Information Sheet on Ramsar Wetlands

1. **Date this sheet was completed/updated**: 7 May 1999

2. **Country**: Honduras

3. **Name of wetland**: Sistema Humedales ….. Zona Sur de Honduras
4. **Geographical coordinates**:

5. **Altitude**: Sea level with low elevations in Bahía de Chismuyo and Bahía de San Lorenzo

6. **Area**: 69,711 hectares (Bahía de Chismuyo 31,616, Bahía de San Lorenzo 15,262, Los Delgaditos 1,816, Las Iguanas 4,169, El Jicarito 6,897, San Bernardo 9,458 and La Berbería 494)

7. **Overview**: Several species of mangrove form the dominant vegetation. These sites are marine coastal ecosystems influenced by the tides, formed by several winter lagoons that are important habitat for both migratory and resident birds. They are also breeding areas for several species of marine turtles, molluscs, crustaceans and fish. In addition, they are important for local inhabitants, who use the mangrove trees for construction and firewood and carry out small-scale fishing and farming activities there.

8. **Wetland type**: A, E, F, G, H, I, J, K, 1, 2, 5, 8, 9

9. **Ramsar criteria**: 1a, 1b, 1c, 2a, 2b, 2c, 2d, 3a, 3b, 3c, 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**:

All criteria except 1d are fulfilled.

13. **General location**:

All of the areas are on the Gulf of Fonseca along the 162 kilometres of Pacific coast in Honduras between the borders with El Salvador and Nicaragua.

14. **Physical features**:

Geology - The parts of the site that border the swamps have hydromorphic soils, while there are alluvial clay vertisols on the plains. The soils in the lagoons were silted in with sediments as a result of Hurricane Mitch, which has left a pattern of destruction. Bahía de Chismuyo, Bahía de San Lorenzo, Los Delgaditos, Las Iguanas and Punta Condega, El Jicarito, San Bernardo and La Berbería receive recent marine and continental sediments including piedmont deposits, gravel and sand terraces, flood plains and flooding covering the rock at on the alluvial plains of the valleys of the Coluteca and Nacaome rivers and part of the Río Goascorán.

The gravels are sub-angular and sub-rounded stones of rhyolite and andesite with feldspar. Sediments deposited by these rivers have formed a series of deltas along the northern edge of the Gulf of Fonseca. The delta of the Río Choluteca and the deposits in the estuaries of the river form the thickest layer of sand, gravels, silt and clays found in the southern region. These deposits are found on volcanic ash and in the breaches. Their thickness varies from 18 metres near the town of Marcovia up to 244 metres on the coast. The main deposit of sand and gravel is found in a vast area between the communities of Monjarás and Marcovia where they are up to 58 metres thick. There are also deposits from the Río Nacaome in the area south of the community of El Tular and deposits from the Río Goascorán in the area of Sonora and near the community of El Olanchano.

Hydrology - Four major rivers empty into the Gulf: Río Choluteca, Río Nacaome, Río Goascorán and Río Negro. Río Choluteca is the longest river on the Pacific coast of Central America. Its basin is estimated to cover 7,580 square kilometres, and its annual volume is 3 million cubic metres. The Río Nacaome has a basin of 2,577 square kilometres and an annual volume of 2 million cubic metres. The Río Goascorán marks the border between Honduras and El Salvador and has a basin of 1500 square kilometres in Honduras and 581 square kilometres in El Salvador, with an annual volume of 1.6 million cubic metres. The Río Negro, whose basin is shared between Honduras and Nicaragua, releases 1.5 million cubic metres of water per year.

Climate - The National Meteorological Service has only two stations in the study area: one in Amapala and the other in Choluteca. In Amapala, average annual precipitation is 1884 mm with an average of 118 days of precipitation a year recorded from May to November with a maximum monthly average of 494.85 mm in October and no rainfall in February. Cloud cover is directly proportional to rainfall: in September 5.9 octas, although with Hurricane Mitch at the end of 1997, the highest average of cloud cover was in October with 6 octas. The month of least cloud cover is April with 1.1 octas.

Average relative humidity is 68 per cent, with an average maximum of 75 per cent and an average minimum of 61 per cent.

It is greatest in October with 88 per cent, and the lowest values are in February and March of 50 per cent. Average annual wind velocity is 6.9 knots with a maximum of 10.6 knots and a minimum of 4.6 knots. Average monthly temperature is 29 C, with a average maximum of 30.6 C and average minimum of 27.9 C. The hottest month is April with an average of 38.6 C.

In Choluteca, an average of 124 days of rainfall per year have been recorded. During Hurricane Mitch, 250 mm of precipitation fell in 24 hours. Average annual cloud cover is 4.2 octas. June is the cloudiest month with 7.2 octas and the month of least cloud cover is March with 1.1 octas. Average annual relative humidity is 66 per cent with an absolute maximum of 99 per cent and absolute minimum of 23 per cent.

The sun shines for an annual average of 2,854 hours, being brightest in March with 288.1 hours and least bright in September with only 191.1 hours. Wind velocity is an annual average of 5.9 knots, with highest velocity between December and April. Annual average temperature is 29 C and the coldest month is September with an average of 25.5 C.

Soils - In Bahía de Chismuyo, there are swamps and wetlands in approximately 92 per cent of the area. There is no drainage and land use is scrub or pasture land, but the area can be used for recreation and as a habitat for birds. About 5 per cent of the soils are fine textured and poorly drained alluvial soils with relatively good soil that is apt for permanent vegetation of pastures or trees, but which can be cultivated occasionally to renew or establish grazing areas. The remaining 2 per cent are characterized by good drainage in a hilly area with slopes of less than 25 per cent and of limited suitability for agriculture, pastures or scrub because of their steep slope and their susceptibility to erosion. They are shallow and require preparation for cultivation or to establish pasture or trees.

In Los Delgaditos, approximately 90 per cent of the area is swamp and wetland. The rest is alluvial, fine textured and poorly drained soils. All of the land in Las Iguanas and Punta Condega is composed of swamps and wetlands. In El Jicarito, there are swamps and wetlands over approximately 93 per cent of the surface. There are fine-textured and poorly drained alluvial soils on 5 per cent and the remaining 2 per cent are soils in the valleys with different degrees of drainage, slopes less than 5 per cent and the highest capacity for farming because the land is very good for intensive cultivation of many crops without danger of erosion. In San Bernardo, all of the area is swamp and wetland, similar to the case in La Berbería.

Tides - The tides generate oscillating currents with periods different from those at the mouth of the estuary because of the intersection of the waves with the bottom. Because of the irregular sea floor, these interactions are never the same in different places. This gives rise to differences in maximum

velocities of flow and ebb. The spacial distribution of the horizontal and vertical currents creates tidal circulation.

This type of circulation is especially strong in the shallow estuaries with a range of tides greater than one meter. This is the case in the Gulf of Fonseca, where they exert a primary force. The currents have very similar magnitudes during the flow and ebb, but vary slightly in direction, as a result of differences in friction on the walls of the channels.

This means that the tides are the main force moving water in the Gulf, which is a shallow estuary and the deepest pools are found inside a line at the mouth up to 17 kilometres inside the estuary. The shallowest area is around the wetlands, mouths and beaches and it is in this water that are found the highest concentrations of pollution, where waste of the populations living on the shores is trapped.

At the beginning of the high tides, there is an accumulation of water for one to two hours in the Bahía de Chorotega, which flows along the Cedeño coast and then empties into the Pacific Ocean, passing near the Tigre and Meanguera islands. This is why there is no trace of sedimentation outside this line on the coast.

In the farthest and most sheltered part of the Gulf, the Estero Real slowly drains the water and holds pollutants for the longest period of time. Bahía de San Lorenzo has a constant flow of water disolving oxygen and renewing nutrients. Bahía de Chismuyo, like that of Bahía de San Lorenzo, has structural topography at its entrance that accelerates the flow of the tides, creating local sources of oxygenation of the water.

Gravitational circulation is created by differences in density and elevation between the fresh water coming from the rivers and the salt water. The less-dense river water has a tendency to remain on the surface of the estuary. Nonetheless, the combined effect of tides and the wind mixes the column of water, creating a vertical exchange between the fresh and salt waters. This process of mixing explains the existence of horizontal and vertical gradients of salinity and density.

In the Gulf of Fonseca, differences in density probably play a minor role in circulation in the estuary, because runoff and the flow of fresh water is insignificant and does not reach 1 per cent of the flow produced by the tide once every twelve hours. Nonetheless, because of the severity of the dry season, it could produce a negative effect on the estuary. This is because of the effect of high evaporation. The density of the surface water could be greater than that of the ocean, leading to a phenomenon of sinking at the mouth of the Gulf.

Tidal ranges - Like on the rest of the Central American Pacific Coast, the semidiurnal tides are important and reach an average of 2.6 to 2.8 metres in height with extremes of 3.2 metres. The Spring tide has the largest range in the year and

is the result of the combination of the gravitational attraction between the moon, the sun and the earth.

15. **Hydrological values**:

Underground water on the Pacific coastal plain is found in terraces composed of sand and gravel of many graduations that widely covers the rock along the alluvial plains of the valleys of the Choluteca and Nacaome rivers and part of the Río Goascorán. These are the most important aquifers in the area.

In the delta of the Río Choluteca, flow can be as much as 1,200 cubic metres per day, producing flows in wells up to 90 litres per second in the areas of Marcovia and Monjarás. There are aquifers with thicknesses between 10 and 40 metres. The limit between fresh water and salt water within the alluvial aquifer is marked by the presence of underground water of high electrical conductivity.

The delta of the Río Nacaome is smaller and consists of granular deposits whose size decreases as it moves away from the mountains. Flows range between 360 and 1300 cubic metres per day. The penetration of the saline wedge in this aquifer limits extraction to two million cubic metres per year, the equivalent of 63 litres per second of continuous flow.

The delta of the Río Goascorán is the smallest of the three with a flow of about 350 cubic metres per day although the aquifer covers only six square kilometres. Flow can reach one million cubic metres per year (31.5 litres per second) distributed in all of the area.

The municipio de Choluteca has about 11 wells that supply 8,000 cubic metres per day, providing 80 per cent of the water consumed in that city. In Cedeño only one well supplies 400 cubic metres per day meeting all of the demand, while in Marcovia two wells supply the same amount and meet the demand. In San Lorenzo, seven wells supply 2,700 cubic metres per day and provide 90 per cent of the demand.

16. **Ecological features**:

There are sandy beaches, winter lakes, mangroves, areas of sea grasses and estuaries among other ecosystems of great importance, which are habitat for migratory and resident species of birds. They are also important breeding areas for coastal and marine fish. They are very important for the food chains and maintenance of local populations.

The dominant vegetation is mangroves and pastures.

17. **Noteworthy flora**:

Avicennia bicolor, A. germinans, Conocarpus erectus, Cyperus papirus, Eichornia crassipes, Laguncularia racemosa, Nimphaea spp., Parkinsonia aculeata, Rhizophora mangle, Typha dominguensis

18. **Noteworthy fauna**:

Ajaia ajaja, Amazona auropalliata, Anadara perlabiata, A. similis, A. tuberculosa, Aratinga holochlora, Cairinia moschata, Centropomus nigrescens, Ctenosauria similis, Egretta caerulea, E. thula, Euthymus lineatus, Fregata magnificens, Grandiarca grandis, Iguana iguana, Jacan spinosa, Lepidochelys olivaceae,
Mycteria americana, Pelecanus albus, Pennaeus californiensis, P. stylirostris, P. vannamei, Scomberomorus concolor, Tigrisoma mexicana, Tringa solitaria

19. **Social and cultural values**:

There is small-scale fishing, the growing of fruit and grains, live-stock raising, shrimp farms, salt-extraction ponds and archaeological remnants.

Symbols: Al (Alianza), Ch (Choluteca), G (Goascoran), Ma (Marcovia), N (Nacaome), Sl (San Lorenzo)

20. **Land tenure/ownership of**:

0 Economic activities in the coastal municipios of the southern area that include the proposed Ramsar sites Product

Production						
	Al	G	N	Sl	Ch	Ma
Shrimp 14,200 hectares	X	X	X	X	X	X
Salt 161,000 tons		X		X	X	X
Fish 500 tons		X	X	X	X	X
Melon/watermelon 11,000 hectares			X	X	X	X
Marañón 1,385 hectares				X	X	X
Maize 8,605 hectares						
Ajonjolí 1,284 hectares	X	X	X	X	X	X
Sugar cane 16,000 hectares		X	X	X	X	X

Land tenure in the coastal municipios of the Gulf of Fonseca is 71 per cent private land, 12.4 per cent public land, 9.2 per cent leased land and miscellaneous 2 per cent. The most wide-spread activities are live-stock raising, farming, shrimping, salt extraction and other small-scale activities. Because of the rapid growth of live-stock raising and agroindustrial activities, some local inhabitants of meagre resources have colonized the hillsides and coasts.

There are other forms of land tenure created by the combination of ownership, public and rented land. Although limited to small areas, it is important to include them because they have an influence on land management in the area.

21. **Current land use**:

At the site, there are still large areas of mangrove broken up by many shrimp ponds and salt extraction areas. In the surrounding area, there are plantations of watermelon, sugar cane, maize, sorghum, sesame and extensive live-stock raising.

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

At the site: heavy fishing, the illegal extraction of wood from the mangrove for trade, salt ponds, ponds for the ranching of shrimp, the construction of roads, sediments, and modifications to the areas of hatching.

In the surrounding area: inadequate use of pesticides, poor disposal of waste, accelerated erosion and extension of the farming frontier.

23. **Conservation measures taken**:

Governmental and private agencies have made efforts to promote conservation by providing organization and technical assistance to small-scale fishermen through the Dirección General de Pesca, requiring environmental certificates for development projects, monitoring water quality in the Gulf of Fonseca, forming a tripartite commission (El Salvador, Honduras and Nicaragua) to implement conservation activities and creating the regional project PROGOLFO. NGOs have participated in the monitoring of resources in the gulf, for example the Committee for the Defensa y Desarrollo de la Flora y Fauna del Golfo de Fonseca (CODDEFFAGOLF).

24. **Conservation measures proposed but not yet implemented**:

The Secretaría de Recursos Naturales y Ambiente (SERNA) has carried out studies aimed at declaring these wetlands as protected areas with well-defined limits and their biological and socioeconomic classification. Furthermore, SERNA has worked with the private sector and governmental agencies to cooperate in protecting the ecosystems in the Gulf.

25. **Current scientific research and facilities**:

A laboratory has been created to analyse water quality in the Gulf. The regional project PROGOLFO carried out studies on the use of natural resources, and another project is studying the laying of eggs by the marine turtle *Lepidochelys olivacea*. Other research is focused on the activities of shrimp ranching and small-scale fishing.

26. **Current conservation education**:

Several private and governmental organisations support conservation activities in southern Honduras and have implemented programmes for protection, conservation and environmental education. Among these organisations are PROGOLFO, DIGEPESCA, PROARCA/CAPAS, IUCN, PROMANGLE, CODDEFFAGOLF, SERNA, ANDAH, environmental committees of children and several municipalities that have organised municipal environmental units.

27. **Current recreation and tourism**:

The most important tourist and recreational activities in these areas are resorts, sport fishing, hunting, aquatic sports and bird watching. Hotels and beach houses have been constructed in the most important communities. Most of the tourists using these sites are Hondurans, with the Easter period being the most important period.

28. **Jurisdiction**:

The proposed wetlands are found in the municipios of Alianza, Goascorán, Nacaome and San Lorenzo in the department of Valle and in the municipios of Choluteca, Marcovia and Namasigue in the department of Choluteca. According to the characteristics of these wetlands and current legislation, the institutions responsible for the management of operations are the Administración Forestal del Estado, Corporación Hondureña de Desarrollo Forestal (AFE/COHDEFOR) and DIGEPESCA. Regulations are set by SERNA as the agency responsible for the Sistema Nacional de Areas Protegidas de Honduras (SINAPH).

29. **Management authority**:

Administración Forestal del Estado
Corporación Hondureña de Desarrollo Forestal (AFE/COHDEFOR)
Col. El Carrizal No. 1
Tegucigalpa
Honduras

30. **Bibliographical references**:

Secretaría de Recursos Naturales y Ambiente. Propuesta de Declaratoria de Corredor Biológico Mesoamericano "Pacífico de Honduras", 1999.