URUGUAY

INTRODUCTION

by **Raul Vaz-Ferreira**

Uruguay has an area of 176,215km^2 and a population of nearly three million. The country borders on the Atlantic Ocean (220 km of coastline), the Rio de La Plata (460 km) and Rio Uruguay (480 km). There are some 3,500 sq. km of lakes, lagoons and dams, and some 3,500 to 4,000 sq. km of permanent and temporary marshes, the largest being those situated in the east and northeast of the country. Overall, it has been estimated that wetlands make up about 3.6% of the territory of Uruguay.

Of the 400 or so species of birds occurring in Uruguay, 175 (44%) are aquatic or semi-aquatic; these include 28 species of Sphenisciformes and Procellariiformes. There are about 200 species of fishes in the lakes, marshes and rivers; these belong mainly to the Siluriformes and Cypriniformes, and many are of commercial importance. All 36 species of amphibians known from Uruguay inhabit wetlands for at least a part of their life cycle, and several of the reptiles are dependent on wetlands, namely five species of freshwater turtle, three snakes and the caiman *Caiman latirostris*. The latter is now in danger of extinction in Uruguay. Of the mammals associated with wetlands, three are trapped for their fur and constitute important natural resources. These are the La Plata Otter *Lutra platensis*, Coypu *Myocastor coypus* and Capybara *Hydrochoerus hydrochaeris*.

There are over one hundred wetlands in Uruguay which clearly require investigation and which have some scientific and/or economic importance. This inventory considers only twelve of these. Most are relatively large wetlands for which at least some information exists on the avifauna. However, the inventory also includes some sites near Montevideo which would be particularly suitable for research purposes and where it is known that a formerly abundant avifauna has been adversely affected by human activities such as industrial pollution, drainage and exploitation. The inventory has been compiled from existing information, either unpublished material in the possession of the contributors or published material in the literature, and no new information has been sought.

Institutional Base for Wetland Conservation and Research

A large number of institutions are directly or indirectly concerned with conservation in Uruguay, and some thirty official services are involved. Those most directly concerned with wetland conservation are as follows:

Governmental

Ministerio de Agricultura y Pesca

Direccion de Suelos: this has carried out surveys of wetlands.

Division Uso y Manejo del Agua.

Industrias Loberas y Pesqueras del Estado: this is responsible for the exploitation of fisheries resources in state owned water bodies.

Instituto Nacional de Pesca.

Direccion de Contralor Legal (Departamento de Fauna): this is responsible for ensuring that the hunting regulations and wildlife preservation laws are being enforced. Its activities are assessed by a Commission made up of representatives of all the institutions concerned with these matters.

Ministerio de Defensa Nacional

Servicio de Parques del Ejercito.

Servicio de Remonta.

Ministerio de Educacion y Cultura

Instituto Nacional para la Preservacion del Medio Ambiente: this is concerned with general problems relating to the environment and coordinates the activities of its many constitutent bodies in the field of environmental conservation. The Institute is also responsible for CITES and respresents ICBP in Uruguay.

Universidad de la Republica: the Facultad de Agronomia and Facultad de Humanidades y Ciencias provide courses relating to environmental protection, and particularly to the protection of habitats, fauna and flora. The Departamento de Zoologia de Vertebrados in the Facultad de Humanidades y Ciencias periodically holds courses which specialize in the preservation of habitats, particularly wetlands. It also conducts research on aquatic mammals, waterfowl, amphibians and freshwater fishes. The Departamento de Limnologia at the same Faculty carries out limnological investigations and studies of pollution in the basin of the Rio Santa Lucia. The Departamento de Oceanografia coordinates a major programme of marine sciences (Programa de Ciencias del Mar) which includes some topics relating to freshwater systems.

Museo Nacional de Historia Natural: this has published various works on the avifauna of Uruguay.

Ministerio de Transporte y Obras Publicas

Administracion de las Obras Sanitarias del Estado: this is in charge of reservoirs supplying water for domestic consumption, some of which are of biological importance.

Direccion de Hidrografia.

Ministerio de Relaciones Exteriores

Direccion de Intereses Maritimos y Fluviales.

Departamento de Organizaciones Internacionales y Medio Ambiente: this is concerned with conventions on habitat preservation, migratory species, etc.

Municipal Authorities

Non-governmental

Sociedad Zoologica del Uruguay: this holds monthly meetings for the presentation of scientific works, and publishes a bulletin. It has created a conservation group which undertakes projects relating to the conservation of natural habitats.

Centro de Investigacion y Promocion Franciscano y Ecologico: the activities of this Centre include, among other things, the promotion of conservation projects involving wetlands and their aquatic fauna.

Progress in Wetland Conservation and Research

A large number of areas in Uruguay have been given some form of protection. Those under state ownership are known as National Parks, and there are now about one hundred such areas in the country. Protected areas incorporating wetlands or with wetlands in close proximity include the following:

Parque Nacional Arequita (965 ha), Department of Lavalleja.
Parque Nacional de Cabo Polonio (6,324 ha), Department of Rocha.
Parque Nacional de Aguas Dulces (200 ha), Department of Rocha.
Parque Nacional de Santa Teresa (3,288 ha), Department of Rocha; close to extensive marshes and Laguna Negra, and administered by the Servicio de Parques del Ejercito.
Parque Nacional de San Miguel (2,295 ha), Department of Rocha; administered by the Servicio de Parques del Ejercito.

The Islas de Lobos, under the direction of the Industrias Loberas y Pesqueras del Estado, are in effect protected areas, since the only exploitation permitted by this institute is that of the seals, all other wildlife being protected.

The open waters of Laguna de Castillos, an area of about 400 ha, have been declared a reserve, and this is administered by the Ministerio de Agricultura y Pesca.

In 1982, the Consejo de Estado de la Republica Oriental del Uruguay approved the Ramsar Convention, and in May 1984, the instrument of ratification was deposited with UNESCO. Wetlands in eastern Uruguay were designated for inclusion in the Ramsar List of Wetlands of International Importance. The area designated includes the lowlands of the Departments of Cerro Largo, Trienta y Tres and Rocha between 32°00'S and 34°30'S, the adjacent Atlantic coast, the valleys of the water courses which flow into Laguna Merin and the Atlantic, and the nearby marshes.

With regard to research on wetlands and waterfowl, there has been no bird banding programme to date in Uruguay, although foreign banded birds have been recovered in the

country. The study of waterfowl began with the present inventory, but several research projects were carried out on other wetland topics before this. These include the following:

a) A study of changes in the vertebrate fauna, especially waterfowl, at Salto Grande Dam during the flooding of the lake (Palerm, 1977; Vaz-Ferreira *et al*, 1980 & 1983). This work was coordinated by the Departamento de Zoologia Vertebrados at the Facultad de Humanidades y Ciencias, and the Comision Tecnica Mixta de Salto Grande.
b) A study of the productivity and biology of the Coypu *Myocastor coypus* in the marshes of Uruguay, carried out under an agreement between FAO and the Instituto Nacional para la Preservacion del Medio Ambiente (FAO, 1980).
c) An analysis of normal parameters and pollution levels in the basin of the Rio Santa Lucia, carried out by the Departamento de Limnologia at the Facultad de Humandidades y Ciencias, and the Instituto Nacional para la Preservacion del Medio Ambiente.
d) Studies of the biology of *Caiman latirostris*, carried out by the Departamento de Zoologia Vertebrados at the Facultad de Humanidades y Ciencias.
e) Studies of temporary freshwater wetlands and their fauna, carried out by the Departamento de Zoologia Vertebrados at the Facultad de Humanidades y Ciencias.

Major Threats to Wetlands and Waterfowl

The major threats to wetlands and their wildlife in Uruguay are as follows:

a) The drainage of marshes; this has increased in recent years because of the growing interest in converting wetlands into agricultural and pasture land, and particularly in transforming wetlands into areas with controlled flooding suitable for rice-growing.
b) The use of pesticides in rice-growing areas.
c) The killing of waterfowl thought to be responsible for crop damage.
d) Illegal hunting and the slaughter of wildlife by ill-educated individuals.
e) The excessive and highly selective capture of wildlife, including species with very small populations, for both national and foreign zoological collections.

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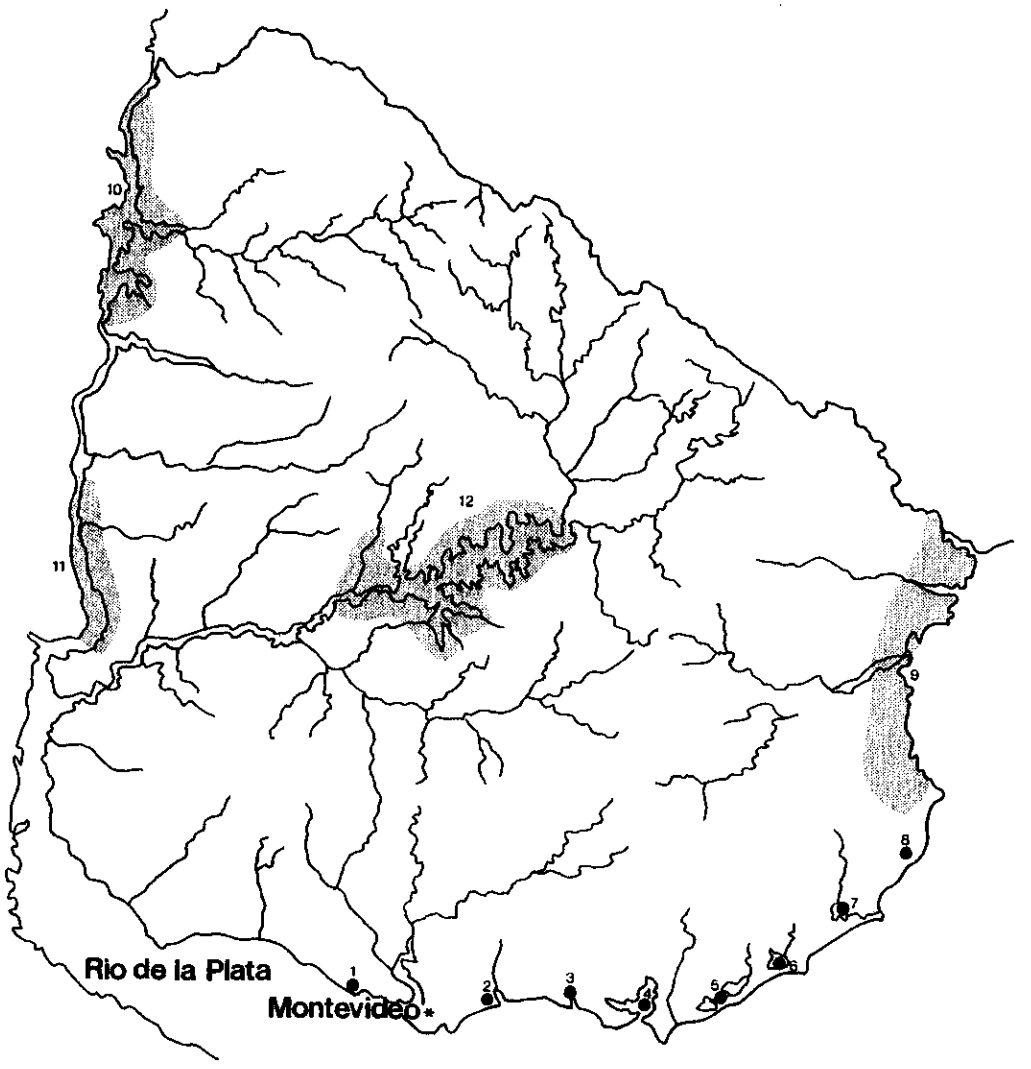

WETLANDS

Site descriptions based on data sheets prepared by Raul Vaz-Ferreira, Eduin Palerm, Mario D. Huertas, Francisco D. Rilla and Federico Achaval. These authors wish to thank the following for their assistance: Andres Palerm, Enrique Gomez-Haedo, Alfredo Gepp, Daniel Panario, the Instituto Nacional para la Preservacion del Medio Ambiente, and the Direccion de Contralor Legal del Ministerio de Agricultura y Pesca.

Arazati Marshes and Rio Santa Lucia (1)

Location: 34°41'S, 56°43'W; 60 km WNW of Montevideo, San Jose Department.
Area: 90,000 ha.
Altitude: 0-20m.
Province and type: 8.32.11; 02, 05, 07, 09, 11 & 13.
Site description: The estuarine coast of the Rio de la Plata, with saline and freshwater ponds and marshes, sandy beaches and coastal sand dunes; the estuary of the Rio Santa Lucia; and riverine marshes along the lower Rio Santa Lucia.
Principal vegetation: An abundant growth of submergent, floating and emergent aquatic vegetation, with extensive *Scirpus* marshes; sand dune vegetation and plantations of *Pinus* and *Eucalyptus* along the coast.
Land tenure: The coast and Santa Lucia River are state owned (fiscal); the remainder is privately owned.
Protection: None.
Land use: Traditional fishing and sport fishing, hunting, recreation and forestry; cattle ranching, agriculture and some settlements and industry in nearby areas.
Waterfowl: A wide variety of breeding, passage and wintering waterfowl have been recorded, including many Ardeidae, Anatidae and shorebirds.
Other fauna: The area is especially rich in wetland associated passerines including the two reedhaunters *Limnornis curvirostris* and *Limnoctites rectirostris*. The mammals, which are well documented, include *Hydrochoerus, hydrochaeris, Lutreolina crassicaudata* and *Ctenomys torquatus*.
Threats: Pollution, excessive disturbance from recreation and hunting, burning of marsh vegetation, and expansion of forestry activities are all causing problems.
Research and conservation: Inventories of the fauna have been conducted by the Facultad de Humanidades y Ciencias.
Source: Eduin Palerm and Mario D. Huertas.
Criteria for inclusion: 2b & 3a.

Pando and Tropa Vieja Marshes, and adjacent coastal zone (2)

Location: 34°46'S, 55°53'W; 20 km northeast of Montevideo, Canelones Department.
Area: 4,400 ha.
Altitude: 0-4m.
Province and type: 8.32.11; 02, 05, 07, 09, 11, 12 & 13.
Site description: A complex of slow-flowing rivers and riverine marshes; permanent and seasonal freshwater lakes and marshes; and estuarine system of the Arroyo Pando and Arroyo Tropa Vieja, with tidal salt marshes, sandy beaches and coastal sand dunes. There are wide fluctuations in water levels according to local rainfall, and most of the marshes dry out in summer, but the Laguna del Cisne is over 5m deep and permanent.
Principal vegetation: The most abundant aquatic plants are species of *Ludwigia, Canna, Lemna, Pistia, Paspalum, Salvinia* and *Eichhornia*, and the dominant emergents *Eryngium* sp, *Panicum prionitis, Cortaderia selloana, Typha* sp, *Scirpus californicus, S. giganteus, Zizaniopsis* sp and *Juncus* spp. There are thickets with species of *Salix, Baccharis, Acacia* and *Erythrina* in the marshes and along the rivers, and plantations of *Pinus* spp and *Acacia longifolia* in the south.
Land tenure: Mainly privately owned, in small parcels; the coast is state owned.

Protection: None.
Land use: Traditional, sport and commercial fishing; hunting; forestry; beach development for recreation; and extraction of sand and subsequent creation of artificial lagoons.
Waterfowl: A wide variety of breeding, passage and wintering waterfowl occur, including *Podiceps major* (up to 50), *Cygnus melancoryphus* (up to 70), several species of Nearctic shorebirds, and large numbers of gulls and terns Laridae.
Other fauna: The Coypu *Myocastor coypus* occurs, and a wide variety of amphibians have been recorded.
Threats: A general increase in land use, particularly hunting, recreation and forest clearance, continues to destroy the natural habitat. A fire recently destroyed a large part of the woodland and plantations in the south of the area.
Research and conservation: A number of faunal and floral surveys have been conducted by the Department of Vertebrate Zoology at the Facultad de Humanidades y Ciencias.
Source: Mario D. Huertas.
Criteria for inclusion: 2b & 3a.

Marshes of the Arroyo Solis Grande (3)

Location: 34°46'S, 55°26'W; 70 km east of Montevideo, Canelones Department.
Area: 4,500 ha.
Altitude: 0-20m.
Province and type: 8.32.11; 02, 05, 07, 09 & 11.
Site description: A slow-flowing meandering river with associated freshwater marshes, brackish to saline estuarine marshes, tidal salt marshes, coastal sand dunes and sandy beaches. The riverine marshes are partly seasonal, and are much reduced in extent by the end of the dry season.
Principal vegetation: The marsh vegetation includes *Paspalum quadrifarium, Panicum prionitis, Cortaderia selloana* and species of *Scirpus, Zizaniopsis, Juncus, Typha, Eryngium, Eichhornia, Salvinia and Pistia.* Shrubs include *Erythrina cristagalli* and species of *Salix and Acacia*, and there are plantations of *Pinus and Eucalyptus* spp.
Land tenure: Mainly privately owned, in small parcels; the coast is state owned.
Protection: None.
Land use: Traditional, sport and commercial fishing; hunting; recreation; beach development; and forestry. Cattle ranching and agriculture in neighbouring areas.
Waterfowl: A wide variety of breeding, passage and wintering species have been recorded, including many Anatidae, Nearctic shorebirds and Laridae.
Other fauna: The Coypu *Myocastor coypus* occurs and there is a rich amphibian fauna in the area.
Threats: A general increase in land use, particularly drainage for development and illegal hunting, is resulting in the progressive degradation of the area.
Research and conservation: Faunal surveys have been conducted.
Source: Mario D. Huertas and Francisco D. Rilla.
Criteria for inclusion: 2b & 3a.

Arroyo Maldonado and Laguna del Sauce (4)

Location: 34°50'S, 55°04'W; 11 km northwest of Punta del Este, Maldonado Department.
Area: 18,000 ha.
Altitude: 0-2m.
Province and type: 8.32.11; 01, 03, 05, 09, 11 & 12.
Site description: A sea bay with sandy beaches, coastal sand dunes, and two small offshore islands (Islas de Lobos); a slow-flowing river (Arroyo Maldonado) with oxbow lakes and riverine marshes; and the nearby Laguna del Sauce, a permanent shallow freshwater lake (up to 2.1m deep) with surrounding marshes.

Principal vegetation: Typical coastal vegetation including *Spartina ciliata, Panicumracemosum, Androtrychum trygium, Dodonaea viscosa* and *Hydrocotyle* sp. The lake has abundant floating vegetation and marshes of *Scirpus* sp.
Land tenure: A mixture of state and private ownership.
Protection: None.
Land use: Sport hunting and fishing; water sports on Laguna del Sauce; general tourism and recreation; and urban sprawl from Punta del Este and Barra de Maldonado. Plantations of *Pinus* and *Eucalyptus* spp have been established to fix the sand dunes. The seals on Islas de Lobos are periodically exploited for their skins.
Waterfowl: Particularly important for migratory shorebirds and Laridae. Several Nearctic shorebirds are common, including *Pluvialis dominica, Tringa spp, Calidris fuscicollis* and *C. melanotos*. At certain times of the year, large numbers of gulls *Larus* spp and other sea-birds congregate around the seal colonies on the offshore islands.
Other fauna: There are colonies of the sea-lion *Otaria flavescens* and fur seal *Arctocephalus australis* on Islas de Lobos. Other mammals include *Myocastor coypus, Scapteromys tumidus, Holochilus brasiliensis* and *Ctenomys pearsoni*.
Threats: The marsh vegetation is being destroyed by the reclamation of land for development; and domestic animals are being introduced into the area.
Research and conservation: Basic faunal inventories have been conducted.
Source: Francisco D. Rilla.
Criteria for inclusion: 3a.

Laguna Jose Ignacio and Laguna Garzon (5)

Location: 34°49'S, 54°38'W; 25 & 30 km east of San Carlos, Maldonado Department.
Area: Laguna Jose Ignacio 1,800 ha; Laguna Garzon 1,300 ha.
Altitude: 0-5m.
Province and type: 8.32.11; 07.
Site description: Two shallow brackish coastal lagoons and associated marshes separated from the sea by a sand barrier, and periodically connected with the sea. Water levels are subject to wide fluctuations.
Principal vegetation: The aquatic vegetation includes abundant *Eichhornia* sp and *Scirpus* sp. The adjacent coastal sand dunes have been planted with *Pinus pinaster* and *Eucalyptus* spp.
Land tenure: A mixture of state and private ownership.
Protection: None.
Land use: Fishing, hunting, recreation and extraction of sand.
Waterfowl: A wide variety of breeding, passage and wintering species have been recorded, particularly Ardeidae, Threskiornithidae, shorebirds and Laridae. The commoner species include *Phimosus infuscatus* (up to 250), *Plegadis chihi* (up to 1,000), *Calidris fuscicollis and Larus maculipennis*. Up to 200 *Calidris canutus* have been observed at Laguna Jose Ignacio.
Other fauna: Mammals include *Myocastor coypus, Scapteromys tumidus, Holochilus brasiliensis*, and *Ctenomys pearsoni*; and there is a rich reptile and amphibian fauna.
Threats: Tourist development, forest clearance and forest fires are destroying the surrounding areas. Wind-blown sand is gradually filling in the lakes and the aquatic vegetation is spreading and reducing the open water areas.
Research and conservation: Basic faunal and floral surveys have been conducted.
Source: Francisco D. Rilla.
Criteria for inclusion: 2b & 3a.

Laguna de Rocha (6)

Location: 34°40'S, 54°17'W; 17 km west of La Paloma, Rocha Department.
Area: 9,000 ha.
Altitude: 0-5m.
Province and type: 8.32.11; 12, 16 & 19.

Site description: A large shallow coastal lagoon, up to 3m deep, separated from the sea by a sand barrier, with surrounding areas of acidic marshes, peat bogs and seasonally flooded grassland and palm savanna. The water levels fluctuate considerably, and large areas of marsh dry out in summer.
Principal vegetation: Marshes with species of *Scirpus, Typha,* and *Juncus, Paspalum quadrifarium, Panicum prionitis, Cortaderia selloana* and *Eichhornia* spp, and other floating aquatics; palm savannas with the palm *Butia capitata* and *Erythrina cristagalli*; thickets of*Salix* and *Acacia*; and plantations of *Pinus* and *Eucalyptus.*
Land tenure: A mixture of state (fiscal) and private ownership.
Protection: None.
Land use: Sport hunting and commercial hunting of coypus, capybara, caiman and rheas; fishing; forestry; rice-growing; and tourist recreation.
Waterfowl: A wide variety of species including *Podiceps major, Ajaia ajaja, Cygnus melancoryphus* (up to 500) and several Nearctic shorebirds, notably *Calidris fuscicollis.*
Other fauna: Mammals include *Myocastor coypus, Hydrochoerus hydrochaeris, Scapteromys tumidus, Holochilus magnus, H. brasiliensis* and *Ctenomys pearsoni.* The caiman *Caiman latirostris* occurs, but is very scarce.
Threats: There is a considerable problem with pesticide run-off from neighbouring rice-fields; and some mammals and birds are being over-exploited.
Research and conservation: Basic faunal and floral surveys have been conducted, but the area has excellent potential for wildlife research, and the establishment of a reserve with appropriate facilities should be encouraged. There is an urgent need for a management plan to permit rational utilization of the wildlife resources of the area.
Source: Francisco D. Rilla.
Criteria for inclusion: 2a, 2b & 3a.

Laguna de Castillos and Arroyo Valizas (7)

Location: 34°20'S, 53°55'W; 12 km southwest of Castillos, Rocha Department.
Area: 10,000 ha.
Altitude: 0-5m.
Province and type: 8.32.11; 09, 12, 13 & 16.
Site description: A permanent shallow brackish lake, up to 5m deep, and marshes, with extensive areas of seasonally flooded grassland and palm savanna. Water levels fluctuate considerably, and large parts of the marshes dry out in summer. At high water levels, the lake overflows into the sea through the Arroyo Valizas.
Principal vegetation: Marshes with abundant *Eichhornia, Pistia, Scirpus* and *Typha*; seasonally flooded grassland and savannas with *Butia capitata* and *Erythrina cristagalli*; sand dune vegetation nearby.
Land tenure: A mixture of state and private ownership.
Protection: A National Park and Reserve of 8,000 ha were established at Laguna de Castillos in 1966, but these include only the open waters of the lake, and not the surrounding marshes. Some of the marshes and the coastal dunes to the southeast are included within the Costa Atlantica National Monument (14,250 ha) established in 1942. The entire area is part of a large Ramsar site designated in May 1984.
Land use: Sport fishing; hunting, particularly for Coypu and Capybara; and forestry.
Waterfowl: A wide variety of waterfowl occur, including up to 100 *Chauna torquata* and 80 *Cygnus melancoryphus.*
Other fauna: Mammals include *Lutra platensis, Myocastor coypus, Hydrochoerus hydrochaeris, Lutreolina crassicaudata, Ctenomys pearsoni* and *Holochilus brasiliensis.*
Threats: There is excessive hunting and fishing, and the nearby woods are being destroyed by fires and indiscriminate felling.
Research and conservation: The National Park and Reserve should be extended to include the surrounding marshes, and the regulations better enforced.
Source: Francisco D. Rilla.
Criteria for inclusion: 2a & 3a.

Laguna Negra and Santa Teresa Marshes (8)

Location: 34°00'S, 53°40'W; 20 km northeast of Castillos, Rocha Department.
Area: 21,500 ha.
Altitude: 0-5m.
Province and type: 8.32.11; 07, 13, 16 & 19.
Site description: A large permanent coastal lagoon, up to 7m deep, with extensive freshwater marshes, peat bogs, and large areas of seasonally flooded grassland and palm savanna. There is very poor drainage in the area and a high accumulation of organic material. At high water levels, Laguna Negra overflows into the Santa Teresa marshes via the Arroyo Los Indios. These marshes then drain into Laguna Merin via the Arroyo San Miguel. There is occasionally some icing in winter.
Principal vegetation: Marshes with species of *Scirpus*, *Typha* and *Eichhornia*; seasonally flooded grassland and savanna with *Butia capitata*, *Erythrina cristagalli* and *Acacia* sp.
Land tenure: A mixture of state (fiscal) and private ownership.
Protection: The nearby Santa Teresa National Park (3,228 ha), established in 1927, includes a strip of coastal scrub, sand dunes and Atlantic coast to the east of Laguna Negra. The lake and all the associated marshes are included in a large Ramsar site designated in May 1984.
Land use: Some hunting and fishing; rice-growing in nearby areas; and tourism and recreation in the Santa Teresa National Park.
Waterfowl: An important area for breeding, passage and wintering waterfowl of a wide range of species. The commoner species include *Egretta thula*, *Plegadis chihi*, *Chauna torquata*, *Anas versicolor*, *Fulica leucoptera*, *Vanellus chilensis* and *Larus maculipennis*.
Other fauna: Mammals include *Lutra platensis*, *Myocastor coypus*, *Hydrochoerus hydrochaeris*, *Scapteromys tumidus*, *Holochilus magnus*, *H. brasiliensis* and *Ozotoceros bezoarticus*.
Threats: Drainage of the wetlands and reclamation of land for agriculture pose the most serious threats. Other problems include excessive hunting and fishing, burning, and disturbance from tourist recreation.
Research and conservation: Now that this wetland has been designated under the Ramsar Convention, reserves should be created and a management plan developed for the area.
Source: Francisco D. Rilla.
Criteria for inclusion: 2a, 2b & 3a.

Laguna Merin and San Miguel Marshes (9)

Location: 32°40'-33°50'S, 53°10'-53°45'W; 70 km east of Treinta y Tres, Rocha and Treinta y Tres Departments.
Area: 350,000 ha.
Altitude: 0-20m.
Province and type: 8.32.11; 07, 09, 13, 16, 17 & 19.
Site description: Laguna Merin is a coastal lagoon, up to 10m deep and 330,000 ha in extent, spanning the Uruguayan/Brazilian border. Approximately 100,000 ha of the lagoon lie in Uruguay. The lagoon margins are mainly hard sand and mud, with little emergent vegetation, but there are very extensive freshwater marshes, shallow freshwater lagoons and impoundments, peat bogs, and areas of seasonally flooded grassland and palm savanna to the west and south. Numerous canals have been dug to facilitate the drainage of the marshes, and large areas are under rice cultivation. The main rivers flowing through the marshes into Laguna Merin are the Tacuari, Olimar and San Luis. Soils are generally peaty with high acidity.
Principal vegetation: Marshes with *Eichhornia*, *Pistia*, *Scirpus californicus*, *S. giganteus*, *Typha* and *Zizaniopsis bonaerensis*; seasonally flooded grassland and savanna with *Butia capitata* and *Erythrina cristagalli*.
Land tenure: A mixture of state (fiscal) and private ownership. 30% of the Biosphere Reserve is state owned.
Protection: No adequate legal protection. 200,000 ha are included within the Bañados del Este Biosphere Reserve established in 1976. The entire area, along with Laguna de Castillos, Laguna Negra and the Santa Teresa Marshes, was designated as a Ramsar site in May 1984.
Land use: Rice-growing in many areas; hunting; utilization of water for irrigation; and some tourist recreation.

Waterfowl: An extremely important area for breeding, passage and wintering waterfowl. A brief survey of a small part of the marshes in October 1983 revealed 53 species of waterfowl including 550 *Egretta thula*, 35 *Euxenura maguari*, at least 25,000 *Plegadis chihi*, 250 *Chauna torquata*, 14 species of Anatidae, three species of *Fulica*, over 300 *Himantopus himantopus*, and very large numbers of *Larus maculipennis*. A concentration of 240 *Heteronetta atricapilla* was particularly noteworthy.
Other fauna: Mammals include *Lutra platensis, Myocastor coypus, Hydrochoerus hydrochaeris, Ctenomys pearsoni* and *Holochilus brasiliensis*.
Threats: The wetlands continue to be drained for cattle ranching, although there is an increasing tendency in the area towards rice-growing and pesticides are being used. Excessive commercial hunting of fur-bearers has resulted in a drastic decline in numbers of the important species, and the industry is dying out. Disturbance from tourist recreation is causing problems in some areas.
Research and conservation: Undoubtedly the most important wetland area for waterfowl and aquatic furbearers in Uruguay. It is to be hoped that with Ramsar designation, steps will be taken to create appropriate reserves and develop an overall wetland conservation strategy for the region.
References: IUCN (1982).
Source: Francisco D. Rilla.
Criteria for inclusion: 123.

Salto Grande Dam (10)

Location: 30°51'S, 57°50'W; on the Rio Uruguay, 14 km north of Salto, Salto and Artigas Departments.
Area: 78,000 ha.
Altitude: 35m.
Province and type: 8.32.11; 09, 11, 15 & 16.
Site description: A large dam on the Rio Uruguay, 120 km long and up to 35.5m deep; completely filled by 1979. The water level fluctuates by up to 6m, exposing large areas of mud at low water, and flooding extensive areas of grassland at high water. There are riverine marshes along the Rio Uruguay as it enters the dam, and marshes in shallow bays.
Principal vegetation: Some floating aquatic vegetation, *Scirpus* marshes, and seasonally flooded grassland. There is still some native forest and scrub in the area, with the endemic *Bambusa tacurusu*.
Land tenure: Most of the land is owned by the Comision Tecnico Mixta de Salto Grande; the remainder is under a mixture of private and municipal ownership.
Protection: No habitat protection. Hunting has been prohibited, but control is inefficient.
Land use: Fishing and pisciculture; hunting of Coypu and Capybara; forestry; cattle and sheep grazing; and cultivation, particularly of sugar cane.
Waterfowl: For a dam, unusually rich in waterfowl, with large numbers of *Podiceps major, Phalacrocorax olivaceus, Anhinga anhinga*, several species of Ardeidae, *Mycteria americana, Phimosus infuscatus, Plegadis chihi, Chauna torquata, Dendrocygna viduata* (tens of thousands), *Amazonetta brasiliensis, Aramides ypecaha, Fulica armillata, Jacana jacana, Vanellus chilensis, Himantopus himantopus* and *Larus maculipennis*. Eight species of Nearctic shorebirds have been recorded in small numbers.
Other fauna: Approximately 100 species of fishes have been recorded, some of the more important ecologically being the Characoidae, two species of Poecilidae, and one species of Jenynsidae. Species that are exploited commercially include *Salminus maxillosus, Hoplias malabaricus, Prochilodus platensis, Leporinus* spp, and various species of Doradidae. Twenty-two species of amphibians have been recorded, including *Leptodactylus ocellatus, L. chaquensis* and *Bufo paracnemis*; and seven aquatic reptiles, including *Caiman latirostris*. Mammals include *Lutra platensis, Pteronura brasiliensis, Hydrochoerus hydrochaeris, Myocastor coypus* and *Ozotoceros bezoarticus*.
Threats: The main threat to the area is run-off of pesticides used in rice-growing in nearby areas. Duck hunting is not excessive, but the Capybara and caiman are heavily persecuted. Forestry operations in the area are destroying the native forests and replacing them with plantations of exotic species.

Research and conservation: Detailed studies of the fauna of the dam were carried out by Vaz-Ferreira and Achaval between 1979 and 1982. A proposal for the establishment of a reserve was put forward some years ago, but no action has been taken to date.
References: Palerm (1977); Vaz-Ferreira *et al* (1980 & 1983).
Source: Raul Vaz-Ferreira and Federico Achaval.
Criteria for inclusion: 123.

Esteros de Farrapos and islands in the Rio Uruguay (11)

Location: 32°50'S, 58°05'W; on the Rio Uruguay between Fray Bentos and San Javier, Rio Negro Department.
Area: 35,000 ha.
Altitude: 5m.
Province and type: 8.32.11; 10, 11 & 16.
Site description: A complex of interconnecting river channels, islands, riverine marshes and oxbow lakes along a 55 km stretch of the Rio Uruguay, with adjacent areas of seasonally flooded grassland. The water level in the river fluctuates considerably according to rainfall, and about 30% of the marshes dry out in the dry season.
Principal vegetation: Marshes with *Scirpus* spp; seasonally flooded grassland; and dense riverine thickets, particularly on the islands, with a very diverse native flora.
Land tenure: Mainly state owned, with some private holdings.
Protection: None.
Land use: Wood-cutting and hunting; cattle ranching and agriculture in the surrounding land.
Waterfowl: A wide variety of species have been recorded, including significant numbers of *Plegadis chihi, Dendrocygna viduata, Aramus guarauna* and *Rynchops niger.*
Other fauna: Mammals include *Lutra platensis, Hydrochoerus hydrochaeris, Myocastor coypus* and *Holochilus magnus*; amphibians include *Leptodactylus ocellatus* and *L. mystacinus*; and reptiles include *Chrysemys dorbignyi.*
Threats: The riverine thickets are being destroyed for fuel; there is a considerable amount of illegal hunting of furbearers and waterfowl; and overgrazing is causing a problem. Much of the area is being considered for conversion into rice fields and other agricultural land.
Research and conservation: The area is primarily important for its very rich and diverse riverine flora which comprises an ecosystem now found almost nowhere else in Uruguay. The area is still relatively inaccessible, and as most of the land is state owned, the establishment of a reserve should not prove difficult. Only preliminary studies have been conducted, and further research is called for.
Source: Mario D. Huertas.
Criteria for inclusion: 2a, 2b & 3a.

Rincon del Bonete Dam and the Rio Negro Marshes (12)

Location: 32°40'S, 56°00'W; 65 km north of Durazno, Departments of Tacuarembo and Durazno.
Area: 150,000 ha.
Altitude: 100m.
Province and type: 8.32.11; 09, 11, 15 & 16.
Site description: A very large dam on the Rio Negro, with numerous small rivers and streams entering along its very indented shoreline; riverine marshes along the Rio Negro; and large areas of seasonally flooded grassland. The water level fluctuates according to control at the dam, and wide expanses of mud are exposed at low water.
Principal vegetation: Relatively little aquatic vegetation in the dam itself, but extensive areas of riverine marsh with *Scirpus* sp, wet grassland, and native woodland.
Land tenure: The dam is state owned; the marshes and surrounding land are privately owned.
Protection: None.
Land use: The dam is used to produce hydroelectricity; also hunting, fishing, ranching and agriculture, and a little forestry.

Waterfowl: Poorly known, but clearly important for *Phalacrocorax olivaceus*.
Other fauna: No information.
Threats: Excessive hunting, disturbance from fishing, and replacement of native woodlands with plantations of exotic species.
Research and conservation: The area is poorly known and requires further study.
Source: Raul Vaz-Ferreira and Mario D. Huertas.
Criteria for inclusion: 0.