

# The Chilean Shorebird Network (RECAP)

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The importance of Chile's coastline for long-distance migratory shorebirds is broadly known. Every year, thousands of shorebirds migrate south from their northern breeding grounds and congregate at coastal sites in Chile. Since the creation of the Chilean Shorebird Network (RECAP) in 1989, research on shorebirds in Chile has increased. Study sites currently span more than 3,000 km from Arica (18°S) to Concepción Bay (37°S), including Coquimbo, Quinteros and Santo Domingo. Each of these areas supports a high concentration of shorebirds, and each is a centre of investigation. RECAP has over 30 active members who are associated with 6 different universities. The scientific studies conducted at each research centre are varied and include research on populations and community ecology, as well as management and conservation strategies for long-distance migratory species.

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Ya es ampliamente sabido la importancia de las costas de Chile para las aves migratorias de larga distancia, ofreciendo áreas de descanso y de permanencia durante la época no reproductiva para las aves. En estas áreas cada año se concentran miles de chorlos y playeros provenientes del Hemisferio Norte. Desde el origen de la Red Chilena de Aves Playeras (RECAP) en 1989, los estudios en este grupo de aves en el país se han intensificado cubriendo actualmente más de 3 000 km de distancia entre la localidad de Arica (18 lat. sur) hasta la Bahía de Concepción (37 lat. sur), pasando por Coquimbo, Quintero y Santo Domingo, las que concentran gran abundancia de Playeros y son nuestros Centros de Investigación. RECAP cuenta con más de 30 participantes activos afiliados a 6 diferentes instituciones. Los estudios científicos que se realizan en cada uno de estos Centros de Investigación son variados abarcando desde estudios poblacionales, ecología de comunidades, hasta manejo y conservación de las especies migratorias de larga distancia.

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L'importance de la côte du Chili pour les oiseaux de rivage qui migrent sur de longues distances est largement connue. Ainsi, tous les ans, des milliers d'oiseaux de rivage migrent vers le Sud depuis leurs aires de reproduction du Nord et se rassemblent à divers endroits de la côte du Chili. Depuis la création en 1989 du Réseau chilien d'étude des oiseaux de rivage (RECAP), la recherche sur les oiseaux de rivage s'est accrue dans ce pays. À l'heure actuelle, les secteurs étudiés couvrent une région qui va d'Arica (18°S) à la baie Concepción (37°S), soit plus de 3 000 km, et qui comprend Coquimbo, Quinteros et Santo Domingo. Chacun de ces secteurs, qui abrite des concentrations élevées d'oiseaux de rivage, constitue un centre de recherche. Le réseau RECAP compte plus de 30 membres actifs affiliés à 6 universités différentes. Les études scientifiques effectuées à chacun des centres sont variées et comportent des études sur les populations et l'écologie des communautés, ainsi que sur les stratégies de gestion et de conservation des espèces de migrants au long cours.

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## Introduction

The shorebirds (Charadrii) are a typical group of long-distance migratory birds and are widespread throughout the world. This group comprises 166 species, divided into 8 families (Johnsgard 1981). The most diversified families are Scolopacidae and Charadriidae, with 83 and 61 species, respectively.

In South America, there are 65 shorebird species, of which 37 migrate from the Northern Hemisphere. The most diversified families are the sandpipers (Scolopacidae), with 29 species, and the plovers

(Charadriidae), with 6 species (Table 1) (Prater, Marchant & Vuorinen 1977).

Chile is located entirely on the western watershed of the Andes. It extends over more degrees of latitude than any other country in the world, from Arica (18°S) to Cape Horn (56°S). It is bordered by Peru and Bolivia to the north and north-east and by Argentina to the east. The geography of continental Chile is altogether remarkable. It is an extremely long and narrow strip of land, 4,160 km long and 320 km wide, narrowing in places to less than 96 km. It is bordered on one side by mountains

**Table 1.** Diversity of species per family and migratory species in North and South America.

Family	North America		South America		Migratory species
	Genus	Species	Genus	Species	
Jacaniidae	1	1	1	1	–
Rostratulidae	–	–	1	1	–
Haematopodidae	1	2	1	3	–
Charadriidae	3	13	8	16	6
Scolopacidae	21	57	15	34	29 <sup>a</sup>
Recurvirostridae	2	2	2	2	2
Burhinidae	1	1	1	2	–
Thinocoridae	–	–	2	4	–
Chionidae	–	–	1	2	–
<b>Total</b>	<b>29</b>	<b>76</b>	<b>32</b>	<b>65</b>	<b>37</b>

<sup>a</sup> Only the five species belonging to the genus *Gallinago* are not migratory.

6,096 m above sea level and on the other by the sea. The total area of continental Chile is 480,000 km<sup>2</sup>. The ecological and climatological features of the country are also remarkable, from the driest desert in the world to cold antarctic weather. The country also has many isolated islands in the Pacific Ocean.

Because of its geography, Chile is an important country for migratory shorebirds from North America, with over 4,000 km of coastal environment and many high-altitude lakes where the shorebird densities are appreciable. Nevertheless, few studies have been undertaken to estimate the diversity and numerical variation of birds in these environments. Recently, a very good study estimating the abundance of shorebird species along the coast of Chile has been done by Morrison & Ross (1989). A total of 50 species of shorebirds is reported in Chile, of which 62% are migratory species from North America. Many of these species are accidental, but the Sanderling *Calidris alba*, Ruddy Turnstone *Arenaria interpres*, Baird's Sandpiper *Calidris bairdii* and Whimbrel *Numenius phaeopus* are very important species in Chile (Araya & Millie 1986).

Since 1982, Chile has been a member of the Pan-American Shorebird Program (PASP). The long-term objective of the programme in Chile has been to band shorebirds on the wintering grounds and to link Chilean sites with other locations critical to the conservation of specific populations (Myers & Sallaberry 1983; Myers *et al.* 1990; Sallaberry & Tabilo 1990).

In 1989, the first Field Workshop for studies of long-distance migratory shorebirds was held in Coquimbo. Since then, research on shorebirds has increased. Knowing the large extent of coastline that should be covered in studies on these migratory birds, Chile organized the Chilean Shorebird Network, or RECAP (Red Chilean para Aves Playeras).

In Chile, we are gradually developing a conservationist attitude regarding wildlife, specifically in relation to birds (Sallaberry 1989; Rottmann & López-Callejas 1992). To develop and disseminate such knowledge to different levels of our society, it is necessary to know and understand thoroughly the general biology of the species concerned. Furthermore, it is imperative to develop a good exchange of information among people, communicating the results to the general public and reaching a broad spectrum of interest levels, from scientists to schoolchildren. A preliminary strategy for conservation of long-distance migratory shorebirds in the Western Hemisphere has been developed by Myers *et al.* (1987).

The purpose of this paper is to summarize the different studies devoted to long-distance migratory shorebirds in Chile under the co-ordination of RECAP.

## Methodology

We gathered information from the different working groups in Chile. We summarized principally the objectives, methodology and results of each project. In many cases, the methods used were conventional and are described elsewhere. More specific methodology is described with regards to each paper to which it applies. The preliminary results of these projects are discussed in relation to the overall scope of RECAP. We present some original tables and figures of specific papers in preparation.

## Results and discussion

Figure 1 locates the centres of research for long-distance migratory shorebirds in Chile, spanning more than 4,000 km from Arica to Punta Arenas. A large variety of projects is being developed at each site with the co-ordination of RECAP. Unfortunately, not all the sites have the same level of

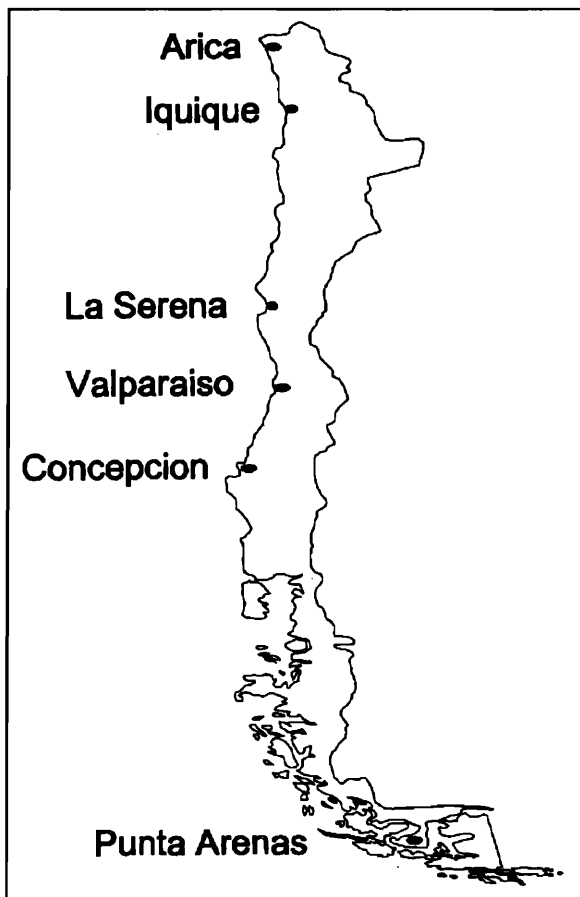


Figure 1. Migratory shorebird research centres in Chile.

research, but there is a shared interest in the movement of the populations during migration to the wintering grounds.

Another interest of RECAP is to co-ordinate workshops on migratory birds in Chile. Already we have held three workshops in different localities. The first one was held in Coquimbo in 1989, the second in Iquique in 1990 and the third in Puerto Montt in 1991. It is very important that this process be continued and that the next workshop be organized with participants from all over the country.

The different projects at each locality are summarized in Table 2; these include five ongoing projects and two under review. The funding for these projects comes from different sources, including private funds. As is evident, research ranges widely from preliminary surveys and censuses to detailed studies of foraging ecology and the environmental impacts of human activities. The scientific studies conducted at each research centre vary; these include surveys and censuses of populations, community ecology and management and conservation strategies for long-distance migratory species.

Because RECAP extends over almost the whole length of the country, it has to collaborate with many other national institutions (Table 3). To minimize problems and to speed up the work in different localities, it is always important to involve graduate students and their universities. This has proven to be the best and most productive association for RECAP.

Below are brief summaries of each of the projects (except Quintero, for which details were not received).

#### **Diversity and abundance of shorebirds at Arica Bay (I Region) during the austral summer**

Arica is the northernmost city of Chile, close to the border with Peru. Very little information on the shorebird community has been gathered until now. During the months of January and February 1991, we censused Arica Bay, which is separated in the middle by the city of Arica. This allowed us to census two well-defined areas, the north and south zones, respectively. The northern section is a sandy beach, whereas the southern section has a rockier environment. The methodology used for this study was conventional: walking along the beach with binoculars (10 × 40 mm) and a spotting scope while counting and identifying the birds. Figure 2 shows the numbers and species of birds in both sections of Arica Bay during the austral summer.

Fifteen species were recorded in the northern section. The most common were Franklin's Gulls *Larus pipixcan* and Sanderlings, each accounting for more than 1,500 birds. Next followed the Whimbrels and Grey Gulls *Larus modestus*, with 300 and 100 birds, respectively.

Only 13 species of coastal birds were recorded in the southern section. Franklin's Gull was the most abundant species in this section, followed by the Elegant Tern *Sterna elegans*, the Grey Gull and the Willet *Catoptrophorus semipalmatus*. The data collected suggest that the Willet population winters largely in northern Chile.

#### **Workshops for the study and conservation of long-distance migratory shorebirds in Chile**

To date, we have organized three field workshops in different parts of the country. Advanced students from universities, professors and professionals employed in government positions attended the workshops. The results of these activities have been excellent, motivating a great number of students to develop their theses on topics related to the study of long-distance migratory shorebirds. The next step is to obtain funds for these students to support them through

**Table 2.** List of projects of the Chilean Shorebird Network.

A. Ongoing projects			
Locality	Latitude	Investigator	Title
Arica	18°21'S	M. Sallaberry J. Abarca	Diversity and abundance of shorebirds at Arica Bay (I Region) during the months of austral summer.
Iquique	20°00'S	E. Tabilo M. Sallaberry V. Farias	Workshops for the study and conservation of long-distance migratory shorebirds in Chile.
Coquimbo	29°32'S	E. Tabilo R. Jorge	Conservation of wetlands and shorebirds on the coastline of Coquimbo.
Quintero	32°45'S	M. Sallaberry C. Gonzalez	Human impact on the shorebird community at Quintero Bay (V Region), Chile.
Concepción	36°40'S	M.C. Klesse M. Sallaberry	Foraging behaviour of Sanderling <i>Calidris alba</i> on Roquant Island, Concepción Bay.

**B. Projects under review**

- Title: Population studies in *Calidris alba* and other long-distance migratory species in Chile.  
Principal investigator: Dr Michel Sallaberry A.  
Co-investigator: Lic. Cristina Klesse M.
- Title: Study of the coastal environment of southern Chile (X Region) as a wintering ground for long-distance migratory shorebirds.  
Principal investigator: Prof. Luis Espinoza G.

**Table 3.** National institutions with which RECAP collaborates.

1. CONAF Corporación Nacional Forestal
2. UNORCH Unión de Ornitólogos de Chile
3. Universidad Arturo Prat (Iquique)
4. Universidad de La Serena (La Serena)
5. Universidad Católica del Norte (Coquimbo)
6. Universidad de Chile (Santiago)
7. Universidad de Playa Ancha (Valparaíso)
8. Universidad Católica de Valparaíso (Valparaíso)
9. Universidad de Concepción (Concepción)

their graduate studies. These workshops are always accompanied by local media publicity.

The second workshop for migratory shorebirds was held in Iquique in 1990. Fifteen students attended the meeting. Now we have a small group studying the annual variation in shorebird numbers at Iquique Bay.

We realize that these activities are very important to motivate both undergraduate and post-graduate students. It is the best way to recruit new young students interested in public education and conservation relating to migratory birds. We must continue with these activities in the future.

### The conservation of wetlands and shorebirds in Coquimbo Bay

This project is the follow-up of Tabilo's thesis on the annual variation, diversity and habitat preferences of shorebird species in Coquimbo Bay. At the completion of this study, we presented a new

project to the government in relation to the management and conservation of long-distance migratory shorebirds (Tabilo, Sallaberry & Myers 1990).

Figure 3 shows the proposed study site in our research proposal. We suggested dividing the bay into three areas as follows: a **recreational area** in the extreme south; an **educational area** in the centre of the bay; and, finally, a **protected area** in the extreme north of the bay (this area to be used only for scientific purposes). Each of these areas is about 4,000 m long.

An alternative project will be developed for the educational area. We are planning to (1) produce a field guide on the birds of the area, (2) present seminars and (3) hold other ecological and conservational activities for students and the general public.

Discussions on this proposal with the government are ongoing.

### Foraging behaviour of Sanderling on Roquant Island, Concepción Bay

This project is C. Klesse's graduate thesis. The general purpose of this work is to study the annual variation in numbers and habitat preferences of the Sanderlings at Concepción Bay and to compare these data with the food availability and foraging ecology of Sanderlings in the area. Two years of observations have been completed, and at this time Klesse is in the final stage of writing his thesis.

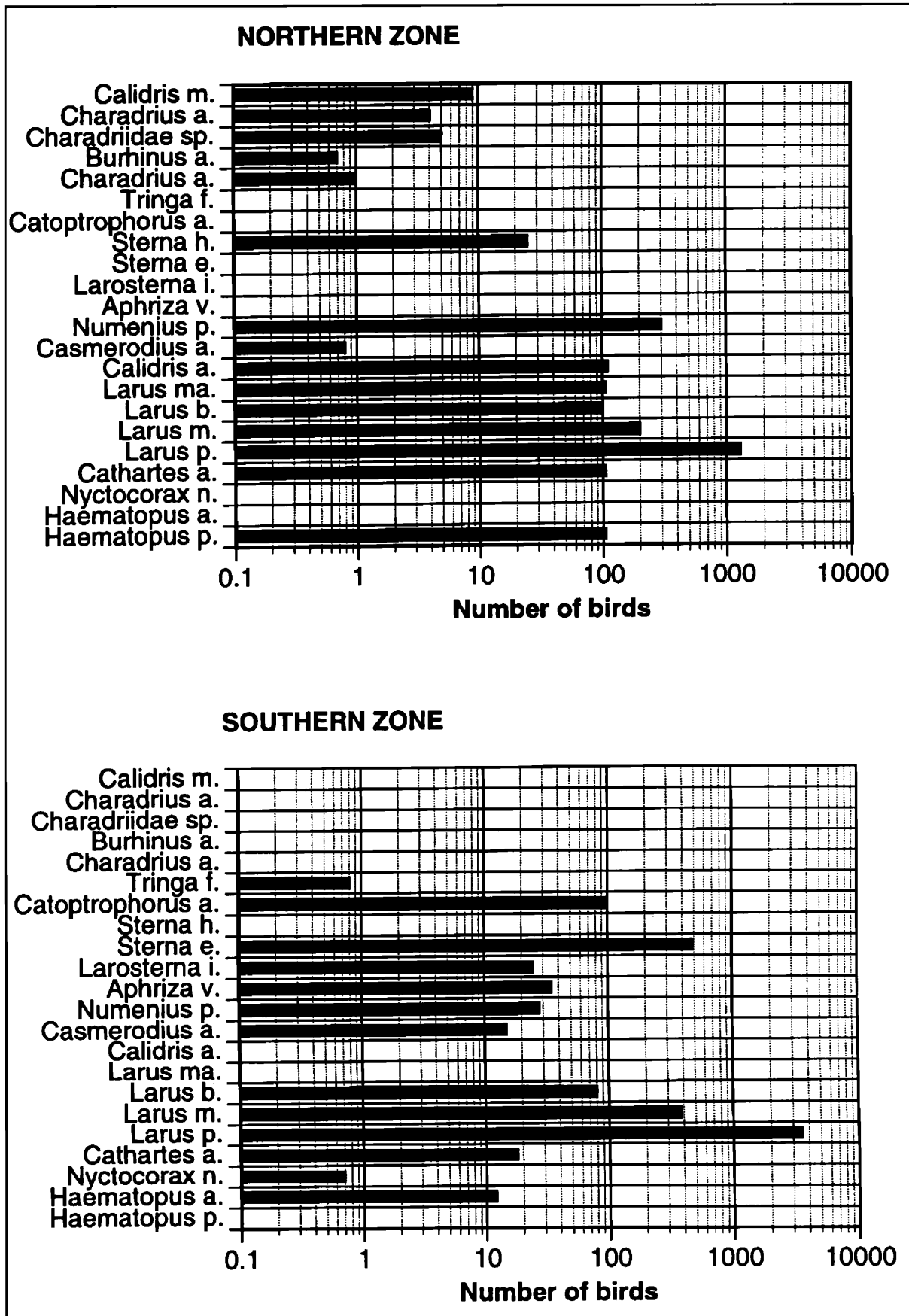


Figure 2. Species and numbers of shorebirds in both sections of Arica Bay during the austral summer.

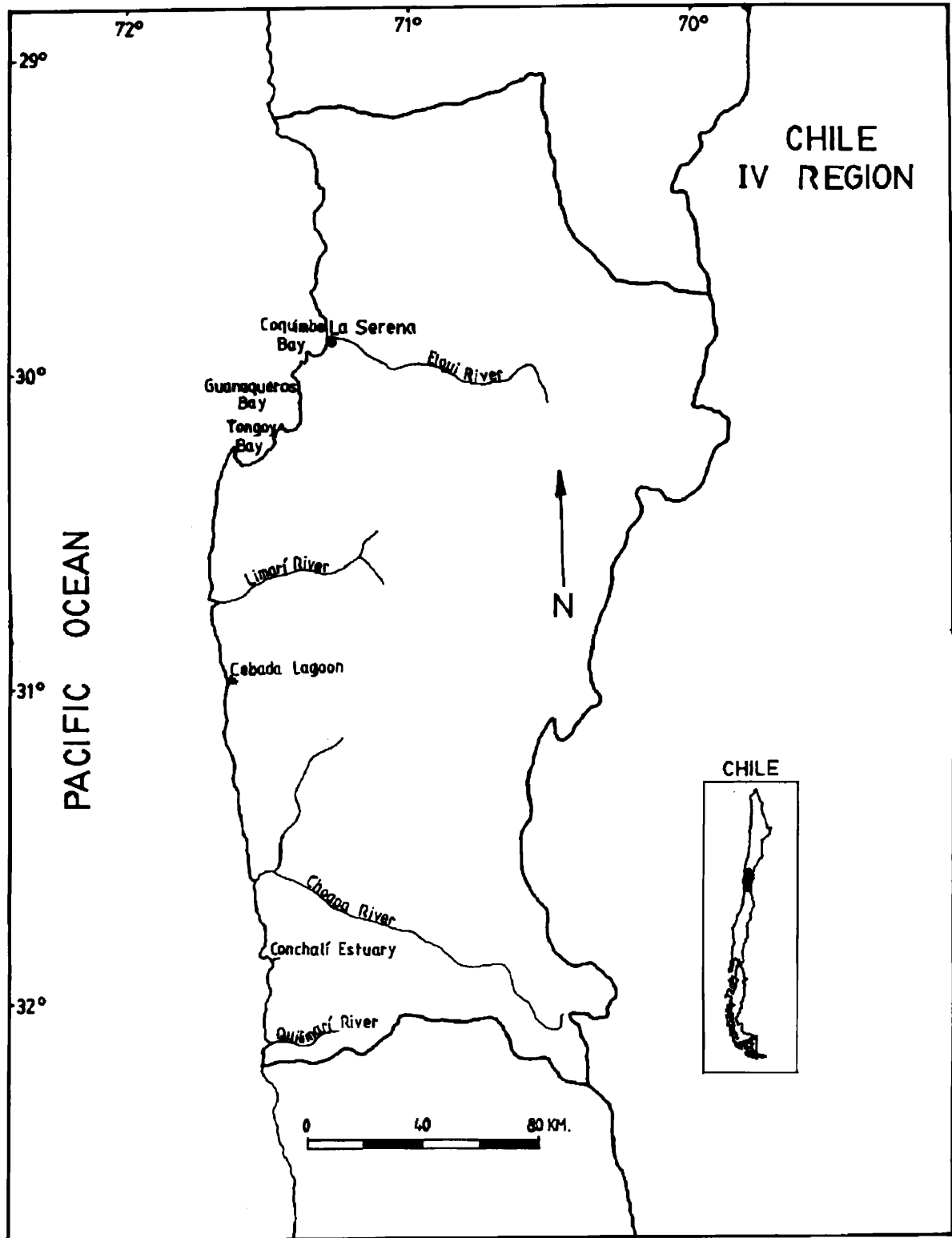


Figure 3. The proposed study site in Coquimbo Bay.

Figure 4 illustrates the monthly variations in Sanderling numbers over two years. These data show that Sanderlings start arriving in the area in August and September and that large numbers of birds remain on the beach during the (austral) summer. Then, in the months of April and May,

there is a second peak, suggesting that southern populations use this beach as a staging area during the northward migration.

Table 4 summarizes the data on the foods consumed by 72 Sanderlings on Roquant Island.



Figure 4. Monthly numbers of Sanderling in 1987 and 1988.

Table 4. Analysis of stomach contents of 72 Sanderlings *Calidris alba* at Roquant Island, Chile.

Type of prey	Prey composition		Frequency	
	Number	%	Number	%
<b>Annelida</b>				
<i>Malacoceros glutaeus</i>	6	0.75	5	6.94
<i>Perinareis vallata</i>	135	16.83	18	25.0
<i>Scolecopsis squamata</i>	18	2.24	17	23.61
<b>Crustacea</b>				
<i>Cancer setosus</i>	548	68.33	36	50.0
<i>Emerita analoga</i>	6	0.75	5	6.94
<i>Exirolana hirsuticauda</i>	8	1.0	4	5.55
<i>Lepidopa chilensis</i>	8	1.0	5	6.94
<b>Insecta</b>				
Carabidae	6	0.75	4	5.55
Coleoptera (no identif.)	11	1.49	11	15.27
Ligacidae	2	0.25	2	2.77
<b>Mollusca</b>				
<i>Aulacomya ater</i>	5	0.62	5	6.94
<i>Littorina araucana</i>	14	1.74	5	6.94
<i>Mulinia edulis</i>	14	1.74	9	12.5
<i>Nassarius gayi</i>	7	0.86	3	4.16
<i>Semimytilus algosus</i>	13	1.62	4	5.55

The two items most important to their diet were *Perinareis vallata* (Annelida) and *Cancer setosus* (Crustacea). These prey were compared with those available on the beach.

It is hoped that this research will be published in detail in a scientific journal.

## Conclusions

- (1) Because of the importance of Chile's coastline for shorebirds and the peculiar biology of long-distance migratory birds, it is necessary to co-ordinate efforts from different parts of the country in order to understand the movement of shorebird populations on their wintering grounds.
- (2) Through RECAP and the production of regular bulletins, people are more aware of the research and new information obtained in different parts of the country.
- (3) With regards to future conservation and habitat protection, it is imperative to know and understand thoroughly the general biology of the species in the ecosystem. It is also necessary to develop a good exchange of information between scientists and the government.

## Acknowledgements

First, we acknowledge all members of RECAP for increasing our knowledge of the migratory shorebirds along our coast. We also thank the Western Hemisphere Shorebird Reserve Network (Wetlands for Americas) and the Wildfowl and Wetlands Trust, UK, for supporting us with many of our projects. We also acknowledge the help of all government and non-government institutions that support our local research.

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