

Importance of the Rio Gallegos estuary, Santa Cruz, Argentina, for migratory shorebirds

SILVIA FERRARI^{1*}, CARLOS ALBRIEU¹ & PATRICIA GANDINI²

¹Unidad Académica Río Gallegos, Universidad Nacional de la Patagonia Austral, Lisandro de la Torre 1070, Río Gallegos (9400), Santa Cruz, Argentina, e-mail: albrieu@arnet.com.ar

²Centro de Investigaciones de Puerto Deseado, Universidad Nacional de la Patagonia Austral, CONICET and Wildlife Conservation Society, e-mail: pagandini@yahoo.com.ar

*Corresponding author

Ferrari, S., Albrieu, C. & Gandini, P. 2002. Importance of the Rio Gallegos Estuary, Santa Cruz, Argentina, for migratory shorebirds. *Wader Study Group Bull.* 99: 35–40.

The aims of this study during 1997–1999 on the Rio Gallegos estuary, southern Patagonia, Santa Cruz province, Argentina, were to determine the importance of the area for migrant shorebirds, to identify the species that use it and to assess problems generated by human activities. We recorded 13 shorebird species, of which seven are Nearctic breeders. White-rumped Sandpiper was the most abundant, followed by Red Knot and Hudsonian Godwit. For these, the maximum number recorded exceeded 1% of the relevant biogeographic population. Therefore the site qualifies as internationally important for these species, according to criterion 3(c) of the Ramsar Convention. Among Neotropical species, the most abundant were Two-banded Plover and Magellanic Oystercatcher. Numbers of Magellanic Plover, an endemic species of southern Patagonia, amounted to nearly 10% of the estimated global population, indicating that the estuary is of crucial importance for this species. Moreover it is also of international importance for Two-banded Plover and probably Magellanic Oystercatcher. We found that the most serious threat to shorebirds is the growth of the city of Rio Gallegos and associated reclamation of tidal flats and salt marshes. Urgent measures are needed to control such developments.

INTRODUCTION

Migratory shorebirds are particularly vulnerable to habitat change, as they depend on a very limited number of sites for feeding and roosting. To design conservation strategies, it is vital to identify these sites and to know at what times of year they used. It is also critically important to understand the environmental problems associated with each site in order to develop protection measures (Davidson *et al.* 1998).

The Rio Gallegos estuary, Santa Cruz province, Argentina, includes several habitats used by non-breeding shorebird populations. However, no previous study has evaluated its importance. Our aims were therefore: (1) to determine the importance of the site for migrant shorebird populations, (2) to identify the species that use it, and (3) to assess potential problems generated by human activities.

STUDY AREA

The Rio Gallegos estuary is located in southern Patagonia, Argentina (51°30'S, 69°00'W) and is the southernmost Atlantic estuary of the South American mainland (Fig. 1). Rio Gallegos City (population: 80,000) is located on the southern shore.

Mean tidal range at the mouth (Punta Loyola) is 9.5 m on spring tides and 5.4 m on neaps. Its length, marked by tidal influence, is about 40 km and width varies from 8 km near the mouth to 800 m at the head. Depth varies from about 25 m in the entrance channel to just a few metres in the inland chan-

nels among the head tidal flats. The Rio Chico is the only tributary within the study area, but during most of the year this provides negligible freshwater input (Perillo *et al.* 1996).

The northern bank of the estuary consists of cliffs 80–129 m high. The southern bank is low, with extensive muddy tidal flats and complex channels. The intertidal areas comprise mud-flats and salt-marshes.

METHODS

Fieldwork, covering all seasons of the year, was carried out between July 1997 and December 1999. All observations were made from the shoreline within ± 2 hours of high water using 10 \times 50 binoculars and 20–60 \times telescopes and were largely confined to three accessible sections of the southern shore. These were selected because previous observations had shown that they are the main shorebird feeding and roosting areas. Therefore counts would cover most, if not all, of each population. They were (Fig. 1):

Section A: 2 km of the estuary shoreline at Rio Gallegos city; chosen particularly for its proximity to the city and for being the area most exposed to disturbance and contamination by untreated sewage.

Section B: 2 km of the estuary shoreline east of the junction with the Rio Chico estuary. This is an area that is relatively little altered by man and subject to minimal disturbance.



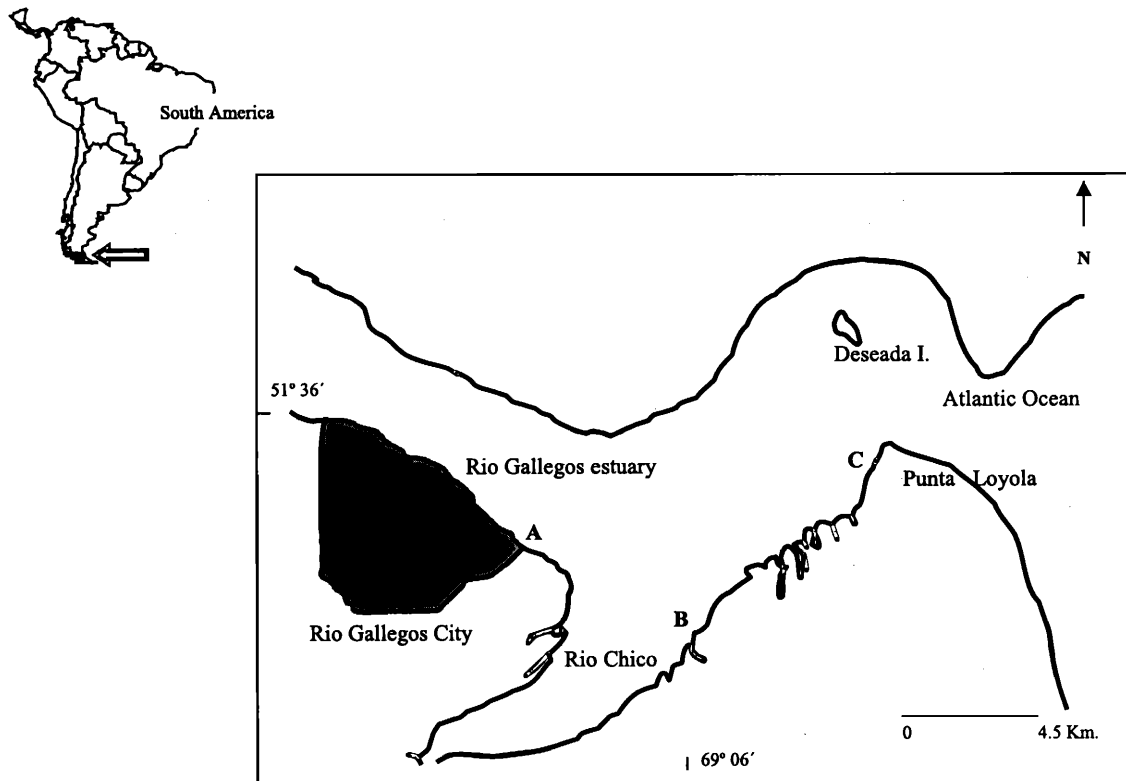


Fig. 1. Location of counting sections A, B and C on the Rio Gallegos estuary, Santa Cruz, Argentina, and other places mentioned in the text.

Section C: 1 km of the estuary shoreline at the mouth of the estuary at Punta Loyola. During the summer months, parts of this beach are used by anglers. Nearby, there is an oil storage installation.

The distance between Sections A and B is about 8 km, and between Sections B and C, 10 km. Counting effort was considerably greater in Section A, with a total of 66 visits. Counts there were made at least once in each month of the year, but more frequently during spring and autumn, when birds are on passage. Sections B and C were counted 37 and 12 times, respectively. The lower number of visits to these sites was due mainly to difficulties of access during the winter months, when roads are often impassable because of snow or ice.

In addition to the three main counting sites, on two occasions (in November 1998 and March 1999) we visited Deseada Island, located close to the mouth of the estuary, 2 kms from the northern shore (Fig. 1).

For those species that were recorded regularly, the numbers presented are the maximum observed in each month, taking all three years together.

We assess the international importance of the Rio Gallegos estuary for each species by reference to the criteria established by the Ramsar Convention (Frazier 1996). These require that for a site to be of international importance for a particular species, it must support at least 1% of the relevant biogeographic population at some time during the year on a regular basis. For Nearctic breeders, we base our assessments on the population estimates of the US Shorebird Conservation Plan (Brown *et al.* 2001). Among the wholly Neotropical shorebirds we recorded, there is a global population estimate for only two species: Magellanic Plover and Two-banded

Plover (Jehl 1975, Wiersma 1996) (for scientific names of the species we studied, please refer to Table 1). It should be noted that because our data were collected over a limited period, we cannot show the long-term regularity of occurrence required by the Ramsar criterion. However, as our counts covered only a part of the estuary, if anything, they are likely to underestimate actual populations. Therefore, if for any species our counts exceed the 1% criterion, the regularly occurring population, is probably even greater.

RESULTS

We recorded 13 shorebird species, seven of which breed in the Nearctic (Table 1). We found two periods of maximum species-richness, one in February–March (10 species) and another in October–November (8 species). The greatest numbers of shorebirds, all species combined, occurred in February with an aggregate total of about 14,000.

Nearctic breeding species

White-rumped Sandpiper

This, the most abundant species, was recorded in all months from September to April (Table 1, Fig. 2a). However, numbers declined in December. The reason might be that the birds moved to feed in other parts of the estuary, outside the study area, because counts in January and February were similar to those of November and it would seem unlikely that the birds moved to another site altogether for such a short time. The species was recorded in all three counting sections, though the largest numbers occurred in section B (Rio Chico).



Table 1. Shorebirds recorded at the Rio Gallegos estuary, Santa Cruz, Argentina, during 1997–1999.

Species	Status	Maximum population	(% of biogeographic population)	Biogeographic population
Baird's Sandpiper <i>Calidris bairdii</i>	PM	15		300,000 ^a
Sanderling <i>C. alba</i>	PM	35		300,000 ^a
White-rumped Sandpiper <i>C. fuscicollis</i>	PM & SV	6500	(1.6%)	400,000 ^a
Red Knot <i>C. canutus rufa</i>	PM	2500	(1.5%)	170,000 ^a
Hudsonian Godwit <i>Limosa haemastica</i>	PM	1000	(2.8%)	36,000 ^a
Whimbrel <i>Numenius phaeopus</i>	PM	175	(1.0%)	17,000 ^a
Greater Yellowlegs <i>Tringa melanoleuca</i>	PM	34		100,000 ^a
Two-banded Plover <i>Charadrius falklandicus</i>	AY – BR	3700	(3.7% or more)	10,000–100,000 ^b
Rufous-chested Dotterel <i>Ch. modestus</i>	OV	50		NEA
Tawny-throated Dotterel <i>Oreopholus ruficollis</i>	SV	4		NEA
Magellanic Plover <i>Pluvianellus socialis</i>	WV	145	(9.7%)	1500 ^{b,c}
Magellanic Oystercatcher <i>Haematopus leucopodus</i>	AY	2360		NEA
American Oystercatcher <i>H. palliatus</i>	OV	3		NEA

PM = Passage migrant; SV = Summer visitor; WV = Winter visitor; OV = Occasional visitor; AY = occurs all year round; BR = Breeds; NEA = No estimate available.

^a Brown *et al.* (2001), ^b Wiersma (1996), ^c Jehl (1975)

Note: Recent evidence that the flyway population of Red Knots (*rufa* subspecies) may not now exceed 50,000 (H.P. Sitters pers. comm.) would increase the proportion using the Rio Gallegos estuary to about 5%.

Red Knot

The second most abundant Nearctic migrants, Red Knots occurred only on passage and were absent in December and January (Table 1, Fig. 2b). The greatest numbers were counted during the northward migration in February and March. The largest flock was recorded in section B (Rio Chico), although knots also occurred in substantial numbers in section A, near Rio Gallegos city. Knots frequently fed alongside Hudsonian Godwits and, on some occasions, Magellanic Oystercatchers. A similar association has been observed on the beaches of Rio Grande, Tierra del Fuego, Argentina (Minton *et al.* 1996).

Hudsonian Godwit

With a similar pattern of occurrence to Red Knot, Hudsonian Godwit numbers were greatest during northward migration in February–April (Fig. 2c). Although it was found in all three counting sections, the largest flocks were observed in section B (Rio Chico).

Whimbrel

Regular passage migrants, Whimbrels occurred at all times of the year except mid winter (June & July) and mid-summer (December & January). During southward migration, numbers peaked in September–October and during northward migration in February (Fig. 2d). The largest number was found in section A, close to Rio Gallegos city in October. 96% of observations related to section A and the rest to section B (Rio Chico). On some occasions, they fed in association with Magellanic Oystercatchers.

Greater Yellowlegs

Seen in small numbers (5–34) during December–March, most occurred in section B (Rio Chico) beside a wide tidal channel. Occasionally a few were recorded in section C (Punta Loyola).

Sanderling and Baird's Sandpiper

Both species occurred occasionally. A group of 35 Sanderlings was observed at Punta Loyola (section C) in March 1998. Small flocks of Baird's Sandpipers were recorded during October–February on the mudflats of Rio Chico (section B) and, less frequently, in section A, near the city. Baird's Sandpipers are very common in the small lagoons of the steppe country in the southern parts of Santa Cruz province, often in flocks of up to 300 individuals (pers. obs.).

Neotropical Species

Two-banded Plover

Among Neotropical species, this was the most abundant occurring mainly in non-breeding flocks during January–August. In spring, the majority move away to breeding sites and numbers are low (Fig. 2e). Two-banded Plovers were recorded nesting around the estuary where they use high-level salt marsh and gravel beaches. This change of habitat would explain the low numbers recorded in our study areas during the breeding season, because our counts covered sections of the shore that were not used for nesting. We found nests with eggs from September to November, and adults with chicks during October and November.

Highest numbers were recorded in section B (Rio Chico) in January and in section C (Punta Loyola) in August. In contrast, only small numbers occurred sporadically in section A, near Rio Gallegos city. During our visit to Deseada Island in March 1999, we found a particularly large flock of 1700.

Magellanic Oystercatcher

The second most abundant of the Neotropical species, Magellanic Oystercatchers were most numerous in July and August, but virtually disappeared from September to January (Fig. 2f). During the latter period we observed singles and pairs, usually near freshwater pools, at various inland sites in the southeast of Santa Cruz province, including a nest with



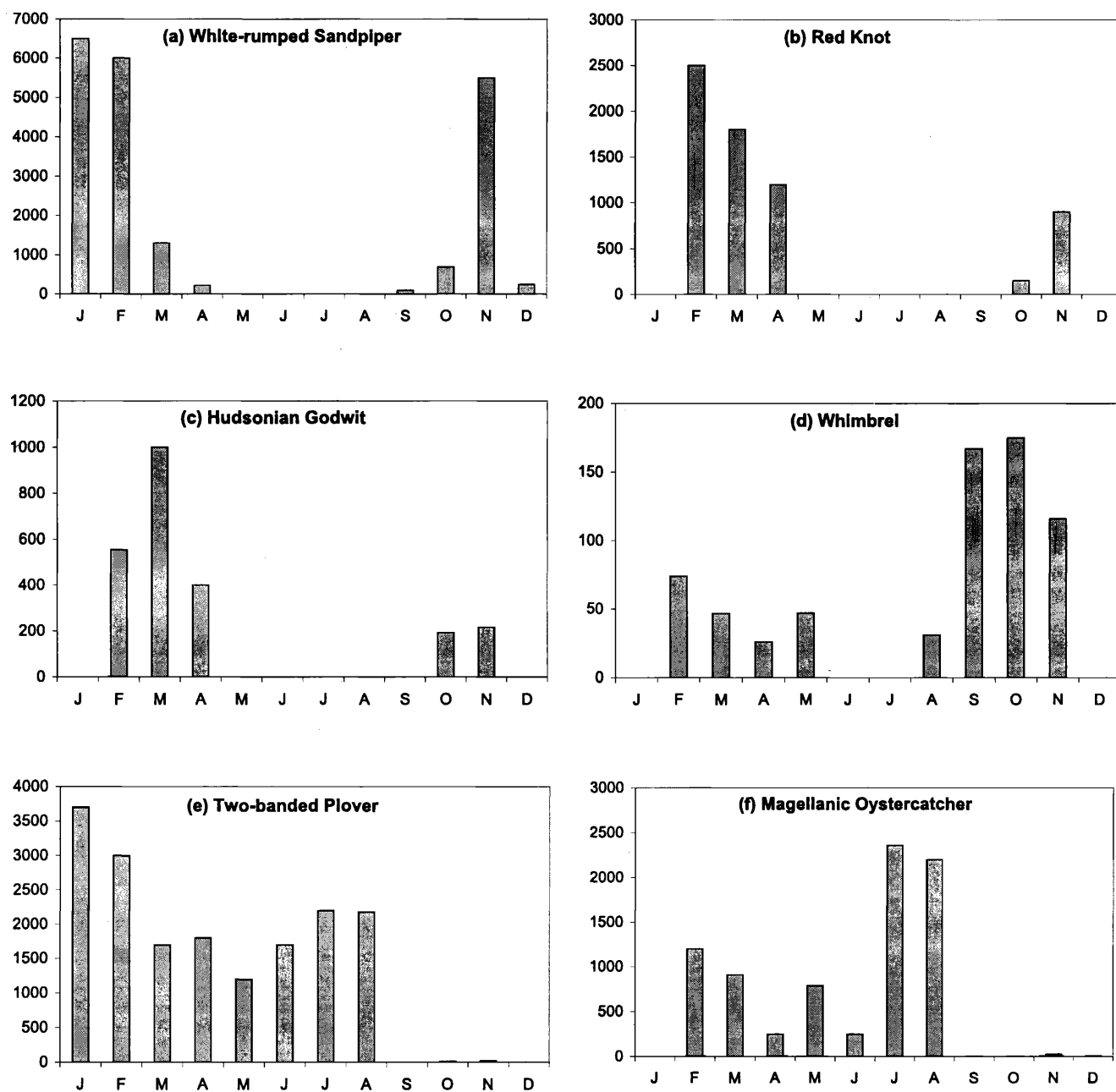


Figure 2. Maximum monthly counts of shorebirds during 1997–1999 in three study areas on the Rio Gallegos estuary, Santa Cruz, Argentina: (a) White-rumped Sandpiper, (b) Red Knot, (c) Hudsonian Godwit, (d) Whimbrel, (e) Two-banded Plover and (f) Magellanic Oystercatcher.

eggs (Ferrari *et al.* 2001). Magellanic Oystercatchers were recorded in all three of our count sections, but were seen most often and in greatest numbers in section A, near Rio Gallegos city.

Magellanic Plover

Breeding inland during August–December, Magellanic Plovers were most numerous on the estuary from March to May, with numbers ranging from 15 to 145, mainly around Rio Chico (section B) and Deseada Island.

Rufous-chested Dotterel

Observed in groups of usually 3–50 during February, March and June, but only at Punta Loyola (section C).

Tawny-throated Dotterel

Only encountered in September and October, in pairs or groups of 3–4, frequenting areas of short grass next to the beach at Punta Loyola.



American Oystercatcher

Found in groups of 1–3 on Deseada Island in November 1998 and in section A near Rio Gallegos city in April 1999.

CONSERVATION PROBLEMS

Problems arising from human activities were identified as:

- Those arising from urban use: particularly the growth of the city towards the coast, the reclamation of tidal flats and salt marshes for urban development and the location of the rubbish dump. The latter is a major problem because it adjoins the feeding and roosting areas used by the birds. Garbage is spread quickly by the strong winds characteristic of the region and is deposited over large parts of the estuary shore. It diminishes habitat quality, especially when plastics, such as polythene bags, cover potentially usable surfaces.
- Oil pollution arising from accidents during operations at the Punta Loyola oil port, located in the mouth of the estuary.

We consider that the most serious problem for shorebird conservation is the extensive use of the tidal flats and salt marshes for urban purposes leading to the loss of roosting areas and the loss and modification of the feeding areas.

DISCUSSION AND CONCLUSION

These results demonstrate the role of the Rio Gallegos estuary as a major site supporting substantial shorebird populations with significant conservation interest. According to globally accepted criteria, the area qualifies as internationally important for five species: White-rumped Sandpiper, Hudsonian Godwit, Red Knot, Two-banded Plover and Magellanic Plover. In addition, it would probably qualify as internationally important for Magellanic Oystercatcher, if only an estimate of the global population was available. This species is considered rare in Argentina (Grigera & Úbeda 1997) and, from our knowledge of it throughout its range in southern Patagonia and Tierra del Fuego, we consider that it is virtually certain that our count of 2,360 exceeds the 1% threshold.

The value of Rio Gallegos is further enhanced if we take into account the fact that the relevant biogeographic populations of both Hudsonian Godwit and Red Knot are currently in serious decline (Morrison *et al.* 2001). Moreover the presence of breeding Two-banded Plovers is nationally significant.

The Magellanic Plover, which is endemic to southern Patagonia, is categorised as near threatened (BirdLife International 2001) and rare (Grigera & Úbeda 1997) with very low population numbers (<1500 birds, Jehl 1975). Therefore our maximum count of 145 represents nearly 10% of the estimated global population and shows that the estuary is of crucial importance for this species.

Although the Whimbrel has a worldwide distribution, it is considered scarce in Argentina, with only occasional records for Tierra del Fuego (Humphrey *et al.* 1970, Clark 1986, Nores 1988, Morrison & Ross 1989, Minton *et al.* 1996), the coast of Buenos Aires (Nores 1988) and Chubut

(Abril & Notary 1993). Therefore our count of 175 is of regional significance.

The sum of the maximum counts for all 13 species is just over 16,500. This figure therefore represents the minimum number of birds that use the Rio Gallegos estuary throughout the year. If we add to this the effect of throughput of passage migrants, the total number of shorebirds supported by the estuary almost certainly exceeds the 20,000 threshold of criterion 3 (a) of the Ramsar Convention. Therefore it is probable that the Rio Gallegos estuary qualifies as a wetland of international importance for shorebirds under two different criteria.

It is emphasised that we were only able to carry out counts in limited parts of the estuary and, although we are confident that we covered all the main areas used by shorebirds, it is very likely that we missed significant concentrations from time to time. This may account for apparent inconsistencies in our counts, such as the fall in White-rumped Sandpipers in December. Nevertheless, this study, which is the first systematic shorebird survey on the Rio Gallegos estuary, has succeeded in establishing that it is of considerable international importance.

The data for Hudsonian Godwit and Red Knot suggest that they use the site mainly during northward migration in February–March, a pattern similar to the one found at San Antonio Oeste, Rio Negro province (Blanco *et al.* 1995). On the other hand Magellanic Oystercatcher numbers show that they occur mainly in the pre- and post-breeding periods. This agrees with the observations of Humphrey *et al.* (1970) for Tierra del Fuego.

The greatest threat to the shorebirds of the estuary is the growth of the city of Rio Gallegos towards the coast, particularly the reclamation of salt marsh and mudflats. This has led to the loss and degradation of some of the most important shorebird habitats and is a process that is continuing. Urgent measures are needed to control these developments and to reduce disturbance and pollution.

We found that the most important area for shorebirds is the mouth of the Rio Chico, which held the largest concentrations of White-rumped Sandpipers, Hudsonian Godwits, Red Knots and Two-banded Plovers as well as providing virtually the only records for the scarcer species, such as Magellanic Plover, Baird's Sandpiper and Greater Yellowlegs. Therefore this is where conservation efforts should be focussed.

ACKNOWLEDGEMENTS

We wish to thank Patricia Gonzalez for her continuous collaboration, support and encouragement, Santiago Imberti and Silvina Sturzenbaum for personal records. We are very grateful to Humphrey Sitters for critical comments and observations of this paper.

Prefectura Naval Argentina provided access to Isla Deseada. The Universidad Nacional de la Patagonia Austral supported this work financially. We also thank Dr Enrique Bucher for his encouragement and Enrique Albrieu for his help in translating our manuscript into English.

This study is part of *Tesis de Maestría en Manejo de Vida Silvestre* completed at the Centro de Zoología Aplicada, Universidad Nacional de Córdoba, Argentina, by one of the authors.



REFERENCES

- Abril, M. & V. Notary.** 1993. Contribución al conocimiento de las aves migratorias en la Bahía Bustamante, Chubut. *Jornadas Nacionales del Mar*. Puerto Madryn, Chubut, Argentina. pp. 129.
- BirdLife International.** 2001. BirdLife's online World Bird Database: the site for bird conservation. BirdLife International, Cambridge, UK.
- Blanco, D., P. González & M.M. Martínez.** 1995. Migración de la becasa de mar, *Limosa haemastica* (Charadriiformes: Scolopacidae), en el sur de América del Sur. *Vida Silvestre Neotropical* 4: 119–124.
- Brown, S., C. Hickey, B. Harrington & R. Gill** (eds). 2001. *United States Shorebird Conservation Plan* 2nd ed. Manomet Center for Conservation Sciences, Manomet, Massachusetts.
- Clark, R.** 1986. Aves de Tierra del Fuego y Cabo de Hornos. Guía de campo. Ed. L.O.L.A. Buenos Aires, Argentina.
- Davidson, N.C., D.A. Stroud, P.I. Rothwell & M.W. Pienkowski.** 1998. Towards a flyway conservation strategy for waders. In: *Migration and international conservation of waders. Research and conservation on north Asian, African and European flyways*. Hötter, H., Lebedeva, E., Tomkovich, P.S., Gromadzka, J., Davidson, N., Evans, J., Stroud D.A. & West, R.B. (eds). pp 24–44. International Wader Studies 10. United Kingdom.
- Ferrari, S., C. Albrieu, A. Manero & V. Malacalza.** 2001. Variación estacional y nidificación de *Haematopus leucopodus*, *Charadrius falklandicus* y *Theristicus melanopsis* en el sur de Santa Cruz en Actas de la I Reunión Binacional de Ecología y XX Reunión Argentina de Ecología. Bariloche, Argentina.
- Frazier, S.** 1996. *Visión General de los Sitios Ramsar en el Mundo*. Wetlands International Publication 39.
- Grigera, D. & C. Úbeda.** 1997. Recategorización del estado de conservación de la fauna de la Patagonia Argentina, Antártida e Islas del Atlántico Sur: un análisis de sus resultados. *Gayana Zoologica* 61: 113–124.
- Humphrey, P.S., D. Bridge, P.W. Reynolds & R.T. Peterson.** 1970. *Birds of Isla Grande (Tierra del Fuego)*. Smithsonian Institution, Washington D.C.
- Jehl, J.R.** 1975. *Pluvianellus socialis*: biology, ecology and relationships of an enigmatic Patagonian shorebird. San Diego. *Soc. Nat. Hist. Trans.* 18: 31–72.
- Minton, C.D.T., T. Piersma, D.E. White, A.J. Baker, L.G. Benegas, P. de Goeij, R.E. Manriquez, M. Peck & M.S. Ramirez.** 1996. Wader numbers and the uses of high tide roosts at the Hemispheric he/she Reserves "Atlantic Costa of Tierra del Fuego", Argentina–January and February 1995. *Wader Study Group Bull.* 79: 109–114.
- Morrison, R.I.G. & R.K. Ross.** 1989. *Atlas of Nearctic Shorebirds on the Coast of South America*. Canadian Wildlife Service Special Publication, Canadá.
- Morrison, R.I. G., Y. Aubry, R.W. Butler, G.W. Beyersbergen, G.M. Donaldson, C.L. Gratto-Trevor, P.W. Hicklin, V.H. Johnston & K. Ross.** 2001. Declines in North American shorebird populations. *Wader Study Group Bull.* 94: 34–38.
- Nores, M.** 1988. Situación y rutas de vuelo de los playeros migratorios en Argentina. Taller de trabajo para gestores ambientales. Universidad Nacional de Córdoba y Manomet Bird Observatory.
- Perillo, G.M.E., M.D. Ripley, M. Cintia Piccolo & K.R. Dyer.** 1996. The Formation of Tidal Creeks in a Salt Marsh: New Evidence from the Loyola Bay Salt Marsh, Rio Gallegos Estuary, Argentina. *Mangroves and Salt Marshes* Vol. 1(1): 37–46. SPB Academic Publishing bv, Amsterdam.
- Wiersma, P.** 1996. Family Charadriidae. In: del Hoyo, J.A. Elliott & J. Sargatal (eds.). *Handbook of the Birds of the World*. Vol. 3. Hoatzin to Auks. Lynx Editions, Barcelona.

