An artificial nesting box built for Scarlet Macaw conservation at Finca Las Piedras, Peru

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Abstract

A nesting box, constructed of wood, was built for scarlet macaw (*Ara macao*) conservation in the Madre de Dios region of Peru. Scarlet macaws are important seed dispersers and are a charismatic species that stand as a poster-child for conservation. Their population is declining because deforestation affects their reproductive rate, which is already naturally low. The logging of mature canopy trees, particularly ironwood (*Dipteryx micrantha*), deprives macaws of the large cavities they require for nesting. The purpose of adding artificial nesting space is to help macaws reproduce and to enrich the jungle experience that ASA offers.

Introduction

Around the world, birds that rely on cavities in large trees to nest in are being negatively affected by deforestation (Cornelius et al., 2008). Between 2000 and 2005, 1.4% of all humid tropical forests were deforested (Asner et al. 2009). The Amazon lost 1.8% of its forest cover between 2000 and 2005, and 18.2% of the basin was selectively logged during the 2000s. Much of the Madre de Dios region of Peru has been logged or selectively logged, and the process shows no sign of stopping. One group of parrots found in the region are the macaws. Large macaws such as the scarlet macaw (*Ara macao*), blue-and-gold macaw (*Ara ararauna*), and red-and-green macaw (*Ara chloropterus*) rely on large, natural cavities of some type for their reproduction.

While Scarlet Macaws are classified as Least Concern by the IUCN, their population is declining (Birdlife International, 2016). Among other problems such as the pet trade and poaching, macaws are losing habitat due to deforestation (Olah et al., 2014). Macaws naturally nest in tall, old, hollow trees (Olah et al., 2014), yet such trees have been steadily removed either for wood or to clear space for farmland. Deforestation has reduced the number of places they can raise young and has taken away trees that will create spaces in the future.

The goal of this project was to build scarlet macaw nesting boxes in a selectively-logged forest along the Amazonian agricultural frontier. Providing space for Scarlet macaws to nest will help ensure the continued survival of the species in this region as logging and deforestation continue. By preserving macaws, other species will benefit, as macaws play an important role in seed dispersal. Additionally, as macaws are a charismatic flagship species, visitors to the region will

be inspired if they are able to see them and may then care more about conservation.

Methods

Nesting Preferences

Scarlet Macaws naturally nest in mature specimens of *Dipteryx micrantha* (ironwood), *Calycophyllum* spp*., Hymenaea oblongifolia, Erythrina* spp*.,* and *Iriartea deltoidea* (barrigona palm) (Olah et al., 2014). The average height of their natural nests is 26.57 m off the ground and the natural nest circumference is 38.56 cm (Olah, 2014). The pre-nesting season is from July to December (Nycander et al., 1995) and nesting season is during the wet season from November to April (Olah et al., 2014). Boxes need to be hung before October to have a higher chance of occupancy in the first year (Nycander et al., 1995).

Field site

The box was built and hung at Finca Las Piedras, the field site of the Alliance for a Sustainable Amazon near Puerto Maldonado, Peru (12.2° 13.6' S, 69.1° 6.5' W). The site is a 54-ha parcel composed mainly of selectively-logged terra firme forest bordered by abandoned agricultural fields. To the west of the field site is the Interoceanic Highway and an expanding strip of deforestation for small scale agriculture. Apart from Brazil nut trees (*Bertholletia excelsa*), most large, cavity-forming trees have been removed from the area by selective logging over the past 30-40 years. This has left very few trees within many miles that are large enough to produce the cavities macaws need. Studies done by Olah et al. (2014) and Nycander et al. (1995) showed that scarlet macaws can and will raise young in artificial nests. These studies were done near a large parrot clay lick, which is an important resource because it provides minerals that are lacking in their natural diet. Although there is no large clay lick near us, scarlet macaws fly over the field site almost every day (personal observation), meaning many persist in the area and may come to use suitable cavities if they are created.

Building the Artificial Nests

Before building, I conducted research into the optimal design of macaw nest boxes. I found that the best design in terms of durability and longevity is cylindrical PVC boxes (Nycander et al., 1995 & Olah et al., 2014). However, PVC of the proper dimensions could not be acquired in Puerto Maldonado, a consideration for NGOs operating in remote areas. Instead, we opted to experiment with wooden boxes. Although such boxes have a limited lifespan due to weathering, chewing by the birds, and infestation by termites and other social insects (Nycander et al., 1995 & Olah et al., 2014), the materials are easily acquired and the boxes are economical and simple to build.

I built two artificial nest boxes: a small one as a pilot project and a larger one to be used by macaws. The dimensions of the small box were 68 cm x 19 cm x 15 cm and it was hung on a wooden post in the forest edge, in a well shaded area. For the large box, design and dimensions followed as closely as possible to the described boxes of Nycander et al. (1995) and Olah et al. (2014). The larger nest box was 150 cm tall in the front and sloped downwards to 131 cm tall in the back. The width of the sides was 45 cm. The roof sloped at an angle of 22.5 degrees down away from the front, to prevent water from running over the

entrance in the rain. The entrance hole was 15 cm in diameter.

The boards used were 3 cm x 15 cm x 3.1 m, cut down to the lengths needed. A wooden frame was made to nail the boards to. A wooden roof was put on to help thermoregulate the inside, and metal pleated sheeting was fastened on top of that using nails to let rain flow off more easily. The bottom was made from wood and fastened to the frame using nails. Along the inside of the box wooden slates were nailed to the sides several inches apart to form a ladder for the birds to climb up and down from the entrance to the bottom of the nest. Before the roof was installed, the bottom was filled with 30 cm of saw dust, sand and wood chunks for use as nesting material. Two extra boards were put on horizontally around the entrance for added support. These two pieces are meant to be replaced yearly as they are chewed on by the macaws.

The small box (Fig. 1A) was completed in approx-imately 7 man-hours and successfully erected in 1.5 hours. The large box (Fig. 1B) was nearly complete after 25 man-hours, with an additional 5 hours devoted to filling it with 30 cm of sawdust, sand, and wood chips, securing the wooden roof, and nailing sheet metal shingles on top to keep the rain out. Hanging the box required a minimum of two trained climbers and four people on the ground, due to the weight of the box (estimated at more than 50 kg) and took 8 hours over two days.

One design aspect that was not used in the nest box was the side door to access the chicks. This was done for simplicity's sake and for ethical reasons. The purpose of this specific box is to provide housing for macaws, not to be able to study them. Only professionals should be handling baby birds.

Figure 1. A small pilot box (A, left) hung in forest edge, and a large box for scarlet macaws (B, right) waiting to be hung. The small box is 68 cm from top to bottom while the large box is 150 cm.

Hanging the box

The box was hung in a Brazil nut tree roughly 25 m up, as this is essentially the only large canopy tree remaining at the site. A trained climber ascended first and installed a pully on a large, well-shaded branch close to the trunk, as temperature is suspected to play a role in successful chick raising (Olah et al., 2014). The box was then raised via the pully, with three people using a rope-climbing ascender to draw the rope down. Slack was pulled through a gris-gris to prevent back-sliding and then safety knots were tied. When the box was raised to it's final height, the climber secured it to the two top-ropes tied to the branch. Then the climber and a second climber secured a rope around the box and the trunk of the tree. Ropes were held in place on the box by the use of metal eye-rings screwed into the wood.

Future work

Occupancy of the nests should be checked using binoculars from the ground once a week starting in November when the macaw breeding season starts. Maintenance will be needed as parts of the box start to decay. Inspections should be done in the early dry season and maintenance will need to be completed by early July when the pre-nesting season starts. The box will most likely need to be retired after 5 or 6 years of use, perhaps less.

Evaluation

One challenge the project faced was a time crunch towards the end, as building just the large box took over 60 man-hours. Time and effort are major considerations for scaling up the project, and there are at least 40 more suitable Brazil nut trees from which boxes could be hung. To avoid this, material to build boxes should be bought and delivered as soon as possible. Another time con-sideration that was not originally accounted for was the need for entrance holes to be drilled by a carpenter. Additional tools, such as sharper saws, will also help if future boxes are to be built on site.

Previous conservation efforts have found that building nests out of PVC has worked best for scarlet macaws (Olah et al., 2014 & Nycander et al., 1995). PVC requires less maintenance than wood boxes because the plastic prevents stinging insects from taking over the nest, the material does not rot as fast in the wet season, and the macaws cannot chew on it as easily. Wood may offer a more natural roosting site and may be a better for thermoregulation, but does not usually last for more than two years. Both Olah et al. (2014) and Nycander et al. (1995) suggest not using wood as the nest material because the investment put into building and hanging the nests is not repaid in the maximum of two seasons the box is good for. The Tambopata Macaw Project sources their PVC from Lima and ships it to Puerto Maldonado. Advanced planning to acquire PVC will make future boxes more durable and worthwhile.

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Works Cited

Asner, G. P.; Rudel, T.K.; Aide, M.; Defries, R.; Emerson, R. (2009). A Con-temporary assessment of change in humid tropical forests. *Conser-vation Biology, 23(6), 1386- 1395.*

BirdLife International. (2016). *Ara macao*. The IUCN Red List of Threatened Species 2016: e.T22685563A9307-9992. <http://dx.doi.org/10.2305/-IUCN.UK.2016-3.RLTS.T2268556-3A93079992.en> .

Brightsmith, D. J.; Stronza, A.; Holle, K. (2008). Ecotourism, conservation biology, and volunteer tourism: A mutually beneficial triumvirate. *Biological conservation, 141(11), 2832-2842.*

Cornelius, C.; Cockle, K.; Politi, N.; Berkunsky, I.; et al. (2008). Cavity-nesting birds in neotropical forests: Cavities as a potentially limiting resource. *Ornitologia Neotropical Society, 19, 253-268.*

Nycander, J. E.; Blanco, D. H.; Holle, K. M. et al. (1995). Manu and Tambopata: nesting success and techniques for increasing reproduction in wild macaws in southeastern Peru. *The Large Macaws: Their Care, Breeding, and Conservation,* 423-443.

Olah, G., Vigo, G., Heinsohn, R., & Brightsmith, D. J. (2014). Nest site selection and efficacy of artificial nests for breeding success of Scarlet Macaws Ara macao macao in lowland Peru. *Journal for Nature Conservation, 22*(2), 176-185.