

# Macaw Reproduction and Management in Tambopata, Peru II: Nest box design and use.

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Large macaws are among the most beautiful Neotropical birds, but unfortunately they are also among the most endangered. Macaws face many threats including clearing for agriculture, logging, and the pet trade. Logging often targets the biggest trees, the ones that have the large tree cavities that macaws need to nest. In addition, many collectors will cut nest trees to get out the young. As a result, the number of available nest sites for macaws has been greatly reduced in recent years. This fact is compounded by the fact that suitable natural cavities are often very rare even in pristine old-growth forests that have not suffered any real impacts from logging (Munn et al 1991). The shortage of nest sites is a serious issue and one that may inhibit the recovery of macaw populations throughout the Neotropics, even in areas where reserves are successfully established.

In response to the need to develop artificial nest sites for macaws, researchers working at the Tambopata Research Center in southeastern Peru were the first to successfully produce nest boxes useable by wild macaws (Nycander et al. 1995). The first "nest boxes" were actually made from the central barrel-shaped section of *Ireartea* palms. These pieces of palm were prepared by cutting a cavity in to the barrel and putting wooden disks to close the top and bottom. Each was 3-5 meters in length and entrance holes were cut about two-thirds of the way up from the bottom. Each nest weighed approximately 350 kg (770 lbs). Twenty four of these nests were hung in October 1990 in the forests around the Tambopata Research Center. Unfortunately most of these nests were hung too late to have nests in the 1990-1991 nesting season, but one of them did have a nest of Scarlet Macaws that successfully fledged a single chick. By the following year, all but three of these boxes had rotted to the point where it was not useable by the birds. Pairs of macaws used the tree remaining boxes, but none successfully fledged young. Despite the difficulties with the design, these were the first successful documented nesting of macaws in an artificial nest substrate (Nycander et al. 1995).

The high rate of decomposition of these boxes made it clear that an alternative had to be developed. As a result, in March 1992, 8 new boxes were hung, made from the wood of tropical cedar (*Cedrella odorata*). These boxes had bases 45 cm x 45 cm and were 1.6 m tall. Each had a slanted roof and a single 15 cm diameter hole in the front about 15 cm from the top. They also had sliding, 20 cm x 20 cm wooden doors that allowed the researchers access to the eggs and young. These boxes were hung in sites where palm boxes had rotted away. Of these 8 boxes, bees immediately occupied 1, and Scarlet Macaws used the other 7. These boxes lasted much better than the palm trunks, but were still did not last as long as hoped. The wood slowly rotted, and this damage was compounded by the macaw's propensity to chew. By September 1998, only one of these boxes was still useable, and all the rest had rotted or had the bottom chewed open by the birds. In September 1999 even this final box was beyond repair and was unusable by the birds.

Even early on, it was obvious that these wooden boxes would not last as long as hoped. For this reason, a new nest box was designed using PVC tubes. These boxes had wooden (*Cedrella odorata*) tops and bottoms, and were lined inside with 5 cm x 5 cm (2" x 2") wire mesh to allow the birds to climb up and down the inside of the tube. Sand and/or saw dust was placed in the bottom of each tube to provide the birds with a soft, moveable substrate on which to lay their eggs. Each nest also has a sliding door that allows researchers to easily remove the chicks from the nests for measurements. The nests were made from both 12 inch and 14 inch diameter tubes. From August – September 1992 10 boxes, 5 12 inch and 5 14 inch were hung in the forests near TRC. The 12" boxes were not used due to a faulty roof design. Of the 5 14" boxes, macaws used 4 of these in the 1992-1993 nesting season. Since 1993, additional boxes have been constructed, the wooden tops and bottoms have rotted away and been replaced with metal disks and the leak problems with the roofs have been fixed. In the 1999-2000 season, 12 boxes were available for macaw nesting. All of the boxes were used except for 3.

There are three common species of large macaws in the area surrounding Tambopata Research Center: Blue-and-gold, Green-winged and Scarlet Macaws. Of these three, only the Scarlet Macaw has ever nested in the artificial nest structures at TRC. Since the central goal of the Tambopata Macaw Project is to develop management techniques to help macaw populations in other areas where they are more endangered it is vitally important that we develop nest boxes that work for all three of the large macaws present in the area. With this goal, 7 new nest boxes were hung during 2000. Three of these were hung in a small nesting colony of Blue-and-gold Macaws in the palm swamp near TRC (Brightsmith

2000). Each was hung from a live Aguaje palm (*Mauritia flexuosa*) at a height of 10-20 meters and about 20 meters from the center of the colony where 5 pairs of Blue-and-golds nested in the 1999-2000 nesting season. These boxes are slightly modified versions of the 12" diameter nests discussed above. The main difference is that the nests hung in the swamp are open on top, just like the dead Aguaje palms that the birds are currently using. All have extra drainage holes in the base and have a mixture of river pebbles, sand and fine rotten wood in the bottom. Two of them are 2.5 m long and one is 1.7 m long (Table 1).

The other 4 nest boxes have been designed in the hopes that Green-winged Macaws will use them. Three of the boxes are exactly the same as those used by Scarlet Macaws except for the fact that they are made from 16" diameter PVC pipe. The 16" pipe was chosen because Green-winged Macaws are significantly larger than Scarlet Macaws, so it is hoped that these larger nests may be occupied by the larger species. Of these, one has been hung in mature floodplain forest near TRC in habitat identical to that used by 2 pairs of nesting Green-wings in 1999-2000. The other two were hung in terra firme forests. One of these was at Posada Amazonas Lodge along the lower Tambopata River in an area frequented by a flock of at least 30 Green-winged Macaws. The other is in a bamboo-dominated forest near TRC.

The fourth nest box is the first PVC nest to be hung horizontally. It is constructed from 16" diameter tube, lined with wire mesh and has an access door near the base, just as in the vertical nests. The main difference is that this nest has just a single hole, and this is located in the disk that tops one end of the nest. The nest is hung from the underside of a large horizontal branch of a *Dipteryx* tree. The nest is hung at a about a 20 degree angle with the entrance at the high side. The tube has a layer of rotten wood about 2-10 cm deep in the bottom third. This nest is hung in mature floodplain forest about 100 m from a natural Green-winged Macaw nest that failed during the 1999-2000 season.

Starting in October of 2000 research teams will begin intensive monitoring of all these nest boxes to determine which species use each type of box and the success rates of these nests. It should be obvious by mid-November if these new box designs have succeeded in attracting Blue-and-Gold or Green-winged Macaws. If either design is used by Green-winged Macaws, this design will immediately be used to start an intensive nest box program near Posada Amazonas and on the other lands of the Native Community of Infierno. The community, as senior partners in the Posada Amazonas lodge, has a vested interest in conservation so they are eager to work with the research team to help the macaw populations here recover from historical exploitation. By involving the community in the project and conservation efforts, we hope to guarantee the future of the macaw populations in the lower Tambopata region.

## Acknowledgement

Each nest at Tambopata Research Center has traditionally been given a name. One of the new 16" diameter nests hung at TRC has been given the name Sue B. in memory of a good friend and champion of macaw conservation Susan Bondalier who passed away in June. It was one of Sue's greatest wishes to come and visit TRC to see the macaws, unfortunately she passed away before being able to fulfill that wish. By putting her name on this box I hope that her memory will live on in this wonderful spot she so wanted to visit.

## Literature Cited

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