

WHOOPING CRANE RECOVERY ACTIVITIES

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by Tom Stehn
USFWS Whooping Crane Coordinator
(361) 286-3559, Ext. 221
Tom_Stehn@fws.gov

HIGHLIGHTS

The Aransas-Wood Buffalo population surpassed the 200 barrier for the first time in presumably over 100 years with 217 whooping cranes arriving in Texas. Included were a record 34 juveniles, including 2 sets of twins, from a record production season in Canada. One juvenile crane separated from its parents in the fall migration and wintered about 75 miles north of Aransas. One of the twin chicks and one adult died while at Aransas, leaving the flock in spring, 2005 estimated at 215 cranes, an increase of 22 from the 193 alive in spring, 2004. Whooping crane numbers at the end of March, 2005, both captive (127) and wild (326), totaled a record 453.

Records for group size reported in the fall migration were set at Muskiki Lake, Saskatchewan (17) and Salt Plains NWR, Oklahoma (32). These groups were the largest ever recorded during migration in Canada and the U.S. It is a conservative estimate that as many as a record 93 individual whooping cranes were observed at Salt Plains and in the immediate area in the fall, with 62 individual cranes stopping at the Quivira NWR and immediate vicinity in Kansas. On December 1, two adult cranes were confirmed present in a flock of 100,000 sandhill cranes by Refuge Biologist Jude Smith at Grulla NWR just a few miles across the border into New Mexico between Clovis and Portales. These were the first whooping cranes from the Aransas-Wood Buffalo flock ever confirmed in New Mexico.

Three white-plumaged whooping cranes were shot at near the Quivira NWR in central Kansas on November 6th, the opening morning of the goose and sandhill crane season. Two injured whooping cranes sighted by landowners were picked up and intensive efforts made to treat extensive injuries. One bird had to have a leg amputated and died three days later. The second bird, after being flown to Patuxent and showing promise of recovery, died 33 days after the shooting from a respiratory infection connected with its injuries, including a broken wing. Extensive heroic efforts to save these two cranes were made by staff at Kansas State University and the Patuxent Wildlife Research Center. Following an investigation, a party of sandhill crane hunters was identified firing at the three cranes and legal charges are expected to be filed. The third crane shot at on November 6th delayed its migration, remaining at Quivira NWR for over a month. It may have resumed migration on December 9th, but it was never reported by anyone in migration and it is not known if it survived and made it to Aransas.

The Whooping Crane Eastern Partnership (WCEP) team trained 14 more juvenile whooping cranes for the fall migration. The migration using ultralight aircraft of just

over 1,200 miles was completed in 64 days with 13 cranes arriving safely at the Chassahowitzka NWR on the west coast of Florida. One juvenile in autumn was released directly into a group of older whooping cranes and successfully followed cranes to Florida.

The year 2004 was a positive one for the captive flocks that fledged 30 chicks. Production was used to supply the eastern migratory reintroduction (15), the Florida nonmigratory population (5), a solo release in central Wisconsin (1), genetic holdbacks as future breeders (6), and one holdback as a display bird. Genetic goals of the captive flocks were fully met in 2004, with several very valuable chicks produced. Numbers for reintroductions were less than hoped for, but met projected targets.

ARANSAS – WOOD BUFFALO FLOCK

FALL MIGRATION, 2004

Whooping crane spring and fall migrations are monitored annually. Sighting reports are forwarded to the Ecological Services Field Office of the U.S. Fish and Wildlife Service in Grand Island, Nebraska, where they are compiled by Wally Jobman.

The first dates recorded for confirmed observations of migrating whooping cranes were September 1 in Canada and October 2 in the United States. The last sighting date was December 1. Sightings were reported from Saskatchewan (41); Alberta (2); Manitoba, (2); North Dakota (18); South Dakota (3); Nebraska (2); Colorado (1); Kansas (23); Oklahoma (17); Texas (4); and New Mexico (1). Weather during September and October, 2004, was seasonable across the Great Plains. Major cold fronts moved through the northern and central Great Plains on October 1, 13, 29, and November 1. As a result of the October 29 and November 1 storm systems, a major sandhill and whooping crane migration occurred from October 31 to November 4. Thirty-five whooping cranes were reported in Kansas on November 5 and 6, and 35 were also reported at Salt Plains NWR, Oklahoma on November 6 and 7. The last confirmed sighting in North Dakota was on November 4, and no confirmed sightings were reported north of Kansas after November 5.^A

Large groups of whooping cranes were reported at Muskiki Lake, Saskatchewan (17) and Salt Plains NWR, Oklahoma (32). These groups were the largest ever recorded during migration in Canada and the U.S. It is a conservative estimate that as many as a record 93 individual whooping cranes (77 adults & 16 young) were observed at Salt Plains and in the immediate area this fall, many recorded by the efforts of volunteer Ann Wilbur.

Unexpected migration events included a lone juvenile whooping crane separated from its parents reported in eastern Colorado in early November and in Tillman County, Oklahoma in mid-November that spent the winter with sandhills in Matagorda County, Texas about 70 miles northeast of Aransas. On December 1, two adult cranes were confirmed present by Refuge Biologist Jude Smith in a flock of 100,000 sandhill cranes at Grulla NWR just a few miles across the border into New Mexico between Clovis and

Portales. These were the first whooping cranes from the Wood Buffalo-Aransas flock ever confirmed in New Mexico.

^A Paragraph paraphrased from the *Fall 2004 Cooperative Whooping Crane Tracking Project* by Wally Jobman.

Three white-plumaged whooping cranes were shot at near the Quivira NWR in central Kansas on November 6th, the opening morning of the goose and sandhill crane season. Whooping cranes normally leave the refuge during the day and are exposed to hunting pressure on surrounding private lands. There were about 200,000 sandhills and 300,000 geese at Quivira at the time of the incident. Twenty-two whooping cranes were roosting at Quivira NWR and environs that morning. Duck season had opened the week before. The refuge has been closed to waterfowl hunting daily starting October 23rd in a special closure due to the presence of the whooping cranes.

Following reports received from landowners, two injured whooping cranes were captured by staff of Quivira NWR and a State of Kansas biologist. Both birds were driven to Manhattan, Kansas three hours away to the vet hospital at Kansas State University. The leg on one of the birds was hanging by a tendon and was amputated by a surgical team late that first night. The second bird had a fractured wing with the humerus exposed. Surgery was performed early the following morning and the bone pinned back together. I am very grateful for the tremendous effort Dr. Jim Carpenter and staff at the Kansas Veterinary Hospital made to do every thing possible for these two birds. Dr. Carpenter's background includes time as the veterinarian at the Patuxent Wildlife Research Center and he is an expert working with whooping cranes.

USFWS puts out two news releases, first about finding the injured cranes and the second acknowledging the cranes had been shot. Following an investigation of several days, a party of sandhill crane hunters was identified firing at the three cranes. Charges are expected to be filed.

The bird with the amputated leg died on November 9th. The second bird with a broken wing and 11 pellets lodged in its body was flown to Patuxent on a State of Kansas aircraft on November 18th. It resumed eating natural foods and seemed to be doing better adapting to captivity, but a respiratory problem developed from the injuries and the bird had to be euthanized. It received excellent care from Dr. Glenn Olsen and the entire crane staff at Patuxent, but the injuries were just too much to overcome. I cannot overemphasize the tremendous amount of effort put into trying to save these two cranes. Both carcasses were sent to the National Wildlife Forensic Laboratory in Ashland, Oregon as part of the law enforcement investigation.

All but one of the whooping cranes present at Quivira NWR on the day of the shooting continued their migration and left the area. One whooping crane, believed to have been the 3rd crane shot at, flew back to the refuge where it remained. It flew less than usual but no obvious injuries were apparent. It was still present on December 9th with limited areas of water still open. It may have resumed migration shortly thereafter, but it was

never reported by anyone in migration and it is not known whether it survived and arrived at Aransas.

Quivira NWR had 62 different whooping cranes stop there this fall. It always receives high whooping crane usage and is legally designated as Critical Habitat. USFWS must work closely with the State of Kansas so that a better job is done implementing the Contingency Plan for Federal-State Cooperative Protection of Whooping Cranes. Quivira NWR is one of the absolute most important migration stopover areas for whooping cranes, and the whoopers need to receive 100% protection both on the refuge and in surrounding areas.

PLATTE RIVER, NEBRASKA

Continued drought affected the Platte River throughout the summer. In the fall migration, only one whooping crane group was confirmed using the Platte River.

Wally Jobman of the USFWS Endangered Species office in Grand Island, Nebraska retired on March 3 after 30 years of tremendous help compiling whooping crane migration sightings, managing the sighting database, and working on Platte River issues. Martha Tacha in the same office has stepped in to head the whooping crane migration sighting network for the Central Flyway.

ARANSAS NATIONAL WILDLIFE REFUGE, TEXAS

The first two whooping cranes arrived at Aransas on October 12, four days ahead of the average first arrival. Eighty-seven percent of the arrivals at Aransas (i.e., 187 birds) occurred between November 3 and November 24. A record 216 cranes made it to Aransas, including a record 33 juveniles with two sets of twins. A news release was put out at the end of November by USFWS-Region 2 resulting in nationwide publicity.

A record 34th juvenile and 217th crane in the flock wintered with sandhills north of the refuge near Bay City in Matagorda County. The peak population of 217 consisted of an estimated 142 adult, 41 subadults and 34 chicks, surpassing the previous high of 194 in the fall of 2003. Eleven adult/subadult cranes failed to arrive at Aransas and were listed as mortality between spring and fall, 2004. One adult whooping crane and one juvenile from one of the two sets of twins died during the winter, leaving the estimated flock size at 215. Habitat conditions were generally favorable for the cranes during the winter, although crab populations were quite low December through February. Salinities were low throughout the winter and the whooping cranes remained in the salt marsh and/or utilized nearby prescribed burns.

MISCELLANEOUS

RECOVERY PLAN REVISION

The draft whooping crane recovery plan was finalized and approved by the Interior Department on Dec. 17th after some last minute changes. The plan was published January 11th in the Federal Register, and is available on the web site *www.fws.gov*. The 60-day public comment period closed March 11th with comments directed to Tom Stehn.

SPECIMENS

Various specimens were shipped to locations in the U.S. in the last 6 months.

In October, Texas Parks and Wildlife Department shipped a specimen unsuitable for use as a taxidermy mount to the U. of Wisconsin-Madison where its skeleton was salvaged. Crane skulls, feet, and feathers were sent by FLFWCC and by Patuxent to Necedah NWR for use in the crane education trunks. Cranes found dead in South Carolina (November) and Alabama (January) were shipped to the U. of Florida in Gainesville and the National Wildlife Forensics Lab, respectively for necropsy.

WHOOPING CRANE RECOVERY TEAM

The Whooping Crane Captive Management and Recovery Team meetings were held February 8-10 at the Patuxent Wildlife Research Center in Laurel, Maryland. Patuxent did an excellent job hosting the meeting at their wonderful facilities. Approximately 50 people attended, I think the biggest turnout ever for a Whooping Crane Recovery Team meeting. Highlights were a very well-orchestrated tour of the crane breeding facility and excellent discussions by people working on so many different aspects of whooping crane recovery. The next meeting of the Recovery Team will be held February 6-7, 2006 in Zacatecas, Mexico in conjunction with the North American Crane Workshop on February 8-10.

GENETICS

In the past five years, there has been a major change incorporating genetics into management decisions for whooping cranes. Pairs in both captivity and in the wild are not passing on genetic material evenly. The genetics of the eastern migratory whooping crane population is especially limited with 85% of the population derived from only five captive pairs. That population is also skewed with more males present. In Florida, four of the nesting pairs are full siblings. Decisions which include a genetic component will be made for every chick produced in captivity to try to maximize genetic diversity in both captive and reintroduced populations.

LOUISIANA

Dr. Sammy King of the Louisiana Cooperative Fish and Wildlife Unit – USGS is planning research projects on crane issues in Louisiana, including determining the summer range of sandhill cranes that winter in Louisiana. Additional habitat assessment studies would be done at White Lake for a possible nonmigratory whooping crane population and at Marsh Island as a wintering site for a possible migratory flock.

CRANE VOCALIZATIONS

Dr. Bernhard Wessling reported to the Recovery Team on his analysis of whooping crane vocalizations recorded in recent years by Brian Johns and Lea Craig-Moore in Wood Buffalo and by Colleen Satyshur and Nick Anich at Aransas. Dr. Wessling has matched the summer and winter calls of 21 pairs. He is continuing to work on possible genetic relationships of vocalizations, comparing genetic kinship with similarity of voice prints.

EXHIBIT AT BLOWING ROCKS

The Nature Conservancy's Blowing Rocks Preserve in Hobe Sound, Florida opened an exhibit entitled "Whooping Cranes: The Journey to Save a Species". The exhibit ran from October 15 to February 26 at their Hawley Education Center.

ERRATA

In the last biannual report, I reported that Canus sired 186 chicks. He was a super-sire, but that would have been REALLY super. Actually, he sired 36 chicks. At the time of his death, he had 186 descendents, which included 147 "grand offspring" and 3 "great-grand offspring".

WHOOPING CRANE CONSERVATION ASSOCIATION (WCCA)

The WCCA with over 600 members has a 45-year history as a watch-dog for whooping crane conservation. They do effective lobbying on whooping crane issues and many educational activities. Projects they have recently funded have included studies at both Aransas and Wood Buffalo, supporting a water conservation foundation in Texas, and purchasing a power point projector for WCEP. The organization's president in 2005 is Walt Sturgeon. Their next meeting is to be held in Louisiana in January or February, 2006.

FLORIDA

The current population for the nonmigratory whooping crane flock in Florida is estimated at 66 birds. A few additional birds may be alive in unknown locations. A number of birds shifted back and forth between the two whooper population centers 102 km apart in Polk and Lake Counties. In 2004, a record 12 whooping crane pairs nested in Florida, but hatching success was poor from the 22 eggs and only one chick fledged. Survival of

the 16 birds released in the 2003-04 winter was good with 3 mortalities recorded. Five cranes were shipped from ICF to Polk County in central Florida on December 8th. These birds were placed in a small pen and kept from flying by wing brails until released on December 22nd. Shortly after they left the pen, a whooper pair from across the ranch started associating with the new birds. One of the five was taken by a bobcat in March. The first whooping crane nest of 2005 was found on January 27th and three additional nests found by mid-March.

The Recovery Team at the annual meeting in February decided to place the Florida reintroduction on hold for one year to further assess high rates of adult mortality and low productivity. Adult mortality has averaged 15% with 12 mortalities recorded in 2004 and January, 2005. A few eggs or individual birds may be shipped to Florida from captivity in 2005 depending on production, but there are no plans to form large release cohorts.

Two additional whooping crane strikes of power lines were recorded in the same area of Florida where collisions have been documented previously. One resulted in mortality, and one bird had its radio transmitter knocked off when hitting the line but the bird seemed okay. The power company was urged to mark the lines in question and have ordered materials to get this done. Collision with power lines remains the largest human-caused source of mortality for fledged whooping cranes. In Florida, 12 whooping crane mortalities from power line strikes have been documented.

Florida researchers continued looking at blood samples for exposure to Infectious Bursal Disease. Scientists at the Patuxent Wildlife Research Center continued work on their Adaptive Management Model for the Florida nonmigratory flock. They presented results and received input at the Recovery Team meeting and hope to have a draft report done in January, 2006.

WHOOPING CRANE EASTERN PARTNERSHIP (WCEP)

WCEP is carrying out a multi-year whooping crane reintroduction project in eastern North America. The goal of the project is to establish a self-sustaining population of at least 125 birds (i.e. 25 breeding pairs). Starting in 2001, captive-raised juvenile whoopers have been costume-raised, isolated from human environments and conditioned to follow ultralight aircraft. There are currently 45 birds in the eastern migratory whooping crane population. A few birds will reach breeding age in 2005 and it is hoped that nesting will occur.

In the fall, the ultralight migration team led 14 whooping cranes from Wisconsin to Florida. The trip lasted 64 days and covered 1,200 miles. Bad weather unsuitable for flying kept the team pinned down for long stretches on several occasions. One crane became sick and died from Eastern Equine Encephalitis virus at the final stop of the migration before the arrival at Chassahowitzka NWR. This virus is normally transmitted by mosquitoes and can be fatal for birds, horses, and humans. It rarely causes death in sandhill cranes, but whooping cranes seem to be more susceptible. While at stopovers in southern Georgia and/or northern Florida, several of the whoopers may have contracted

the virus as evidenced by changes in their blood chemistry monitored during health exams. The Florida Department of Health noted viral transmission to sentinel chickens in nearby counties during the time that the whooping cranes were moving through the area. One other whooping crane was noted to have been temporarily ill but recovered.

In Wisconsin, one juvenile whooping crane dropped out of the flight training program due to abnormal development of flight feathers. By the time the pulled feathers had regrown correctly, it was too late to train the bird to follow the ultralight. This crane (# 18-04) was released the last week in October by direct autumn release into groups of older whooping cranes that led him on his first migration. Between November 7th and January 3rd, it at times flew solo, but mostly crane 18-04 successfully followed sandhills and/or whoopers to the release pen at Chassahowitzka and then continued on to nearby Pasco County. His migration included a 5-week stopover at Hiwassee Wildlife Refuge in Tennessee with six other whoopers. No. 18-04 is the first whooping crane in the eastern migratory population to make his first migration following older cranes rather than ultralight aircraft. With the apparent success of this direct autumn release, the Recovery Team has endorsed a proposal to try this with up to eight juvenile birds in 2005.

The migration of the older whooping cranes in the eastern flyway was delayed by the lack of arctic weather systems that help push them south. A major departure occurred on November 6th with 15 older cranes leaving the summering area. Three older whooping cranes did not leave Wisconsin until the second week in December as the ultralight migration team was arriving at Chassahowitzka, with just three of the older cranes in Florida at the time. The last 3 whooping cranes to leave Wisconsin completed the migration to the Chassahowitzka pen site in only 5 days.

The late migration of the older birds caused problems for management of the juvenile whooping cranes at the Chassahowitzka release pen. Aggression from older birds can disrupt roosting and feeding of the younger cranes and make them susceptible to predation by bobcats. The older birds, once they return to Chassahowitzka, usually move on to winter elsewhere if no pelleted food is available to them at the release pen. With most of the older cranes still situated north of the migration team that was poised to arrive at Chassahowitzka, there was much discussion of “parking” the juveniles away from Chassahowitzka for up to two weeks to give the older birds an opportunity to complete their migration and move on through Chassahowitzka. However, because of the unknowns associated with the movements of the older birds, it was decided to take the youngsters directly to Chassahowitzka. A small enclosure was built at the pen site to keep the young birds away from the older birds and keep food away from older birds. This arrangement worked, but the presence of older birds for long periods kept the juveniles penned up more than desired and limited their time acclimating to the wild in the open release pen. By February, the ultralight juveniles were able to spend more time out of the enclosure and hopefully learned important survival skills.

The wintering areas selected by the older whooping cranes did not go as expected. Some of these birds wintered off of the expected migration corridor in North Carolina (n=3) and South Carolina (n=7). Included in these “stray” birds were the cranes that had summered

in Michigan. Four older whoopers short-stopped to winter in Tennessee. Nineteen wintered in Florida. A decision was reached not to capture any of the “stray” birds and return them to Florida, but to see where they would migrate to in the spring of 2005. The Recovery Team is concerned about birds returning to a core release area in central Wisconsin in summer to promote pairing. However, if sufficient pairing occurs, then a wider ranging population within the area designated as experimental nonessential for the eastern whooping cranes would be okay.

Two older whooping cranes died during the fall migration. One was a crane apparently taken by a bobcat at the Cape Romain National Seashore in South Carolina. The second was a bird that died in Limestone County, Alabama on Dec 23rd. This latter incident is still under investigation. A third older whooper and one of the juveniles were taken by bobcats at Chassahowitzka when they roosted outside the pen. This left 45 whooping cranes in the eastern migratory population.

One of the migratory whooping cranes old enough to pair up (# 6-01) spent about three weeks in December in Lake County occasionally associating with a flock of the nonmigratory Florida whooping cranes. This was the first documented “mixing” of the two flocks. No detrimental behaviors were observed during these interactions, and crane # 6-01 actually seemed to prefer the company of sandhills than the other whoopers.

The Wisconsin Department of Natural Resources in November, faced with major budget cuts, targeted the whooping crane coordinator’s position as one of 106 positions to be cut. After a rapid public and agency outcry, Wisconsin decided to retain the whooping crane position, once again proving the power of partnership.

The annual winter WCEP meeting was held at Homosassa Springs State Wildlife Park, Florida on January 26-28. The biannual face-to-face meetings in September and January are very important for planning purposes and team unity. Items addressed included 1) moving the ultralight migration route to the west to avoid mountain weather; 2) changes in winter pen management and/or location to deal with the older cranes interacting with the juveniles; 3) future genetic management and a skewed sex ratio of reintroduced birds; 4) initiation of direct autumn release technique; and 5) difficulty meeting project funding needs.

The WCEP communications and outreach team continued its hectic pace maintaining web sites that attracted over 7 million visits, running information booths at fairs, conferences, and festivals in AZ, FL, GA, MD, TN, TX, and WI, hosting VIP tours, dealing with hundreds of media, and doing environmental education in the schools.

WCEP co-chairman John Christian representing the nine founding member agencies and non-profit organizations that comprise WCEP received an honor award from the Whooping Crane Conservation Association for efforts to safeguard the whooping crane. Joe Duff representing Operation Migration also received an honor award. The awards were presented at the annual meeting of the WCCA in Titusville, Florida on November

19th. Speakers at the festival included John French of Patuxent, Brian Johns (CWS), John Christian and Tom Stehn (USFWS).

CAPTIVE FLOCKS

The year 2004 was a positive one for the captive flocks, with 30 total chicks fledged. Six were held back in captivity because of their valuable genetics. This fully met the planned for flock expansion to meet genetic goals. Production was used to supply the eastern migratory reintroduction (16) and the Florida nonmigratory population (5). For production totals and other activities of the captive whooping crane breeding facilities in 2004, please refer to my March-September 2004 biannual report available on-line at www.bringbackthecranes.org.

Improvements were made to crane pens at Patuxent, Lowry Park, and San Antonio. Construction was started on new breeding pens at SSC and a new isolation rearing facility at ICF.

The Calgary Zoo shipped two birds to ICF in October. Unfortunately, one of the two birds later died in an accident getting caught in the flight netting while in quarantine at ICF. At the San Antonio Zoo, one of their females (Buffy) died unexpectedly on November 22. The death occurred at night during a period of thunderstorms and flooding rains which were presumably a factor. A crane currently at Patuxent may be shipped to San Antonio in the fall to replace Buffy, though this is dependent on a chronic respiratory condition of this bird.

Keith Gibson of the Calgary Zoo continued work on his hatchability study. He visited ICF at the end of November and Patuxent in February to incorporate data from these two breeding centers into his analysis.

WHOOPING CRANE NUMBERS / March 22, 2005

Wild Populations

| Location | Adults | Young | Total | Breeding Pairs |
|-----------------------------|--------|-------|-------|----------------|
| Aransas/Wood Buffalo NP | 182 | 33 | *215 | 67 |
| Rocky Mountains | 0 | 0 | 0 | 0 |
| Florida non-migratory | 61 | 5 | **66 | 13 |
| Wisconsin/Florida migratory | 32 | ***13 | 45 | 0 |
| Subtotal in the Wild | 275 | 51 | 326 | 80 |

* One chick separated from its parents in migration and wintered in Matagorda County, Texas. One adult and one chick died at Aransas, so the peak population for the 2004-05 winter equaled 217.

** This number is a conservative estimate since not all whooping cranes in Florida can be located on a regular basis. Five juveniles were shipped from ICF to Florida on December 8th. One chick fledged in the wild.

*** These are chicks hatched at Patuxent and have migrated behind ultralights to Florida (13), or released into the wild solo (1).

Captive Populations

| Location | Adults | Young | Total | Breeding Pairs |
|--|---------|-------|---------|----------------|
| Patuxent WRC, Maryland | 51 | 3 | 54 | 13 |
| International Crane Foundation, Wis. | 32 | 3 | 35 | 10 |
| Devonian Wildlife Conservation Center, Calgary | 18 | *1 | 19 | 6 |
| Species Survival Center, Belle Chasse | 8 | **1 | 9 | 1 |
| New Orleans Zoo | 2 | 0 | 2 | 0 |
| San Antonio Zoo, Texas | 5 | 0 | 5 | 1 |
| Homosassa Springs Wildlife State Park | 1 | 0 | 1 | 0 |
| Lowery Park Zoo, Tampa, Fla. | 2 | 0 | 2 | 0 |
| Subtotal in Captivity | 119 | 8 | 127 | 31 |

* Three chicks fledged. One was held back as a display bird in Calgary for health reasons. Two were shipped to ICF on September 30th. One subsequently died in an accident. The remaining chick was shipped on to Florida on December 8th.

** Egg came from the wild Florida nonmigratory flock.

TOTALS (Wild + Captive) 326 + 127 = 453