

The conservation of Spix's macaw

Tony Juniper and Carlos Yamashita

*An expedition recently mounted in north-eastern Brazil gathered evidence strongly indicating that Spix's macaw *Cyanopsitta spixii* is effectively extinct in the wild. The only hope of saving the species from total extinction now rests with the small captive population. Fieldwork suggested that habitat degradation played a part in the decline of the species and it was concluded that habitat conservation should be a major consideration in future efforts to save it. A fully integrated conservation package is proposed that reflects the multiplicity of conservation needs of Spix's macaw.*

Introduction

Spix's macaw is one of the least known of the Neotropical parrots. Since it was first collected on the banks of the Rio São Francisco in 1819, the species has been known from a small collection of museum specimens, sight records from a handful of observers (see, for example, Naumburg, 1928) and a tiny captive population. Work by Roth (1990a,b) and the reports of other observers had led several authors to conclude that the species was extinct in the wild. Recently, however, there has been doubt concerning the wild status of Spix's macaw. Rumours of birds sold on the black market and reports of Spix's macaws in the wild led to speculation that a hitherto unknown population survived.

It is widely believed that Spix's macaw possessed a range encompassing a 300,000-sq-km area in the interior of north-eastern Brazil (Roth, 1990a,b). Several authors, including Sick (1985) and Ridgely (1981), gave a range including parts of the states of Bahia, Piauí, Maranhão, Goiás and Pernambuco. This is a vast area covering three major vegetation types and suggested that Spix's macaw was a generalist species capable of tolerating a range of conditions. Indeed, the habitat preferences of this species have been cited as elements of the semi-arid *caatinga* (Roth, 1990a,b), the more humid and predominantly evergreen *cerrado* (Sick, 1985) and deciduous woodlands that form a mosaic with both vegetation types where conditions are suitable (Ridgely, 1981).

However, recent authors (Forshaw and Cooper, 1989; Roth, 1990a,b; Silva, 1989) indicate that a favoured habitat feature of the last known wild birds was the *Tabebuia caraiba* gallery woodlands fringing the seasonal watercourses that traverse the *caatinga* vegetation in north-eastern Bahia state. Although other workers (Meyer de Schauensee, 1970; Ridgely, 1981; Sick, 1985) have suggested palm groves (particularly *Mauritia flexuosa*) as a preferred habitat feature, fieldwork undertaken in 1990 would indicate that this is an erroneous conclusion (Juniper and Yamashita, unpub. data).

In recent years it has been recognized that Spix's macaw must be very rare and King (1978) listed it as Vulnerable in the *ICBP Red Data Book*. Throughout the 1980s the species was under serious threat from the international trade in live birds, and Thomsen and Munn (1988) charted the decline of the only known population, which existed in the area where the type specimen was collected near Curaçá in north-eastern Bahia. In July 1990 only a single bird remained from a population of around 30 pairs (Juniper and Yamashita, unpub. data).

Juniper and Yamashita (unpub. data) present evidence suggesting Spix's macaw to be chiefly associated with *T. caraiba* gallery woodlands, a restricted formation that appears to occur only in a relatively small area of north-eastern Bahia on the right bank of the Rio São Francisco. Evidence gathered in this region strongly indicated that the existing available

habitat is a mere remnant and that this explains the original rarity of the species and its extreme vulnerability to trapping. These findings further emphasize the importance of the small number of specimens in captivity but also highlight the need for habitat conservation measures, a consideration not previously thought important in the struggle to save Spix's macaw.

Habitat, population and distribution of Spix's macaw

The habits of wild birds reported by Roth (1990a,b), and our observations of the last wild bird, strongly indicated a preference by Spix's macaws for the *T. caraiba* gallery woodlands that are associated with the seasonal water-courses characteristic of the right bank of the Rio São Francisco. It is not absolutely clear why such woodlands should be favoured, especially since Roth (1990a,b) presented information indicating a diet that included the fruits and seeds of tree species that occur widely in the caatinga and that are not obviously tied to the creeks. However, it is possible that nest site availability is important and Juniper and Yamashita (unpub. data) present evidence showing a positive relationship between the preferred areas of woodland for Spix's macaw, the proportion of dead wood and the number of available nest holes. Also, Roth (1990a,b) cites the testimony of bird trappers who indicate a strong preference for traditionally used holes in old *T. caraiba* trees.

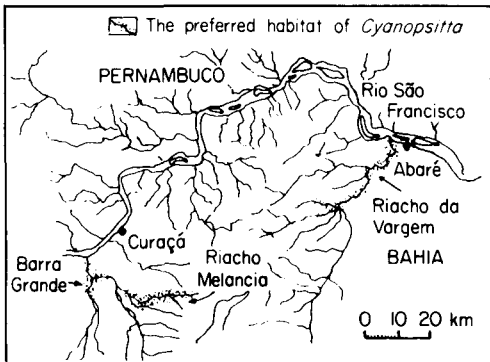


Figure 1. Map to show the distribution of Spix's macaw.

The current area of *T. caraiba* gallery woodland is very limited in extent. On the basis of conversations with local people (including a land-use planner with access to aerial photographs) and a ground search conducted across a wide area of the right bank of the Rio São Francisco, it was estimated that approximately 30 sq km are left. This woodland is concentrated into three patches: one at Barra Grande (the type locality), one at Riacho Melancia (where birds were observed by Roth [1990a,b] and ourselves) and in the Riacho da Vargem (the new locality from which it is thought the last birds were recently removed) (Figure 1).

A search of the preferred habitat revealed the existence of one Spix's macaw, although this individual had formed a pair bond with a single blue-winged macaw *Ara maracana*. These birds were frequently observed together, allopreening several times and copulating on at least one occasion.

Causes of the extinction of Spix's macaw in the wild

Roth (1990a,b) listed three main pressures on the species: direct hunting; African bees; and trapping for the black market in live birds. To this list we can now add habitat loss as a long-term contributory factor to extinction.

Habitat loss

Evidence was collected that indicated that the *T. caraiba* gallery woodlands described above are a remnant. Regeneration was found to be very poor and this was attributed to grazing pressure. An analysis of size-class structure of the *T. caraiba* trees showed that the population of this species is dominated by a preponderance of mature specimens. Indeed, only 1.5 per cent of specimens are in the 10–20-cm DBH (diameter at breast height) class and saplings of 30–200 cm in height were found in only one of the ten samples. This section of creek was surrounded by a fence that excluded domestic stock and indicated that the absence of saplings in other areas was due to

grazing pressure. Furthermore, although several samples contained good numbers of seedlings under 30 cm high, the majority were heavily browsed and would probably not survive the dry season.

North-east Brazil was the first region to be settled by Europeans with the Rio São Francisco providing a natural corridor into the interior. As pastoralism has been the major land-use here for over 300 years, it can be assumed that *T. caraiba* woodland was once more extensive and that its decline was due to the pressure of domestic stock. This resulted in a concomitant decline in the numbers of Spix's macaw, which then became more susceptible to other pressures.

Trapping for trade

The most serious pressure and the one that directly led to the loss of the species in the wild was the taking of live birds for the bird trade. Thomsen and Munn (1988) presented information on the number of birds removed from the Curaçá population, the presumed source for all birds received by collectors in recent years (Roth, 1990a,b). Between 1977 and 1987 at least 23 birds were handled by two dealers and Roth (1990a,b) gives an account of how the last breeding pair was mercilessly persecuted; this led to several consecutive breeding failures and ultimately the capture of the adults. During fieldwork carried out in July 1990, the authors found that efforts were under way for the capture of the last individual.

African bees

Roth (1990a,b) suggested that the aggressive introduced African bees could have contributed to low breeding success by competing with Spix's macaw for nest holes. However, during the *T. caraiba* survey carried out by the authors, only 2 out of the 40 potential nest holes examined obviously contained bees.

Direct hunting

Direct hunting may have contributed to the decline of Spix's macaw since 'bush meat'

forms a significant part of the diet of the local rural people. Indeed, we found elderly residents who could recall shooting the species many years ago.

Conservation of Spix's macaw

Previous initiatives

In recent years, several initiatives have been launched in an attempt to save Spix's macaw from extinction. In August 1987, a meeting was convened at Loro Parque in Tenerife in the hope that a co-operative captive-breeding effort could be established. Since then, several field surveys have been undertaken by Roth to try and find further wild birds and in October 1989 plans were laid for the establishment of a recovery committee, backed in law by the Brazilian Government, with representatives of interested parties meeting to arrange the development of a captive-breeding programme (some 15 birds are held in captivity around the world). In June and July 1990, a further field survey was carried out under the auspices of the International Council for Bird Preservation. Information collected during this expedition forms the basis of the recommendations outlined below. These recommendations are now being actively pursued by ICBP.

Conservation recommendations

While we congratulate the government of Brazil on the rapid establishment of its working group, the discovery of a bird remaining in the wild must alter the agenda for the species's recovery. We feel that there is still a good chance to save Spix's macaw from extinction if the following recommendations are acted upon.

* The last wild bird must be protected from trappers. If the species is allowed to become extinct in the wild, it will be far more difficult to reintroduce captive-bred individuals. The recovery programme for the Puerto Rican parrot *Amazona vittata* has demonstrated the great value of maintaining a wild population

(Snyder *et al.*, 1987) and work in Arizona on the reintroduction of thick-billed parrots *Rhynchopsitta pachyrhyncha* has highlighted the immense difficulty of returning captive-bred birds to the wild in the absence of an established population. Guards, preferably armed, must be posted in the locality frequented by the last bird.

* A mate should be found for the last wild bird. A suitable partner should be found from among the captive birds for the last wild individual and every effort must be made to encourage successful breeding in the wild. It should be possible to determine the gender of the last wild bird from a feather (which will involve some risk when the bird is captured) or its *Ara maracana* partner could be surgically sexed, although it is not certain that this individual is of the opposite sex to the Spix's macaw. The early release of other wild-caught adults should also be planned for.

* Habitat conservation measures must be instigated. The *T. caraiba* gallery woodlands favoured by Spix's macaw are not regenerating. Goats, sheep and cattle currently eat all of the young trees and as a consequence the habitat is gradually disappearing. Sections of the seasonal watercourses should be fenced for 5–10-year periods to enable young trees to grow out of the reach of domestic stock. Ultimately, this kind of management will be of benefit to the farmers since the mature trees provide a renewable source of food for domestic stock during the dry season. It is felt that the *T. caraiba* gallery woodlands merit conservation in their own right due to the very limited extent of this formation.

* A fully up-to-date captive-breeding facility should be established in the area where the last wild birds were known. In order to maximize the productivity of the tiny captive population, a technologically advanced breeding facility should be established near Curaçá. This should be properly funded and run by an internationally recognized expert on macaw husbandry. Several benefits would result if such an initiative is taken, including: a 'neutral' site would encourage other aviculturists to send their birds to the scheme; the climate and surroundings would facilitate greater

breeding success and acclimatize the birds for ultimate release; benefits for both the wild birds and those held in captivity would be gained through the opportunity to manage both sets of birds together. Such benefits have proved central to the successes achieved with the recovery effort for the Puerto Rican parrot; although generally very poor, the local people were found to be very helpful and genuinely interested in the macaw. A conservation effort set up locally would promote goodwill and contribute greatly to the ultimate protection and conservation of wild birds.

* The working group established under Brazilian law for the recovery of Spix's macaw needs to broaden its remit to accommodate the new situation created by the discovery that a single wild bird survives. We commend the points above to the group, which should be responsible for the overall management of the project and should ensure that all major decisions reflect the priority conservation needs of the species.

Summary and conclusions

The main (ultimate) cause for the loss of Spix's macaw in the wild was the live bird trade. This pressure was particularly serious since the wild population had been depleted through the loss of habitat. Other less serious factors such as introduced bees and shooting for food may have hastened the decline but were probably not instrumental in bringing about the extinction.

Increasingly, as time passes, the chances of saving Spix's macaw from extinction are reduced. The multiplicity of factors that led to the virtual extinction of this species in the wild will require a correspondingly diverse range of measures to re-establish it. New information concerning the threats to the habitat of Spix's macaw is particularly disturbing and it is obvious that an integrated approach involving both captive breeding and ecological expertise (as well as better enforcement of wildlife trade laws and education of local people) will be needed if a serious attempt is to be made to secure the species in the wild.

Acknowledgments

The expedition to search for Spix's macaw would not have been possible without the support and participation of Luiz Claudio Marigo, Francisco Pontual and Roberto Otoch. We gratefully thank them for their outstanding contribution to this work. We wish to thank the International Council for Bird Preservation and the World Parrot Trust for financial support for the fieldwork and Mike Rands and Nigel Collar for their comments on drafts of the manuscript.

References

Forshaw, J.M. and Cooper, W.T. 1989. *The Parrots of the World*. 3rd (revised) edn. Blandford, Poole.
 King, W.B. 1978. *Endangered Birds of the World: The ICBP Bird Red Data Book*. Smithsonian, Washington.
 Meyer de Schauensee, R. 1970. *A Guide to the Birds of South America*. Academy of Natural Sciences, Philadelphia.
 Naumburg, E.M. 1928. Remarks on Kaempfer's Collections in Eastern Brazil. *Auk* 45, 60-64.

Ridgely, R.S. 1981. The current status and distribution of mainland Neotropical parrots. In *The Conservation of New World Parrots* (ed R. F. Pasquier). ICBP (Tech. Pub. 1), Cambridge.
 Roth, P. 1990a. Bericht über ein 1985-1988 durchgeführtes Projekt. *Papageien*, 90, 86-88.
 Roth, P. 1990b. Bericht über ein 1985-1988 durchgeführtes Projekt. *Papageien*, 90, 121-125.
 Sick, H. 1985. *Ornitologia Brasileira, Uma Introdução*. Editora Universidade de Brasília, Brasília.
 Silva, T. 1989. *A Monograph of Endangered Parrots*. Silvio Mattacchione and Co, Canada.
 Snyder, N.F.R., Wiley, W.J. and Kepler, C.P. 1987. *The Parrots of Luquillo: the Conservation and Natural History of the Puerto Rican Parrot*. Western Foundation of Vertebrate Zoology, Los Angeles.
 Thomsen, J.B. and Munn, C.A. 1988. *Cyanopsitta spixii*: a non-recovery report. *Parrotletter*, 1 (1), 6-7.
 Tony Juniper, International Council for Bird Preservation, 32 Cambridge Road, Girton, Cambridge CB3 0PJ, UK.
 Carlos Yamashita, Rua Voluntarios da Patria 4130/52A, 02402 São Paulo, SP, Brasil.