

IMPORTANCE OF LITTORAL MUDFLATS FOR MIGRANT AND RESIDENT AVIFAUNA

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INTRODUCTION

The coast's importance in the Guyanas is related to the presence of very extensive mudflats, the sediments of which come from those of the Amazon River. The bulk of sediments carried to the sea by the vast Amazon system originate in the Andes mountains; after discharge into the Atlantic, the sediments are carried northwestwards by the Guiana Current and are deposited along the northern coast of South America, especially along the Guianas's coast. The currents and tides produce a very dynamic coastal system, with mudflats steadily migrating westwards along the coast, leading to an alternative pattern of sandy beaches and intertidal flats. Despite the unstable sediments, heavy currents, and high turbidity of the water, the vast intertidal areas are productive enough to be able to support enormous populations of shorebirds. In Suriname, Swennen et al. (1982) showed that a zone with a high density of crustaceans (mainly tanaid shrimps) occurred on the upper part of the flats below mean high-tide level, with much lower densities of invertebrates occurring at lower tidal levels where immersion times were longer.

In addition to the lateral migration of mudflats, cycles of propagation and erosion of the shoreline occur, so that the areas of open swamp and lagoons may develop where mangrove forest have died out, providing further near-coastal habitats for shorebirds. Sediment deposition appears to be particularly extensive along the coasts of Suriname and French Guyana which occupy an indentation in the Guyana Shield. Farther east, intertidal sediments tend to become sandier.

To obtain a global and direct figure of the mudflat primary production, Rojas-Beltran (1986) established the trophic chain of guyanese estuaries, showing the main effect of zoo and phyto plancton for the feeding of shrimps, crabs and small fishes, first scavenger, then omnivorous, then sometime carnivorous.

All these animals provide natural food for birds.

An aerial survey, carried out in January/February from 1982 to 1986 covered some 28 000 km of the South America coastline. More than 2,9 million Neartic shorebirds were counted. It was possible to clearly identified the most important coastal wintering areas used by various categories and species of shorebirds. A relatively small number of sites supports major portions of the censused population.

Flights were timed to coincide with high tide whenever possible, so that shorebirds would be encountered in roosting flock along the water's edge.

Based on given numbers alone, the north coast of south America was clearly the most important wintering area for Neartic shorebirds, holding nearly 2.5 million, or 85.6% of the total for South America. On the north coast, the distribution of small species was centered on the Guianas, with Suriname(57.9%) and French Guyana(16.9%) together composing some 75% of the South America total. For medium size shorebirds 42.2 % of South America's total is located in the Guianas. Brazil hold's the largest percentage of the total of large species (29%).

The Guyanese area was covered in February 1982.

Figure 1 shows a summary of this sensus.

The arrow on Figure 1 shows apart of the coast where no birds were counted. It is a 15 km line of sandy beaches, rocky headlands and mainly mudflats around the city of Cayenne. During 1989-90 we made a sensus of birds occupying a part of it : Cayenne's old harbour mudflat.

Figure 2 show that the most important neartic shorebirds sensus were done on muddy beaches open at low tide.

METHODS

Localisation: Cayenne's old harbour is located in Cayenne's estuary river's. A concrete pier built 200 meters West then 80 meters South causes a mudflat deposit of almost the same size throughout the year. The study area was delimited West by the sea line at low tide, South by the left bank of a little stream crossing the city of Cayenne, East and North by the mangrove forest in front of the town. During the low tide the area is of aproximatly 20 hectares.

The censuses began on october 1989 and are not stopped yet. At the end of september 105 were done. All censuses were conducted around low tide; they are the sum of three counting points: in the north, south and eastern (facing the mangrove) direction; the further distance observed was of 400 meters. Bird species were identified (table 1). The number of individuals encountered of each species was estimated. The small sandpipers were identified as individuals when there were few. They were only clasified as *Calidris* sp. and *Charadrius semipalmatus* in large flocks. Egrets where counted in white forms or blue forms; ratios of the immature little blue Herons/Snowy egrets were established and corrected daily. It takes about twenty minutes to make a bird count of the full area.

RESULTS

On Cayenne's old harbour two bird groups are represented: the migrants and the residents birds. The most important part of the migrants are limicols from neartic regions nesting in Alaska. For most of them the mudflats of northern South America are the first stop-over after a continuous flight over the Caraib sea (Hicklin and

Smith, 1984). They accumulate the energy for molting when they go south and the one needed for migrating north during spring migration.

The number of limicols varies a lot depending on the season, the day, the tide and the hour where the censuses were done. These variations are not described in this summary. The relationships between species are the subject of an other paper.

Conclusions

An important part of the migratory birds are staying or passing through the north America coast and they are mainly attracted for their food on the mudflats. There is also a continuous food pressure on the same mudflat by the resident population.

In an area considered as poor in migrants shorebirds we determine that some 250 birds/hectare are feeding during migration.

Taking into account the number for each species and their food need in regard to their weight (Table 2), the prey quantity available must reach during the top of the migration 8 kg fresh weight per hectare. All along the year, this mudflat must provide a minimum of two kg/hectare of prey to the resident bird population.

Literature cited

- Hicklin P.W. and P.C. Smith, 1984. Selection of foraging sites and invertebrate prey by migrant Semipalmated Sandpipers, *Calidris pusilla* (Pallas), in Minas Basin, Bay of Fundy. *Can. J. Zool.* 62: 2201-2210.
- Morrison R.I.G. and R.K. Ross 1989. Shorebird distribution and coastal environments in south America. in *Atlas of Neartic shorebirds on the coast of South America*. Chap 4: 119-122.
- Swennen C., Duiven P. and A.L. Spaans 1982. Numerical density and biomass of macrobenthic animals in the intertidal zone of Surinam, south America. *Neth. J. Sea Res.* 15:406-418.

Table 1: Status, habitat and fishing habits of the bird species currently observed in Cayenne old harbour mudflats.

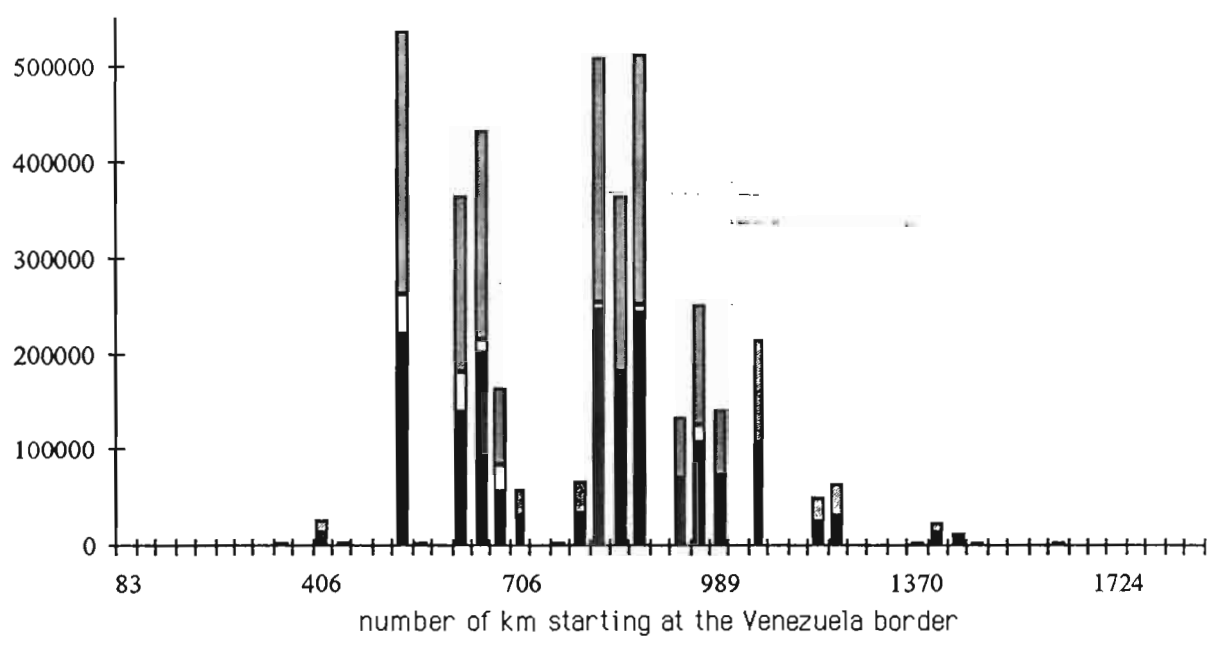
Species	Status	Habitat	Feeding behaviour	Group
<i>Egretta caerulea</i>	B-RBn	M-MC-LM-EVS	V-W-S	LS
<i>Egretta thula</i>	B-RBn	M-MC-LM-EVS	V-W-A	LS
<i>Egretta tricolor</i>	B-RBn	M-MC-LM-EVS	V-ST	LS
<i>Nycticorax violaceus</i>	B-RBn	M-MC-LM	V-W-A	LS
<i>Tringa melanoleuca</i>	H-P-E	EVS	V-T-W-lb	MS
<i>Tringa flavipes</i>	H-E	EVS	V-T-W-lb	MS
<i>Arenaria interpres</i>	H-P-E	EVS-MC	V-sb	MS
<i>Pluvialis squatarola</i>	H-P-E	EVS-MC	V-sb	MS
<i>Catoptrophorus semipalmatus</i>	H-E	EVS-MC	V-T-W-lb	MS
<i>Numenius phaeopus</i>	H-P-E	EVS-MC	T-lb	MS
<i>Calidris pusilla</i>	H-P-E	EVS-MC	V-T-W-lb	SS
<i>Charadrius semipalmatus</i>	H-P-E	EVS-MC	V-T-W-lb	SS
<i>Eudocimus ruber</i>	B-RBn	M-MC-LM	T-S	LS
<i>Rynchops niger</i>	VNR	LM-EC-EVS	T-F	F
<i>Larus atricilla</i>	H-VBR	LM-EVS	V-F	F
<i>Sterna maxima</i>	H	LM-EC-EVS	V-F	F
<i>Sterna antillarum</i>	B-VNR-MI	LM-EC-EVS	V-F	F
<i>Pandion haliaetus</i>	H-VNR	EC-MC	V-F	F

Legend: The same specie can have different status as some birds can just be pasting through the area, some others can be staying during winter and some others a year or more. H= Neartic migrant; MI=intratropical migrant; B= breeding; RBn= Resident but non breeding; VNR= nonbreeding visitor; P= seen during spring and fall.

EC= coastal waters; EVS= mudflats or sandyflats; LM= laguna; M= mangroves; MC= coastal marshes.

Feeding strategy: T= tactile; V= visual; Feeding behaviour: A= active; S= standing; W= walking; F= flying; sb= short beak; lb= long beak.

Group: LS= large shorebirds; MS= medium size shorebird; SS= small size shorebird; F= fishing birds.



Total nearctic shorebirds between Guiana and Amazon estuary

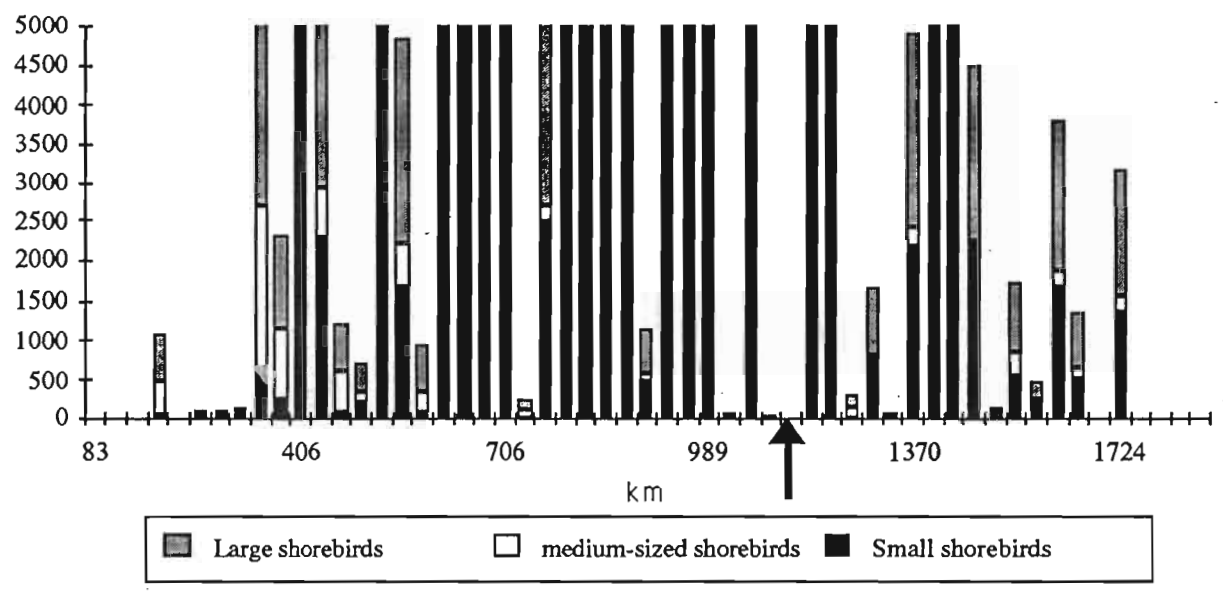


Figure 1 : Top: Variation of migrant shorebirds populations along the northern south America coast, between Venezuela-Guyana border and Amazon estuary. Down: detail.

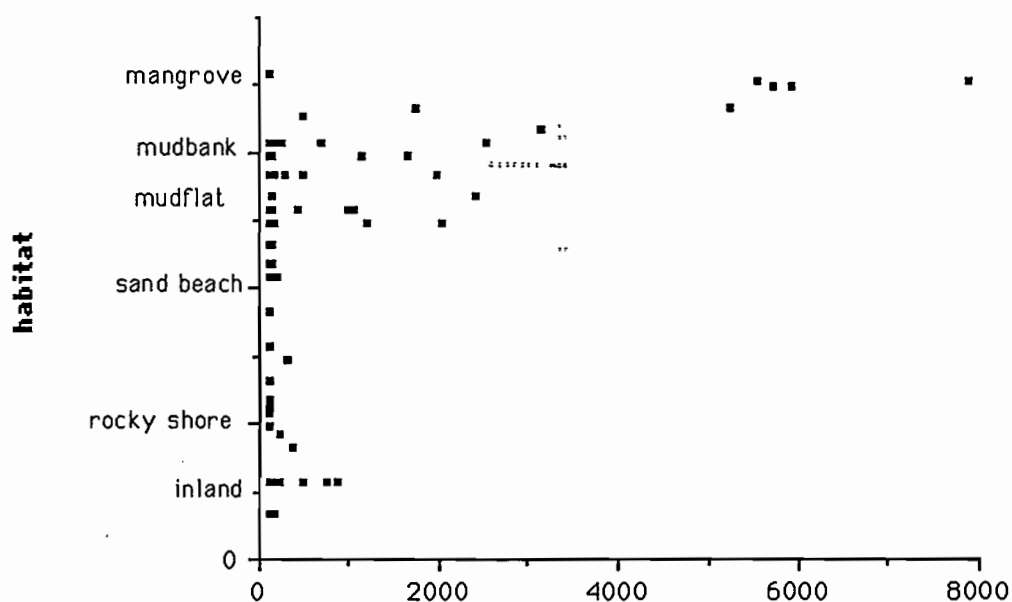


Figure 2: Shorebirds density in regard to habitats (from data of Morrison and Ross, 1989) between Venezuela-Guyana border and Amazon estuary.

Table 2: Diet and food need for the bird species currently observed in Cayenne Old harbour mudflats.

Species	average weight g.	daily food g.	Main diet
<i>Egretta caerulea</i>	320	64	Fishes, shrimps, insects
<i>Egretta thula</i>	300	60	Fishes
<i>Egretta tricolor</i>	280	56	Fishes, shrimps
<i>Nycticorax violaceus</i>	650	130	Crustacea
<i>Tringa melanoleuca</i>	170	34	Diptera
<i>Tringa flavipes</i>	75	15	Diptera
<i>Arenaria interpres</i>	100	20	Mollusca, larvae and pupae of Diptera
<i>Pluvialis squatarola</i>	165	33	Mollusca
<i>Catoptrophorus semipalmatus</i>	210	42	Mollusca, Crustacea, Arachnoides, Hymenoptera
<i>Numenius phaeopus</i>	350	70	Mollusca, Insects
<i>Calidris pusilla</i>	25	5	Mollusca, Crustacea
<i>Charadrius semipalmatus</i>	40	8	Mollusca
<i>Eudocimus ruber</i>	800	160	small Crustacea, Insects
<i>Rynchops niger</i>	300	60	Mollusca, Insects, Fishes
<i>Larus atricilla</i>	260	52	Fishes, shrimps
<i>Sterna maxima</i>	410	82	Fishes, Crustacea, flying termites
<i>Sterna nilotica</i>	180	36	small fishes
<i>Sterna antillarum</i>	45	9	small fishes
<i>Coragyps atratus</i>	1350	270	Offal
<i>Pandion haliaetus</i>	1520	340	Fishes

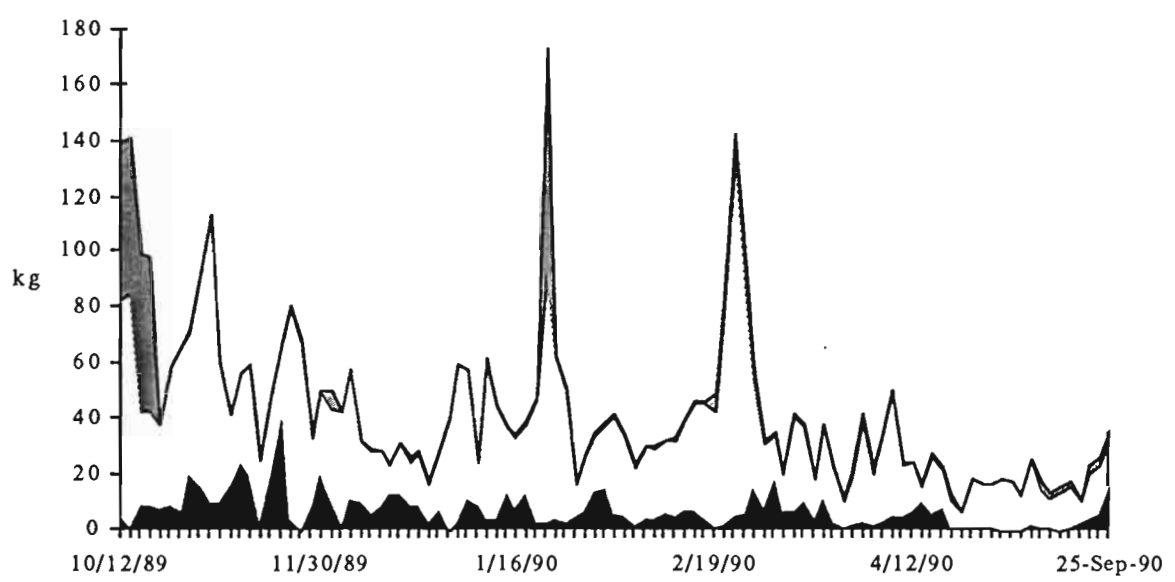
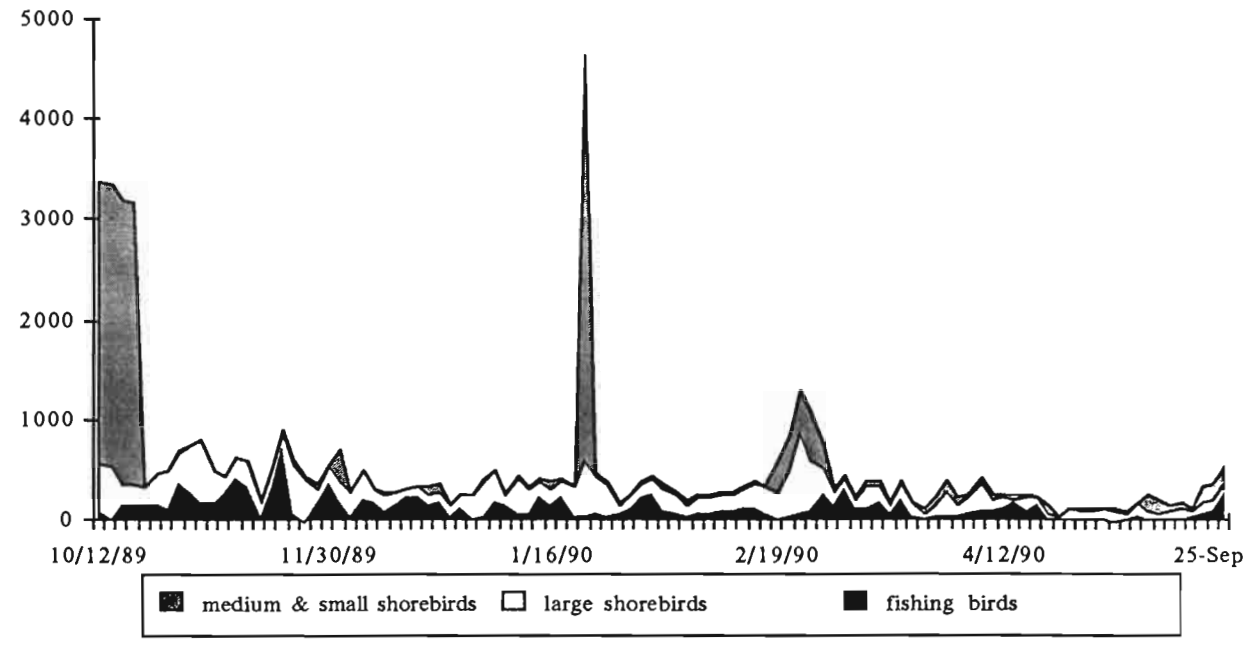


Figure 3: Variations of the shorebird population on Cayenne's old harbour mudflat (20 hectares) between October 1989 and September 1990.
Top: number of birds in the three main groups
Down: Food in kg per 20 hectares require for the three main groups.

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