

# Scarlet Macaw Monitoring Program

## Final Report – 2013 Nesting Season



*Adopted chick with head out of cavity three days before fledging © FCD*

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## ACKNOWLEDGEMENTS

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### INTRODUCTION

The Scarlet Macaw is the most widely distributed (Mexico to Brazil) of the 17 existing macaw species (Wiedenfeld 1994). Presently two subspecies have been identified being *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 throughout their range, due to habitat modification and the pet trade (Inigo-Elías 1996, Wright *et al.* 2001, Vaughan 2002) and has been included in Appendix I of CITES since 1983. The species typically 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). Being a long lived species; highly disturbed scarlet macaw populations are able to persist, shading the effect of habitat destruction and decrease recruitment for years (Marsden & Pilgrim 2003). This effect may be observed as a slow decline in population, followed by a drastic population crash as individuals of the populations become old leading to high mortality rates.

The Scarlet Macaw (*Ara macao cyanoptera*), the largest parrot species in Belize, is locally endangered due to poaching and listed as a species of high conservation concern in the Wildlife Protection Act of Belize. Scarlet Macaw population estimates in Belize suggest that there are round 200 individuals in the wild (Matola & Sho 2002). In Belize, the Chiquibul Forest serves as a key foraging and breeding habitat for the species. Over the past 5 years Friends for Conservation and Development (FCD) and in the latter three years Scarlet 6 (Roni Martinez and Charles Britt Group) has been systematically documenting Scarlet Macaw breeding activities as well as poaching of the same. Efforts have been concentrated along the banks of the Macal and Raspaculo Rivers (main breeding grounds) and results have indicated that poaching is a severe threat to the survival of the Scarlet Macaw population in Belize.

The objectives of this report are to: (i) present the findings of the 2013 Scarlet Macaw breeding season; (ii) summarize illegal activities recorded along the breeding ground of the Scarlet Macaw; (iii) identify Scarlet Macaw nest poaching vulnerability hot spots, and (iv) summarize the feeding ecology and behavior of adult Scarlet Macaws based on opportunistic observations.

### METHODOLOGY

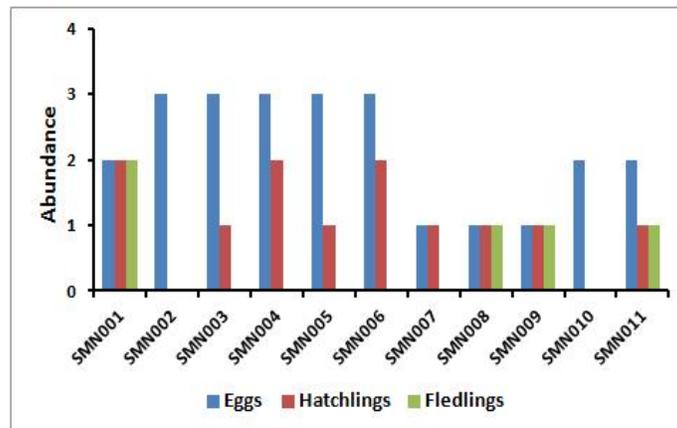
Scarlet Macaw bio-monitoring was concentrated along the banks of the Macal and Raspaculo Rivers. Active searching for active and potential cavities initiated in early February (onset of the breeding season). Field assistants navigated the rivers using a skiff and canoes while examining the trees on both banks of the river for cavities using binoculars. Once a tree with 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. All potential cavities identified were regarded as active until a breeding pair was observed using it. After a week of observing an adult inside the cavity, the nest was climbed using ascending equipment and inspected to verify its activity. Once eggs were hatched, the nest was monitored every 5 days to record the development of the chicks. Active nest monitoring included climbing the trees using rope ascending equipment, visually inspecting the cavity and then took a couple of photographs for further analysis and to document the development of the chicks. Nests were monitored until the chicks fledged. Nests that were located near field personnel camp sites were monitored throughout the day from a make-shift bird blind, in order to cause minimal impact on the parental care of chicks. On these nests, adult behavior around nest 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. Chick health and growth rates were periodically evaluated by veterinarians.

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

## RESULTS

During the 2013 breeding season a total of 13 active nests were identified, of which 11 were systematically monitored (Figure 1). The other two nests failed at an early stage of development due to tree structural failure and early nest abandonment for an unknown cause. The monitored breeding pairs laid a total of 24 eggs, an average clutch size of 2.18 eggs (minimum = 1; maximum = 3). Of the 24 eggs laid, 12 hatched (a hatching efficiency of 50%); while only 5 chicks successfully fledged the nest (Figure 1). Of the monitored nests, 36.36% had three eggs, while 27.27% had one egg only. During the season one re-nesting attempt was reported, this breeding pair managed to lay 5 eggs in their two nesting attempts but only one egg hatched.



**Figure 1:** Absolute abundance of eggs, hatchlings and fledglings per nest monitored in 2013.

Of the monitored nest 63.63% failed. Nest failure was attributed to tree structural failure (9%) (Figure 2 A), natural predation (27.27%) and poaching (27.27%) (Figure 2 B). The poached nests contained 33.3% (n = 4) of hatchlings, while 16.7% (n = 2) and 8% of the hatchlings were lost due to tree structural failure and natural predation respectively. By the end of the breeding season, seven new cavities were recorded (Figure 3). The new cavities were not monitored as these were discovered after abandonment by breeding pairs. All the new cavities registered showed evidence of poaching as indicated by climbing spur marks on the tree trunks and were confirmed as being active by the presence of fresh feathers and debris in the cavities.

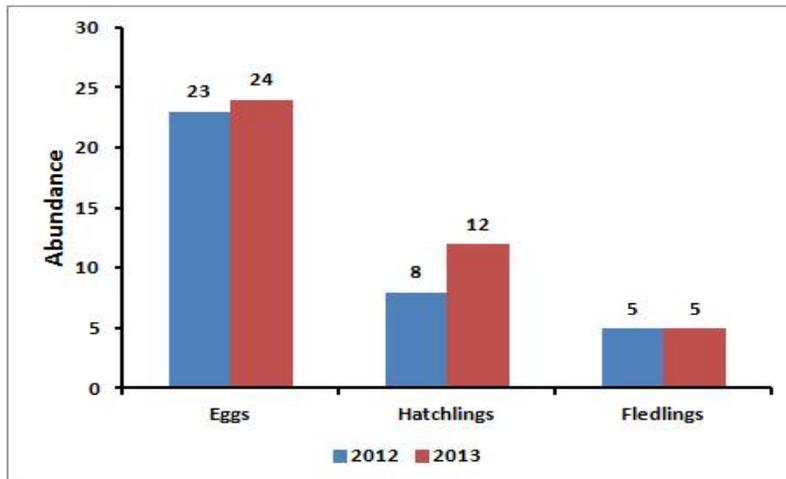


**Figure 2:** Scarlet Macaw nest failure due to structural failure of tree (A) and poaching as indicated by spur marks on tree (B)



**Figure 3:** Spatial distribution of monitored Scarlet Macaw nests by fate along the banks of the Macal and Raspaculo Rivers for the 2013 breeding season

When comparing the absolute abundance of eggs laid, hatchlings and fledgling between the 2012 and 2013 breeding season (even though in 2012, a total of 10 nests were monitored) we observe that the amount of eggs laid and fledglings were highly similar but the absolute abundance of hatchlings were greater in 2013 (Figure 4).



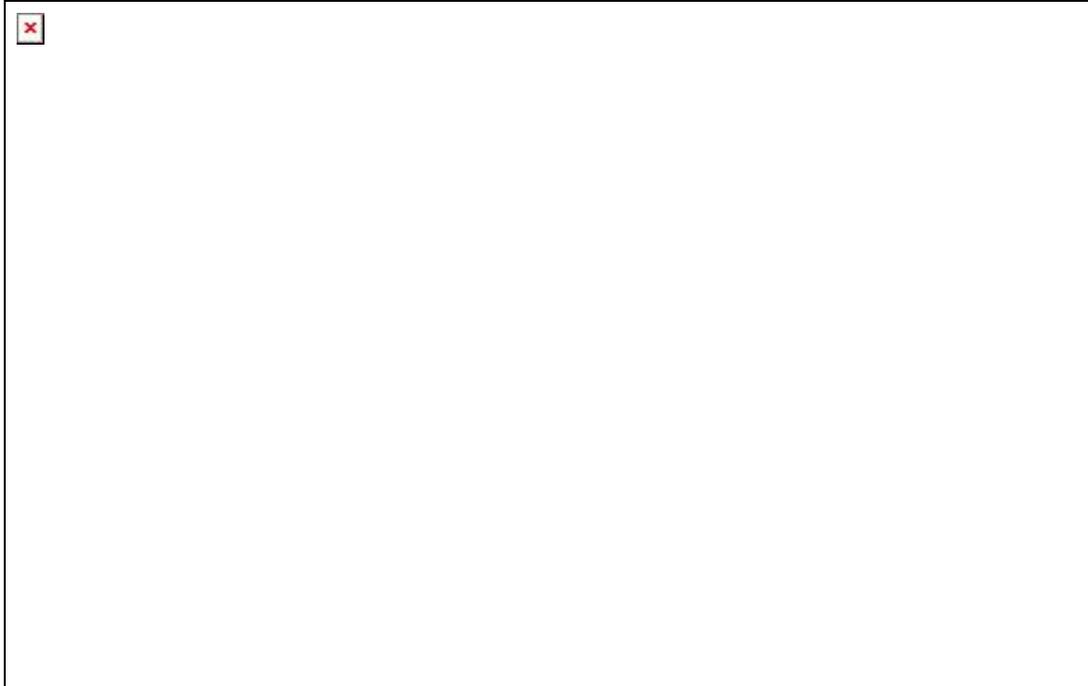
**Figure 4:** Absolute abundance of eggs, hatchlings and fledglings between 2012 and 2013 breeding season.

### Scarlet Macaw Sightings

During April to October of 2013, a total of 994 adult Scarlet Macaw sightings were recorded. All recordings were based on opportunistic sightings. Recorded flocks consisted of 4 individuals on average (Minimum = 1; Maximum = 25). Of this, 81% were observed in flight, which were mostly flying along the Macal and Raspaculo River valleys but some were recorded flying high in the air following an east-west direction, probably indicating a migration pattern. Foraging individuals accounted for 17.6% of all sightings and were documented in flocks of up to 25 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) and *Bursera simaruba* (Gombolimbo).

### Illegal activities

At the onset of the breeding season, the frequency of illegal activities reported was low but recorded a high increase from May to late September. This seems to coincide with chicks' maturity; an indication that poachers have a good idea about the reproductive season of Scarlet Macaws in the area. Illegal activities registered ranged from xatero/poacher sightings, camps and trails (Figure 5).



**Figure 5:** *Spatial distribution of illegal activities recorded along the banks of the Macal and Raspaculo Rivers during the 2013 Scarlet Macaw breeding season.*

A total of 22 xateros/poachers were sighted, of which two were detained by Law Enforcement personnel plus food and other material were confiscated (Figure 6 E & F). During each sighting an average of 1.83 poachers were recorded (minimum = 1; maximum = 3). On three different occasions poachers were observed with horses (n = 5). The abundance of make-shift camps recorded (n = 22) suggest that there was a high concentration of individuals engaged on illegal activities in the study area. The make-shift camps ranged from a single structure for one night use only to more complex ones composed of living quarters and a kitchen (Figure 6 A).

There is also a dense network of illegal trails utilized by xateros/poachers. A total of 67.31 km of trails were mapped (Figure 5). All major mapped trails had a general west to east direction and cross the Chalillo Lake at various points. Most of the xatero/poacher sightings and camps were recorded along these trails. We also recorded signs of various illegal activities ranging from forest fire (Figure 6 C), make-shift rafts (Figure 6 B), cooking fire places (Figure 6 D) and evidence of illegal hunting on various occasions. These activities were distributed throughout the study area. The forest fire recorded occurred on the banks of the Chalillo Lake, just below the confluence of the Macal and Raspaculo River.



**Figure 6:** Some examples of illegal activities recorded within the Scarlet Macaw breeding area; xatero/ poacher camp (A), make-shift raft (B), forest fire started by poachers (C), xatero/ poacher fire place (D), climbing spurs (E) and illegally hunted game meat (F). The latter two images are from items left behind by poachers when approached by field personnel.

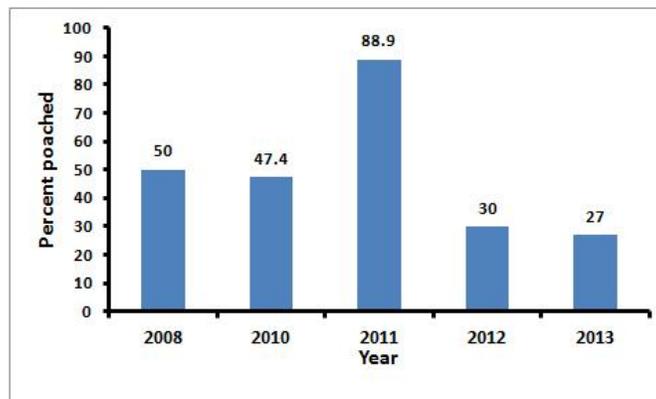
## Poaching vulnerability of Scarlet Macaw nests

Based on the poaching vulnerability index model, 7 of the monitored nests were located in an area of high poaching vulnerability, of which three were poached. Of the four nests that produced fledglings, three were located in areas with medium to low vulnerability, while one on an area of high vulnerability (Figure 7). All of the new cavities discovered at the end of the breeding season were located in high poaching vulnerability areas, and all showed evidence of being poached during the 2013 breeding season.



**Figure 7:** Poaching vulnerability map based on illegal activities recorded during the 2013 Scarlet Macaw breeding season.

Even though poachers were persistent in their efforts to poach nests, poaching during this season was the lowest reported in the last 5 years of monitoring (Figure 8).



**Figure 8:** percentage of monitored Scarlet Macaw nests poached along the banks of the Macal and Raspaculo River valleys.

## RECOMMENDATIONS

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

- Continue to monitor active nests on a yearly basis to have solid data on the breeding biology of target species.
- Conduct periodical chick health check-ups to increase the survival probability of the same.
- Maintain a constant presence at breeding sites, especially around active nests in order to decrease poaching vulnerability.
- Collect and analyze DNA samples of both adults and chicks to be able to monitor the genetic variability of the population.
- Continue to monitor illegal activities within the Scarlet Macaw breeding and foraging areas.
- 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 by our experience this year. WCS in Guatemala has also implemented this strategy with very high success but note that there is higher success as long as there is only one chick (already) in the foster nest.
- Mount GPS transmitters on adult and fledgling in order to study their movement patterns and determine if they do migrations to other areas in order to determine better conservation strategies.

## CONCLUSION

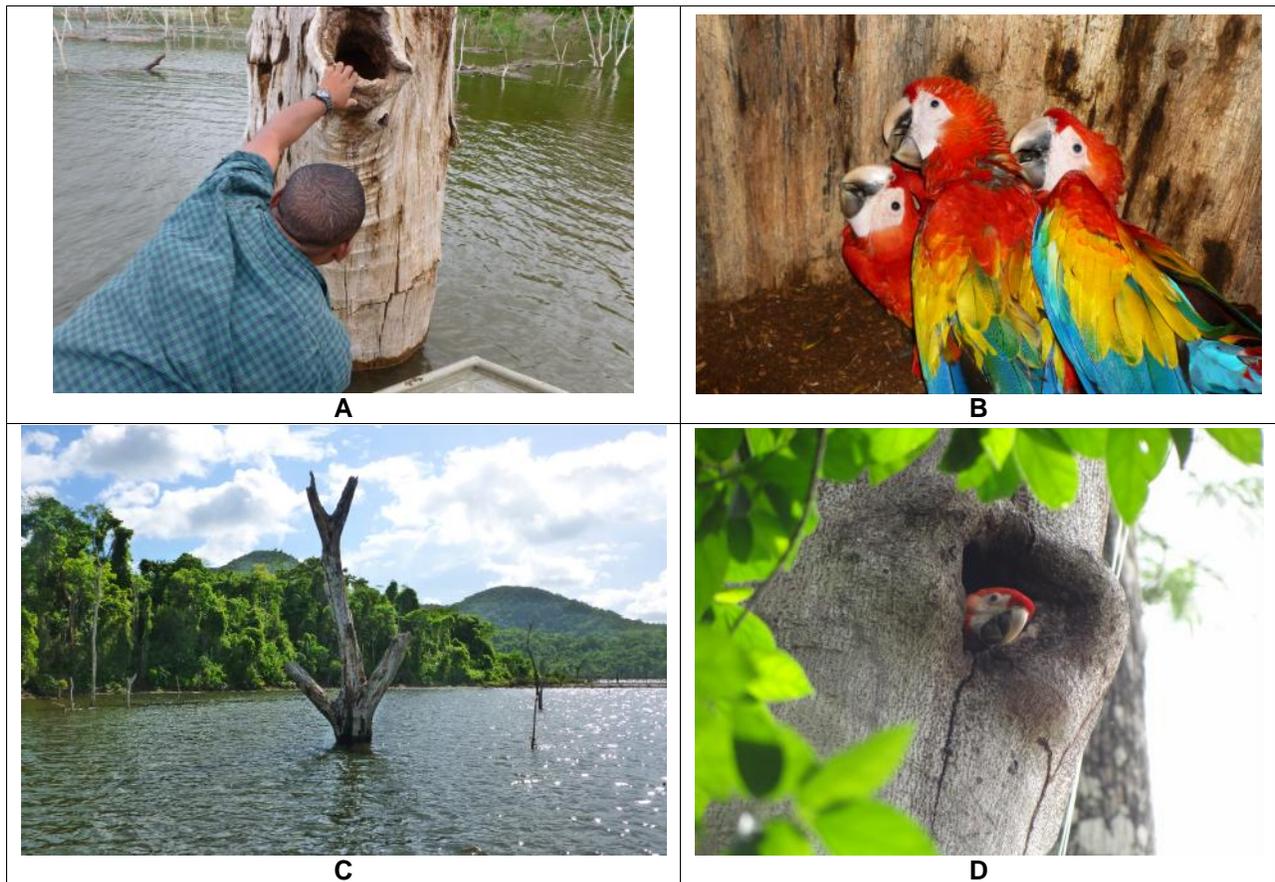
The 2013 Scarlet Macaw breeding season managed to add a total of 5 fledglings (similar to that of 2012) of the 24 eggs laid in 11 monitored nests to the wild population. The constant presence and systematic monitoring of active nests have helped us understand more the breeding biology of the species. It has also allowed us to gather data on the feeding ecology of wild individuals, allowing identification of important food sources. The result obtained (in terms of number of fledglings) was due to a joint effort between FCD and Scarlet 6 (Roni Martinez and Charles Britt group). The joint effort assured a constant presence in the area but due to the distance between the nests it was impossible to have a constant human presence in all the active nests, which led to the poaching of the same.

An important experience this year was the rescue of an 85 day old chick from being drowned by the rising water level of the Chalillo Lake (Figure 9 A - D). The chick was introduced into a foster nest that had 2 chicks of almost the same age. At first, the foster parents were hesitant to enter the nest and feed the chicks but after a day, they did feed their young plus the adapted chick. The parents continued to feed and care the chicks for 11 days after which the foster chick fledged the nest followed by the other two chicks two days later. This was our first experience in in-situ management of Scarlet Macaws and proved to be successful. It was observed that after introducing the chick to the cavity, adults were more frequently feeding chicks and did not enter the cavity during the night hours as they did before. This added some stress to the parents but was not severe due to the short period (11 days) that chicks spent

in the nest. This experience also leads to the assumption that in-situ management of the population is a promising conservation strategy that will drastically increase the number of fledgling per year. This strategy will also reduce poaching as chicks at risk can be extracted from nests, cared for in a in-situ laboratory and later introduced in others nests that are more easily monitored.

Based on data collected and the poaching vulnerability index map, poaching is the mayor threat to the survival of the population in the Chiquibul Forest. Poachers were observed to be well determined in conducting their activities. An effective way of deterring poachers is to have constant presence in the area but requires lots of resources thus finding other strategies to increase fledgling success is necessary.

Scarlet Macaw hatchlings' health condition was evaluated on three occasions (Figure 9 E). These were conducted by Dr. Isabelle Paquet-Durand, Dr. Angela Gimmel (both from the Belize Wildlife & Referral Clinic) and Dr. LoraKim Joyner (Avian veterinarian). This exercise also provided field staff with hands on experience in how to handle chicks and perform measurements, necessary to monitor chick growth rates. It also helped in the detection of early signs of stress and parasites on chicks, which could lead to the treatment of chicks and cavities for parasites thus directly increasing chick survival rates. Four out of the five fledglings were also banded, using specialized metal bands (Figure 9 F). The banding of chicks was conducted with the objective of aiding in identification of individuals. The field visits by the veterinarians was coordinated by Roni Martinez (Scarlet 6) as well as the provision of bands; FCD provided field support (tree climbing and chick extraction). These efforts were very important as it allowed us to have data about the health status of the chicks.





**Figure 9:** Richard Harris (FCD field assistant) approaching the nest to extract the chick (A), chick (right) introduced into the foster nest, nest cavity completely under water (C), adopted chick with head out of cavity three days before fledging (D); avian veterinarians conducting general health check on chick (E) and banded chick (F).

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