

Birds of Serra da Capivara National Park, in the “caatinga” of north-eastern Brazil

FÁBIO OLMOS

Summary

Serra da Capivara National Park covers an area of about 1,300 km² in south-eastern Piauí, north-eastern Brazil. The park's vegetation is the endemic caatinga, with a few remnants of semi-deciduous forest in some canyons. The area has a reasonable diversity of plants, with 615 catalogued species. Since 1986, 208 bird species have been observed in the park and its buffer zone, including 10 threatened or near-threatened species, plus two recently extinct in the area. Other species are regionally rare and have declined over parts of their distribution. The park also harbours several threatened mammals and caatinga endemics. Despite having been created in 1979 the park remains effectively unprotected and unmanaged. Current levels of poaching and habitat destruction prejudice the future of several species, including some that have already vanished from other parts of the caatinga.

O Parque Nacional da Serra da Capivara abrange uma área de aproximadamente 1,300 km² no sudeste do Piauí, nordeste do Brasil. A vegetação do parque é a caatinga, com alguns enclaves de mata semi-decídua. A área possui uma razoável diversidade de plantas, com um total de 615 espécies já catalogadas. Desde 1986, um total de 208 espécies de aves foram observadas no parque e sua zona-tampão, incluindo 10 consideradas ameaçadas ou quase-ameaçadas, além de duas recentemente extintas na área. Outras espécies são regionalmente raras ou tem declinado em parte de sua área de distribuição. O parque também abriga diversos mamíferos ameaçados, e endemismos da caatinga. Apesar de ter sido criado em 1979, o parque ainda não foi consolidado e é pouco mais que um parque de papel. Com os presentes níveis de caça clandestina e destruição de habitats, diversas espécies se extinguirão, incluindo algumas já desaparecidas de outras partes da caatinga.

Introduction

The caatinga is a vast semi-arid biome comprising most of north-eastern Brazil, roughly the area between 35° and 45°W and 3° and 16°S (Reis 1976). This area is the largest dry region within the Neotropical region and is bordered by much more mesic habitats (Markhan 1972, Reis 1976). The entire biome is subject to periods of pronounced aridity, when annual rainfall does not exceed 200 mm and may be zero (Markhan 1972).

The vegetation of this semi-arid region is composed of different xeric, deciduous plant assemblages, which are collectively known as “caatinga”. There is a large degree of endemism among the plants (Lima 1960, Hayashi 1973, Hayashi and Numata 1976, Emperaire 1989).

There appear to be few endemic vertebrates in the caatinga (Mares *et al.* 1985) but in fact undescribed taxa are still regularly discovered, especially amongst the reptiles (see Manzani and Abe 1990, Rodrigues 1991a–d, Vanzolini 1991a,b).

Since colonization in the 1700s, the caatinga has been heavily altered, the low and open present-day bush being derived from a more forest-like assemblage (Webb 1974, Sarmiento 1976). Arboreal caatinga still survives in a few areas, especially in Piauí.

As a whole the conservation of the caatinga has been neglected, only 0.1% of it being protected by national parks and other reserves (M. T. Jorge-Padua

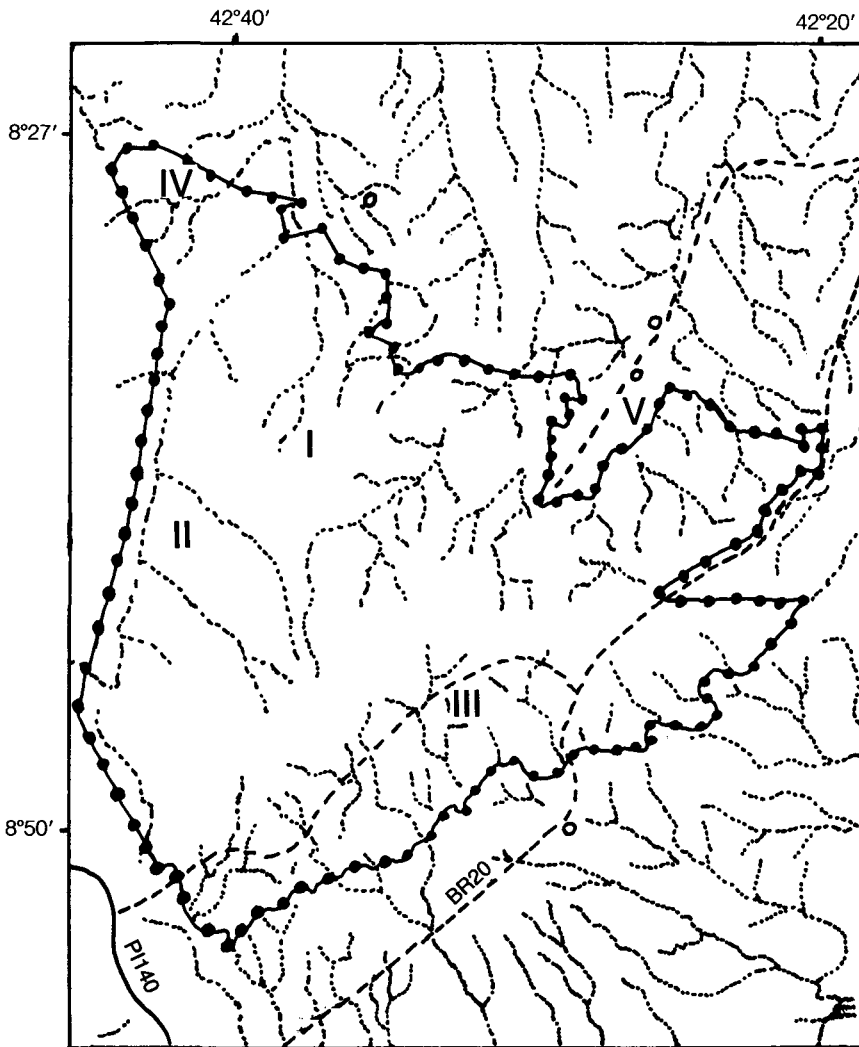


Figure 1. Map of Serra da Capivara National Park, south-eastern Piauí, Brazil. The heavy dotted line shows the park's limits. Open circles are villages. All roads in the region, including BR 20, are unpaved, except for PI 140. Places mentioned in the text are I, Gongo; II, Serra Branca; III, Zabele; IV, Angical; V, Varedão.

verbally 1991; also IBAMA 1989a). This paper presents information on the species composition and conservation status of the bird community of one of the largest of such reserves, Serra da Capivara National Park.

Study area and methods

Serra da Capivara National Park was created in 1979 mainly to protect the rich archaeological sites in the region, among the oldest known in America (Guidon and Delibrias 1986). The park is located in south-eastern Piauí, between 8°30'–8°50'S and 42°20'–42°50'W, and has a total area of 129,140 ha (Figure 1).

Basically the park covers a sandstone plateau ("chapada") with cliffs 50–200 m high, dissected by a few valleys and narrow canyons. Soils on the chapada are yellow-red latossols, while in the valleys and canyons they are of white sand, except in the canyon of Varedão, at the north-eastern border of the park (Figure 1), which has argillous soil. Along the border of the chapada there are large areas of eroded rock and shallow soil.

Climate is semi-arid, with a mean annual temperature of 28°C and low thermic range. Annual precipitation is variable, between 250 and 1,260 mm, with a trend to the lower value. Most rain falls between September and March, but timing and amount are unpredictable (Emperaire 1989). There are no perennial water-courses in the park, only some waterholes and springs. There are a few man-made reservoirs, the largest of which is at Zabelê, an abandoned village in the park.

The park's vegetation has been described in detail by Emperaire (1989), who found 615 plant species and defined eight plant assemblages. Here I simply her classification (as the differences among them are not always clear in the field), and distinguish five main vegetation types:

1. Arboreal-arbustive caatinga covers most of the park, has a high diversity of species, and consists mostly of tangled bushes and trees up to 10 m high. It is barely penetrable as most woody plants are heavily ramified from the base.

2. Arboreal caatinga is mainly restricted to the west of the park. Trees are up to 12 m high and there is a more open undergrowth.

3. Angical is an open woodland mainly of 12–15 m high "angico" trees *Anadenanthera macrocarpa*. Best examples are in the south of the park, near Zabelê.

4. Second-growth caatinga represents a species-poor assemblage which forms after cultivation or burning. Depending on the soil type it is dominated by *Croton sonderianus* or *Piptadenia obliqua*–*Mimosa acutistipula* up to four metres high.

5. Semi-deciduous forest, restricted to the narrower canyons, has tall (up to 30 m) trees with straight and sparsely branched trunks and almost no undergrowth.

Bird surveys were conducted all over the park in December 1986; July 1987; July and December 1989; and March through May and July 1991. Birds were censused and identified with the aid of binoculars and tape-recordings provided by the Arquivo Sonoro Neotropical (UNICAMP). A few individuals were mist-netted, especially nightjars.

The area around the park was also surveyed, especially Fazenda Veneza

(8°45'S 42°16'W), where there is a large artificial reservoir, and Lagoa do Muquem (8°24'30''S 42°22'20''W), a lagoon in the Rio Piauí basin subject to wide water-level variations and even complete drying-out (Olmos and Souza 1991). Brazilian law considers a 10 km stretch around any federal reserve as an "environmental conservation area" where human activity is, in theory, controlled (Federal Decree 99,274 of 6 June 1990).

For listing the species I used some of the criteria of Stotz and Bierregaard (1989) for abundance and sociality (Table 1).

Results

Observations and captures in and around the park resulted in a list of 208 species of birds, of which 179 are known from within the park (Table 1). Most species not observed in the park are waterbirds for which there is little habitat, although some species like sandpipers and ducks frequently use the reservoir at Zabelê. As expected in a highly seasonal environment, the populations of some species suffer wide fluctuations and may be present during part of the year only. This is true for waterbirds and most granivorous ones, including some icterids, doves and seedeaters. The status column of Table 1 indicates the average abundance of a species when it is present in the region.

Table 1. Birds of Serra da Capivara National Park, Brazil

Species	Habitat	Status	Sociality
<i>Crypturellus noctivagus</i> *	1,2,3,4	C	S
<i>Crypturellus parvirostris</i> *	1,3,4	C	S
<i>Crypturellus tataupa</i> *	1,2	F	S
<i>Nothura boraquira</i> *	4	C	S
<i>Podiceps dominicus</i> *	6	X	S
<i>Phalacrocorax olivaceus</i>	6	X	S,M
<i>Anhinga anhinga</i>	6	X	S
<i>Ardea cocoi</i>	6	X	S
<i>Casmerodius albus</i> *	6	X	S,M
<i>Egretta thula</i>	6	X	M,U
<i>Butorides striatus</i> *	6	X	S
<i>Bubulcus ibis</i>	6	X	M,U
<i>Syrigma sibilatrix</i>	6	X	S,U
<i>Nycticorax nycticorax</i>	6	X	S,M
<i>Tigrisoma lineatum</i>	6	X	S
<i>Ixobrychus involucris</i>	6	X	S
<i>Mycteria americana</i>	6	X	M
<i>Dendrocygna viduata</i> *	6	X	M
<i>Dendrocygna autumnalis</i>	6	X	S
<i>Amazonetta brasiliensis</i> *	6	X	M
<i>Cairina moschata</i> *	6	X	S
<i>Sarcoramphus papa</i> *	7	R	S
<i>Coragyps atratus</i> *	7	C	S
<i>Cathartes aura</i> *	7	F	S
<i>Cathartes burrovianus</i> *	7	C	S
<i>Gampsonyx swainsonii</i> *	1,2,4	R	S
<i>Ictinia plumbea</i> *	1,4,5	X	S
<i>Accipiter bicolor</i> *	1,2	X	S

Table 1 (cont.)

Species	Habitat	Status	Sociality
<i>Geranoaetus melanoleucos</i> *	7	R	S
<i>Buteo albicaudatus</i> *	7	R	S
<i>Buteo albonotatus</i> *	7	R	S
<i>Buteo swainsoni</i> *	7	×	M
<i>Buteo brachyurus</i> *	7	R	S
<i>Buteo magnirostris</i> *	1,2,3,4,7	C	S
<i>Heterospizias meridionalis</i> *	1,4	R	S
<i>Geranoospiza caerulescens</i> *	1,7	R	S
<i>Herpetotheres cachinnans</i> *	1,4,5,7	F	S
<i>Micrastur ruficollis</i> *	1,2,5	F	S
<i>Milvago chimachima</i> *	1	×	S
<i>Polyborus plancus</i> *	1,2,3,4,7	F	S
<i>Falco femoralis</i> *	1,5,7	R	S
<i>Falco sparverius</i> *	1,2,3,4,7	F	S
<i>Penelope superciliaris</i> *	1,2,4,5	U	S,M
<i>Penelope jacucaca</i> *	1,2,4,5	U	S,M
<i>Aramus guarauna</i>	6	×	S
<i>Aramides cajanea</i> *	4	×	S
<i>Porzana albicollis</i>	6	×	S
<i>Laterallus melanophaius</i>	6	×	S
<i>Gallinula chloropus</i> *	6	×	S
<i>Porphyryla martinica</i>	6	×	S
<i>Cariama cristata</i> *	1,3,4	F	S
<i>Jacana jacana</i> *	6	×	S
<i>Vanellus chilensis</i> *	4,6	×	S
<i>Hoploxypterus cayanus</i> *	6	×	M
<i>Tringa solitaria</i> *	6	×	S
<i>Tringa flavipes</i>	6	×	M
<i>Actitis macularia</i> *	6	×	S
<i>Himantopus himantopus</i>	6	×	M
<i>Columba picazuro</i> *	1,2,3,4	C	S,M
<i>Zenaida auriculata</i> *	1,2,3,4	C	M
<i>Columbina minuta</i> *	1,2,3,4	F	S,M
<i>Columbina talpacoti</i> *	1,2,3,4	C	S,M
<i>Columbina picui</i> *	1,2,3,4	C	S,M
<i>Claravis pretiosa</i> *	1,2,3,4,5	C	S,M
<i>Scardafella squammata</i> *	1,2,3,4	C	S,M
<i>Leptotila verreauxi</i> *	1,2,3,4,5	C	S
<i>Ara chloroptera</i> *	1,2,7	U	S,M
<i>Ara maracana</i> *	4,5	R	S
<i>Aratinga leucophthalmus</i> *	1,4	R	S,M
<i>Aratinga cactorum</i> *	1,2,3,4	C	M
<i>Forpus xanthopterygius</i>	4	×	M
<i>Amazona aestiva</i> *	1,2,3,4,5	F	S,M
<i>Coccyzus melacoryphus</i> *	1,2,4	F	S
<i>Piaya cayana</i> *	1,2,5	U	S
<i>Crotophaga major</i> *	2,4	×	M
<i>Crotophaga ani</i> *	1,4	C	M
<i>Guira guira</i> *	1,4	C	M
<i>Tapera naevia</i> *	1,2,4	F	S
<i>Dromococcyx phasianellus</i> *	1,2	U	S
<i>Tyto alba</i> *	1,5	U	S
<i>Otus choliba</i> *	1,4,5	F	S

Table 1 (cont.)

Species	Habitat	Status	Sociality
<i>Bubo virginianus</i> *	5	×	S
<i>Glaucidium brasilianum</i> *	1,2,3	F	S
<i>Nyctibius griseus</i> *	1,5	U	S
<i>Podager nacunda</i>	4,7	C	S,M
<i>Chordeiles pusillus</i> *	1,5,7	C	S
<i>Nyctidromus albicollis</i> *	4	×	S
<i>Caprimulgus rufus</i> *	1	F	S
<i>Caprimulgus parvulus</i> *	1,2,4	C	S,M
<i>Caprimulgus hirundinaceus</i> *	1,2,4,5	F	S,M
<i>Hydropsalis brasiliana</i> *	1,2,4	F	S
<i>Streptoprocne zonaris</i> *	7	C	M
<i>Streptoprocne biscutata</i> *	7	C	M
<i>Reinarda squamata</i>	7	×	M
<i>Phaethornis nattereri</i> *	1,2,4,5	U	S
<i>Phaethornis gounellei</i> *	1,2,4,5	U	S
<i>Eupetomena macroura</i> *	1	×	S
<i>Colibri serrirostris</i> *	1	×	S
<i>Chrysolampis mosquitus</i> *	1,2,3,4,5	F	S
<i>Chlorostilbon aureoventris</i> *	1,2,3,4	F	S
<i>Calliphlox amethystina</i> *	1,2,5	U	D
<i>Ceryle torquata</i>	6	R	S
<i>Chloroceryle amazona</i>	6	×	S
<i>Chloroceryle americana</i>	6	R	S
<i>Trogon curucui</i> *	1,2,5	F	S,U
<i>Galbula ruficauda</i> *	1,2,4	R	S
<i>Nystalus maculatus</i> *	1,2,4,5	F	S
<i>Picumnus limae</i>	4	×	S
<i>Picumnus pygmaeus</i> *	1,2	R	S,U
<i>Chrysoptilus melanochloros</i> *	1,2,3,5	U	S
<i>Celeus flavescens</i> *	1,2,3	U	S
<i>Dryocopus lineatus</i> *	1,3,5	R	S
<i>Veniliornis passerinus</i> *	1,2,3,5	F	S,U
<i>Phloeoceastes melanoleucos</i>	3,5	R	S
<i>Sittasomus griseicapillus</i> *	3,5	R	S,U
<i>Dendrocolaptes platyrostris</i> *	1,2,3,5	F	S,U
<i>Lepidocolaptes angustirostris</i> *	1,2,3,5	F	S,U
<i>Campylorhamphus trochilirostris</i> *	1,2,5	U	S,U
<i>Furnarius leucopus</i> *	1,4	U	S
<i>Furnarius figulus</i> *	1,4	U	S
<i>Synallaxis ruficapilla</i> *	1,2	U	S,U
<i>Synallaxis frontalis</i> *	1,2	U	S,U
<i>Synallaxis albescens</i> *	1,2	F	S,U
<i>Gyalophylax hellmayri</i> *	1	R	S
<i>Certhiaxis cinnamomea</i>	6	×	S
<i>Poecilurus scutatus</i> *	1,2,5	R	S,U
<i>Pseudoseisura cristata</i> *	1,4	U	S
<i>Megaxenops parnaguae</i> *	1,2,4	F	S
<i>Taraba major</i> *	1,2,3,4	F	S,U
<i>Sakesphorus cristatus</i> *	1,2,4	F	S,U
<i>Thamnophilus doliatus</i> *	1,2,3,4	F	S,U
<i>Thamnophilus punctatus</i> *	1,2,3,4,5	C	S,U
<i>Myrmorchilus strigilatus</i> *	1,2,3,4,5	F	S,U
<i>Herpsilochmus pileatus</i> *	1,2,4,5	F	S,U

Table 1 (cont.)

Species	Habitat	Status	Sociality
<i>Formicivora grisea</i> *	1	R	S
<i>Formicivora melanogaster</i> *	1,2,4,5	C	S,U
<i>Hylopezus ochroleucus</i> *	1,2,5	F	S,U
<i>Platypsaris rufus</i> *	1,5	R	S,U
<i>Pachyramphus polychopterus</i> *	1,2,5	U	S,U
<i>Xolmis irupero</i>	4	×	S
<i>Fluvicola pica</i>	6	×	S
<i>Fluvicola negenta</i> *	6	×	S
<i>Arundinicola leucocephala</i>	6	×	S
<i>Satrapa icterophrys</i> *	4	×	S
<i>Machetornis rixosus</i>	4	U	S
<i>Tyrannus melancholicus</i> *	1,2,3,4	C	S,U
<i>Empidonomus varius</i> *	1,4	R	S
<i>Megarhynchus pitangua</i> *	1,2,4,5	F	S,U
<i>Myiodynastes maculatus</i> *	1,2,5	F	S,U
<i>Myiozetetes similis</i> *	1,2,4	R	S,U
<i>Pitangus sulphuratus</i> *	1,2,4	F	S,U
<i>Pitangus lictor</i>	6	R	S
<i>Casiornis fusca</i> *	1,2,4	R	S,U
<i>Myiarchus tyrannulus</i> *	1,2,3,4,5	C	S,U
<i>Empidonax euleri</i>	1	R	S
<i>Myiobius cf. barbatus</i> *	1,2	R	S,U
<i>Tolmomyias flaviventris</i> *	1,2,3,4,5	R	S,U
<i>Hirundinea ferruginea</i> *	1	C	S
<i>Todirostrum cinereum</i> *	1,2,3,4,5	F	S,U
<i>Idioptilon margaritaceiventer</i> *	1,2,3,4,5	F	S,U
<i>Euscarthmus meloryphus</i> *	1,4	F	S,U
<i>Serpophaga subcristata</i> *	5	×	S
<i>Elaenia flavogaster</i> *	1	×	S
<i>Myiopagis viridicata</i> *	1,2,3,4,5	C	S,U
<i>Camptostoma obsoletum</i> *	1,2	F	S
<i>Phyllomyias fasciatus</i> *	1,2,4	R	S
<i>Leptopogon amaurocephalus</i>	2,4	R	S
<i>Tachycineta albiventer</i>	6	×	S
<i>Progne chalybea</i> *	7	C	M
<i>Stelgidopteryx ruficollis</i> *	7	×	S
<i>Troglodytes aedon</i> *	1,2,5	F	S,U
<i>Mimus saturninus</i> *	1,4	C	M,U
<i>Turdus rufiventris</i> *	1,2,4,5	U	S,U
<i>Turdus leucomelas</i> *	2,3,5	F	S,U
<i>Turdus amaurochalinus</i> *	2,3,5	U	S
<i>Polioptila plumbea</i> *	1,2,3,4,5	F	S,U
<i>Cyclarhis gujanensis</i> *	1,2,3,5	U	S,U
<i>Vireo olivaceus</i> *	2,5	R	S
<i>Hylophilus poicilotis</i> *	1,4	×	S,U
<i>Molothrus badius</i> *	1,2,4	F	M
<i>Molothrus bonariensis</i> *	1,2,4	C	M,U
<i>Gnorimopsar chopi</i> *	1,2,4,5	C	S,M
<i>Agelaius ruficapillus</i> *	6	R	S
<i>Icterus cayanensis</i> *	1,2,3,4,5	F	S,U
<i>Icterus icterus</i> *	1,2,3,4,5	F	S,U
<i>Leistes superciliaris</i> *	4	×	S
<i>Basileuterus flaveolus</i> *	2,3,5	F	S,U

Table 1 (cont.)

Species		Habitat	abundance
<i>Coereba flaveola</i> *	1,2,5	U	S,U
<i>Conirostrum speciosum</i> *	2,3,5	F	S,U
<i>Euphonia chlorotica</i> *	1,2,3,4,5	F	S
<i>Thraupis sayaca</i> *	2,4,5	×	S
<i>Tachyphonus rufus</i> *	4	×	M
<i>Nemosia pileata</i> *	2,3,5	F	S,U
<i>Hemithraupis guira</i> *	5	×	U
<i>Sericossypha loricata</i> *	1,2,4,5	C	M
<i>Paroaria dominicana</i> *	1,2,4	C	S,U
<i>Cyanococcyz brissonii</i> *	1,2,4	U	S
<i>Volatinia jacarina</i> *	1,4	F	M,U
<i>Sporophila lineola</i> *	4	R	S,U
<i>Sporophila nigricollis</i> *	1,4	R	S,U
<i>Sporophila albogularis</i> *	1,4	R	S,U
<i>Oryzoborus maximiliani</i>	4	×	S
<i>Sicalis citrina</i> *	1	×	S
<i>Sicalis flaveola</i>	4	×	S
<i>Spinus yarrellii</i>	1,4	×	S,M
<i>Coryphospingus pileatus</i> *	1,2,3,4,5	C	S,M,U
<i>Zonotrichia capensis</i> *	4	R	S,U
<i>Passer domesticus</i> *	4	C	S,M

1. Arboreal-arbustive caatinga. 2. Arboreal caatinga. 3. Angical. 4. Secondary caatinga. 5. Semi-deciduous forest. 6. Water or water's edge. 7. Overhead.

C (common): recorded every day in some numbers. F (fairly common): recorded at least every other day, rarely more than a pair in a day. U (uncommon): recorded at least once a week. R (rare): recorded less often than once a week. ×: migrants, vagrants, species with insufficient habitat; includes species seen only one to three times.

S: solitary or in pairs. M: monospecific flocks. U: mixed-species flocks.

*: observed in the park.

Sequence and taxonomy follow Sick (1985).

Species of conservation concern for which new information has been gathered are as follows.

Greater Rhea *Rhea americana*

Considered near-threatened by Collar and Andrew (1988). The subspecies from north-eastern Brazil (*R. a. americana*) has declined all over its former range to the point where it has been very difficult to obtain specimens for a captive-breeding scheme (B. V. Mendes verbally 1991). It was wiped out by hunters in the general area of what is now the park in the late 1960s or early 1970s, although there is a remnant population to the north-east of the park (São João do Piauí). The species may be reintroduced in the park if adequate protection to the area is provided.

Yellow-legged Tinamou *Crypturellus noctivagus*

A threatened species (Collar and Andrew 1988, IBAMA 1989b), although relegated to near-threatened status in Collar *et al.* (1992). The subspecies which

occurs in the park is *C. n. zabele*. The bird is common and widespread in the park, being frequently heard during the rainy season. It has been found in several types of vegetation but avoids open areas. Although hunted for its meat it seems to be holding its numbers.

King Vulture *Sarcoramphus papa*

This species is rare or absent throughout north-eastern Brazil. There are only one or two pairs in the park, which are regularly observed. One adult roosting with an immature was observed in Esperança canyon, in the southern part of the park, in July 1987, and another such pair was seen feeding on the remains of a large (around 6 kg) armadillo *Dasypus novemcinctus* killed by a puma *Felis concolor* in the northern part of the park (Serra do Gongo) in July 1991.

White-browed Guan *Penelope jacucaca*

A threatened caatinga endemic (Sick 1985, Collar and Andrew 1988, IBAMA 1989b), although relegated to near-threatened status in Collar *et al.* (1992). This species is quite secretive and rarely seen, but is easily detected by the characteristic sound it makes with the wings during the rainy season, apparently as a courtship display. It is usually found in pairs but a group of six adult-sized birds was observed in July 1987. Most often observed in taller vegetation, including semi-deciduous forest and angical, but also in second-growth caatinga near human dwellings. The species is much sought by hunters, who lay ambushes near fruiting trees, especially *Ziziphus joazeiro*. The park apparently has a good population of the species, which is widespread in it.

Spix's Macaw *Cyanopsitta spixii*

A pair of macaws fitting the description of this very endangered species (Juniper and Yamashita 1990, Collar *et al.* 1992) was observed by Niéde Guidon (verbally 1991) during an archaeological survey at Serra Branca in March–April 1975. The species is apparently familiar to some local people to the north-west of the park, who are able to identify it and the Hyacinth Macaw *Anodorhynchus hyacinthinus* (said to occur further west) from illustrations. A villager from Angical claimed to have observed a pair of small, pale blue macaws feeding on *Hymenaea* fruits in early 1991, but my own surveys in the same area proved fruitless.

Green-winged Macaw *Ara chloroptera*

This species has disappeared from large areas of its former range, including eastern and south-eastern Brazil (Sick 1985). The park harbours a small resident population of about 20 individuals, mainly concentrated at Serra Branca, although pairs are occasionally seen in the southern part of the park. The macaws nest in natural cavities high in the cliffs, with a concentration of four pairs nesting in the same cliff near the village of Angical, at the north-western border of the park. Although nesting in the park, macaws make long foraging flights, often ranging outside the park, which makes them vulnerable to disturb-

ance, shooting and the loss of feeding areas. I have observed them feeding on the fruits and seeds of the legumes *Copaifera langsdorffii* and *Hymenaea courbaril*, common in rocky areas.

Until recently youngsters were stolen from the nests for the pet trade, despite the danger of climbing the cliffs. Some such pet macaws are to be seen in the nearby city of São Raimundo Nonato.

Blue-winged Macaw *Ara maracana*

A near-threatened species according to Collar and Andrew (1988). It is very rare in the park, perhaps with only one pair present in the northern portion, especially at Varedão. Locals report it to be commoner along the Rio Piauí, a temporary river which flanks the Serra da Capivara massif (Olmos and Souza 1991). One was observed feeding on the seeds of the introduced *Melia azedarach* at Zabelê in December 1991.

Great Horned Owl *Bubo virginianus*

Reiser (1905) described the subspecies *B. v. deserti* from Juazeiro, about 300 km south-east of Serra da Capivara, but its taxonomic status is unclear. This owl was observed and heard in the park during 1986 and 1987, especially in the canyons, but it has not been found since. Its decline coincided with a crash in the numbers of *Kerodon rupestris*, a large caviomorph rodent which lives on the cliffs. Other known prey are the echimyid rodent *Trichomys apereoides* and the bats *Artibeus planirostris* and *Desmodus rotundus*, as recorded from regurgitated pellets.

The only other records of the species from north-eastern Brazil are from the coastal forests (Teixeira *et al.* 1987). If valid, *B. v. deserti* probably deserves conservation concern.

Pygmy Nightjar *Caprimulgus hirundinaceus*

This is a near-threatened caatinga endemic (Collar and Andrew 1988). The species was sporadically mist-netted but, judging from observations, it is not rare. It was observed foraging in open, disturbed areas.

Cinnamon-throated Hermit *Phaethornis nattereri* and Maranhão Hermit *P. maranhoensis*

Phaethornis maranhoensis has been considered to be the mature male of *P. nattereri* (Hinkelmann 1988a,b) although this view is not unanimous (Grantsau 1988). Both *nattereri* and *maranhoensis*-like individuals have been observed syntopically in the park and using the same flowers. Although not common, these hummingbirds have been observed in disturbed areas where some of their food-plants grow and appear to withstand some degree of habitat degradation. Observed food-plants are *Pavonia glazioviana* (Malvaceae), *Helicteres muscosa* (Sterculiaceae), *Ruellia asperula* (Acanthaceae) and *Bauhinia* spp. (Leguminosae).

Great Xenops Megaxenops parnaguae

This singular and poorly known furnariid has been considered threatened (Collar and Andrew 1988, IBAMA 1989b, Collar *et al.* 1992). Although difficult to observe, it has a distinctive, loud vocalization (*contra* Teixeira *et al.* 1989) and can easily be located when present. It is fairly common in the park, foraging in all kinds of caatinga, including low bushes in burnt areas. Nevertheless the species's needs for nesting are unknown and it is possible that it depends on taller, arboreal vegetation.

Silvery-cheeked Antwren Sakesphorus cristatus

This antbird is a near-threatened species (Collar and Andrew 1988) restricted to north-eastern Brazil (Sick 1985). It is fairly common in the park, even in secondary vegetation, usually being seen in pairs in mixed-species flocks with Great Antshrike *Taraba major*, antshrikes *Thamnophilus* spp., Black-bellied Antwren *Formicivora melanogaster*, White-browed Antwren *Herpsilochmus pileatus* and Long-billed Wren *Thryothorus longirostris*.

White-browed Antwren Herpsilochmus pileatus

This species was once considered threatened (Collar and Andrew 1988) after the revision of the group by Davis and O'Neill (1986), who found *pileatus* specimens *sensu strictu* from only two localities in north-eastern Brazil. However, this bird is quite common in Serra da Capivara, pairs frequently associating with mixed-species flocks. It was observed both in the semi-deciduous forest patches and all forms of caatinga, but seems to prefer taller vegetation.

The identity of the species at Serra da Capivara was confirmed by crossed play-backs of tape-recordings of both *H. pileatus* and its sister species, the Black-capped Antwren *H. atricapillus*.

White-throated Seedeater Sporophila albogularis

A near-threatened species (Collar and Andrew 1988, though dropped as such by Collar *et al.* 1992) heavily trapped for the cagebird market. It is rare all over the region, recent records being only of small (up to six birds) groups or of solitary birds. Another factor contributing to the rarity of this and other seedeaters has probably been the heavy use of pesticides on pastures near the Rio Piauí. It is usually observed in open, degraded areas with grasses.

Greater Large-billed Seed-finch Oryzoborus maximiliani

This species has been considered either threatened (IBAMA 1989b) or near-threatened (Collar and Andrew 1988, Collar *et al.* 1992). It is much sought-after for the cagebird market and my only record of it is an observation of a lone male at Fazenda Veneza in 1986. The species is now probably extinct in the region.

Yellow-faced Siskin *Spinus yarrellii*

Another threatened species (Collar and Andrew 1988, Collar *et al.* 1992) which has suffered from trapping for the cagebird market and, apparently, from pesticide poisoning. It has been rarely recorded from Fazenda Veneza and the extreme north-west and south-east of the park, in both arboreal–arbustive caatinga and cultivated areas.

Conservation status of Serra da Capivara National Park

Brazilian national parks are “permanent preservation areas” protected by law from all destructive activities (Federal Decree 84,017 of 21 July 1979). As stated above a 10 km stretch around all parks is automatically considered a buffer zone (“environmental protection area”).

Despite this legal protection, however, Serra da Capivara has no adequate statutory budget, patrolling being made by only four guards with one vehicle. The land tenure of the park has not been resolved, as about 240 families are still waiting to be compensated for losing their properties. Although some people abandoned their land, many continue to live, cultivate or raise cattle in the park. This is especially harmful at Angical and Varedão.

A management plan for the park has been completed by the staff of the Fundação Museu do Homem Americano (FUMDHAM), a non-profit scientific and environmental organization whose researchers have worked in the park since the early 1970s. Nevertheless, without a resolution of the land ownership problem and the greater involvement of the proper government agencies, the plan will be of little value.

Hunting

This is one of the worst problems in the area. Local people are very poor and consider any wild animal large enough to be eaten as a potential meal, including such creatures as skunks and pumas. Even wealthier people, including local officials, will spend weekends hunting at the Serra. Although hunting is usually directed at armadillos, any larger bird will be bagged, including doves, guans and tinamous. Hunting has already wiped out species like the Greater Rhea and giant armadillo *Priodontes maximus*, and put several others on the brink.

Trapping of birds for the cagebird market, including their export to other regions of the country, was more intense in the past, but still continues. The reason for the decline of this activity is the decline of the bird populations themselves. Today birds are captured mainly for the local market.

Burning and grazing

Several fires have occurred in the park, the worst of them during 1986, when all the area from the north-west border (Angical) south to Serra Branca burned during three months without any action from the authorities. Other smaller fires have occurred since in the same area. Fine forest canyons and tall arboreal

caatinga areas were destroyed and replaced by much poorer and fire-susceptible secondary vegetation.

These fires are caused either by hunters, often as vandalism, or by farmers to create new browse for the cattle. These animals also compete with wildlife for food and water, and prevent the regeneration of some tree species, like the threatened *Astronium urundeuva*, by eating the seedlings.

Logging

This is a minor problem today, but still occurs sporadically. Until 1989 several clear-cuttings occurred to provide firewood for the making of lime at nearby mines. There is also selective logging of some species, especially *Astronium urundeuva*, *Anadenanthera macrocarpa*, *Tabebuia impetiginosa* and *Diptychandra epunctata*, mainly for export to other parts of the country as fence poles. The first three species, besides being listed by FAO (1986) as in danger of genetic erosion, are important components of more forest-like caatinga assemblages, especially in transitional areas between semi-deciduous forest and arboreal-arbustive caatinga.

Discussion

Serra da Capivara National Park and its buffer zone have a diverse bird community for a semi-arid area, including a number of migratory birds. Among the birds found in the park are most of the caatinga endemics or near-endemics and several species of conservation concern. Most of them have good populations in the park and would require no management besides effective protection of the area.

The only other caatinga reserve for which there is a published species list is Raso da Catarina Ecological Station in northern Bahia, best known for its endemic Lear's Macaws *Anodorhynchus leari*, with 132 species (Sick *et al.* 1987). Some important species, such as Pygmy Nightjar, Great Xenops, White-browed Antwren, Silvery-cheeked Antshrike, Greater Large-billed Seed-finch and Yellow-faced Siskin, apparently do not occur in Raso da Catarina, although other threatened or near-threatened species found in Serra da Capivara do, plus Lear's Macaw and the Pectoral Antwren *Herpsilochmus pectoralis* (a threatened species according to Collar and Andrew 1988, IBAMA 1989b, Collar *et al.* 1992). There is no published information on the fauna of the other caatinga reserves, Aiuaba and Seridó Ecological Stations.

The species presently at greatest risk in the Serra da Capivara park are the fringillids and macaws. The first could conceivably be reintroduced into the park, although close monitoring would be necessary to assess the possible effect of pesticide poisoning on birds under present conditions. The macaws use areas still under heavy human influence for both breeding and foraging. The largest nesting group of Green-winged Macaws (four pairs) is very near Angical, an area burnt every year. The population also seems too small to be viable in the long term.

Blue-winged Macaws regularly occur only at Varedão, at the very limit of the

park, an area still subject to heavy grazing and agriculture. Varedão is the only canyon with an argillous soil in the region, forming pools during the rainy season and sustaining a peculiar forest dominated by 20–30 m high *Hymenaea* spp. and *Tabebuia impetiginosa* trees. Owing to its unique character it should be a conservation priority.

Serra da Capivara also harbours one of the most diverse floras in the caatinga domain (Empereire 1989) and several threatened species of mammal (Olmos 1992). The park's populations of jaguar *Panthera onca* and white-lipped peccary *Tavassu pecari* may well be the last in the entire caatinga. New taxa have also been discovered in the park, including an endemic lizard, *Tapinurus helenae* (Manzani and Abe 1990), a nectarivorous bat (M. F. B. Souza verbally 1987) and an agouti (M. L. Lorini verbally 1991).

Management priorities

Although a management plan is already available, some urgent action needs to be taken, as the park is being rapidly degraded. After the area has been properly safeguarded, other activities stressed in the plan can be executed. At the present time it is necessary to:

1. Resolve the problem of the land tenure of the park, indemnifying owners and occupants, and removing them and their domestic animals from the park.
2. Post a minimum of 20 permanent guards, adequately equipped, and with vehicles for patrolling.
3. Install gates and signs at all entrances of the park to prevent entry by hunters in vehicles and by cattle, and construct fences in areas subject to constant invasion by cattle and near settlements to provide an easily recognized boundary for the park.
4. Consider areas adjacent to the park used by threatened species as deserving "permanent preservation", and begin studies to incorporate them into the park, with priority given to the parts of Varedão outside the park and to a 8,000 ha stretch between the park and the PI 140 road, used by most threatened species, including the Green-winged Macaw and the endangered three-banded armadillo *Tolypeutes tricinctus*.

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