

### 4.3 Fauna and Flora Confirmed around the Lakes

The preliminary list of fauna and flora for the study area is shown in Annex of the P/R (1). The listed species number of the fauna and flora is as follows:

Class	Mammal	Bird	Fish	Reptile	Amphibian	Insect	Mollusc	Crustacean	Plankton	Alga	Plant
No	57	318	161	29	6	261	30	31	41	94	586

#### 4.3.1 Characteristics of the Study Area

The study area can be largely divided in 3 sub-regions (Benton, W.): littoral, southwest mountain and “campanha”.

##### (1) Littoral

Littoral can be utilized to designate all the plain of the Atlantic coast. It varies from 10 km of width to 100 km near the Patos Lake. It is a plain area, some times wavy, sandy, with Quaternary origin. Great part of the littoral is dominated by dunes and wet plain lands, with low vegetation. The interior part of the littoral presents some jungles with shrubs, and in more favourable areas forests can appear. Those forests present trees of Lauraceae, Myrtaceae and big trees of *Ficus* sp. The lake and lagoon beaches are sandy or composed by wetlands with *Juncus*. There are no marsh in this sub-region. The higher and humid forests are located in the north part, and near Tapes and Santa Vitória do Palmar there are spots of *Cocos* sp. The human altered the landscape with the cattle breeding, rice cultivation and other specialized crops, as due to activities of drainage, deforestation and plantation of *Pinus* and *Eucaliptus*. Even though, the littoral is one of the most untouched region. There are excellent aquatic ambients as the Peixe lake, beaches and coastal water near Barra do Rio Grande and the Taim Ecological Station.

## **(2) Southwest Mountains**

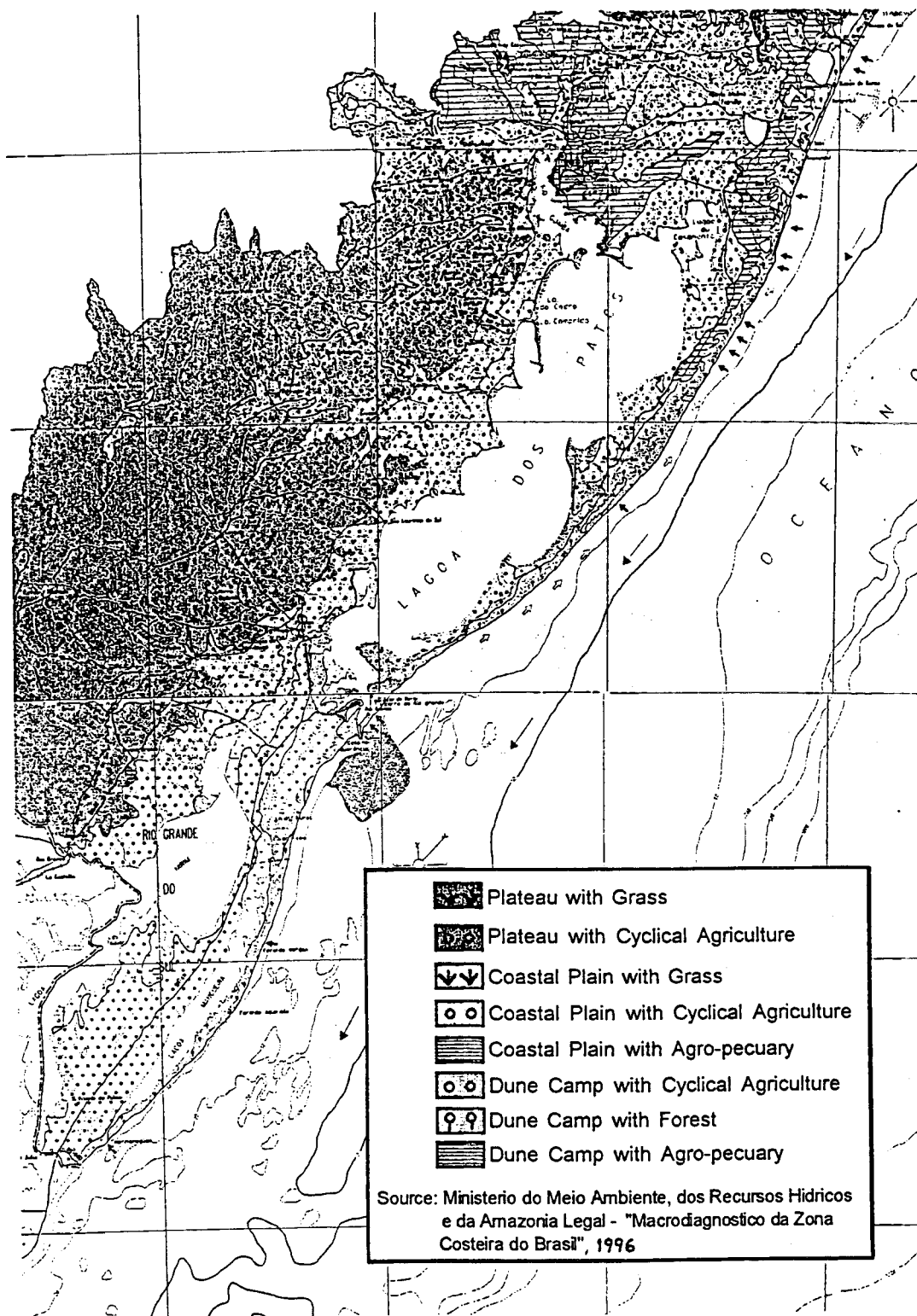
It is a triangular sub-region between Guaíba lake, São Gabriel and Jaguarão. The typical formation are the wavy granite mountains with rounded top of Archeozoic origin. The average altitude is about 300 m, but some mountains can reach 600 m. Naked platforms and steep rocks can be found in some areas where Algonquian, Silurian and Triassic sediments cover the granite. The Camaquã river crosses this sub-region and the river is generally surrounded by gallery jungles with various “latifoliada” specimens. The jungles along the Camaquã river are the most impressive one. The mountains present varied coverage, with dispersed trees, low shrubs and grass. There are araucaria with groups of *Podocarpus lamberti* in small basins with higher elevation at the south part. The area between Caçapava do Sul and Lavras do Sul and the areas near Camaquã river present rich habitats. Birds as *Amazona pretrei*, *Myiopsitta monachus*, *Mimus saturninus* and *Paroaria coronata* are abundant in the area.

## **(3) Campanha**

It is a small part located in the south of the Southeast Mountains. The altitude varies from 60 to 300 m, but the lower altitude predominates. The most important formation is the Triassic arenite of granite origin in form of solidified dunes. Lava layer covered the arenite during the Jurassic and Cretaceous period, but great part is eroded. The main slope is in Uruguai river direction.

Despite of the existence of low platforms, the wavy mountains predominate. The terrain is flat along the large rivers and near the Uruguai river. Wetlands are excellent habitats for aquatic birds and are located near the Uruguai river and near Dom Pedrito. Major part of this sub-region is or was covered by natural camps, appearing few places with trees. The gallery jungles are narrow, generally low. Many artificial eucalyptus forest attracts birds that avoid open lands.

Other characteristics are presented in the Physico-Natural Characterization (**Fig. 4.3-1**), Vegetation (**Fig. 4.3-2**), Relief Units (**Fig. 4.3-3**) and Cross Sectional Formations of the Mata Atlântica (**Fig. 4.3-4**).

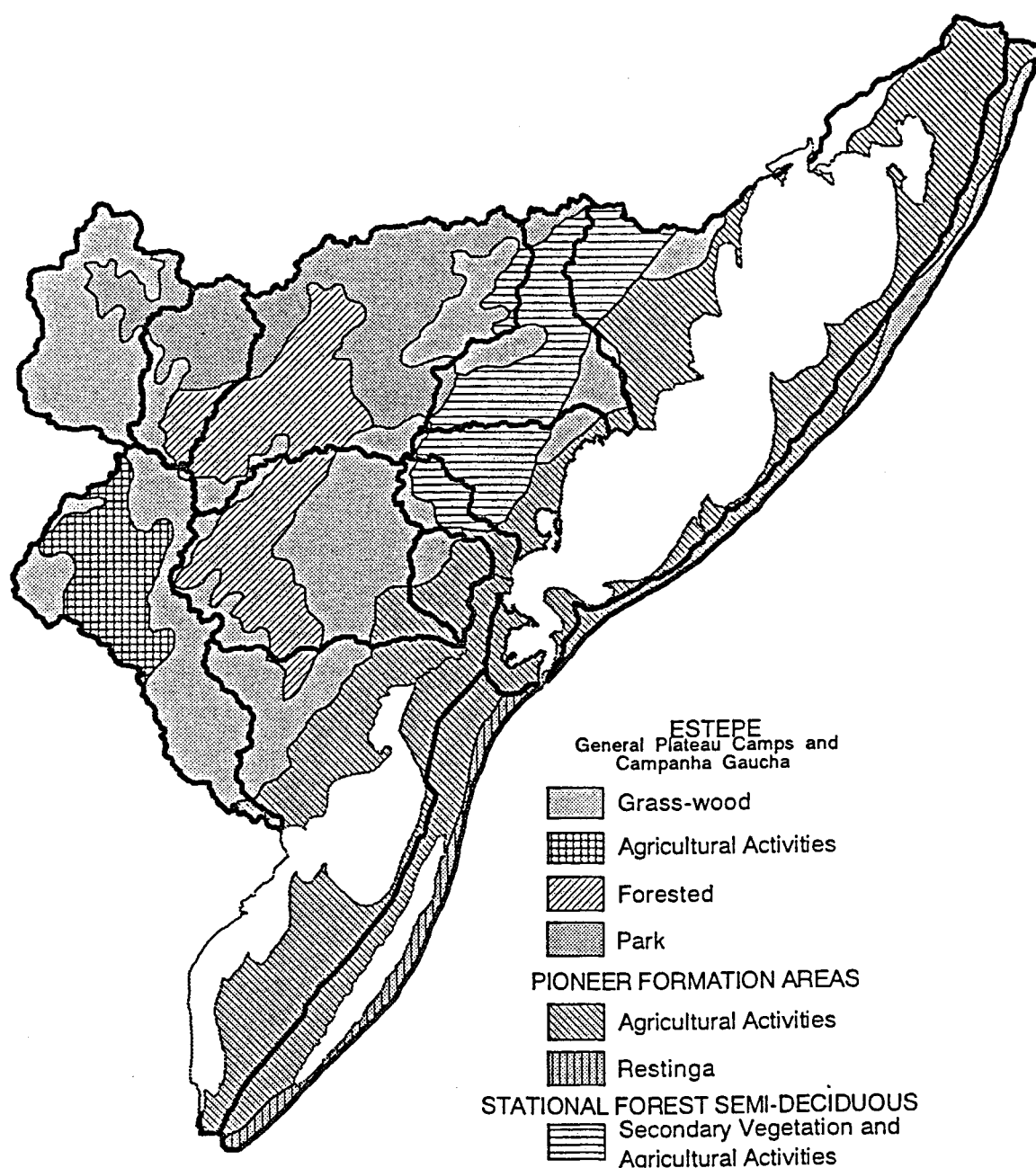


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Fig.4.3-1

Physico-Natural  
Characterizations



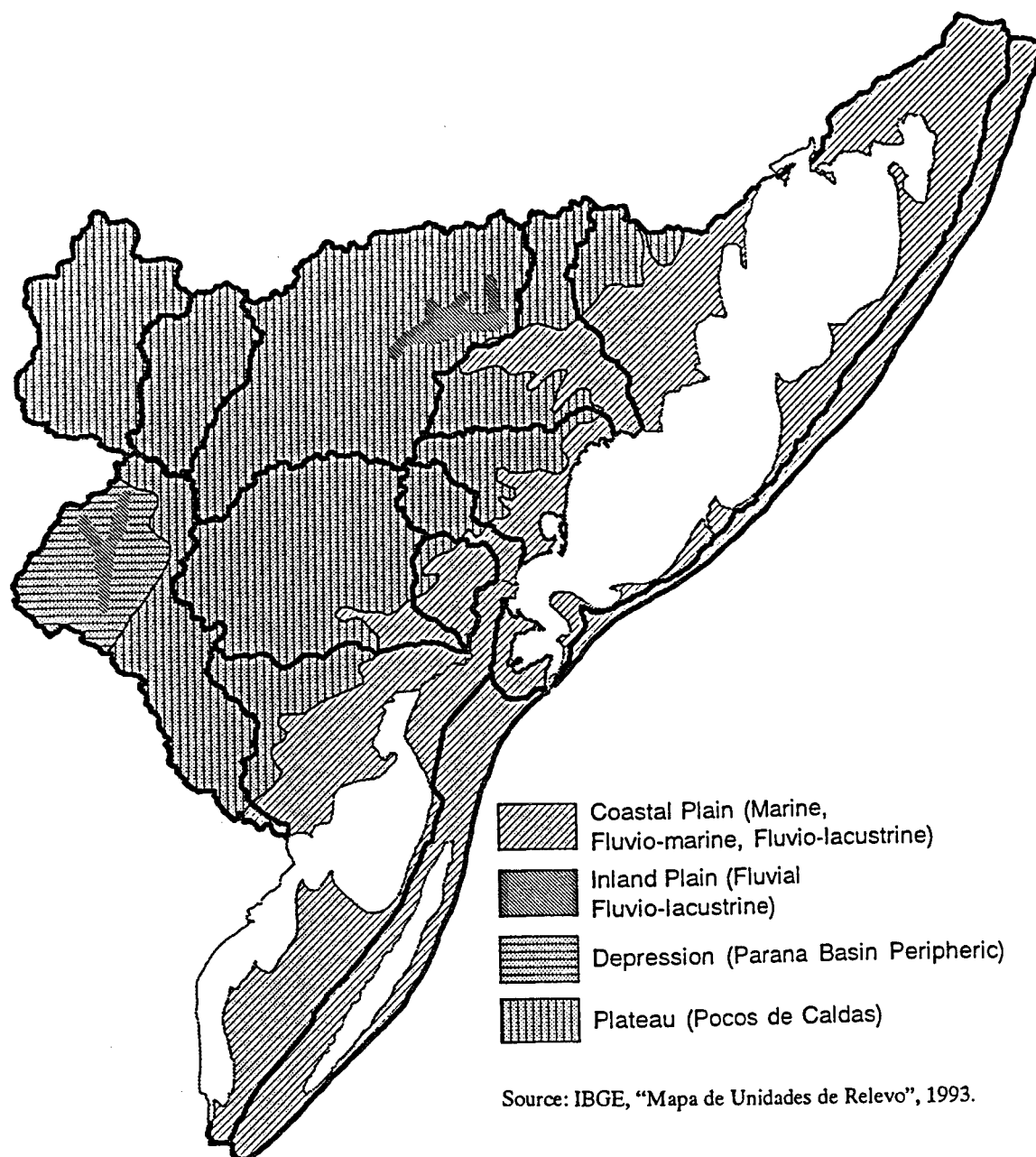
Source: IBGE, "Mapa de Vegetação do Brasil", 1995.

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**Fig.4.3-2**

**Vegetation**

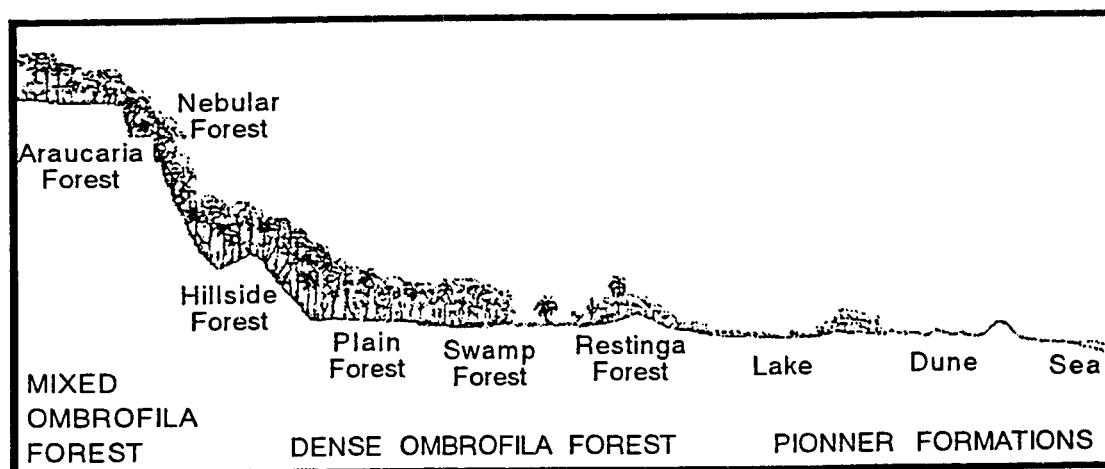
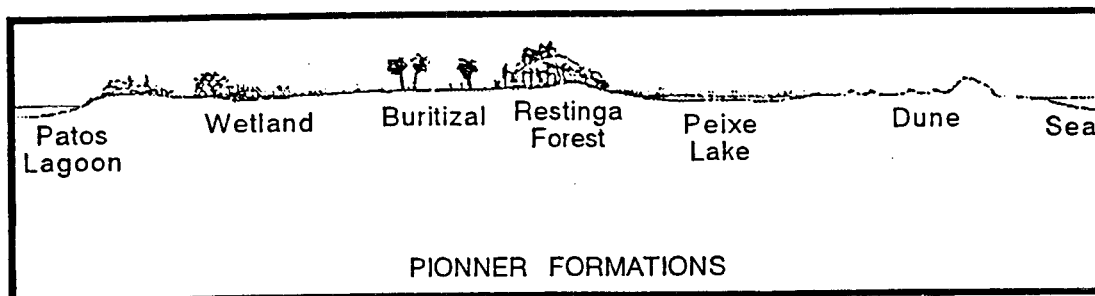


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**Fig.4.3-3**

**Relief Units**



Source: Marcuzzo, S., "A Reserva da Biosfera da Mata Atlântica do RS", 1998

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**Fig.4.3-4**

**Cross-Sectional Formations  
of the Mata Atlantica**

### 4.3.2 Site Survey

#### (1) Aerial Survey

Aerial surveys were carried out on 22<sup>nd</sup> of February 1999 and on 28<sup>th</sup> of September 1999 to observe the seasonal variation in type and quantity of birds. The results are shown in **Table 4.3-1**. The aerial census was realized with the collaboration of Mr. Sherezino Sherer of IBAM and Mr. Rafael A. Dias of GEEPAA.

Additional aerial survey was realized to recognize the Camaquã river basin in 24<sup>th</sup> of September 1999. Survey routes in September 1999 are presented in **Fig. 4.3-5**.

#### (2) Ground Survey

Ground surveys were carried as follows (**Fig. 4.3-6**):

Lagoa Pequena:	23 <sup>rd</sup> of September of 1999 with cooperation of Mr. Enrique Salazar and Mr Giovanni N. Maurício of GEEPAA.
Taim Ecological Station:	16 <sup>th</sup> of September 1999.
Del Rei Wetland:	18 <sup>th</sup> of September 1999.
Santa Vitória do Palmar:	18 <sup>th</sup> of September 1999.
Arroio São Miguel:	18 <sup>th</sup> of September 1999.
Downstream of Camaqua River:	24 <sup>th</sup> of September 1999.

A bird list observed in Camaquã river and Pequena Lake is shown in **Tables 4.3-2** and **4.3-3**. Distribution of flora in the study area is shown in **Table 4.3-4**.

Table 4.3-1 Aerial Census Result

Specimen	22/02/99	28/09/99
<b>Barra do Ribeiro</b>		
<i>Casmerodius albus</i>	12	13
<i>Bubulcus ibis</i>	110	158
<i>Ciconia maguari</i>	1	0
<i>Plegadis chihi</i>	5	17
<i>Dendrocygna viduata</i>	32	98
<i>Ardea cocoi</i>	0	1
<i>Egretta thula</i>	0	3
<i>Euxenuria maguari</i>	0	11
<i>Platalea ajaja</i>	0	1
<i>Chauna torquata</i>	0	1
<i>Amazonetta brasiliensis</i>	0	2
<b>Tapes</b>		
<i>Bubulcus ibis</i>	40	6
<i>Plegadis chihi</i>	5	12
<i>Ardea cocoi</i>	0	2
<i>Casmerodius albus</i>	0	1
<i>Euxenuria maguari</i>	0	5
<i>Dendrocygna bicolor</i>	0	24
<i>Dendrocygna viduata</i>	0	28
<i>Fulica sp.</i>	0	72
<i>Larus maculipennis</i>	0	11
<b>Arambare</b>		
<i>Bubulcus ibis</i>	637	12
<i>Ciconia maguari</i>	1	0
<i>Plegadis chihi</i>	16	37
<i>Vanellus chilensis</i>	12	99
<i>Ardea cocoi</i>	0	3
<i>Euxenuria maguari</i>	0	1
<i>Fulica sp.</i>	0	93
<i>Jacana jacana</i>	0	114
<b>Santa Rita do Sul</b>		
<i>Bubulcus ibis</i>	183	0
<i>Plegadis chihi</i>	282	2
<i>Euxenuria maguari</i>	0	1
<i>Agelaius ruficapillus</i>	0	320
<b>Camaqua Delta</b>		
<i>Casmerodius albus</i>	3	0
<i>Mycteria americana</i>	2	0
<i>Bubulcus ibis</i>	56	12
<i>Ciconia maguari</i>	5	0
<i>Plegadis chihi</i>	68	16
<i>Falacrocorax brasilianus</i>	0	2
<i>Ardea cocoi</i>	0	2
<i>Casmerodius albus</i>	0	2
<i>Egretta thula</i>	0	2
<i>Euxenuria maguari</i>	0	12
<i>Platalea ajaja</i>	0	2
<i>Chauna torquata</i>	0	8
<i>Dendrocygna viduata</i>	0	4
<i>Larus maculipennis</i>	0	11

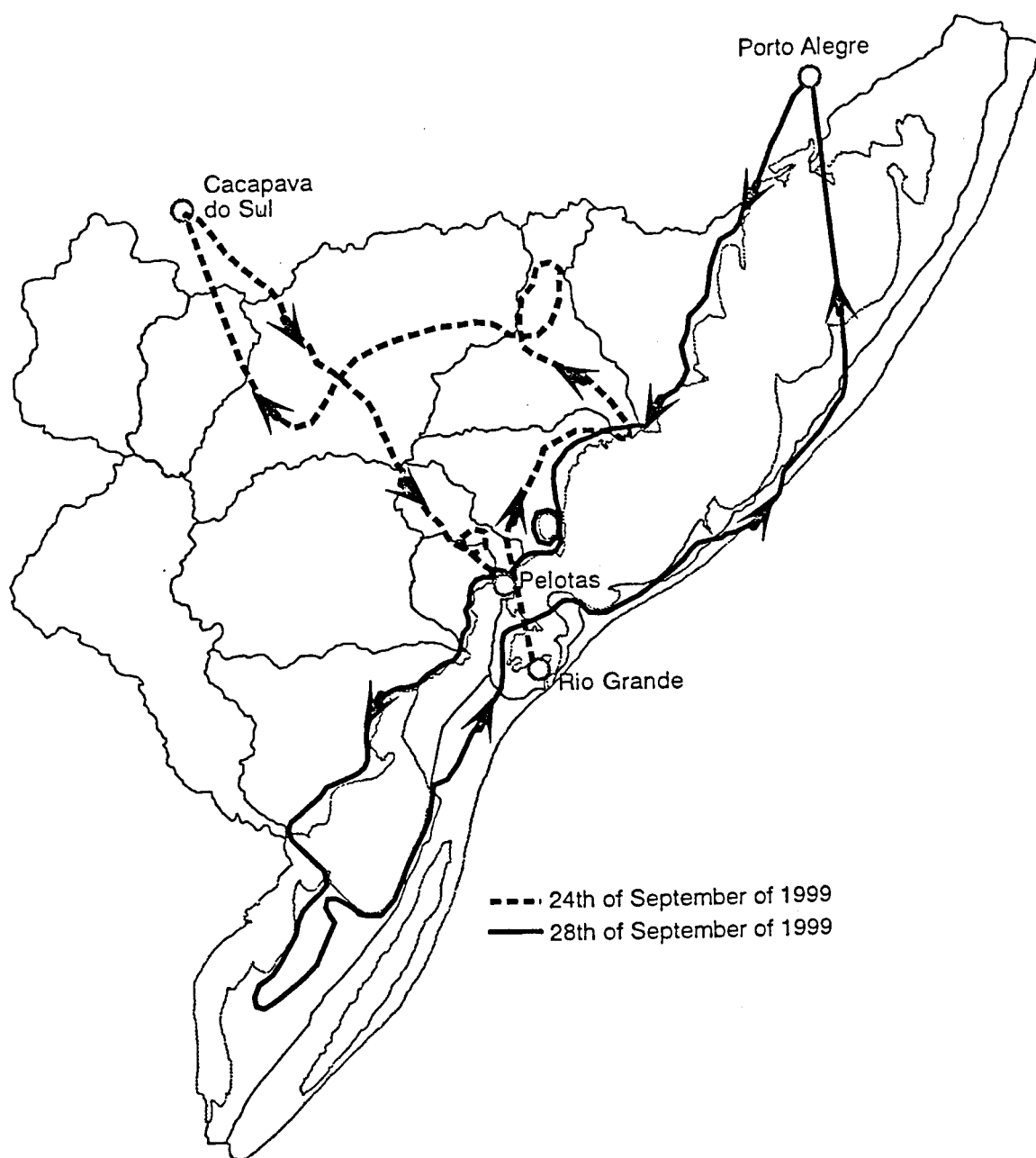
Specimen	22/02/99	28/09/99
<b>Pequena Lake</b>		
<i>Syrigma sibilatrix</i>	2	0
<i>Bubulcus ibis</i>	4	0
<i>Ciconia maguari</i>	6	0
<i>Plegadis chihi</i>	18	354
<i>Chauna torquata</i>	4	0
<i>Dendrocygna viduata</i>	30	166
<i>Falacrocorax brasilianus</i>	0	104
<i>Ardea cocoi</i>	0	50
<i>Casmerodius albus</i>	0	46
<i>Euxenuria maguari</i>	0	17
<i>Platalea ajaja</i>	0	22
<i>Amazonetta brasiliensis</i>	0	55
<i>Rostrhamus sociabilis</i>	0	2
<i>Jacana jacana</i>	0	15
<i>Larus maculipennis</i>	0	15
<i>Agelaius ruficapillus</i>	0	190
<b>Pelotas</b>		
<i>Phalacrocorax brasilianus</i>	8	0
<i>Ardea cocoi</i>	1	1
<i>Egretta thula</i>	1	0
<i>Bubulcus ibis</i>	202	2
<i>Miquiteria americana</i>	35	0
<i>Ciconia maguari</i>	1	0
<i>Plegadis chihi</i>	112	341
<i>Platalea ajaja</i>	3	1
<i>Chauna torquata</i>	5	0
<i>Casmerodius albus</i>	0	3
<i>Egretta thula</i>	0	4
<i>Euxenuria maguari</i>	0	10
<i>Phimosus infuscatus</i>	0	8
<i>Dendrocygna bicolor</i>	0	250
<i>Coscoroba coscoroba</i>	0	2
<i>Cygnus melancoryphus</i>	0	3
<i>Anas georgicas</i>	0	6
<i>Anas platyrhynchos</i>	0	14
<i>Netta peposaca</i>	0	140
<i>Amazonetta brasiliensis</i>	0	6
<b>Santa Isabel</b>		
<i>Phalacrocorax brasilianus</i>	4	0
<i>Casmerodius albus</i>	4	13
<i>Bubulcus ibis</i>	320	0
<i>Ciconia maguari</i>	3	0
<i>Plegadis chihi</i>	30	7
<i>Platalea ajaja</i>	20	0
<i>Chauna torquata</i>	6	0
<i>Dendrocygna viduata</i>	3	0
<i>Amazonetta brasiliensis</i>	2	4
<i>Euxenuria maguari</i>	0	22
<b>Sao Lourenco do Sul</b>		
<i>Bubulcus ibis</i>	262	16
<i>Plegadis chihi</i>	740	18
<i>Platalea ajaja</i>	2	0
<i>Dendrocygna viduata</i>	62	104
<i>Larus maculipennis</i>	200	0
<i>Phimosus infuscatus</i>	0	88
<i>Dendrocygna bicolor</i>	0	45
<i>Vanellus chilensis</i>	0	1
<i>Agelaius ruficapillus</i>	0	90

Specimen	22/02/99	28/09/99
<b>Farol Barra do Ribeiro</b>		
<i>Casmerodius albus</i>	12	-
<i>Bubulcus ibis</i>	110	-
<i>Ciconia maguari</i>	1	-
<i>Plegadis chihi</i>	5	-
<i>Dendrocygna viduata</i>	32	-
<b>Caluba Lake</b>		
<i>Phalacrocorax brasilianus</i>	5	-
<i>Ciconia maguari</i>	2	-
<i>Vanellus chilensis</i>	4	-
<b>Cenandes Wetland</b>		
<i>Ciconia maguari</i>	2	-
<i>Plegadis chihi</i>	35	-
<i>Platalea ajaja</i>	1	-
<b>Cassino Beach</b>		
<i>Dendrocygna viduata</i>	48	-
<i>Dendrocygna bicolor</i>	2	-
<b>Sao Jose do Norte</b>		
<i>Ciconia maguari</i>	1	0
<i>Bubulcus ibis</i>	65	22
<i>Plegadis chihi</i>	292	1397
<i>Coscoroba coscoroba</i>	2	4
<i>Jacana jacana</i>	2	0
<i>Himantopus himantopus</i>	5	0
<i>Gallinula chloropus</i>	5	0
<i>Vanellus chilensis</i>	8	0
<i>Ardea cocoi</i>	0	3
<i>Casmerodius albus</i>	0	8
<i>Egretta thula</i>	0	21
<b>Barra Falsa / Bojuru</b>		
<i>Plegadis chihi</i>	40	-
<i>Anas georgicas</i>	19	-
<i>Rostrhamus sociabilis</i>	1	-
<i>Mivalgo chimango</i>	2	-
<i>Mivalgo chimachima</i>	1	-
<b>Lagoa do Peixe</b>		
<i>Ardea cocoi</i>	1	0
<i>Egretta thula</i>	3	4
<i>Plegadis chihi</i>	12	1283
<i>Vanellus chilensis</i>	30	0
<i>Trygites subruficollis</i>	80	0
<i>Calidris canutus</i>	300	0
<i>Calidris fuscicollis</i>	202	280
<i>Falacrocorax brasilianus</i>	0	882
<i>Casmerodius albus</i>	0	2
<i>Euxenuria maguari</i>	0	1
<i>Platalea ajaja</i>	0	4
<i>Phoenicopus chilensis</i>	0	22
<i>Dendrocygna viduata</i>	0	539
<i>Coscoroba coscoroba</i>	0	238
<i>Cygnus melancoryphus</i>	0	2185
<i>Anas georgicas</i>	0	4
<i>Netta peposaca</i>	0	12
<i>Fulica sp.</i>	0	5569
<i>Larus maculipennis</i>	0	39

Specimen	22/02/99	28/09/99
<b>Arroito / Del Rey Wetland</b>		
<i>Bubulcus ibis</i>	45	0
<i>Plegadis chihi</i>	381	9088
<i>Platalea ajaja</i>	26	71
<i>Chauna torquata</i>	308	58
<i>Coscoroba coscoroba</i>	142	417
<i>Cygnus melancoryphus</i>	255	581
<i>Anas platyrhynchos</i>	121	0
<i>Fulica sp.</i>	185	0
<i>Egretta thula</i>	0	12
<i>Euxenuria maguari</i>	0	19
<i>Phimosus infuscatus</i>	0	6
<i>Dendrocygna viduata</i>	0	667
<i>Ardea cocoi</i>	0	12
<i>Anas georgicas</i>	0	14
<i>Anas versicolor</i>	0	2
<i>Rostrhamus sociabilis</i>	0	9
<i>Aramus guarauna</i>	0	4
<i>Vanellus chilensis</i>	0	10
<i>Larus maculipennis</i>	0	45
<b>Granja Mangueira</b>		
<i>Rhea americana</i>	1002	-
<i>Casmerodius albus</i>	2	-
<i>Bubulcus ibis</i>	46	-
<i>Ciconia maguari</i>	13	-
<i>Plegadis chihi</i>	104	-
<i>Platalea ajaja</i>	2	-
<i>Dendrocygna viduata</i>	60	-
<i>Aramus guarauna</i>	1	-
<i>Himantopus himantopus</i>	4	-
<b>Mangueira Lake West Margin</b>		
<i>Phalacrocorax brasilianus</i>	23	-
<i>Chauna torquata</i>	7	-
<i>Aramus guarauna</i>	3	-
<i>Himantopus himantopus</i>	2	-
<i>Larus maculipennis</i>	64	-
<b>Afogados</b>		
<i>Ardea cocoi</i>	-	10
<i>Casmerodius albus</i>	-	10
<i>Egretta thula</i>	-	4
<i>Euxenuria maguari</i>	-	4
<i>Plegadis chihi</i>	-	187
<i>Platalea ajaja</i>	-	20
<i>Chauna torquata</i>	-	6
<i>Dendrocygna bicolor</i>	-	20
<i>Dendrocygna viduata</i>	-	243
<i>Anas versicolor</i>	-	2
<i>Netta peposaca</i>	-	41
<i>Coscoroba coscoroba</i>	-	101
<i>Cygnus melancoryphus</i>	-	66
<b>ESEC Taim</b>		
<i>Plegadis chihi</i>	330	2
<i>Platalea ajaja</i>	18	0
<i>Coscoroba coscoroba</i>	12	0
<i>Casmerodius albus</i>	0	2
<i>Euxenuria maguari</i>	0	1

Specimen	22/02/99	28/09/99
<b>Flores Lake</b>		
<i>Mycteria americana</i>	2	-
<i>Ciconia maguari</i>	4	-
<i>Phimosus infuscatus</i>	8	-
<i>Plegadis chihi</i>	51	-
<i>Platalea ajaja</i>	18	-
<i>Coscoroba coscoroba</i>	20	-
<i>Fulica sp.</i>	31	-
<b>Rincão Lake</b>		
<i>Casmerodius albus</i>	4	-
<i>Bubulcus ibis</i>	253	-
<i>Ciconia maguari</i>	17	-
<i>Phimosus infuscatus</i>	2	-
<i>Plegadis chihi</i>	425	-
<i>Platalea ajaja</i>	26	-
<i>Chauna torquata</i>	4	-
<i>Dendrocygna bicolor</i>	1	-
<i>Dendrocygna viduata</i>	477	-
<i>Amazonetta brasiliensis</i>	3	-
<i>Heterospiza meridionalis</i>	1	-
<i>Aramus guarauna</i>	1	-
<i>Larus maculipennis</i>	14	-
<i>Agelaius ruficapillus</i>	262	-
<b>Gateado Lake</b>		
<i>Rhea americana</i>	7	-
<i>Bubulcus ibis</i>	66	-
<i>Plegadis chihi</i>	15	-
<i>Platalea ajaja</i>	6	-
<i>Dendrocygna bicolor</i>	32	-
<i>Dendrocygna viduata</i>	111	-
<i>Polyborus plancus</i>	2	-
<i>Vanellus chilensis</i>	2	-
<i>Agelaius ruficapillus</i>	262	-
<b>Ponta Alegre</b>		
<i>Casmerodius albus</i>	1	0
<i>Bubulcus ibis</i>	12	0
<i>Ciconia maguari</i>	1	0
<i>Plegadis chihi</i>	12	40
<i>Dendrocygna viduata</i>	300	76
<i>Falacrocorax brasilianus</i>	0	3
<i>Ardea cocoi</i>	0	8
<i>Egretta thula</i>	0	4
<i>Euxenuria maguari</i>	0	19
<i>Platalea ajaja</i>	0	50
<i>Chauna torquata</i>	0	2
<i>Anas versicolor</i>	0	2
<i>Rostrhamus sociabilis</i>	0	2
<i>Vanellus chilensis</i>	0	2
<b>Torotama</b>		
<i>Ardea cocoi</i>	-	2
<i>Casmerodius albus</i>	-	6
<i>Egretta thula</i>	-	8
<i>Falacrocorax brasilianus</i>	-	6



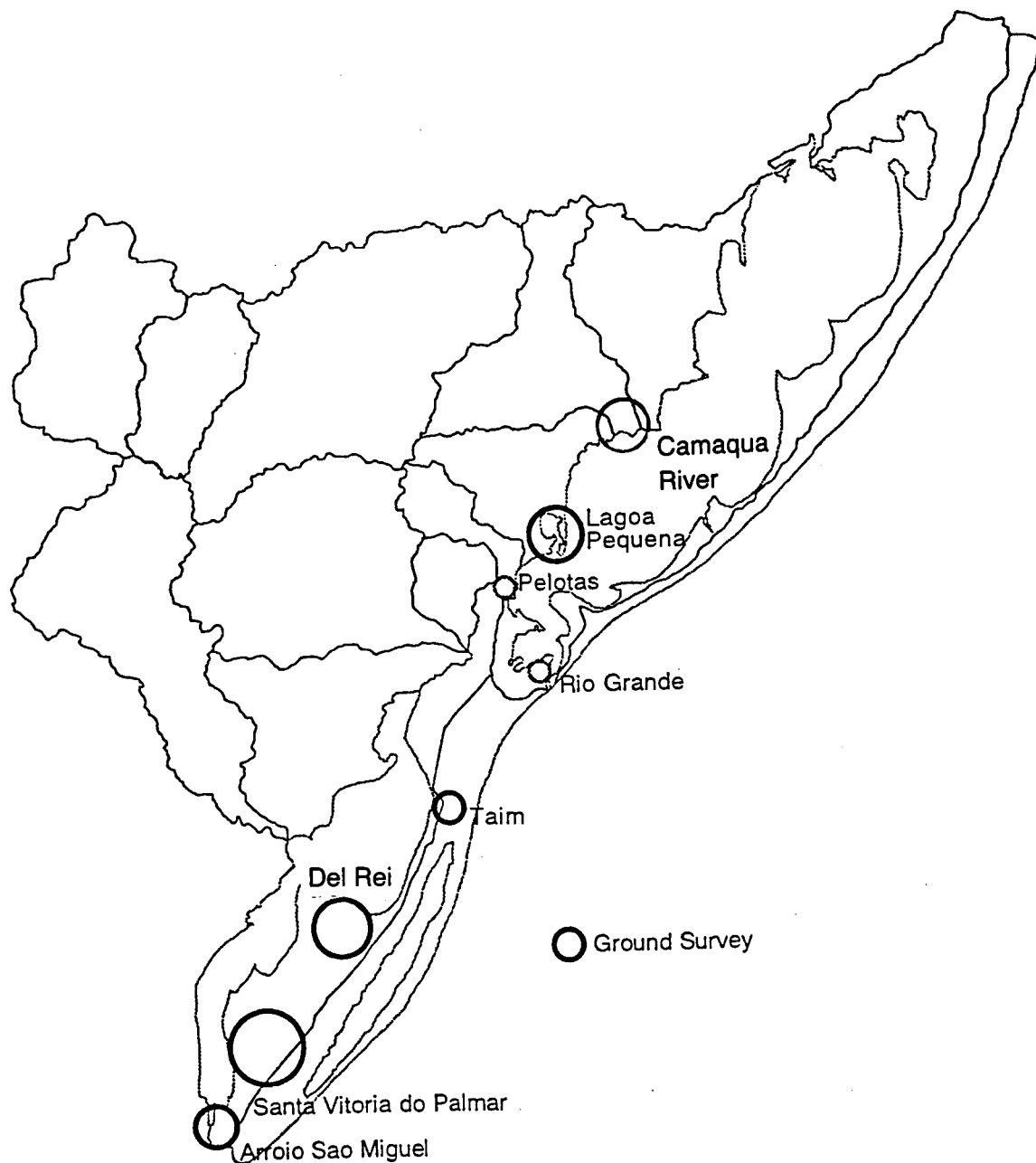


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**Fig.4.3-5**

**Aerial Survey Routes  
 in September 1999**



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**Fig.4.3-6**

**Ground Survey Points**

**Table 4.3-2 List of Birds Observed during Ground Survey along Camaqua River  
(24th September 1999)**

Family	Species	Popular Name
TINAMIDAE	<i>Nothura maculosa</i>	Spotted Nothura
PHALACROCORACIDAE	<i>Phalacrocorax brasilianus</i>	Neotropic Cormorant
ARDEIDAE	<i>Ardea cocoi</i>	White-necked Heron
	<i>Casmerodius albus</i>	Great Egret
CATHARTIDAE	<i>Coragyps atratus</i>	Black Vulture
	<i>Cathartes aura</i>	Turkey Vulture
ANATIDAE	<i>Anas versicolor</i>	Silver Teal
ACCIPITRIDAE	<i>Rosthramus sociabilis</i>	Snail Kite
	<i>Rupornis magnirostris</i>	Roadside Hawk
	<i>Buteogallus urubitinga</i>	Great Black Hawk
FALCONIDAE	<i>Mivalgo chimachima</i>	Yellow-headed Caracara
RALLIDAE	<i>Aramides cajanea</i>	Gray-necked Wood-rail
CHARADRIIDAE	<i>Vanellus chilensis</i>	Southern Lapwing
	<i>Charadrius collaris</i>	Collared Plover
LARIDAE	<i>Phaetusa simplex</i>	Large-billed Tern
COLUMBIDAE	<i>Columba picazuro</i>	Picazuro Pigeon
	<i>Leptotila verreauxi</i>	White-tipped Dove
PSITTACIDAE	<i>Pyrrhura frontalis</i>	Reddish-bellied Parakeet
CUCULIDAE	<i>Guira guira</i>	Guira Cuckoo
TROCHILIDAE	<i>Stephanoxis lalandi</i>	Black-breasted Plovercrest
	<i>Hylocharis chrysura</i>	Gilded Hummingbird
TROGONIDAE	<i>Trogon surrucura</i>	Surucua Trogon
ALCEDINIDAE	<i>Ceryle torquata</i>	Ringed Kingfisher
	<i>Chloroceryle amazona</i>	Amazon Kingfisher
PICIDAE	<i>Piculus aurulentus</i>	White-browed Woodpecker
	<i>Veniliornis spilogaster</i>	White-spotted Woodpecker
FORMICARIIDAE	<i>Thamnophilus caeruleus</i>	Variable Antshrike
FURNARIIDAE	<i>Furnarius rufus</i>	Rufous Hornero
	<i>Synallaxis spixi</i>	Spix's Spinetail
	<i>Synallaxis ruficapilla</i>	Rufous-capped Spinetail
	<i>Phacellodomus ferrugineigula</i>	Red-eyed Thornbird
	<i>Syndactyla rufosuperciliata</i>	Buff-browed Foliage-gleaner
	<i>Sclerurus scansor</i>	Rufous-breasted Leaf-tosser
DENDROCOLAPTIDAE	<i>Sittasomus griseicapillus</i>	Olivaceous Woodcreeper
	<i>Lepidocolaptes squamatus</i>	Scaled Woodcreeper
TYRANNIDAE	<i>Phyllomyias virescens</i>	Greenish Tyrannulet
	<i>Serpophaga nigricans</i>	Sooty Tyrannulet
	<i>Serpophaga subcristata</i>	White-crested Tyrannulet
	<i>Phylloscartes ventralis</i>	Mottle-cheeked Tyrannulet
	<i>Todirostrum plumbeiceps</i>	Ochre-faced Tody-flycatcher
	<i>Myiophobus fasciatus</i>	Bran-colored Flycatcher
	<i>Lathrotriccus euleri</i>	Euler's Flycatcher
	<i>Pitangus sulphuratus</i>	Great Kiskadee
HIRUNDINIDAE	<i>Stelgidopteryx ruficollis</i>	Southern Rough-winged Shallow
TROGLODYTIDAE	<i>Troglodytes aedon</i>	House Wren
MUSCICAPIDAE	<i>Turdus rufiventris</i>	Rufous-bellied Thrush
	<i>Turdus albicollis</i>	White-necked Thrush
VIREONIDAE	<i>Cyclarhis gujanensis</i>	Rufous-browed Peppershrike
EMBERIZIDAE	<i>Parula pityumi</i>	Tropical Parula
	<i>Basileuterus culicivorus</i>	Golden-crowned Warbler
	<i>Basileuterus leucoblepharus</i>	White-rimmed Warbler
	<i>Coereba flaveola</i>	Bananaquit
	<i>Stephanophorus diadematus</i>	Diademed Tanager
	<i>Euphonia chlorotica</i>	Purple-throated Euphonia
	<i>Zonotrichia capensis</i>	Rufous-collared Sparrow
	<i>Agelaius ruficapillus</i>	Chestnut-capped Blackbird

Source: JICA Survey (collaboration of Giovanni N. Mauricio)

**Table 4.3-3 List of Birds Observed during Ground Survey in Pequena Lake and Feitoria Island (23rd September 1999)**

Family	Species	Popular Name
PODICIPEDIDAE	<i>Rollandia rolland</i>	White-tufted Grebe
	<i>Podiceps major</i>	Great Grebe
FREGATIDAE	<i>Fregata magnificens</i>	Magnificent Frigatebird
PHALACROCORACIDAE	<i>Phalacrocorax brasilianus</i>	Neotropic Cormorant
ARDEIDAE	<i>Ardea cocoi</i>	White-necked Heron
	<i>Egretta thula</i>	Snowy Egret
	<i>Casmerodius albus</i>	Great Egret
	<i>Bubulcus ibis</i>	Cattle Egret
CICONIIDAE	<i>Ciconia maguari</i>	Maguari Stork
THRESKIORNITHIDAE	<i>Plegadis chihi</i>	White-faced Ibis
ANHIMIDAE	<i>Chauna torquata</i>	Southern Screamer
ANATIDAE	<i>Anas versicolor</i>	Silver Teal
	<i>Callonetta leucophrys</i>	Ringed Teal
	<i>Amazonetta brasiliensis</i>	Brazilian Duck
ACCIPITRIDAE	<i>Rostrhamus sociabilis</i>	Snail Kite
	<i>Buteo magnirostris</i>	Roadside Hawk
	<i>Circus buffoni</i>	Long-winged Harrier
FALCONIDAE	<i>Mivalgo chimango</i>	Chimango Caracara
	<i>Polyborus plancus</i>	Crested Caracara
ARAMIDAE	<i>Aramus guarauna</i>	Limpkin
RALLIDAE	<i>Aramides cajanea</i>	Gray-necked Wood-Rail
	<i>Gallinula chloropus</i>	Common Gallinule
	<i>Fulica armillata</i>	Red-garthered Coot
	<i>Fulica leucoptera</i>	White-winged Coot
CHARADRIIDAE	<i>Vanellus chilensis</i>	Southern Lapwing
	<i>Pluvialis dominica</i>	Lesser Golden Plover
SCOLOPACIDAE	<i>Tringa flavipes</i>	Lesser Yellow Legs
	<i>Gallinago gallinago</i>	Common Snipe
RECURVIROSTRIDAE	<i>Himantopus mexicanus</i>	Black-necked Stilt
LARIDAE	<i>Larus maculipennis</i>	Brown-hooded Gull
	<i>Phaetusa simplex</i>	Large-billed Tern
	<i>Sterna trudeaui</i>	Snowy-crowned Tern
	<i>Sterna superciliosa</i>	Yellow-billed Tern
COLUMBIDAE	<i>Columba picazuro</i>	Picazuro Pigeon
	<i>Leptotila verreauxi</i>	White-tipped Dove
PSITTACIDAE	<i>Myiopsitta monachus</i>	Monk Parakeet
CUCULIDAE	<i>Piaya cayana</i>	Squirrel Cuckoo
ALCEDINIDAE	<i>Chloroceryle americana</i>	Green-Kingfisher
TROCHILIDAE	<i>Chlorostilbon aureoventris</i>	Glittering-bellied Emerald
PICIDAE	<i>Colaptes melanocloros</i>	Green-spotted Woodpecker
	<i>Veniliornis spilogaster</i>	White-spotted Woodpecker
DENDROCOLAPTIDAE	<i>Sittasomus griseicapillus</i>	Olivaceous Woodcreeper
FURNARIIDAE	<i>Furnarius rufus</i>	Rufous Hornero
	<i>Phleocryptes melanops</i>	Wren-like Rushbird
	<i>Cranioleuca sp</i>	
	<i>Spartonoica maluroides</i>	Bay-capped Wren-spinetail

**Table 4.3-3 (continued)**

Family	Species	Popular Name
FORMICARIIDAE	<i>Thamnophilus perspicillatus</i>	Variable Antshrike
TYRANNIDAE	<i>Hymenops perspicillatus</i>	Spectacled Tyrant
	<i>Machetornis rixosus</i>	Cattle Tyrant
	<i>Pitangus sulphuratus</i>	Great Kiskadee
	<i>Lathrotriccus euleri</i>	Euler's Flycatcher
	<i>Tolmomyias sulphureus</i>	Yellow-olive Flycatcher
	<i>Todirostrum plumbeiceps</i>	Ochre-faced Tody Flycatcher
	<i>Phylloscartes ventralis</i>	Mottle-cheeked Tyrannulet
PIPRIDAE	<i>Chiroxiphia caudata</i>	Blue Manakin
COTINGIDAE	<i>Carpornis cucullatus</i>	Hooded Berryeater
HIRUNDINIDAE	<i>Tachycineta leucorrhoa</i>	White-rumped Swallow
	<i>Phaeogrogne tapera</i>	Brown-chested Martin
	<i>Hirundo rustica</i>	Barn Swallow
TROGLODYTIDAE	<i>Troglodytes aedon</i>	House Wren
TURDIDAE	<i>Turdus rufiventris</i>	Rufous-bellied Thrush
	<i>Turdus albicollis</i>	White-necked Thrush
MOTACILLIDAE	<i>Anthus correndera</i>	Correndera Pipit
ICTETIDAE	<i>Molothrus bonariensis</i>	Shiny Cowbird
	<i>Agelaius thilius</i>	Yellow-winged Blackbird
	<i>Agelaius ruficapillus</i>	Chestnut-capped Blackbird
PARULIDAE	<i>Basileuterus culicivorus</i>	Golden-crowned Warbler
	<i>Basileuterus leucoblepharus</i>	White-rimmed Warbler
	<i>Coereba flaveola</i>	Bananaquit
EMBERIZIDAE	<i>Tachyphonus coronatus</i>	Ruby-crowned Tanager
	<i>Stephanophorus diadematus</i>	Diademed Tanager
	<i>Tangara preciosa</i>	Chestnut-backed Tanager
	<i>Sicalis luteola</i>	Grassland-Yellow Finch

Source: JICA Survey (collaboration of Giovanni N. Mauricio)

Table 4.3-4 Flora List in the Study Area

Família / Gênero e Espécie	Nome Popular	Localidades Estudadas							
		Pontal	Dunas	Barro Duro	Toló	Lagoa Pequena	Pacheca	Turuçu	HBITL
Anacardiaceae									
<i>Lithraea brasiliensis</i> L. March.	Aroeira-brava	x	x	x	x	x	x	x	x
<i>Schinus polygamus</i> (Cav.) Cabr.	Molho	x	x	x	x	x		x	x
<i>Schinus weinmanniifolius</i> Mart. ex Engl. **	Aroeirinha		x			x			
<i>Schinus terebinthifolius</i> Raddi	Aroeira-vermelha	x	x	x	x	x		x	x
Annonaceae									
<i>Rollinia maritima</i> Zachia	Aralicum-mirim	x	x	x	x	x		x	x
Aquifoliaceae									
<i>Ilex dumosa</i> Reissek	Caúna	x	x	x	x	x	x	x	x
Berberidaceae									
<i>Berberis laurina</i> Billb.	São-João	x	x	x	x	x			
Bignoniaceae									
<i>Tabebuia avellanedae</i> Lor. ex Griseb. ?	Ipê-roxo								x
Boraginaceae									
<i>Cordia ecalyculata</i> Vell.	Louro-mole	x	x	x	x	x	x		
<i>Cordia verbenacea</i> L.	Baleeira	x	x	x	x	x			
<i>Patagonula americana</i> L.	Guajuvira	x	x	x	x	x	x	x	x
Buddlejaceae									
<i>Buddleja</i> sp.	Chirca-do-banhado	x	x	x	x	x			
Cactaceae									
<i>Cereus peruvianus</i> (L.) Mill.	Tuna	x	x	x	x	x			
<i>Opuntia arechavaletae</i> Speg. ex Arech.	Palma-espinhosa	x	x	x	x	x			
Caprifoliaceae									
<i>Sambucus australis</i> Cham. et Schlecht. ?	Sabugueiro								x
Celastraceae									
<i>Maytenus cassineformis</i> Reissek	Coração-de-bugre	x	x	x	x	x			
<i>Maytenus ilicifolia</i> Mart. ex Reissek	Espinheira-santa			x	x	x			
Combretaceae									
<i>Terminalia australis</i> Camb.	Sarandi	x	x		x	x	x	x	x
Compositae (Asteraceae)									
<i>Baccharis pseudotridentata</i>	Vassourão		x	x	x	x			
<i>Eupatorium tremulum</i> Hook. & Arn.	Chirca-do-banhado	x	x	x	x	x			
<i>Dasyphyllum spinescens</i> (Less) Cabr.	Sucará	x	x	x	x	x			
<i>Gochnatia polymorpha</i> (Less.) Cabr.	Cambará	x	x	x	x	x			
<i>Senecio brasiliensis</i> Less.	Maria-mole	x	x	x	x	x		x	x
Cyatheaceae									
<i>Nephelea setosa</i> (Kaulf.) Tryon	Xaxim-de-espinho	x	x	x	x	x			x
Ebenaceae									
<i>Diospyros inconstans</i> Jacq.	Maria-preta	x	x	x	x	x	x	x	x
Ephedraceae									
<i>Ephedra tweediana</i> Fish. & C.A. Mey *	Efedra	x	x	x	x	x		x	x
Erythroxylaceae									
<i>Erythroxylum argentinum</i> Schulz	Cocão	x	x	x	x	x	x	x	x

Source: Enrique Salazar

Table 4.3-4 Flora List in the Study Area (cont.)

Euphorbiaceae									
<i>Actinostemon concolor</i> (Spreng.) Müll. Arg.	Laranjeira-do-mato	x	x	x	x	x	x	x	x
<i>Phyllanthus sellowianus</i> Müll. Arg.	Sarandi								
<i>Sapium glandulatum</i> (Vell.) Pax	Leiteiro	x	x	x	x	x	x	x	x
<i>Sebastiania brasiliensis</i> Spreng.	Branquilho	x	x	x	x	x	x	x	x
<i>Sebastiania commersoniana</i> (Baill.) Smith & Downs	Branquilho	x	x	x	x	x	x	x	x
<i>Sebastiania schottiana</i> (Müll. Arg.) Müll. Arg.	Sarandi-negro								
Flacourtiaceae									
<i>Banara parviflora</i> (Gray) Benth.	Guaçatunga	x	x	x	x	x	x	x	x
<i>Casearia decandra</i> Jacq.	Guaçatunga	x	x	x	x	x	x	x	x
<i>Casearia sylvestris</i> Sw.	Chá-de-bugre	x	x	x	x	x	x	x	x
<i>Xylosma pseudosalzmanii</i> Sleum.	Sucarã	x	x	x	x	x	x	x	x
Icacinaceae									
<i>Citronella paniculata</i> (Mart.) How.	Congonha								
<i>Villaresia cuspidata</i> Miers	Congonha	x	x	x	x	x	x	x	x
Lauraceae									
<i>Aiouea saligna</i> Meissn.	Canela-sândalo								
<i>Nectandra megapotamica</i> Mez	Canela-imbuia	x	x	x	x	x	x	x	x
<i>Nectandra rigida</i> Nees	Canela-ferrugem								
<i>Ocotea puberula</i> Nees	Canela-guaicá	x	x	x	x	x	x	x	x
<i>Ocotea pulchella</i> Mart.	Candinha	x	x	x	x	x	x	x	x
Leguminosae-Caesalpinoideae									
<i>Senna corymbosa</i> (Lam.) Roxb.	Fedegoso	x	x	x	x	x	x	x	x
Leguminosae-Mimosoideae									
<i>Acacia bonariensis</i> Gill.	Unha-de-Gato	x	x	x	x	x	x	x	x
<i>Acacia caven</i> (Mol.) Mol.	Espinilho	x							
<i>Calliandra selloi</i> (Spreng.) Macbr.	Angiquinho								
<i>Calliandra tweediei</i> Benth.	Quebra-foice	x	x	x	x	x	x	x	x
<i>Mimosa bimucronata</i> (DC.) O.K.	Maricá	x	x	x	x	x	x	x	x
Leguminosae-Papilionoideae									
<i>Erythrina crista-galli</i> L.	Corticeira	x	x	x	x	x	x	x	x
<i>Erythrina falcata</i> Benth.	Corticeira-da-serra								
<i>Sesbania marginata</i> Benth.	Acácia-do-banhado	x	x	x	x	x	x	x	x
<i>Sesbania punicea</i> (Cav.) Benth.	Acácia-do-banhado	x	x	x	x	x	x	x	x
Malvaceae									
<i>Abutilon molle</i> L.	Malvaisco	x	x	x	x	x	x	x	x
Melastomataceae									
<i>Miconia hyemalis</i> St. Hil.	Pixirica	x	x	x	x	x	x	x	x
<i>Leandra atropurpurea</i> Cogn.	Pixirica	x	x	x	x	x	x	x	x
Meliaceae									
<i>Cedrela fissilis</i> Vell.	Cedro		x						
<i>Trichilia clausenii</i> C.DC.	Catiguá-vermelho	x	x	x	x	x	x	x	x
<i>Trichilia elegans</i> A. Juss.	Pau-de-ervilha	x	x	x	x	x	x	x	x
Moraceae									
<i>Ficus enormis</i> (Mart. ex Miq.) Miq.	Figueira	x	x	x	x	x	x	x	x

Source: Enrique Salazar

Table 4.3-4 Flora List in the Study Area (cont.)

<i>Ficus organensis</i> (Miq.) Miq.	Figueira	x	x	x	x	x	x	x	x
<i>Sorocea bonplandii</i> (Baill.) Burg., Lanj. & Boer	Sincho	x	x	x	x	x	x	x	x
Myrsinaceae									
<i>Rapanea ferruginea</i> (Ruiz & Pav.) Mez	Capororoca	x	x	x	x	x	x	x	x
<i>Rapanea laetevirens</i> Mez	Capororoca	x	x					x	x
<i>Rapanea parvifolia</i> (A. DC.) Mez	Capororoquinha	x	x	x	x	x	x	x	x
<i>Rapanea umbellata</i> (Mart. ex A. DC.) Mez	Capororoca	x	x	x	x	x			
Myrtaceae									
<i>Blepharocalyx salicifolius</i> (Kunth) Berg.	Murta	x	x	x	x	x	x	x	x
<i>Campomanesia aurea</i> Berg.	Guabiobinha	x	x	x	x	x		x	x
<i>Campomanesia xanthocarpa</i> Berg.	Guabioba	x	x			x	x	x	x
<i>Eugenia hiemalis</i> Camb.	Guamirim	x	x	x	x	x			x
<i>Eugenia involucrata</i> DC.	Cerejeira-do-Rio Grande					x	x	x	x
<i>Eugenia rostrifolia</i> Legr.	Batinga						x	x	
<i>Eugenia schuechiana</i> Berg.	Guamirim					x	x	x	x
<i>Eugenia uniflora</i> L.	Pitangueira	x	x	x	x	x	x	x	x
<i>Eugenia uruguayensis</i> Camb.	Cambuí	x	x			x		x	x
<i>Gomidesia palustris</i> (DC.) Kaus.	Guamirim	x	x	x	x	x			x
<i>Hexachlamys edulis</i> (Berg.) Kaus. & Legr.	Pessegueiro-do-campo	x	x	x	x	x			x
<i>Myrcia glabra</i> (Berg.) Legr.	Ubá	x	x			x			x
<i>Myrcia multiflora</i> (Lam.) DC.	Cambuí		x			x	x	x	x
<i>Myrcianthes cisplatensis</i> (Camb.) Berg.	Guamirim	x	x	x	x	x	x	x	x
<i>Myrcianthes gigantea</i> (Legr.) Legr.	Araçazeiro-do-mato	x	x	x	x		x		
<i>Myrciaria cuspidata</i> Berg.	Cambuí							x	
<i>Myrciaria tenella</i> (DC.) Berg.	Cambuí						x	x	x
<i>Myrrhinium atropurpureum</i> Schott	Murtinho	x	x	x	x	x	x	x	x
<i>Psidium cattleianum</i> Sab.	Araçazeiro	x	x	x	x	x			
Nyctaginaceae									
<i>Guapira opposita</i> (Vell.) Reitz.	Maria-mole	x	x	x	x	x		x	x
Palmae (Arecaceae)									
<i>Syagrus romanzoffiana</i> (Cham.) Glass.	Gerivá	x	x	x	x	x	x	x	x
<i>Geonoma gamiova</i> Barb. Rodr. *	Guaricana	x	x		x				
<i>Geonoma schottiana</i> Mart. *	Guaricana		x						
Phytolaccaceae									
<i>Phytolacca dioica</i> L.	Umbú	x	x	x	x	x		x	x
Piperaceae									
<i>Piper gaudichaudianum</i> Kunth	Pariparoba-do-mato	x	x	x	x	x		x	x
<i>Piper xylosteoides</i> Steud.	Pariparoba-do-mato	x	x	x	x	x			
Polygonaceae									
<i>Coccoloba cordata</i> Cham.	Pau-de-junta	x	x	x	x	x			x
<i>Ruprechtia laxiflora</i> Meissner	Viraró	x	x	x	x	x			
Rhamnaceae									
<i>Discaria americana</i> Gill. et Hook.	Curro		x		x	x		x	x
<i>Scutia buxifolia</i> Reissek *	Coronilha	x	x	x	x	x	x	x	x
Rosaceae									

Source: Enrique Salazar



Table 4.3-4 Flora List in the Study Area (cont.)

<i>Prunus sellowii</i> Koeh. **	Pessegueiro-bravo		x			x		x	x
<i>Quillaja brasiliensis</i> (St. Hil.) Mart.	Pau-sabão	x	x	x	x	x		x	x
<i>Rubus</i> sp.	Amoreira-do-mato	x	x	x	x	x		x	x
Rubiaceae									
<i>Cephalanthus glabratus</i> (Spreng.) K. Shum.	Sarandí	x	x	x	x	x	x	x	x
<i>Chiococca alba</i> (L.) Hitch.	Cainca	x	x	x	x	x		x	x
<i>Faramea marginata</i> Cham.	Pimenteira-do-mato	x	x	x	x	x	x	x	x
<i>Guettarda uruguensis</i> Cham. & Schlecht.	Veludinho	x	x	x	x	x	x	x	x
<i>Psychotria brachyceras</i> Müll. Arg. **	Café-do-mato	x	x	x	x	x	x	x	x
<i>Psychotria carthagenensis</i> Jacq.	Carne-de-vaca	x	x	x	x	x	x		
<i>Randia armata</i> (Sw.) DC.	Limoeiro-do-mato	x	x	x	x	x		x	x
Rutaceae									
<i>Helietta longifoliata</i> Britt. ?	Canela-de-veado								x
<i>Zanthoxylum hiemale</i> St. Hil.	Coentrilho	x	x	x	x	x		x	x
<i>Zanthoxylum rhoifolium</i> Lam.	Mamica-de-cadela	x	x	x	x	x		x	x
<i>Zanthoxylum</i> sp.	Mamica-de-cadela	x	x	x	x	x			
Salicaceae									
<i>Salix humboldtiana</i> Willd.	Salso	x	x	x	x	x	x	x	x
Santalaceae									
<i>Acanthosyris spinescens</i> (Mart. & Eichl.) Griseb. **	Sombra-de-touro	x	x	x	x	x			x
<i>Iodina rhombifolia</i> Hook. & Arn. *	Cancorosa	x	x	x	x	x			x
Sapindaceae									
<i>Allophylus edulis</i> (St. Hil.) Radlk.	Chal-chal	x	x	x	x	x	x	x	x
<i>Dodonaea viscosa</i> (L.) Jacq.	Vassoura-vermelha	x	x	x	x	x		x	x
Sapotaceae									
<i>Bumelia obtusifolia</i> Roem. & Schult. *	Falsa-cordilha	x	x	x	x	x		x	x
<i>Chrysophyllum gonocarpum</i> (Mart. & Eichl.) Engl.	Aguai-amarelo	x	x	x	x	x		x	x
<i>Chrysophyllum marginatum</i> (Hook. & Arn.) Radlk.	Aguai-vermelho	x	x	x	x	x	x	x	x
Solanaceae									
<i>Cestrum calycinum</i> Willd.	Coerana	x	x	x	x	x			x
<i>Cestrum</i> sp.	Coerana	x	x	x	x	x	x	x	x
<i>Solanum arenarium</i>			x			x	x	x	x
<i>Solanum erianthum</i> D. Don	Fumo-bravo	x	x	x	x	x	x	x	x
<i>Solanum glaucophyllum</i> Desf.	Espichadeira	x	x		x	x			
<i>Solanum inaequale</i> Vell.	Canema						x	x	
<i>Solanum sanctae-catharinae</i> Dunal	Joá		x						
Styracaceae									
<i>Styrax leprosus</i> Hook. & Arn.	Carne-de-vaca	x	x	x	x	x		x	x
Symplocaceae									
<i>Symplocos uniflora</i> (Pohl) Benth.	Sete-sangrias	x	x	x	x	x	x	x	x
Thymeliaceae									
<i>Daphnopsis racemosa</i> Griseb.	Embira	x	x	x	x	x	x	x	x
Tiliaceae									
<i>Luehea divaricata</i> Mart.	Açoita-cavalo	x	x	x	x	x	x	x	x
Ulmaceae									

Source: Enrique Salazar

Table 4.3-4 Flora List in the Study Area (cont.)

<i>Cellis spinosa</i> Spreng.	Taleira	x	x	x	x	x	x	x	x
<i>Trema micrantha</i> (L.) Blume	Grandiúva	x	x	x	x	x			x
Verbenaceae									
<i>Aloysia gratissima</i> (Gill. et Hook.) Tronc.	Cidrilha	x	x	x	x	x		x	x
<i>Citharexylum montevidense</i> (Spreng.) Mold.	Tarumã-de-espinho	x	x	x	x	x		x	x
<i>Citharexylum myrianthum</i> Cham.	Tucaneira	x	x	x	x	x		x	x
<i>Lantana camara</i> L.	Cambarazinho	x	x	x	x	x			x
<i>Lippia alba</i> (Mill.) N.E. Brown	Cidreira	x	x						x
<i>Vitex megapotamica</i> (Spreng.) Mold.	Tarumã	x	x	x	x	x	x		
(*) Ameaçadas de Extinção - Lei 4119 / 96									
(**) Populações muito reduzidas - vulneráveis	Sub-total:	112	119	104	108	115	65	94	110
(?) Possivelmente introduzidas									
HBITL - Horto Botânico Ir. Teodoro Luis / UFPel - incluindo matas da Embrapa / CPACT									

Source: Enrique Salazar

#### **4.4 Ecosystems in the Selected Wetlands**

In the arrial survey on 28<sup>th</sup> September 1999, following places were visited. Results of observations and supplemental comments by Mr. Rafael A. Dias are mentioned for the following.

##### **(1) Patos Lake Northwestern Coast**

This region is overall characterized by extensive rice fields mingled with lakes, which supply water for irrigation purposes. Martin (1997) has discussed the importance of lakes to aquatic birds. Small wetlands along Patos Lake near Barra do Ribeiro need fauna/flora surveys. Two large wetlands were observed, and a larger one, south of Tapes, close to Graxaím Lake, where *Ciconia maguari* were breeding, deserves adequate research. Another interesting area near Tapes is the “butiazal”, an extensive area covered with palms and tracts of forest, all suffering from overgrazing by cattle.

##### **(2) Camaquã River Mouth**

Camaquã’s mouth is dominated by riverine forest with different species composition. A very extensive wetland, with forests, reedbeds, sedges and low grass open wetlands, between the river’s mouth and São Lourenço do Sul is of special interest. It seemed to be virtually untouched from the air, and *Ardea cocoi* and *Ciconia maguari* were breeding in the area.

##### **(3) Patos Lake Southwestern Coast**

Pequena Lake is the highlight of this region, and its forests, freshwater and saltwater wetlands seem highly impacted by overgrazing and drainage activities.

#### **(4) Canal do São Gonçalo**

This area must be treated as a unity, as evidenced by satellite images and air photographs. This huge region, highly threatened by drainage for agricultural purposes, might be a very important coastal wetland in Rio Grande do Sul, judged by its size and complexity in habitat types (forests, “sarandi” bushes, reedbeds, sedges, low grass open wetlands). There are five better preserved sub-areas: Barra Falsa and Capão Seco region east of Pelotas (breeding site for *Ciconia maguari* and *Larus maculipennis*); the area at EMBRAPA-CPATB; the mouth of Piratini River; the Formosa Lake region southwards; and the eastern shore southwards of Piratini’s mouth towards Mirim Lake. The whole area must be properly surveyed and different wetland composition defined for adequate conservation measures.

#### **(5) Mirim Lake Western Shore**

The large wetland close to Arroio River Grande’s mouth, next to Ponta Alegre, is the most outstanding wetland in the whole area. Encroached to the east by agricultural lands, its diversity of habitats (“sarandi” bushes, reedbeds, sedges, low grass open wetlands), geographical position and size render it as of special interest.

Another wetland in the region is a small area at Arroio Juncal, completely surrounded by rice fields. Despite being breeding site for *Ardea cocoi* and *Ciconia maguari*, its small size and poor overall condition might reflect low conservation priority. Anyway, judging by its austral position, floral and faunal surveys are needed to attest this.

#### **(6) Mirim Lake Eastern Shore**

Wetlands southwards of Pontal dos Latinos did not appear to be extensive or in good condition from the air.

Wetlands at Banhado dos Afogados are highly threatened by agriculture. Forests and palms (*Butia capitata*) are the most threatened feature in the area. Forest remnants were small and suffering from overgrazing. Palms were old, scattered among the rice fields, and renewal was not evidenced. These palm stands, from which Santa Vitória do Palmar was named, are one of the most highly threatened ecosystems in Rio Grande do Sul’s southern coastal plain. Sparse tussocks of *Cortaderia sellowiana* grass, which forms a

virtual sea of grass along nearby Uruguayan wetlands, where observed in few areas of Afogados wetland. Surveys to detect better preserved areas, as well as fauna/flora inventories, are urgent. This area, alongside the Brazilian segment of Banhado de San Miguel (Banhados del Leste) along Arroio São Miguel, and not Pontal dos Latinos, should be targeted for joint Brazil-Uruguay wetland conservation as stated in the National Report to the 7<sup>th</sup> Ramsar Convention Meeting (1999).

Another priority in terms of research is Banhado del Rey. From the air, its overall condition seemed better than other wetlands in the region, but encroachment is evident on its borders. In terms of size and habitat diversity, it is also a conservation priority.

#### **(7) Taim Wetland**

Most of Taim wetland is protected by a conservation unit, but efforts to extend it northwards to Banhado do Aguirre and Banhado do Serrano should be considered, by proper research in these areas.

#### **(8) Cordões Litorâneos and Banhado do Maçarico**

They are highly neglected wetlands in terms of research form an extensive and well preserved area in Rio Grande municipality. Comprised of sedges and reedbeds mingled with sandy fields and occasional forests, appropriate research is desperately needed. They are structurally unique among Rio Grande do Sul's wetlands.

#### **(9) Banhado do 25 and Banhado da Mulata**

These peat marshes are comprised mainly of Cyperaceae, dominated by *Scirpus giganteus* patched with *Cladium jamaicensis*, and bordered by gravatá, *Eryngium pandanifolium*, and herbaceous vegetation with grasses. Corticeira trees, *Erythrina cristagalli*, and small bushes (sarandi) occur in some places, and swampy forests line some of its margins, occasionally invading the wetland. Located in an area of sandy rolling fields, these wetlands are unique in the whole region, the bird fauna resembling that of wetlands in Rio Grande do Sul's highlands.

#### **(10) Ilha da Torotama**

Apparently similar to the Lagoa Pequena area: salt and freshwater wetlands with patches of forest. The gradient of sand dunes, sandy and wetland forests, wet fields, fresh and salt water wetlands observed along Banhado do Silveira deserves further investigation.

#### **(11) São José do Norte**

A marsh similar to Banhado do 25, observed at Ponta Rasa and in apparent good condition, requires immediate research.

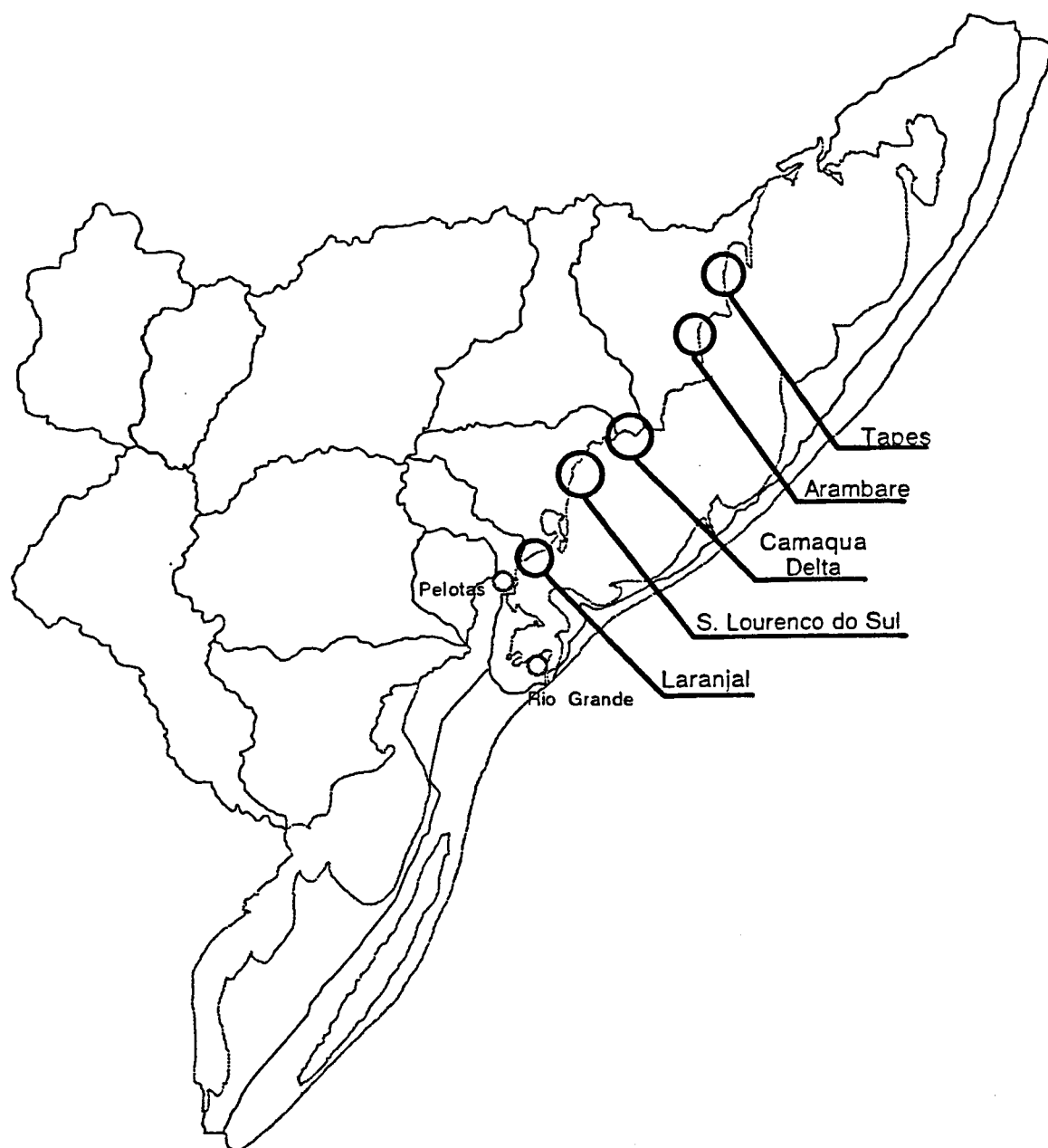
Although not surveyed from the air, Banhado do Claudinho is of interest, probably the most important and large wetland of the southern peninsula.

#### **(12) Peixe Lake**

All of the area is of great importance, and grazing seems the highest threat. The conservation area limits should be evaluated, so extensive overgrazed forest tracts and nearby wetlands are not neglected.

### **4.5 Biological Accumulation of Agricultural Chemicals**

Biological accumulation of agricultural chemicals on aquatic organisms was analysed. Sampling was made, between 22<sup>nd</sup> to 24<sup>th</sup> of October of 1999, for three specimens of aquatic organisms: fish, shrimp and gastropoda. Five collection points that are Tapes, Arambaré, Camaquã delta, São Lourenço do Sul, and Laranjal beach, presented in **Fig. 4.5-1**. Those areas were selected due to the intense agricultural activities (output of agricultural chemicals) and access facility. Three samples of each species were collected from a total of 45 samples. Samples were mixed for each species at each collection point to avoid incorrect results. Concentration of organo-chlorides were analyzed.



THE STUDY ON THE ENVIRONMENTAL MANAGEMENT  
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JAPAN INTERNATIONAL COOPERATION AGENCY  
KOKUSAI KOGYO CO., LTD. / PACIFIC CONSULTANTS INTERNATIONAL

**Fig.4.5-1**

**Biological Accumulation  
Analysis of Agricultural  
Chemicals in Aquatic  
Organisms**

## 4.6 Fauna/Flora Listing System

There are several studies about fauna and flora in the study area, but many of them are localized. A general and complete list of fauna and flora for all the study area does not exist. It is not necessary to mention the importance of a general list of fauna and flora for the sustainable development of the region.

Because this work (listing the fauna/flora) can not be carried in a short period, one solution is to create a mechanism that anyone can participate in supplying information. A participatory information system that can contribute to facilitate the information accumulation. So a listing mechanism is proposed that can be easily accessed by any person interested in developing the knowledge of fauna and flora existent in the study area.

With the development of the digital communication, the cheaper and easier way is to develop a site on the Internet. This site can be accessed to input data or see the stored information.

A preliminary flow-chart for the data registration site is presented in **ECO-F-1** (annex). It is divided mainly in two sections: to input and see the data. The data will be stored in two sections: the final data and temporary data. The temporary data will be utilized for contributions of any person that must be filtered before being added to the final data. The final data will be the one accessed for persons interested to know the fauna/flora of the region. The data contribution can be done through at least the item presented in the lower part of **ECO-F-1** (annex).

A preliminary flow-chart of the process between the addition of the temporary data to the final data is presented in **ECO-F-2** (annex). It will be called filter, that is basically a data management process. One organism, for example the Fundação Zoobotânica, can be responsible for this management. It must be one organism for time economy and judgement uniformity, but the rules must be defined by a committee involving all related organisms.

The initial data of the system can be developed from the preliminary list of fauna/flora of the present study. This data must include not only the fauna/flora list, but comments and other relevant information in the future.

Maps must be included in the system as for distribution presented in **ECO-F-3** (annex) for flora, **ECO-F-4 (a) and (b)** (annex) for birds and for seasonal variations as in



**ECO-F-5** (annex) for water community. Another important item is the elaboration of a regional endangered fauna/flora list as presented in the **ECO-T-1** (annex), economically important specimens, exotic specimens and other important classification.

This system can be expanded in the future associating to information as the Information Sheet about Wetlands in Patos/Mirim Lake Basin presented in chapter 5 to be a general environmental protection system.

One important consideration that must be done in the Information System is to be in accordance with databases in national level, for example the one that is under project called “ESNAZU” of the Ministry of Environment, or in world level if possible.

#### **4.7 Legislation**

The collected Brazilian legislation is classified as follows:

- **Law:** Is a written, general and abstract norm, emanated by a state organization specialized to legislate, applied by Federal organizations while not revoked. It is created and applied decentralized in the federal, state and municipal domain.
- **Decree-Law:** Act of the Executive Power head, characteristic of dictator governments, executed with or without constitutional authorization. In Brazil, this type of legislative act only occurred during the 1930 Revolution that dissolved the Congress (1930-1934) and during the Military Dictatorship (1964-1985).
- **Decree:** Personal act of the Executive Power that has the fundamental objective to regulate and develop laws. There is no decree independent from the law or autonomous in the Brazilian juridical order.
- **Resolution:** It has the some power as law. It is formula that the related organizations utilize to manifest their deliberation about subjects of their competency or to dispose about their own function.
- **Government Order:** Administrative act that the authorities of any command section, inferior of the Executive Power head, dispatch general or special orientation about the law application of laws or regulations or questions related to the public server performance.

A preliminary list of federal, state and municipal legislation is presented in **ECO-T-2 (a), (b) and (c)** (annex). The first impression is that the legislation system to protect the fauna and flora is concentrated so much in the federal level. More power must be distributed in the municipal level to decentralize the activities and make it more effective.

#### **4.8 Organizations Related to the Ecosystem**

The **ECO-T-3** (annex) shows a preliminary list of organizations that can contribute for the ecosystem conservation and recognizance. The table presents the NGOs and the others that include public (federal, state and municipal) and private ones.

The figure **ECO-F-6** (annex) shows their spatial distribution. They are mainly located in large cities, and therefore, monitoring activities in the plateau areas and sparsely populated areas seem to be difficult.

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4-f9	Melo, M.T.Q.	Resultados Preliminares de Levantamento das Populações de <i>Caiman latirostris</i> em Ambientes de Áreas Úmidas no RS, BR <i>Preliminary Results of the Caiman latirostris Populations in Humid Areas Environment in RS, BR</i>	1997	VIII Congreso Ibero-americano de Biodiversidad y Zoología de Vertebrados.



No.	Author/Editor	Title	Year	Published by / Printed in
4-f10	Burger, M.I.	A Caça Esportiva de <i>Dendrocygna viduata</i> no Sul do Brasil (1984-1991): Formas de Avaliação e Efeitos da Caça de outras Espécies de Mudanças na Legislação <i>The Sportive Hunting of Dendrocygna viduata in Southern Brazil (1984-1991): Evaluation Manners and Effects of Hunting on other Species and Changes in the Legislation</i>	1997	VIII Congreso Ibero-americano de Biodiversidad y Zoología de Vertebrados, Chile.
4-f11	Guadagnin, D.L.	Estandarização de Contagens de Columbídeos para Monitoramento da Caça no RS <i>Standardization of Columbidae Counting for Hunting Monitoring in RS</i>	1997	VIII Congreso Ibero-americano de Biodiversidad y Zoología de Vertebrados, Chile.
4-f12	Burger, M.I.	Efeito do Habitat na Distribuição de <i>Dendrocygna viduata</i> no RS <i>Effect of the Habitat in the Distribution of Dendrocygna viduata in RS</i>	1996	3º Congresso de Ecologia no Brasil.
4-f13	Taborba, W.Q.	Censo Aéreo de alguns Anatídeos no RS <i>Aerial Census of some Anatidae in RS</i>	1996	Resumo do XXI Congresso Brasileiro de Zoologia.
4-f14	Oliveira, K.P.A	Distribuição Geográfica de Seis Famílias (Capromyidae, Caviidae, Dasyproetidae, Erethizontidae, Hydrocharidae, Sciuridae) de Rodentia no Estado do RS <i>Geographical Distribution of Six Families (Capromyidae, Caviidae, Dasyproetidae, Erethizontidae, Hydrocharidae, Sciuridae) of Rodents in the RS State</i>	1996	Resumos do XXI Congresso Brasileiro de Zoologia.
4-f15	Nascimento, J.L.X.	Biologia e Situação Atual da Marreca-Parda <i>Anas georgica</i> no BR <i>Biology and Present Situation of the Marreca-Parda (Pard-Duck) Anas georgica in BR</i>		
4-f16	Nascimento, J.L.X.	Monitoramento da Costa do RS através de Censo Aéreo de Aves <i>Monitoring of RS Coast through the Aerial Census of Birds</i>		

No.	Author/Editor	Title	Year	Published by / Printed in
4-f17	Ataguile, B.S.	Dados Referentes ao Censo Aéreo em Regiões de Banhado no estado do RS, BR <i>Data Concerning to Aerial Census in Swampy Regions of the RS State, BR</i>		
4-f18	Nascimento, J.L.X.	Análise dos Dados de Anilhamento de <i>Amazonetta brasiliensis</i> no Brasil <i>Analysis of "Anilhamento" (related to rings) Data of the Amazonetta brasiliensis in Brazil</i>	1990	Ararajuba 1
4-f19	Lema, T.	Contribuição ao Conhecimento dos Testudines do RS – Lista Sistemática Comentada (Reptila) <i>Contribution to the Knowledge of Testudinidae in RS – Commented Systematic List (reptile)</i>	1990	Acta Biologica Leopoldensia , 12
4-f20	Valentini, H.	Análise da Pesca do Camarão-rosa ( <i>Penaeus brasiliensis</i> e <i>P. paulensis</i> ) nas Regiões Sudeste e Sul do BR <i>Analysis of the Pinky-Shrimp (Penaeus brasiliensis and P. paulensis) Fishery in the Southeast and South Regions of BR</i>	1991	Atlântica, Rio Grande, 13-1
4-f21	Vooren, C.M.	Guia das Aves Comuns da Costa do RS. Projeto Asas Polares. <i>Guide of Common Birds of the RS Coast. Polar Wings Project</i>	1995	IMAGO MARIS, 2
4-f22	Silva, K.G.	Monitoramento da Ocorrência de Tartarugas Marinhas no Litoral do RS <i>Monitoring of the Occurrence of Marine Turtles in the RS Coast</i>	1996	XI Semana Nacional de Oceanografia.
<b>(g) Rio Guaíba</b>				
4-g1	Torgan, L.C.	Diatomáceas das Praias do Guaíba, RS <i>Diatomaceae of the Guaíba Beaches, RS</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.
<b>(h) Laguna dos Patos Estuary</b>				
4-h1	Koch, E.M.	Transplante de <i>Ruppia marítima</i> L. no Estuário da Lagoa dos Patos – RS <i>Transplant of Ruppia maritime L. in the Patos Lake Estuary – RS</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.

No.	Author/Editor	Title	Year	Published by / Printed in
4-h2	Chao, L.N.	BELAP – Bioecologia dos Peixes do Estuário da Lagoa dos Patos – RS <i>BELAP – Bioecology of Fishes of the Patos Lake Estuary – RS</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.
4-h3	Topin, L.O.	Biologia do Siri <i>Callinectes sapidus</i> na Área Estuarine da Lagoa dos Patos - Rio Grande – RS <i>Biology of Callinectes sapidus crab in the Estuary Area of the Patos Lake – Rio Grande – RS</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.
4-h4	D`Incao, F.	Crescimento e Mortalidade do Camarão <i>Penaers paulensis</i> na Lagoa dos Patos, RS <i>Growth and Mortality of Penaers paulensis Shrimp in the Patos Lake, R</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.
4-h5	Marchiori, M.A.	Repovoamento do Camarão Rosa <i>Panaeus paulensis</i> no Estuário da Lagoa dos Patos - Rio Grande – RS <i>Repopulation of the Pink Shrimp Penaers paulensis in the Estuary of the Patos Lake – Rio Grande – RS</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.
4-h6	Bemvenuti, C.E.	Efeito da Predação sobre a Macrofauna Bentônica de uma Enseada Estuarina da Lagoa dos Patos <i>Predatory Effects over the Bottom Macrofauna of an Estuarine Inlet of the Patos Lake</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.
4-h7	Amus, M.L.	Estrutura da Comunidade Associada à Pradaria de <i>Ruppia maritima</i> no Estuário da Lagoa dos Patos, RS <i>Structure of the Community Associated to the Ruppia maritima Prairie in the Patos Lake Estuary, RS</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.
4-h8	Amus, M.L.	Levantamento e Modificações Ambientais do Ecossistema Estuarial da Lagoa dos Patos <i>Environmental Survey and Modifications of the Estuarine Ecosystem of the Patos Lake</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.
4-h9	Itussarry, M.E.	Aspectos Biogeográficos dos Ostracodes determinados por Parâmetros Ambientais na Porção Estuarial da Lagoa dos Patos <i>Bio-geographical Aspects of the Ostracodes determined by Environmental Parameters in the Estuarine Portion of the Patos Lake</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.

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4-h10	Niencheski, L.F.H.	Monitoria de Ambientes por Balanus <i>Monitoring of Environment by Balanus</i>	1984	1º Seminário sobre Pesquisa da Lagoa dos Patos.
4-h11	Bemvenuti, M.A.	Hábitos Alimentares de Peixe-rei (Atherinidae) na Região Estuarina da Lagoa dos Patos, RS, BR <i>Feeding Habits of the King-fish (Peixe-rei, Atherinidae) in the Estuarine Region of the Patos Lake, RS, BR</i>	1990	Atlântica 12-1
4-h12	Bemvenuti, M.A.	Abundância, Distribuição e Reprodução de Peixes-rei (Atherinidae) na Região Estuarina da Lagoa dos Patos, RS, BR <i>Abundance, Distribution and Reproduction of Peixes-rei (Atherinidae) in the Estuarine Region of the Patos Lake, RS, BR</i>	1987	Atlântica 9-1
4-h13	Bemvenuti, C.E.	Características Estruturais da Macrofauna Bentônica em Dois Pontos da Região Estuarina da Lagoa dos Patos, RS, BR <i>Structural Characteristics of the Bottom Macrofauna in Two Points of the Estuarine Region of the Patos Lake, RS, BR</i>	1992	Atlântica 4
4-h14	Capitoli, R.R.	Occurrence and Bio-ecological Observation on <i>Metasesarma rubripes</i> (crab) in the Estuarine Region of Patos Lake	1977	Atlântica 2-1
4-h15	Weiss, G.	Development and Metamorphosis Characteristics of <i>Lycengraulis olidus</i> (Engraulidae) and <i>Brevoortia pectinata</i> (Clupeidae) in the Patos Lake Estuary	1977	Atlântica 2-1
4-h16	Reis, E.G.	Reproduction and Feeding Habitats of the Marine Catfish <i>Netuma barba</i> in the Estuary of Patos Lake, BR	1986	Atlântica 8
4-h17	D`Incao, F.	Pesca e Biologia de <i>Penaeus paulensis</i> na Lagoa dos Patos, RS <i>Fishery and Biology of Penaeus paulensis in the Patos Lake, RS</i>	1991	Atlântica 13-1
4-h18	Bemvenuti, C.E.	Impacto da Predação sobre <i>Heteromastus similis</i> southern, 1921 e <i>Nephtys fluviatilis</i> monro, 1937 em Fundos Moles Estuarinos <i>Predatory Impact over Heteromastus similis southern, 1921 and Nephtys fluviatilis monro, 1937 in Estuarine Soft Bottom</i>	1988	Atlântica 10-1

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4-h19	Costa, C.S.B.	Distibuição, Função e Valores das Marismas e Pradarias Submersas no Estuário da Lagoa dos Patos, RS, BR <i>Distribution, Function and Values of Submerged Marshy Areas and Prairies in the Patos Lake Estuary, RS, BR</i>	1997	Atlântica 19
4-h20	Silva, K.G.	Os Pinipedes no Litoral do RS – Monitoramento, Pesquisa e Educação Ambiental <i>The Pinnipedian in the RS Coast – Monitoring, Research and Environmental Education</i>	1997	
<b>(i) Palmares do Sul</b>				
4-i1	Ramos, R.A.	Comportamento Reprodutivo de Algumas Espécies de Anatidae em Cultivo de Arroz Irrigado no município de Palmares do Sul, RS, BR <i>Reproductive Behavior of some Anatidae Species in the Irrigated Rice Cultivation of the municipality of Palmares do Sul, RS, BR</i>	1997	VIII Congreso Ibero-americano de Biodiversidad y Zoología de Vertebrados, Chile.
<b>(j) Santa Vitória do Palmar</b>				
4-j1	Ataguile, B.S.	Levantamento Preliminar da Avifauna em Região Natural de Banhado, na Estância Ipiranga, RS <i>Preliminary Survey of Avifauna in the Swamp Natural Region, in the Ipiranga Farm, RS</i>		
4-j2	Nascimento, J.L.X.	Aninhamento de <i>Dendrocygna</i> spp. no Brasil entre 1973 e 1994 <i>Nesting of Dendrocygna spp. in Brazil between 1973 and 1994</i>	1995	
4-j3	Bretschneider, D.S.	Nota sobre a Alimentação do Marrecão ( <i>Netta peposa</i> ) em Santa Vitória do Palmar, RS, BR <i>Note about the Feeding of Marrecão (Netta peposa) in Santa Vitória do Palmar, RS, BR</i>	1981	Ser. Zool., Porto Alegre, 58
<b>(k) Others</b>				
4-k1		Caracterização Sócio-Econômica e Fundiária do Parque Nacional da Lagoa do Peixe - RS <i>Socio-Economic and Land Ownership Characterization of the Lagoa do Peixe National Park - RS</i>		

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4-k2		II Simpósio de Ecossistemas da Costa Sul e Sudeste Brasileira <i>II Symposium of Ecosystems of the Brazilian Southern and Southeast Coast</i>	1990	
4-k3	SCP	Comercio e Turismo -Projeto RS 2010 -	1998	SCP
4-k4		Política Nacional de Ecoturismo		
4-k5	Programa Mar de Dentro, SCP	Eco-Turismo Pro-Mar de Dentro	1999	SCP