

SCARLET MACAW BIO-MONITORING PROGRAM

2014 Nesting Season

FINAL REPORT



September 2014

This final report is prepared by FCD as part of the program requirements. The report summarizes the results of the 2014 scarlet macaw bio-monitoring period with the intention of reporting to key institution and stakeholders who have financed and supported this conservation program in the Chiquibul Forest

ACKNOWLEDGEMENTS

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Many thanks goes to WCS-Guatemala for allowing Guierry Polanco to work with us in the field; his knowledge and working experience with the species was invaluable to us.

To the Belize Wildlife and Referral Clinic (BWRC), many thanks for providing veterinarian care to chicks.

A very special thanks goes to Scarlet 6 Bio-monitoring Team, who joined efforts in the surveillance of active nests, thus the number of fledglings is attributed to the joint efforts of Scarlet 6 and FCD. Scarlet 6 generously provided the Scarlet Macaw bands.

Many thanks goes to Francisco Galicia, Elroy Reyes, Roberto Tzib (all three are FCD research field assistants) and Guierry Polanco (WCS field technician) who spent countless days in the field collecting data on Scarlet Macaws and documenting illegal activities along the banks of the Macal and Raspaculo River Valleys. Without their hard work and dedication the successful execution and implementation of this project would not have been possible.

FCD is also grateful to the following volunteers: Andrew Mallinak, Gabriel Lopez and Isvi Lemus for spending countless days in the Chiquibul Forest helping in field bio-monitoring.

Scarlet macaw monitoring was originally started by FCD in 2009 thanks to the support provided by Dave Tyrie, Ray Mayhew and Jacqui Rukin from the United Kingdom. Their support has been instrumental in making this program grow. The skiff named after the late Dave Tyrie continues to make bio-monitoring possible at FCD.



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ABSTRACT

The Scarlet Macaw (*Ara macao cyanoptera*), representing Belize's largest parrot species, is locally endangered primarily due to poaching. The Chiquibul Forest is the key foraging and breeding habitat for the species in Belize. The Friends for Conservation and Development (FCD) and Scarlet 6 Bio-monitoring Team (Roni Martinez and Charles Britt Group) have systematically documented Scarlet Macaw breeding activities and poaching during the past years. For the 2014 breeding season a total of 10 nesting attempts were monitored of which 31 eggs were laid. Of the total number of eggs laid 13 hatched but only 8 chicks fledged. Poachers managed to steal 4 chicks from the nests and their activity remained persistent in the study area throughout the season. Most of the active nests, continues to be found in high poaching probability areas as identified by the density and intensity of illegal activities being recorded around these. Poachers were reported to be more elusive in conducting their activities as evidence by the low number of sighting even though the intensity of bio-monitoring patrols was increased. To increase Scarlet Macaw fledgling success, from the present moment which is very low, it is necessary to manage the population by hand raising at risk chicks in an in-situ field laboratory and conducting a soft release into the wild of these chicks.

Scarlet Macaw Bio-Monitoring Program

Final Report – 2014 Nesting Season

INTRODUCTION

The Scarlet Macaw is the most widely distributed (Mexico to Brazil) of the 17 existing macaw species (Wiedenfled 1994). Two subspecies have been identified, *Ara macao cyanoptera* (ranges from southern Mexico to southeast Nicaragua) and *A. macao macao* (ranges from extreme south of Nicaragua to Brazil and Bolivia) (Schmidt 2008). Scarlet Macaws are endangered due to habitat modification and the pet trade (Inigo-Elías 1996, Wright *et al.* 2001, Vaughan 2002) thus included in Appendix I of CITES since 1983. The species shows a slow life history, living between 40 – 50 years in the wild, reaching sexual maturity at 4 – 8 years, low annual reproductive rate (Inigo-Elías 1996), high annual adult survival (Brightsmith 2005) and high parental post-fledging care of up to a year (Myers & Vaughan 2004). As long lived species; highly disturbed populations persist, shading the effect of habitat destruction and decrease recruitment for years (Marsden & Pilgrim 2003). The effects are observed as a slow population decline, followed by a population crash as aged individuals have greater mortality rates.

The Scarlet Macaw (*Ara macao cyanoptera*), representing Belize's largest parrot species, is locally endangered due to poaching and listed in the Wildlife Protection Act as a species of conservation concern. Wild population estimates are round 200 individuals for Belize (Matola & Sho 2002). In Belize, the Chiquibul Forest is the key foraging and breeding habitat for the species. The Friends for Conservation and Development (FCD) and Scarlet 6 (Roni Martinez and Charles Britt Group) have systematically documented Scarlet Macaw breeding activities and poaching during the past five and three years respectively. Bio-Monitoring efforts along the Macal and Raspaculo River banks have identified poaching as the mayor threat to the survival of the species in Belize.

The objectives of this report are to: (i) present the findings of the 2014 Scarlet Macaw breeding season; (ii) summarize illegal activities recorded along the breeding ground of the Scarlet Macaw; and (iii) summarize the feeding ecology and behavior of adult Scarlet Macaws based on opportunistic observations.

METHODOLOGY

Scarlet Macaw bio-monitoring was concentrated along the Macal and Raspaculo River banks. Active search for potential cavities began in early February (at the onset of the breeding season) by examining large trees along both banks for cavities. Rivers were navigated by using skiff and canoes. Once a potential cavity was discovered, GPS points were recorded at the base of the tree and further inspections were conducted to validate the potential of the cavity. Potential cavities were regarded active until the breeding pair had laid an egg. After observing an adult inside the cavity for a week, the nest was climbed using ascending equipment and inspected to verify its active status. Once eggs were hatched, the nest was monitored every 5 days to record chicks' development. Active nest monitoring included climbing to visually inspect the cavity and take photographs for further analysis and to document chicks' development. Nest monitoring continued until chicks fledged. Nests located near field personnel camp sites were monitored throughout the day from a make-shift bird blind, so to cause minimal impact on the parental care of chicks. On these nests, adult behavior was recorded plus the number of times parents fed the chick and time spent feeding. Opportunistic sightings of Scarlet Macaws were recorded; including activity, flight direction, GPS coordinates and food source if foraging. Avian veterinarians periodically evaluated chicks' health and growth rates.

In addition, to active nest monitoring, all illegal activities observed in the study area were recorded. This included xatero/poacher trails, camps, sightings, make-shift rafts, and evidence of hunting. Data collected was utilized to produce a nest poaching vulnerability hot spot map using a weighted sum index model.

RESULTS

During the 2014 Scarlet Macaw breeding season a total of 10 active nests were monitored; whereas 8 natural cavities were used as two re-nesting attempts were made. All but one nest was systematically monitored. One nest was recorded on a dead tree, which was not safe for climbing. Seventy percent of the nests were located on the banks of the Raspaculo River (Figure 1). Of the cavities used for nesting, three were new cavities while the others were cavities known to be used before 2011 (Figure 1). Based on the spatial distribution of active nests in 2013 and 2014 (Figure 3), the Raspaculo River holds the greatest concentration of Scarlet Macaw nests than the Macal River, even though these rivers share the same ecosystem.

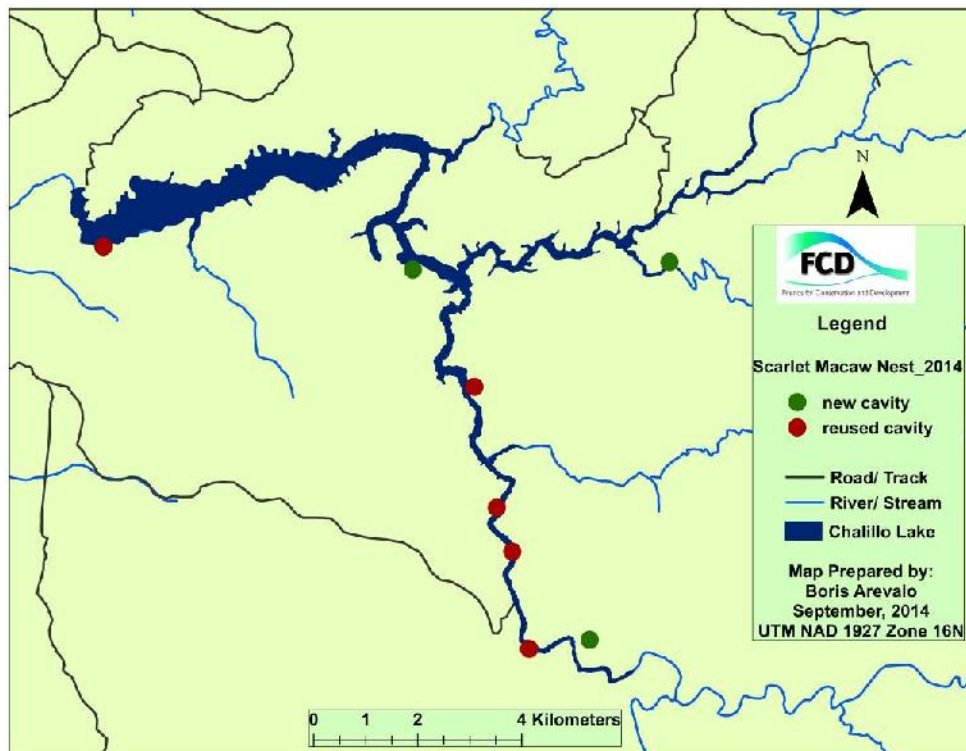


Figure 1: Spatial distribution of active Scarlet Macaw nests during the 2014 breeding season

The breeding pairs laid 31 eggs of which 13 hatched and 8 chicks managed to fledge. Forty percent of the nesting pairs had a clutch size of 4 eggs, similar percentage was recorded with a clutch size of 3 eggs (Figure 2). Nest SMN014 was a re-nest of nest SMN012, thus this breeding pair managed to lay a total of 7 eggs in two breeding attempts; of which three eggs hatched. The second re-nesting attempt was nest SMN005 and SMN010, breeding pair laid a total of 5 eggs. During both attempts, zero eggs hatched. Seventy five percent of the breeding pairs that laid 4 eggs managed to hatch 2 chicks of which all fledged (Figure 2).

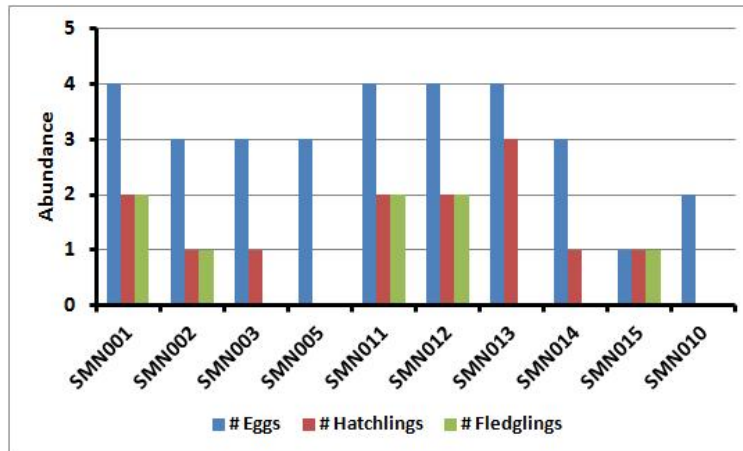


Figure 2: Number of eggs, hatchlings and fledglings form each of the monitored Scarlet Macaw nests in 2014.

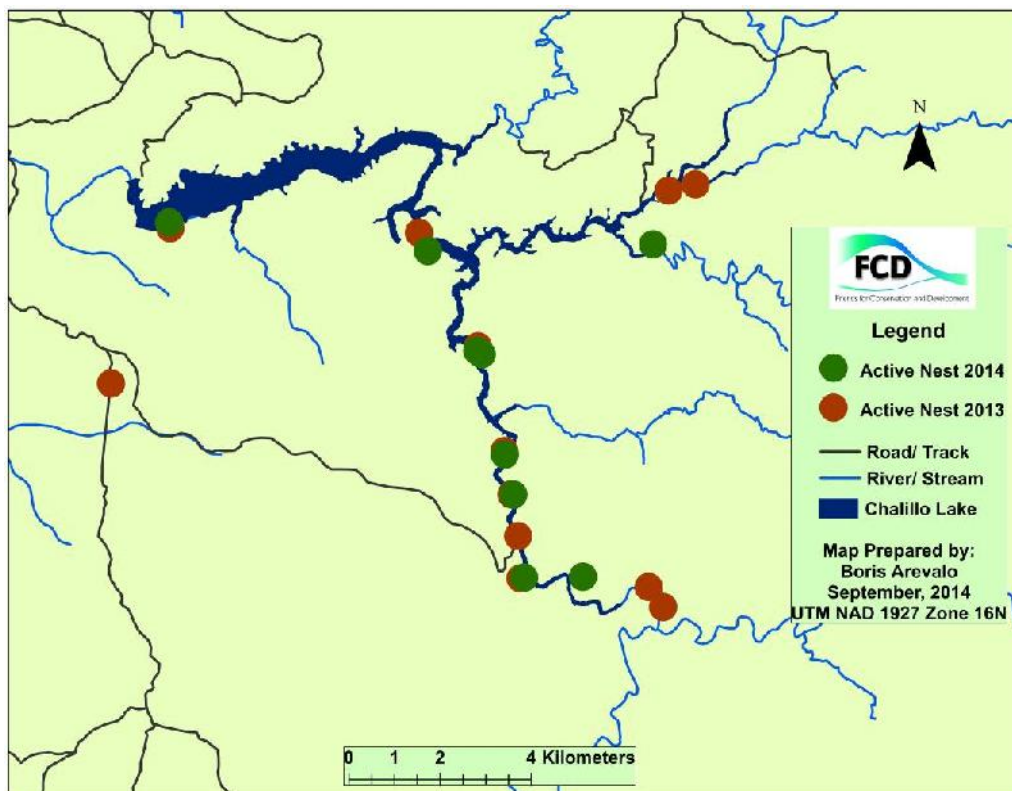


Figure 3: Spatial distribution of active Scarlet Macaw nests along the banks of the Raspaculo and Macal Rivers during the 2013 and 2014 breeding season.

On average, clutch size was 3.1 eggs (the highest in three years), with an average of 1.3 chicks per nest and an average of 0.8 fledglings per nest (Table 1). Egg hatching efficiency was intermediate compared to 2013 and 2012 but in all years hatching efficiency was less than 55%. The overall number of chicks, number of fledglings and number of fledglings per nest was greater than in 2012 and 2013. The percentage of chicks that managed to fledge was less than that of 2012 but greater than that of 2013 (Table 1).

Table 1: Scarlet Macaw bio-monitoring comparative nest results for 2012, 2013 and 2014

Variable	Year		
	2012	2013	2014
Number of nests	8	12	8
nesting attempts	10	13	10
Number of eggs	23	24	31
Eggs per nest	2.3	1.85	3.1
Number of chicks	8	13	13
chicks per nest	0.8	1	1.3
Percentage eggs that hatched	34.78	54.16	41.9
Number of fledglings	5	5	8
Number of fledglings per nest	0.5	0.38	0.8
Percentage of chicks that fledged	62.5	38.46	61.5

The lost of chicks was attributed to two factors being poaching (n = 4) and death due to parental neglect and/ out competition by older siblings (n = 1) (Figure 4 A). Of the 18 eggs that did not hatch all but three were found in the cavities; these are suspected to have been preyed upon. The rest were found containing a tiny cavity as seen on Figure 4 B.



Figure 4 A: Third chick of nest dead caused either by parental neglect and or out competed by siblings



Figure 4 B: Scarlet Macaw nest with two chicks and showing one of the 18 eggs that did not hatch but found inside cavity with a tiny cavity.

Scarlet Macaw Sightings

A total of 3,034 Scarlet Macaw sightings were recorded from mid February to August of 2014. Average flock size was 5.7 individuals (minimum = 1; maximum = 75 individuals). Sightings were recorded mainly along the banks of the Macal, Raspaculo and Monkey Tail River plus opportunistic sightings along the road to Las Cuevas Research Station (Figure 5). Based on activity, 57% of sightings were individuals in flight, 28% were foraging and 15% were perching. Macaws that were either perching and or foraging were commonly documented in flocks (Figure 6) of up to 75 individuals. Foraging individuals were observed feeding on the shoots, floral buds and green fruits of *Schizolobium parahyba* (Quamwood) trees, green *Attalea cohune* (cohune nuts) and on unripe fruits of *Vitex guameri* (Fiddle Wood), *Bursera simaruba* (Gombolimbo).and Inga spp. (Bri-Bri).

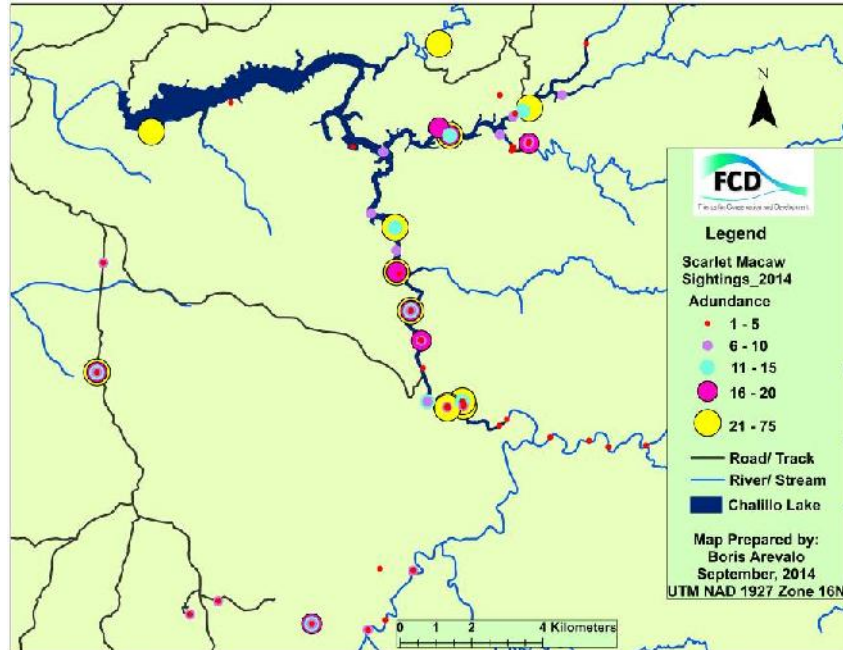


Figure 5: Spatial distribution of Scarlet Macaw sightings in the Chiquibul Forest during mid February to August, 2014.



Figure 6: Two different flocks of Scarlet Macaw (n= 20 and 5, respectively) recorded along the banks for the Chalillo Lake.

Illegal activities

Illegal activities within the study area were recorded as early as February but it was until the latter half of April to the end of May that xatero/poacher activity along the banks of the Chalillo Lake increased dramatically. Even though there was a high intensity of illegal activities only 3 xatero/poacher sightings were made this year, compared to the 22 sightings made in 2013. Based on the poaching vulnerability Index (Figure 8), all but two of the active nests were located in areas with a high probability of being poached. Field personnel were only able to set permanent camps at three of these nests, from which 5

chicks were able to fledge. Of the 23 illegal camps recorded in 2013, thirteen of these were reused by xateros/poachers.

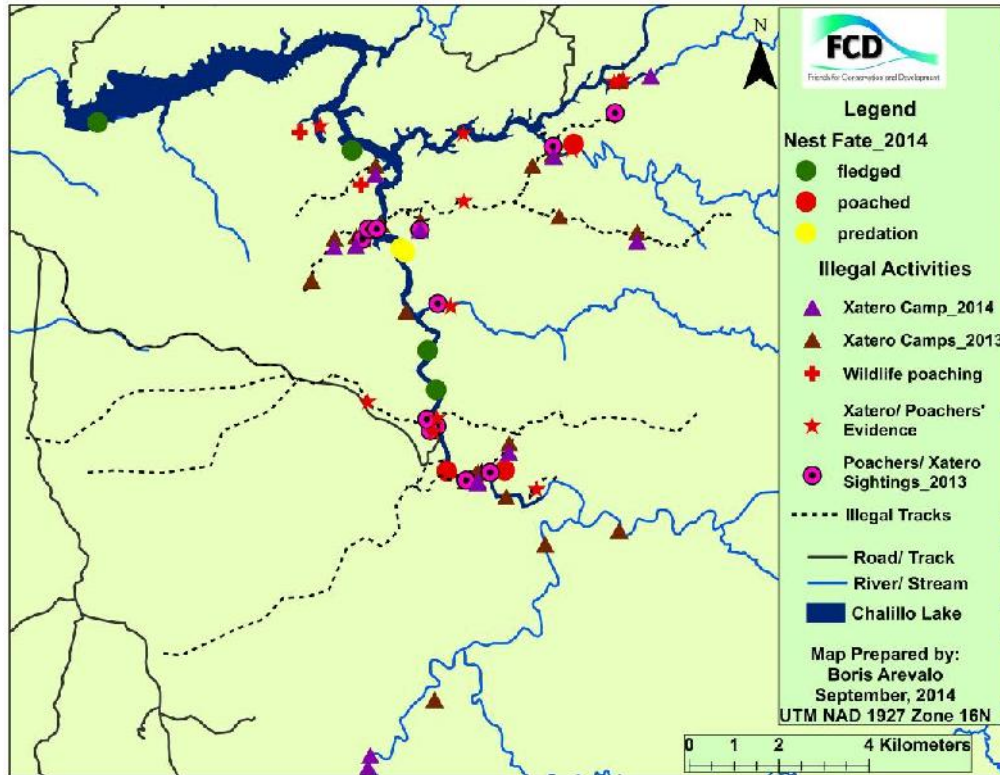


Figure 7: Spatial distribution of illegal activities in relation to active Scarlet Macaw nests recorded within the study site in 2014.

During the month of May, field personnel also recorded the poaching of Red-lored Parrots (5 nests), Morelet's Crocodile ($n = 2$) and looting of Mayan sites (3 mounds) (Figure 9) - activities not previously recorded within the flood prone area of the Chalillo Lake. On the 5th May, FCD Law Enforcement Team managed to intercept a poacher and managed to confiscate a .22 riffle with 42 live rounds, plus the first confiscated Scarlet Macaw chick. Unfortunately by the time the poacher was intercepted the chick was dead. The poacher escaped. The interception was made on the road to Caracol, about 11 km. direct flight from the Chalillo Lake.

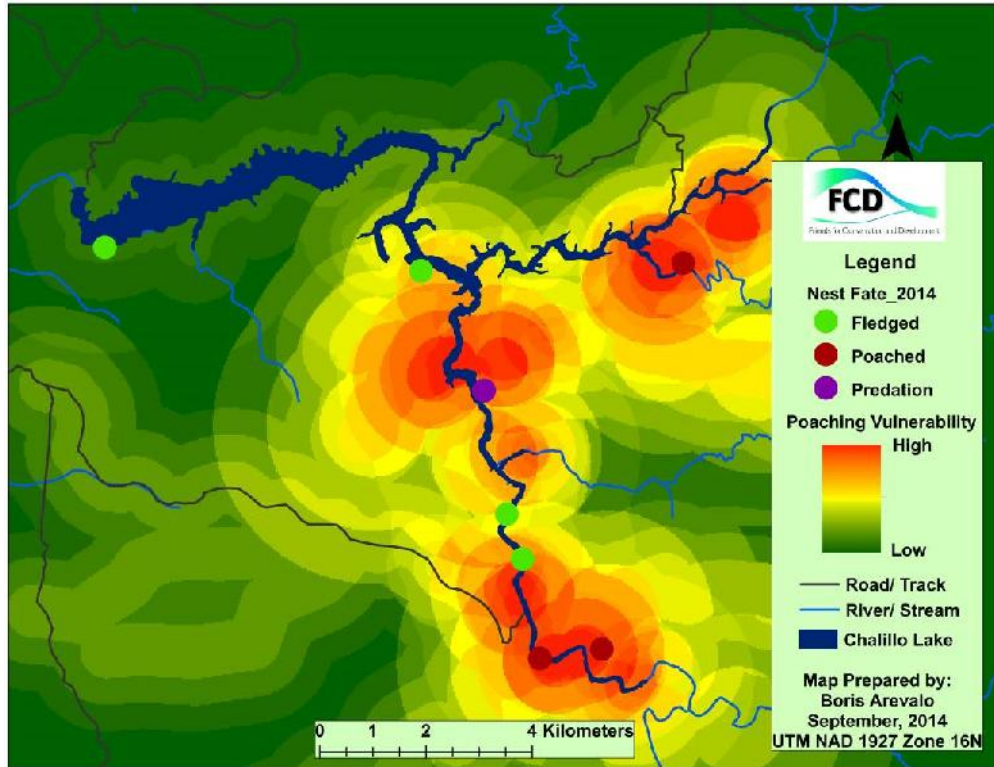


Figure 8: Poaching Vulnerability Index Map constructed based on occurrence of illegal activities



Figure 9: Red-lored Parrot nest poached and Mayan mound looted along the Chalillo Lake

VETERINARY CARE

A vital component of Scarlet Macaw nest biomonitoring is providing veterinary care for chicks. This was provided by Dr. Isabelle Paquet-Durand, from the Belize Wildlife and Referral Clinic. The veterinarian conducted three health checks on chick (first when chicks were between 6 – 15 days of age, second when chicks were 30 – 45 days of age and last check when chicks were 65 – 75 days of age). During each visit chicks were evaluated for general body conditions and for apparent ailments. If needed chicks were applied vitamin supplements and treated for external parasites.

For the first time since 2007, FCD recorded the establishment of an Africanized bee hive about 3 meters above the nest cavity at SMN_011. Bees were euthanized using Volaton® (active chemical: phoxim), as we feared that these could attack the chicks when they got more agile and also prevented the team being stung while conducting their systematic nest monitoring activity. We also recorded our first nest infestation by army ants. This occurred on SMN_002. The same was treated with Sevin Dust and a minute quantity of Volaton. During the process the chick was extracted from the cavity and allowed a 2 hour period before being re-introduced back to the nest, to prevent any infection from nest treatment.



Dr. Isabelle from BWRC providing health check of macaw chicks



Reintroduced chick in treated nest after being invaded by Army Ants.

FIELD VISITS AND PUBLIC AWARENESS

On May 7 – 8, 2014, the Belize Forest Department, FCD's Executive Director and Wildlife Biologist, together with Charles Britt, Nikki Buxton and Dr. Isabelle Paquet-Durand made a visit to El Peru, Peten, Guatemala where WCS has an in-situ laboratory for the rearing of Scarlet Macaw chicks. The objective was to view first-hand how WCS is working with the species in order for us to adapt their population management methodology and seek to increase Scarlet Macaw chick fledgling rates in the Chiquibul Forest.

FCD's Research Field Assistants Francisco Galicia and Elroy Reyes underwent a 4 day training in the aspects of hand feeding and laboratory raising of macaw chick, with WSC field technicians at El Peru. This training took place from July 15th to 19th.

Three major field visits were conducted in an effort to raise awareness about the issues affecting the Scarlet Macaws in the Chiquibul Forest. The first field visit took place on May 11, 2014. The group consisted of the Belize Forest Department, Scarlet Six Bio-monitoring Group, Belize Bird Rescue Center, Belize Wildlife and Referral Clinic and FCD's Executive Director and Wildlife Biologist. The objective of the visit was for the Forest Department to assess the viability of an in-situ population management of the species starting 2015; since there are many illegal activities that are impacting the population. Las Cuevas Research Station was identified as the ideal location to set up a field laboratory and flight cage to help the species by increasing fledgling rates. The second visit to the study area was conducted by a group of 8 students from the University of Florida and the University of Tennessee. The objective was to learn about the efforts being conducted to safe guard the species. This field visit took place on May 19 – 21, 2014. On September 11th members of the Cayo Tour Guide Association were given a day tour along

the Chalillo Lake so to explain the issues affecting the Scarlet Macaw population in the Chiquibul and define ways that they could help in the conservation of the species.



Elroy Reyes learning the process of food preparation for macaw chick hand feeding



Tour guides on field visit to Scarlet Macaw foraging and breeding site, Chalillo Lake

CONCLUSION

For the breeding season a total of 10 nesting attempts were monitored of which 31 eggs were laid. Of the total number of eggs laid 13 hatched but only 8 chicks fledged. Poachers managed to steal 4 chicks from their nests. Their activity remained persistent in the study area throughout the period. Most of the active nests, continued to be located in high poaching probability areas as qualified by the density and intensity of illegal activities being recorded around these. Poachers were reported to be more elusive in conducting their activities as evidenced by the low number of sightings even though the intensity of bio-monitoring patrols was increased.

Over the last two years FCD has been undertaking all efforts to increase coordination and communication between all stakeholders. In the field both FCD and Scarlet 6 have been in constant communication in order to maintain a constant human presence in the area and help deter poachers. Since the 2013 season FCD has developed a working calendar so as for one team to take over activities of the other when field personnel are on stand down. Through an improved communication with both teams FCD managed to have a constant presence at the study site from early May to August. This prevented poachers from disturbing more Scarlet Macaw nests. Veterinarian field visits were also coordinated between the team. All field data collected by either team was shared to keep all staff abreast of the situation. When one of the teams was moving on stand down, a briefing was carried out to inform the replacement personnel about the actual situation in the field.

An interesting experience this year was the relocation of two chicks who had a very high risk of being poached. These were moved to a nest that had been poached earlier but a permanent camp was set in place during the experiment. The relocated chicks were of approximated 19 and 20 days of age. These chicks were relocated from their original nest one day after their foster parents' nest was poached. The day after the chicks were relocated, their nest was climbed by poachers, thus if we had not made the decision to relocate the nests all our bio-monitoring efforts would have dwindled allowing only 6 chicks to fledge instead of 8 for this year. The foster parents adapted the chick quickly and by the end of the first day they were feeding them. This is the second experience that we have had in relocating chicks and in

both cases these have been successful. In 2013 the relocation of a chick was done due to the nest being at risk of being flooded.



Figure A: Chick on the day of relocation to foster nest



Figure B: Healthy foster chicks at approximate 80 days of age.

Based on FCD's experience, it has been recommended to explore other conservation interventions on the remaining population of macaws. It has been concluded that to increase Scarlet Macaw fledgling success (at the present moment it is very low) it is necessary to manage the population by hand raising at risk chicks in an in-situ field laboratory and conducting a soft release into the wild of these chicks.

RECOMMENDATIONS

Based on the results and observation made during the season, the following is recommended:

- Scarlet Macaw population management. This will involve extraction of chicks from their natural nest cavity when an at-risk chick has been identified, and caring for the chick at an in-situ "laboratory" (field camp) where care and food are provided until the chick is healthy enough to be placed into a wild nest. Fostering chicks into an adoptive active nest works well, as proven with our experience this year. WCS in Guatemala has also implemented this strategy with very high success rate but have noted that there is a higher success rate as long as there is only one chick (already) in the foster nest. If no foster nest is available then chicks are to be placed in a soft release cage for ultimate liberation into the wild. Both the laboratory and flight cage have been proposed to be established at Las Cuevas Research Station in the Chiquibul Forest.
- Maintain a constant bio-monitoring presence at the breeding sites, especially around active nests in order to decrease poaching vulnerability.
- Explore methods on how to tag adult and fledgling Scarlet Macaws so that these be easily identified in the field. This will help us understand if the same breeding pair is using the same cavity and how frequent breeding pairs have chicks. In terms of fledglings it will help determine survival rates and understand social interaction with wild adult macaws in the region.
- Continue to monitor active nests on a yearly basis to have solid data on the breeding biology of target species.

- Mount GPS transmitter on adult and fledgling in order to study their movement patterns and determine if they migrate in order to devise better conservation strategies.

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