

Information Sheet on Ramsar Wetlands

Official translation by Charles Akin.

1. **Date this sheet was completed/updated:** February 1998
2. **Country:** Colombia
3. **Name of wetland:** Sistema Delta Estuarino del Río Magdalena, Ciénega Grande de Santa Marta
4. **Geographical coordinates:**

10	20'	-	11	05'	North latitude
74	06'	-	74	52'	West longitude
5. **Altitude:** 0-20 metres above sea level
6. **Area:** approximately 400,000 hectares
7. **Overview:**

This area includes more than 20 lakes with different levels of sedimentation and salinity of which the Ciénega Grande is the largest (45,000 hectares). These mangrove ecosystems are the most important and largest on the Caribbean coast of Colombia. The fisheries are of great economic importance. Furthermore, the mangroves are the habitat for species of resident and migratory birds, mammals, reptiles, molluscs and fish.

8. **Wetland type:**

F, I, L, M, Tp, Xf

9. **Ramsar criteria:**

1a, 2b, 2c, 3b, 4a, 4b

10. **Map of site included? Please tick yes -or- no**

11. **Name and address of the compiler of this form:**

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12. **Justification of the criteria selected under point 9, on previous page:**

Criterion of unique or representative wetland - Sistema Delta Estuarino del Río Magdalena, Ciénega Grande de Santa Marta is the most important estuarine wetland in Colombia because of its area, forming the largest coastal lagoon in Colombia, and because of its role in Colombia's economy. The fisheries resources and agricultural activities on which the local communities depend give it socioeconomic importance.

General criterion based on plants and animals - In addition to its importance for resident and migratory birds and the importance of its fisheries resources, as documented by Correa (1984) and Naranjo (1986), the Ciénaga Grande de Santa Marta is an important area for reptiles such as the brown caiman (*Caiman crocodilus fuscus*), American crocodile (*Crocodylus acutus*), common iguana (*Iguana iguana*) and mammals such as monkeys (*Alouatta seniculus* and *Cebus* spp.), chiguiro (*Hydrochaeris hydrochaeris*) and the American manatee (*Trichechus manatus*). This diversity of species is the result of different types of vegetation such as mangroves, flooded forest, tropical deciduous forest and herbaceous and aquatic vegetation, which provide habitat, cover and food for these species.

Specific criteria base on aquatic birds - This region is the most important area on the Colombian Caribbean coast for aquatic birds with large concentrations of resident and migratory shore birds from the Neo-Arctic (Botero 1982). According to Simon (1981), it is also especially important for the Anatidae that winter in this area, because this area is of special importance in the migration dynamics of many species from North America that use this region during the northern winter as an intermediate base for their flights south and is a breeding site for many birds from northern Colombia with shorter migration cycles.

Criterion based on fish - Because of its special conditions, the Sistema Delta Estuarino Río Magdalena, Ciénaga Grande de Santa Marta plays an important role in the production of fisheries resources in Colombia, especially because it is an area for breeding and raising of the fry of commercially important fish and because it is an area of transit for reproductive migrations of fish. It is also an area rich in macro invertebrates such as molluscs, shrimp and crabs.

13. General location:

The Sistema Delta Estuarino del Río Magdalena, Ciénaga Grande de Santa Marta is located in the department of Magdalena in northern Colombia. It is bordered on the north by the Caribbean and to the west by the Magdalena River. Towards the west, the plain overlaps the lateral floodplain of the Magdalena River. Towards the southeast, the estuarine plain overlaps the colluvial fans of the Aracataca, Fundación and Tucurín rivers. To the east, there is a clear boundary between the estuarine plain and the high alluvial terrace known as the banana zone (Proyecto Prociénaga 1995).

Parts of nine municipalities are covered by this area: Aracataca, Cerro de San Antonio, Ciénaga, El Piñón, Pivijay, Pueblo Viejo, Remolino, Salamina and Sitio Nuevo.

14. Physical features:

Climate - According to Botero (1982), average annual rainfall in this area is 1400 mm, distributed seasonally. There is a very wet period from the middle of August until November with

heavy rainfall in October, a long dry season from December to April, a short rainy season in May and June and a short dry season from July to mid August. Average annual temperature is 28 C with little change during the year. Winds from the northwest blow during the dry season from mid-December until March or the beginning of April. Relative humidity varies from 70 per cent during the dry season to 80 per cent during the wet season.

Hydrology - According to Botero (1982), the two sources of fresh water in this region are the Magdalena River from the south and rivers flowing from the Sierra Nevada (Aracataca, Frío, Fundación, Sevilla and Tucurínca) in the east. The Magdalena River is 1358 kilometres long and its basin covers more than 20 per cent of the total area of Colombia, including highly populated areas and important agricultural areas. This system is connected to the fresh water swamps and mangrove lagoons through a series of seasonal channels. Salt water flows into the swamp primarily because of the action of the tides and is replaced by a continuous discharge of fresh water during the wettest months (Antoine et al. 1972).

During the rainy season, fresh water flows in from all sources. The Magdalena River overflows onto the flood plains and into the mangrove lagoons. Water level rises, and salinity is reduced to zero. Water flows to the Ciénaga Grande and eventually to the sea. At the beginning of the dry season, the water level of the Magdalena decreases and flooding ceases. Water lost through evapotranspiration is replaced by sea water that flows into the Ciénaga Grande, and the cycle is repeated once the rains begin again and fresh water enters the system (Wiedemann 1973).

Nonetheless, as a result of the construction of the highway between Ciénaga and Barranquilla from 1956 and 1960, the water conditions of this system have changed drastically, causing a reduction in the exchange of water between the swamps and the sea and in the inflow of fresh water into the system. This is because of the obstruction of the channels and the currents that allow exchange between the sea and the complex of swamps in the external delta of the Magdalena River. Another reduction in the inflow of fresh water is caused by the obstruction of the river-swamp connections and swamp-swamp for the control of flooding, drainage of the swamps in order to avoid salinization of soils for agriculture. Furthermore, pollutants enter this ecosystem from the Magdalena River, especially through the connections of this river with other currents and channels (Aguas Negras, Clarín, Renegado and Torno) that enter the swamps. All these sources of pollution have degraded water quality in the system.

Geomorphology - There are three processes among the probable causes for the formation of the Ciénaga Grande de Santa Marta: 1) rapid growth of the lagoon's delta, 2) compaction of Quaternary sediments and 3) a recent increase in sea level (Wiedemann 1973).

The main geomorphological units in this region according to Simon (1981) are the following:

Delta of the main branch of the Magdalena River - About 5 kilometres before its mouth, the depth of the Magdalena doubles from 5 to 10 metres.

Marine sedimentary platform - In the eastern part of the region, there is a marine sedimentary platform with an average width of 13 kilometres and a gradual slope that increases to about 35 metres in depth as it nears the outer edge. The materials on the platform are basically grey sand, mud deposits and mixtures of mud and sand. Other formations in this area are a low platform subject to tectonic influences and a coastal plain.

Lagoon system of the Ciénaga Grande de Santa Marta - The main units are the subbasin on the eastern flank, formations of alluvial piedmont plain (the edges of the basin), recent low alluvial plain and intermediary alluvial plain.

Soil - Information on the soil characteristics in the region was taken from Proyecto Prociénaga (1995).

Soils on the coastal plain - In general, the soils of this region are poorly drained, sandy in texture with clear evidence of gleyzation. They occupy a flat, slightly depressional relief and in general are lightly alkaline with high concentrations of salts, low organic carbon content and a high presence of usable phosphorous. They have low fertility.

The following associations are found:

Association Bocas de Ceniza (RWB) - Accumulations of quartz sand in longitudinal dunes with heights of more than 5 metres and hilly relief with slopes of 7-12 per cent.

Association Salamanca (RWC) - Because of its flat and concave topography, water remains on the surface during most of the year, especially during high tides. This association is formed by layers with high concentrations of heavy sand.

Quality, depth and permanence of water - The Caribbean has a series of large-diameter pools and currents, created by the meeting of the Equatorial current and the Caribbean countercurrent. The tidal pattern is mixed and of slight magnitude (an average of 35 centimetres with extremes of 60 centimetres). The wave pattern is tied to the Northeast trade winds, with waves of about 4.5 centimetres (Simon 1981). Towards the east, the height of the waves decreases, because of the shallow depth and the protection against winds provided by the Santa Marta range.

The sea has a permanent connection with the Ciénaga Grande de Santa Marta through the Boca de la Barra and seasonally through a series of swamps located on the coastal plain of the Island of Salamanca. In addition, there probably is seepage of salt water through the coastal plain.

The mechanical action of the wind on the water surface plays a greater role in the movement of water in the Ciénaga Grande

than in the swamps in the alluvial part because of the greater effect of the surface. In the interior of the Ciénaga Grande, there are differences in water level because of the action of the northern winds, which changes the difference in elevation among the lagoons and the flow among them.

Even though there are only slight changes in the tide and its area of direct influence is limited to the northeastern part of the Ciénaga Grande, the northern winds play an important role in exchanges among the bodies of water. The joint action of wind and tide can strengthen or weaken the exchange, depending on the conditions.

There has been a dramatic change in the water in the outer delta of the Magdalena River because of the reduction in the capacity for exchange between the swamps and the sea and in the contribution of fresh water to the system. These two factors, together with high rates of evapotranspiration in the area, have led to the salinization of several lagoons and the soils of several sectors in the delta, the intrusion of the salt wedge towards the interior of the agricultural soils and the formation of salt residue in the mangrove areas during the dry period.

The quality of the water, under present conditions of flow and taking into account the activities carried out in the development of the tributary basins, is affected by two important external sources of organic and microbial pollution for the lagoon system. The first comes the inflow of fresh water from the Magdalena River, which affects primarily several sectors of the floodplain and the area influenced by the rivers on the western catchment basin of the Sierra Nevada which feeds primarily the Ciénaga Grande.

Within the system of lagoons, the sources of organic and microbial pollution are the local populations settled on the edges of the Ciénaga Grande, the stilt communities of the Ciénaga and El Pajalar and the human settlements on the edges of the channels and smaller swamps. The lack of health infrastructure in all of this area leads to the use of the water and nature for disposal of solid and liquid waste from domestic sources.

Other sources of contamination are crop spraying in the banana area and the waste water from the African palm processing plants into the streams that empty into the Ciénaga Grande.

15. Hydrological values:

The Ciénaga Grande de Santa Marta has a high degree of variation and complexity in environmental conditions and strong interaction with the marine, limnetic and land systems. These conditions, especially variations in salinity, determine the presence of species and the structure of the natural communities in this environment, because of the physiological adaptations and the behaviour necessary to survive in an environment under physical and chemical conditions and in the availability of habitat (Prociénaga 1995).

This system helps to prevent erosion and to control flooding from the Magdalena River and rivers flowing from the Sierra Nevada de Santa Marta. Furthermore, it serves to charge and relieve the aquifers, while serving for water storage. The mangroves also help to stabilise the coastline by acting as a barrier against storms and maintaining bottom sediments in place with its roots, acting as a regulator of water.

16. **Ecological features:**

The main types of habitat in this ecosystem are groups of interconnected fresh water lakes and estuaries. These aquatic environments are characterized by several types of vegetation such as seasonally flooded forests along the edges of the rivers and freshwater channels. There are also mangroves, deciduous forests and herbaceous vegetation.

17. **Noteworthy flora:**

Among the flora present in these ecosystems and of great importance are communities of four species of mangrove: *Avicennia germinans*, *Conocarpus erectas*, *Laguncularia racemosa* and *Rhizophora mangle*. The *A. germinans* forms almost homogeneous forests in higher areas and especially around the swamps where salinity is higher. *C. erectas* grows only in the mouths of the rivers from the Sierra Nevada and is the least abundant. *L. racemosa* is also found along the edges of the forest and in areas of intermediate salinity (20-30 per cent). *R. mangle* is found primarily along the edges of bodies of water and on the edges of the mouths of the rivers from the Sierra Nevada (Prociénaga 1995).

The presence of these species is determined by environmental factors such as salinity gradient, exposition to tides and subsoil characteristics, making them vulnerable to changes in the these parameters.

Other important plant formations present are dense alluvial forest, seasonally flooded with species such as *campano* (*Samanea saman*), *pivijay* (*Ficus pallida*), *copey* (*Ficus magdalenica*), *olla de mono* (*Lecythis minor*); dense deciduous forest affected by drought and of low elevation with species such as *guayacán de bola* (*Bulnesia arborea*), *carreto* (*Aspidosperma polyneuron*), *palma de vino* (*Scheelea magdalenica*), *quebracho* (*Astronium graveolens*), *volador* (*Gyrocarpus americanus*), *hobo* (*Spondias mombin*). There are also tall and woody herbaceous Gramineae on wet or flooded soil most of the year with species such as *enea* (*Typha domingensis*), *Cyperus giganteus*, *Cyperus neptunia prostrata*, *Juncus* spp., *Eleocharis* spp., *Setaria vulpise* and *bijao* or *lengüevaca* (*Thalia geniculata*).

18. **Noteworthy fauna:**

Alvarez y Blanco (1985) recorded 114 species of fish in the Ciénaga Grande. Forty per cent are grouped as marine-estuarine, 36 per cent are freshwater fish, 20 per cent are found in the estuary and only 4 per cent of the species are marine.

The basic ichthyofauna in the swamp is formed by migratory euryhaline species or permanent residents. Only 11 species are true residents that spend their complete life cycle within the system. This includes *chivo cabezon* (*Ariopsis bonillai*), *chivo mapalé* (*Cathorops spixi*) and *robalito* (*Centropomus ensiferus*) (Santos and Acero 1992). These species, together with species that reproduce in the sea such as *lisa* (*Mugil incilis*), *anchoveta* (*Mugil curema*) and *mojarra rayada* (*Eugerres plumieri*), form the basis of the ichthyofauna in the swamp. Because of the euryhaline nature of the resident species, the basic qualitative structure of the swamp's ichthyofauna has not been modified significantly in the past few years.

As for the terrestrial fauna, the external delta of this system, according to Simon (1981), forms an important territory in the dynamics of migration of several populations of birds from North America that use the region during the winter as an intermediate base for their flights to the south and as a reproduction site for many birds in northern Colombia with shorter migration cycles.

Sánchez (1988), based on studies by other authors, reported 195 species of birds on the Isla de Salamanca, and Botero and Botero (1989) described 175 species of birds in the Santuario Ciénaga Grande de Santa Marta. Some of the important species of aquatic birds (Anatidae) in this area reported by Botero (1982) are:

Resident neotropical: black-bellied whistling-duck (*Dendrocygna autumnalis*), Fulvous tree-duck (*D. bicolor*), white-faced tree-duck (*D. viduata*), malibú (*Anas bahamensis*), *Oxyura dominica*, *Netta erythrophthalma*, Muscovy duck (*Cairina moschata*) and comb duck (*Sarkidiornis melanotus*)

Migratory species: *barrquete* (*Anas discors*), duck (*Anas americana*), northern shoveler (*Anas clypeata*) and *Aythya affinis*

There are also two endemic species: the sapphire-bellied hummingbird (*Lepidopyga lilliae*) and the *tordo* (*Molothrus armenta*).

This region is also rich in reptiles such as the common iguana (*Iguana iguana*), common caiman (*Caiman crocodilus*), neotropical rattlesnake (*Crotalus durissus*), boa constrictor (*Boa constrictor*) and river turtle (*Podocnemis scripta*). As for the mammals, in this area and in the Santuario de Flora y Fauna de la Ciénaga Grande de Santa Marta, species have been reported such as the white-tailed deer (*Odocoileus virginianus*), *Hydrochaeris hydrochaeris*, monkeys such as the red howler (*Alouatta seniculus*) and *Cebus* spp. According to Naranjo (1986), the American crocodile (*Crocodylus acutus*) and the manatee (*Trichechus manatus*) are found.

19. Social and cultural values:

This area is of socioeconomic importance because of the fisheries resources represented by the production of fish of commercial importance, as well as oysters, shrimp and crabs. In addition, it is an area for livestock and aquaculture activities and for the extraction of wood from the mangrove. This area is also important for ecotourism.

20. Land tenure/ownership of:

There is both government and private land in this area. Approximately 23,000 hectares are in the Santuario Ciénaga Grande de Santa Marta and 21,000 hectares are in the Parque Nacional Isla de Salamanca. Furthermore, there are ranchers and farmers with private properties of an average of 20 hectares and banana and African palm producers.

In the surrounding area, there are also ranchers and farmers with private properties.

21. Current land use:

Land use in the reserve is primarily for agriculture and livestock, and there is extensive cultivation of African palm and bananas. There are also important fishing activities and of the 3,600 inhabitants of settlements on stilts, 44 per cent are directly occupied by fishing.

In the surrounding area and in the basin, land is also used for agriculture and ranching.

22. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land use and development projects:

According to Proyecto Prociénaga (1995), as a result of the construction of the Barranquilla-Santa Marta highway between 1956 and 1960, the possibility for exchange between the lagoons and the sea was limited to the sector of Boca de la Barra. At the same time, the flow of fresh water from the Magdalena River was gradually reduced as a result of the filling-in and blocking of channels between the river and the swamp and among swamps. The filling in of the system of channels was the result of the increase of sediment load in the Magdalena River, generated by deforestation and the dumping of materials throughout the basin. The blocking-off of the channels in the western part was an attempt to control flooding, dry up the smaller swamps and avoid salinization of farm land. Environmental degradation of the basins of the rivers flowing from the Sierra Nevada and the use of water for the irrigation district in the banana region have led to an increase in the sediment load and the reduction of the contribution of fresh water to the lagoons.

These factors have led to hypersalinity in the subsoil of the mangrove and the aquatic systems, causing the death of the mangrove and the reduction of its natural capacity for regeneration. Furthermore, this has led to a loss of reproductive habitat, cover and food for the terrestrial fauna

and the reduction of migratory birds (Proyecto Prociénaga 1995).

As for the fish, the reduction of several species has been caused not only by the death of the mangrove but also by inappropriate fishing activities in the region and general disruption in the coastal area.

There are conflicts and competition between persons who use the same resources such as land and fish and those who use other resources, but whose activity affects the activity of others (livestock and users of the streams, fishermen with the industrial farmers who pollute the system).

In the surrounding area the conflicts mentioned above also occur.

23. Conservation measures taken:

One part of the Ciénaga Grande de Santa Marta has been protected by the Isla de Salamanca National Park since 1964, over an area of 21,000 hectares and another by the Santuario de Flora y Fauna Ciénaga Grande de Santa Marta since 1977, with an area of 23,000 hectares. These areas are administered by the Administrative Unit of the Sistema Nacional de Parques Nacionales of the Ministerio del Medio Ambiente. In addition, in 1978 the Ciénaga Grande de Santa Marta and the El Pajalal system of lagoons was declared a reserve for the use of marine species for extraction by small-scale fishermen.

24. Conservation measures proposed but not yet implemented:

Since June 1992, several governmental agencies have participated in a rehabilitation project for the Ciénaga Grande de Santa Marta (PRO-CIENAGA) under a bilateral agreement between Colombia and Germany. Part of this project is the preparation of an environmental management plan for this area with guidelines for environmental administration of the ecosystem, with an emphasis on water resources. Furthermore, in July 1997 the Ministerio del Medio Ambiente prepared a management plan for the Ciénaga Grande as a Ramsar site. A proposal was also prepared by the Corporación Autónoma Regional del Magdalena (Corpamag) in order that this area be declared a biosphere reserve.

25. Current scientific research and facilities:

Three meteorological stations have been installed by the Proyecto Prociénaga in Condazo, Nueva Venecia and Tasajera. In addition, there is a station for monitoring birds in Punta Blanca, and a project is being prepared for a population survey of *pato yuyo* (*Phalacrocorax brasiliensis*).

The Ministerio del Medio Ambiente and the International Tropical Timber Organization are preparing a project for the conservation and management of the multiple use and development of mangroves in Colombia. During the first phase of this study (1995-1996), the structure and specific composition of the mangrove was studied, identifying stress on

the ecosystem and the relations of the local community to it. During the second phase (1997-1998), growth and recovery plots were created: two in Ciénaga, one in Sitio Nuevo and one in Pueblo Viejo to study botanical and phenological characteristics and natural regeneration. In addition, the project is working with the communities in the drafting of a pilot production plot that will serve as an alternative use of the mangrove for the local inhabitants. A project was also begun for recovery of the mangrove in the Parque Nacional Isla de Salamanca with the planting of seedlings.

A fisheries survey is being carried out for the production of species and monitoring of the water.

26. Current conservation education:

As part of the fisheries project, a campaign of environmental education is being carried out in the area with the objective of defining measures for the rational management of fisheries resources. In the Parque Nacional Isla de Salamanca, there is a visitors centre, laboratory, museum and conference room. Every week there are visits by school children for ecological hikes along the trails in the park. In the Santuario de Flora y Fauna Ciénega Grande de Santa Marta, there are two houses for visitors where explanations are given, pamphlets are distributed and there are occasional field visits.

27. Current recreation and tourism:

In the Ciénega Grande de Santa Marta, there are tourist activities, especially in the Parque Nacional Isla de Salamanca where 8,800 visitors, were registered in 1997, and in the Santuario de Flora y Fauna Ciénega Grande, where there were 100 visitors in 1997. Hotels near the reserve also take tourists to Punta Blanca and Nueva Venecia to observe birds.

28. Jurisdiction:

Part of this wetland belongs to the government, and part is private. The administration of the wetland is carried out by several agencies recognized by the Ministerio del Medio Ambiente including the Corporación Autónoma Regional del Magdalena (Corpamag) and the Unidad Administrativa Especial del Sistema de Parques Nacionales Naturales under the aegis of the Ministerio del Medio Ambiente.

29. Management authority:

Corporación Autónoma Regional del Magdalena
Ministerio del Medio Ambiente
Calle 38 # 8-40
Dirección Técnica de Ecosistemas, piso 2

30. Bibliographical references: