestone Co. AL, unknown, under investigation.

Morbidity

- Developmental wing and leg problems managed in at least 12 birds while at PWRC.
- 4 orthopedic problems following handling or procedures; 1 may have been complicated by mild myopathy but there is no diagnostic evidence to support this. 1 iatrogenic toe fracture.
- 2 insect-bite reactions, necessitating long-term anti-inflammatory and even antibiotic treatment.
- 4 cases of primary respiratory disease at PWRC (likely aspergillosis).
- Foreign bodies in three birds: 02-04, 16-04 and 22-04. Two resolved via endoscopy, one self-corrected.
- 2 unexplained cases of lameness, all resolved with treatment.
- 18-04 lost multiple primary feathers on both wings from unknown cause in mid-August. Feathers regrown by late October, the bird was reconditioned and released.
- Potential EEE-related illness in two or more cranes during ultralight migration – serology pending.

Recapture/Post-release Evaluations

- FL: 4-02, 09-02, 11-02, 14-02 and 18-02. Range of testing performed; all testing WNL.
- MI: 12-03 had aluminum can top removed. No other health check performed.
- WI: 01-01 (fecal only, not recapture), 02-01, 8-02, 17-02, 06-03. Various testing WNL.

Parasite Issues

- Deworming occurred weekly since beginning at PWRC. Gapeworm was not diagnosed at Necedah, though occasional wheezing was reported early on. Ascarid and Capillaria infections were diagnosed but did not appear persistent.
- Delivery failure of anthelmintics is a continuing concern as birds age and doses increase.
- Coccidial infections were diagnosed in several birds towards the end of migration.

Bacterial Disease Issues

- Non-pathogenic strains of Salmonella were detected in 2/16 birds (19-04, 20-04 both *S. westhampton*) at pre-shipment, and 2/16 on arrival (16-04, 22-04 both *S. lexington*). No birds were positive at pre-migration health check.

- Water testing from release sites shows reasonable levels of coliform bacteria; probably due to high precipitation this summer resulting in improved water flows at each pen site.

Viral Disease Issues

- Eastern Equine Encephalitis titers were negative at the PWRC pre-shipment exams; no vaccinations were performed this year due to lack of virus activity in WI and limited availability of a suitable vaccine. Morbidity (17-04 and others) and mortality (6-04) from EEE occurred in late migration probably from exposure in southern GA or northern FL. M. Spalding will provide more details as they become available.
- West Nile Virus vaccination was given to all chicks at PWRC, resulting in 3 potential seroconversions. Results from pre-migration testing show 2 seropositive birds with high titers likely due to natural virus exposure (06-04, 12-04).
- IBD testing at PWRC suggested 1 seroconversion (12-04). Results from pre-migration testing suggest 2 seroconversions (06-04, 19-04). No WCEP bird has been observed with disease linked to IBD exposure to date.

Florida Arrival Health Assessments and Overwinter Monitoring

- Marilyn Spalding will provide updates at the winter meeting.

HEALTH TEAM 2004 OBJECTIVES & PROGRESS REPORT

- Present an overview of WCEP Health Management at the Jan 2004 North American Veterinary Conference and publish the results of our program in the Proceedings of the North American Crane Workshop from Jan 2003. *NAVC done; NACW proceedings paper submitted.*
- Secure recommendations for future EEE and WNV vaccination from WCHAT and present at the Feb 2004 meeting. *WNV vaccination protocol implemented; EEE decision was based on low virus activity from human & veterinary surveillance in 2004 & lack of vaccine. 6-04 demonstrates difficulty in relying on seasonal change of mosquito populations in SE USA and the timing of migration. WCHAT will discuss various EEE strategies similar to WNV next month.*
- Work with WCHAT to update the whooping crane necropsy protocol, coordinate information across institutions and improve accessibility of findings relevant to WCEP. The structure of the database maintained at ICF needs to be reviewed. *Discussions have occurred re: necropsy protocol but needs final action; carcass inspection – NWHC will do all except MS will perform those recovered in Florida and nearby areas; the database at ICF has not changed.*
- Develop additional resources for the hospitalization and potential rehabilitation of injured WCEP cranes in WI and FL. In cooperation with the Whooping Crane Recovery Team and WCHAT, draft a set of guidelines for intervention and rehabilitation of ill or injured free-ranging whooping cranes. Also, initiate discussion on the appropriateness of releasing individuals that require weeks to months of rehabilitation where isolation protocols cannot be followed. *On-site hospital facility available at Necedah, OM pen needed for isolation in FL, otherwise facilities at UF and UW-Madison would be needed; no action on intervention/rehab guidelines, Kansas situation points out potential need; there is agreement that captive-reared whooping cranes brought in for extensive rehabilitation are not suitable release candidates.*
- Encourage the Whooping Crane Recovery Team to streamline the institutional review process in order to increase the number of facilities capable of taking non-releasable whooping cranes for display purposes. *Stated to WCRT. No specific action taken.*
- Work with Necedah staff to design an effective acute care facility for ill or injured WCEP cranes under isolation conditions. Guidelines for the staffing associated with nursing these cases must be decided as soon as possible. *Done.*
- Acknowledge the contribution of the network veterinarians' willingness to help in an email following spring 2004 migration, and recheck the listings prior to fall migration 2004. *Done.*

- Strive for no handling induced injuries during restraint for examinations, banding or relocation. A review of handling techniques should be conducted prior to the 2004 season with WCEP personnel. *See statistics above. Some handling guidelines are within the capture guidelines prepared for WCRT.*
- Initiate a discussion of the impact of the supplemental release plan on provision of health care to ICF FL non-migratory chicks and the WCEP ultralight cohort, and assess the challenges that three projects presents (available personnel, workload & priorities, bird movements and risks of cross-contamination). *Stated to WCRT. No specific action taken.*

HEALTH TEAM 2005 OBJECTIVES:

- We will work to keep the migration vet network list updated. The spread of the free-ranging flock may require additional contacts (NC/SC for instance, similar to MI this past summer). The participants were thanked via email in December.
- An EEE vaccination plan will be updated by WCHAT at the WCRT meetings next month. A new vaccine will need to be identified for use by the captive flocks and in any reintroduction projects where it is deemed necessary, but will require safety testing prior to use.
- The Health Team is in the process of detailing a health management plan for the supplemental release. Eventually we will detail all health management strategies at each stage into one master document.
- A set of capture guidelines will be made available for comment prior to the WCRT meetings where it is to be presented. These guidelines are intended to facilitate safe and efficacious capture of free-ranging whooping cranes in all projects, including WCEP.

Resource Development Committee

At the September, 2004 WCEP meetings the Budget Team was renamed the Resource Development Committee to more accurately reflect the roles and responsibilities of the committee.

The mission of the Resource Development Committee is to 1) develop resources to meet the project needs as determined by each partner and agreed to by the committee; 2) coordinate the development and tracking of resources and relate progress to budgeted needs; 3) coordinate communication among non-governmental partners to avoid duplicate grant request to the same potential donors.

Committee members include; Charlie Luthin, co-chair (NRFW), Bob Lange, co-chair (ICF), John Christian (FWS), Bob Russell (FWS), Beth Goodman (WDNR), Larry Wargowsky (FWS), Jim Kraus (FWS), Sarah Ellgen (NFWF), Donn Waage (NFWF), Peter Stangel (NFWF), John French (USGS), Heather Ray (OM), Geoff Dixon (OM), Rachel Levin (FWS).

BUDGET

The total budget for 2004 was \$1,785,015. Composition of major budget components is as follows:

Equipment	142,118
Travel	194,129
Salaries & Benefits	573,645
Outreach	314,540

At year-end most necessary funding requirements have been met. Cost for work to the hurricane damaged Chassahowitzka pens completed before the 2004 arrival has not been reported to the Resource Development Committee.

As we anticipate the fifth migration of whooping Cranes to Florida in 2005, it is expected that the total budget will continue to be in the \$1.7 to 1.8 million range. Equipment needs may be less; however, the anticipated supplemental release will add to the human resource needs. Additionally, the increasing numbers of adult migrating cranes will require additional monitoring resources as well.

The entire project would not exist without the generous support of our donors who have embraced the WCEP mission. The National Fish and Wildlife Foundation has provided substantial dollars for the benefit of several of the partners; Windway Corporation has provided numerous hours of aircraft and pilot time to track and monitor Whooping Crane activity. In 2004, Natural Resources Foundation of Wisconsin contributed \$43,000 for equipment and staffing needs of five WCEP partners.

A partial list of additional contributors includes:

- The Charlotte & Walter Kohler Trust
- Phillips 66
- Mead Witter Foundation
- Eagle Optics
- Spurlino Foundation
- Walter Alexander Foundation

We thank our many corporate, foundation and individual donors who are of critical importance to the success of this important conservation project.

We are also pleased to announce that in 2005 Orvis, Inc. has agreed to provide funding and significant advertising for the migration project in upcoming catalogs and on their web site.

NRF has submitted a pre-proposal for funding from National Fish & Wildlife Foundation for summer, 2005 to benefit three WCEP partners. Project support is requested for habitat research (ICF), development of the management plan (DNR), and for WCEP signage at Chassahowitzka NWR [Friends of Chass].

Among outstanding needs for 2005, above and beyond the familiar needs of WCEP partners are additional funds to support the supplemental release project at Necedah National Wildlife Refuge.

Bob Lange & Charlie Luthin
Co-chairs



Communications and Outreach Team Activities – 2004

Introduction

In the fourth year of the Whooping Crane Eastern Partnership, outreach remains a key to the project's success. The Communications and Outreach Team--comprising public affairs, outreach, environmental education, information and communications specialists representing all WCEP founding members and a number of other partners, including volunteers—is key to building support for the project through education, media relations and coordinated public outreach efforts.

The Communications and Outreach Team is responsible for and directs all aspects of external communications and public contact on behalf of the project. The WCEP partners' mandate to the team is to advance public understanding and continued support for the protection and restoration of whooping cranes and their habitat in eastern North America.

The partnership recognizes that a cohesive voice is critical to the project's success. In keeping with the mandate, the Communications and Outreach Team is responsible for developing and implementing specific procedures and protocols for dealing with all communications aspects of the project.

The 2004 WCEP Communications and Outreach Team was co-chaired by Joan Garland, education outreach specialist with the International Crane Foundation, and Rachel F. Levin, public affairs specialist with the U.S. Fish and Wildlife Service's Midwest Region.

Accomplishments for 2004

Web sites

The Internet continued to be an effective way to communicate up-to-date information to large numbers of stakeholders, news media, students and the general public. Available statistics show that WCEP-related Web sites received a combined total of more than 7 million visits in 2004, led by Journey North with 6.4 million hits. Data from the International Crane Foundation and USGS Patuxent Wildlife Research Center were incomplete or unavailable, but these two sites likely continued to attract a high number of interested Web surfers.

These WCEP-related Web sites received a combined total of 7,396,041 known hits during 2004:

- International Crane Foundation: www.savingcranes.org/ 76,000 visitors ^{††}
- Journey North: www.learner.org/jnorth/ 6,444,841 visitors
- Operation Migration: www.operationmigration.org/ 582,427 visitors
- WCEP site: www.bringbackthecranes.org/ 247,264 visitors
- USGS Patuxent Wildlife Research Center: whoopers.usgs.gov/ 45,509^{††}

^{††} Note: new ICF website launched 10/8/04 - No visitor data available prior to this date.

^{††} Note: 2003 figures provided as 2004 totals not available but presumed similar

Booths/Festivals

WCEP partners and volunteers attended festivals, fairs and conferences as far flung as Arizona. These events allow partners to reach large audiences through distribution of WCEP materials including brochures, posters, CDs and videos. Staffed exhibit booths reached a combined total of more than 30,000 people in 2004.

Major WCEP-sponsored booths and exhibits included:

Necedah Crane Festival, Necedah, Wisconsin. Attendance was approximately 3,000 people at this annual event, held in partnership with the Necedah Lions Club. WCEP partners represented at this festival included Operation Migration Inc., U.S. Fish and Wildlife Service, International Crane Foundation, USGS Patuxent Wildlife Research Center, Wisconsin Natural Resources Foundation and Necedah National Wildlife Refuge. More than 600 people participated in whooping crane bus tours of the refuge.

Speakers included:

George Archibald, International Crane Foundation
Laura Erickson, Journey North
Jim Harris, International Crane Foundation
Jane Duden, Journey North
Karen Hollingsworth, Wildlife Photographer
Joe Duff, Operation Migration
Rich King, Biologist/Necedah NWR

Farm Technology Days, Bloomer, Wisconsin. Approximately 2,000 people attended during this three day festival.

International Crane Foundation's Crane Fest, Baraboo, Wisconsin. Attendance was around 300 people.

Necedah NWR, Operation Migration Inc. and International Crane Foundation staff participated in the Town of Necedah parade, exhibiting the crane puppets and ultralights.



The WCEP float at the Town of Necedah parade.

Space Coast Birding and Wildlife Festival, Titusville, Florida: Several WCEP partners, including John Christian (FWS), John French (USGS) and Tom Stehn (FWS) led presentations and programs at this festival, which is always well attended.

Outreach booths at festivals in Georgia, Tennessee, Texas, Florida, Wisconsin, Arizona and Maryland reached an additional 26,000 people. These included:

- Aransas Whooping Crane Festival, Port Aransas, Texas
- Hiwassee Sandhill Crane Festival, Birchwood, Tennessee
- Willcox Sandhill Crane Festival, Willcox, Arizona
- Ducks Unlimited Great Outdoor Festival, Oshkosh, Wisconsin
- Colonial Coast Birding Festival, Jekyll Island, Georgia
- Patuxent Wildlife Festival, Laurel, Maryland

Team Accomplishments

The Outreach Team becomes the Communications and Outreach Team (COT): At the fall 2004 WCEP meeting, the Outreach Team discussed its name and function, renaming itself to better emphasize its expertise at various forms of communication (both internal and external). In keeping with the updates of the WCEP Partnership Guidance Document and team Roles and Responsibilities initiated in 2004, the COT refined its own functions, obligations and needs. The team is currently working on a series of communications protocols and procedures to serve as guidance for all team members and WCEP partners.

New members welcomed to Communications and Outreach Team: In an effort to broaden our internal communications or “inreach” efforts—which will ultimately benefit external communications and outreach—the Communications and Outreach Team welcomed several new participants, including outreach specialists from FWS field offices in the Southeast. These new participants jumped in and proved themselves invaluable members of the team by doing outreach to the media and the public in their local areas that complemented broader outreach efforts. State agency partners continued to be actively involved in outreach during the ultralight migration. Most flyway states sent our media alerts while the cranes were in their state, often reaching more media outlets than WCEP alerts, and ultimately boosting media and public interest in the project.

Reprint of the WCEP informational brochure “Bring Back the Cranes”: This updated brochure proved extremely effective as an outreach tool. After an initial 2003 print run of 25,000, the Communications and Outreach Team realized that its supply needed to be replenished. Another 2,500 were printed and quickly distributed to partners.

VIP visits to Necedah NWR: Members of Congress, Interior Department and Fish and Wildlife Service officials, movie producers and celebrities all visited Necedah National Wildlife Refuge and spent time touring and learning about WCEP. VIP visitors included media mogul Ted Turner, U.S. Congressman Ron Kind of Wisconsin, renowned wildlife photographer Karen Hollingsworth and Casey Stemler, special assistant to the FWS Director.

Outreach on #18-04, WCEP's first "one-by-one" released bird: In anticipation of interest in WCEP's first one-by-one or "supplemental release," the Communications and Outreach Team developed a series of questions and answers for use by team members in media interviews and public interaction.



Cranes 7-03 and 18-04 foraging with sandhills at Necedah NWR.

Media Relations

News media from as close as Necedah and Crystal River and as far away as India and New Zealand devoted page space, airtime and bandwidth to the Whooping Crane Eastern Partnership. Once again, media interest peaked in volume during the fall migration, with media on-site at many stopovers and reporters tracking the ultralight-led migration on a daily basis. Throughout the year, however, the partnership was spotlighted in regional, national and international news media, both print and broadcast.

The Communications and Outreach Team distributed nine news releases and media alerts in 2004.

Media highlights include:

- **"60 Minutes II":** The news magazine is producing a story to be aired in early 2005. Reporter Charlie Rose interviewed OM's Joe Duff and staff at the USGS Patuxent Wildlife Research Center. A "60 Minutes" film crew followed the Class of 2004 chicks as they were shipped from Patuxent to Necedah NWR and throughout their training.
- **BBC documentary "Flight School":** The BBC produced a documentary focusing on the conditioning of the chicks and their journey behind the ultralight aircraft. The program aired in the United States in April, prompting an outpouring of response from viewers and WCEP supporters (both negative and positive reactions).
- **KARE 11 TV of Minneapolis/St. Paul, Minn.,** featured the project during its 15-minute Sunday night "KARE 11 Extra" segment.
- Planning for a large-screen-format IMAX film on the project continued. Representatives from Minnesota Science Museum, Watchable Wildlife, WCEP and the National Wildlife Refuge System met at Necedah NWR in July, along with a film producer who scouted potential locations for filming.

2004 Media Coverage

The following represent media inquiries and all *known* media coverage for January-December, 2004. In most cases it does not include coverage where WCEP was not the focus of the story. WCEP, and the individual partners' work with the project, was mentioned (by name and indirectly) in many more articles about whooping cranes, ultralights and endangered species conservation.

Key: **Bold text** indicates the number of stories produced or used by the media outlet (if more than one story).

"AP" after an entry indicates that media outlet used one or more Associated Press articles.

ABC News 4 (Columbia, S.C.)
ABCNews.com **x2**
Akron (Ohio) Beacon Journal AP
AL.com **x2**
Arizona Republic AP
Associated Press
Atlanta Journal-Constitution
Atlantic CoastWatch
AVWeb (aviation publication) **x2**
Banner Journal (Black River, Wis.) **x3**
Baraboo News Republic **x11**
Bay News 9 TV Tampa
Beaufort (S.C.) Gazette **x2**
The Bee (Phillips, Wis.)
Biloxi (Miss.) Sun Herald AP
Boston Globe AP
Bradenton Herald AP **x4**
Burlington County (Pa.) Times AP **x2**
David Brian Butvill, freelance writer
Camp Douglas (Wis.) Hustler
CANOE. Ca (Canada) AP
The Capital Times, Madison, Wis. **x4**
Carolina Channel (Greenville, S.C.) AP
Cell Signalling Technologies
Centre Daily Times (State College, Penn.) AP
Charlotte (N.C.) News and Observer AP
Chattanooga (Tenn.) **x2**
Chicago Sun Times **x4**
Chicago Tribune **x2**
Citrus Chronicle (Crystal River, Fla.) **x2**
Community Press, Ottawa, Canada
The Companion (Juneau Cty., Wis.)
The County Line (Wis.)
Daily Planet—Canada
Daily Standard, Celina, Ohio
Daytona Beach News-Journal AP **x2**
Decatur (Ala.) Daily **x2**
Defenders magazine (Defenders of Wildlife)
Detroit Free Press **x3**
Duluth (Minn.) News Tribune AP **x8**
Evansville (Wis.) Review
Express (Washington, D.C.) AP
Fish and Wildlife News (USFWS)
Fort Wayne (Ind.) Journal Gazette/News-Sentinel **x3**
Fox News Channel
Gainesville Sun AP
Grand Forks (N.D.) Herald AP **x2**
Great Lakes Radio Consortium
Green Bay (Wis.) Press Gazette AP
Guardian (Manchester, UK)
Herald-Tribune (Sarasota, Fla.) AP **x2**
Homosassa (Fla.) Beacon **x12**
Houston Chronicle
Indian Express (Bombay, India)
Indianapolis Star **x4**
Island Packet (Hilton Head, S.C.)
Judith E. Davidson (freelancer)
Kalamazoo (Mich.) Gazette
Kansas City (Mo.) Star AP **x2**
KARE 11 TV Minneapolis, Minn.
Knoxville (Tenn.) News
LaCrosse (Wis.) Tribune **x8**
Lafayette (Ind.) Journal and Courier **x3**
Lakeland (Fla.) Ledger AP **x2**
Ledger-Enquirer (Columbus, Ga.)
Lexington (Ky.) Herald Leader AP
Living Bird Magazine (Cornell Laboratory of Ornithology)
Los Angeles Daily News AP
Los Angeles Times AP
Macon (Ga.) Telegraph **x4**
Mad Dog and Merrill radio show (WHBY, Appleton, Wis.)
Magnum radio (Tomah, Wis.) **x3**
Marshfield (Wis.) News Herald
Maryland Public Television
Miami Herald AP **x5**
Michigan Public Radio
Milwaukee Journal Sentinel **x5**
MLive.com (Michigan media) **x3**
Monroe (Wis.) Times

Monroe County Democrat (Sparta, Wis.) **x2**
Monroeville (Ind.) News
Monterey (Calif.) Herald AP
Mooresville/Decatur (Ind.) Times **x2**
Myrtle Beach (S.C.) Sun News AP **x2**
Naples (Fla.) Daily News AP
National Geographic magazine
National Public Radio
National Wildlife magazine (NWF)
NationalGeographic.com
NBC 5 TV (Chicago)
New York Times **x3**
Newkerala.com (India)
News Channel 4, Jacksonville, Fla. AP
Newschannel KATC 3 (Lafayette, La.) AP
Newsday (New York City) AP **x2**
News-Gazette (Champaign, Ill.)
Orvis Group
Palm Beach Post
Peoria (Ill.) Journal-Star **x3**
Philadelphia Inquirer AP
Pilot-Independent (Walker, Minn.)
Post and Courier (Charleston, S.C.) **x3**
Post-Crescent (Appleton, Wis.) **x2**
Quad Cities Times (Davenport, Iowa) AP
Rail Communities Messenger **x16**
Raleigh (N.C.) News and Observer AP
Record-Eagle (Traverse City, Mich.)
Rednova News (Texas)
Reporter-Times (Martinsville, Ind.)
The Repository (Canton, Ohio) AP
Rose Tree Productions (Rome, Ga.)
St. Paul (Minn.) Pioneer Press **x6**
St. Petersburg Times **x17**
San Jose Mercury News AP **x4**
San Luis Obispo (Calif.) Tribune AP **x2**
Scholastic News
Seattle Post-Intelligencer AP **x2**
Seattle Times **x2**
South Bend (Ind.) Tribune **x3**
Star News (Wilmington, N.C.) AP
Star Tribune (Minneapolis, Minn.) AP
Star-Times (Juneau County, Wis.) **x17**
The State (Columbia, S.C.)
News AP **x2**

Steven Low Company (IMAX producer)
Stevens Point (Wis.) Journal **x2**
Tallahassee (Fla.) Democrat AP **x3**
Tampa Tribune **x9**
Times Leader (Wilkes-Barre, Pa.) AP **x2**
TimesDaily (Florence, Ala.) AP
Times-Georgian (Carrollton, Ga.)
Times-Picayune (New Orleans) AP **x2**
Times-Press (Streator, Ill.)
Toledo Blade
Tomah (Wis.) Journal **x4**
Tomah (Wis.) Monitor-Herald
Trail Communities (Wis.) Messenger **x5**
USA Today **x3**
The View (Stevens Point, Wis.)
WAGA Fox 5 (Atlanta)
Washington Post AP
Washington Times
Wausau (Wis.) Channel 7 News
WCPO.com (Cincinnati, Ohio)
WDEF TV News 12 (Chattanooga, Tenn.)
The Weather Channel
Weldon Owen Education (Auckland, NZ)
WESH TV Channel 2, Orlando, Fla. **x2**
WFDL radio (Fond du Lac, Wis.)
WIBC – Network Indiana Radio
WGN radio (Chicago)
WGOW radio (Chattanooga, Tenn.)
Wichita (Kan.) Eagle AP
Wildlife magazine (Canadian Wildlife Federation)
WIS TV Columbia, S.C. AP
Wisconsin Public Radio **x6**
Wisconsin Rapids Daily Tribune **x12**
Wisconsin State Journal (Madison, Wis.) **x2**
Wisconsin Trails magazine
Worcester (Mass.) Telegram and Gazette AP
WRCB TV (Chattanooga, Tenn.)
WRGA radio (Rome, Ga.)
WRPQ radio (Baraboo, Wis.) **x2**
WSPT radio (Portage, Wis.)
WTTS radio (Indianapolis, Ind.)
WVLT TV (Knoxville, Tenn.)
Yahoo

Environmental Education

Environmental education accomplishments in 2004 involved the continued arrangement with Journey North to extend educational outreach efforts into schools throughout North America. Journey North is an Internet-based education project that links students across North America to track wildlife migration and seasonal change. Now in its 12th year, Journey North reaches more than 400,000 students in 11,000 classrooms. It is the nation's largest real-time, "citizen science" project specifically for children and its work has been featured on the NBC, ABC and CBS national news, USA Today, the Washington Post, the Boston Globe, and other publications in the U.S., Canada and Mexico. Through Journey North's website, students and teachers track the WCEP cranes' status and general locations during the fall and spring migrations.

- In 2004 the Communications and Outreach Team contacted registered Journey North teachers in the southern flyway states prior to migration. The teachers were informed of WCEP's educational offerings, including the opportunity to have a member of WCEP present a program at their school. Through these contacts, we were able to reach more schools during the migration. A member of the Communications and Outreach Team accompanied the migration during the southern half and provided education programs to these schools.
- WCEP partners provided environmental education programs to adults and children throughout the eastern flyway and other states. Programs were given during migration and throughout the year to schools, universities, conservation and birding clubs, civic organizations, professional conferences, home school groups, government agency staff, and museum visitors.



WCEP outreach coordinator Joan Garland gives a classroom presentation.

- Environmental education outreach programs in 2004 reached more than 13,000 people in 15 states:

State	# of People
WI	5,468
IL	762
IN	223
KY	767
TN	2,074
GA	256
FL	2,268
AZ	75
IA	50
MD	205
MN	70
NE	150
NJ	26
NV	125
TX	680
TOTAL	13,199

- Visitors to the International Crane Foundation and the Necedah National Wildlife Refuge received WCEP education programs included with their tour.
 - Programs at the International Crane Foundation reached 24,877 visitors.
 - Programs at Necedah NWR reached approximately 2,940 people.
- Wisconsin's Wyalusing State Park, located at the confluence of the Wisconsin and Mississippi Rivers, educated more than 240 campers throughout the year with whooping crane presentations by the DNR natural resource educator.



Students display their whooping crane artwork after a classroom presentation on WCEP.

- Approximately 250 people witnessed the ultralight migration departure on October 10 at Necedah NWR. Supporters watched from a different site than in the past, gathering at “the bend in the road” between the refuge office and town on 20th Street West / Grand Dyke Road. The “bend in the road” provided excellent viewing of the ultralights and the birds for the visitors, media and project staff.

About 150 spectators observed the cranes and ultralights as they left Muscatatuck NWR in Indiana on November 13.



Muscatatuck NWR flyover



The faithful gather in the early morning for the arrival flyover in Crystal River.

- Though the cranes and planes were expected to arrive in Chassahowitzka NWR on a Wednesday—and public announcements were made to that effect—weather conditions delayed the arrival until the following Sunday. Despite the postponements, some 1,500 dedicated people crowded the field in front of the Crystal River Mall to watch the flyover. Many stayed to hear an informative talk and project summary by WCEP partners from Chassahowitzka National Wildlife Refuge, Operation Migration, International Crane Foundation, and Friends of the Chassahowitzka National Wildlife Refuge. Volunteers from Chassahowitzka NWR, Friends of the Chassahowitzka National Wildlife Refuge, and the Citrus County Chapter of the Audubon Society volunteered their time to coordinate this event.

Recognition and Awards

The nine founding member agencies and non-profit organizations that comprise the Whooping Crane Eastern Partnership received an Honor Award from the Whooping Crane Conservation Association (WCCA) for their contributions to safeguard the Whooping crane. The award was presented at the annual meeting of the WCCA, held in Titusville, Florida on November 19, 2004.



Thank you notes written by Florida students after a WCEP presentation.

