

Whooping Crane Eastern Partnership

2013 Condensed Annual Report



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PREFACE

The Whooping Crane Eastern Partnership (WCEP) enters its 14th year of work to restore Whooping Cranes to eastern North America this coming season. We appear to be on the cusp for good things to come, but many challenges remain. This past year marked the completion of a structured decision making process within WCEP to help update our existing 5-year strategic plan, address ongoing questions, and chart a course for successful reintroduction of a self-sustaining population. Much of this process benefitted from excellent work by WCEP's operational teams and leadership and is reflected in plans for 2014.

Our research team, through painstaking field work and detailed analysis over the past three years, has confirmed that parasitic black flies are the leading cause of nesting failures of Whooping Cranes in central Wisconsin. In response, partners at the Necedah NWR are developing a nest management plan to interrupt Whooping Cranes before black fly emergence and incite the cranes to re-nest at times with fewer flies on the landscape. To date, all previous nests that fledged chicks resulted from the pair's second nesting attempt. We believe this management effort will increase hatching success for many of the pairs remaining in this region, and may also provide additional fertile eggs for use by WCEP, or in other Whooping Crane recovery efforts elsewhere.

In concert with these efforts, since 2011 we have pursued a strategy of releases of captive-reared cranes in east-central Wisconsin at the Horicon NWR and White River Marsh SWA to improve initial nesting success. Whooping Cranes that were released in these areas should begin to express nesting behavior in 2014. Our monitoring team will be engaged in tracking this effort closely this year. Our rearing team will again coordinate the captive upbringing and release of Whooping Cranes with ultralight aircraft and by direct release in the fall to augment the presence of birds in east-central Wisconsin. Lastly, we will continue with a valuable new experiment on release of crane-reared juveniles after the initial release of four birds in 2013 at Necedah NWR, and successful social integration and migration of two of them. We hope that this technique will result in acceptable assimilation rates to be useful in the future.

Restoring extirpated wildlife populations to their former range is extremely complex and fraught with challenges, none more so than the loss of our reintroduced Whooping Cranes to shootings by vandals. These tragic deaths are needless. They rob all of the partners, our supporters, and the public, of a piece of our collective natural heritage. WCEP will continue to place great effort at pursuing outreach activities and collaboration with other organizations to prevent these occurrences, and to seek applicable remediation and restitution from convictions.

Cranes are in their own category - no crane reintroduction has ever been successful. Nobody said this was going to be easy – but we think it can be done. We need to keep making steps in the right direction. As the Guidance Team co-chairs, we speak on behalf of the project leadership team in expressing our sincere gratitude for the sacrifices you all make for Whooping Crane restoration. We have come a long way since 2001. If we focus on the future and the areas where improvements are needed, we will be closer to our goal of establishing a self-sustaining flock of Whooping Cranes in eastern North America.

Whooping Crane Eastern Partnership founding members are the International Crane Foundation, Operation Migration USA Inc., Wisconsin Department of Natural Resources, U.S. Fish and Wildlife Service, the U.S. Geological Survey’s Patuxent Wildlife Research Center and National Wildlife Health Center, the National Fish and Wildlife Foundation, the Natural Resources Foundation of Wisconsin and the International Whooping Crane Recovery Team.

Guidance Team: Bill Brooks, U.S. Fish and Wildlife Service; Joe Duff, Operation Migration; Pete Fasbender, U.S. Fish and Wildlife Service; John French, USGS Patuxent Wildlife Research Center; Barry Hartup, International Crane Foundation; Davin Lopez, Wisconsin Department of Natural Resources; Doug Staller, Necedah National Wildlife Refuge

OPERATIONS TEAM

Each WCEP operational team has a team chair or co-chairs. These team leaders make up the Operations Team and include: Operations Team Chair: Billy Brooks – USFWS; Rearing and Release Team Chair: Terry Peacock – USFWS; Monitoring and Management Team Chairs: Davin Lopez - WI DNR and Anne Lacy – ICF; Research and Science Team Chairs: Jeb Barzen – ICF and Sarah Converse – USGS/PWRC; Communications and Outreach Chairs: Joan Garland – ICF and Heather Ray – OM.

Project decisions that cannot be made within a team or between teams are made by the Operations Team. The Operations Team Chair updates the Guidance Team on the project needs, operations and decisions. If the Operations Team is unable to come to agreement on a decision that involves multiple teams, they seek the support of the Guidance Team. In 2013, the Operations Team 2013 accomplishments include:

Monthly conference calls to discuss project operations held on the third Tuesday of each month except in February; summary notes of the call are posted to the WCEP Wiki; 2013 call dates: 1/13, 3/19, 4/22, 5/21, 6/18, 7/16, 8/20, 9/17, 10/31, 11/19 and 12/16.

Planned and facilitated the WCEP Annual Meeting on February 13th to report on 2012 accomplishments. The meeting was held as a webinar. The webinar format allowed for reduced travel costs and larger participation from partnership as participants were able to attend via the internet from their work locations around the country.

2013 WCEP Annual Report was drafted by Operational Teams; compiled by the Communications and Outreach Team; reviewed and edited by the Operations Team and Guidance Team; finalized and posted on the BringBacktheCranes.org website in February.

2013 work plans and budgets were finalized in January 2013. Drafting work plans for 2014 work plans were initiated in December 2013.

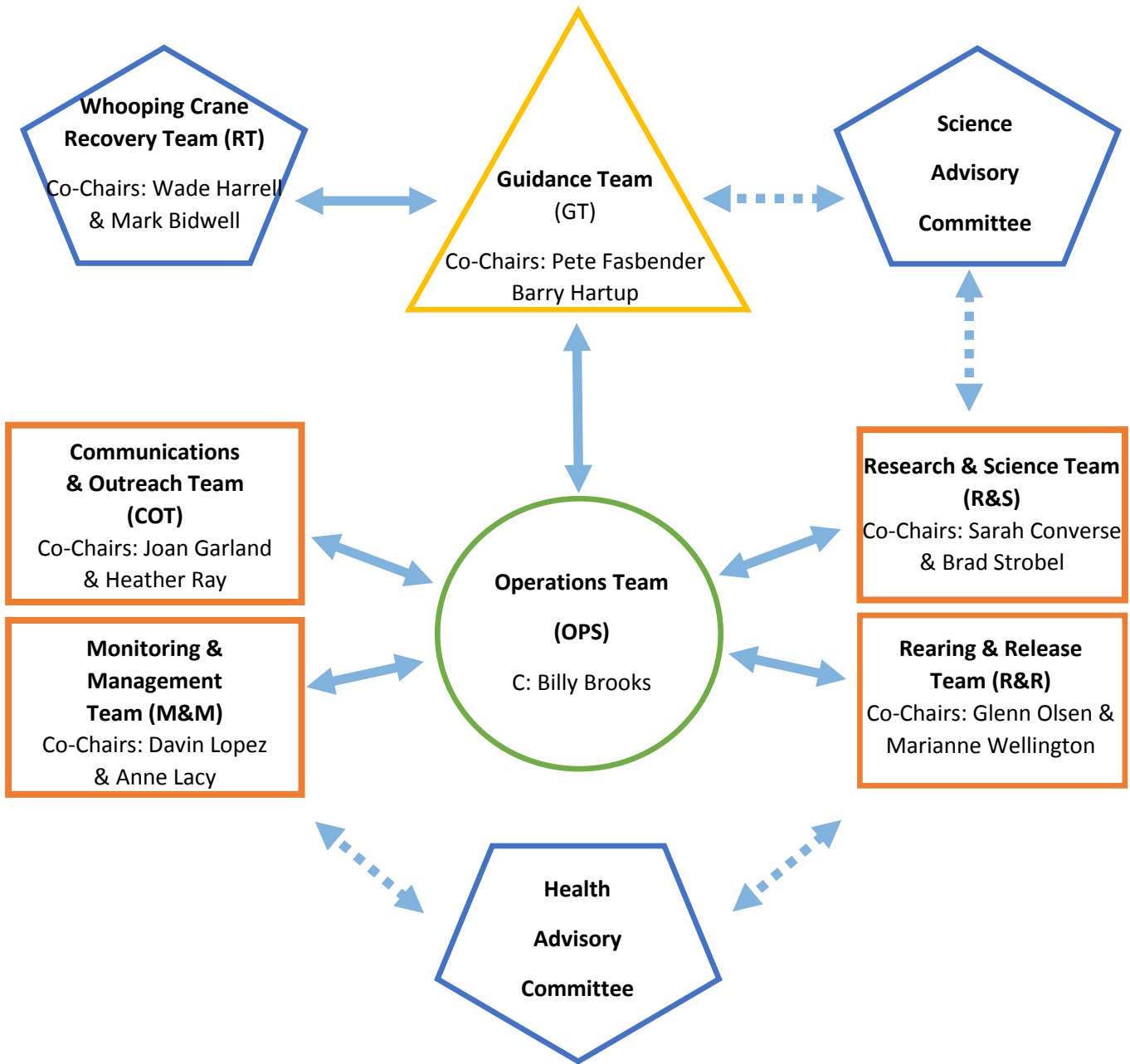
Operations Team provided a recommendation to the Guidance Team to include a Wisconsin DNR land manager on the Guidance Team in July 2013.

Operations Team concurred with Monitoring and Management Team Decision to use Teflon harness for experimental backpack transmitter attachment in August 2013.

In 2012, the WCEP Guidance Team chose to use a Structured Decision Making process to help revise the existing 5-year strategic plan. The Operations Team, along with the Guidance Team, formed the core of the participants and the initial workshop was held 20-24 August 2012. This resulted in the identification of 2 decision problems, the large-scale reintroduction strategy and management to address nesting failure. The resolution of the second decision problem was implemented beginning in the 2013 nesting season.

Additional work continued on the first decision problem in 2013 and culminated in a second meeting in Necedah, Wisconsin, 27-29 August 2013 to discuss results of modeling and negotiate tradeoffs amongst multiple objectives. The notes and final reports from the conference calls and workshops are being used by the Guidance Team to develop the future course of the project.

WCEP Organizational Structure



Note: Solid arrows represent decision-making and advisory pathways. Dashed arrows represent strictly advisory pathways.

REARING & RELEASE TEAM

Releases continued in the Wisconsin Rectangle in 2013. The number of chicks available for release was slightly increased this year due to eggs taken from Necedah. This year the R&R Team and WCEP decided to conduct the parent rearing experiment. The 5 eggs allocated to the parent rearing experiment were in addition to the 8 chicks in the ultralight program and the 9 chicks in the direct autumn release program. A summary of each release method is included below.

Ultralight-led Migration

Early imprinting:

Between May 14 and May 19, 2013, eight Whooping crane chicks were hatched at Patuxent Wildlife Research Center. All eight were the result of eggs collected from abandoned nests at Necedah NWR. The birds were imprinted on the costumed handlers and conditioned to follow an aircraft provided by Operation Migration. (See Patuxent WRC for details of training) Due to this narrow age range, all the birds were socialized into one cohort. At a mean age of 48 days, the birds were transported in custom built containers by private aircraft provided Windway Capital courtesy of Terry Kohler.

Summer conditioning:

The birds arrived at the White River Marsh State Wildlife Area in Wisconsin on July 9, 2013 and were housed at the existing facilities including a dry pen with a visual barrier and the wet pen for night roosting. The birds spent a total of 85 days at White River (12 year mean 101.4 days). They had access to water roosting on 83 nights (12 year mean 90.5 days). The weather allowed us to train them with the aircraft on 52 days (12 year mean 58 days). The birds fledged on August 9, 2013 at an average age of 85 days.

Migration:

Although we targeted a much earlier departure date, the 2013 migration did not begin until October 2. Once the birds moved to the first stopover, we experienced another extended weather delay of eleven days. That caused a number of drop outs on the northern end of the migration. As a result of poor weather, this was the second longest migration taking 96 days compared to the 57 days it took to complete the migration in 2012.

Despite long weather delays and cold temperatures, all eight birds assigned to the aircraft led method and transported to Wisconsin in July, survived to reach the wintering grounds.

Wintering:

The decision to winter all the birds at St Marks NWR this year was made by the refuge managers and the WCEP Rearing and Release Team. The migration ended on January 5, 2014. All eight birds made the 45 minute flight from the last stopover in Leon County, FL and landed at the pen site. This enclosure covers an area of approximately 4 acres (1 hectare) including two ponds of brackish water and is not top netted.

The birds were kept in a smaller top netted pen built inside the release pen until they underwent a veterinary examination were fitted with permanent marking bands and radio tracking devices. That

procedure was completed on January 16 and the birds were released on January 21, 2014. We are very grateful for the assistance of Disney’s Animal Kingdom whose veterinary team provided the expertise to examine the birds. Our friends at Disney also assist with the winter monitoring.

Direct Autumn Release (method of releasing chicks near other cranes in the fall)

The Modified Direct Autumn Release Project began raising crane chicks at the International Crane Foundation (ICF), Baraboo, WI in 2011, transferring the birds to Necedah National Wildlife Refuge where they fledged, and moving them to Horicon National Wildlife Refuge where the chicks (ages 82-107 days) were allowed to fly freely and were released in October. After two years of promising results where the yearling birds returned closer in proximity to Horicon than Necedah NWR, the 2013 cohort was hatched and reared at ICF through fledging and then moved to a temporary pen on the Horicon. We met our goals of moving the group of chicks to Horicon within a similar age ranges as the chicks in 2011 & 2012.

Age of chicks when moved to Horicon NWR			
Year	Number of chicks	Age range of chicks in days	Average age
2011	8	82-107	96
2012	7	86-107	98
2013	9	82-102	96

The Horicon holding pen was in the same vicinity used in 2011 when 8 chicks were released. The chicks were banded in late September and released October 24th. Interactions between chicks, costumes and wildlife were similar to previous years though each year provides new challenges and nuances which will be addressed later. Because the previous years’ released birds left Horicon within a week after release (2011 birds left within a week & 2012 birds left the morning after release), the 2013 chicks were purposely released between cold fronts in hopes to keep the chicks near Horicon longer.

In order to follow the protocol of releasing the chicks near adult whooping cranes, a release site on the southeastern side of the Horicon NWR was selected. Radio signals of adult whooping cranes 16-11 and 18-11 indicated the adults were using the southern portion of the main pool, a fair distance from the sandhill roost where the 2011-12 chicks had been released. The release site was chosen where the chicks would be able to see and hear the adult whooping cranes and tens to hundreds of sandhills fly over. Although a different release site was selected, the method and timing of release was similar to previous years as was the chicks’ behavior. All chicks flew large circles post release, trying to get their bearings. A group of chicks made it back to an abandoned pen that night. Over the next several days the chicks remaining at the release site, left that area to either join the other chicks or return to the familiar area around the holding pen.

Within a few days all 9 chicks were back together and although they would split up, interact or follow sandhills briefly or overnight, they were often observed as a large group. The chicks roosted on the refuge and foraged in the fields similar to the wild sandhills and adult whooping cranes. The chicks were observed interacting with 16-11 and also with the captive parent reared chick, which flew to Horicon for the day before flying north again. Overall the chicks' behaviors were within normal limits: flying off roost and foraging in the corn fields, returning to the marsh and foraging or exploring various areas and for the most part roosting on the refuge until weather conditions no longer provided safe roosting areas. The chicks roosted in frozen cornfields as well as the frozen marsh. Even though several good migration opportunities occurred, the chicks' basic needs were met. They had plenty of food (field corn), water (a pond kept partially open behind a house near the Refuge), and a social group.

Migration:

No. 57-13 began migration from the Horicon NWR, Dodge County, WI, on 15-17 November. He was reported in Meigs County, Tennessee on the evening of 20 November and remains in the area.

Nos. 50, 51, and 54-13 began migration from the Horicon NWR, Dodge County, WI, on 11 December. They were detected in flight in Ogle County, Illinois, later that day and had arrived in Mason County, Illinois, by the night of 12 December. They were observed together at this location during an aerial survey on 13 December. Satellite readings from no. 54-13 indicated she was in the area through at January 9.

Mortality:

Four birds died prior to the group migrating on December 11.

The remains of Direct Autumn Release juvenile male no. 53-13 were discovered on the Horicon National Wildlife Refuge on 13 November. Death had occurred the previous night. Cause of death was predation.

The remains of the juvenile female no. 56-13 were discovered on private property near the Horicon National Wildlife Refuge, Dodge County, Wisconsin, on 29 November. Death likely occurred 28/29 November. Cause of death was trauma (impact or predatory).

The radio transmitter and metal federal leg band of Direct Autumn Release juvenile female no. 52-13 were recovered on the Horicon National Wildlife Refuge on 4 December. Death likely occurred on 30 November or 1 December. Cause of death pending; predation suspected.

The fully intact carcass of Direct Autumn Release juvenile male no. 55-13 was recovered on private property near the Horicon National Wildlife Refuge on 7 December. Death had occurred shortly before collection. Cause of death was acute fungal pneumonia, perhaps from foraging in contaminated silage.

More unfortunate news of the discovery of the deaths of 2 of the 3 birds that migrated to Illinois was reported mid-January. Male # 50-13 and female 51-13 were found near the Illinois River south of Peoria. No signals were heard for 54-13 in the vicinity and no PTT readings have been received.

Parent-Rearing (experimental research release)

In 2013 we were able to begin the parent-rearing research. We received 5 eggs for the parent-rearing research project at USGS Patuxent Wildlife Research Center, Laurel, Maryland. All 5 eggs hatched and we were able to rear 4 chicks (80%) for release (Figure 1). This rearing success rate is similar to the overall success rate over the last decade.

The parent-reared (PR) chicks hatched between 2 and 5 June 2013. Other than the one mortality from an accident on 8 July, no unusual problems were encountered. All chicks received vaccinations for West Nile virus and eastern encephalitis virus on 17 July and 14 August. A final comprehensive health examination was done on 5 September. At that time all 4 remaining chicks were tested for Salmonellosis and found negative. Routine complete blood counts and serum chemistries were within normal limits for that age group. No external or internal parasites were identified. All PR chicks were shipped to Necedah National Wildlife Refuge on 19 September on a flight donated by Windway Corporation.

During the PR chicks' stay at Patuxent, daily behavioral observations were made, using techniques formerly applied in our study of the differences between parent-reared sandhill crane chicks and costume raised whooping crane chicks. In 2013 we used the costume raised Louisiana whooping crane chicks as our comparison group, as the WCEP costume raised ultralight chicks were almost a month older than the PR whooping crane chicks. We intend to report these results at the next North American Crane Workshop in April 2014.

After arrival at Necedah NWR, the PR chicks were held one night together at site 3 (the former Direct Autumn Release pen, Figure 2), and then banded the next day. Each chick received colored leg bands with a conventional vhf radio transmitter on one leg and a PTT (satellite radio) on the other leg. In addition, each chick had distinct color banding of the transmitter leg bands and an aluminum Bird Banding Laboratory band above the foot. After banding, 3 of the chicks were transported to separate sites on the refuge where temporary pens had been created. At least one adult whooping crane pair was known to use the area surrounding all 4 temporary pen sites.

The pen sites were visited several times daily and checked for chick behavior and adult crane presence and behavior. In addition, all sites had remote cameras that recorded chicks and a limited field of view around the pen during daylight hours. Adult pairs of whooping cranes visited all chick pen sites on numerous occasions.

At 0600 hours on 23 September, we opened one wall of the temporary pen at site 1 and immediately the PR chick flew out and entered a low area about 50 m from the pen site. The adults that frequented this pen site came back within 10 minutes and appeared to be searching for the chick, locating the chick shortly afterwards. After that, the PR chick (24-13) was consistently seen with this pair of adult birds (2-04 and 8-09) at Necedah (Figure 3), at a staging area on the Wisconsin River near Baraboo, and finally on the wintering grounds for these adult whooping cranes in Hopkins County, Kentucky.

Over the next two days, 24-25 September, we released the other 3 PR whooping crane chicks. Chick 22-13 stayed at site 3 for several days, but despite being observed within 10 m of the resident adults, was never accepted by the adults, though no aggression was seen. Eventually the chick left the site 3 area and briefly associated with the site 1 birds for one morning. The chick was next seen several miles northeast of the refuge on a cranberry farm and associated marshes. There were sandhill cranes and a pair of whooping cranes there. Eventually the chick migrated east to the area used by the ultralight aircraft trained whooping cranes around Berlin, Wisconsin. The chick briefly visited the DAR area at Horicon NWR, and then migrated to the Kankakee River bottomlands in northern Indiana. This is a known staging area for sandhill cranes and at least some of the EMP whooping cranes. Here the chick was seen frequently in association with 4 adult whooping cranes (identities unknown). Eventually, during a cold spell with northerly winds, the chick migrated in one day from northern Indiana to Meigs County, Tennessee. Here the chick has been seen with a pair of EMP whooping cranes on the Hiwassee and Moon River state lands and the Armstrong Ferry Recreation Area.

Chick 21-13 was released from a site in the central part of the Necedah National Wildlife Refuge. In the pen the chick was visited numerous times by one, or two pairs of adults. After release the chick was seen in association with two different pairs of adult whooping cranes, but never for an extended period of time. No aggression by the adults was ever observed. Eventually, this chick moved several miles north, still on the refuge, but it was hit by a vehicle and killed on 2 October. Chick 20-13 was released from site 5 and associated with 9-05 and 35-09 and an unbanded pair of sandhill cranes that stayed near the adult whooping cranes. This chick was killed by a canid predator on the adults' territory in mid-October.

The PR research project met expectations this year. We introduced 4 PR whooping crane chicks as planned, observed chicks form temporary and longer-term social bonds with adult pairs of whooping cranes, and had 2 PR chicks successfully migrate to wintering areas.

The following individuals have substantially helped with this project in 2013

From Patuxent: Glenn Olsen and Sarah Converse, Co-investigators; John French, Branch Chief; Jane Chandler and Robert Doyle, lead caretakers for this project; Sharon Peregoy, biological technician Barbara Clauss, biological technician; Brian Clauss, biological technician; Charles Shafer, biological technician and chief helper with remote cameras; Carlyn Caldwell, veterinary technician; Anna Jiang, University of Maryland; Mary Ashley, 4th year veterinary student; Anne Harshbarger, Glenelg High School

From Necedah National Wildlife Refuge: Doug Staller, Refuge Manager; Brad Strobel, biologist; Richard Urbanek, biologist; The entire refuge staff helped with various details.

From International Crane Foundation: Eva Szyszkoski for help banding, and then monitoring cranes on migration; Anne Lacy and others for monitoring 24-13 and adults when they were in the Baraboo area Marianne Wellington and the DAR staff for watching 22-13 at Horicon.

MONITORING AND MANAGEMENT TEAM

This report documents the biology of the whooping cranes in the reintroduced eastern migratory population during the calendar year of 2013.

Winter 2012/2013

Maximum size of the eastern migratory population through the end of December 2012 was 114 birds (58 males and 56 females). Estimated distribution included 42 whooping cranes in Indiana, 16 in Florida, 16 in Alabama, 11 in Tennessee, eight in Illinois, three in Kentucky, three in Georgia, nine at unknown locations, two not recently reported, and four long term missing. The total in Florida included five recently-released ultralight-led juveniles. This total does not include a suspected, but unconfirmed, mortality.

Spring Migration 2013

Spring migration in 2013 was noticeably later than the previous year. Of known migration dates or ranges, the majority of birds initiated spring migration during the month of March. Nos. 27-06 and 26-09 were the first whooping cranes to be confirmed back at the Necedah NWR (by 17 March). Of documented cranes two years of age or older returning to central or southeastern Wisconsin, 12% did so by 25 March, an additional 65% arrived on or before 31 March (with 29 and 30 March being major migration completion days), and the remaining 23% by 8 April. Five juveniles were first documented in Wisconsin on 19 April-1 May. An additional juvenile was reported in Allegan County, Michigan, on 23 April.

Spring and Summer 2013

A majority of the 2012 juveniles did not exhibit extensive spring wandering movements and only one (no. 14-12) was documented traveling into another state (southern, Michigan and northern Indiana) where he remained until fall migration.

Maximum size of the eastern migratory population at the end of August was 101 birds (54 males, 46 females, and one unknown). This total includes one wild-hatched chick. Estimated distribution at the end of the report period or last record included 94 whooping cranes in Wisconsin, 2 in Michigan, 3 not recently reported, and 2 long term missing. Detailed information about the 2013 DAR and Ultralight led juveniles can be found in the Rearing and Release section of this report.

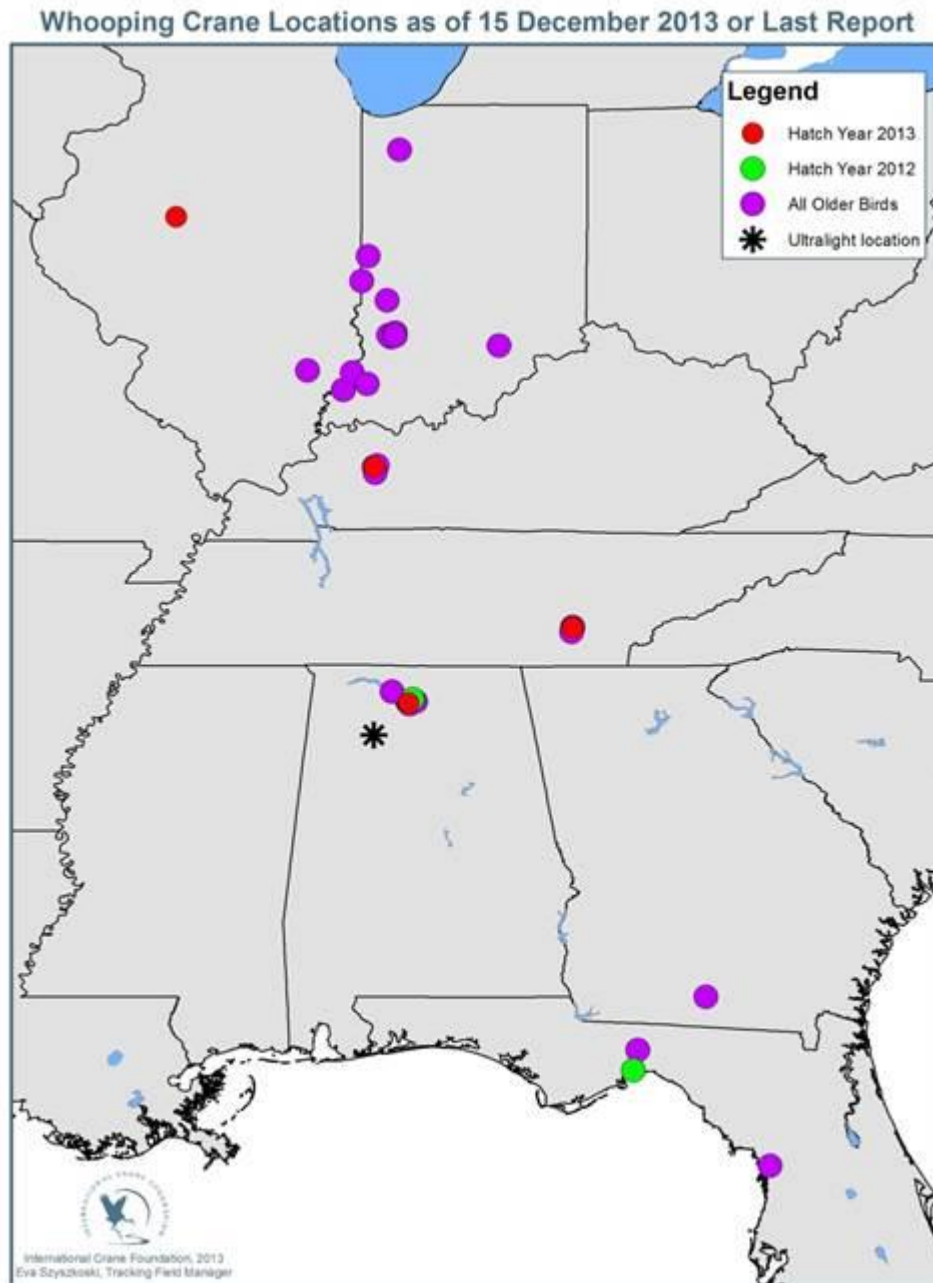
Most of the older cranes (Hatch Year 2001-11) summered on or near the Necedah National Wildlife Refuge, Horicon National Wildlife Refuge, or White River Marsh State Wildlife Area. Early autumn distribution was similar to summer distribution for most cranes in the population; however, some birds left their summering territories to use staging areas at remote locations in southern Wisconsin.

Autumn Migration 2013

The 2013 migration initiation date was quite varied, with only about half the birds having left Wisconsin by mid-November. The last birds (four 2013 DAR birds) in the population left Wisconsin on December 11 (three by flight, one by plane). The late departure was despite unseasonable cold temperatures in December and little open water for roosting. Additional information on this unusual pattern can be found in the Rearing and Release section of the report.

Winter 2013

Maximum size of the eastern migratory population through December 15 was 101 birds (56 males and 45 females). Estimated distribution at the end of the report period or last record included 5 whooping cranes in Illinois, 37 in Indiana, 9-11 in Tennessee, 7-9 in Kentucky, 24 in Alabama, 2 in Georgia, 6 in Florida, 3 at unknown locations, 3 not reported in eight or more months, 1 presumed dead, and 2 long term missing. This total does not include 8 cranes that were still being led south by ultralights at the end of 2013. Those eight were released in January 2014.



Survival

As of December 31, 2013, 220 whooping cranes have been released as juveniles since the reintroduction began in 2001 (8 more ultralight led cranes are due to be released in early 2014). This value excludes 17 HY2006 ultralight-led juveniles that died during confinement in a storm and one HY2007 ultralight-led juvenile that was removed from the project after being unable to fly after handling at the winter release site. An addition of six naturally produced juveniles (one in 2006, two in 2010, two in 2012, one in 2013) resulted in a grand total of 226 reintroduced individuals, of which 101 (44.6%) may currently survive.

In 2013 there were 20 confirmed mortalities, three suspected mortalities, and four long-term missing cranes that were removed from the population totals. Of these, seven (26%) were less than a year of age, six (22%) were one year olds, and the rest (52%) were two years old or older.

As of December 30, 2012, there have been 121 total recorded mortalities. Of those, 39% have had the cause of death determined, 38% have not, and 23% have never been recovered. The primary known cause of mortality was predation (47%), followed by impact trauma (19%), gunshot (19%), and disease (9%).

Reproduction

Twenty-three nests by 21 pairs were initiated in 2013, twenty-one first nests and two renests. All first nests were initiated between April 15 and April 29 except one late first nest initiated on May 30. Of the first nesting attempts, one nest hatched out two chicks and one incubated past term on nonviable eggs. Renesting attempts by two pairs were initiated in late May. Of the renests, one nest hatched out one chick.

Transmitter Testing

Due to continued budget constraints and the high cost of obtaining data from Doppler and GPS PTT units, combined with the continued emergence of cellular technology for wildlife tracking, the Monitoring and Management Team decided to test cellular technology on the Eastern Migratory Population of whooping cranes. To do so we, along with Operation Migration staff, deployed three experimental, backpack-mounted, cellular transmitters designed by the University of Nebraska-Lincoln on three captive ultralight birds. While the backpack mount and cellular technology seemed to work fine, a flaw in the design of the strap attachment to the transmitters and the transmitter casing design caused undo drag on the birds while they were in flight training next to ultralight aircraft, as observed by the pilots. Due to this issue, the transmitters were removed shortly after deployment. In 2014, we will continue to explore redesigning and redeploying these transmitters as well as the possible use of commercially made leg-mounted cellular tracking devices.

RESEARCH & SCIENCE TEAM

Efforts by the Research and Science Team this year have focused on advancing our understanding of reproductive success from a number of different perspectives. We report here on: 1) the conclusion of the field component of our reproductive success experiment; 2) new tests with captive sandhill cranes regarding any potential effect of leg-mounted radio transmitters on the incubation environment; 3) the development of new techniques designed to improve research in the future; 4) the potential for environmentally induced changes to the genetics of the EMP (termed epigenetics); 5) how our research has been used in WCEP and in the broader science community; and, finally, 6) how we wish to test the knowledge we have gained so far through a forced re-nesting experiment.

Reproductive Success Experiment

This project began in 2009 when we measured hatching success in the absence of any management effort. In 2010, we completed a test application of *Bti* in a portion of the Yellow River and determined that a larger scale treatment would be possible. We also measured the distribution of avian feeding black fly species (*Simulium* spp.) throughout a broader area of Wisconsin and found that the Necedah area appears to be a somewhat unique area of concentration for avian-feeding black flies. In 2011 and 2012 we completed *Bti* treatments on a landscape scale and measured a significant decrease in *S. annulus* and *S. johannseni* along with an increase in hatching success for whooping cranes. Importantly, with improved hatching success we were able to examine chick mortality and found that, though 9 chicks hatched only 2 chicks fledged. Reproductive success, as measured by the number of chicks fledged to fall migration per territory, remained too low to produce a sustainable population in the long term. In 2013 we replicated our protocol from 2009 and did no *Bti* treatment so that we could rule out annual variation as an explanation for changes in hatch success among years. Black fly abundance returned on the landscape and nest success declined, especially in response to *S. annulus* abundance. Currently we are analyzing these data further and hope to submit a paper for publication by the end of the year.

Do Leg-mounted Transmitters Effect Copulation or Incubation Environment of Sandhill Cranes?

To test this question USGS Patuxent Wildlife Research Center staff used 8 pair of known self-fertile sandhill cranes that were also good at incubation. Leg-mounted transmitters were placed on 4 pairs of sandhill cranes while only color bands were placed on the other 4 pairs as controls. All 8 pairs laid, each pair laying 2 clutches of 2 eggs each. Each pair was allowed to incubate the last 2 egg clutch, though one egg in each clutch of 7 of the pairs was a replaced by a data-logger egg to examine incubation environment. The 4 pairs with leg-mounted transmitters laid 11 fertile eggs and 5 infertile eggs. The control sandhill cranes laid 9 fertile eggs, 7 infertile. This was the first year of a 2-year study. The leg band transmitters were removed from the cranes during the fall health examinations, refurbished, and placed on the former control cranes on 17 January, 2014.

Testing Backpack Harnesses and Cell Tracking Devices

In 2013, ICF collaborated with the University of Nebraska – Lincoln to test several facets of experimental cell transmitters and backpack harness attachment mechanisms. Specific tests included: 1) A cell transmitter was deployed on a captive bird at ICF to test accelerometer data (3 planes of movement). Data was collected, but issues with camera prevented developing correlations between behaviors and device readings. 2) Testing quick attachment methods for backpack harnesses on captive birds to minimize handling times and bird stress. Handling times fell within allowable protocols. 3) Deployment of backpack harnessed cell trackers on Sandhill Cranes to test both harness effects and cell devices. All birds survived well and acted normally. Cell devices

failed at higher than acceptable rates. 4) Deployed 4 cell transmitters on UL birds in Sept. Observations in flight revealed that the design of experimental transmitter produced unacceptable drag during flight. All transmitters were removed after several days. 5) ICF summarized deployments of all recent backpack-mounted devices deployed on cranes (and other large-bodied birds) to examine known outcomes. The Monitoring and Management Team then produced a recommendation for WCEP regarding the use of backpack harnesses for WCEP cranes. These tests suggest that further testing is needed. Future plans include ensuring that design of transmitter does not inhibit flight; further testing of backpack attachment on Sandhill Cranes; another transmitter deployed on a captive bird to record movement data and possibly additional testing with UL birds for longer periods.

Epigenetics

Mark Berres (UW-Madison) is examining the potential influence of diet and/or environmental contamination on epigenetic patterns in Whooping Cranes. The first examination is to compare how genomes of western and eastern populations of Whooping Cranes compare. They should be similar because the eastern population was produced from captive birds that came from the western population. Real differences in the genome between the populations, beyond that expected through mutation, could be due to environmental effects. One means for epigenetic affects is through the diet's potential impact on methylation patterns. Environmental pollutants might also change genetics as well.

Preliminary testing came from blood samples taken from 4 western and 3 eastern whooping cranes (known breeders) to compare differences (if any) and one sandhill crane as a reference. Sequence data have been completed. Analysis is due to be completed by the end of January. If results seem interesting with the small, initial sample size, more exhaustive sampling can be done. Management implications relate to diet fed captive cranes and potential influence of pollutants on breeding wild birds.

Science Impact of the Eastern Migratory Population Reintroduction Effort

The science output from the Eastern Migratory Population reintroduction effort has been growing substantially in recent years. To date, a total of 26 peer-reviewed articles have appeared, focused on topic areas including health, demography, behavior, and management. In addition, 12 published abstracts and 2 student theses have been produced. The scientific impact of EMP-focused publications is also growing. The most widely cited paper (Runge et al. 2011) has been cited 57 times (scholar.google.com, accessed 23 January, 2014). The second most-cited paper (Hartup et al. 2005) has 13 citations. The journal impact factors for selected outlets have generally been less than 2, but 3 papers published between 2011 and 2014 have been in journals with impact factors >3 (Biological Conservation, 3.79, Runge et al. 2011; Ecological Applications, 3.82, Servanty et al. 2014; Science, 31.2, Mueller et al. 2013). Journal impact factors are a widely used tool to assess the visibility of publication outlets. Increasing the visibility of publication outlets and the diversity of topics will benefit the overall science impact of the reintroduction. Taking advantage of opportunities for collaboration outside the partnership may be especially beneficial, as additional expertise can be tapped.

A full report is available from Sarah Converse in Appendix 1.

Literature Cited

- Hartup, B. K., G. H. Olsen, and N. M. Czekala. 2005. Fecal corticoid monitoring in whooping cranes (*Grus americana*) undergoing reintroduction. *Zoo Biology* 24:15-28.
- Mueller, T., R.B. O’Hara, S.J. Converse, R.P. Urbanek, and W.F. Fagan. 2013. Social learning of migratory performance. *Science* 341:999-1002.
- Runge, M. C., S. J. Converse, and J. E. Lyons. 2011. Which uncertainty? Using expert elicitation and expected value of information to design an adaptive program. *Biological Conservation* 144:1214-1223.
- Servanty, S., S. J. Converse, and L. L. Bailey. 2014. Demography of a reintroduced population: moving toward management models for an endangered species, the whooping crane. *Ecological Applications: In Press*

2014 Plans: Forced Re-nesting Experiment

In 2014 we will begin two unique research projects that focus on better understanding the breeding ecology of Whooping Cranes at NNWR. First we will examine the Effects of Forced Re-nesting on Reproduction of a Reintroduced Population of Whooping Crane (*Grus americana*). By forcing pairs to re-nest we hope to modify the timing of re-nesting efforts so that second nests fall outside the activity period of *S. annulus* and thereby increase hatch success. This experiment will also allow salvage eggs from initial nests that can be used to increase reintroduction efforts. Similar nest manipulations have been conducted with wild populations of Mississippi Sandhill Cranes and Florida Sandhill Cranes. Second nests have higher fledging rates (21% versus 0.1%) than initial nest attempts. Forced re-nesting rates have been ~75% in Mississippi Sandhill Cranes. The objectives of this experiment are to a) determine if egg salvage induced nest failure can increase the population’s re-nesting rate, b) modify the timing of re-nesting to avoid peak black fly population levels and c) compare the reproductive success of forced re-nests and first nests of whooping cranes.

Second, we seek to Compare the Breeding Ecology and Reproductive Success of Sandhill Cranes and Whooping Cranes. Since the reintroduction of whooping cranes, few data have been collected on Sandhill Cranes on NNWR. To understand the factors limiting the reproductive success of the EMP, it is logical to examine the reproductive ecology of the population of Sandhill Cranes nesting at NNWR.

If *Simuliidae* flies are the ultimate cause of low reproductive success in Whooping Cranes then reproductive success of Sandhill Cranes may be low as well. If reproductive success differs between Sandhill Cranes and Whooping Cranes then ecological, biological or behavioral differences may be important. The objectives of this study are to: a) collect data on the ecology of the population of Sandhill Cranes nesting on NNWR, b) compare the reproductive success of Sandhill and Whooping Cranes if differences exist, c) compare reproductive success to other known breeding populations in Wisconsin where black flies are not prevalent and d) evaluate factors of nest success that may be responsible.

Transition of Leadership

It has been almost four years since WCEP reorganized into the present team structure. These teams are now working well and the overall effectiveness of WCEP has been greatly enhanced. The next step in our evolution is to evoke productive transitions between leadership within WCEP. As part of that process Jeb Barzen has stepped down as chair of the Research and Science Team and Sarah Converse has assumed that role. Brad Strobel has accepted the co-chair position. It has been a rewarding challenge for the entire team to lead WCEP’s research efforts and we are hopeful that our focus on applied science will ultimately lead us to a sustainable population of Whooping Cranes in the EMP.

COMMUNICATIONS AND OUTREACH TEAM

The 13th year of whooping crane reintroductions by WCEP saw a continued effort by the Communications and Outreach Team to lead external communications for WCEP including outreach, education, and media relations.

The team is responsible for and directs all aspects of external communications and public contact on behalf of WCEP. Comprising communications and education specialists and other key partner staff representing WCEP founding members, the Communications and Outreach Team remains essential to building support for the project through education, media relations, and coordinated public outreach efforts.

WCEP Media Releases/Press Statements

The Communications and Outreach Team issued press releases and statements during project milestones, including:

- Spring migration update
- Arrival of ultralight cranes at White River Marsh
- Arrival of DAR cranes at Horicon NWR
- Study of nesting success
- Departure of the DAR and ultralight-led fall migrations
- State updates of ultralight-led migration
- Updates on cases involving illegal shootings of whooping cranes

Media Coverage

Spikes in media coverage occurred at several points in 2013: During the crane's spring migration, when the ultralight-led and DAR cranes departed on migration, the nesting study press release, and illegal shootings of whooping cranes.

Increasing Outreach Opportunities

WCEP focused on expanding outreach to out-of-state partners and audiences via:

- Putting updates and news releases on Facebook and Twitter
- Expanding the WCEP media contact list to include other states along the flyway

Education and Outreach Programs and Events

Education continues to be a key component of the Communications and Outreach Team's efforts. The whooping crane reintroduction project has offered a strong opportunity to inform and motivate students along the flyway about cranes and wetland conservation. The migration of these birds highlights the dependence of cranes and other wildlife on wetlands along the migration route, so the decisions and conservation outlook of future generations are critical to the survival of these cranes.

The Communications and Outreach Team delivered presentations throughout the year at partner organizations, schools, universities, conservation and birding clubs, professional conferences, birding festivals, civic organizations, and zoos. Outreach representatives distribute education materials, including brochures and curricula, which help interpret crane migration, behavior and ecology. In addition to presentations, the team also participated on other outreach activities such as radio and TV interviews and live chats.

Environmental education accomplishments in 2013 included the continued partnership 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, including WCEP cranes' status and general locations during the fall and spring migrations. Journey North reaches nearly 1 million students at 54,000 sites, and their website receives over 250,000 visitors per month. Operation Migration funds the Journey North whooping crane participation each year.

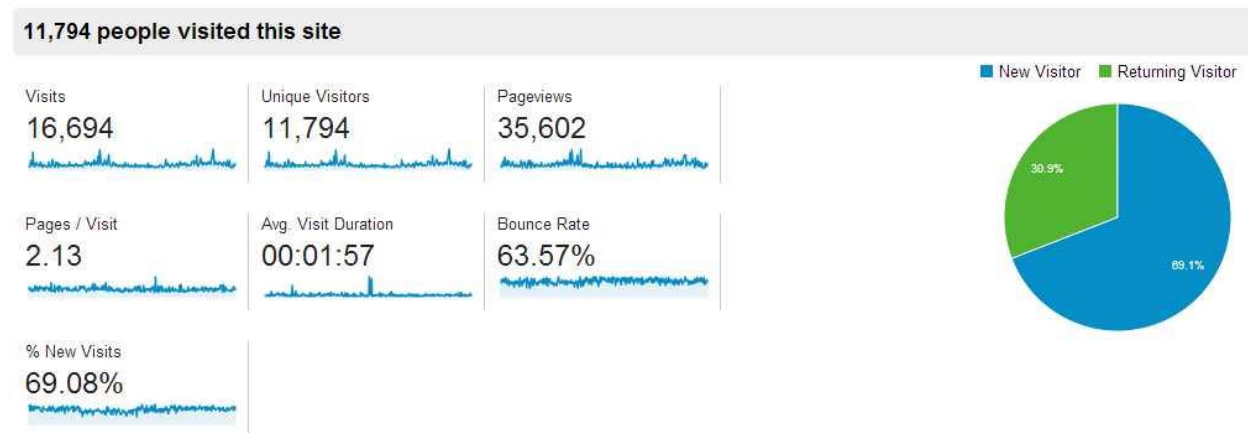
WCEP partners participated in a number of regional and national outreach festivals in 2013, reaching approx. 12,000 people. Events attended included the Port Aransas Whooping Crane Festival, Texas; Berlin Whooping Crane Festival, Wisconsin; Bald Eagle Days, Wisconsin; Wisconsin Wetlands Association Annual Conference; International Migratory Bird Day, Florida; Rivers and Wildlife Festival, Nebraska; and the St. Marks NWR Wildlife Heritage and Outdoors Festival, Florida.

Other education and outreach activities included interpretive tours and education programs at partner facilities, the International Crane Foundation and Operation Migration crane cams, and ultralight flyover events. The Communications and Outreach Team also continues to maintain the whooping crane trunk and education manual for school and other group use (dnr.wi.gov/files/PDF/pubs/ER/ERO661.pdf).

WCEP Website

The WCEP website (www.bringbackthecranes.org) and related partner websites continue to be effective and efficient means of communicating up-to-date information to large numbers of stakeholders, news media, students, and the general public.

www.bringbackthecranes.org – Just under 12,000 unique visitors were captured during 2013. These visits resulted in more than 35,000 page views.



When combined with partner websites: <http://www.operationmigration.org> (121,223) and www.savingcranes.org (WCEP-related pages: 42,052) unique visitor traffic, a total of 175,069 were reached.

Where are they coming from?

Search engine traffic generated just under 7000 visits, while referring websites and social media avenues generated the balance.

Source	Visits	Visits	Contribution to total: Visits
	5,651 % of Total: 33.85% (16,694)	5,651 % of Total: 33.85% (16,694)	
1. operationmigration.org	1,740	30.79%	
2. facebook.com	619	10.95%	
3. fws.gov	550	9.73%	
4. in.gov	142	2.51%	
5. google.com	137	2.42%	
6. m.facebook.com	132	2.34%	
7. learner.org	128	2.27%	
8. t.co	125	2.21%	
9. myfwc.com	120	2.12%	
10. links.govdelivery.com	117	2.07%	

WCEP Social Media Sites

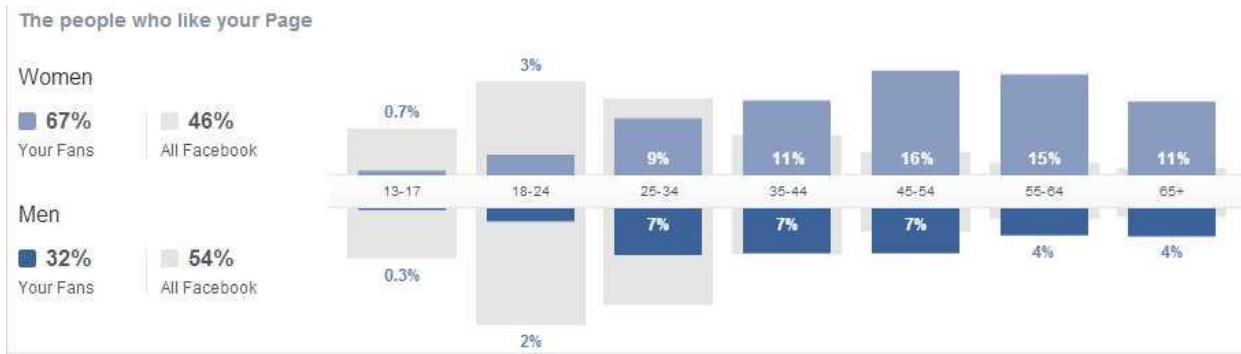
Social media sites provide WCEP with an additional tool to better reach new and existing audiences about the project and its partners.

The primary materials posted to the WCEP Facebook Page ([facebook.com/WhoopingCraneEasternPartnership](https://www.facebook.com/WhoopingCraneEasternPartnership)) were news releases and WCEP partner items of interest (often cross-posted between partner Facebook pages). Through increased usage and exposure, WCEP was able to increase the number of “likes” the page had received from 395 on 1/1/13 to 669 on 12/31/13, representing growth of 69% over the year.

“Likes” are a useful metric to determining the amount of potential overall exposure a page has, however, a Facebook user needn’t “like” the WCEP page to be able to interact. Case in point is that 4461 unique visitors shared 5385 stories about the WCEP Facebook page throughout the year.

Facebook defines this activity as: *The number of people sharing stories about your page. These stories include liking your Page, posting to your Page's timeline, liking, commenting on or sharing one of your Page posts, answering a question you posted, responding to one of your events, mentioning your Page, tagging your Page in a photo.*

Demographic breakdown of WCEP Facebook page ‘Likes’:



WCEP also uses Twitter (twitter.com/bringbackcranes). In an effort to continue to expand outreach, WCEP is actively following numerous Twitter feeds that are similar in scope and nature to WCEP’s. The Communications and Outreach Team primarily utilized Twitter to disseminate news releases (an ever-expanding use of Twitter) and to send out important updates and breaking news items.

In addition to Facebook and Twitter, the Communications and Outreach team has a dedicated WCEP Flickr site ([flickr.com/photos/wcep1](https://www.flickr.com/photos/wcep1)), which provides a central location to post and disseminate photos pertaining to the reintroduction project. Currently the Flickr site hosts 164 photos. The Monitoring and Management Team often receives many high-quality photos from the public that are available for WCEP and others to use as well as the countless photos taken by partners during various activities. The Flickr site allows the Communications and Outreach Team to direct the media and the public to the site, which provides the photos for download and contains crediting information as needed.

Illegal Shooting and Hunter Education Initiative

To help address the unfortunate issue of whooping crane shootings, the Communications and Outreach Team is coordinating a multi-state, multi-agency initiative to help mitigate future losses. A 14-member working group of partners from the three whooping crane populations was formed in 2013. The team is comprised of federal, state and non-profit agencies from Wisconsin, Minnesota, Indiana, Georgia, Tennessee, Nebraska, Louisiana, and Texas. The working group provides partners with an opportunity to share ideas, resources, and identify needed materials and programs to address accidental and intentional whooping crane shootings.

ICF developed two hunter education panels as part of this new initiative. The panels were installed on kiosks at the Patoka River National Wildlife Refuge in Indiana. The signs are available to other state and federal wildlife refuges along the eastern flyway and complement existing WCEP hunter education materials.

WCEP Wiki

To provide a transparent and effective information sharing structure for the partnership, the Communications and Outreach Team continues to develop and manage the WCEP intranet site (Wiki). The Wiki serves as a repository for WCEP information that is accessible to all WCEP members.

Appendix 1

Science Impact of the Eastern Migratory Population Reintroduction Effort

Sarah Converse

The science output from the Eastern Migratory Population reintroduction effort has been growing substantially in recent years. To date, a total of 26 peer-reviewed articles have appeared, focused on topic areas including health, demography, behavior, and management. In addition, 12 published abstracts and 2 student theses have been produced (Figure 1).

The scientific impact of EMP-focused publications is also growing. The most widely cited paper (Runge et al. 2011) has been cited 57 times (scholar.google.com, accessed 23 January, 2014). The second most-cited paper (Hartup et al. 2005) has 13 citations.

The journal impact factors for selected outlets have generally been less than 2 (Figure 2), but 3 papers published between 2011 and 2014 have been in journals with impact factors >3 (Biological Conservation, 3.79, Runge et al. 2011; Ecological Applications, 3.82, Servanty et al. 2014; Science, 31.2, Mueller et al. 2013). Journal impact factors are a widely used tool to assess the visibility of publication outlets.

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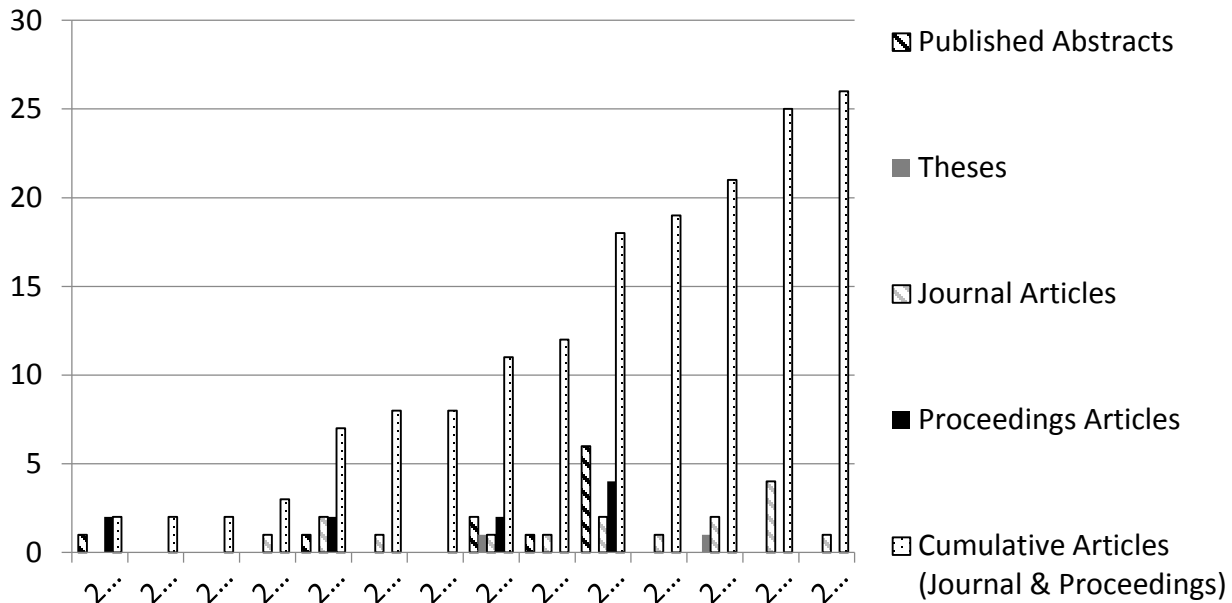


Figure 1. Scientific publications, 2001-present, resulting from the Eastern Migratory Population reintroduction effort. All journal and proceedings articles are in peer-reviewed journals, and abstracts are peer-referred.

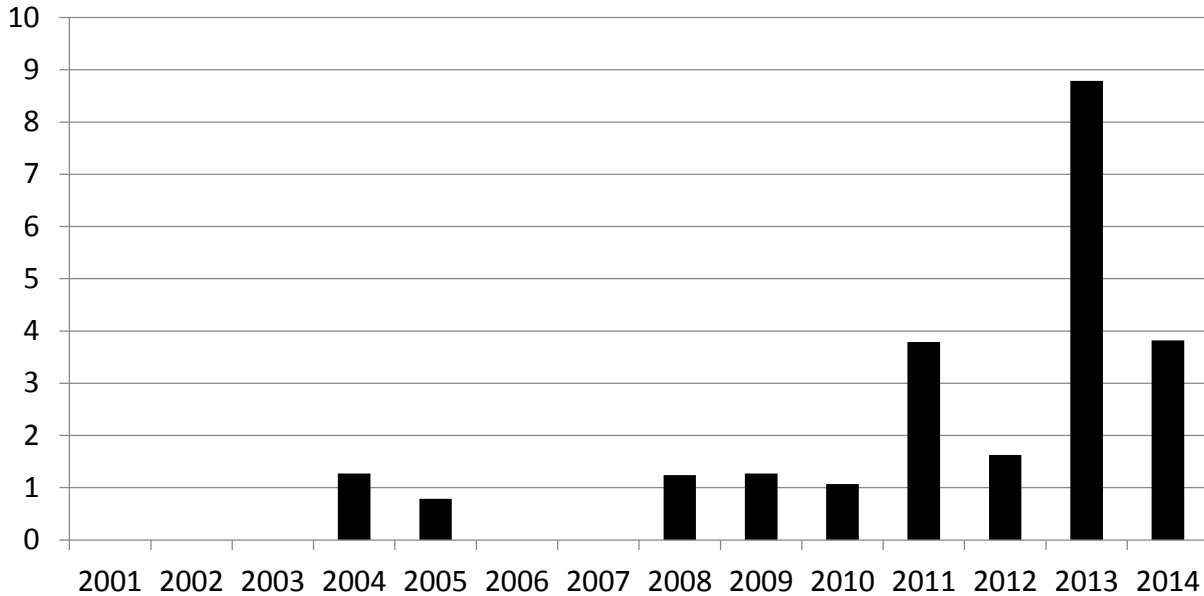


Figure 2. Average journal impact factor, by year of publication, for journal publications resulting from the Eastern Migratory Population reintroduction effort. Journal impact factors were obtained from ResearchGate (researchgate.net; accessed 23 January, 2014).

Literature Cited

Hartup, B. K., G. H. Olsen, and N. M. Czekala. 2005. Fecal corticoid monitoring in whooping cranes (*Grus americana*) undergoing reintroduction. *Zoo Biology* 24:15-28.

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