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RIPARIAN BIRD DENSITIES ALONG FOUR TRIBUTARIES OF THE RIO PARANÁ IN NORTH-EAST ARGENTINA

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Densidad de aves ribereñas en cuatro tributarios del Río Paraná en el NE de Argentina

Resumen. Densidades lineales de aves (y mamíferos) fueron registradas a lo largo de cuatro tributarios del Paraná en la provincia de Misiones, Argentina. En una reciente expedición, se hicieron conteos a fin de determinar el status del Pato Serrucho (*Mergus octosetaceus*) en Argentina. Se examinó un total de 340 kilómetros de ríos, incluyendo secciones del Arroyo Uruzú, Urugua-í, Piray Miní y Piray Guazú, usando un bote inflable. Datos concernientes a la densidad de aves de río, rapaces y mamíferos acuáticos se presentan y discuten. Durante la expedición sólo un Pato Serrucho fue registrado y la conclusión inevitable es que la especie está en vías de extinción en Argentina.

Palabras clave: aves ribereñas, censos, Misiones, Argentina.

Key Words: riparian birds, censuses, Misiones, Argentina.

INTRODUCTION

During the austral winter of 1993 a team of British and South American scientists surveyed some of the rivers of Misiones Province, searching for the threatened Brazilian Merganser (*Mergus octosetaceus*). Misiones Province, in north-east Argentina, lies between the south flowing Paraná and Uruguay rivers and is bordered by Paraguay to the west and Brazil to the east. The avifauna of the region has been relatively well studied, most notably by W.H. Partridge (1954, 1956). All Argentine records of Brazilian Merganser come from Misiones Province. The majority of observations are from the 1940's and 1950's when the species was re-discovered by Dr. Eduardo del Ponte in October 1947 after having been considered globally extinct since the 1920's. Follow-up studies by A.G. Giai in 1948 and W.H. Partridge between 1949 and 1954 (Partridge 1956) comprise almost all that is known of the species

from the region. Records of *M. octosetaceus* outside of this period are few in number and widely scattered throughout the province. However, the majority are located in the north-west, along tributaries of the río Paraná, close to the border with Paraguay.

STUDY AREA

The region still has approximately 45-50 percent forest cover (Chebez 1990), although little of this is intact primary forest as selective logging, whereby only valuable timber trees are removed, is widespread. Currently six percent of the province lies within protected areas; the Iguazú National Park, Urugua-í Provincial Park and 11 smaller protected areas. Misiones is the third most densely populated province in Argentina with an average of 20 inhabitants per square kilometre (IGM 1987), but has only been dramati-

Table 1. Physical characteristics of four tributaries of the Paraná River surveyed from July to September 1993.

Variable	River Section			
	Uruzú	Urugua-í	Piray Miní	Piray Guazú
Length (km)	30	150.5	88.5	69.5
Width (m)	10-20	10-60	10-50	10-50
Gradient (metres descended/km)	2.8	2.1	1.02	—
% forest cover along section	100	95	90	90

cally modified since the turn of the century and consequently deforestation and habitat alteration has not been as severe as in neighbouring areas of Brazil and Paraguay, both of which have a much longer historical background. Threats to the forest in Misiones include clearance for agriculture, afforestation with non-native conifers, hydroelectric dam construction and, perhaps the biggest ongoing problem, swidden agriculture, which is mainly affecting the headwaters and upland forest of the Sierra de Misiones which borders Brazil. Any disturbance in the catchment of forest streams is likely to alter the balance of water chemistry, with a consequent change in the flora and fauna.

METHODS

Sections of the following rivers were surveyed using an inflatable boat; Arroyo Uruzú (8 - 10 July 1993), Arroyo Urugua-í I (15 - 24 July 1993) and II (30 August - 12 September 1993), Arroyo Piray Miní (3 - 5 August and 7 - 10 August 1993) and Arroyo Piray Guazú (15 - 19 August and 22 - 23 August 1993). The Arroyo Urugua-í section was repeated because of its historical importance for Brazilian Merganser. All sections surveyed possessed the same basic characteristics; straight, wider and deeper sections interspersed at 0.5 - 1.5 km intervals with stretches of rapids or small waterfalls which almost always occurred after bends in the river. Periodically, the river would deviate into numerous small channels, where the water was shallow and overhanging vegetation became more abundant. The valley shape was typically steep along the majority of river length, with small flat areas interspersing this, indicating where the river breach-

es in flood conditions. All the rivers react fast to rainfall if the surrounding land is saturated, with rises in water level of up to five metres in under three days occurring in severe cases.

During each river descent all target species (those considered to be dependent largely on rivers and streams) and basic river characteristics (transect length, maximum and minimum width, percentage forest cover along length and gradient - see Table 1) were recorded by a single observer situated in the bows of the boat. All species were recorded by sight only, not on call. Linear densities along each section were calculated by dividing the total number of birds recorded by ten percent of the section length (to give individuals/10 km). This follows and allows easy comparison with Hayes & Tamayo (1992), who also recorded riparian birds and mammals during their search for Brazilian Merganser along tributaries of the Paraná in Paraguay.

RESULTS AND DISCUSSION

Linear densities of most bird and mammal species varied between river sections (Table 2) as noted by Hayes & Tamayo (1992) in Paraguay. Some striking differences were apparent. Olivaceous Cormorant (*Phalacrocorax olivaceus*) densities were much higher along the Uruzú and Urugua-í rivers both of which drain into the recently completed Urugua-í dam. The dam basin now supports large colonies of cormorant and these presumably travel upstream to feed. A similar trend can be seen for Anhinga (*Anhinga anhinga*). Densities for Olivaceous Cormorant may merely reflect the proximity of these breeding colonies or could indicate changes in the water quality of these rivers beneficial to this

Table 2. Linear densities (individuals/10km) of selected riparian bird and mammal species along four tributaries of the Paraná River. Order and nomenclature of birds follows Narosky & Yzurieta (1989). Locations: 1 = Uruzú, 2 = Urugua-í I, 3 = Urugua-í II, 4 = Piray Miní, 5 = Piray Guazú.

Species	1	2	3	4	5
<i>Anhinga anhinga</i>	1.0	1.5	1.3	0.2	
<i>Phalacrocorax olivaceus</i>	8.0	7.0	7.6	1.1	0.6
<i>Ardea cocoi</i>		0.2	0.4		
<i>Tigrisoma lineatum</i>		0.1			
<i>Butorides striatus</i>		0.1	0.7	0.3	0.7
<i>Nycticorax nycticorax</i>	0.7		0.2		0.3
<i>Mesembrinibis cayennensis</i>	1.0				
<i>Cairina moschata</i>	0.3	0.1	0.5		
<i>Sarkidiornis melanotos</i>				0.8	
<i>Mergus octosetaceus</i>				0.1	
<i>Amazonetta brasiliensis</i>				0.2	
<i>Spizastur melanoleucus</i>	0.3	0.1	0.1	0.1	
<i>Buteogallus urubitinga</i>	0.3	0.8	0.8	1.4	1.2
<i>Pipile jacutinga</i>	4.3	0.1	0.7	0.9	0.3
<i>Aramus guarauna</i>		0.1			
<i>Aramides saracura</i>		0.1	0.5	0.2	0.3
<i>Heliornis fulica</i>		0.1	0.1		
<i>Tringa solitaria</i>			0.1		
<i>Ceryle torquata</i>	1.0	1.4	3.3	1.2	0.9
<i>Chloroceryle amazona</i>	1.0	4.6	7.0	5.1	5.2
<i>Chloroceryle americana</i>	1.0	0.3	1.3	0.2	0.7
<i>Lochmias nematura</i>	1.7	1.1	3.5	1.6	4.0
<i>Knipolegus cyanirostris</i>			0.4		
<i>Serpophaga nigricans</i>	1.0		0.1		1.9
<i>Basileuterus rivularis</i>	1.0	2.8	4.9	5.5	14.1
<i>Lutra longicaudis</i>	1.0	0.9	0.9	0.8	1.3
<i>Hydrochaeris hydrochaeris</i>	0.3	0.3	1.0	2.7	1.0

species. Hayes & Tamayo (1992) recorded low densities of Olivaceous Cormorant (0 - 1.1 individuals/10km) along three Paraguayan tributaries of the Paraná during their study. The presence of Olivaceous Cormorant at such high densities along these rivers is therefore atypical and is perhaps an unforeseen impact of the construction of the Urugua-í dam. However, with such limited data, one can only speculate about the likely effect on river ecosystems and especially Brazilian Merganser populations of such a density of piscivorous birds.

Three species considered to be globally threatened (Collar *et al.* 1992, IUCN 1990) were recorded during the survey. Only one Brazilian Merganser was recorded, along the Piray Miní.

The bird appeared to be flightless, most likely due to being in moult. This suggests that it was not breeding, although the lack of knowledge about the species biology means that this cannot be stated with certainty. The observations from this expedition clearly show that the Argentine population of *M. octosetaceus* is critically low and it may indeed already be too late to ensure its long-term survival. In spite of this additional unsurveyed habitat still remains in Misiones and surveys of these areas are urgently needed to clarify the species status within the region as a whole. However, none of these areas support significantly less disturbed habitat than those surveyed in 1993 and so it would seem likely that very few birds could remain in Misiones. Sadly, high wa-

ter quality cannot be guaranteed in these rivers due to forest clearance for agriculture in their headwaters.

The Black-fronted Piping-Guan (*Pipile jacutinga*) was recorded along all the rivers surveyed, including the Piray Guazú, a site not recorded in Collar *et al.* (1992). This species has been noted to be particularly restricted to riverine strips of forest in Misiones (Collar *et al.* 1992) and this was confirmed by our observations. It was typically encountered along sections of river where low rocky islands were present, and was often observed foraging in these areas (see Benstead & Hearn 1994). Black-fronted Piping-Guan was not recorded by Hayes & Tamayo (1992).

Finally, the endangered Southern River Otter (*Lutra longicaudis*) was recorded at high densities along all rivers surveyed. This general high density, compared to the results of Hayes & Tamayo (1992), probably reflects low hunting pressure in Misiones.

Survey results (Table 2) provide baseline data against which the future effects of landuse within the catchments of the four tributaries can be monitored. Current protected area design in Misiones is unable to maintain pristine river ecosystems suitable for Brazilian Merganser. The future of this species clearly depends on bioregional conservation management whereby the activities within an entire catchment are regulated.

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