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Information Sheet on Ramsar Wetlands

1. Date this sheet was completed/updated: January 2001

2. Country: Cuba

3. Name of wetland: Ciénaga de Zapata

4. Geographical coordinates:

22° 01' 12" – 22° 40' 17" North latitude
80° 35' 17" – 82° 09' 30" East longitude

5. Altitude: 0 to 10 metres above sea level

6. Area: 452,000 hectares

7. Overview: Located in southern Matanzas province, Ciénaga de Zapata is one of the largest and best preserved wetlands in the Caribbean Islands, with the largest area of swamps and tidal pools in Cuba and large areas of forest. All the area has been declared a multi-use protected area by Cuban legislation (Executive Committee of the Council of Ministers, January 1995) and as a Biosphere Reserve (UNESCO January 2000). Its core is five strictly protected areas, including a national park. It is recognized as a phytogeographic area because of its unique flora. Among the fauna are a diversity of species of birds, primarily migratory species, and local endemic species, which have a limited distribution within the area. There are 19 communities with a total population of 9390 persons in the wetland. The main economic activity is forestry, tourism and fishing.

8. Wetland type:

Marine/coastal: A, B, C, D, E, F, G, H, I, J
Continental: L, M, N, O, P, Q, R, Sp, Ss, Tp, Ts, U, W, Xf, Xp, Y, Zk(b)
Man-made: 1, 2, 3, 4, 7, 9

9. Ramsar criteria: 1, 2, 3, 4, 5, 6, 7, 8

Criteria that best characterize the site: 1

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:

Ciénaga de Zapata is the largest and most complete karstic drainage system in Cuba, the Cuenca de Zapata. Several hydrological phenomena in this wetland have led to the existence of unique ecosystems, such as the vegetative association of the Ciénaga spring (criterion 2), described for only this wetland and a system of surface drainage characterized by the existence of several rivers, lagoons, swamps, channels and artificial canals of medium to small flow with an important hydrological function. Ecologically, this area has very special characteristics with a large diversity of habitats and variable climatic conditions, exerting a strong influence in all of the southern part of Matanzas province, the south-western part of Cienfuegos province and the south-eastern part of Havana province (criteria 1, 3 and 7). The natural resources of this large insular wetland are of vital importance for the livelihood of the local inhabitants and for those in the surrounding area. The main natural resource is the forest. Forest exploitation (extraction of wood and production of charcoal) is the main source of income because almost all the local inhabitants are involved in this activity. The forests give wood used for building and for tourist installations. The forests are also used for tourism. Although the water is inapt for human consumption in all of this area, there are communities that depend heavily on this resource at the local level. Ciénaga de Zapata also constitutes a source of food for local communities and for nearby towns and cities. There is a small fishing port in the area that supplies the needs of southern Matanzas province (criterion 7).

Culturally, Ciénaga de Zapata has its own identity, playing an important role for the conservation of key elements in Cuban and Caribbean culture, such as important archaeological sites from pre-agro-pottery (gathering) indigenous communities and the customs, lifestyles and traditions of the current inhabitants in the use of natural

resources. The large diversity of these ecosystems, the status of conservation, the dimensions and natural attributes make this wetland a unique example in the biogeographic region in which it is found—Neotropical, Cuba, Udvardy province, 1975 MDF (IUCN, 1982). In descriptions of regional differences for Cuba: vegetation (del Risco and Vandama, 1989), fauna (de la Cruz, 1989) and physical-geographic (Mateo and Acevedo, 1989), Ciénaga de Zapata has been considered a separate unit considerably different from the other units represented in the country and is considered unique in nature (criteria 1 and 3). Other Cuban wetlands, such as the delta of the Rio Cauto and the Ciénaga de Lanier, have some similar characteristics but only in the most general terms. However, the complexity of the landscape and geology of Ciénaga de Zapata (a wetland developed on karst), the presence here of local endemism of great importance for the conservation of genetic resources of Cuban and Caribbean biota in general (characteristic species) as well as its dimensions, degree of conservation and ecological and socio-economic functions make it the outstanding wetland in the country (criterion 1).

Its flora is represented by about 1000 species with 13 per cent endemism (criteria 3 and 7) gathered in 16 vegetative associations. However, its importance for the conservation of genetic and ecological diversity is greater because of the large areas of natural vegetation in good conservation status and because of the heavy forest cover of special importance for the island Caribbean. The fauna is characterized by a diversity of birds, primarily resident or migratory waterfowl and by the extent of the important local and national endemic species. Endangered species such as the *gallinuela de San Tomás* (*Cyanolimnas cerverai*), the Cuban tree boa (*Epicrates angulifer*), the American manatee (*Trichechus manatus*) and the *jutía enana* (*Mesocapromys nanus*), as well as others considered endangered or vulnerable, such as the Cuban crocodile (*Crocodylus rhombifer*), the American crocodile (*Crocodylus acutus*), the *ferminia* (*Ferminia cerverai*), the Cuban sandhill crane (*Grus canadensis nesiotes*) and others with their only population or at least important populations in this wetland (criterion 2).

This region has been relatively little affected by man given the low degree of economic assimilation of its ecosystems (with the exception of the forest and forest products although not everywhere) and the presence of large areas of mangroves, flooded savannahs and grasslands. This characteristic makes this wetland an important refuge for conservation of biodiversity in Cuba and the Caribbean (criteria 1, 7 and 8). A large number of migratory birds (most of them aquatic) from North America spend the winter months here, forming dense and large communities. Occasionally, rare or atypical species to the Caribbean are reported, such as the *cisne blanco* (*Cygnus columbianus*). The coastal area and the offshore area of this wetland constitutes a refuge for juveniles and larval stages in addition to being a breeding area for species of high ecological and economic importance, such as the *cangrejo de tierra* (*Cardisoma guanhumi*), the *jaibas* of the genus *Callinectes*, the *cobo* (*Strombus gigas*), the American manatee (*Trichechus manatus manatus*), marine turtles (*Caretta caretta, Chelonia midas* and *Eretmochelys imbricata*), crocodiles (*Crocodylus acutus* and *C. rhombifer*) and fish of the genera *Calamus, Haemulon* and *Lutjanus* (ICGC, 1993) (criteria 2 and 4).

Furthermore, this wetland constitutes one of the sites of greatest taxonomic diversity of endemic species of Cuban fauna, because of three genera of local endemic birds: the *ferminia* (*Ferminia cerverai*), the *gallinuela de Santo Tomás* (*Cyanolimnas cerverai*) and the *cabrito de la ciénaga* (*Torreornis inexpectata*). The taxonomic diversity is also evident by the presence of an endemic local relict mammal, the *jutía enana* (*Mesocapromys nana*), and the Cuban crocodile (*C. rhombifer*), a local endemic, as well as several subspecies of local endemic vertebrates. This is the only site in Cuba where the eight genera of endemic birds are found and where 23 of the 26 species of endemic birds to Cuba have been recorded. In addition, there are more than four species of endemic local plants (criteria 2 and 7).

In the specific case of waterfowl, the resident and migratory species have a total population of more than 20,000 specimens. In the area of Las Salinas in the Ciénaga de Zapata national park are found the largest communities of migratory birds with a considerably high number of species whose in the following families: Charadridae, Escolopacidae, Laridae (Charadriformes), Anatidae (Anseriformes), Threskiornithidae, Ardeidae (Ciconiiformes), Phoenicopteridae (Phoenicopteriformres), Pelecanidae, Phalacrocoridae, Fregatidae (Pelicaniformes), Accipitridae, Pandionidae (Falconiformes) and Gruidae (Gruiformes). They are found in this area from the time they arrive from North America and spread out later throughout the marshes. Among the national residents, the pink flamingo (*Phoenicopterus ruber ruber*) stands out as the most abundant species, forming colonies of up to 3000 specimens only in the area of Las Salinas (Blanco, 1996) (criteria 4, 5, and 6). This is also the site that has been most studied for aquatic birds in Cuba, therefore, the quantitative data available on these species in Ciénaga de Zapata refer primarily to the populations or subpopulations in this area. In other parts of the wetland, breeding areas have been identified, including the large ecosystem of Ciénaga de Zapata the habitat for complete populations of several species of aquatic birds, particularly the *gallinuela de Santo Tomás*, whose population is restricted to the Ciénaga Occidental de Zapata (criteria 2 and 7). Although the data available are very limited, several Cuban ornithologists consider that in many cases the populations of aquatic birds in this wetland are more than 1 per cent of their total Cuban populations (Hirám González Alonso, personal communication) (criterion 6).

In contrast with the land vertebrates with many species, there are not many species of freshwater vertebrates in the region. Nonetheless, there are larger and more stable populations of one of the most outstanding endemic species in Cuba, the *manjuarí* (*Atractosteus tristoechus*) (Lepidosteidae), a key species in the ecologic relations of the Cuban wetlands where it is found, considered a living fossil threatened with extinction (criteria 2, 5, 6 and 7). There is a specialized centre in the region for reproduction of native ictiofauna with a successful programme of breeding of this species and other local river species such as the *Pomacea* sp. (Mollusca) and *Trachemis decussata* (Reptilia). Other species of river fish also endemic to Cuba found in the area are *Cichlasoma tetracantha*, *Cubanichthys cubensis*, *Gambusia punctata* and *G. punticulata* (Alayo, 1973). Because of its ecological importance and significance for the conservation of phreatic and underground ecosystems, the *peces ciegos* (indicator species) of which two are known for Ciénaga de Zapata: *Lucifuga dentate* and *L.* sp. *nova*, the latter recently discovered in the cenotes of the eastern part of the area, creating a strictly local

endemism still being described. Other non-autochthonous species have been introduced, basically with economic objectives (consumption) and sport fishing among which are the carp (*Cyprinus carpio*), trout (*Micropterus salmoides*) and tilapia (*Oreochromis aureus*).

Crustaceans are also very abundant, especially the *cangrejo de tierra* (*Cardisoma guanhumi*), which breeds in the coastal mangroves. This species migrates from inland to the coast, travelling almost 30 kilometres and passing through a large range of dissimilar habitats. This region is important because it is an area for the development of large populations of juvenile marine fish in light of the existence of large areas of coastal lagoons, mangroves and salt ponds, providing a considerable diversity of habitats (criteria 5 and 7). In addition, the existence of coral reef barriers over several tens of metres and emerging coral reefs along all of the coast of the Ciénaga Occidental de Zapata create a system of habitats where large communities of fish develop, including *celenterados* and other marine species (criterion 7). The provision of sediment, nutrients and other components of the emerged area of the marine part of the wetland create very heterogeneous environmental conditions along the coast. This influence is evident in the colour of the seawater during times of greatest supply, which turns dark. This influence can be seen several kilometres along the coast, especially in the Bahía de Cochinos. This water is also very important for the development of juvenile fish of many species and marine organisms that develop on the marine platform, in the mangroves and other coastal areas of this large wetland (criterion 8).

13. General location:

In the Republic of Cuba, province of Matanzas, municipios of Ciénaga de Zapata, Jagüey Grande, Unión de Reyes and Pedro Betancourt, this wetland occupies the entire extreme southern portion of Matanzas province. Its length is 175 kilometres from west to east, between Punta Gorda and Jagua, with a maximum width of 58 kilometres north to south between the town of Torriente and Cayo Miguel. The average width is 14 to 16 kilometres.

14. Physical features:

From the point of view of geology, this wetland is characterized by the presence of considerable thickness of peat and a structure of deep faults that have led to the existence of two well-defined blocks: the Ciénaga Occidental and the Ciénaga Oriental de Zapata. The first is a very subsided block where accretion coast dominates, while in the eastern block the coast is abrasive and higher.

The soils in Ciénaga de Zapata have an east-west spatial orientation in four strips: red ferrous (typical and hydrated) and yellow ferrous; peat, gleyzed peat and clay-peat; red and black rendzinas; and coastal marsh and mangrove solonchak.

River relief is almost non-existent throughout this area (ICGC, 1993). Only the Río Hatiguanico, only a few kilometres long, crosses the marsh and drains off the surface water to the Broa Cove.

Maximum elevation above sea level is 10 metres and the minimum is 0 to 2 metres. In the tidal area, the maximum depth is 2 metres and in the coastal area, between 1 and 600 metres, although in Bahía de Cochinos it is 1000 metres deep.

The climate is very marked by the local physical-geographical conditions. The temperature has the following characteristics:

> A low north–south gradient of annual average temperature with higher values towards the interior;
>
> A low north–south gradient of annual maximum temperature with the highest inland;
>
> A strong north-south gradient of distinct climate variables, from the central portion with extreme values of air temperature and heavy annual precipitation to the southern coastal area with a range of high temperature the year round.

The hottest period begins in May and ends in October, and the driest period (winter) is from November to April. Precipitation is markedly seasonal with a range between 1200 and 1300 mm during the rainy season and 250 to 300 mm during the dry season. Average annual precipitation is 1300 mm. The climate of the wetland is created by relative air humidity, which is 85 per cent, and the prevailing wind is from the east (ICGC, 1993). Average temperature of the hottest month is 30° C, and the average of the coldest month is 20° C.

15. Hydrological values:

The intense development of karst, both in the upper third of the basin (southern Colon karstic plain) as well as in the Ciénaga, has created the largest system of karst drainage in Cuba (the Sur de Matanzas basin or the Zapata basin), which occupies almost all the southern portion of the province of Matanzas and the extreme southwestern part of Cienfuegos (ICGC, 1993). This system has special structural characteristics, forming a complex of aquifers on several levels. The system discharges primarily into Ciénaga de Zapata and then into the sea through two outlets that concentrate a large part of the visible surface and underground runoff in the basin, Bahía de Cochinos and Broa Cove. The rest of the runoff drains underground directly from the basin into the sea. This runoff has not been measured even though its important contribution to the existence of many submarine springs, which are clearly visible in satellite photos is known (ICGC, 1993).

The surface drainage network of the Zapata basin is very dismembered by the action of the karstic processes and the creation of swamps, plus by the man-made processes of canals, regulation and drainage. One of the most important drainage canals is the sub basin of the Rio Hatiguanico, composed of the Hatiguanico, Negro and Guareiras rivers, which empty directly into the sea through Broa Cove. The existence of hydro-geological windows that form many springs, draining large volumes of water from the upper third of

the basin has formed these rivers. The spring of the Río Guareiras with a flow of more than 2 cubic metres/second and relatively low salinity (0.5 grams/litre of chlorine) during periods of drought is one of the most important.

16. Ecological features:

The platform surrounding the southern edge of Ciénaga de Zapata has developed through a complex process in which its geographical position, insular character, geological-geomorphologic evolution, composition of the substratum and hydrodynamic characteristics of the aquifer have given special traits to the ecosystems. One of the outstanding aspects of Ciénaga de Zapata is the existence of a series of submarine natural land formations, whose structural unity brings out a noticeable marked horizontal zonation. Other outstanding ecological characteristics are the ecological fragility, the sub-latitudinal character of special distribution of the landscape units and a relative homogeneity of distribution of territorial systems. It is also characterized by a very special flora with noticeable biogeographic individuality, because this area is recognized as a phitogeograpohic district. Endemism is not high (13 per cent) (del Risco et al., 1995).

There are 35 taxa with a restricted distribution in Cuba, which are in the Caribbean region, and 49 taxa with a pan-Cuban distribution that link it to the Antillean subregion. Most of the phytogeographic links are with Hispaniola, southern United States and the Bahamas. Of the more than 900 known species in the wetland, there are 110 botanical families, 15 of which are considered rare or endangered.

The scarcity of species of river fish also characterizes this wetland, although this is the case throughout the Cuban archipelago. On the other hand, one of the richest and most diverse communities of waterfowl in Cuba has been recorded here. The region's ecological characteristics have made this the only area in Cuba in which three species of Capromidae, the *jutía enana* (*Mysatheles nanus*), the *jutía carabalí* (*Mesocapromys prehzensilis*) and other Capromidae endemic to the Antilles, live here sympatrically.

17 and 18. Noteworthy flora and fauna:

Type of habitat: Swamp grassland

This habitat is characterized by the presence of herbaceous species, primarily *cortadera de dos filos* (*Cladium jamaisence*), *macío* (*Tipha dominguensis*), *junco de ciénaga* (*Eleocharis instertincta*), *junco fino* (*Eleocharis cellulose*) and *flechera* (*Sagitaria diversifolia*). Several species disappear during flooding and give way to others, such as *malangeta* (*Numphar luteum*) and *ova blanca* (*Ninphea rosea*). Elements of mangrove vegetation can be found scattered among the herbaceous vegetation. This is the habitat of four local endemic species of fauna: *jutía enana* (*Mesocapromys nanus*), *cabrerito de la ciénaga* (*Torreornis inexpectata inexpectata*), *ferminia* (*Ferminia cerverai*) and *gallinuela de Santo Tomás* (*Cyanolimnas cerverai*). There are other species such as the Cuban crocodile (*Crocodylus rhombifer*) and the *jicotea* (*Trachemys decussata*).

Type of habitat: Mangrove

This is a perenifoliate forest that has a single tree stratum in which the four species of mangrove that exist in Cuba are found: *mangle rojo* (*Rhizophora mangle*), *mangle prieto* (*Avicenia germinans*), *patabán* (*Laguncularia racemosa*) and *yana* (*Conocarpus erecta*). When they are on the coastline they are usually in a consecutive distribution inland in the order referred to previously. On the edges of rivers and canals, they can appear in a different order, sometimes forming wooded areas of a single species, which are called *yanales* or *patabanales*, depending on the dominant species. The species of wildlife most frequently found in this type of habitat are *jutía conga* (*Capromys pilorides*), *jutía carabalí* (*Mysateles prehensilis*), *gavilán batista* (*Butoegallus gundlachi*), *chillina* (*Teretristis fernandinae*), *canario de manglar* (*Dendroica petichia*) and the Cuban crocodile (*Crocodylus rhombipher*).

Type of habitat: Swamp forest

This is a forest of low tree stratum in which *júcaro* (*Bucida buceras*), *roble blanco* (*Tabebuia angustata*), *ocuje* (*Calophylum antillanun*), *vívona* (*Rauwolfia cubana*) and several palms, such as *palma cana* (*Saval parviflora*) and *guano prieto* (*Acoelorraphe wrighti*). There are many epiphytes such as *curujeyes* (*Tillandsia flexuosa, T. valenzuelana* and *T. uneoides*) and lianas (*Smilax filiformis, S. habanensis* and *S. laurifolia*). The most frequent herbaceous plants are *Sagitaria diversifolia* and *Typha dominguensis*, both present in the swamp grassland. Several species nest in this habitat: the Cuban amazon (*Amazona leucocephala*) and the Cuban parakeet (*Aratinga euops*). Other species of fauna are frequently found, including *majá de Santa María* (*Epicrates angulifer*), *jutías* (*Capromys pilorides* and *Mysateles prehensilis*), *paloma perdiz* (*Starnoenas cyanocephala*), *sijú platanero* (*Glaucidium siju*) and *zunzuncito* (*Mellisuga helenae*), which prefers the trees of this forest for nesting. In the swamp forests of Santo Tomás is found a local endemic subspecies of reptile, the *chipojo de Santo Tomás* (*Anolis lueteogularis calceus*).

Type of habitat: Semi-deciduous forest

More than half the species in the tree stratum are deciduous, and the most frequent are *soplillo* (*Lisiloma latisiligua*), *almácigo* (*Bursera simaruba*), *ceiba* (*Ceiba pentandra*), *palma real* (*Roistonea regia*), cedar (*Cedrela mejicana*), *baría* (*Cordia gerascanthus*) and *majagua* (*Hibiscus helatus*). Several species of orchids and *curujeyes* of the genus *Tillandsia* are found. In this type of habitat are found a large number of forest bird species that exist in Ciénaga de Zapata: *tocororo* (*Priotelus temnurus*), *cartacuba* (*Todus multicolor*), *zunzunes* (*Mellisuga helenae* and *Chlorostilbon ricordi*), Cuban amazon (*Amazona leucocephala*) and others.

19. Social and cultural values:

The region of Ciénaga de Zapata was discovered by Christopher Columbus on his second voyage to the West Indies. At that time, Indians from the late pre-agro-pottery culture were living here in a settlement near the present Bahía de Cochinos. Because

this area is far from maritime routes, it is geographically isolated and there are many hiding places among the small islands, this coastal area was ideal for pirates. Among the most famous pirates were Diego Pérez and Gilberto Girón, who used this area as a base for their operations during two distinct periods. After piracy was eliminated, this area was used in the nineteenth century for smuggling African slaves.

The ten-year war of independence during the twentieth century did not occur in Matanzas province with the violence that it did in eastern Cuba, but because of the closeness of Las Villas province where there are groups of *mambis*, given the geographical characteristics, this area played a relatively important role among the independence movements of the past century and the liberating army found secure refuges here to re-gather its strength and cure its wounds.

At the middle of the first decade of the twentieth century, the first and only railroads were constructed in the territory. This area entered into the history of America on 17 April 1961 with the defeat of 1500 mercenaries trained, armed and led by the government of the United States.

Ciénaga de Zapata is the municipio in Cuba with the largest area and the smallest population with about 9000 inhabitants, giving it a population density of 1.99 inhabitants per square kilometre of which 39.9 per cent live in urban areas and 60.04 per cent live in rural areas. This population is spread over 19 human settlements.

20. Land tenure/ownership of:

All of the land in the protected area is government property. In the surrounding area, 99.5 per cent of the land is government property and 0.5 per cent is private property. In theory, there are no programmes for distributing or selling land. Land has been loaned to farmers for local subsistence.

21. Current land use:

The basic economic activities of the communities are:

Forestry—production of wood and charcoal linked to the forestry company and in the case of charcoal a low percentage of small-scale production;

Fishing is regulated by the fishing company “René Ramos Latourt”;

Tourism has expanded recently, giving employment to a small part of the local population;

Handicrafts are also a relatively new activity that employs a small part of the indigenous population, mainly women, who use forest products to sew decorative objects;

Bee-keeping is considered one of the most important activities in the area;

In the protected areas that form the nucleus of the wetland, the following activities are carried out:

Forestry: Improvement of the forest through proper management. In this area, forestry activities are oriented towards promoting forest conservation, including elimination of exotic plants.

Tourism: There is basic tourist infrastructure in several parts of the Ciénaga de Zapata National Park for observing wildlife, boat trips, sport fishing, landscape enjoyment and hiking.

Scientific: Studies of the wild fauna and flora, socio-economic, historical and cultural studies are being carried out.

In the surrounding area, the following economic activities are carried out:

Forestry: In this area, there is an authorized forestry exploitation aimed at producing wood as timber, firewood, charcoal and wood for smoking tobacco. There is forestation. The large amount of land required for this activity causes impact and disturbances throughout the forest. The extraction of firewood from the area where wood is cut under the forestry plan guarantees the sustainable use of this resource, provided that rotation of cutting is respected.

Bee keeping: Given the richness of potential sources of nectar, this activity could be even more important. Artificial hives are exploited and rotated. Beekeeping does not caused negative impact.

Forestry: This activity is oriented to improving the forest through planting and treatment, creating employment for the local population and ensuring survival of the forest.

The main land uses and economic activities are:

Forestry: This is the area where the most intense exploitation of the forest takes place. There is forestation in order to create reserves for later exploitation.

Livestock raising: There is no intensive livestock raising in this area. This activity is limited to the area around several communities and is based on two animals: cattle and buffalos. This activity affects the environment because several imported animals, especially buffalos, cause damage to crops and the natural vegetation.

Agriculture: There are programmes for rice, citrus fruits and other crops. There are small private farmers and users. The most important impact is related to the use of chemical fertilizers.

Sport hunting: This is an activity in the rice fields, where resident and migratory birds are hunted. The impact of this activity is regulated through control of the number of specimens that can be hunted.

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

The natural resources of Ciénaga de Zapata are subject to constant socio-economic pressure, accentuated by recent economic conditions that have increased the pressure of local inhabitants and other factors on the ecosystem. There is increased cutting, illegal hunting and fishing in light of the obvious decrease in the capacity of the territory to protect basic areas. Economic recovery has begun, however, and the effects of implementation of the WWF-CIDA project for the conservation and sustainable development of Ciénaga de Zapata have begun to change this situation.

In general, a lack of most of the infrastructure needed for conservation, protection and environmental education constitutes a hindrance to full sustainable development of the region and represents a potential threat. Ciénaga de Zapata is one of the least-studied areas in Cuba because of the inaccessibility of much of the area.

The growth of tourism in the area is also a factor to be taken into consideration, unless correctly planned. Aspects of the natural areas such as ecotourism and environmental interpretation, which should have full environmental management programmes must be taken into account in order to permit the rational use of these areas without exhausting resources.

Other activities that can affect the ecological characteristics of the wetland are:

Extraction of resources (exploitation of the forest, extraction of peat, extraction of sand);
Road construction;
Destruction and modification of the habitat;
Erosion;
Hydrological changes;
Pollution;
Introduction of exotic species;
Forest fires;
Farming;
Production of charcoal.

23. Conservation measures taken:

Five protected areas forming a nucleus have been approved for protection of Ciénaga de Zapata. Ciénaga de Zapata National Park is the most important nucleus and four smaller areas play an important local role (Refugios de Fauna Bermejas, Los Sábalos, Arroyones and the Reserva Florística Manejada Jibarita). These areas cover 254,800 hectares of

land and 493,000 hectares of water. The whole swamp forms part of a special region for sustainable development and has been declared by UNESCO as a biosphere reserve.

Legal protection of the wetland's natural resources is based on the following regulations:

Agreement 235 of 1984 of the Comité Ejecutivo del Poder Popular of the province of Matanzas, approving the Refugio de Fauna Santo Tomás, which is included in the new area of the Ciénaga de Zapata National Park;

The Agreement of 17 February 1997 of the Consejo de la Administración Provincial, approving the provincial system of protected areas, which includes parts of the national park, other complementary nuclear areas and the Elemento Natural Destacado Sistema Espeleolacustre de Zapata located in this area;

Decree 197/96 of the Plan Turquino Manatí, declaring all Ciénaga de Zapata as a protected area for multiple use, providing the same legal protection for all the proposed site;

Agreement 235 of 1984 of the Comité Ejecutivo del Poder Popular of the province of Matanzas, approving the Refugio de Fauna Santo Tomás, which is included in the new proposal for the Ciénaga de Zapata National Park.

Agreement 3462/99 of the executive committee of the council of ministers, approving the participation of Cuba in the Ramsar Convention and Ciénaga de Zapata as the first site nominated by Cuba.

24. Conservation measures proposed but not yet implemented:

Re-definition and frequent up-dating of protected areas for strict protection.

25. Current scientific research and facilities:

The territory has six institutions for protection and study of biological diversity and the environment:

Ministerio de Ciencia, Tecnología y Medio Ambiente (CITMA) for Ciénaga de Zapata;

Breeding station for native fish species in Ciénaga de Zapata National Park of the Ministry for Agriculture;

Empresa Municipal Agropecuaria (EMA, Victoria de Girón), Ministry of Agriculture;

Instituto de Medicina Veterinaria Ciénaga de Zapata;

Provincial weather station at Playa Girón (CITMA);

The crocodile breeding project of the Ministerio de la Industria Pesquera.

These institutions have carried out:

Field studies on the first inhabitants of this area and Spanish immigrants and from several islands in the Caribbean near Cuba. Further socio-economic and historical studies are being carried out.

Studies of existing communities, their origin, composition and customs, the life-span of the inhabitants, use of traditional and natural medicine and the incidence of disease, parasites and a project that will study in detail the 19 communities in the area;

Studies of migratory birds, fish ecology and freshwater native turtles, ranching and ecology of the two species of crocodile found in the area, reproduction in captivity of Cuban parrots (*cotorra* and *catey*), conservation surveys, population surveys (density and abundance) of birds, location of rare and endangered local endemic species and botanical and wildlife inventories;

Studies of local fauna and flora have been carried out with emphasis on endemic species and all those that are threatened with studies in the wild and in captivity;

Studies of 18 species of endangered flora and 15 species of fauna are being undertaken or continued. Studies of the ecology of each species should be intensified aimed at reproduction in captivity for introduction in the natural environment, recovering abandoned habitats and recreating conditions for their natural development.

There are also practical studies of the use of tourism in areas of importance for conservation and tourism.

Ciénaga de Zapata has an ecological station located in the Ministry for Science, Technology and the Environment with a laboratory for the chemical analysis of water quality, a specialized resource department with computers and a library, experimental plots for vegetables and a fish pond for research, a classroom for environmental education, a visitors' centre and a biological specimen collection.

26. Current conservation education:

There is a strategy in the area for environmental education and its approach is global and multi-sectorial with a heterogeneous target public that includes all ages, sectors and communities. It goes beyond schools in order to reach communities, culture and sport, research, production, services the public sector and activities itself.

Educational and training activities	Target groups
Technical meetings on environmental education	Government employees, teachers, technicians and scientists linked to this

	activity
Training courses for forest wardens	Forest wardens in the area and the surrounding area
Workshops and training and post-graduate courses	Directors, professors and communicators in the area
Conferences and seminars	Political leaders, school directors, labour centres, local communities and university students linked to work in the area
Talks related to forest activities, tourism, fishing, health and others	Communities, labour centres, production units and groups of visitors
Environmental education and ecological tourism courses	Tourist sector, forestry and local communities
Workshops on environmental education	Schools, labour centres and local communities
Pilot activities for sustainable agriculture, tourism and fishing	Local communities
Debates around films, documentaries and slides	Schools and local communities
Visits to conservation areas or degraded areas	Schools and local communities
Competitions concerning the environment	All inhabitants
Publication of information brochures and a local magazine (Humedales)	The entire population
Creation of environmental clubs	Schools and local communities
Radio programmes (Medio Ambiente en Avance) and newspaper articles	The general public at the site and in the surrounding area

27. Current recreation and tourism:

Tourism is concentrated in the tourist centres of La Boca, Guamá, Playa Larga and Playa Girón, all located along the highway of Playa Larga, which annually receive an average of 800,000 national tourists and 100,000 foreigners for wildlife excursions, sport hunting and fishing, sunbathing, camping, scientific tourism and hiking. Tourism generates a series of positive and negative impacts on the wetland, such as:

Positive impacts

Generation of income and jobs;
Improvement in the living standards of the local inhabitants;
Social and economic development;
International recognition of the region and its natural and historical values.

Negative impacts

Pollution;
Generation of waste;

Changes in natural conditions;
Focus of tourism on protected nature areas.

28. Jurisdiction:

Ciénaga de Zapata is a municipio in the province of Matanzas.

29. Management authority:

Agency responsible for the management of the protected areas in the wetland:

Centro Nacional de Areas Protegidas (CNAP)
Calle 18A, No. 4114
Playa 1100
Havana, Cuba
Tel.: (53 7) 22 79 70
Fax: (53 7) 24 07 98
e-mail: tonyperera@ama.cu

Unidad de Areas Protegidas de la Empresa Municipal Agropecuaria
Carretera Playa Larga, Kilómetro 30
Ciénaga de Zapata
Province of Matanzas
Tel.: (53 59) 7249

Unit responsible for the environmental management of the wetland:

Organo CITMA
Ciénaga de Zapata
Carretera Playa Larga, Kilómetro 25
Ciénaga de Zapata
Province of Matanzas
Tel.: (53 59) 5539

30. References: