

Reintroduction of Blue and Gold Macaws to Trinidad

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ABSTRACT

Blue and Gold Macaws (*Ararauna*), once found in the Nariva Swamp in Trinidad were extirpated in the 1960s because of poaching for the pet trade and habitat alteration. In 1993, the Forestry Division of Trinidad and Tobago, The Centre for the Rescue of Endangered Species of Trinidad and Tobago (CRESTT) and the Cincinnati Zoo and Botanical Garden embarked on a mission to restore this species to its island habitat. Surveys of food sources and nesting sites showed that this now protected wetland could still support a population of Blue and Gold Macaws. After several unsuccessful attempts to obtain chicks for release through captive breeding, a pilot study on the reintroduction of wild-caught birds was implemented. In 1999, eighteen birds (9 potential pairs) were imported from stable wild populations in Guyana. After quarantines and physical examinations, the birds spent four weeks in a pre-release flight cage located in a protected wildlife sanctuary within the Nariva Swamp. They were monitored by local villagers and introduced to natural foods of the area. Over a period of 3 months, 14 birds were released (8 males and 6 females). More than one-year later, 9 macaws continue to be sighted in the wild. Behavioral observations of six of these birds during February to May 2001 suggest the possibility of nesting activity. Trained local villagers in the communities bordering the swamp have been monitoring flight patterns and potential nesting sites of the released birds. Education programs have helped the local communities and schools to learn more about the Nariva wetlands and its

sustainable use. Private and corporate sponsors and the local media have helped to raise public awareness island-wide to the significance of this conservation effort.

INTRODUCTION

Parrot species have been declining in numbers and range over the last several decades (Collar and Andrew 1988, Forshaw 1989, Collar and Juniper 1991). The Blue and Gold Macaw is found in eastern Panama, Guyana, western Columbia, western Ecuador and most of the Amazon Basin (Juniper and Parr, 1998). This species was also found in Trinidad until the 1960s, when the island population was extirpated due to over-collecting for the pet trade and habitat alteration. Collar 1997 lists the species as apparently extinct in Trinidad and extinct in many areas in Ecuador, Columbia and Brazil. In 1993, the Forestry Division, Ministry of Agriculture, Land and Marine Resources, Trinidad and Tobago, the Centre for the Rescue of Endangered Species of Trinidad and Tobago (CRESTT) and the Cincinnati Zoo and Botanical Garden began working to reestablish this parrot in its native habitat.

The Blue and Gold Macaw and the island of Trinidad offer a unique opportunity to provide much needed research on the process of reintroduction of parrots. The Nariva Swamp, the former habitat of the Blue and Gold Macaw, is an ideal location for this experiment. The wetland consists of 15,400 acres, and central to the project is the 3,840-acre protected Bush Bush Wildlife Sanctuary. Permits restrict human access to the Sanctuary, while hunting and fishing are prohibited. The Nariva Swamp became a protected wet-

land under the Ramsar Convention in 1993, and the Bush Bush Wildlife Sanctuary, established in 1968, remains a prohibited area under the Forest Act of Trinidad and Tobago. The Blue and Gold Macaw, listed as a CITES (Convention of International Trade of Endangered Species) Appendix II species, is also protected under the Conservation of Wildlife Act of Trinidad and Tobago. Populations of Blue and Gold Macaw have been disrupted by human contact in many of its previous ranges. However, since this species is not endangered, the possibility of relocating birds from nearby stable populations to areas from which they have been extirpated can be considered (Soulé 1987, Griffith et al., 1989).

The island habitat lends itself to productive study of the relocation process. The limited range of the flock on the island allows for a much better chance to study the birds after release. People in the villages that border the swamp, Kernahan to the southeast, Plum Mitan to the northwest and Manzanilla to the east play a leading role in protecting the habitat against forest fires and poaching. So far, the data collected on the released birds has been totally dependent on these nearby communities.

METHODS

Suitability of Chosen Habitat

Aerial and ground surveys conducted in the Nariva Swamp in 1995 determined that suitable food source and potential nesting sites are still available in the area to support a population of Blue and Gold Macaws. Vegetation types in the Nariva Swamp are a mosaic of scattered plant communities including mangrove, wet-forest

and two types of palm swamp forest. Palm swamp forest, (made up of *Mauritia setigera* or *Roystonea oleracea* palm stands) occurs in fragmented stands sometimes bordered by illegal and legal agricultural cultivation and human settlements (Wildlife Section, 1994-1996). Three psittacine species still occupy the Nariva swamp. These are the Red-bellied Macaws (*Ara manilata*), the Orange-winged Parrot (*Amazona amazonica*) and the Green-rumped Parrotlet (*Forpus passerinus*). The total Red-bellied Macaw population was found to be 136 birds while the population estimate for the Orange-winged Parrot was 224 birds. The diets of both birds are comprised mainly of palm fruit, with other fruit consumed only when palm fruit availability significantly declined. With apparently no competition for palm fruit from other species coupled with the extended fruiting period of both palms, the psittacines are ensured of a steady food source for at least 8 months annually. (Bonadie and Bacon, 2000). Alternate fruiting trees such as balata (*Manilkara bidentata*) and mango (*Mangifera indica*) are available during the other 4 months of the year.

Captive Breeding of Birds for Release

Following the assessment of suitable food and habitat for the macaws a captive breeding program was established to produce chicks for reintroduction. In August 1994, Blue and Gold Macaws obtained from the Wildlife Section Forestry Division, the Emperor Valley Zoo and private breeders in Trinidad were surgically sexed at a workshop in Trinidad hosted by CRESTT and Mt. Hope School of Veterinary Medicine. Male and female birds identified by leg bands were housed at the Wildlife Section to facilitate pair bonding and potential breeding but after several years only a few infertile eggs were produced.

In September 2000, another avian sexing workshop was held in Trinidad to teach local veterinarians the techniques of surgical sexing and to identify additional pairs

for the macaw captive breeding effort. Collaborators in the reintroduction project provided 48 captive Blue and Gold Macaws that were sexed without cost with the hope that some chicks produced would be donated to the program for release. To date, a few pairs of Blue and Gold Macaws have produced offspring but this aspect of the program is still being coordinated. A protocol for raising captive-bred chicks for release based on techniques reported by researchers in Tambopata Research Center (TRC) in Madre de Dios, Peru and Amigos de Las Aves in Costa Rica is being developed. Meanwhile, because the captive breeding effort had not produced chicks for release, it was decided to reintroduce wild-caught macaws. If successful, this would provide a flock of wild birds from which future captive-bred young could learn social and foraging skills that would increase their chances of survival in the wild.

Relocation of Wild-caught Macaws

With funding provided by the Endangered Parrot Trust in Ocala, Florida, eighteen Blue and Gold Macaws were imported from Guyana to Trinidad in October 1999. The birds were trapped in August 1999 after the January to April nesting season. The government of Guyana established a quota of 22 Blue and Gold Macaws for each legal exporter. Laparoscopic sexing was used to identify 9 potential pairs of Blue and Gold Macaws. Transponder chips inserted into each bird provided a method of permanent identification while a small band around the right or left leg identified males from females.

Following guidelines established by the Trinidad and Tobago government, the birds were quarantined in Guyana for a period of at least 28 days, under veterinary supervision. Blood samples were used to test the birds for Psittacosis / Ornithosis, Avian Influenza, and Newcastle's disease. Treatment against Psittacosis / Ornithosis using chlortetracycline was initiated during the quarantine period in

Guyana and continued through the importation into Trinidad for a total of 45 days. To reduce the stress of relocation, the birds were fed a high carbohydrate diet, supplemented with sunflower seeds and vitamins. They were certified free of endoparasites and ectoparasites prior to importation into Trinidad. Upon entry into Trinidad, the birds were quarantined at the government's Wildlife Section, and not allowed contact with birds of a different health status. Government veterinarians performed health assessments on the birds before they were released.

The macaws to be released were acclimated in a large pre-release flight cage in the Bush Bush Wildlife Sanctuary for 4 weeks in November - December 1999. During this period they became accustomed to the natural foods found in the Nariva Swamp. Besides the *Mauritia* and *Roystonea* fruits on which the macaws feed, several other species of trees, the seeds of which could be used as food for the macaws were identified within a two-mile radius of the release site. These include sandbox (*Hura crepitans*), mahoe (*Sterculia caribaea*), and hogplum (*Spondias mombia*). Trained villagers from a nearby community fed and monitored the birds during the pre-release phase. The birds remained healthy and some pair bonding was observed indicating that the stress of quarantine and transfer had no obvious damaging effects.

Release of Wild-caught Macaws

In early December 1999, five male macaws were selected for release. Criteria for the release included flight-capability and overall fitness. Since some of the macaws' flight feathers were trimmed during trapping, regrowth of these feathers was essential for survival in the wild. Selection of males for the initial release was based on a protocol that suggests that the males will explore the habitat, establish territories and court available females. One of the released males, who was reluctant to leave the area and seemed limited in flight, was

recaptured and returned to the flight enclosure. During the next 48 hours, the four released macaws were observed at or near the release site taking food provided by the monitors. Up to one week later, vocalization with the birds remaining in the flight cage could be heard. In less than three weeks, two birds were spotted in Kernahan in the southwestern region of the swamp about 8½ miles from the release site.

In January 2000, three males and five female macaws were examined and released. The remaining two males and four females were not released at this time due to lack of flight readiness. About two weeks later, one released female macaw visited an aviary in Point Galeota on the southeast tip of the island, some 18 miles away. She was captured and returned to project personnel who later released her in Bush Bush Wildlife Sanctuary. In February 2000, 10 of the 12 released birds were still being sighted by villagers in the areas bordering the swamp. In March, 2000, another pair of macaws was released making a total of 14 macaws that were reintroduced over a three-month period. Sightings of at least two macaws together were frequently reported at various points in or near the swamp. On May 2nd, 2000, a farmer in the nearby village of Plum Mitan reported the only confirmed mortality of the released birds. Cause of death was not determined. Between June and December 2000, nine macaws continued to be sighted in and around the swamp. Four birds remained of unknown status. Figure 1. shows the survival of birds between December 1999 and May 2001.

Monitoring of Released Birds

Funding from the Cincinnati Zoo and Botanical Garden Conservation Fund provided stipends for the teams from the Kernahan and Plum Mitan villages to intensely monitor the birds during the February to May 2001 nesting season. During this time, the island suffered a severe dry season plagued by forest fires. A core

group of personnel from each community was selected and trained in monitoring, site assessment and data collection. A team coordinator and two assistants closely supervised the team as required. Two groups of 12 personnel did daily observations by foot, 4 hrs/day in different geographic points in and around the Nariva Swamp. Boat and four wheel vehicles were used to access some areas. The survey period accounted for 8,640 man-hours during the 4-month period. Coordination and supervision accounted for 1,080 man-hours. Migratory patterns and potential nesting behavior of the macaws were at risk but nine macaws continued to be seen by the monitoring teams. Despite some wild fires in and around the Nariva Swamp, the potential nesting sites remained intact while there was no threat to the existing food source. The areas affected by fires were mainly the marshes and grasslands which would hopefully regenerate with the onset of the rainy season.

In an area south/south west of Plum Mitan, six macaws were routinely seen in a flight pattern that terminates in an area of thick Moriche palms known as Bois Neuf Island. While there appears to be three bonded pairs, there are records of three birds being seen in flight on some occasions. Sightings of three birds were also reported in Matura, northeast of Bush Bush. These birds are part of the six in that particular range. This was confirmed based on the trend and corresponding sightings in the southeast and south-central areas. In January 2001, three macaws were recorded on videotape at Point Galeota on the southeast corner of the island. These birds traveled west along the coastline to Quinam on the south-central coast. Moriche palms are not dominant in this area but the birds feed on other forest species such as wild nutmeg or Cajuca (*Virola surinamensis*), mahoe (*Sterculia caribaea*) and hogplum (*Spondias mombia*).

DISCUSSION

The immediate benefit of the

reintroduction project is the return of a species to its native habitat. After more than thirty years, nine wild Blue and Gold Macaws are presently flying across the Nariva Swamp. Besides restoring some of the native fauna, the wetlands will also be impacted by the return of the macaws. The Blue and Gold Macaws enhance the habitat in their search for food and nesting sites. Through their eating habits they aid in seed dispersal for many of the native trees. This could help to establish new colonies of native species that are competing with introduced species. The holes enlarged for macaw chicks could also provide habitats for other species. Since the wetlands is home to some endangered species such as the West Indian Manatee (*Trichechus manateus*), Giant Anaconda (*Eunectes murinus*) and a large fresh water turtle Mata Mata (*Chelys finbriata*), all attempts to stabilize the environment will have far reaching effects.

Locally the Blue and Gold Macaw has become a flagship species for the stewardship of the wetlands. Through intensive conservation programs in schools, education of local volunteers on the monitoring of the macaws, and local media coverage of the reintroduction program, public awareness on the importance of preserving this native species has grown considerably. The success of the project is due largely to the local groups who have worked closely to document the birds' movements and survival. During the dry fire season, unpaid firefighters and fishermen from Plum Mitan set up camp within sight of Bois Neuf Island where six macaws were frequently observed. As a result, no intruders could access that area and the birds had a safe haven. We believe that the support of the local communities will help to insure that poaching remains an insignificant factor in the reintroduction process and that other damaging processes will be sharply curtailed (i.e. burning of foliage to aid in fishing and clearing land for farming).

Education workshops conducted in the villages on sustain-

able use of the wetlands and the protection of other threatened and endangered species in the Nariva Swamp have resulted in villagers being more cooperative about obtaining hunting and fishing licenses and protecting the area from intruders. In May 2001, a school comprised of only 8 teachers and 140 students in the village of Plum Mitán completed a comprehensive 4-month study on the Nariva wetlands, using the Blue and Gold Macaw as a flagship species. They entered their project in a "hands-on" environmental education competition sponsored by the government's Environmental Management Authority and finished in 3rd place in the island-wide competition.

Lastly, the research gained through this reintroduction will hopefully aid other parrot reintroduction studies. The ability to reintroduce species into native habitats and have them survive without human supplements is crucial to many avian species as more habitats are impacted by local populations (Wiley et al., 1991). Timing is an important consideration, as this type of relocation will only work as long as there are stable populations from which to gain the study animals. With each reintroduction, studies reveal new information that will facilitate future efforts to reintroduce parrot species to restored habitats.

Reintroduction protocols for this project were established using IUCN guidelines, reference materials, and exchange of information with other reintroduction groups. Data collection will continue for several years after the release dates until survival of the flock is assured through reproductive success. Results of the project will be distributed through journals and conferences. Individual contacts from other avian reintroduction projects will be updated on the progress of the studies.

FUTURE WORK

Future success of this project is dependent upon augmentation of the original flock to achieve the carrying capacity for this species in the swamp. Another relocation of

wild caught macaws is the most expedient method of bolstering the small test population. However, captive-breeding efforts should continue so that future releases could include some young captive-born birds. The next set of birds to be released should be radio collared in order to obtain more data on survival, feeding patterns, and nesting behavior. Research on the birds by radio transmission for one year after their release date will help to determine the success of relocation. The location of the roosting sites and hopefully nesting areas will be key to understanding the needs of the flock, i.e., are there enough nesting cavities, are the birds developing territories, are the adults mentoring the younger birds? Most importantly, the radio collars will allow observers to discover the location of any nesting holes without directly intruding into the nesting areas.

Management of the captive-breeding program so that the release of chicks produced could be coordinated with the release of wild-caught birds would be another objective. Chicks produced from the captive-breeding program will need to be sexed, quarantined and tested before being integrated with the wild caught birds during the pre-release acclimation period.

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