Information Sheet on Ramsar Wetlands

1. Date this sheet was completed/updated: 17 September 2002

2. Country: Cuba

3. Name of wetland: Gran Humedal del Norte de Ciego de Ávila

4. Geographical coordinates:

21º 57’ 30" – 22º 37’ 40" North latitude
78º 04’ 20" – 78º 49’ 00" West longitude

5. Altitude: maximum 1.05 metres above sea level, average minus 0.5, minimum minus 5 metres below sea level

6. Area: 226,875 hectares

7. Overview:

This wetland is located north of the province of Ciego de Avila (in the central region of Cuba) and includes most of the coast, the immediate maritime area and the cays adjacent to this area. This includes two natural reservoirs: Laguna de la Leche (a characteristic coastal lagoon type unique in Cuba) and Laguna La Redonda, plus the bodies of water south of Loma de Cunagua, which maintain a permanent volume of 250 million cubic metres of water. There are six proposed protected areas in the wetland, of which three are classified as wildlife reserves, mainly for endemic and endangered species of migratory birds. From the point of view of the flora, there are endemic and endangered species, including *Copernicia fallaense*, a local endemic with a conservation status of rare. From the socio-economic point of view, this wetland is one of the most important tourist poles in Cuba and is an important provider of fishery resources because of the richness of its marine platform and scenic value.

8. Wetland type:

Marine-coastal: A, B, C, D, E, G, H, I, J and K

Types of wetlands by decreasing order of importance: A, I, J, K, H, E, C, B, D and G

9. Ramsar criteria: 1, 2, 3 and 4

Criteria that best characterize the site: 3 and 4

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

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

Pedro Cardoso Gómez
Unidad de Medio Ambiente
Delegación Provincial del Ministerio de Ciencia, Tecnología y Medio Ambiente
Calle Marcial Gómez 401, esquina Estrada
Ciego de Avila
Tel.: (53 33) 229 38
Fax: (53 33) 231 01
E-mail: acc@fica.inf.cu

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

Criterion 1: This wetland includes two natural reservoirs: Laguna de la Leche (with the characteristic of being a unique type of coastal lagoon in Cuba) and Laguna La Redonda, in addition to the bodies of water south of Loma de Cunagua, where there is a permanent volume of 250 million cubic metres of water.

Criterion 2: In the area of the wetland, there are seven proposed protected areas, of them three classified as wildlife refuges, primarily for endemic and endangered species of migratory birds. As for the flora, there are endemic and endangered species, including (*Copernicia fallaense*), an endemic local with a conservation status of rare.

Criterion 3: There are 82 families, 225 genera, 344 species and 48 endemic plants, 10 of which are listed in the catalogue of endangered or extinct plants in Cuban. The fauna is represented by 251 species of terrestrial vertebrates, of which 9 are amphibians, 7 of them endemic; 28 reptiles, 21 of them endemic, three endangered; 202 birds, of which 116 correspond to migratory species, 38 of them with rare populations and 85 resident species, of which 28 are endemic and 15 endangered. There are 12 species of mammals, of which two are endemic.

Criterion 4: The wetland is an important source of feeding for species of crustaceans, lobster, *jaiba*, *Moro* crab and others found here. Many species of fish, crustaceans and sea turtles reproduce in parts of the wetland, taking advantage of the favourable conditions found here for their first life stage. Last year, more than 1000 nests of American flamingo (*Phoenicopterus ruber*) were recorded in the colonies there. A large number of aquatic birds live permanently in the wetland. There are populations of American flamingo (*Phoenicopterus ruber*), pelican (*Pelecanus occidentalis*), *corúa* (*Phalacrocorax auritus*) and several species that are considered rare but that are abundant here, such as the *marbella* (*Anhinga anhinga*), *cayama* (*Mycteria americana*), black-billed wood-duck (*yaguasa criolla*) (*Dendrocygna arborea*), *pato Bahamas* (*Anas bahamensis*) and the sandhill crane (*grulla*) (*Grus canadensis*), which is endangered.

13. General location:

This wetland is located in the province of Ciego de Avila, in the central region of Cuba, in the municipios of Bolivia, Morón and Primero de Enero. It is located in the northern part of the province, covering most of the coast, the immediate maritime area and cays surrounding this area. This wetland extends about 40 kilometres towards the interior of the large island, forming part of the large hydrographical basin in the province (La Yana basin). Nearby is the city of Morón (second most important in the territory), at a distance of five kilometres with a population of approximately 60,000 inhabitants.

14. Physical features:

Geology: As for the geology, this wetland is characterized by the presence of terrigenous and peaty carbonate deposits from the Holocene, interrupted in the highest parts not subject to flooding by areas that date from the Upper Pleistocene formed by deposits of clays, sands and *calcarenitas*. Farther north a shallow interior sea and the cays that surround it with a similar formation, towards the southern borders appear the deposits and in the central and north those from the Upper Pleistocene, with fundamentally sandy bottoms up to the coral reef. In general, all emerged parts of this area are decomposed layers with Quaternary sediments, interrupted only by a layer of decomposition over sedimentary rocks in the salt dome of Turiguanó, where an unexploited important deposit of chalk emerges. All the area of the wetland and surrounding area can be classified as a structural-formational complex of neo clay-terrigenous-carbonated platform.

Geomorphology: This wetland is located on a very flat area with little vertical relief (in general, less than 10 metres) and shallow breaks in the karst surface. The coastal edge of the wetland is characterized by lagoons, swamps, marshes and other forms. In several sectors, channels have been dug (the polders of Turiguanó). The slopes are less than 0.8 per cent in all their extension and on the sea bottoms, which form part of the wetland, slopes are less than 3 per cent. Recent exogenous processes of the lagoonal-paludal accumulative type with typical biogenic (mangrove) and marine (sand bars) deposits in the area. Structurally, almost the entire wetland on the largest island is considered to be a monoclinal graben (from the Quaternary III–IV), interrupted only by the Turiguanó block of salt dome and the system of blocks of the larger cays, considered as blocks in sub-horizontal, monoclinal and centroclinal strata. Geomorphologically in synthesis this wetland has an area of alluvia lagoonal-paludal accumulatives, swamp, flat towards the south, continues with an area of the marine bottom of abrasive-accumulative insular platform. It is interrupted farther north by the lagoonal-paludal plain of the cays (in its southern part) and ends on the northern edge of the cays again on the same abrasive-accumulative insular platform. The proposed wetland is considered inapt for mechanical ploughing and is permanently flooded, which would require very complex and expensive drainage works. This facilitates its conservation in the absence of another use, other than its current use. The soils are hydromorphic marshes with peat subtypes, except in higher parts farther inland (Turiguanó and Cayo Coco), which have typical calcimorphic humus soils.

Origin: Natural.

Soil types: The soils are calcimorphic humus, typical humus carbonate type and typical black rendzina, with a predominance of hydromorphic soils of marsh-peat type with salinity from the surface.

Depth, fluctuations in level and permanence of water: The part that is permanently flooded is formed by the Bahía de los Perros, Laguna de la Leche, Laguna La Redonda and Cierre de Puente Largo. In no case, is the water deeper than six metres. In the rest of the wetland, fluctuations and permanence of the water are determined by the rainfall regime, with two well-defined periods. There is a wet period from May to October and a dry period from November to April.

Tidal regime: According to historical data gathered in several updated documents, all along the exterior central edge of the platform of the Sabana-Camagüey Archipelago, basically in the area between the San Nicolás canal and the Viejo de Bahamas canal, the tide is regular semidiurnal. This is confirmed by the values obtained in the field. The tide in this area is synodal, which depends basically on the phases of the moon. The tides have a variable amplitude during the lunar month. The highest tides in the region occur during the period of syzygy (full moon and new moon), creating average maximum amplitudes of 74 centimetres, while the smallest occur during the period of quadrature (waxing and waning of the high moon), with a minimum amplitude of 38 centimetres. The average amplitude of the tide in the area is 56 centimetres and the maximum extreme between the maximum and the minimum observed during this period is 87 centimetres. The average waning has a duration of 6 hours, 6 minutes, while the waxing is 6 hours, 19 minutes.

Watershed:

(a) Cuenca Chambas – area: 67.6 square kilometres; volume of 79.6 million cubic metres
(b) Cuenca El Calvario – area: 189 square kilometres; volume of 14.7 million cubic metres
(c) Cuenca Naranjo – area: 264 square kilometres
(d) Cuenca Cimarrones – area: 95 square kilometres
(e) Cuenca La Yana – area 1555 square kilometres; volume of 40 million cubic metres

Most significant climatic characteristics on the cays: The behaviour of the temperature regime on the cays is typical for the area and specific to the cays and islands, where there is little fluctuation of temperature. Minimum average temperatures usually are high with values between 21.0° and 25.0° C. On the contrary, maximum averages are not so high, taking into account the latitude of the cays. They range between 26.4º and 31.6º C. The greatest contrasts among these parameters occurs from June to September and their amplitude is only slightly above 7.0º C, while during the rest of the year the amplitude is much lower. The average monthly temperature by time of day is about 30º C during the afternoon and mid-day of the hottest months of the summer while the agreeably warm temperatures, between 26º and 29º C during the end of the day and until the end of the night, in the rainy season (May-October). Cool temperatures occur at dawn. The cays are immersed in the tropical zone, under the almost permanent influence of a mass of maritime tropical air, small spatial dimensions and technical oscillations, as well as

proximity to a warm sea, creating high relative year round humidity. The cays have diurnal variations of relative humidity considerably higher (on Cayo Coco) than the other cays. The average relative humidity varies by 80 per cent from 10 am until 7 pm in almost year round. During the afternoon and at mid-day, relative humidity is low, which raises the air's capacity for evaporation contributing to a decrease in the sensation of warmth and raising the well-being of persons.

Precipitation*:* The total annual of the precipitation decreases toward the coasts and reach values of 1000–1200 millimetres. The rainfall regime is similar on the cay and the rest of the cays there are two well-marked periods: the rainy season (May–October) and the light rainy season (November–April), registering maximum annual rainfall in October of 181.9 millimetres with an average of 10 to 14 days with rainfall. During the rainy season, the relative minimum in relation to average precipitation corresponds to July. The lower averages of annual rainfall occur from November to April, with an absolute minimum in January of only 35.8 millimetres, with an average of three to five days of rainfall. The days with rainfall also vary from one season to another with an average that ranges between 9 and 14 days in the rainy season and between 3 and 8 days in the light rainy season. During the light rainy season, the greatest amount of rainfall is produced basically by the presence of frontal systems that affect the northern region, while the rains occurring during the rainy period are created by the coming together of several meteorological factors, such as the convergence of wind at dawn. There is also an increase in the temperature gradient, as well as the presence of tropical disturbances that affect the region.

Winds*:* In the area of the cays, the prevailing wind is from the northeast, gaining in velocity during the day when the trade winds are reinforced by the sea breeze. The highest average velocities occur towards 4 pm in all months of the year. There are seldom calms, and they usually occur at dawn. The average maximum wind velocity occurs in November and December. This is because of the high frequency of days with strong winds associated with the passage of cold fronts or tropical cyclones. Likewise, the minimum wind velocity occurs from June to September, except at times of severe meteorological events.

Description of the areas of Morón and Bolivia

Temperature*:* This region is characterized by high temperatures, with ranges of 30º, 25° and 20º C of maximum, average and minimum temperature respectively. The afternoons of April are the beginning of the summer season with an average maximum temperature of 30.4º C, despite this being a month of transition, when slightly cool and sometimes cold temperatures are recorded at dawn and in the early hours of the morning, which correspond with the end of the winter season.

Winds*:* Year round, the direction of the prevailing of the wind in the region is from the east. In this area, calms usually occur in all months of the year, with September the month in which this phenomenon occurs with greatest frequency and the opposite phenomenon during March and April.

Precipitation*:* Rainfall has a marked difference between May and October and November to April. Rainfall is abundant during the first and scarce in the second. The thermal range is exaggerated between the summer months and the winter for

our climate. In this area, there occurs a dry period or very short scarce rains in only two months (December and January) and a long rainy season that extends from February to November. The greatest atmospheric humidity at a few metros above the surface is in October and November with 86 per cent, while the least occurs in March and April with 76 per cent. The sky is partially cloudy year round.

15. Hydrological values:

The lagoons of La Leche and La Redonda are the main hydrological features of the wetland, forming a complex of natural lagoons closely related to each other with a capacity for storing 210 million cubic metres, which supply their water to the underground basin of Norte de Ciego de Ávila and to Bahía de los Perros.

The following basins flow into the area:

(a) Chambas - area: 67.6 square kilometres; volume of 79.6 millions cubic metres
(b) El Calvario - area: 189 square kilometres; volume of 14.7 millions cubic metres
(c) Naranjo – area: 264 square kilometres
(d) Cimarrones - area: 95 square kilometres
(e) La Yana – area 1555.0 square kilometres; volume of 40 million cubic metres

16. Ecological features:

Terrestrial flora: The flora around Laguna de la Leche is composed of 47 species of vascular plants in 25 families. About 34.78 per cent of the species present are used as medicinal plants, 17.77 per cent for food, 6.66 per cent are toxic or poisonous, 17.7 per cent are honey-producing, 41.30 per cent are ornamental, 13.33 per cent provide animal fodder, 56.52 per cent are used as timber and 28.26 per cent for other uses. Endemism in the area is very low with only four endemic species: *majagua negra* (*Atkinsia cubensis*), *encinillo* (*Pithecellobium obovale*), *hediondo* (*Copernicia gigas*), *Copernicia fallaense* (with a conservation status of rare in the catalogue of endangered plants of Cuba).

Vegetation terrestrial: The main plant formations found at Laguna de la Leche are:

(a) Mangrove
(b) Swamp forest
(c) Swamp grasslands
(d) Secondary vegetation

Mangrove: This formation is found mainly in the land–water interphase over a bog substratum. They are very well represented on the edges of the lagoon where the species *Rhizophora mangle* dominates. Its average height is between 13 and 16 metres with a good degree of conservation except in several places of easy access where man-made activity has had an effect. Taking a quantitative improvement of the mangrove as the most represented formation in the ecosystem, the basal area is 21.53 square metres/hectare with a total volume of trunk of 3.82 cubic metres and a biomass of 18.02 kilos/square metres, averaging 15.7 trees/100 square metres.

Swamp forest: This is located mainly towards the south-western part of the lagoon on rich organic soil in seasonally flooded organic material depending on the seasons of the year. It is between 8 and 10 metres in height and is represented mostly by species such as *ocuje* (*Callophyllum antillanum*), *Annona glabra*, *bagá* (*Bucida* sp.), *Copernicia* sp. and *Sabal parviflora*, among others. The herbaceous stratum is partly composed of *cortadera* (*Cladium jamaicense*), *helecho de pantano* (*Achrostychum aureum*) and *Cyperus* sp. Epiphytes are widely represented in this forest by species belonging to the *Encyclia, Oncidium* and *Tillandsia* genera. In this formation, an area is being selected for possible construction of an interpretive trail based on the attractions found there and for the bird life that characterizes it.

Swamp grasslands: This is found in permanently or seasonally flooded areas. At Laguna de la Leche, it is located in the areas that border the lagoon, especially in the grassland that is found west of the access road to Atarraya. The main species that characterize it are *Cyperus giganteus, Eliocharis* sp*., Panicum* sp. and *Typha dominguensis,* among others. On the edge of the access road, there is construction of observation towers with 10 and 5 metres respectively for observation of the landscape in the area which has good views providing a contrast among the various plant formations found there.

Secondary vegetation: Given the degree of human activity at Laguna de la Leche since the beginning of the century makes this formation the most representative of the main area of access to the lagoon on the edges of the canals that have been dug there. The main species that because of their size and numbers dominate the area are *casuarina* (*Casuarina equisetifolia*), coconut (*Cocos nucifera*), *majagua* (*Hibiscus elatus*), *almendro de la India* (*Terminalia catapa*), flamboyant (*Delonix regia*) and *pino macho* (*Pinus caribaea*). In the Sabana-Camagüey Archipelago in recent years, several expeditions have been carried out to study the potential for tourism of several of the most important cays there, such as the work of Ricardo et al. (1989), Elenevki et al. (1988) and more recently the study of the island groups and coastal areas of the Cuban Archipelago for tourism (ACC/ICGC, 1990). In the study carried out by ACC/ICGC (1990) on island groups and coastal areas of the Cuban archipelago for tourism, which includes the Coco, Guillermo and Paredón Grande cays, the most recent results on knowledge about the flora of Cay Coco, with a total of 77 families, 191 genera, 260 species and 38 endemic plants. With the surveys made until now, five new families appear (Bombacaceae, Cruciferaceae, Phytolaccaceae, Myrsinaceae and Ulmaceae), 34 genera and 84 species for a total of 82 families, 225 genera and 344 species, being the families best represented Euphorbiaceae (26), Mimosaceae (12), Poaceae (22) and Rubiaceae (19). As for the endemic species (Figure 1), 10 new species were identified for a total of 48, giving 14 per cent of endemism in the families Apocyaceae (4), Bignoniaceae (3), Cactaceae (3) and Euphorbiaceae (5). Of the endemic taxa found, 19 were recorded for the first time for the former province of Camagüey. Four of them were recorded only for the western sector of Cuba (Samek, 1973). This is the case of *Chascotheca neopentandra*, *Malpighia cubensis, Matelea oblongata* and *Sida brittonii*, and two for the eastern sector of Cuba: *Leptocereus maxonii* and *Vanilla barbellata*. Endemic species, *Angadenia lindeniana*, *Apassalus cubensis*, *Diospyrus grisebachii*, *Mitracarpus squarosus* and *Tabebuia trachycarpa, w*hich were recorded for the former provinces of Oriente, Las Villas and several for the western provinces now have a continuous distribution from the eastern region to the western region, and *Cordia angiocarpia*,

Eugenia farameoides and *Machaonia havanensis*, which was located in the central western part of Cuba, now extend their distribution to the most eastern part of the central region.

Cayo Coco has a strictly local endemic: *Cameraria microphylla*. However, there are other endemic species specific to the cays, coasts and northern cays, districts of central and eastern Cuba, which had the category of local endemics such as *Isocarpa glabrata* and *Selenicereus brevispinus,* described for Cayo Romano, thus increasing its area of geographic distribution, reaching to Cayo Sabinal, where it was collected by Elenevki et al. (1988). *Cresentia mirabilis* reported for the first time for Cayo Sabinal by Ekman and later for Puerto Padre in Las Tunas appears in this place increasing its area of distribution in its phytogeographical district. *Chamaesyce paredonensis* and *Heliotropium myriophyllum* described for Cayo Paredón Grande are located in most of the areas with sandy coastal vegetation of Cayo Coco.

Another aspect of great conservation interest is the existence in the area of 10 species that appear listed in the catalogue of Cuban endangered or extinct plants in the following form:

- Rare: *Anthirrea myrtifolia Cordia bahamensis*, *Heliotropium myriophyllum*, *Isocarpa glabrata, Leptocereus maxonii*, *Monanthochloe littoralis*, *Paspalum insularis* and *Selenicereus brevispinus*
- Endangered: *Cameraria microphylla* and *Crescentia mirabilis*

Selenicereus brevispinus, despite its listing as rare, is rather abundant on Cayo Coco, Cayo Guillermo, Cayo Paredón Grande and Cayo Alto.

Endemic Species on Cayo Coco
(Or: Sector Cuba Oriental Cc: Sector Cuba Central Oc: Sector Cuba Occidental)

Scientific name	**Distribution**
ACANTHACEAE	
Apassalus cubensis (Urb.) Koboski	Or, Cc, Oc
AGAVACEAE	
Agave legrelliana Jascobi	Cc
APOCYNACEAE	
Angadenia lindeniana (Muell. Arg.) Miers	Or, Cc, Oc
Cameraria microphylla Britt	Endemic, regional
Plumeria clusioides Griseb	Or, Cc
ARECACEAE	
Coccothrinax littoralis León	Or, Cc
Copernicia yarey Burret	Or, Cc
Saval parviflora Becc	Oc, Cc
ASTERACEAE	
Isocarpa glabrata Blake	Endemic, regional
ASCLEPIADACEAE	
Cynanchum penicillatum (Griseb) Alain	Or, Cc, Oc

Matelea oblonglata (Griseb) Woods	Oc, Cc
BIGNONIACEAE	
Crescentia mirabilis Ekm and Urb	Cc, Or
Tabebuia myrtifolia (Griseb) Britt	Or, Cc, Oc
Tabebuia trachycarpa (Griseb) K. Schum	Or, Cc
BORAGINACEAE	
Cordia angiocarpia A. Rich	Cc
Heliotropium myriophyllum Urb	Endemic, local
CACTACEAE	
Leptocereus maxonii Britt and Rose	Or, Cc
Pilosocereus millspaughii (Britt) Byl	Endemic, local
Selenicereus brevispinus Britt and Rose	Endemic, local
COMBRETACEAE	
Bucida subinermis Borhidi	Or, Cc
Bucida palustri Borhidi	Cc, Oc
EBENACEAE	
Diospyrus grisebachii (Hiern) Standl	Or, Cc, Oc
ERYTHROXYLACEAE	
Erythroxylum havanense Jacq	Or, Cc, Oc
EUPHORBIACEAE	
Chamaesyce paredonensis Millsp	Endemic, regional
Chamaesyce centunculoides (H.B.K) Millsp	Or, Cc
Chascotheca neopentandra (Griseb) Urb	Oc, Cc
Croton myricifolius Griseb	Or, Cc
FABACEAE	
Belairia mucronatan Griseb	Or, Cc, Oc
Piscidia cubensis Urb	Or, SC, Cc
Canavalia ekmanii Urb	Or, Cc, Oc
LYTHRACEAE	
Ginoria curvispina Koehne	Cc, Oc
MALPIGHIACEAE	
Malphigia cubensis H.B.K.	Oc, Cc
MALVACEAE	
Sida brittonii León	Oc, Cc
MENISPERMACEAE	
Hyperbaena racemosa Urb	Or, Cc, Oc
MIMOSACEAE	
Pithecellobium obovale(A. Rich.) C.Wright	Oc, Cc
MYRTACEAE	
Eugenia farameoides A. Rich	Cc, Oc
ORQUIDACEAE	
Cattleyopsis ortgiesiana (Rchb. f.)	Or, Cc, Oc
Vanilla barbellata Rchb.f	Or, Cc
PASSIFLORACEAE	
Passiflora foetida L. var. quinqueloba (Griseb) Killip	Or, Cc
POLIGALACEAE	

Securidaca elliptica Turez	Or, Cc, Oc
Polygala saginoides Griseb	Or, Cc, Oc
POLIGONACEAE	
Cocoloba retusa Griseb	Or, Cc, Oc
RHAMNACEAE	
Reynosia camagueyensis Britt	Cc
Reynosia mucromata Griseb	Or, Cc, Oc
RUBIACEAE	
Machaonia havanensis (Jacq.) Alain	Cc, Oc
Mitracarpus squarosus C and S	Or, Cc, Oc
TEOPHRASTACEAE	
Jacquinia aculeata (L.) Mez	Or, Cc, Oc

17. Noteworthy flora:

Dominant Species at Laguna de la Leche

Family	**Scientific name**	**Common name**	**Uses**	**Endemic**
ANACARDIACEAE	*Mangifera indica* L.	Mango	1, 2, 7	
ANACARDIACEAE	*Metopium toxiferum* (L.) Kruq and Vrb.	Guao de costa	1, 3, 4	
ANONACEAE	*Xylopia obtusifolia* A. Rich.	malangeta	8	
ARECACEAE	*Acoclarraphe wrightii* Wendl.	guano prieto	5, 8	
ARECACEAE	*Roystonea regia* (H.B.K.)	palma real	2, 5, 6, 7, 8	
ARECACEAE	*Sabal parviflora* Becc.	palma cana	2, 5, 7, 8	
ARECACEAE	*Copernicia gigas* Ekman	hediondo	7	X
ARECACEAE	*Copernicia fallaense*	palma falla		X
ARECACEAE	*Cocos nucifera* L.	coconut	4	
BIGNONIACEAE	*Tabebuia angustata* Britton	roble blanco	7, 8	
BIGNONIACEAE	*Vitex paviflora* A. Luss.	roble viti	5	
BIGNONIACEAE	*Crescentia cujete* L.	güira cimarrona	1, 4, 5, 7, 8	
BIGNONIACEAE	*Kigelia pinnata* D.C.	arbol de la salchicha		
BORAGINACEAE	*Cassia spectabilis* D.C.	algarrobillo	7	
BORAGINACEAE	*Cordia galeotliana* A. Rich	ateje blanco	4	
BURSERACEAE	*Bursera simaruba* (L.) Sarg.	almácigo	1, 5, 7, 8	
CAESALPINACEAE	Baryxylum inerme (Roxb.) Pieree	franboyán amarillo	5	
CAESALPINACEAE	*Delonix regia* (Bojer) Raf.	franboyán rojo	5	
CASUARINACEAE	*Casuarina equisetifolia* Forst.	casuarina	1, 5, 7	
CLUSIACEAE	*Clusia rosea* Jacq.	copey	1, 3, 5, 6, 7, 8	
CLUSIACEAE	*Calophyllum antillanum* Britton	ocuje	5, 6, 7	
COMBRETACEAE	*Buchenavia capitada* (Vahl) Eichl.	júcaro amarrillo	7	
COMBRETACEAE	*Lagincularia racemoso* (L.) Gaerth	White mangrove (*patabán*)	1, 4, 7, 8	
COMBRETACEAE	*Conocarpus erecta* L.	buttonwood	1, 4, 7, 8	
CUMBRETACEAE	*Terminalia catappa* L.	almendro de la India	5	
ESTERCULIACEAE	*Guasuma tomentosa* H.B.K.	guásima	1, 6, 7	
EUPHORBIACEAE	*Hura crepitans* L.	salvadera	3	
GRAMINIACEAE	*Bambusa vulgaris* Schrad.	caña brava	7	

LAURACEAE	*Laurus nobilis* L.	laurel	2, 5	
MALVACEAE	*Atkinsia cubensis* (Britt. and Wils.)	majagua negra		X
MALVACEAE	*Thespesia populnea* Corr.	majagua de la Florida	5	
MELIACEAE	*Swietenia mahagoni* (L.) Jacq.	Cuban mahogany	1, 5, 7	
MIMOSACEAE	*Cailliea glomerata* Macbride	marabú	8	
MIMOSACEAE	*Lisiloma latisigua* (L.) Benth.	sabicú	7	
MIMOSACEAE	*Pthecellobium obovale* (A. Rich.) C. Wright	encinillo		X
MIMOSACEAE	*Lysiloma latisiquum* (L.) Benth.	soplillo	1, 4, 5, 7	
MIMOSACEAE	*Pithecellobium arboreum* (L.) Vrb.	sabicú moruro		
MIMOSACEAE	*Samanea saman* (Jacq.) Merril	algarrobo del país	5, 7	
MYRTACEAE	*Psidium guajava* L.	guayabo	1, 2, 7	
NINFEACEAE	*Nymphaea amazonum* Mart. and Zucc.	ova		
PINACEAE	*Pinus caribea* Morelet	palma macho	7	
POLYGONACEAE	*Coccoloba uvifera* L.	uva caleta	1, 2, 4, 5, 6, 7	
POLYGONACEAE	*Coccoloba dibersifolia* Jacq.	uvilla	5, 6, 7	
RHIZOPHORACEAE	*Rhizophora mangle* L.	Red mangrove	1, 2, 4, 7, 8	
SAPINDACEAE	*Melicocca bijuga* L.	mamoncillo	2	
TIFACEAE	*Typha gustifolia* L.	macío	8	
VERVENACEAE	*Avicennia guminaris* L.	mangle prieto	1, 4, 7	

Endemic Species Found on Cayo Coco
(**Or**: Sector Cuba Oriental **Cc**: Sector Cuba Central **Oc**: Sector Cuba Occidental)

Species	**Distribution**
ACANTHACEAE	
Apassalus cubensis (Urb.) Koboski	Or, Cc, Oc
AGAVACEAE	
Agave legrelliana Jascobi	Cc
APOCYNACEAE	
Angadenia lindeniana (Muell. Arg.) Miers	Or, Cc, Oc
Cameraria microphylla Britt	Endemic, regional
Plumeria clusioides Griseb	Or, Cc
ARECACEAE	
Coccothrinax littoralis León	Or, Cc
Copernicia yarey Burret	Or, Cc
Saval parviflora Becc	Oc, Cc
ASTERACEAE	
Isocarpa glabrata Blake	Endemic, regional
ASCLEPIADACEAE	
Cynanchum penicillatum (Griseb) Alain	Or, Cc, Oc
Matelea oblonglata (Griseb) Woods	Oc, Cc
BIGNONIACEAE	
Crescentia mirabilis Ekm et Urb	Cc, Or
Tabebuia myrtifolia (Griseb) Britt	Or, Cc, Oc
Tabebuia trachycarpa (Griseb) K. Schum	Or, Cc
BORAGINACEAE	

Cordia angiocarpia A. Rich	Cc
Heliotropium myriophyllum Urb	Endemic, regional
CACTACEAE	
Leptocereus maxonii Britt et Rose	Or, Cc
Pilosocereus millspaughii (Britt) Byl.	Endemic, regional
Selenicereus brevispinus Britt and Rose	Endemic, regional
COMBRETACEAE	
Bucida subinermis Borhidi	Or, Cc
Bucida palustri Borhidi	Cc, Oc
EBENACEAE	
Diospyrus grisebachii (Hiern) Standl.	Or, Cc, Oc
ERYTHROXYLACEAE	
Erythroxylum havanense Jacq.	Or, Cc, Oc
EUPHORBIACEAE	
Chamaesyce paredonensis Millsp.	Endemic, regional
Chamaesyce centunculoides (H.B.K) Millsp.	Or, Cc
Chascotheca neopentandra (Griseb) Urb	Oc, Cc
Croton myricifolius Griseb	Or, Cc
FABACEAE	
Belairia mucronatan Griseb	Or, Cc, Oc
Piscidia cubensis Urb	Or, Cc
Canavalia ekmanii Urb	Or, Cc, Oc
LYTHRACEAE	
Ginoria curvispina Koehne	Cc, Oc
MALPIGHIACEAE	
Malphigia cubensis H.B.K.	Oc, Cc
MALVACEAE	
Sida brittonii León	Oc, Cc
MENISPERMACEAE	
Hyperbaena racemosa Urb	Or, Cc, Oc
MIMOSACEAE	
Pithecellobium obovale(A.Rich.) C.Wright	Oc, Cc
MYRTACEAE	
Eugenia farameoides A. Rich	Cc, Oc
ORQUIDACEAE	
Cattleyopsis ortgiesiana (Rchb. f.)	Or, Cc, Oc
Vanilla barbellata Rchb.f	Or, Cc
PASSIFLORACEAE	
Passiflora foetida var. quinqueloba L. (Griseb) Killip	Or, Cc
POLIGALACEAE	
Securidaca elliptica Turez	Or, Cc, Oc
Polygala saginoides Griseb	Or, Cc, Oc
POLIGONACEAE	
Cocoloba retusa Griseb	Or, Cc, Oc
RHAMNACEAE	
Reynosia camagueyensis Britt	Cc
Reynosia mucromata Griseb	Or, Cc, Oc

RUBIACEAE	
Machaonia havanensis (Jacq.) Alain	Cc, Oc
Mitracarpus squarrosus C. and S.	Or, Cc, Oc
TEOPHRASTACEAE	
Jacquinia aculeata (L.) Mez	Or, Cc, Oc

18. Outstanding fauna

So far in the wetland, a total of 251 species of terrestrial vertebrates have been recorded, of which nine are amphibians, 28 reptiles, 202 birds and 12 mammals.

Main values by groups:

Amphibians: Seven species are endemic for 77.77 per cent of endemism. The species *Eleutherodactylus cuneatus, E. greyi, E. planirostris* and *Peltaphryne gundlachi* constitute the first records of their existence on the cays of Cuba.

Reptiles: About 21 species are endemic for 75.0 per cent of endemism. The species *Amphisbaena cubana*, *Arrhyton taeniatum* and *Diploglossus delasagra* constitute first records for the cays of Cuba. The following species are considered charismatic: iguana (*Cyclura nubila nubila*), *chipojo azul* (*Anolis equestris potior*), (*majá de Santa María*) (*Epicrates angulifer*), *jicotea* (*Trachemys decussata decussata*) and the American crocodile (*Crocodylus acutus*). The species *Antillophis andreae, Leiocephalus carinatus, L. cubensis* and *Tropidophis melanurus* have still not been assigned to any of the subspecies already known for each in Cuba. Therefore, they could be classified as new local endemic forms in future studies. The species crocodile (*Crocodylus acutus*) and the iguana (*Cyclura nubila*) are considered endangered and are listed in Appendix I of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES), while the species in the genus *Tropidophis* (*T. melanurus* and *T. pardalis*) and the *majá de Santa María* (*Epicrates angulifer*) are listed in Appendix II, which lists species that even though they are not endangered, international trade can dangerously affect their conservation.

Birds: In general, a total of 202 species of birds have been recorded for the wetland for a 47.6 per cent of the total forms recorded for Cuba (424), of which 195 are found on Cayo Coco, 83 on Cayo Guillermo and 107 on Cayo Paredón Grande. Migratory species (116), of which 102 visit this area during the winter, 38 of which have rare populations and one, *Falco peregrinus* is listed in CITES Appendix II. The rest of the species (14) arrive here during the summer, seven with rare populations. Resident species (85), with 28 endemic forms (9 species and 19 subspecies) and 15 species considered endangered in the following categories.

(a) Endangered species: American flamingo (*Phoenicopterus ruber*) and Gundlach's hawk (*gavilán colilargo*) (*Accipiter gundlachi*).

(b) Rare species: *marbella* (*Anhinga anhinga*), *cayama* (*Mycteria americana*), *yaguasa criolla* (*Dendrocygna arborea*), *pato Bahamas* (*Anas bahamensis*), sharp-shinned hawk (*gavilancito*) (*Accipiter striatus*, endemic subspecies), common caracara (*caraira*) (*Polyborus plancus*), *arrierito* (*Coccyzus minor*), *sijú de sabana* (*Speotyto cunicularia*), *cárabo* (*Asio flammeus*), *carpintero*

escapulario (*Colaptes auratus*, endemic subspecies), *sinsonte prieto* (*Mimus gundlachii*), *tomeguín prieto* (*Tiaris bicolor*) and *cabrerito de la ciénaga* (*Torreornis inexpectata,* endemic species).

Of these species, American flamingo (*Phoenicopterus ruber*), Gundlach's hawk (*gavilán colilargo*) (*Accipiter gundlachi*), Everglade kite (*gavilán caracolero*) (*Rostrhamus sociabilis*), black-billed wood-duck (*yaguasa criolla*) (*Dendrocygna arborea*), sharp-shinned hawk (*gavilancito*) (*Accipiter striatus*), common caracara (*caraira*) (*Polyborus plancus*), burrowing owl (*sijú de sabana*) (*Speotyto cunicularia*) and the short-eared owl (*cárabo*) (*Asio flammeus*) are listed in CITES Appendix II. A total of 29 colonies of nesting water fowl have been recorded so far, of which information has been obtained about the number of nesting pairs in six of them.

Mammals are represented by 12 species, of which two are endemic to Cuba, *jutía conga* (*Capromys pilorides*), which is represented by small populations to the west and southwest of Cayo Coco in mangroves and in small cays in Bahía de los Perros, and one species of bat, *Phyllops falcatus*.

19. Social and cultural values:

Laguna de la Leche owes its name to the whiteness of its water due to the presence of calcium sulphate and chalk on its bottom. Much earlier, for a long time it was the only access for supplies for the population of Morón. Freight arrived through the swamps to a place called El Embarcadero, which is 2,250 metres from this administrative centre, whose distance saved it before the War of Independence, by a railroad that crossed the length of Calle San Fernando (now Narciso López) to the stop south of the town through which the merchants of this town shipped through their merchandise from the Caribbean. This railroad was called the "Tortuga" because locomotives had to go very slowly in order not to throw out sparks from their chimneys, which could burn down the guano shacks that were on both sides of the rail line.

Laguna de la Leche was the second means of communication for Morón from the north. The means of transportation that were used there were shallow-draft sailboats, boats, canoes and small boats, because the depth of the swamps and canals was no more than four feet. The first freight from Caibarién and Havana arrived in Morón through this passage. It was off-loaded at El Embarcadero and from there it was transported in carts to the town. Using this same route, the Spanish penetrated to the area of La Trocha with their convoys, during the wars of 1868 and 1895. In 1848, several inhabitants of the town of Morón began to dig a ditch from Laguna de la Leche to Morón so that boats could arrive right in the centre of town, but this idea was abandoned, and the remains of the canal are there today.

In the Pan-American publication *La Epoca*, an article was published in 1914 about a project being studied based on the idea of opening a canal across the island of Cuba from Júcaro to Morón in order to join the Atlantic Ocean with the Caribbean. This project did not even reach its first phase. This lagoon is also linked to the political history of Cuba because armed Cubans prowled its waters on several occasions during the wars of 1868 and 1895, as we shall see below.

The fort at El Embarcadero was attacked and burned during the night of Sunday, 28 May 1876, by the second contingent of the Oriente under Colonel José Medina and Commander José Barbosa and by the regiment Castillo under Colonel José Gómez Cardoso and Commander Nicolás Hernández Moreno. This fort had 27 cannons, and its garrison was a lieutenant, a sergeant, two corporals and 16 soldiers. During the attack, the Spanish side lost 18 dead, including the commander. Only two were saved: the sentinel, who jumped into the water and fled to the forest near the canal and a soldier who was able to flee in the direction of the town. The Cuban forces lost only one soldier. On 26 August 1895, Capitan Simón Reyes Hernández arrived with 40 men at El Embarcadero, burning four boats and setting fire to the storehouse there. On 12 September 1895, they attacked and burnt two boats at the exit from Laguna de la Leche at Boca de Júcaro. On the night of 26 December 1896, Máximo Gómez crossed the line of Spanish fortifications almost at its centre, known as the "Trocha de Júcaro a Morón", in the middle of an infernal battle and without a single casualty. They travelled in a large convoy of infantry, horses, weapons and supplies in the direction of Las Villas. On 15 January 1897, General Quintín Banderas crossed La Trocha de Júcaro to Morón de la Reforma on his way to Oriente near Laguna de la Leche. During the first days of May 1897, General José Lacret Morlot crossed La Trocha near Laguna de la Leche, specifically across Isla de Turiguanó, at the head of a large number of Mambise officials. Between 26 and 28 May 1897, Colonel Dimas Zamora and Commander Tranquilino Cervantes crossed La Trocha through an area near Laguna de la Leche. Between 17 and 19 July 1897, Lieutenant-Coronel Simón Reyes crossed La Trocha near Laguna de la Leche. This was a dangerous crossing and resulted in Generalísimo Máximo Gómez decorating the troops that participated and promoting Simón Reyes. Between 22 and 24 September 1897, General González Clavel crossed La Trocha at Isla de Turiguanó near Laguna de la Leche. On 24 October 1897, Colonel Dimas Zamora crossed at La Trocha over Isla de Turiguanó near Laguna de la Leche, leading 280 infantry soldiers. In this crossing, the patriot and poet Puerto Rican Gonzalo Marín died from illness. On 29 April 1898, a mail boat was attacked in Los Esteros very near Laguna de la Leche. The attack was carried out by Capitan Antonio Caballero at the head of a group of men.

Laguna de la Leche and its surroundings have also been the scene of legends, traditions, popular fiestas and sport and, above all, of recreation and entertainment of the town of Morón. In the 1950s, two tourist installations were constructed: the Morón Yacht Club with a swimming pool for adults and children and the Atarraya, for the Colonia Española, a restaurant-bar built on pilings in the water and specializing in seafood, especially paella. On the other side of the opening of the canal, rustic bars also proliferated where fried fish, *minuta*, beer, soft drinks, coconut milk and various types of rum were sold on the weekends. The canal was crossed in small boats guided with poles, which were part of the tradition and the surroundings. La Tabla, a popular musical group that entertained in the bars, gave a touch of distinction to the place.

Laguna de la Leche was also the scene of one of the oldest legends of Morón: known as *El güije de los esteros*. According to the sailors that sailed through the swamps of El Embarcadero, a long time ago there was an animal similar to a monkey that climbed in the white mangroves that grew on both banks of the rivers of that canal. It had large black and round eyes and clearly turned-back ears. It appeared, of course,

at night and disappeared into the water. Everyone in Morón was afraid of the *güije de los esteros*, both those who "had seen it" and those who knew it from the descriptions of their ancestors.

In addition to this legend, there were also very old traditions such as celebration of Easter, when the traditional religious processions on foot were held from Morón to El Embarcadero and from there to Laguna de la Leche, where everyone travelled in boats and regattas were held for sailboats and motor boats, which served as relaxation and entertainment for hundreds of the inhabitants of that city. Perhaps these religious processions were what later led to the famous aquatic carnivals. They have been held since 1955, along the canal that goes from El Embarcadero to Laguna de la Leche. At the beginning, they were organized by families of the upper classes, which decorated their boats and passed through that canal, providing an impressive spectacle and unique entertainment. But this tradition has been lost, perhaps because of the urgent tasks demanded by the revolution, which was preoccupied with numerous social problems. However, with the policy of reviving the best cultural traditions the aquatic carnivals appear again, but with a distinct emphasis although its essence is the same. They are always held in the summer.

Beginning in 2000, the Formula T1Grand Prix of motor boat racing, an international event, has been organized on this natural reservoir, which has been incorporated into the annual circuit of this class, becoming an additional option for the tourist pole of Jardines del Rey.

20. Land tenure/ownership of:

Ninety-five per cent of the land is government property. The landowners are basically the Empresa Nacional para la Protección de la Flora y la Fauna, the Ministry for Agriculture (MINAGRI), the Empresa Forestal, the Ministry de la Pesca and the Institute for Hydraulic Resources.

21. Current land use:

This land is currently used for fishing (OEE Pesqueras y Acuicultura), forestry, tourism, bee-raising, livestock raising, agriculture, INRH (supply of water) and hunting.

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

In the 1930s and for economic reasons related to the transportation of sugar from the nearby sugar mills, the Canal de Chicola was dug linking the sea with Laguna de la Leche, which together with other factors, contributed to salinization of the water of the lagoon, which at the end of 1988 reached 48 grams/litre. Until May 1988, that dam suffered several transformations caused by man to which were added the impact produced by the dumping of waste industrial, agriculture and domestic that accelerated considerable degradation of the ecosystem. The process of sedimentation produced by the contribution of the numerous canals and streams that empty into the lagoon and that transport the erosion of the basin and waste, accelerated a thick cover of mud on its bottom. This lagoon received the impact of

waste from the CAI and the Destilería Enrique Varona, the CAI Patria o Muerte, the Cebadero de Toros and the Porcino de La Isla de Turiguanó and the lagoon for waste treatment from the city of Morón. Changes in this ecosystem were caused basically by organic pollution, which is reversible once the main sources of pollutants are eliminated. Systematic physical, chemical and bacteriological monitoring has made it possible to determine the evolution of the process of its degradation. Furthermore, in May 1988 rains made possible desalinisation of its water together with elimination of various sources of pollutants that affected it.

Since 1976, samples have been taken from the lagoon for physical, chemical and bacteriological analysis. According to the most recent sample taken in April 2000, water quality of that reservoir currently meets the requirements for use for fishing at all points except at the entrance of the Júcaro and Punta Novillo canals, which carry away waste from the town of Morón and the CAI Patria o Muerte.

In 1985, in order to develop tourism on the Sabana-Camagüey Archipelago and as part of the creation of infrastructure to support that growth, construction was begun of engineering works that linked Cuba with the cays. In 1989, paving of the Turiguanó-Cayo Coco and Cayo Coco-Paredón Grande canals was completed, which has led to changes in several of the physical and chemical parameters, as well as in the biotic communities found there (De La Paz, 1994). Because of these anthropic changes in the past decade high levels of capture were maintained. However, since 1992, fisheries production has been affected substantially by a decrease in levels of capture, which was associated by the producers with deterioration of the environmental conditions of the bay because of paving of parts of the marine platform. According to several studies made and interviews, the situation of Bahía de los Perros has improved since 1995, namely with the reappearance of several species such as the *jaiba*, lobster, *porgo* and *jiguagua* although the *chopa* and the *patao* are still dominant.

23. Conservation measures taken:

In the wetland, a total of six areas are maintained as protected areas with some type of official recognition by agreements between the provincial government and the Ministry for Agriculture. One of them, the Loma de Cunagua Wildlife Reserve, has been declared a protected area by the Council of Ministers.

Centro-Oeste Cayo Coco Ecological Reserve	National importance
Monte El Coy Managed Plant Reserve	Local importance
Cayo Alto Wildlife Reserve	Local importance
Dunas de Playa Pilar Outstanding Natural Element	National importance
Loma de Cunagua Wildlife Reserve	National importance
Finca El Venero Wildlife Reserve	Local importance

This wetland is included in the GEF/PNUD project for the Sabana-Camagüey Archipelago.

24. Conservation measures proposed but not yet implemented:

There is a series of programmes and plans prepared that have not been implemented including the following:

(a) Drafting or updating management plans for protected areas in the wetland;

(b) Gathering of basic information for implementation of the management plan for the Buenavista Biosphere Reserve;

(c) Updating of forestry management and land use plans;

(d) Drafting of a multi-sectorial strategy for protection of the wetland's resources.

These measures have not been implemented because of a lack of material and financial resources, but there is now some progress with support from the GEF/PNUD project.

25. Current scientific research and facilities:

There are currently several institutions that carry out scientific research in the area and deal with protection and conservation of biological diversity. Among them are:

(a) Centro de Investigaciones de Ecosistemas Costeros, belonging to the Ministerio de Ciencia, Tecnología y Medio Ambiente, which carries out research for protection and conservation of biological diversity of the ecosystems. This institution has an ecologic station, laboratories and trained staff.

(b) Empresa para la Protección de la Flora y la Fauna, which is an agency belonging to the Ministry for Agriculture, specialized in protection of fauna and flora, now carrying out several projects for conservation of endangered species (*Phoenicopterus ruber, Grus canadensis, Ciclura nuvila*), for which it has an administrative unit in the area.

(c) Instituto de Medicina Veterinaria, although it does not have installations in the area, it is studying ectoparasites in bovines and equines.

(d) The Ministerio de la Pesca is carrying out research on ecological changes caused by humans that affect marine life.

(e) The Instituto de Recursos Hidráulicos has an installation on Cayo Coco for monitoring water.

(f) The Academy of Sciences has carried out archaeological, speleological and ethnographic studies.

26. Current conservation education:

Educational and training activities	**Target groups**
Technical meetings on environmental education	Government officials, teachers, technicians and scientists in this field

Training courses for forest wardens	Local forest wardens and fisheries inspectors and from nearby areas
Workshops, training courses and post-graduate study	Local leaders, teachers and communicators
Conferences and seminars	Politicians, school directors, labour centre directors, local communities and university students working in this field here
Talks on the activities of the sugar agro-industry, forestry, tourism, health and others	Communities, labour centres, production units and groups of visitors
Course of environmental education and ecotourism	Tourist sector and local communities
Sessions of working groups on environmental education	Schools, labour centres and local communities
Demonstration activities on sustainable agriculture, tourism and fishing	Local communities
Projection and debate on films, documentaries and slides	Schools and local communities
Visits oriented to local conservation areas and degraded areas	Schools and local communities
Contests based on environmental themes	All the inhabitants of the province
Printing of pamphlets	All the inhabitants in the province
Creation of environmental clubs	Schools and local communities
Radio programmes and newspaper articles	General public

27. Current recreation and tourism:

In the wetland, there is the third tourist pole in Cuba with eight hotels in operation with a total of 2602 rooms in categories 5*, 4* and 3* and hotels under construction with a total of 1434 rooms. There are plans to construct 4 per cent of the area of the cays and other tourist infrastructure. The Formula T-1 Grand Prix of motorboat racing has been held at Laguna de la Leche since 2000, plus other recreational activities for domestic and international tourism. The Centro Internacional de Pesca Deportiva de la Trucha is located at Laguna La Redonda. There are also areas for hunting where the Torcaza Cabeciblanca International Hunting Tournament has been held since 1990. The type of tourism attracted to the wetland is basically “sun and beach” although there are forms of ecotourism, hunting and fishing, but in small numbers in the high and low seasons.

Number of visitors by year (in thousands)

Year	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**Total**
Number of visitors	20.6	43.0	55.7	83.4	120.6	122.0	145.2	590.5

28. Jurisdiction:

Republic of Cuba, province of Ciego de Ávila, municipios of Bolivia, Chambas, Morón and Primero de Enero.

29. Management authority:

Environmental management
Ministerio de Ciencia Tecnología y Medio Ambiente
Unidad de Medio Ambiente, Delegación Provincial de Ciego de Avila
Calle Marcial Gómez no. 401, esquina Estrada
Tel.: (53 33) 229 38
Fax: (53 33) 231 01
E-mail: acc@fica.inf.cu
Person to contact: Pedro Cardoso Gómez

Forestry management
Ministerio de la Agricultura
Servicio Estatal Forestal
Tel.: (53 33) 258 04/257 60
Person to contact: Jesús Cabrera

Administration and management of protected areas
Ministerio de Agricultura
Empresa para la Protección de la Flora y la Fauna
Calle Prolongación Martí 611, esquina Pedro Méndez y La Guajira
Tel.: (53 33) 243 02
Fax: (53 33) 243 02
Person to contact: Luis Antonio Solana Batista

Management of fisheries resources
Ministerio de la Pesca
Asociación Pesquera Pescavila, Ciego de Ávila
Calle Cuba no. 64, esquina Honorato Castillo y Maceo
Tel.: (53 33) 254 95
Fax: (53 33) 258 70
Person to contact: Luis Orlando Páz López

Management of forest resources
Ministerio de Agricultura
Empresa Forestal Integral Ciego de Ávila
Calle Ciego de Ávila no. 51, esquina Honorato Castillo y Maceo
Tel.: (53 33) 230 19
Fax: (53 33) 230 19
Person to contact: Eberto Pérez Aguado

Management of livestock
Ministerio de Agricultura
Dirección Provincial de Ganadería, Ciego de Ávila
Calle Libertad no. 102
Jicotea
Tel.: (53 33) 341 33

Fax: (53 33) 354 167
Person to contact: Carlos Rivero Peñaranda

Tourism management
Ministerio del Turismo, Delegación Ciego de Ávila
Calle Máximo Gómez no. 82, esquina Honorato Castillo y Maceo
Tel.: 33- 24268
Fax: 33- 266300
Person to contact: Raúl Naranjo Aday

Management of bee-keeping
Ministerio de Agricultura
Establecimiento Provincial de Apicultura, Ciego de Ávila
Calle Marcial Gómez no. 1281
Final
Tel.: (53 33) 281 71
Person to contact: Rafael Guzmán Lores

Water management
Instituto Nacional de Recursos Hidráulicos
Dirección Provincial, Ciego de Ávila
Carretera a Morón
Tel.: 33- 23917
Fax: 33- 266386
Person to contact: Rolando Macias Alonso

Management of hunting
Ministerio de Agricultura
Empresa para la Protección de la Flora y la Fauna
Calle Prolongación Martí no. 611, esquina Pedro Méndez y La Guajira
Tel.: (53 33) 243 02
Fax: (53 33) 243 02
Person to contact: Luis Antonio Solana Batista

30. References: