



UNDP Project Document

Government of Cuba

United Nations Development Programme

Mainstreaming and Sustaining Biodiversity Conservation in three Productive Sectors of the Sabana Camaguey Ecosystem

Brief description

The Sabana-Camagüey Ecosystem (SCE) occupies a strip of approximately 465 km along the central north coastline of Cuba. It includes a group of watersheds along the northern mainland (19,400 km²) as well as an archipelago composed of the adjacent shallow marine shelf (8,311 km²), the oceanic Exclusive Economic Zone (43,800 km²) and 2,515 keys covering 3,400 km² and representing 60% of all the Cuban keys and the largest system of keys in the Wider Caribbean. The variety of habitats in the SCE support a great diversity of marine and terrestrial biota and a high level of terrestrial endemism, which places this zone among the richest in biodiversity in Cuba and the Caribbean.

The national and global significance of the outstanding wealth of the Sabana Camaguey ecosystem and seascapes has long been recognized and was endorsed through the early commitment of GEF to support a three-phase Program for its conservation. Phase 1 identified problems and opportunities, completed biogeophysical, economic and social characterization of the SCE and developed a Strategic Plan. Phase 2 secured the conservation of particularly sensitive or high biodiversity value areas in a network of protected areas that covers 20% of the SCE, and made impressive progress in promoting an ecosystem-based approach within a traditionally centralized and sector-driven development-planning framework. Now that these key elements are in place, there is a need, and an opportunity, to work outside protected areas and focus on biodiversity across the productive land and seascape promoting changes in the key productive sectors in the SCE.

The proposed FSP would be the third and final phase of the Program and would promote operational changes within the tourism, fisheries and agriculture sectors to ensure biodiversity conservation across the sea and landscape that make up 80% of the archipelago. This will be achieved through four main Outcomes as follows: (i) a strengthened enabling environment will exist for the financial, institutional, environmental and social sustainability of biodiversity conservation in the tourism, fisheries and agriculture-livestock sectors in the SCE; (ii) the tourism sector develops in accordance with the conservation of marine and terrestrial ecosystems within the SCE; (iii) sustainable fisheries are practiced within the SCE so that fish populations and marine ecosystem functions are maintained and/or restored; and (iv) the declining sugar cane industry transitions into sustainable land use practices, with greatly reduced negative impacts on the coastal region of the SCE.

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Acronyms

AMA	Environmental Agency, CITMA
CECA	Center for Coastal and Environmental Studies
CEGIA	Environmental Management and Auditing Centre
CICA	Center for Environmental Inspection and Control, CITMA
CICM	Council for Integrated Coastal Management
CIDEA	Environmental Information, Dissemination and Education Centre
CIEC	Coastal Ecosystem Research Center, CITMA
CIET	Terrestrial Ecosystems Research Center
CIGEA	Center for Environmental Information, Management and Education, CITMA
CIM	Center for Marine Researches of the University of Havana, MEP
CIP	Center for Fishery Researches, MIP
CITMA	Ministry of Science, Technology and Environment
CNAP	National Protected Area Center, CITMA
CNCH	National Watershed Council
DPA-CITMA	Direction of Environmental Policy of CITMA
DPPF	Provincial Delegation of Physical Planning, MEP
ENPFF	National Enterprise for the Protection of Flora and Fauna, MINAGRI
GEF	Global Environment Facility
GoC	Government of Cuba
ICM	Integrated Coastal Management
ICMA	Integrated Coastal Management Authority
IDO	Institute of Oceanology, CITMA
IES	Institute of Ecology and Systematics, CITMA
IGEO	Institute of Tropical Geography, CITMA
IGP	Institute of Geology and Paleontology, MINBAS
IIF	Institute of Forestry Researches, MINAGRI
INRH	National Institute of Hydraulic Resources
INSMET	Institute of Meteorology, CITMA
IPF	Institute of Physical Planning, MEP
ISPJAE	Higher Polytechnical Institute “José Antonio Echevarría”, MES
MEP	Ministry of Economy and Planning
MES	Ministry of Higher Education

MICONS	Ministry of Construction
MIMC	Ministry of the Industry of Construction Materials
MINAGRI	Ministry of Agriculture
MINAZ	Ministry of the Sugar Industry
MINFAR	Ministry of the Armed Forces
MINFP	Ministry of Finance and Prices
MINTUR	Ministry of Tourism
MINVEC	Ministry of International Cooperation
MIP	Ministry of Fisheries
NPD	National Project Director
PDF-B	Project Development Facility – Block B
PSC	Project Steering Committee
PTC	Project Technical Committee
SCA	Sabana-Camaguey Archipelago
SCE	Sabana-Camaguey Ecosystem
TPR	Tripartite Review
UNAIC	National Union of Architects and Engineers of Cuba
UNDP	United Nations Development Programme
WWF	World Wildlife Fund

SECTION I: Elaboration of the Narrative**PART I: Situation Analysis****1. Context and Global Significance****1a. Geographic Context**

1. The project will be implemented in the Sabana-Camaguey Ecosystem (SCE), which occupies a strip of approximately 465 km along the central north zone of Cuba, between Punta Hicacos (west) and Nuevitás Bay (east). It includes the northern watersheds of the provinces of Matanzas, Villa Clara, Sancti Spíritus, Ciego de Ávila, and Camaguey; as well as an archipelago, the adjacent shallow marine shelf and the oceanic Exclusive Economic Zone (see Annex 4 Map 1). The Sabana Camaguey Archipelago constitutes the largest system of cays in the Wider Caribbean and represents 60% of all the Cuban cays in number (2,515 cays). Mangrove swamps are profusely distributed among the cays and along the mainland coast. The cays, beaches and coral reefs of the region are well known for their quality and beauty.

2. The SCE has considerable regional importance due to its high diversity of marine and terrestrial species, the high level of endemism of terrestrial flora and fauna, and the enormous variety and abundance of migratory birds which use the area as a stopping point between North America and points south. The project area includes extensive areas of globally significant ecosystems distributed throughout the landscape and seascape (cays, marine shelf and mainland watersheds), including mangrove forests, dry forest and coastal shrub systems, coral reefs and seagrass beds. Species of global significance include migratory birds, endemic plant and animal species, flamingos and other threatened and charismatic birds, marine turtles, manatee, dolphins, crocodiles, etc. See Annex 3 for additional details on the environment and globally significant biodiversity of the project area

1b. Socio -Economic Context

3. The disintegration of the European Socialist Block and the USRR in the early 90s severely impacted the Cuban economy, leading to the “special period” that has been in place since 1991. In order to reorient the economy, opportunities for foreign investment were increased and the legal and monetary frameworks were changed to allow for new forms of investment and ownership. Sectors like tourism and mining were prioritized during the “special period”, and subsequently attracted foreign investment. Tourism in particular experienced significant growth (more than 20% annually), and some 5 millions tourists are expected to visit Cuba in 2005. Fishing, agriculture and livestock raising also have remained sectors of great social, economic and security strategic importance for the country. Although economic conditions have improved significantly, improving economic growth rates is still a high priority for Cuba. Despite the challenges of the “special period”, Cuba has maintained a notable commitment to environmental issues, and in fact great institutional and legal advances related to environmental and biodiversity issues have been achieved in the past decade.

4. According to the Cuban Population Census (2002), 2.3 million persons live within the 40 municipalities belonging to the Sabana Camaguey Ecosystem (SCE), with 79% in urban areas and 21% in rural areas. Of these 40 municipalities, 16 are located in the coastal zone, with a total population of 747,123 inhabitants. Fishing, tourism, agriculture and sugar production are the main economic activities in the project zone. Local inhabitants also participate in mining (salt, gypsum, and construction materials) in Ciego de Ávila province; in cement production in Camaguey province; and in tanneries and the

construction of machinery in Villa Clara province. Cattle raising is also an important activity in mainland areas of Camaguey province. Economic activity and human populations are concentrated in the mainland areas of the SCE, with the exception of fisheries activity in the sea and tourism, which is highly concentrated on the coastal cays. However, even with tourism development in the cays, human populations are still located on the mainland, and construction workers and hotel employees are largely prohibited from living on the cays on which they work.

5. The best wages in the SCE are enjoyed by workers in the tourism and fisheries industries, as well as in citrus production (localized in Matanzas province). Tourism employees benefit primarily from the opportunity to receive tips and other bonuses in foreign currency. Commercial fishermen benefit from receiving part of their salary in foreign currency, with some fishermen earning an average of US\$2-3,000/year, well above the national average. The higher wages offered by these sectors has had some negative impacts on stability in other sectors, due to the exodus of qualified personnel towards higher paying positions, with the exception of fisheries, which requires more specialized expertise and which presents fairly difficult working conditions.

6. Phase 2 of this project supported some pilot initiatives for alternative income-generation for local residents. For example, a flamingo farm in the Río Máximo Fauna Refuge (Camaguey province) has created 11 jobs. Residents of this protected area gain additional income by monitoring crocodile nesting sites, and in some areas members of the community are employed to eliminate alien invasive species such as the “marabú” spiny tree (*Dichrostachys cinerea*) and the catfish (*Claria sp.*). The incentive for participation by local residents is that they may keep whatever animals or plants they eradicate, for example catfish to be consumed as food and marabou which is transformed into charcoal, with the result that both of these alien species have declined significantly in the refuge.

Tourism Sector

7. Tourism in Cuba has grown dramatically in the past 15 years. In 1990, some 300,000 tourists visited Cuba, and by 2004 that number had risen to 2 million. Despite some deceleration after the September 11 terrorist attacks, some 2.3 million tourists are expected to visit Cuba in 2005. The rapid growth in tourism, combined with the decline of the sugar cane industry and the agriculture sector overall, has made tourism the most important economic sector in the Cuban economy. Tourism now accounts for 41% of national foreign currency income earnings (as compared to 2% in 1990), and it contributes 43% to the national balance of payments (as compared to 4% in 1990).

8. With the commercial name “Jardines del Rey”, the Sabana-Camaguey Ecosystem (SCE) is envisioned as the second most important tourism development area in Cuba. Currently, there are 14 hotels with 4,337 hotel rooms in the SCE, primarily on Coco, Guillermo, Santa María and Las Brujas cays, and the area received 96,000 visitors in 2004 (and 130,000 visitors expected in 2005). Tourism is expected to continue to grow rapidly in the SCE, with plans for 250,000 visitors and 34 hotels with 10,000 hotel rooms by 2010.

9. The development of tourism in the SCE has had a significant impact on the socioeconomic conditions of the communities on and nearby the cays (Coco, Guillermo, Santa María, Las Brujas and Ensenachos) within the SCE. Tourism directly employs approximately 12,000 persons in the SCE, and these jobs are widely sought after for their high pay, opportunity for foreign currency earnings, and training in marketable skills. Although wages in the fishing sector are higher than in tourism, the working conditions in fisheries are generally very difficult. (see Annex 7 – Tourism Sector Assessment for more details)

Fisheries Sector

10. Fishing is the fourth largest economic sector in Cuba, with production reaching close to 50,000 tons in 2004, with an approximate value of US\$100 million. Primary fishing resources include lobster, lane snapper, mutton snapper, groupers, jacks, grunts, rays, commercial sponges, blue crabs, and queen conch. The marine shelf of the Archipelago Sabana-Camaguey is the second most important fishing area of Cuba, accounting for 20% of total national catches (35% of finfish and 15% of lobster). Fishing employs approximately 3,300 persons in the SCE, of whom 21% are women.

11. The current focus of development of the fishing sector in the SCE is based on promoting the recovery of the valuable but declining fishing resources in the area. The program includes policy, legal and institutional support for new regulations and restrictions on fishing effort and other activities affecting fish stocks and marine ecosystems, and the development of alternative fisheries production practices to reduce pressure on fishing resources of high value. At present, MIP is implementing new restrictions on fishing gears, including a prohibition on set nets (tranques) and the gradual reduction of the employment of bottom trawlers (chinchorros), in order to protect fish spawning patterns, the survival of small individuals, and the conservation of the marine bottom. These prohibitions are expected to affect more than 250 fishermen, and MIP is required by law to offer these persons new employment sources or to provide them continued wages until they find new employment.

Agriculture and Livestock Sector

12. Until recently, sugar cane and livestock have dominated agricultural land-use in the SCE. The morphology of the area, characterized by large plains, as well as the availability of subterranean hydrological resources, made the provinces of the SCE among the most important producers of sugar cane, fruit trees, and agriculture products in general, and the most important area in the country for livestock products. In the past few years, prices of sugar in the world market have declined significantly, so that today sugar sells for US\$0.06/pound. At present, forty sugar producing countries manage their production with the use of sugar quotas, with a guarantee of prices to producers that hovers around US\$0.21/pound. Even though this price is almost four times higher than that of the world market, for many producers sugar production even at this price is unsustainable.

13. Between the years 1900 and 1950, sugar production in Cuba grew at an average yearly rate of 5%, while in the years from 1950 to 2000 production growth declined to a 1% annual rate. In light of the steady decline in prices for sugar in the past decades, the export-dependent Cuban sugar industry has been forced to contract. In 2002, the GoC decided to produce approximately 700,000 tons of sugar for domestic consumption, and to sell sugar in the export market only when the price generated in foreign currency was superior to the cost of production. The practical result of this strategy has been a drastic reduction in sugar production in Cuba. In 2003, the Government of Cuba (GoC) decided to implement an Integrated Program of Conversion of the Sugar Industry.

14. The Sugar Conversion program calls for the reordering and improvement of all aspects of sugar cane production, including industrial facilities, agricultural lands, and the labor force. In 2003, the program made the decision to close 70 of the 155 existing sugar cane processing facilities in the country. Of the 85 sugar mills still in operation, 71 are devoted to sugar production and the remaining 14 are dedicated to the production of molasses and other diversified sugar products. In the SCE, 23 of the 44 sugar mills were closed, and their associated lands (62% of the total in the SCE) were taken out of sugar cane production (all sugar cane fields and mills are managed by MINAZ).

2. Threats, Root Causes and Barriers Analysis

2a. Overview of Threats

15. The Sabana-Camagüey Ecosystem (SCE) is a complex of terrestrial and marine ecosystems with strongly interconnected components. Actions in the mainland have significant influence on the ecological condition of inshore water bodies (e.g. lagoons), as well as coral reefs and other important habitat. On the other hand, disturbances in natural hydrographic cycles have produced impacts on the terrestrial environment, for instance by causing mangrove mortality in some cays and mainland coasts (Alcolado *et al.*, 1999¹). Currently, the SCE includes a mosaic of ecosystems under varying degrees of pressure, with undisturbed mainland, marine and cay ecosystems intermixed with areas affected significantly by human activities, such as tourism, fisheries, mining, agriculture, livestock, forestry, industry, human settlements, transportation, and infrastructure. The most significant threats to biodiversity within the Sabana Camaguey Ecosystem come from activities associated with the tourism, fishery and agricultural/livestock sectors, all of which play an important role in the local and national economies. The extent and nature of the impact of these three sectors in the SCE is described below. In addition, maps showing the location of areas of high threat as well as the location of areas of globally significant biodiversity are provided in Annex 4; a matrix of threats, root causes and barriers is provided in Annex 5; and an explanation of the relative significance of the impacts of the three targeted sectors is provided in Annex 6.

Tourism

16. The estimated total area of marine and cay ecosystems impacted by tourism is approximately 2,900 km². This area includes about 150 km² of cays (approximately 4% of the total area of cays), which are impacted by tourism infrastructure, primarily on the cays of Las Brujas, Ensenachos, Santa María, Guillermo and Coco. To date, coral reefs have been impacted only slightly by tourism, but approximately 105 km² of marine area are at risk from such activity (N of Matanzas Province, NW and NE of Villa Clara Province, from Cayo Guillermo to Cayo Paredón, and Cayo Sabinal). In addition, the construction of causeways (largely to support tourism development) has affected approximately 2,480 km² of bay environments (Bahía de Buenavista, Bahía de Los Perros and Bahía de Jigüey).

17. Although tourism development within the Sabana Camaguey Ecosystem has been highly concentrated on a few offshore cays, the existing and potential impacts of tourism development are significant (see Annex 4 – Map 2 for areas of tourism impact) Most of the tourism development to date has been based on the “sol y playa” model, with large hotel complexes and substantial supporting infrastructure (roads, causeways, service facilities, worker housing, etc.). Tourism infrastructure has led to significant habitat fragmentation, land conversion, land modification, disturbance of flora and fauna, and introduction of exotic/invasive species, primarily on the cays of Las Brujas, Ensenachos, Santa María, Guillermo and Coco. In many cases, construction is carried out without consideration of minimizing the development footprint, resulting in unnecessary vegetation clearing and over-dimensioned earth moving, land filling and ground leveling. Construction is also approved in fragile cay ecosystems, such as areas of coastal xeromorphic shrubs, evergreen and semi-deciduous forests, and coastal lagoons, which are critical habitat for native biodiversity and significant numbers of migratory birds. In addition, materials for construction are supplied in part by quarries within the SCE, some of which are sited in areas of critical coastal habitat. To date, there has been no significant tourism development on the mainland of the SCE.

¹ Alcolado, P.M., E.E. García and N. Espinosa (Eds.) (1999) *Protecting Biodiversity and Establishing Sustainable Development in the Sabana-Camagüey Archipelago*. GEF/UNDP Project Sabana-Camagüey CUB792/G31. CESYTA S.L. Madrid, 145 p.

18. Apart from construction of tourism facilities themselves, the construction of causeways that connect the cays to the Cuban mainland, which have been primarily to enable tourism development, have impacted some inland water areas, in some cases severely and over large areas. The impacts of causeways include changes to natural hydrological and sediment dispersion patterns, as well as to biological patterns (migration, dispersion, recruitment and reproduction) of fish and other marine biota (see Fisheries section below for more details on impacts of causeways on the marine environment). In addition, the causeways act as a corridor for the introduction of exotic animals and plants into the cays.

19. The management practices of existing tourism operations also have a negative impact on biodiversity within the SCE. Although hotels have made some progress in “greening” their operations, for the most part hotels fail to reuse and/or adequately treat wastewater, despite the water scarcity endemic to the cays, or to adequately management the disposal of solid wastes (estimated at 1.5 kg/tourist/day). Hotels also continue to import substrate from the mainland, and to use exotic ornamental plants for their landscaping, which has led to significant dispersal of exotic species in some areas. Finally, the activities of tour operators and visitors have had some impact on native ecosystems, in particular coral reefs, through the anchoring of dive boats, collection of marine biota, and pollution.

Fisheries

20. The impact of fisheries activities extends over virtually all of the 8,311 km² marine shelf of the Sabana-Camagüey Archipelago, which encompasses 390 km² of coral reefs, 5,625 km² of seagrass-beds, and remaining areas that include non-seagrass bearing soft (sandy and muddy) bottoms, and some non-reef rocky bottoms (see Annex 4 – Map 5 for areas of fishing impact) The primary impacts of fishing activities stem from overfishing, destructive fishing gears and practices, and poor management of coastal aquaculture, which together have led to a reduction of fish stocks and the degradation of marine ecosystems. In addition, the construction of causeways for tourism and other development objectives has had poorly understood, but likely significant, effects on fisheries resources and marine biodiversity.

21. The Sabana Camaguey Archipelago is one of the most over-fished areas in Cuba, with the highest concentration of ships/km² and of set nets/km² of any area of the Cuban shelf. Over-fishing has contributed to the modification of the trophic balance of coral reefs, threatening the existence of these biodiversity rich ecosystems of paramount importance for fisheries and tourism development. Among other impacts, overdependence on certain species has led to a scarcity of herbivores (parrot fishes and surgeon fishes) necessary to control algal proliferation on coral reefs, and of carnivore fishes to control coral predators and scrapers. Herbivore fish are fished heavily by commercial fishermen (using fish traps and bottom trawl), and to a lesser extent by sport and subsistence fishers using spear guns. Herbivore fish biomass (mostly parrot fishes and surgeon fishes) declined from 3500 g/100 m² in 1988-89 to 2250 g/100 m² in 2000; while carnivore fish biomass decreased from 16350 g/100 m² in 1988-89 to 2600 g/100 m² in 2000 (Claro-Madruga *et al.*, 2000)². Although other factors have had a significant impact on coral reef health, including climate change, coral diseases, and an increase in algal cover (which increase water turbidity and kills coral reefs) due to a die-off of the sea urchin (*Diadema*) that feeds on algae and historically high nutrient levels in the 1990s, the impacts of over-fishing have been a key factor in the decline of average coral cover from 24% in 1994 to 8% in 2003. In addition to overfishing, the SCE also has seen increased levels of illegal fishing activity, including the taking of globally significant species such as turtles, dolphins and manatees, and the extraction of reef species for the ornamental trade.

² Claro-Madruga, R., K. Cantelar, F. Pina- Amargós and J. P. García-Arteaga (2000) Biodiversidad y manejo de la ictiofauna del Archipiélago Sabana-Camagüey. Informe final del PNCT: Cambios globales y evolución del medio ambiente cubano, p97

22. Current use of unsustainable and destructive fishing gear and practices within the SCE also contribute to threats to globally significant marine biodiversity. The widespread use of gear such as set nets (tranques) and bottom trawls (chinchorros) have depleted fisheries stocks and destroyed bottom habitat. In addition, catching and discarding of juvenile fish is a significant problem due to the poor selection of gear. Fishermen have also greatly reduced fish stocks in the SCE through deleterious fishing practices, such as fishing in spawning and nursery areas, fishing without off-seasons, and capturing juveniles and breeding females. While the use of set nets and bottom trawls became more strictly regulated in 2004, these gears are still used in some areas, and other destructive gears and practices continue.

23. Although aquaculture is not widespread in the SCE, the facilities that do exist have some negative impacts on coastal and marine biodiversity. Wastewater problems and the escape of cultured species (including tilapia (*Oreochromis aureus*), catfish (*Claria* sp.), carps (*Cyprinus* sp.) to the natural environment, as well as other organisms, has occurred at two mainland coastal sites of the SCE (near Morón City, Ciego de Ávila Province, and in the Río Máximo basin, Camaguey Province) and at several inland dams (e.g. Río Zaza dam). The use of fertilizers to increase yields has resulted in eutrophication problems in Gloria and Los Perros Bays, and though recent mitigation efforts (i.e. an artificial channel to drain the aquaculture facilities near Río Máximo) have corrected some of the impacts in these sites, wastewater still drains into the Bahía la Gloria.

24. Finally, the impacts of the construction of causeways, as well as other infrastructure such as dikes and dams, are poorly understood, but are believed to be a major factor in the decline of some marine ecosystems and fisheries stocks in the SCE. Causeways have been constructed, without environmental impact studies, in mangrove forests that are critical breeding and sheltering habitat for numerous fish and crustacean species. These causeways act as barriers that interfere with the migrations of several species (including commercial species of finfish and lobster), the dispersal of their eggs and larvae, and the migration of recruits to nursery areas. In addition, the causeways have impeded natural water flows, increasing the areas of inland waters with high salinity levels and disrupting life cycles of many species.

Agriculture and Livestock

25. This sector impacts coastal and marine biodiversity over a total watershed/marine area of approximately 26,420 km². Of this area, 19,400 km² corresponds to the watersheds of the SCE, which are affected by habitat loss, fragmentation, land conversion and modification, removal of native flora and fauna, exotic and invasive species, and loss of agro-biodiversity, including approximately 500 km² of native coastal vegetation (semideciduous forests, swamp forests and mangroves, etc.). In addition, 6,520 km² of seagrass-bed and non-seagrass soft bottom areas, as well as other marine ecosystems such as coral reefs, are affected by nutrification (induced mesotrophy), eutrophication and enhanced silt/particulate organic sedimentation from runoff of livestock manure, agricultural inputs (fertilizers, herbicides, pesticides) and soils. There is no significant agriculture or livestock raising on the cays (see Annex 4 – Map 6 for areas of impact of agricultural activities)

26. Among the significant causes of negative impacts on coastal and marine biodiversity are increasing levels of soil and water degradation. Inadequate land preparation techniques, such as tillage down gradients rather than along them, or overly deep troughs in shallow soils, are leading to soil erosion, resulting in downstream impacts such as sedimentation and contamination of water bodies. Sediments are deposited on the vegetation (phanerogams and algae) in the seagrass beds, affecting their productivity and associated biota (transforming composition and decreasing diversity of species). The sediments also cause a decrease in water transparency, thus affecting photosynthesis of seagrass beds and diminishing their function as critical habitat for fishery productivity. In addition, the use of high-pressure aspersion irrigation, and amounts of water that exceed natural absorption rates of the soil, also contribute to soil erosion and high run-off rates, blocking natural waterways and impacting sensitive wetland and coastal

ecosystems down stream through overloading of soil nutrients and contamination from agricultural chemicals (WWF 1997³). Poor management of water resources, including excessive extraction of underground water, also contributes to marine intrusion and salinization in coastal areas, with severe impacts on the productivity of mangrove swamp ecosystems (primarily the red mangrove *Rhizophora mangle*).

27. Deforestation of native forests, and the spread of non-native forests and monoculture plantations, is also a source of threats to coastal and marine biodiversity within the SCE. While forest cover is not declining overall within the SCE (mirroring the situation in the country as a whole), the extent of natural coastal forests is declining as forest managers do not ensure adequate levels of reforestation, and as they utilize non-native species for reforestation projects. As a result, habitat loss and fragmentation has occurred in the coastal forest ecosystems, and additionally, the critical ecosystem services provided by these forests, which buffer aquatic and marine ecosystems from terrestrial impacts such as point and non-point sources of pollution, sedimentation, and agricultural run-off, have been negatively impacted.

28. Other impacts on coastal and marine biodiversity come from existing livestock management practices and policies, in particular the rapid increase in non-native water buffalo (*Bubalus bubalis*) populations within the SCE, which are used increasingly for meat and milk production. This species, introduced from China, thrives in the coastal habitat of the SCE, where it finds the necessary conditions of food, shade, and abundant access to water (buffalo need water to dissipate body heat and to protect themselves with mud from ectoparasites). However, the buffalo possesses great physical strength and has destroyed large areas of native vegetation in certain locales, including the deterioration of soils, fences, hedges and trees, which has led to habitat loss and significant increases in soil erosion affecting downstream (marine) ecosystems. Water buffalo are also becoming a significant factor in some areas in increasing waste flows into coastal waters, further exacerbating problems of eutrophication in critical areas such as seagrass beds.

29. Agricultural and industrial wastes (solid and liquid) are another source of impacts on biodiversity in the SCE. Lands designated for sugar cane and other agricultural cultivation were drained by natural rivers and streams or by channels and ditches that were constructed to flow into coastal waters (in most cases these extended four or five kilometers inland). Furthermore, wastes coming from sugar cane mills historically have been the primary source of pollution affecting coastal and marine ecosystems, although this threat has declined greatly with the reduction in sugar production in the SCE. Nevertheless, sugar production does continue, yet adequate agricultural waste treatment policies and processes do not exist within the SCE, and most technologies and systems that are in use are inefficient and obsolete, leading to environmental degradation and higher management costs.

Other Threats

30. As noted above, the tourism, fisheries and agriculture/livestock sectors all contribute to pollution in the SCE, with significant impacts on coastal and marine biodiversity. In addition, industrial activity and human settlements also contribute significant pollution into the SCE (see Table 1 below). Up until 2003, one third of Cuba's sugar mills were located in the SCE, and sugar industry pollution was a significant source of degradation of the marine coastal zone. However, in that year, one-half of the existing sugar mills were deactivated. Although information on the current pollution from remaining sugar mills is not yet published, a significant reduction of sugar cane industry-based pollution is expected.

31. Untreated wastewater pollution from industrial sites and coastal human settlements (e.g., Cárdenas, Isabela, Remedios, Caibarién, and Nuevitas) in the coastal and watershed zones also are significant

³ WWF (1997). WWF Country Plan for Cuba. Conserving Biological Diversity and Sustainable Use 1997-2002, WWF Canada, Toronto

sources affecting the marine shelf. Because of deficient operations of sewer systems and wastewater treatment plants, wastewater has contributed to eutrophication in some parts of the bays of the SCE, affecting life both in the water column and on the bottom. Historically, 20% of inshore sea grass beds were lost due to the turbidity of the water column and high concentrations of organic matter on the bottom. Currently, the GoC has undertaken various initiatives to reduce pollution loads. Several legal instruments related to the disposal of wastewater have been passed, including Law 81 for the Environment and Law 200 on Environmental Legal Infringements. Sectoral and regional environmental strategies are supposed to establish targets for the economic sectors to reduce their pollution levels, and Watershed Councils at the provincial and municipal levels are in charge of monitoring pollution loads dumped into the watersheds and coastal ecosystems. Various technical solutions have also been implemented, such as increased irrigation of sugar cane with treated wastewater; the introduction of cleaner production processes and service activities; the rehabilitation and maintenance of wastewater treatment systems; and the reorganization of enterprises, transferring productive processes to facilities with better wastewater treatment. Despite ongoing pollution problems, these and other actions have led to a significant reduction of disposed organic matter from all wastewater sources (sugar industry, other industries, human settlements) between 1999 and 2003 within the SCE (see Table 2 below).

Table 1: Pollution sources and BOD disposal within the northern watersheds of the provinces involved in the project (2003)

Basins/ Provinces	Pollution Sources					Load disposal (BOD ₅) ton/year
	Industry	Agriculture & Livestock	Domestic	Other	Total	
Matanzas	18	6	17		41	6138
Villa Clara	74	20	58	-	152	9762
Sancti Spiritus	5	5	4	6	20	2134
Ciego de Avila	13	13	31	-	57	10,410
Camagüey	12	7	18	2	39	2971
TOTAL	122	51	128	8	309	31,415

Table 2: Load disposal (BOD₅) ton/year within the northern watersheds of the 5 provinces of the Sabana Camaguey Ecosystem

Year	Province					Total in SCE
	Matanzas	Villa Clara	Sancti Spiritus	Ciego de Avila	Camaguey	
1999	26098	11393	2268	10623	3644	54026
2000	24629	10999	4110	10766	3213	53717
2001	14893	10595	2521	10319	3606	41934
2002	9302	10012	2341	9995	2666	34316
2003	6138	9762	2029	9744	2959	30632

32. Oil drilling and marine transportation of oil and dangerous wastes also are potential threats to the marine and coastal ecosystems of the SCE. Oil prospecting and extraction are carried out at the west end and center of the SCE, and future oil extraction is planned to the north of the central cays. However, oil and dangerous waste spills are not considered significant threats at this time, and Cuba has established strict regulations and implemented systematic monitoring of the environmental performance of all oil development projects.

33. In addition to threats directly related to human activities, climate change is believed to have some negative impacts on marine ecosystems, in particular coral reefs. Repeated coral bleaching events (mild to moderate) associated with sea surface temperature increases occurred in 1995, 1997, 1998, and 2003. Together with coral diseases and macroalgae proliferation, these events have contributed to coral reef decline.

2b. Barriers to Mainstreaming Biodiversity into Three Targeted Productive Sectors

34. Limited Integrated Planning and Institutional Coordination: The capacity of productive sector institutions and resource management agencies alike to carry out effective planning and coordination that mainstreams biodiversity conservation is extremely limited in Cuba. For example, in the Sabana Camaguey Ecosystem, the existing Integrated Coastal Management Authority, which is designed to address the goal of inter-institutional integration and coordination among the productive sectors, environmental managers, and specialized scientific institutions, is still not operational except in a few specific municipalities, and requires significant strengthening in order to be effective at both the regional and local levels. In the meantime, planning processes and development activities are carried out by each sector independently, with the result that impacts from one sector's activities on other productive or protected landscapes remain unaccounted for in planning decisions. Examples of such situations include the construction of hotels near critical fishing grounds; the establishment of livestock operations directly upstream from globally significant coastal habitat; and degradation of coral reefs by destructive fishing gear in areas with high tourism potential. Although ICMA's role will not be to take authority from the productive sectors, it will enable information sharing and coordination to ensure that changes in practices (tourism development, land management, fisheries) have an ecosystem level focus and mainstream biodiversity concerns.

35. In addition to the poor coordination among the productive sectors, coordination and planning between these sectors and the protected areas system (CNAP) within the SCE is very limited. For example, there is almost no coordination between marine protected areas (managed by CNAP) and fishery reserves (managed by MIP), so that an ecosystem level approach to management of fish stocks and marine biodiversity remains unachieved. Similarly, MINAZ has not considered or addressed the problem of movements of non-native species (e.g. rats and mongooses) from converted sugar cane fields to neighboring protected areas that harbor globally important biodiversity (e.g. Río Máximo Faunal Refuge, Caguanes National Park). In the tourism sector, tourism managers in areas like Cayo Coco, Cayo Guillermo and Cayo Santa Maria have not participated at all in assessing or developing the potential to increase tourism products in areas such as the neighboring national parks Caguanes and Los Caimanes, nor in investigating the potential to establish sustainable income generating mechanisms from tourism which would increase tourism sector revenues while also promoting biodiversity conservation.

36. Limited capacities within institutions also constitute an important barrier to mainstreaming biodiversity concerns. The Ministry of Sugar (MINAZ) has limited experience in agricultural and livestock production and is undertaking these activities on converted sugar lands with little knowledge of soils, topography, water and nutrient availability, climatic conditions, or appropriate animal species and agricultural and forestry varieties. The Ministry of Tourism (MINTUR) continues to base development planning (calculation of room capacities) on the beach area available (in ha), and does not take into account ecosystem carrying capacity, about which it knows nothing. In the fisheries sector, MIP has insufficient capacity to study fish spawning areas and to determine the precise location, size, identity of spawning species and their spawning periods, which hinders the recovery of endangered or very depressed species like the Nassau grouper (*Epinephelus striatus*) and some snappers. As a result, even though MIP is willing to improve its management decision-making related to fisheries to incorporate

biodiversity conservation goals, limited technical and material capacities constitute a barrier to this objective.

37. Incomplete regulatory framework and guidelines governing sectoral impacts on biodiversity: Existing laws, regulations, guidelines and enforcement mechanisms governing the three targeted productive sectors have significant gaps in the ways that they address environmental management, and in particular, the issue of biodiversity conservation. Legislation in Cuba which addresses biodiversity directly is generally broadly written and does not include accompanying regulations which would allow for enforcement of new policies and activities on the ground. The institutional and regulatory framework also is often confused, so that for example monitoring and enforcement of resources such as fisheries and forests is subject to overlapping jurisdictions and competition between CITMA on the one hand and forest rangers and fisheries managers on the other hand. In other areas, existing regulations and policies are simply too broad to be of use in managing impacts on biodiversity. For example, while tourism development is subject to environmental impact assessments for individual development projects, there are no laws or policies in place to allow for strategic impact assessments that would measure the overall impact of tourism development across an ecosystem/geographic area, a key factor in considering impacts on species and ecosystem diversity. Additionally, environmental impact assessments generally allow for the granting of environmental licenses for development projects without assessing the need or requiring agreements for rehabilitation of landscapes degraded by construction activities. In the fisheries sector, existing systems of protection, surveillance and environmental control of fishing practices are poorly integrated, and despite the recent establishment of new regulations on fishing gear and practices, an integrated approach for the planning and management of fisheries stocks has not been developed.

38. Information Gaps on Biodiversity and Integrated Coastal Management: As noted above, gaps in knowledge about the condition (rarity, threat, endemism, introduced species) and requirements and spatial connectivity of species populations and ecosystems of local and global significance constitute a barrier to mainstreaming biodiversity conservation into productive sector planning and activities. These knowledge gaps also exacerbate the tendency (also noted above) to make decisions based on short-term consideration of narrowly defined economic benefits, to the detriment of economic and ecological sustainability. As a result, destructive building practices, introduction of alien species, inappropriate official fishing quotas, inadequate mesh sizes, etc. continue to be the outcome of many productive sector activities. In addition, planning for future activities by these sectors remains limited to areas in which information already exists; in other words, business as usual. For example, because the tourism industry knows in Cuba knows little about nature tourism and ecotourism (markets, products, etc.), the sun and beach model of tourism development continues to dominate in sectoral planning. Finally, decision-making managers and scientists need early warning information systems in order to conserve certain ecosystems. For example, effective conservation of coral reefs is dependent on early identification of areas of concern so that tourist diving can be redirected to other zones or so that areas most resistant to coral bleaching can be prioritized to be included refuges.

39. Low Awareness and Understanding of Biodiversity Issues and Sustainable Development Options: In general, awareness of the impacts of productive sector activities on biodiversity, of the potential for sustainable production alternatives based on biodiversity-friendly processes, or of the means to undertake such activities, is very limited among almost all stakeholders in the Sabana Camaguey Ecosystem (decision makers, resource managers, entrepreneurs, workers, local inhabitants, etc.). In the tourism sector, for example, there is little awareness of the success of ecotourism in locales similar to the SCE in other parts of the Caribbean, nor any understanding of the potential ecotourism attractions within the SCE, nor any persons qualified to act as tour operators or guides for ecotourism. In the agriculture sector, there is almost no awareness of the impacts of waste contamination from agriculture and livestock on globally important species and ecosystems in downstream coastal and marine habitats, or of the

ecological impacts of introduced species (e.g. destruction of native vegetation by water buffalo) in coastal forest habitats, nor is there any knowledge of effective and efficient options to mitigate these impacts.

40. Productive sectors priorities focused on short-term economic benefits: In common with most countries, in Cuba the development of the tourism, fisheries and agriculture/livestock-raising sectors has been based on traditional economic strategies that pay little attention to the environmental goods and services of ecosystems, or the appropriate internalization of costs (such as negative impacts on biodiversity and the environment), which is essential for long-term economic sustainability. For the most part, there are few models for measuring the long-term benefits of sustainable production, or for measuring the true costs of economic activities (i.e. environmental costs), and therefore there are no incentives for resource managers to consider alternative forms of production. As a result, the three targeted sectors develop management plans based primarily on production targets (e.g. maximum yield in a given year) and with little consideration of long-term environmental effects or economic returns. This focus on maximizing short-term returns limits the incorporation of biodiversity principles into sectoral development.

41. Absence of models for biodiversity-friendly alternative livelihoods: Even for those decision makers, managers and individual producers who do show interest in new productive sector strategies and activities, the lack of demonstrated models for biodiversity-friendly and economically sustainable alternatives within the SCE, and Cuba as a whole, continues to present a barrier to adoption and replication of these alternatives. This barrier affects decision makers and managers, who feel constrained in their abilities to regulate or limit destructive practices (e.g. overfishing, high-impact tourism development, mono-culture cultivation) by the likely impact of increased controls on workers, and the lack of options to present to these workers as proven alternative employment opportunities. While the Government of Cuba has demonstrated some willingness to shoulder the costs of reduced employment from increased regulation (as with continued payment of salaries to unemployed sugar industry workers, and profit sharing with fishermen who are idled by increased fish imports from Chile), these are clearly not long-term solutions for managers or workers.

42. National Economic Structures: Several issues associated with the planned economy in Cuba present potential barriers to mainstreaming biodiversity conservation. Under the Cuban system, production and distribution processes are mainly governmental, and the private sector is very small in productive sectors such as agriculture and fisheries, and almost nonexistent in tourism. While this structure guarantees social equity, it also increases the effect of any given planning and development policy or tradition, thereby exacerbating both positive and negative patterns. It also means that most innovation and willingness to change must be directed through state institutions, which frequently will continue business as usual without strong incentives to change. In addition, few mechanisms are in place for the sustainable finance of conservation activities, and there is no framework of laws and policies to ensure that conservation related revenues will be controlled and/or used by conservation proponents in the areas in which they are collected.

3. Institutional, Legal and Policy context

3a. National Cross-Sectoral Policy, Legal and Institutional Frameworks

Development Planning in Cuba

43. The Institute of Physical Planning (IPF), which is part of the Ministry of Economy and Planning (MEP), manages a comprehensive system of land-use planning at national and provincial levels. The IPF is charged with selecting the broad-scale planning priorities for different regions of the country – for

example, the amount of land and resources to be allocated to livestock production in a Province. In order to make these decisions, the IPF works closely with numerous agencies and enterprises involved in land use, resource management, conservation, etc., including the Ministry of the Environment (CITMA). The IPF has displayed and demonstrated its willingness to integrate environmentally responsible criteria into its development planning processes, and indeed, the IPF has played an important role during Phases 1 and 2 of the project, and will be an important component in the operation of the Integrated Coastal Management Authority for the SCE.

44. In spite of significant methodological and operational advances in planning during more than three decades of practice across the country, current practices of the Institute of Physical Planning still present significant barriers to sustainable development planning in ecologically sensitive areas. Among the most important of these barriers are: 1) territorial planning is carried out as a consultative process rather than a participative one; 2) environmental considerations are not sufficiently incorporated into territorial planning processes; 3) the involvement of most relevant stakeholders typically does not take place until the later stages of the planning process; and 4) Strategic Impact Assessments for environmental planning at the ecosystem or landscape level have yet to be legally adopted as instruments to be used by planners prior to the elaboration of development plans.

Environmental Management and Planning

45. Numerous laws, regulations and plans for environmental management exist in Cuba, among which the most important are the National Environmental Strategy (NES), passed in 1997, and Law 81 (Law of Environment), also passed in 1997, which constitutes the fundamental law underlying the country's system of laws, decrees and resolutions relevant to biodiversity conservation. Since the establishment of Cuba's National Environment Strategy, CITMA has taken a lead role in managing processes of elaboration, discussion and approval of both Sectoral Environmental Strategies and Territorial Environmental Strategies. This environmental strategy development is quite comprehensive, so that entities at all levels of each economic sector of the country (Ministries, Enterprises) and at all levels of territorial management (national, provincial and local) must produce their own Environmental Strategies, all of which are reviewed and approved by CITMA.

46. These strategies, in all levels and sectors, are the starting point for implementing annual plans of management and investment to protect the environment and natural resources. The development and execution of these strategies is a key element in enhancing coordination between CITMA and the productive sectors of the economy, as well as with provincial and local authorities. While this systemic approach to environmental planning has contributed to making CITMA a recognized authority in environmental management, and established its role in convening institutions and agencies at various levels and from various sectors, for the most part it has not succeeded in institutionalizing inter-sectoral coordination for environmental management. Instead, CITMA has relied on more ad-hoc processes and structures, such as the use of Technical Ministerial Consultative Groups, which are inter-ministerial groups, led by CITMA, created to address challenges in environmental management and sustainable development in specific ecosystems (bays, mountains, watersheds, etc.). For example, the National Coastal Zone Group, has developed proposals for policies, strategies and recommendations related to coastal zone planning and biodiversity protection, as well as monitoring of implementation and community participation (the National Coastal Zone Group was an active participant and contributor during the PDF-B phase, and is expected to be a key participant in project activities related to inter-sectoral coordination and sustainable financing mechanisms). However, while these groups have succeeded in improving some cross-sectoral planning, they are ad-hoc structures with limited authority and varying degrees of participation.

47. A more permanent structure for inter-sectoral coordination is the National Watersheds Council (CNCH). Created by the Executive Committee of the Council of Ministers in 1997, the CNCH is the highest national authority for watershed planning and management, composed of ministers of economic sectors directly involved in the use and protection of natural resources in eight key watersheds in Cuba. The CNCH is in charge of coordinating, monitoring, and evaluating economic and social development strategies at the watershed level, and establishing management and mitigation plans to guide these strategies. The Executive Committee of the Council of Ministers designated CITMA as chair of the CNCH, and the National Institute of Hydraulic Resources as co-chair at the national, provincial and municipal levels.

48. Thus far, the CNCH has not operated in the Sabana Camaguey Ecosystem, as none of the eight watersheds for which it is responsible is located in the area. However, the CNCH has been directed by government mandate to extend its management operations to coastal zones of the country which already have begun to implement ICM mechanisms. For this reason, the proposed Integrated Coastal Management Authority (ICMA) for the SCE will be placed within the institutional structure of the CNCH.

Development planning for the Sabana Camaguey Ecosystem

49. Currently in the SCE, a broad-scale development plan created by the IPF exists at the regional level, and each productive economic sector has its own master plan (at varying levels of geographic detail and technical expertise). As a key element in integrating these levels of planning, and strengthening the enabling environment to support changes in sectoral practices, the project will support the operationalization of the Integrated Coastal Management Authority (ICMA) as the lead institution for inter-sectoral coordination in the SCE. Created in Phase 2 of the project but not yet operational, ICMA is designed to implement integrated coastal management practices in the SCE, such as integrated planning and decision making, coordination, conflict resolution, community education and participation, disaster contingency planning, etc.). ICMA is a regional and local nested system that coordinates local governments and institutional coalitions at the provincial and municipal levels in their implementation of ICM mechanisms and instruments at their respective geographic levels (the organizational model for the Cuban government is one of vertical integration and coordination, so that almost all Ministries have representations or delegations at the provincial and municipal levels).

50. Although there is some experience of integrated and coordinated work with existing government bodies (as noted above) in assessing the crucial environmental problems of the SCE, the formal structure and resources provided by ICMA will remove significant barriers to integrated planning and mainstreaming of biodiversity conservation. Through ICMA, the project will enable the tourism, fisheries, agriculture and sugar sectors to strengthen existing planning functions and to consolidate them in similar and comparable formats; it will make needed adjustments to the regulatory and enforcement framework for biodiversity conservation and management, and it will introduce the use of Strategic Impact Assessments, which will allow for ecosystem-level assessments of the impacts of potential development activities, similar to the site-specific analysis of existing Environmental Impact Assessments. This will be particularly important for the sugar industry, whose conversion process currently only looks at impacts at the site level, although the simultaneous conversion of 23 different sites in the SCE will have significant regional effects (additional details on ICMA are provided in Annex 1).

3b. Policy, Institutional and Legal Frameworks in the Productive Sectors

Tourism Sector

51. The Ministry of Tourism (MINTUR) is responsible for all government polices and programs related to tourism. A number of agencies are directly part of the MINTUR, such as the Directorate of Development, Directorate of Investments, the Technical Group for Tourism (TGT), and FORMATUR (training of tourism sector workers), and each of these has provincial and local level offices. In addition, several large hotel chains (Cubanacán, Gran Caribe, Islazul, Palmares) are directly operated by MINTUR. Other lodging and marina enterprises, as well as the national camping network, and the major travel agencies (Cubatur and Viajes Cubanacán, Havanatur, Cubamar, Gaviota Tour, Cubadeporte, Paradiso and Ecotur), are independent entities but operate according to the guidelines and regulations established by MINTUR.

52. All of the tourism development in the cays of the Sabana Camaguey Ecosystem (SCE) is owned and managed by MINTUR, although 10 of 14 hotels are jointly operated with foreign partners. The SCE was designated in 1989 as an area for the development of “sun and beach” tourism, when the first Territorial Zoning Scheme for Tourism was carried out. Since that year, detailed territorial zoning plans have been elaborated for each major tourism development area in the SCE, and development proposals for hotel and other tourism related infrastructure are periodically updated and adjusted.

53. MINTUR is required to consider environmental impacts in its planning processes, through such laws as Resolution No. 77/95 on Environmental Impact Assessment and Decree No. 272/1999 for the Regime of Territorial Planning and Urbanism. Actions related to the protection of the environment and natural resources that MINTUR has carried out in the SCE include: the introduction of cleaner production practices in tourism facilities to conserve water and energy and reduce solid wastes; training courses for environmental auditors of the tourism system; development sustainability indicators for tourism development based on the Agreement of Declaration of the Caribbean as a Sustainable Tourism Area; and awards granted to tourism facilities for being free of CFCs (chlorofluorocarbons) and OES (ozone exhausting substances). Phase 2 of this project helped to strengthen environmental management of tourism activities by supporting Decree Law 202/2000 on “Management of the Coastal Zone”, which established regulations for sustainable coastal development, such as requiring physical setbacks of tourism infrastructure away from coastal zones, and establishing different levels of protection across the beach profile.

54. Despite MINTUR’s responsibility for managing environmental impacts, neither the existing regional tourism development plans for the SCE, nor the Master Plan for the development of tourism in the cays, focuses on environmental issues. Furthermore, these processes are advisory in nature and there is little real participation by local stakeholders who are most aware of existing and potential environmental impacts. Finally, the existing Sustainable Tourism Indicators used by MINTUR do not incorporate biodiversity conservation.

Fisheries Sector

55. The Ministry of the Fisheries (MIP) is responsible for the management and marketing of the country’s fisheries, as well as the environmental monitoring and control of marine resources. Fisheries production is organized in Enterprise Groups (e.g. PESCACUBA, INDIPES, GEDECAM, ARGUS and PESPORT) within MIP. In addition, MIP is comprised of several research agencies, such as the Center for Fisheries Research (CIP), the Higher Fishing Institute (ISP), the Aquaculture University Mampostón, and others.

56. Within the SCE, fisheries production is carried out by Provincial Enterprises organized into eight Basic Fishing Units in the areas of Cárdenas, La Panchita, Carahatas, La Isabela, Caibarién, Punta Alegre, Turiguanó and Nuevitas. These units participate in the capture and processing of marine finfish and lobsters, and the production of freshwater aquaculture and shrimp aquaculture. MIP is also responsible for activities such as the construction and repair of vessels in its own network of shipyards.

57. The regulatory system for the conservation and management of fish resources and their habitat is based primarily on Law No. 164/1996 “Fishery Regulation”, which designates MIP as the agency in charge of controlling the extraction, cultivation, processing and marketing of fisheries resources. Other important laws are Resolution No. 31/1999 for the establishment of special use zones (i.e. no-take areas) in marine waters; Resolution No. 1/97, a joint resolution of MIP and CITMA that establishes important regulations for the protection and sustainable use of coral reefs; and Resolution 58/2004 which bans the use of set nets. Regulations are enforced by a Corps of Inspectors from the National Office of Fishery Inspection within MIP, which has a network of offices in every province in the country.

58. The passage of Resolution 58/2004 in the year 2004, along with a ban on bottom trawling that will be progressively implemented from 2004-07, are significant steps in making Cuba’s fisheries production more sustainable and in protecting marine ecosystems. These measures, which will protect spawning populations and conserve bottom habitat, will require the conversion to different uses and gears of at least 37 vessels in the SCE, involving 250 persons.

59. While fisheries regulation is improving in Cuba, many aspects of the regulatory framework remain poorly developed. For example, integration of fisheries enforcement activities between the MIP Corps of Inspectors and other parties (for example, the system of marine protected areas and the Cuban Coast Guard) is very limited, and the illegal collection of marine biota (corals, mollusk shells, etc.), illegal fishing, the use of prohibited fishing gears and practices, and the fishing and hunting of threatened marine species, remains poorly regulated. Likewise, the system of granting sport and subsistence fishing licenses is poorly regulated, and lacks basic data on sport and subsistence catch levels.

60. In addition, coordination and planning processes in the fisheries sector still present many barriers to mainstreaming biodiversity conservation into sector activities. Currently, fishing catch levels and management plans are discussed in the Fishery Consultative Commission, where various stakeholders are invited to participate but only in an advisory role. Furthermore, participation is mostly limited to the fisheries sector itself, so that there is no inter-sectoral planning or coordination, despite the immense impacts of other sectors on fisheries resources and marine ecosystems. When there are issues of concern involving the fisheries and other sectors, the process to date has been that of ad-hoc inter-institutional arrangements to discuss issues among the interested parties.

61. In spite of these barriers, a number of conditions in the fisheries sector in Cuba provide it with a real opportunity to implement a strong model of sustainable production and conservation. Cuba benefits from a strong scientific and technical capacity in the fisheries sector, relatively healthy fisheries resources and marine ecosystems (for the Caribbean), strong legislation for fisheries management, and a vertically integrated and centralized fisheries production sector wherein coordinated implementation of new, more sustainable practices has a good potential for success.

Agriculture/Livestock-Raising sector

62. Two ministries are responsible for productive land use in Cuba – the Ministry of Agriculture (MINAGRI) and the Ministry of Sugar (MINAZ). From an institutional point of view, MINAZ is responsible for lands under sugar cane production. However, with the advent of the Sugar Industry Conversion Program that began in 2003, MINAZ is also responsible for the ongoing management of its lands that are being converted from sugar cane production to other uses.

63. The Ministry of Agriculture, on the other hand, is responsible for the use, conservation and improvement of agricultural and forest lands; the conservation, management, rational use and sustainable development of forest resources; and the protection and increase of the cattle heritage and livestock

raising, among other functions. MINAGRI has extensive experience and technical capacity in these areas, represented by agencies such as the State Forestry Service (SEF), the Environmental Enterprise Group (GEAM), Forestry Research Institute (IIF), the National Enterprise for the Protection of Flora and Fauna (ENPFF), the Institute of Soils (IS), and the National Institute of Tropical Agriculture Fundamental Research (INIFAT). As a consequence, the norms and technical regulations to be applied in agriculture, livestock-raising and reforestation activities on former sugar cane lands are those established by the Ministry of Agriculture, although management responsibility remains with MINAZ.

64. To accomplish its new management responsibilities, MINAZ has restructured its institutional framework to include a new Agricultural Vice-ministry with three National Directorates for Crops, Forest and Fruit-Trees, and Livestock. In each province, Agricultural Managerial Groups (GEA) have been created and these groups manage areas devoted to agricultural production within the framework of land use changes. In addition, MINAZ has established formal inter-institutional coordination mechanisms with the Ministry of Agriculture to develop and implement land use policies.

65. From the environmental point of view, the sugar land conversion program has not taken into account all of the potential impacts on coastal and marine ecosystems. While the program has considered the existence and technical state of waste treatment systems for sugar production processes and their by-products as one of the elements in deciding on which mills to close, it did not consider the potential impacts of agriculture and livestock activity on coastal and marine ecosystems in selecting areas for land use conversion.

66. More generally, land use planning and distribution has been based largely on local level criteria, without an ecosystem or landscape level approach. In addition, while planning of the sugar land conversion has incorporated criteria on production level, market potential and employment opportunities, it has not incorporated assessments of the impacts on biodiversity (locally or at the ecosystem level) of these land use changes. These shortfalls are due in large part to the lack of information on conditions at the ecosystem level, or more commonly, the lack of mechanisms for sharing such information when it does exist. Although one of Cuba's strengths is the existence of numerous scientific institutions that have carried out many high quality studies of agricultural/livestock conditions, coordination between these institutions and MINAZ in planning and implementing the Conversion Program has been minimal. Furthermore, MINAZ, despite having ultimate responsibility for the sugar cane land conversion process, does not have a Geographic Information System that would allow it to compare areas targeted for conversion and their uses, type of soils, vegetation, their proximity to the coastline and to areas of high biodiversity, and other elements that may be necessary for decision-making.

4. Stakeholder Analysis

67. A wide array of stakeholders will participate in implementation of the proposed project, in areas ranging from technical and material inputs to design, management and oversight responsibilities. Because the project is focused on interventions in the productive sectors and landscape, several productive sector ministries will be integral parts of the project management structure and implementing unit. As in Phases 1 and 2 of this project, the Ministry of Science, Technology and Environment (CITMA) will be charged with inter-sectoral activities, such as development of the Integrated Coastal Management Authority, the information networks and capacity building mechanisms to support it, and the overall sustainable financing program of the project. However, in a departure from Phases 1 and 2, the remainder of the project, focused on capacity building, policy and legal changes, and pilot demonstrations in the productive sectors, will be the direct responsibility of the relevant ministries, in this case the Ministry of Tourism, the Ministry of Fisheries, and the Ministries of Agriculture and Sugar.

68. These four ministries in particular have been closely involved in all stages of the development of the proposal, and the significant human and technical resources that they have provided for the design of the project are one indicator of the potential benefit that they see from participating in the project. For each of these ministries, mainstreaming biodiversity conservation into their activities holds a potential benefit. For Tourism, diversification of the traditional “sun and beach” tourism model with nature related tourism will provide an opportunity to expand the overall tourism product offered by Cuba at a time when competition in the Caribbean is becoming more severe and the saturation of the Cuban market for this particular kind of tourism approaches. For Fisheries, clear signs of the decline of the Sabana Camaguey fisheries stocks, the second most important in Cuba, have already led to increased restrictions on fishing effort, and fisheries managers are eager to find yet more ways to reduce fishing impacts, as well as to provide viable alternative livelihoods for fishermen (the Ministry of Fisheries is responsible for continuing to pay fishermen indefinitely after they have been laid off until they find new employment). For Sugar, the shutting down of almost 50% of the country’s sugar production and the ongoing conversion process to different land uses poses an immense challenge to the Ministry of Sugar, and they are consequently open to trying a variety of “non-traditional” approaches to agriculture, livestock and forestry management. Additional details on the entire range of stakeholders, including a table showing their interests and possible conflicts with the project, are provided in Section IV.

5. Baseline analysis

69. In spite of the high priority that the Government of Cuba places on the conservation of biodiversity and the sustainability of its development programs, social and economic pressures can still promote decision making based on short-term revenue decisions that will compromise globally significant biodiversity. In the baseline scenario, the primary criteria for development and planning decisions in the Sabana Camaguey Ecosystem will be short-term profitability and economic growth on a sector by sector basis. Sector-based decision making will continue to minimize the role that biodiversity and ecologically sustainable practices play in economic development, and as a result biodiversity resources will be ignored and degraded. The planning and management processes for the SCE at the inter-sectoral and regional level will continue to pay scant attention to environmental concerns, while environmental planning and oversight will remain sector specific and unable to address issues at the landscape or ecosystem levels. Moreover, the legal, regulatory and enforcement framework for environmental management, and particularly for biodiversity conservation, will remain incomplete and ineffective. What regulation and protection does exist for biodiversity in the SCE will continue to be focused on protected areas, and the productive landscape and seascape will continue to be heavily impacted by human activity.

70. In the baseline scenario, the possibility of acquiring relevant understanding about species, populations and ecosystems of national and global importance to enable informed management and decision making would be severely reduced. In addition, economic incentives for biodiversity friendly investments and practices will remain almost non-existent, providing no impetus for change in the traditional high-impact development and resource management practices common in the area. As well, actual models of successful sustainable tourism, fisheries, and agriculture and livestock raising economic activities will not be available to promote understanding and support for biodiversity conservation among productive sector stakeholders, or to provide demonstrable alternatives to traditional development models. Opportunities to develop local capacity for integrated coastal management will also be severely limited in the baseline, as existing efforts will not have resources adequate to carry on their programs. Further details on the baseline situation are provided in the Incremental Cost Analysis.

PART II: Strategy

6. Project Rationale and Policy Conformity

6a. GEF Operational Program and Strategic Priority

71. The project is eligible under the GEF BD 2 “Mainstreaming Biodiversity in Production Landscapes and Sectors”. It will mainstream biodiversity conservation into the tourism, fisheries and agriculture sectors, promoting changes in the practices of these sectors and provide an enabling environment for supporting these changes. It will include specific components geared to induce the changes in each of the relevant productive sectors. Strengthening the enabling environment to support these changes will also provide the financial, institutional, social and ecological sustainability of the impacts achieved over the entire Program. These will include strengthening of inter-institutional coordination through systemic and institutional capacity building to the project’s five provinces and five reference municipalities, as well as to the directorates of the ICMA, the development of sustainable financing mechanisms for biodiversity conservation and linking of the management activities of tourism, fisheries and agriculture/livestock-raising sectors to protected area to the activities across the productive landscape.

72. The proposed project also complies with other GEF eligibility criteria. The main objective is aligned with national policies as shown in Section 10b. Global biodiversity benefits would clearly be captured in coastal and marine ecosystems, and as such the proposed project will support GEF Operational Program 2; Coastal, Marine and Freshwater Ecosystems. The project design support both of the primary objectives of OP2 – Conservation and Sustainable Use. Conservation will be ensured by establishing various forms of protected zones for the fisheries sector, as well as guidelines and regulations restricting the location and scale of tourism development. Sustainable use will be ensured by seasonal restrictions and gear and practice restrictions on fisheries, development of sustainable nature related tourism, and improved planning and management to make agriculture, livestock and forestry practices more biodiversity friendly. The project also meets the primary assumptions for OP2 projects, namely that the project scope will cover a variety of ecosystem types that are identified as priorities within national biodiversity strategic plans and programs, and the best practices and lessons learned from the project will be replicated both within the SCE and in other locales in Cuba and throughout the Caribbean.

73. The proposed project is designed to support the primary objectives of the Convention on Biological Diversity: the conservation of biological diversity, the sustainable use of its components, and the equitable sharing of the benefits arising out of the utilization of these components. The project will support the objectives of the following CBD articles, among others: Article 6 (General Measures for Conservation and Sustainable Use) by integrating conservation and sustainable use of biodiversity into relevant productive sector plans and policies; Article 7 (Identification and Monitoring) by data collection, impact monitoring, adaptive management and documenting lessons learned; Article 8 (*In situ* Conservation) by ensuring conservation of marine and terrestrial biodiversity within the productive landscapes; Article 10 (Sustainable Use of Components of Biological Diversity) by establishing an enabling environment and demonstrations for productive use of biodiversity resources; Article 11 (Incentive Measures) by creating economic and policy incentives promoting sustainable agriculture and fisheries production and nature-based tourism; and Article 13 (Public Education and Awareness) by creating and implementing education and awareness programs for local populations, key decision makers, and the general public.

74. The project is also designed to support relevant CBD guidance on coastal and marine biodiversity including the Jakarta mandate and the guidance stemming from COP 7 in this arena. In particular be mainstreaming of biodiversity into the productive landscape and seascape it supports a number of key

elements under Decision VII/5 of COP 7 on the Elaborated Programme of Work on Marine and Coastal Biological Diversity. These are indicated in the table below. With regard to tourism and biodiversity, the proposed project takes account of the Guidelines on Biodiversity and Tourism Development created in Decision VII/14 of COP 7 on Biological Diversity and Tourism, including establishing goals such as “sustainable tourism compatible with biodiversity conservation and sustainable use”, “integration and interrelation with other plans, developments or activities in the same area”, and “poverty reduction, through the generation of sufficient revenues and employment to effectively reduce threats to biodiversity in indigenous and local communities”.

Links between the project’s goals and CBD Updated Work Programme of Work on Marine and Coastal Biological Diversity (Decision VII/5 of COP 7)

Programme Element	Operational Objective
<u>Programme Element 1:</u> Implementation of integrated marine and coastal area management (IMCAM)	<p><u>Operational Objective 1.1:</u> To apply appropriate policy instruments and strategies, including building of capacity, for the effective implementation of IMCAM</p> <p><u>Operational Objective 1.2:</u> To undertake direct action to protect the marine environment from negative impacts</p>
<u>Programme Element 2:</u> Marine and coastal living resources	<p><u>Operational Objective 2.1:</u> To promote ecosystem approaches to the conservation and sustainable use of marine and coastal living resources, including the identification of key variables or interactions, for the purpose of assessing and monitoring, first, components of biological diversity; second, the sustainable use of such components; and, third, ecosystem effects.</p> <p><u>Operational objective 2.3:</u> To gather and assimilate information on, build capacity to mitigate the effects of, and to promote policy development, implementation strategies and actions to address: (i) the biological and socio-economic consequences of physical degradation and destruction of key marine and coastal habitats including mangrove ecosystems, tropical and cold-water coral-reef ecosystems, seamount ecosystems and seagrass ecosystems including identification and promotion of management practices, methodologies and policies to reduce and mitigate impacts upon marine and coastal biological diversity and to restore mangrove forests and rehabilitate damaged coral reef; and in particular (ii) the impacts of mangrove forest destruction, coral bleaching and related mortality on coral-reef ecosystems and the human communities which depend upon coral-reef services, including through financial and technical assistance.</p>

6b. GEF Projects and Programs in the Country

75. Cuba is currently implementing several GEF projects and initiatives that have thematic links with the proposed project. Among these is the UNDP-GEF project “Demonstration of Innovative Approaches to the Rehabilitation of Heavily Contaminated Bays in the Wider Caribbean”, which is setting up pilot demonstrations to test innovative technical, management, legislative and educational approaches for reducing the input of contaminants into international waters. The lessons of this project on waste management and mitigation in coastal and marine ecosystems will be of great benefit to the Sabana Camaguey project, and mechanisms for information exchange between the two projects will be established. Cuba also is participating in a major regional project focusing on watershed and coastal area management in the Caribbean Small Island Developing States (SIDS). This project, “Integrating Watershed & Coastal Area Management in Caribbean SIDS (IWCAM)”, involves 13 Caribbean countries and will address regional and country-specific issues related to management of critical watersheds and the marine environment. The project will review systems for aquatic monitoring of pollution loads from

point sources and from marine port activity; identify technologically sound alternatives to industrial and domestic wastewater treatment; and work in pilot areas to demonstrate good practices in the agriculture and forestry sectors, with an emphasis on the development of organic agriculture and reforestation in critical areas (steep slopes, areas near rivers) in order to decrease erosion and transport of solids into river systems and the Cienfuegos Bay (project is located on the southern coast of Cuba, not within the SCE).

76. A third GEF regional initiative in which Cuba is participating is “A Transboundary Diagnostic Analysis and Strategic Action Programme for the Gulf of Mexico Large Marine Ecosystem (GOM/LEM)”. This project (currently in PDF-B phase) is intended to enhance national and regional efforts to address high priority environmental and resource issues in the Gulf of Mexico Large Marine Ecosystem in an integrated fashion consistent with the LME approach. The area of intervention for this project in Cuba is not located within the Sabana-Camaguey Ecosystem, although lessons learned in both projects could be interchanged. Cuba also is implementing a GEF Small Grants Programme (SGP), which at present is not supporting any projects within the SCE.

77. In addition to the projects noted above, two additional GEF-supported initiatives will be closely linked to the Sabana Camaguey project. One of these is the UNDP-GEF project “Strengthening the National System of Protected Areas”, which will coordinate closely with the Sabana Camaguey project on issues of sustainable financing and tourism development within protected areas (see Annex 8 for details).

78. The other initiative is the proposed GEF Country Programme Partnership (CPP), which will provide support to Cuba in combating land degradation, desertification and drought. The CPP will include a series of projects that would each have capacity building components as well as on-the-ground demonstrations. Links with the proposed SC project will occur principally at the capacity building levels. Capacity-building elements of the CPP will include mechanisms and conditions to mainstream sustainable land management principles into national, regional and local planning frameworks; the strengthening of institutional capacities to monitor, prevent and combat factors leading to land degradation nationwide; and building awareness in all relevant stakeholders of this phenomenon and its relationship with socio-economic activities, natural resource use and conservation. These activities would be undertaken at the national and regional levels and would contribute towards the implementation of sustainable land management in the entire country. Through such actions, the CPP will have positive effects on reducing the impact of land degradation, soil erosion and run-off in the Sabana-Camaguey Ecosystem, despite the fact that on the ground interventions of the CPP would not be undertaken in watersheds that drain into the archipelago⁴. Capacity building of land management and planning institutions by the CPP, including the National Watershed Council (CNCH), also will help to consolidate the integrated institutional approaches to planning represented by the Integrated Coastal Management Authority for the Sabana Camaguey Ecosystem. Finally, CPP site-specific demonstrations in other parts of Cuba could provide practical lessons that will feed into Outcome 4 of the proposed Sabana Camaguey project, which focuses on ensuring that the declining sugar cane industry transitions into sustainable land use practices that do not have negative impacts on the coastal region.

79. During the development of both the CPP and the Sabana Camaguey project, close consultations between project teams have taken place, and in fact several stakeholders from key ministries have participated in the development of both initiatives. This coordination will continue during the

⁴ Site-specific actions of the CPP will focus on priority watersheds in five areas of Cuba (Guantánamo, Pinar del Rio, Cauto River basin, Villa Clara, Habana Matanzas), demonstrating practices for prevention of degradation as well as conservation and rehabilitation of ecosystem integrity. These would be undertaken through sequential projects in the three main regions of Cuba (West, Central and East) and in locations with the most advanced land degradation processes and those most vulnerable to desertification. None of the targeted watersheds drain into the Sabana Camaguey ecosystem.

implementation of both initiatives, ensuring that there is no overlap between initiatives and that collectively they will advance national priorities while capturing global benefits in both biodiversity and land degradation issues.

6c. Project Strategy

80. The global significance of the marine and coastal biodiversity in the Sabana-Camaguey Ecosystem (SCE) has long been recognized and is described in Annex 3. Recognition of the unique attributes of the area was illustrated in the early commitment of the GEF to support a three-phase intervention for the conservation of this outstanding archipelago, designed to evolve over a long-term horizon from building capacities and consolidating processes to the development of specific arrangements for enhancing prospects for sustainability.

81. This three-phase GEF Program was approved in 1992. The 1st phase (1993-1997) focused on the identification of problems and opportunities, completing bio-geophysical, economic and social characterization of the SCE, and developing a Environmental Strategic Plan that included a proposal for an SCE protected areas network and guidelines for the sustainable development of tourism in 4 priority cays. The second phase project (1999-2004) focused on the implementation of key priorities from the Strategic Plan, including establishment of priority protected areas, developing a framework for Integrated Coastal Zone Management, setting up biodiversity monitoring, and expanding sustainable tourism guidelines to the strategic planning level in 13 cays, and to a detailed planning level in 4 cays.

82. Phase 2 secured the conservation of particularly sensitive or high biodiversity value areas and made impressive progress in promoting an ecosystem-based approach within a traditionally centralized and sector-driven development-planning framework. By strengthening cross-sector linkages for planning and monitoring, encouraging participation at various levels, and building environmental awareness levels and management capacities, for the first time the five provinces that share the SCE came adopted common goals for resource management and conservation. The second phase was also strategic in opening new doors for CITMA and strengthening its ability to convoke other sectors and ensure environmental compliance.

83. Now that these key elements are in place, there is a need and an opportunity, to work outside protected areas and focus on biodiversity across the productive land and seascape, promoting changes in the key productive sectors in the SCE. If long-term conservation is to be achieved, this broader approach to conservation is essential given the tight interrelations common in archipelagos and coastal and marine habitats. The GoC has expressed willingness and interest in advancing these reforms, and in view of the centralized planning system, they have the ability to implement them. These sectoral reforms would not only provide unquestionable global biodiversity benefits but, in the particular case of tourism, could provide a more conservation friendly sun and sand tourism model, as well as a diversified nature related tourism model, both of which could be replicated throughout Cuba and the Wider Caribbean.

84. The GoC is looking to GEF and UNDP as partners to assist them in this new path. It seeks to complete the sequentially phased intervention and ensure that impacts of the entire Program are sustained beyond GEF involvement. As such, Phase 3 will focus on implementing sustainable practices in nationally prioritized productive sectors (tourism, fisheries and agriculture), addressing threats at their sources to sustain biodiversity conservation across the broader sea and landscape representing 80% of the archipelago. In addition to components geared to achieving reforms in each of three selected productive sectors, this phase will also strengthen the enabling environment for supporting these changes in the long-term and beyond the life of the GEF intervention. This in turn will further address sustainability issues and enhance the long-term benefits of the previous two phases of the entire Program.

85. The proposed Project would constitute the third and final phase of the GEF-supported Program. It offers the opportunity to implement activities beyond the Ministry of Environment and work with the Ministries of Tourism, Fisheries Industry, Agriculture, and Sugar, as well as Provincial and Local governments, to overcome barriers that currently impede the incorporation of biodiversity conservation in their practices. In the light of the continued economic constraints in Cuba, without the support of GEF it is unlikely that these barriers will be fully overcome and an opportunity for encouraging biodiversity friendly development in an area of outstanding global significance will have been lost. Furthermore, without this final intervention, the sustainability of achievement to date will be undermined.

86. Under the GEF Alternative the sustainability of social and economic development within the coastal land- and seascapes of the SCE will be enhanced. The project recognizes that the SCE includes a variety of habitats and unique biodiversity within and outside of areas under protection. Therefore, the project aims to create an enabling environment and change the behavior of the economic actors and the communities within the productive land- and seascapes so that the existing mosaic of habitats and species can be maintained, and their requirements incorporated into the future economic and social development of the region. This requires the mainstreaming of biodiversity principles within Government ministries and planning processes. It also requires working directly with the relevant economic sectors, mainly tourism, fisheries and agriculture, as well as communities. The direct engagement with the economic sectors will strengthen the links between the Ministry of Science, Technology and Environment, protected areas, and economic stakeholders at the national and local levels. The proposed Alternative would provide the opportunity to continue the process of biodiversity conservation before tourism, fishing and mainland based activities (agriculture, livestock raising, etc.) cause irreversible damage to globally important ecosystems and species.

87. The project is poised to take advantage of key characteristics of the Cuban socio-economic situation at a time when several clear opportunities present themselves. Under Cuba's centrally planned economy, the government is the majority or sole owner of almost all productive enterprises. As such, a successful model for change demonstrated in one enterprise or area can be easily and widely replicated by government mandate. In addition, the government can adjust regulations, policies and mechanisms to create an enabling environment supportive of biodiversity conservation activities that it sees as being in its own interest. For example, the government owns most of the hotels and other tourism infrastructure in the country (including 10 of 14 hotels in the SCE), and thus if it sees that biodiversity conservation is helping to diversify its tourism product and ensure continued growth in this preeminent sector in the country, it will ensure that processes for revenue sharing and reinvestment into biodiversity conservation are implemented, both for conservation goals and to benefit the bottom line of government owned entities. Similar situations are emerging in the fisheries sector, where the government is already enacting new restrictions and limits on catches in recognition of the fact that its own revenues from fisheries are declining because of poor management, and in the agriculture sector, where the conversion process for sugar cane lands offers an opportunity to develop economically and environmentally sustainable production models before other, less sustainable practices become entrenched.

88. The project area encompasses a significant part of the landscape of the Sabana Camaguey Ecosystem. Indirect affects of the project will cover the watersheds of the five provinces in the mainland, the cays and the marine shelf, an area of approximately 2,280,000 ha of landscape and 831,100 ha of seascape. This large area will be impacted indirectly through education and awareness raising, capacity building, better enforcement, new management structures for the integrated coastal management, new no-take areas, and new regulations and sustainable practices to mainstream biodiversity in the economic sectors. However, most of the on-the-ground project interventions will take place within a smaller area. Fisheries activities will cover the most area – apart from two small-scale aquaculture demonstrations, the implementation of new fishing technologies (FADs) and the application of new regulations and implementation of various forms of protected areas and zones will cover approximately 277,000 ha. Agriculture sector activities

will be focused in several distinct sites, totaling 3,507 ha of agriculture, 2,740 ha of livestock management, and 42,446 ha of forest management. Tourism activities will be focused on areas of existing tourism infrastructure (limited to 4 cays), as well as nature related tourism development in two protected areas (these areas cover 540,377 ha in total, but actual development of nature related tourism will be within very focused areas, as noted below). Finally, five Municipalities were selected as the focal areas for the application of integrated coastal management (ICM) mechanisms and community participation activities within the project, including their participation in the Integrated Coastal Management Authority. These municipalities are: Martí (in the east of Matanzas Province; 23,560 inhabitants); Yaguajay (northern coast of Sancti Spiritus province; 59,103 inhabitants); Caibarién (in the northeast of Villa Clara Province; 38,047 inhabitants); Minas (in the north of Camaguey province; 38,197 inhabitants); and Nuevitas (in the east of Camaguey province; 45,444 inhabitants). (see Annex 3 – Project Scope for additional details)

7. Project Goal, Objective, Outcomes and Outputs/Activities

89. The Project Goal is to protect the marine and coastal biodiversity of global significance in the productive landscapes and seascapes of the Sabana-Camaguey Ecosystem of Cuba, while contributing to the country's social and economic development. The Project Objective is to promote operational changes within three key productive sectors to enable biodiversity conservation in the SCE and to support these changes through improvements to the enabling environment.

90. This will be achieved through four main Outcomes as follows:

1. A strengthened enabling environment will exist for the financial, institutional, environmental and social sustainability of biodiversity conservation in the tourism, fisheries and agriculture-livestock sectors in the SCE.
2. The tourism sector develops in accordance with the conservation of marine and terrestrial ecosystems within the SCE
3. Sustainable fisheries are practiced within the SCE so that fish populations and marine ecosystem functions are maintained and/or restored
4. The declining sugar cane industry transitions into sustainable land use practices, with greatly reduced negative impacts on the coastal region of the SCE.

Outcome 1: A strengthened enabling environment will exist for the financial, institutional, environmental and social sustainability of biodiversity conservation in the tourism, fisheries and agriculture-livestock sectors in the SCE (Total Cost: US\$4,739,318; Co-Financing: US\$3,877,700; GEF Request: US\$861,618)

91. Activities under Outcome 1, for which CITMA will have primary responsibility, will strengthen the enabling environment at the national and local levels to support the reforms introduced and operationalized within the targeted productive sectors for the project area (Outcome 2-4). Changes to the enabling environment will focus on inter-sectoral coordination, institutionalized in the Integrated Coastal Management Authority (ICMA), and supported by the Capacity Building Centers for Integrated Coastal Management Network (CBC/ICM-N), and on the establishment of sustainable financing mechanisms to support biodiversity conservation at the inter-sectoral level, and within the productive sectors, over the long-term.

92. By the end of the project, there will be an operational framework for management of natural resources and economic activities within the Sabana-Camaguey Ecosystem that is supportive of the protection and sustainable use of biodiversity. This framework will depend on the active participation of decision

makers, resource managers, fishermen, tourism sectors workers, agriculture, livestock and forestry producers, and local communities in planning and decision-making processes within the context of stakeholder coalitions at the Provincial and SCE levels. Overall responsibility for ensuring the coordinated participation of these various stakeholders, and for ensuring that policies and actions are supportive of integrated coastal management and the mainstreaming of biodiversity conservation into productive sector activities, will lie with ICMA, which has already received a mandate from the Government of Cuba to lead inter-sectoral coordination in the SCE. To support the operations and coordination of ICMA, the productive sectors, and other stakeholders, and Environmental Information System for the SCE (SIAESC) will be established to collect, organize, and disseminate information generated by the project. In addition, the CBC/ICM-N will undertake capacity building activities to allow various stakeholders to participate effectively in new coordination and management processes, and to apply these changes within their own areas of responsibility. The project also will support the dissemination of lessons learned and best practices on integrated coastal management to other areas of Cuba and elsewhere, including the model of ICMA for other coastal zones.

93. In order to ensure that the benefits of ICMA, the SIAESC, the CBC/ICM-N and other processes for mainstreaming biodiversity conservation across sectors will continue over the long term, the project will design and implement various sustainable financing mechanisms. The costs for long-term funding of ICMA will be borne in part by the Government of Cuba, which will pay for the costs of staff, participation of member institutions/agencies, and support services (offices, equipment) at the national, provincial and local levels. The GoC will also cover the ongoing costs for operation of the Environmental Information System for the SCE (SIAESC). Other long-term costs for the operation of ICMA, such as document production, workshops, and exchanges among municipalities, etc. will be funded through long-term sustainable finance mechanisms. Other costs are expected to be covered by income from sustainable financing mechanisms. The project will evaluate potential taxes and fees and the willingness to pay of visitors and tourism operations, and based on this, establish and implement mechanisms for collecting and managing/distributing monies collected. The project will also propose rules for the distribution of these sums, to be split between tourism sector participants, resource management and conservation agencies, and ICMA. MINTUR estimates that with the application of these taxes, an annual income of approximately US\$250,000 can be obtained, depending on the actual number of people interested in these activities in the SCE (details on this funding is available in Annex 8).

94. In addition to significant support from the Government of Cuba, co-financing for Outcome 1 will be provided by UNDP through the Capacity 2015 program, in particular for the establishment and operation of the Capacity Building Centers for Integrated Coastal Management Network (CBC/ICM-N) (Output 1.2), and linkages between this network and the Capacity 2015 Integrated Learning & Application Networks in other countries (Output 1.3). Additional co-financing for capacity building measure related to mainstreaming biodiversity conservation in the fisheries sector will be provided by WWF-Canada (Output 1.3).

Output 1.1: Integrated Coastal Management Authority (ICMA) to coordinate the planning and activities of diverse government and social stakeholders within the Sabana Camaguey Ecosystem

Activity 1.1.1: Fully operationalize the Integrated Coastal Management Authority (ICMA), which was designed and formally established during Phase 2 of the Sabana-Camaguey project.

95. In order to operationalize the Integrated Coastal Management Authority (ICMA), the project will finalize the legal establishment of the full governance structure of ICMA, with agreed upon and implemented operational mechanisms, detailed annual and long-term work plans, and monitoring of performance at the regional, provincial and municipal levels. The project will be building on the progress achieved during Phases I and II of the project in establishing local level ICM processes, with the

following priorities: 1) establish the regional planning and coordinating office, which in turn will strengthen the capacities of provincial and local entities and incorporate them into a nested system that allows for decision-making at the cross-sectoral and ecosystem-wide level, with a priority focus on integrated planning for the three targeted productive sectors (and other areas of action with significant impacts on biodiversity, such as urban growth); 2) selection of indicators for monitoring of functioning of ICM mechanisms by local governments and existing local ICM coalitions, and ongoing assessment of their impact on the biodiversity-friendly sustainable development of the coastal zone; 3) differentiate government budgets related to environmental protection, so that sector-based spending on biodiversity conservation in coastal ecosystems can be accurately measured; and 4) establish an Environmental Information System to support environmental analysis, planning and decision making.

96. By the end of the project, ICMA will constitute an operational framework for management of the Sabana-Camaguey Ecosystem, with the active participation of key stakeholders, through the development of coalitions for the protection and sustainable use of biodiversity. ICMA will ensure the active participation of fishermen, tourism and agriculture personnel, and local communities in planning and decision-making processes, including volunteer monitoring, within the context of stakeholder coalitions at the Provincial and SCE levels; and it will enable informed management and decision-making based on knowledge of relevant biological and ecological aspects of terrestrial and marine biodiversity in the productive land- and seascapes. [The possibility of establishing a benchmark system for management by ICMA entities also will be investigated during the first year of the project.](#) (See Annex 1 for extensive details on the purpose, structure and functions of ICMA)

Activity 1.1.2: Development and operationalization of an Environmental Information System for the SCE (SIAESC).

97. An Environmental Information System for the SCE (SIAESC) will be established to provide existing information, as well as information generated by the project, to enable decision makers and resource users to make better informed decisions on development that enable improved conservation of biodiversity within the SCE. The SIAESC will be a crucial tool for informed analysis, application of results, cross fertilization, and synergies within the ICMA, and will make use of the extensive data sets developed during Phases 1 and 2 of this project, as well as inputs from ongoing planning and monitoring activities of the project (for example, spatial planning processes under activities 2.5.2 and 4.1.1). The SIAESC will operate as a meta-database that maintains and posts an overall listing of all data sets available, and has direct links to the databases that individual data generators/holders maintain, such as the Protected Area Information System. Integrated into the SIAESC, this information will enable interactive and integrated management and dissemination of information for the support of biodiversity conservation, in particular by serving as the information center for ICMA bodies. The SIAESC will have a small full-time staff, which will be hosted in the Institute of Tropical Geography within CITMA.

Output 1.2: Environmental education and capacity building for local inhabitants and participants in the three productive sectors to enable participation in activities for integrated coastal management and mainstreaming of biodiversity conservation into productive sectors in the Sabana Camaguey ecosystem.

Activity 1.2.1: Establishment and operation of the Capacity Building Centers for Integrated Coastal Management Network (CBC/ICM-N) *(with the support of the Capacity 2015 Project “Information Learning Network Global Project”)*

98. The establishment of the CBC/ICM-N in the five provinces belonging to the SCE, and connected to a main Center within the Environmental Agency (AMA) of CITMA in Havana, is an important component in the effort to promote integrated coastal management and mainstreaming of biodiversity conservation into productive sectors in the Sabana Camaguey ecosystem.

99. The local centers within the CBC/ICM-N will act as the physical, logistical and information focal points for integrated coastal management within the SCE, and as such will support all of the varied functions of ICMA. The centers will: carry out capacity needs assessments within the targeted productive sectors (fishing, tourism, agriculture), local governments, community-based organizations and members of the Integrated Coastal Management Authority (ICMA); implement programs to raise environmental awareness among selected target groups (women, school teachers and primary level students, workers in the fisheries, tourism and agricultural sectors – building on the awareness raising of decision makers in Phase 2); serve as an information hub on integrated coastal management and sustainable development for productive enterprises, government decision-makers and educational institutions; facilitate the systematization, exchange and transfer of ICM experiences and best practices to stakeholders within the Sabana-Camaguey ecosystem and other coastal regions in Cuba; and strengthen local initiatives on Integrated Coastal Management and contribute to the awareness-raising and changes in behavior regarding biodiversity in coastal communities.

100. The Capacity Building Centers for Integrated Coastal Management Network (CBC/ICM-N) also will be responsible for supporting capacity building and awareness raising activities within the scope of activities for each of the three targeted productive sectors. Thus, the Centers will provide the information and organizational focal points in each province for capacity building related to integrated coastal management processes and strategies for mainstreaming of biodiversity into the productive sectors, although the actual technical expertise regarding productive sector activities (e.g. tourism development, fisheries management, sustainable agriculture) will come from the sectors themselves (relevant ministries and scientific/technical institutions). In the tourism sector, the Centers will support many of the activities under Output 2.1, including: training local tourism authorities in understanding and addressing links among the tourism industry and threats to the conservation of biodiversity (2.1.1), capacity building and training for the tourism sector labor force to solve the learning and information needs linked to ICM (2.1.3), awareness-raising campaigns for tourism visitors (2.1.4), and study tours to observe best practices in the tourism sector in the Caribbean (2.1.5). In the fisheries sector, the Centers will support activities under Outputs 3.2 and 3.4, including: strengthening capacity for enforcement of fisheries regulations (3.2.3), technical assistance, training and exchange of experiences on sustainable fishing practices among fishing enterprises and communities (3.4.1), and awareness-raising activities for fishermen in municipalities where pilot projects and new restrictions on fisheries practices will be implemented (3.4.2). As for the agriculture sector, the Centers will support activities under Outputs 4.1 and 4.2, including: capacity to develop and implement a framework for improving the existing planning for the conversion of sugar lands (4.1.1), and capacity building and training of key stakeholders (decision-makers, managers, workers) from the sugar industry in selected biodiversity-friendly agriculture, livestock and forestry activities (4.2.2).

101. Activities of the CBC/ICM-N will be managed by CITMA representatives within the respective municipal governments (these are officers within the municipal structure tasked with management of environmental issues). The municipal governments will provide physical office space, appoint staff and pay salaries of participating staff. Through the Capacity 2015 Project, the CBC/ICM-N will be connected to – and form part of – a larger framework of Integrated Learning & Application Networks (ILANs) that are planned in several countries of the region.

102. In order to make the CBC/ICM-N functional, the following activities will be undertaken:

- Establish the CBC/ICM-N within the Environmental Agency (AMA) of CITMA in Havana, linked to five Sub-Centers in five coastal municipalities of the SCE provinces (Caibarién, Yaguajay, Martí, Morón, Minas, Nuevitas) (note: the centers in Caibarién and Nuevitas already have equipment and technical personnel in place)

- Determine the institutional and operational arrangements necessary for the CBC/ICM-N, ensuring direct links with local ICMA entities and other stakeholders, and with the monitoring and evaluation systems and information systems developed for project implementation (e.g. the SIAESC)
- Assess learning and capacity development needs of stakeholders to support and participate in integrated coastal management and mainstreaming of biodiversity conservation into productive sectors. During Phase 2, the project focused on assessing and developing awareness on environmental issues among decision-makers. During Phase 3, the project will extend this assessment to other stakeholders, such as resource users (e.g. fishermen, farmers), local resource managers, and entrepreneurs.
- Organize consultative workshops in the five coastal municipalities, with the broad participation of local stakeholders participating in ICM mechanisms (local governments, local environmental authorities, community representatives, NGOs, fisheries, tourism and agriculture/ livestock/ forestry sectors), in order to assess local expectations and desires for the Centers, to determine current knowledge of ICM processes, to demonstrate the cross-sectoral and ecosystem-wide nature of ICM problems and solutions, and to develop local plans of action for ICM in a participatory manner
- Develop and implement annual work plans for each local Sub-Center, in consultation with the productive sectors and other interested stakeholders, and with the guidance of the regional Center in Havana
- Establish mechanisms for accessing international knowledge and best practices on integrated coastal management, including information services at each of the five centers to ensure local-level access to the SIAESC for productive enterprises, government decision-makers, women and educational institutions, as well as a special portal linking the CBC/ICM-N to the Information Learning Network (ILN) – Latin-America (LA)
- Develop and implement cooperation and cost sharing mechanisms, with representatives of the tourism, fisheries and agriculture sectors, as well as other parties benefiting from the Centers, so that these stakeholders will contribute to long-term financial support for the CBC/ICM-N (initially, the Centers will be jointly funded and supported by CITMA and participating Municipal Governments)

Activity 1.2.2: Implement a capacity building and awareness-raising program within the CBC/ICM-N, for decision-makers and workers in the productive sectors (tourism, fisheries, agriculture/livestock), local authorities, local communities and ICMA staff, on strategies and processes for integrated coastal management, as well as sustainable economic practices that will support the mainstreaming of biodiversity of conservation in the three target sectors.

103. Capacity building activities will include: future scenario planning, land use zoning, governance, participatory methods, information management, negotiation and conflict management techniques, and basic concepts in environmental landscape-level planning associated with the productive sector. The project also will provide training in topics directly related to understanding and managing ongoing changes in the relevant productive sectors (e.g. control of invasive species, assessment of pollution, nitrification and salinity, habitat recovery following management plans, and introduction of clean and environmentally friendly production technologies in fisheries and agriculture industries, etc.). In addition, this activity will include dissemination of results of new regulatory, management, and pilot project activities generated during the project to relevant stakeholders (for example, technical assistance, training and exchange of experiences on sustainable fishing practices among fishing enterprises and communities).

104. In order to carry out these activities, the project will use the following strategies and mechanisms for capacity building: 1) training courses in non-formal educational methods, participatory research and systematization techniques; 2) production of manuals, brochures, videos, an annual bulletin and other materials on integrated coastal management, the mainstreaming of environmental considerations within the productive sectors, and environmental problems directly affecting local communities; 3) applied research, documentation of best practices/case studies, systematization of experiences, facilitation of stakeholder exchanges and participation in forums and other events, to socialize and transfer knowledge on integrated coastal management and sustainable development generated by the project; and 4) awareness-raising activities for resource users affected by new ICM plans and processes, such as fishermen in the municipalities (Caibarién and Nuevitas) where pilot projects and new restrictions on fisheries practices will be implemented, in order to communicate the benefits of ICM and the alternative livelihoods options available to affected users.

Activity 1.2.3: Monitor progress in the changes of attitudes and behavior of relevant stakeholders through ongoing environmental perception and behavior surveys, as well as data collected on environmental infractions.

Output 1.3: Lessons learned on integrated coastal management, and the mainstreaming of biodiversity conservation in the tourism, fisheries and agriculture/livestock sectors, available for dissemination within Cuba and internationally

Activity 1.3.1: Collect and organize lessons learned on Integrated Coastal Management and the mainstreaming of biodiversity conservation in productive sectors

- Organize meetings, workshops and exchanges to systematize ICM experiences, draw lessons learned and capture the project memory from the perspectives of different participants
- Organize information on lessons learned and best practices in ICM located within the Environmental Information System for the SCE (SIAESC) (see Activity 1.1.2)
- Produce printed and audiovisual material on best practices in ICM relevant to audiences in other locales and countries

Activity 1.3.2: Disseminate lessons learned on Integrated Coastal Management and the mainstreaming of biodiversity conservation in productive sectors to persons in other parts of Cuba and internationally

- Facilitate exchanges of productive enterprises and cooperatives, local governments, environmental agencies, academic sector and community organizations that were involved in the project and now practice ICM, with other coastal regions of Cuba, to transfer experiences and knowledge for similar initiatives, using institutions such as the National Hydrographic Council, Provincial Centers for Environmental Studies, Provincial Planning Authorities, etc.
- With the support of Capacity 2015, share experiences and material with the Integrated Learning & Application Networks established in pilot countries
- Through existing relationships with the University of West Indies (Jamaica), share experiences and material with other countries in the greater Caribbean region.

Activity 1.3.3: Undertake project monitoring and evaluation processes to support applications of best practices and lessons learned related to ICM and mainstreaming of biodiversity conservation in productive sectors, and to enable adaptive management throughout life of project

- Support the mid term and final evaluations of the Sabana-Camaguey project by organizing self-evaluation workshops with project stakeholders, sharing information and facilitating contacts with ILN-LA initiatives
- Undertake project monitoring and evaluation to ensure adaptive management to enable achievement of projected project impacts. This will include: Measurement of Means of Verification for Project

Purpose Indicators, Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis), APR, PIR, and TPR reports

Output 1.4: Institutional, policy and legal frameworks in place to support mechanisms for the long-term financing of conservation and sustainable use of biodiversity within the targeted productive sectors of the SCE (see Annex 14 for detailed information)

105. During the PDF-B phase, a number of workshops were held in conjunction with the sustainable financing team from the National System of Protected Areas (CNAP), which is implementing the UNDP/GEF Project “Strengthening of the National System of Protected Areas”. Together, it was decided to establish a Sustainable Financing Program (SFP) to coordinate sustainable financing of biodiversity conservation activities of the two projects. While the SFP will address all issues related to sustainable financing of biodiversity (including protected areas), this project will provide support only for those issues related to the productive sectors and landscape.

106. The objective of the project’s participation in the SFP is to generate additional long-term financial resources for biodiversity conservation and its sustainable management in the productive landscape of the Sabana Camaguey Ecosystem. These financial resources will be directed towards supporting inter-sectoral entities that support biodiversity conservation (e.g. the Integrated Coastal Management Authority, the Capacity Building Centers for ICM Network), towards sectoral institutions attempting to mainstream biodiversity conservation into productive sector activities (e.g. Ministries of Tourism, Fishing, Sugar, Agriculture), and towards communities, enterprises and individuals who participate in the development of economically sustainable and biodiversity friendly production income generating activities.

107. During implementation of the project, the SFP will: 1) create and/or strengthen institutional, policy and legal frameworks for the sustainable financing of biodiversity conservation; 2) design and implement specific sustainable financing mechanisms for biodiversity conservation; and 3) monitor the results of the pilot demonstration projects for sustainable economic production (carried out under Outcomes 2-4). Each of these activities will complement the other, so that the enabling environment created will provide the legal and policy basis for the financing mechanisms and pilot projects to operate, while the financing mechanisms and the pilot projects will provide lessons learned for adapting policies, laws and institutional structures. Thus, by project’s end, structures, mechanisms, and instruments for the sustainable financing of biodiversity conservation activities within the productive sectors of the SCE will have been developed at the national level and tested, and implemented at the local level.

108. Activities related to the enabling environment for sustainable financing of biodiversity conservation (part 1 above) will be coordinated by CITMA, which will create a small team, led by an economist with experience in economic valuation of ecosystems, supported by an International Consultant with expertise in sustainable financing of biodiversity conservation, and also including (part-time) a biologist and two economics professors from the University of Havana, who directed the environmental economics components during the Phase 2 of the Project. The creation and implementation of some of the specific mechanisms to support sustainable financing (part 2 above) will be the shared responsibility of the CITMA team and the relevant productive sectors, in particular the Tourism Sector (see Output 2.4 for details). Finally, demonstration and replication of pilot projects that will create models for financially sustainable and biodiversity-friendly tourism, fisheries, and agriculture, livestock and forestry activities (part 3 above) will be directed by the relevant sector partners, though the CITMA team will apply lessons learned to policy, legal and institutional changes.

Activity 1.4.1: Evaluation of international models of mechanisms for the sustainable financing of conservation (e.g. the Latin American and Caribbean Network of Environmental Funds and the Inter-

Agency Planning Group on Environmental Funds), and analysis of the applicability of these models to the Cuban political and socio-economic context

Activity 1.4.2: Implement a Sustainable Financing Program (SFP), directed by CITMA, with the participation of targeted productive sector ministries, the Ministries of Economy and Planning, Finances and Prices, the National System of Protected Areas, and ICMA, which will guide the process of developing a legal, policy and institutional framework supportive of mechanisms and structures for financial sustainability of biodiversity conservation

- Implement priority changes to the existing enabling environment (e.g. clear regulations on retention of fees generated by biodiversity friendly activities for ongoing conservation) and identify additional priorities
- Implement awareness raising program for decision-makers in order to demonstrate the economic benefits of biodiversity conservation and the feasibility of sustainable financial mechanisms
- Technical studies and economic evaluations of environmental goods and services in selected pilot sites, in order to generate support among decision makers for financial mechanisms for biodiversity conservation
- Continue work initiated during the PDF-B phase in strengthening the capacity of technicians from relevant institutions in designing and implementing sustainable financing mechanisms
- Implement an information dissemination program to ensure that the experiences obtained in relation to sustainable finance will be made available to other national, provincial, and municipal programs, and to ensure awareness about modification of laws, regulation, and practices that enable sustainable financing of biodiversity conservation throughout the country

Activity 1.4.3: Develop and implement specific sustainable funding instruments and mechanisms for biodiversity conservation, drawing on lessons learned from pilot projects for sustainable income generation (Outputs 2.2, 3.3, 4.3, 4.4 and 4.5) and in coordination with sustainable financing mechanisms in the tourism sector (Output 2.4 – a key long-term funding source for ICMA, the SIAESC, and the CBC/ICM-N)

- Government Contributions: The project will explore the potential to ensure ongoing direct payments by productive sectors entities to ICMA, based on the demonstrated benefits to the sectors of the ongoing operation of ICMA (see Output 1.1)
- Taxes, Fees and other Payments: Options include visitor and user fees; license fees and taxes; payments for environmental services; resource extraction fees; pollution taxes; fines and penalties for illegal resource extractions (e.g. illegal fishing); taxes on timber sales, etc.
- Mechanisms: Options include fiscal instruments; biodiversity enterprise funds; economic instruments for valuing and charging for environmental services; facilitation of partnerships and investment opportunities among productive sector Ministries and productive enterprises, and use of existing financial funds for sustainable environmental management (see Output 4.5)

Outcome 2: The tourism sector develops in accordance with the conservation of marine and terrestrial ecosystems within the SCE (Total Cost: US\$3,991,362; Co-Financing: US\$2,665,178; GEF Request: US\$1,326,184)

109. Activities under Outcome 2 have been designed to ensure that the rapidly expanding tourism industry in the Sabana Camaguey Ecosystem is developed and managed in a way that maximizes consideration of biodiversity conservation and minimizes negative impacts on the globally significant coastal and marine ecosystems of the area. These activities will be implemented primarily by the Ministry of Tourism (MINTUR), in close cooperation with CITMA and other conservation and resource management agencies, as well as with government and jointly operated tourism enterprises (hotel, tour operators, etc.).

110. Project interventions will be focused primarily within the SCE, at the regional, provincial and local levels, although it will also create an enabling environment (changed planning processes and strengthened capacity for nature related tourism) that will benefit the country as a whole. Awareness raising of environmental conservation will target numerous stakeholders, from educating and providing guidelines to the local workforce, as well as visitors, so as to reduce their individual threats to the coastal and marine ecosystems, to assisting local authorities in understanding and dealing with the linkages between tourism development and operation and threats to local ecosystems, to study tours related to best practices in environmental management and conservation in the tourism sector in the Caribbean.

111. The project also will develop tools and guidance so that new hotels, infrastructure and related services planned for development in the region will comply with the framework and associated principles and standards. Tourism development planning processes, including the Tourism Master Plan for the SCE, environmental impact assessments, and others, will be updated to incorporate biodiversity concerns, through the joint efforts of MINTUR, the Institute of Physical Planning in the Ministry of Economy and Planning, major government tourism companies, Gaviota S.A. and Cubanacan S.A., and others. Because of Cuba's centrally focused government structure, once revisions and updates to the Master Plan and other planning processes are endorsed by the central government, all governments and tourism operations at the local level must comply.

112. In addition to reducing negative impacts, the project will also demonstrate an alternative model for tourism development in Cuba from the traditional "sol y playa" experience. By promoting nature related tourism, the project will offer Cuba the opportunity to test a tourism development model with much lower impacts on the environment, and in particular on fragile ecosystems such as the cays and marine areas of the SCE. The project will demonstrate various "packages" for nature related tourism activities within one of the protected areas in the SCE, and based on lessons learned, will replicate these activities at another protected area (see Annex 4 – Map 3). In addition, the project will strengthen capacities within the tourism sector as a whole to enable replication on a wider scale throughout the country (post-project).

113. In addition to significant support from the Government of Cuba, co-financing for Outcome 2 will be provided by a Spanish NGO, Ecodesarrollo, through its project for "Technical training and infrastructure creation for ecotourism development and resource sustainable management in public use areas of Cayo Romano". This cay, which is located within the Protected Area Gran Humedal del Norte, is one of the pilot demonstration sites for ecotourism development under activity 2.2.2. The resources and expertise of Ecodesarrollo will also support project activities for designing ecotourism products in conjunction with existing hotels and tour operators in the SCE (activity 2.2.3), as well as reducing the impact of tourism infrastructure development (activity 2.5.3).

Output 2.1: Awareness and capacity building for adoption of environmentally sustainable practices by tourism sector stakeholders (*activities under Output 2.1 will be coordinate by the Capacity Building Centers for Integrated Coastal Management Network established under Output 1.2.*)

Activity 2.1.1: Training of local tourism authorities in understanding and addressing links between activities of the tourism industry and threats to the conservation of biodiversity

Activity 2.1.2: Delivery of technical assistance (by provincial and local offices of CITMA) to hotels and tour operators in developing guidelines for human activity (visitors and staff) related to the environment, including implementation of codes of behavior.

Activity 2.1.3: Capacity building and training for the tourism sector labor force in environmentally friendly practices

Activity 2.1.4: Awareness-raising campaigns for tourism visitors on minimizing impacts and other conservation-oriented activities (especially in sensitive ecosystems such as islands/cays)

Activity 2.1.5: Study tours for designers/architects, planning/zoning personnel, tour operators and tourism managers to observe best practices in environmental management and conservation in the tourism sector in the Caribbean

Activity 2.1.6: Awareness-raising of dive center personnel by means of participatory volunteer monitoring of impacts on coral reef biodiversity, using the system of cooperation between CITMA and diving centers in the SCE established during Phase 2

Output 2.2: Development of nature related tourism at two pilot demonstration sites within the Sabana Camaguey ecosystem (Buena Vista Biosphere Reserve and Gran Humedal del Norte) (See Annex 8 for further details)

Activity 2.2.1: Pilot demonstration of nature related tourism at the Buena Vista Biosphere Reserve (BBR), with activities including:

- Development of marketing strategies and materials for nature related tourism products
- Development of the infrastructure, services and attractions for nature-based tourism in protected area
- Capacity building for protected areas staff in promoting and managing tourism visitation
- Training of local inhabitants within the BBR to enable their participation in nature tourism or other alternative tourism activities (for example, as tour boat drivers/operators, tour guides, lodging managers, etc.
- Implementation of six nature related tourism packages to promote visitation to the BBR (See Annex 8 for further details on these packages)

Activity 2.2.2: Replication of best practices and lessons learned for nature related tourism at the Gran Humedal del Norte (wetlands area) in Ciego de Avila province.

Activity 2.2.3: Implementation of activities to promote nature related tourism at the existing tourism resort centers within the SCE, in cooperation with hotels and tour operators

- Work with hotels and tour operators to design additional tourism packages for ½ day, 1 day, and multi-day visits to local natural attractions, farms and agricultural facilities, etc.
- Develop and implement guidelines for hotels and tour operators to use in designing and operating nature related visits
- Capacity building of tour guides and tour operators in promoting the attractions of the BBR and the Gran Humedal del Norte

Output 2.3: Capacity building to enable replication of demonstration strategies for nature related tourism throughout the Sabana Camaguey ecosystem

Activity 2.3.1: Integration of new tourism marketing strategies based on nature related tourism into overall Cuban tourism marketing strategies and processes

- Development and implementation of marketing strategies to increase the role of nature tourism and ecotourism within the Sabana Camaguey ecosystem (national and international fairs and expos, specialized marketing materials, etc.)
- Awareness raising and training of specialists at FORMATUR, of personnel at tourism operators (e.g. Gran Caribe, Cubanacán, CUBATUR, Havanatur, Islazul, Palmares, Campismo, and

ENPFF), and of tour guides (domestic and international) with regard to nature related tourism opportunities and practices

Activity 2.3.2: Development and implementation of information and capacity to enable replication of nature related tourism throughout the SCE

- Final identification of the most promising sites for nature related tourism development throughout the SCE (based on initial assessments completed during Phase 2)
- Training of local inhabitants throughout the SCE to enable their participation in nature tourism or other alternative tourism activities (for example, as tour boat drivers/operators, tour guides, lodging managers, etc.)

Activity 2.3.3: Capacity building to enable the protected areas network throughout the SCE to develop and manage nature related tourism

- Capacity building for protected areas staff in promoting and managing tourism visitation
- Development of the infrastructure and services for nature-based tourism in protected areas

Output 2.4: Sustainable financing mechanisms to support long-term mainstreaming of biodiversity conservation into tourism sector policies and activities (*activities under Output 2.4 will be integrated into the overall sustainable financing program developed under Output 1.4*)

Activity 2.4.1: Development and implementation of revenue mechanisms (taxes, fees, etc.) to generate financial resources for biodiversity conservation (see Annex 8, Section 5 for additional details)

114. As a complement to the development of nature related tourism packages in the BBR, the project also will carry out experimental work, in cooperation with selected hotels in Coco and Santa María cays, in applying tourism visitor and user fees for conservation to selected nature related tourism activities. Over 2 years, the project will establish and implement mechanisms for collecting and managing the sums collected, and for ongoing assessments of willingness to pay on the part of tourists. The project will also define and implement rules for the distribution of these sums, to be split between tourism sector participants, resource management and conservation agencies, and the Integrated Coastal Management Authority (ICMA). MINTUR estimates that with the application of these taxes, an annual income of approximately US\$250,000 can be obtained, depending on the actual number of people interested in these activities in the SCE.

Output 2.5: Tourism sector regulations and planning strategies and processes that integrate biodiversity friendly practices

Activity 2.5.1: Development of a common vision among local tourism sector participants (MINTUR, hotel managers, tour operators, tourism agencies, etc.) on strategies to integrate biodiversity conservation into tourism sector activities while also supporting the economic development and business priorities of tourism sector participants

Activity 2.5.2: Strengthen the integration of environmental concerns into tourism sector planning processes

- Incorporate biodiversity conservation into the existing Sustainable Tourism Indicators being developed by the Government of Cuba under the auspices of the Association of States of the Caribbean (AEC)

- Revise the existing Tourism Master Plan for the SCE to take fuller account of biodiversity conservation
- Implement the use of strategic impact assessments where the potential uses of landscapes would be evaluated and decided upon prior to any development activity in the area (under current Cuban law, environmental impact assessments are required at the project level only)
- Change project approval processes so that, in order to gain approval, new projects must include provisions for funding the expected ongoing costs of environmental monitoring and rehabilitation

Activity 2.5.3: Reduce the impact of tourism infrastructure development on terrestrial and marine ecosystems

- Carry out detailed assessments of the impacts of existing tourism infrastructure development in selected critical habitat zones (e.g. targeted cays), and develop and implement appropriate mitigation measures
- Develop and implement regulations for hotels and other tourism facility operators to use in designing and operating facilities
- Promote environmental design strategies, including general principles of landscape architecture, effective waste treatment, renewable energy technologies, and tourism development planning in ecologically sensitive areas

Activity 2.5.4: Develop and implement guidelines for environmentally friendly tourism operations

- Improvement and application of regulations for waste management at hotels and other tourism facilities, including waste treatment and reduction, water re-use and treatment, green energy generation, and codes for use non non-native plant species
- Guidelines for tour operators for management of tourism activities (boating, diving, fishing, wetlands visitation, etc.)
- Guidelines to ensure that supply chains of food to the hotels are managed in an environmentally sustainable manner

Activity 2.5.5: Establish nurseries of native plant species for use in hotel landscaping and for the rehabilitation of areas degraded by existing tourism infrastructure

115. Most of the tourism development within the SCE involves large-scale facilities that have a significant impact over large areas, including the destruction of significant areas of native vegetation. In the case of hotels, after construction is completed the largely barren hotel grounds need to be planted with vegetation. However, because of a lack of native species of seedling, saplings, etc., most hotels have planted substantial areas of non-native ornamental species. This has resulted in significantly higher water usage in these areas of high water scarcity, as well as the spread of exotic vegetation into the surrounding landscape. In recent years, some improvements have been made in reducing the use of exotic species, but there still are not sufficient native plants available to allow for the reduction in the use of non-native species. The tourism sector is prepared to commit funds and resources to nursery development because of the cost reductions that will occur from using native species.

Outcome 3: Sustainable fisheries are practiced within the SCE so that fish populations and marine ecosystem functions are maintained and/or restored (Total Cost: US\$5,141,451; Co-Financing: US\$3,980,300; GEF Request: US\$1,161,151)

116. Fisheries production is the 4th largest component of the Cuban economy, and the Sabana Camaguey Ecosystem (SCE) is the second most important fishing area in Cuba, with 20% of the total national catch. The fisheries sector in the SCE is dominated by commercial fishing, which is organized in four state-run enterprises, while sport fishing and subsistence fishing play a smaller role in the area. Certain existing

fishing technologies (bottom trawling, set nets), fishing practices (harvesting of juvenile fish) and management shortcomings (unsustainable levels of commercial fishing effort, lack of fishery reserves for critical habitat, etc.) pose an ongoing threat to fisheries resources and to marine ecosystems in general

117. The Government of Cuba has already recognized that it faces significant problems in the fisheries sector, and its willingness to address these problems provides a great opportunity for mainstreaming biodiversity conservation into the sector. Activities under Outcome 3, to be implemented by the Ministry of Fisheries (MIP) in cooperation with local governments, government fisheries companies, resource management and conservation agencies, and individual fishermen, will work to reduce activities harmful to the coastal and marine environment. Information on fisheries resources and marine ecosystem conditions will be expanded to allow for improved management. Additional laws, regulations and policies, such as restrictions on the extraction of commercial species and by-catch, new fishery protection zones, harvest quotas, and gear restrictions, will be implemented. To make sure that implementation is successful, significant capacity building will take place to improve monitoring and enforcement within the SCE, complemented by awareness raising among fishermen and other local inhabitants about the impacts of certain practices on long-term fisheries viability, about the details of new regulations, and about new sustainable employment opportunities.

118. The project also will implement pilot project activities to demonstrate sustainable economic alternatives for fishermen, in particular for those fishermen whose jobs are eliminated by new regulations and reduced quotas -- estimated at 250 fishermen working in 37 boats (see Annex 4 – Map 4). Participants will be required to give up their license in the commercial fishery in return for participating in these activities (fishermen participating in illegal fishing activities will not be eligible to participate in the pilot projects). By offering alternative livelihoods, these pilot projects will ensure that these fishermen do not switch to other activities that might negatively impact biodiversity, such as: a) illegal fishing, b) furtive use of illegal gears and practices, c) catching species of global concern such as manatees, marine turtles, dolphins, coral reef herbivore and top predating fishes, etc., and d) poaching both coastal terrestrial protected or unprotected natural areas for hunting and logging.

119. Several different alternative sustainable fisheries options will be developed. There are several areas with suitable ecological conditions for sponge cultivation, and existing natural stocks of sponges are sufficient to support the seeds for this activity without any population decline. In addition, blue crab cultivation will be developed, as these are among the most abundant species in inshore areas and have a high market value. Finally, the use of FADs (Floating Aggregating Devices) for attracting fish in open waters close to the marine shelf is also a promising alternative which diverts fishing pressure away from depleted shelf resources.

120. In addition to significant co-financing by the Government of Cuba for activities under Outcome 3, WWF Canada will provide co-financing through its project “Development of a Modern Sustainable Fishing Sector” during the years 2006-2008. This project will primarily support activities for awareness building and local capacity under Output 1.4, by establishing Local Committees to support fisheries management and to develop local management capacities; by modernizing fishing enterprises with environment-friendly equipment and skills and awareness building and training on principles of sustainable development; and by co-administration of the project by the Local Committees in preparation for transfer of responsibilities.

Output 3.1: Biophysical and socio-economic information necessary to make well informed decisions on necessary regulations, fisheries practices and sustainable fisheries development activities

Activity 3.1.1: Updating of biophysical and socio-economic information necessary to make well informed decisions on necessary regulations, fisheries practices and sustainable fisheries development activities.

121. The project will establish baseline values from existing data sets, will select additional indicators for analysis during the project, will identify personnel and locations/time intervals for data collection, and will implement data collection and updating throughout the course of the project.

Activity 3.1.2: Based on the above and on the demonstration activities of Output 3.2, identify and delimitate areas and seasons for spawning, recruitment and breeding of commercial species and others of interest, to support the establishment of improved fishing regulations and the siting of fishery reserves (activity 3.2.2)

Activity 3.1.3: Determination of baseline environmental conditions (fish populations, area and health of seagrass beds, reefs, and other critical habitat) inside and outside of proposed fishery reserve areas (e.g. north of Villa Clara province), and ongoing data collection of these conditions to evaluate the impact of fishery reserves

Activity 3.1.4: Assessment of the impacts of causeways, contamination, and other land-based factors in selected breeding and fishing areas and identification of mitigation measures.

122. The impacts of land-based activities such as pollution and sedimentation from agriculture, industry and human settlements, as well as the construction of causeways linking cays to the mainland (primarily for tourism development), is poorly understood within the SCE. However, preliminary assessments indicate that these activities have a significant impact on localized areas of critical habitat for fisheries resources and marine biodiversity. Phase 2 of the project made significant progress in incorporating design and construction practices to control the impact of development activities within the coastal zone of the SCE, thereby reducing and in some cases mitigating impacts on globally significant biodiversity. However, additional assessments need to be carried out to ensure that regulation and control is focused on the highest impact development activities and in the areas of most importance for globally significant biodiversity, and that the most cost-efficient and effective control and mitigation measures are adopted.

123. Contamination from land-based sources is believed to have a direct impact on habitats for fish nursing, breeding and spawning, and improved understanding of the areas and sources of highest impact will allow fisheries managers, within the framework provided by ICMA, to work with sources of impact (e.g. agriculture and livestock enterprises, etc.) to reduce and/or mitigate impacts. In addition, natural sediment flows, climate change impacts, and the effects of drought all have an impact on the levels of contamination, runoff, and sediments reaching the coastal waters of the SCE. While the project cannot control these factors, understanding of them will allow fisheries managers to adjust their estimates for maximum sustainable yield, and fishery reserve and marine protected area managers to improve their selection of sites and allowable activities.

124. The project also will investigate the ecological impacts of the causeways, and will carry out environmental and socio-economic analyses of various control and mitigation options. These options would largely focus on improving water flows into and through the lagoons affected by causeways, and may include: 1) restoration of natural canals that feed into the lagoons, which have slowly closed in over time through natural processes; 2) creation of artificial canals; 3) restoration of water flows in rivers feeding into lagoons, which have declined from urban and agricultural use; and 4) construction of additional bridges to allow for water flow through causeways. While the project will work to implement control measures to apply to new development activities, mitigation measures for existing causeway

infrastructure will be identified but not implemented during the project, due to the high level of uncertainty regarding actual impacts and the potential costs of mitigation.

Activity 3.1.5: Improve understanding of the connectivity between and among populations of marine species and interacting water bodies, with a focus on commercial fish species and species of global importance, to support fisheries and biodiversity management at the seascape level

125. Basic understanding of the health of populations of marine species of importance for global biodiversity and/or fisheries stocks, and their dependence on hydrodynamic processes within the SCE, is very minimal and a significant barrier to effective management and conservation. The interactions of demographic connectivity, referring to the movement of living organisms between nearby and more distant populations, including everything from pelagic eggs, larval stages, juveniles and adults, and hydrodynamic connectivity, referring to flows of nutrients, pollutants, high and low salinity waters, etc. are believed to be significant and better understanding of these factors would improve the capacity to design and implement networks of fishery reserves and Marine Protected Areas. In addition, connectivity is basic to understanding the impacts that can result from poor management of fishing, of coastal development and hydrographic basins, and of the construction of causeways, on marine and coastal areas that receive flows from coastal zones. Finally, understanding of connectivity is integral in designing control and mitigation measures for coastal and marine engineering works, such as the creation or enlargement of channels to facilitate a greater exchange of water with the ocean, in order to reduce salinization in inshore areas or to increase access for migrations of larvae and other marine organisms.

Activity 3.1.6: Evaluate the socio-economic impacts (positive and negative) of changes in fishing regulations and practices on the fishing industry and individual fishermen. Perception assessments at the start, middle and end of the project

Output 3.2: Appropriate fisheries regulations and practices of benefit to the stabilization and/or partial recovery of fish populations and of species and habitats of global importance.

Activity 3.2.1: Reduction in official target levels for fishing effort by commercial fishing industry, with an emphasis on selected carnivore fish (groupers, snappers and sharks) and selected herbivore fish (parrot fish and surgeon fish) critical to reef ecosystem functioning

126. The Ministry of Fisheries (MIP) has stated its clear intent to reduce official target levels for selected fish species, based on analysis of sustainable yields, ecological impacts, etc. In addition, MIP has already implemented a system of payments to fishermen that is based in part on the quality of catch (i.e. the size of fish captured), rather than just the quantity of catch. By expanding this system in terms of the ratio of payments made based on quality, and by applying it to additional species and geographic areas, the project will promote an overall reduction in targeted levels of fish catch within the SCE.

Activity 3.2.2: Strengthening of regulations and mechanisms to ensure sustainable fishing practices for commercial, sport and subsistence fishing in the SCE

127. Working with MIP, marine protected areas staff, and relevant resource management agencies, the project will work to revise, update and improve the existing body of laws and regulations for commercial sport, and subsistence fishing as follows:

- General regulations and information management: Activities will include 1) Revising, updating and improving existing fishing body of commercial fishing regulations, including new restrictions on fishing equipment such as bottom trawling and set net technologies; 2) Improved license

systems for sport and subsistence fishermen; and 3) Improvement of data base on sport fishing effort and impacts

- Changes in fishing practices: The project will provide technical assistance to the four primary fishery enterprises in the SCE to influence their systems of fish catch, by-catch and sale. Changes to practices by these companies will be used as demonstrations to other fishery enterprises. This will include the development of training programs and exchanges of experiences between the enterprises on use of gear and fishing practices.
- Restrictions on destructive gear and practices: Chinchorros (bottom trawlers) have already been banned in parts of the SCE. A comparison of fishing with and without chinchorros will be made using sea observers to document wastage by discards, or by simulated commercial fishing using this gear. Feeding data collected into a basic fisheries model, and the project will measure the potential increase in yield if selective harvesting of adult bottom fish were practiced using long lines, or hook and line, rather than chinchorros. Analysis will also be made of the impact of the ban on seagrass beds. In addition, the project will study the impact of the 2005 ban on all use of tranques (set nets) within the SCE. Based on these analyses, the project will propose adjustments to the bans on both chinchorros and tranques, as well as other potential bans on certain fishing practices (e.g. discarding of used fishing nets).
- Experimental Closed Areas: Two areas would be established, each of at least 10 km² of shelf, and a comparative study of fish populations inside/outside of these areas would be undertaken. The first area would be closed to all gears, and a second such area would be closed to all nets, but left open to hand line and sports fishing (e.g. for lobster)
- Reef herbivore fish and algal stress recovery assessment: In at least 30 coral reef sites where baseline information exists (from Sabana Camaguey Phase 2) about herbivore fish abundance and biomass and bottom algal cover, evaluations will be done of changes in size and species composition and abundance of herbivore fish after fishing restrictions are imposed, and the resulting impact on algal cover.
- Fishery Reserves: Currently, there are no fishery reserves (or no-take areas) within the SCE. Based on activities 3.1.1 and 3.1.2, and on the demonstrations of Output 3.2, this activity will identify and delimitate areas and seasons for spawning, recruitment and breeding of commercial species and others of interest, to support the establishment and siting of fishery reserves (by the end of year 4).
- Marine Protected Areas (MPAs): The project will work with the National System of Protected Areas (CNAP) to investigate coordination between the management of fishery reserves and closed areas (managed by MIP) and formal Marine Protected Areas (managed by CNAP), including the desirability of establishing an MPA rating and evaluation system.

Activity 3.2.3: Strengthened enforcement capacity for fisheries regulations

128. The existing system of enforcement for fisheries in the SCE is hampered by a lack of human, technical and financial resources, and additional training and capacity building will be necessary to allow for effective enforcement of the new regulations, protected zones, and other activities proposed by the project. Currently, each province has its own Corps of Fisheries Inspectors who work for the National Office of Fishery Inspection. In 2004, there were 81 inspectors within the entire SCE (an area of 8,311 sq. km.), with offices in the eight largest ports in the area. These inspectors are responsible for monitoring and controlling commercial, sport and private fishing activities, including enforcement of fishing gear restrictions (such as the new restrictions on the use of tranques and chinchorros), regulations related to the minimum legal size of fish captured, and enforcement of no-fishing areas. They also have responsibility for enforcing biodiversity protection in the marine environment, and are responsible for preventing and penalizing illegal hunting of species such as manatee, dolphin, crocodile and marine turtle,

as well as the extraction of any non-authorized marine organism. The inspectors work jointly with state fishery enterprises, the National Sport Fishing Federation and Coast Guard.

129. The project will strengthen the capacity of fisheries managers and regulatory authorities to enforce the new regulations and procedures established under activities 3.2.1 and 3.2.2 (e.g. limits on total catch, closed areas and seasons, fishing equipment regulations, etc.). In addition to implementing enforcement actions using the new enforcement capacity, the project will also monitor the impacts of improved enforcement on the state of key ecosystems and species within the Sabana Camaguey ecosystem, including: 1) monitoring the effects of elimination of net fishing (esp. chinchorros) on fish populations and bottom epifauna (e.g. assess the effects of reducing discards after transition to hook and line fishery); 2) testing the effects of closure of fishing on small isolated coral reefs with high algal coverage to determine effect of fish density/reef area, by adding herbivorous fish to the enclosure, which leads to algal cover diminishing; and 3) testing the effects of seasonal closure of fisheries in selected areas during spawning season of snappers on stock recovery prospects.

130. To enable adequate enforcement of existing and planned restrictions on activities affecting the marine environment, the project will provide training and new material and technical support to the Corps of Fisheries Inspectors in each province (supported by additional commitments from the Government of Cuba to expand the size of the Corps of Inspectors and provide additional fuel for boats). For example, fisheries inspectors have received little training in areas such as biodiversity values and functions, fish taxonomy, law enforcement, and pollution monitoring, and they lack resources such as dedicated boats (they currently must rely on commercial vessels), communication equipment, GPS systems, computers for managing information, etc. Inspectors will also have improved access to information on marine and coastal ecosystems through the SIAESC, which will incorporate data collected by the monitoring stations established during Phase 2 of the Sabana Camaguey project, as well as information generated by the Corps of Inspectors and other parties. Through the CBC/ICM-N under Output 1.2, the project will facilitate coordination for monitoring of marine biodiversity and fisheries resources between the Corps of Inspectors and existing partners (e.g. state fishery enterprises, the National Sport Fishing Federation, and the Coast Guard), as well as new partners (e.g. dive centers, individual fishermen, protected area rangers, and community volunteers). Finally, the project will also provide technical training and awareness raising for fisheries inspectors and these other partners on the new regulations developed under activity 3.2.2

Output 3.3: Pilot projects to demonstrate sustainable livelihood alternatives for fishermen affected by new restrictions on fishing effort and practices (see Annex 10 for additional details on each of the activities below, including detailed economic analyses)

Activity 3.3.1 (Pilot Project 1): Establishment of floating aggregating devices (FADs) for sustainable fishing

131. Floating aggregating devices present an opportunity to increase the size of fisheries stocks within the SCE without detriment to coastal and marine ecosystems. FADs are floating structures deployed in the open sea to attract and catch fish. The use of FADs is considered one of the most sustainable alternative fishery practices, as they have no affect on bottom habitats and they do not require the use of bait. FADs will be tested in the north of Villa Clara Province, with additional sites for replication near La Panchita - Isabela. These sites were selected because, apart from being habitats of the target species, they are close to fishing villages and close to the areas where fishermen currently use fishing practices that will be eliminated during the project. Initial economic analyses of the use of FADs in the SCE indicate that the recovery period for initial investment costs is only 4 months. These preliminary analyses (detailed in Annex 10) will be developed further in the first stages of project implementation, but they indicate that proposed activities would provide sufficient returns to warrant continued development.

Activity 3.3.2 (Pilot Project 2): Demonstrations for commercial cultivation of molted Blue Crab (jaiba mudada)

132. Blue crab production in the town of Caibarién will be tested in a pilot production facility during years 2006-2008, with replication in Nuevitas in the province of Camaguey. This relatively simple cultivation practice is environmentally sustainable, as crabs in the molting period stop feeding and thus inputs and wastes are minimal. Blue crab production also has an excellent potential as a sustainable income source for fishermen, and economic analyses show that the recovery period for initial investment costs is only 6 months, primarily because molted blue crabs have a significant economic value (US\$16,000/ton), which is superior to crabs caught in the wild (due primarily to increasing demand in the international market). These preliminary analyses (detailed in Annex 10) will be developed further in the first stages of project implementation, but they indicate that proposed activities would provide sufficient returns to warrant continued development.

Activity 3.3.3 (Pilot Project 3): Establishment of pilot farm for commercial cultivation of sponges

133. Sponge cultivation will be demonstrated in Caibarién Municipality (Villa Clara Province) during the years 2005-2009. A pilot demonstration will be initiated on a 1 hectare plot to observe the progress of the culture growth, and to determine the technical and economic feasibility of this production alternative, with the expectation of expanding the culture area beginning in year 2 of the project. Sponge cultivation is an ecologically responsible practice that does not generate pollution, and it is a comparatively economically attractive fishing activity. Commercial sponges are prized in the market (40.0 usd/kg), and cultured sponges (*Hippospongia lachne*) have an even higher value, reaching a mean value of 53.5 usd/kg. Initial analyses show that even with conservative estimates of the market value of cultured sponges (45 usd/kg), and assuming that 25% of the harvest is used to repopulate the native populations, the recovery period for initial investment costs is approximately 9 months. These preliminary analyses (detailed in Annex 10) will be developed further in the first stages of project implementation, but they indicate that proposed activities would provide sufficient returns to warrant continued development.

Output 3.4: Fishermen and decision-makers within the SCE supporting fishing levels and practices that conserve biodiversity (These activities will be directed in large part by the Capacity Building Centers for Integrated Coastal Management Network (CBC/ICM-N) established under Output 1.2)

Activity 3.4.1: Development of programs of technical assistance, training and exchange of experiences on sustainable fishing practices among fishing enterprises and communities within the SCE, including dissemination of results of new fisheries restrictions and of pilot project activities.

Activity 3.4.2: Awareness-raising activities for fishermen in the municipalities (Caibarién and Nuevitas) where pilot projects and new restrictions on fisheries practices will be implemented.

Outcome 4: The declining sugar cane industry transitions into sustainable land use practices, with greatly reduced negative impacts on the coastal region of the SCE (Total Cost: US\$13,600,546; Co-Financing: US\$12,830,000; GEF Request: US\$770,546)

134. The overall objective of the activities under Outcome 4 is to develop and implement alternative models for the conversion of lands formerly under sugar cane production, including sustainable and biodiversity-friendly agriculture, livestock raising and forestry, and to simultaneously develop capacities and an enabling environment that will ensure that these models are replicated throughout the conversion program (within the SCE and elsewhere in Cuba). This project presents an excellent opportunity to introduce biodiversity friendly land uses over a large territory of former sugar cane plantation areas, and if successful it will both enhance the sustainability of national development and reduce significant

potential negative impacts on sensitive coastal and marine habitats that harbor globally significant biodiversity

135. All of the proposed pilot project sites are in close proximity to areas identified during Phase 1 and Phase 2 of the project as critical to globally significant biodiversity (see Annex 4, Map 6). In addition, the pilot sites selected were chosen in part for their proximity to the coasts (all are located in a zone that ranges from between 2 and 5 kilometers inland), and thus for their potential impact on coastal and marine ecosystems. Finally, all four of the agriculture and buffalo sites (demonstration and replication) are located on lands formerly under sugar cane cultivation; while the five sites for coastal forest management are a mix of ownership between the Ministry of Sugar and the Patrimonio Forestal (the latter are neighboring to former sugar cane lands). (see Annex 12 for economic analysis and other details of the pilot demonstration activities)

136. The total potential area for replication (i.e. total # of hectares of sugar conversion land) within the SCE is 165,943.5 ha, which equals the areas of the 23 sugar enterprises that have been closed. The total area available for productive use (the remaining area consists of developed areas, reservoirs, rivers, roads, etc.) is approximately 141,550 ha, of which 90,875 ha have been designated for livestock production, 28,593 ha for production of various crops, and 22,082 ha for forests and fruit trees. None of the 23 centers is dedicated to any single use, but rather each enterprise is developing a mix of livestock, agriculture and forestry activities, based primarily on soils, topography, climate, local food demand and other community needs (e.g. wood), personnel requirements and expertise, etc.

137. The Government of Cuba, represented by both MINAGRI and MINAZ (which will have primary responsibility for implementing activities under Outcome 4), has asserted its willingness to explore a variety of sustainable production alternatives on lands that were formerly under sugar cane production. In part, this is due to the fact that agriculture in Cuba generally provides very low economic returns, and represents a small part of overall national GDP. Cuba has a very limited capacity to purchase agricultural inputs (e.g. fertilizers, pesticides) or fuel and parts for agricultural equipment, as well as limited access to the latest advances in agricultural technologies and practices. As a result of this, and the country's remote location, Cuba does not depend on the agriculture sector as a source of foreign currency earnings, and thus the pressure to focus on export-oriented crops and/or other types of industrial monocultures is limited. Moreover, national policy places a much higher priority on agriculture for food production and security, and crop and animal selection is based on these issues more than on export potential.

138. Nevertheless, the project will support the development of market strategies and distribution linkages to enable sale of agricultural and livestock products to the tourism centers within the SCE. This will serve to make such products more attractive to producers and to the government alike, as tourists are more willing and able to pay a premium for agricultural goods. In this regard, the fact that the proposed demonstration activities in sustainable agriculture involve organic production will only make marketing of these products to tourists (many of them ecologically conscious consumers from Europe and Canada) even easier.

Output 4.1: Land use planning/zoning for former sugar cane lands and facilities within the SCE, based on landscape level ecological and socio-economic assessments

Activity 4.1.1: Develop and implement a framework for improving existing planning for the conversion of sugar lands (e.g. to include biodiversity factors), with the participation of relevant scientific institutions within the Ministry of Sugar (MINAZ), Ministry of Agriculture (MINAGRI), Ministry of Environment (CITMA) and elsewhere (*Activities under this Output will be supported by the Establishment of the Capacity Building Centers for Integrated Coastal Management Network under Activity 1.2.2*)

- Upscale planning process for converted sugar cane lands from individual plantation/enterprise focus landscape focus that takes into account the overall mix of potential agriculture, livestock and coastal forestry activities within the context of the entire ecosystem, under the auspices of the Integrated Coastal Management Authority
- Ensure participation of protected areas managers, through existing Protected Areas Coordinating Committee, in planning for agricultural, livestock and forestry activities in buffer zones for protected areas, including promotion of the use of sustainable technologies, sustainable management of exotic fauna, and capacity building and awareness raising for decision makers and communities
- Promote the integration of coastal and marine biodiversity conservation factors into existing plantation/enterprise level planning processes
- Build on existing province-level soil maps, which were used to identify conversion areas, to include information on actual land uses, as well as the impacts of those uses, so that maps can be used to zone and plan land uses for different areas at the level of specific conversion areas

Activity 4.1.2: Monitor impacts on biodiversity stemming from land use changes on former sugar cane lands, including new management practices, changes in technology, and introduced and/or invasive species, by using and strengthening the existing monitoring capacities of MINAZ

Activity 4.1.3: Assess the evolution of marine-coastal water and sediment quality as response to the management measures and planning adopted during the sugar cane industry conversion.

Activity 4.1.4: Assessment of movements and impacts of populations of exotic species from converted sugar lands to natural landscapes, and elaboration of plans for the control or eradication of high-priority species (rats, mongooses, feral cats)

Output 4.2: Establish management and technical capacity for biodiversity friendly agricultural, livestock and forestry production on former sugar cane lands (*activities under this Output will be supported by the Establishment of the Capacity Building Centers for Integrated Coastal Management Network under Activity 1.2.2*)

Activity 4.2.1: Build capacities within MINAZ to enable it to plan and manage more sustainable and biodiversity friendly types of agricultural, livestock and forestry production in converted areas

- Further evaluation of potential options for agricultural, livestock and forestry production on former sugar cane lands, including cost-benefit analyses of alternative land uses (building on analyses completed during PDF-B phase)
- Establish training agreements and mechanisms to utilize resource production expertise of Agriculture, Livestock and Forestry researchers and extension staff
- Establish training agreements and mechanisms to utilize planning expertise of technical staff and CITMA and Institute of Physical Planning

Activity 4.2.2: Capacity building and training of key stakeholders (decision-makers, managers, workers) from the sugar industry in selected biodiversity-friendly agriculture, livestock and forestry activities

- Capacity building and training in sustainable production and land management, agro-biodiversity conservation, and recognition and incorporation of environmental services values
- Training in organic agricultural production and supply chain management to provide high value organic products to hotels in the SCE
- Training mechanisms to include short technical courses, workshops, and applied field activities

Activity 4.2.3: Development and implementation of economic incentives for workers on former sugar cane lands to continue participation in sustainable resource production in agriculture, livestock and forestry

139. This activity is designed to ensure that rural workers formerly employed on sugar cane lands have adequate incentives and support to make them remain in agricultural, livestock or forestry production, so that they do not engage in other, potentially less biodiversity-friendly activities within the SCE (for example, engaging in illegal hunting and fishing)

- Productivity, production and marketing improvements in agriculture, livestock and forestry activities leading to increased incomes. Many of these improvements will take place under Outputs 4.3 – 4.5, such as development of relatively lucrative markets for local agricultural products (including organic agricultural products) within the tourism sector, application of new techniques to reduce production costs, and development of nurseries for improved forest (wood) production. (See Annex 12 for more details)
- Policy and institutional mechanisms to allow workers to retain an increased percentage of their production for their own use/sale, sufficient to provide income competitive with non-agricultural employment, based on adoption of environmentally friendly production practices (use of organic fertilizers, solid and liquid waste recycling, water conserving irrigation techniques, etc).
- Increased use of the Fund for Forest Development, the Fund for Environmental Conservation, and/or other existing national funds (environmental financing mechanisms) to enhance incomes (and offset costs) for forest workers. Currently, these funds are not well known and are not fully subscribed, and thus represent unused capacity for promoting sustainable forest management. The project will assist local communities, cooperatives and enterprises in applying for financial support from these Funds based on plans for reforestation and more environmentally friendly forest management. Additional details on these funds are provided in Annex 13 on Sustainable Financing.

Output 4.3: Demonstrate pilot strategies for sustainable management of water buffalo on former sugar cane lands

140. Economic analyses of water buffalo management are provided in Annex 12. These preliminary analyses will be developed further in the first stages of project implementation, but they indicate that proposed buffalo management activities at the La Magdalena demonstration site would provide sufficient returns to warrant continued development. Production in three milking facilities and two meat facilities would generate revenues of \$128,600 per year on the farm, and based on initial capital costs of \$390,950 and annual operating costs of \$62,000, the investment recovery time is 5.87 years and the profitability ratio after investment recovery is 2.07.

Activity 4.3.1: Implement biodiversity friendly animal rearing practices to reduce the impact on marine and coastal ecosystems of recently introduced water buffalo on former sugar cane lands in the SCE

- Assess existing impacts of water buffalo on coastal and marine biodiversity within the SCE, and establish baseline conditions
- Carry out pilot project for biodiversity friendly water buffalo management at the livestock enterprise Aracelio Iglesias Yaguajay (Sancti Spiritus Province, 10,486.8 ha)
- Introduce existing sustainable technologies for management and re-use of livestock waste, and develop methodologies to establish them in livestock enterprises within the SCE located near the coast (between 2 and 3 km.)

Activity 4.3.2: Replication of best practices on friendly livestock rearing (buffalo) and waste control at

the Unidad Proletaria Enterprise (13 966.9 ha)

Output 4.4: Demonstrate pilot strategies for biodiversity friendly production on former sugar cane lands

141. Economic analyses of potential crop cultivation livestock management and plantation forestry (using native species) are provided in Annex 12. These preliminary analyses will be developed further in the first stages of project implementation, but they indicate that proposed sustainable management activities at the Guamuta demonstration site would provide sufficient returns to warrant continued development. Forests managed as 41% reserves and 59% plantations would generate positive economic returns, as would the planting of crops for domestic consumption (yucca, sweet potato, bean, chickpea, tomato and onion), and diversified livestock production (cattle for milk, sheep, pigs and poultry)

Activity 4.4.1: Test and implement the best management practices for biodiversity friendly agriculture, livestock and forestry activities on a cooperative farm (former sugar cane lands) in Guamuta (Matanzas Province)

Activity 4.4.2: Replication of the best practices for biodiversity friendly agriculture, livestock and forestry activities developed under Activity 4.4.1, at the Bolivia Enterprise, Ciego de Ávila province (15 826 ha)

Output 4.5: Sustainable forest management of biodiversity-rich coastal forests within the SCE

Activity 4.5.1: Implementation of reforestation, rehabilitation, conservation, and productive management of coastal forest areas

Activity 4.5.2: Development and implementation of forest management plans for forest land managers (provincial forest enterprises and the State Forest Service) that conserve critical habitat, preserve important water resources, provide buffer zones for marine ecosystems, and promote native species by provincial forest enterprises and the State Forest Service

Activity 4.5.3: Establish native species tree nurseries to supply saplings for reforestation efforts

Activity 4.5.4: Promote increased use of the Fund for Forest Development, the Fund for Environmental Conservation, and/or other existing national funds (environmental financing mechanisms) to enhance incomes (and offset costs) for forest workers (see Annex 12 for details)

8. Project Indicators, Risks and Assumptions

142. The following performance indicators have been identified. The Log Frame and the Result Measurement Table in Part 3 of the ProDoc provide the full list of indicators, baselines and targets, sampling information and a detailed justification for their selection.

- % of hotels in ecologically sensitive areas built according to planning guidelines that have incorporated biodiversity conservation recommendations
- % of operating costs of ICMA derived from sector based resources/mechanisms
- Increase in sector budgets for actions related to environmental conservation in the SCE
- % of new hotels in ecologically sensitive areas within the SCE that are planned with specific guidelines for biodiversity conservation
- Revenues from taxes and fees on tourism activities invested in biodiversity conservation within the SCE

- # of hectares of seascape under legal protection and demarcated for fishery reserves
- Number of incidents of illegal fish catches per unit effort of enforcement per year within the SCE decreases

Assumptions & Risks

Risk	Rating*	Risk Mitigation Measure
The three levels of government (national, provincial and local) and various sectors (tourism, fisheries, agriculture) cannot agree on coordinated efforts for resource management	L	Operationalization of the Integrated Coastal Management Authority, the strengthened capacity and awareness of its participants, and improved policy, legal and financial frameworks supporting biodiversity friendly practices, will allow ICMA to fulfill its statutory role as coordinating, management and conflict resolution body
The Ministry of Tourism is unwilling to develop options apart from the traditional and profitable “sun and beach” model	M	Development of successful demonstrations of alternative tourism models (i.e. nature related tourism) will actually increase the overall tourism revenues of the country by diversifying its product, <u>and</u> make traditional “sun and beach” tourism more profitable by providing additional attractions desired by tourists
The Ministry of Fisheries is unwilling to establish and enforce strong fisheries regulations	L	The Ministry of Fisheries is already implementing significant new restrictions on fishing gear, and reducing allowable fish catches, as it recognizes the decline of the fisheries resource in the SCE. Additional analysis of the marine ecosystems in the area will only reinforce this recognition, and demonstrated models for alternative fisheries production will provide managers with a viable alternative for workers in the sector
The Ministry of Sugar chooses to adopt short-term economic basis for deciding on appropriate uses of converted sugar cane producing lands	L	The first priority in Cuban agricultural is food production rather than economic returns, particularly since Cuba has little participation in exports of agricultural products, and managers are aware of the priority placed on maintaining the sustainable productivity of lands. This priority will be enhanced by demonstrated sustainable production practices, and by the lessons learned from the Cuba CPP for land degradation
Overall Risk Rating	L	

*Risk rating – H (High Risk), S (Substantial Risk), M (Modest Risk), and L (Low Risk).

9. Expected global, national and local benefits

Global Benefits:

143. The project will provide the region and the world invaluable experiences in mainstreaming biodiversity into tourism, fishery and agriculture/livestock-raising practices, and will demonstrate operational and institutional experiences of Integrated Coastal Management suitable for replication in other locales. The application of sustainable financing mechanisms to support biodiversity conservation and to sustain the institutional operations of the Integrated Coastal Management Authority will provide a valuable model for similar coastal ecosystems in the Caribbean and elsewhere. In addition, the positive impacts on social issues that will be created by moving to more sustainable practices will constitute global benefits of the project. Additional details on the global benefits of the project are provided in the Incremental Cost Analysis in Section II.

144. The Sabana-Camagüey Ecosystem (SCE) has considerable regional importance due to its high diversity of marine and terrestrial species, the high level of endemism of terrestrial flora and fauna, and the enormous variety and abundance of migratory birds which use the area as a stopping point between North America and points south. The project area includes extensive areas of globally significant

ecosystems distributed throughout the landscape and seascape (cays, marine shelf and mainland watersheds), including mangrove forests, dry forest and coastal shrub systems, coral reefs and seagrass beds. Species of global significance include migratory birds, endemic plant and animal species, flamingos and other threatened and charismatic birds, marine turtles, manatee, dolphins, crocodiles, etc.

National Benefits:

145. National benefits include the improvement of regulations and practices for sustainable tourism, fishery and agriculture/livestock-raising by replication of project biodiversity-mainstreaming experiences. The improvement of the operation of ICMA and improved ICM experiences at the municipal and provincial levels will have a methodological impact across the country. Of special significance will be the availability of concrete demonstrations of implementation of sustainable financing mechanisms and instruments for biodiversity conservation and ICM operation, which will enable their assimilation by the national Government and their dissemination at the national level, including along the south coasts of the same five provinces that are participating in this project.

146. With regard to conservation of nationally important biodiversity, the rat hutia *Mesocapromys auritus* is a critically endangered local endemic of high conservation priority. Additionally, one of the only three Cuban populations of Swamp Sparrow *Torreornis inexpectata* exists in the area, as does the Long-Tail Hawk *Accipiter gundlachi*, a national endangered endemic species, as well as the largest nesting colony of Pink Flamingoes (*Phoenicopterus ruber ruber*) in the Caribbean, with high value as a tourist attraction.

Local Benefits:

147. By mainstreaming biodiversity through the application of sustainable regulations and practices in the selected economic sectors, and by implementing integrated coastal management processes, the project will be of paramount benefit for local communities in the medium and long term, from the economic, social and environmental points of view. Awareness about the advantages of sustainable practices, together with the establishment of incentives, will create the necessary willingness to move towards more sustainable development. Local level protection benefits to biodiversity include a number of vulnerable local terrestrial endemic species, including a subspecies of the terrestrial gastropod mollusks *Ligus fasciatus sanctamariae*, *L. fasciatus romanoensis*, and *Cerion spp.*; the local endemic lizard *Anolis equestris portior*; the Swamp Sparrow *Torreornis inexpectata varonai*; the Green Woodpecker *Xiphidiopicus percusus cocoensis*; and the Grand Antillean Cuckoo *Saurothera merlini santamariae*.

10. Country Ownership: Country Eligibility and Country Drivenness

10a. Country Eligibility

148. Cuba is eligible for UNDP assistance and signed the United Nation Convention for the Conservation of Biological Diversity (UNCBD) in 1992. The GEF Focal Point has played an active role in the preparation of the Full Project Brief through the Environmental Agency (of the Ministry of Science, Technology and Environment - CITMA), and closely accompanied the development and negotiation of this Concept and fully supports its submission to the GEF (see GEF Focal Point Endorsement letter in Section IV).

10b. Link to National Strategies

149. Cuba has an extensive institutional and legal framework supporting environmental regulations and guidelines with relevance to the proposed project. In 1975, the new Constitution of the Republic of Cuba recognized the need to protect the environment, and in 1977 the National Commission for the Protection of Environment and Natural Resources (COMARNA) was created. In 1994, as a result of increasing awareness on the importance of the environment for the economy, the Ministry of Science, Technology and Environment (CITMA) was created (see Institutional Context for details on CITMA).

150. The main elements of the environmental legal framework developed since 1994 include: the Environmental Law 81, 1997; Decree-Law for the Coastal Zone, 2002; Decree-Law on Protected Areas, 2002; National Biodiversity Strategy and Action Plan; Declaration of the first group of 33 Protected Areas of the National Protected Area System (including 11 in the SCE project area); Resolutions on Special Zones of Use and Protection (marine no take-areas), twenty four of which have already been designated; Resolutions 143 and 111 for Management of Special Regions of Sustainable Development, and Access to Biodiversity Resources; Decree-Law on Fishing and the Fishery Inspection Corps; Resolution 77 on Environmental Impact Assessment, 1995; Establishment of a National System of Environmental Recognition; and Decree 272 on Regional and Urban Planning and Urbanism

151. In the policy arena, Cuba has a National Environmental Strategy and a National Environmental Program that constitute the Cuban adaptation of UNCED Agenda 21. These provide guidance on environmental priorities and policies, including for sectoral activities. In addition, specific Sectoral and Regional Environmental Strategies exist as a way to involve stakeholders from different economic sectors and regions of the country in addressing environmental problems. The socioeconomic development of ecologically sensitive areas, such as the Sabana-Camagüey Ecosystem (SCE), has evolved gradually in the last years within this framework of cross-sectoral environmental management. By working closely with the main productive sectors of the SC ecosystem, and promoting the adoption of sustainable uses across the productive land and seascape, the proposed project is clearly in line with county priorities and directives for environmental conservation and sustainable development.

152. The Sabana Camaguey Ecosystem plays an important role in the national development framework, and the three productive sectors targeted by the project, tourism, fisheries and agriculture, constitute a significant percentage of the Cuban economy. The Government of Cuba has demonstrated its commitment to the project, and its faith that the project objectives match its own national priorities, by agreeing to significant reforms of all three of these sectors within the context of the project. By working with the tourism, fisheries and agriculture sectors in the SCE to maximize synergies with biodiversity conservation, the proposed project can help shape the long-term sustainability of a key element of national development while capturing significant benefits to globally significant biodiversity.

10c. UNDP Programs and Projects

153. The UNDP Country Programme for Cuba (2003-2007) is focused on concrete priorities that cut across the most urgent development problems of the country (see <http://intra.undp.org/rblac/index.html>). A list of priorities has been established for the new programme, in collaboration and consultation with the government and with the UN agencies. The stated goals of the Sabana Camaguey project comply with and support these priorities in several ways. The UNDP programme includes as a priority “*Strengthening Management Capacity for Human Development*”, especially based on human development at the local level. The objectives of this priority are to develop local capacities (at the community, municipal and provincial levels), to strengthen local economies, and to improve the gender equity thereby making local development environmentally sustainable. The third phase of the Sabana Camaguey project fits directly in these objectives by promoting operational changes at the local and provincial levels within the key productive sectors in the SCE, ensuring the country’s social and economic development and enabling biodiversity conservation across the seascape and landscape.

154. In addition, the proposed Sabana Camaguey project also will support the priorities for “*Strengthening of Productive Capacities*” and “*Improvement of Food Security*”, in particular through the project activities focused on the conversion of the sugar cane industry to economically and environmentally sustainable production systems which will increase household incomes and food security, provide capacity building for local inhabitants and resource managements, and prevent negative impacts on coastal and marine biodiversity. Also, the Sabana Camaguey project supports the Country Programme priority of “*Improving the Quality of Life*”, which identifies such project activities as protected area management, biodiversity conservation, actions to address land degradation, and coastal zone management (among others) as target areas for intervention. Finally, the goals of the proposed project support the UN Millennium Development Goals, in particular Goal 7 “Ensuring Environmental Sustainability”.

11. Sustainability

155. The proposed project constitutes the third and final phase of a sequenced GEF supported intervention. This long-term intervention was designed to evolve from identifying priorities and building capacities and processes in the first two phases, to the third phase of consolidation to enhance prospects for sustainability. Thus from the outset, the issue of sustainability of impacts beyond the life of the GEF intervention has underpinned the design and implementation of this third phase, and key elements and components have been identified and incorporated into design to address sustainability issues.

11a. Institutional Sustainability

156. The first element is the decision to focus on promoting changes within the productive sectors. By focusing the project on reforms within the productive sectors, the relevant line ministries will be involved and the reduction of threats and removal of barriers will occur at the sources and be sustained by the reforms achieved in each sector. At project end, key practices in these sectors will incorporate biodiversity conservation considerations and as such the sustainability of impacts after the GEF intervention will be self-perpetuating.

157. Secondly, the project also will strengthen the enabling environment to support changes in the productive sectors (see Outcome 1), which will further facilitate the sustainability of the project’s objectives. The primary instrument for promoting and coordinating long-term participation by national, provincial and local institutions in pursuing project-related objectives will be the Integrated Coastal Management Authority (ICMA). During implementation, the project will carry out legal establishment of the full governance structure of ICMA, with agreed upon and implemented operational mechanisms, detailed annual and long-term work plans, and monitoring of performance at the regional, provincial and municipal levels.

158. In operational and structural terms, initially ICMA will be housed within the Ministry of Science, Technology and the Environment (CITMA). CITMA was chosen because it has the necessary legal status and coordinating responsibility for this umbrella role, because it has the technical capacity to support ICM activities, and because it chairs and coordinates the National Watershed Council (CNCH). During these first two years, ICMA staff will be located at CITMA headquarters, and CITMA will provide basic financial and logistical support to these staff as well as local ICM initiatives. The Vice Minister of CITMA will chair the regional-level ICMA committee for the SCE, which will be composed of representatives of government ministries and productive sector enterprises from each of the 5 provinces of the SCE.

159. By year 3 of the project, it is expected that ICMA will be integrated into the existing structure of the National Watershed Council (CNCH), and the President of the CNCH will chair ICMA from that point forward. As the highest national authority for watershed planning and management, the CNCH is composed of ministers of the economic sectors directly involved in the use and protection of the natural resources of the country, and it is in charge of coordinating, monitoring, and evaluating economic and social development strategies at the watershed level. Because ICMA's operations are specifically mandated to build on existing structures, rather than creating new ones, the CNCH provides a relevant existing institutional structure in which to locate ICMA.

160. The Government of Cuba (GoC) has demonstrated support for ICMA in its structural design (granting it authority at the supra-ministerial level) and its commitment to providing sufficient staffing levels once ICMA is operational (including post-project). Further, the GoC has demonstrated its commitment to ICMA by opting to create the Environmental Information System for the SCE (SIAESC) to support ICMA activities, as well as the Capacity Building Centers for Integrated Coastal Management Network (CBC/ICM-N) to enable widespread participation in ICMA. Given Cuba's centralized political system, the high-level support for ICMA from the GoC will ensure that the targeted productive sectors will support and participate in its ongoing operations. During the third phase of this GEF supported Program, GoC support of ICMA's mandate, planned budgetary provisions, and progress in its hierarchical evolution will be closely monitored.

11b. Technical and Social Sustainability

161. In addition to institutional sustainability, the project is also designed to promote the sustainability of its technical and social components. Regarding the former, the project will undertake considerable capacity building through the Capacity Building Centers – Integrated Coastal Management Network (CBC/ICM-N), as well as activities within the sectors, to ensure that a wide array of stakeholders possess the technical capacity to continue implementation of conservation related activities after the project ends. For example, the maintenance and enhancement of monitoring processes within the SCE will continue with the support of the monitoring stations established during Phase 2, as well as the SIAESC and the participation of relevant national scientific institutions (terrestrial and marine). As for social sustainability, the project design includes widespread public participation, particularly within the ICMA framework, as well as a number of pilot demonstration projects for sustainable alternative livelihoods that will provide positive incentives for ongoing participation by local inhabitants.

11c. Financial Sustainability

162. During the project implementation, a Sustainable Financing Program (SFP) will be established to generate additional long-term financial resources for biodiversity conservation and sustainable management in the productive landscape of the Sabana Camaguey Ecosystem. Financial resources generated by the SFP will help to fund ongoing inter-sectoral entities that support biodiversity conservation (e.g. the Integrated Coastal Management Authority, the Capacity Building Centers for ICM Network), sectoral institutions attempting to mainstream biodiversity conservation into productive sector activities (e.g. Ministries of Tourism, Fishing, Sugar, Agriculture), and communities, enterprises and individuals who participate in the development of economically sustainable and biodiversity friendly production income generating activities. Additional details are provided in Annex 13 – Sustainable Financing

12. Replicability

163. Based on the demonstrated willingness of the involved sectors (environment, tourism, fisheries and agriculture/livestock-raising), the project has been designed to promote replication of pilot demonstration experiences in each of the targeted productive sectors: tourism (e.g. nature related tourism), fisheries (sponge cultivation, molted blue crab raising, floating aggregation devices.) and agriculture/livestock raising (reforestation, sustainable agriculture, water buffalo management). In addition, lessons learned from operating the Integrated Coastal Management Authority (ICMA) will provide valuable models for ICM processes in other locales. The replication of project activities such as these will be possible throughout Cuba and in many other areas of the Caribbean, which largely share the ecological, biophysical and socio-economic conditions found in the Sabana Camaguey Ecosystem. Furthermore, each of the five provinces involved in the project also has appreciable coastal and marine areas along the southern coast of Cuba, making it highly likely that provincial authorities will have a ready opportunity to replicate successful models developed by the project on their southern coastlines.

164. The potential for effective and widespread replication of the project's activities is enhanced also by the cross-sectoral design of the project and the wide participation of stakeholders. Unlike many biodiversity conservation projects, this project is an equal effort of environmental conservation agencies on the one hand and productive sector agencies on the other, from the project design process to the composition of project staff to the allocation of funds. Because of this broad institutional involvement, support for replication throughout Government of Cuba institutions and policy and legal frameworks will be high, and new processes and policies will have been introduced across many institutions.

165. As in Phase 2, which forged a partnership between the GEF and Capacity 21, the proposed project will receive funds from the GEF and from Capacity 2015, which can be considered a new experience with possibilities for replication across the country and in other GEF projects.

166. To ensure effective replication of models and lessons learned developed during the project, a number of project activities are specifically designed to support replication. Each of the pilot demonstrations (Outputs 2.2, 3.3, 4.3, 4.4. and 4.5), includes plans, targets and budget allocations for replication during the project. By replicating pilot demonstration activities, the project will by definition develop strategies and procedures that can be used for additional replication at other sites after the project implementation period has ended. In addition, other activities will support development of an enabling environment that supports replication with changed policies, information resources, technical capacities, and financial resources, such as: Activities 1.3.1 and 1.3.2 (collecting, organizing and disseminating lessons learned on integrated coastal management processes); Activities 1.4.3 and 1.4.4 (establishing legal and institutional frameworks for sustainable financing of conservation and alternative livelihood activities, and implementing selected sustainable financing mechanisms); and Activities 2.3.1 and 2.3.2 (marketing of sustainable tourism and training in tourism management). As detailed under these activities, the project will use a variety of means to disseminate lessons learned and to otherwise promote replication, including brochures, publications, videos, the existing project website, participation at national and international conferences and workshops, collaboration missions, and information exchanges.

167. Finally, through the Capacity 2015 Project, the CBC/ICM-N will be connected to – and form part of – a larger framework of Integrated Learning & Application Networks (ILANs) that are planned in several countries of the region.

PART III: Management Arrangements

Overview

168. During execution of the FSP, the Ministry of Science, Technology and the Environment (CITMA) will have lead responsibility for cross-sectoral activities, including the Integrated Coastal Management Authority, learning networks and public awareness and education, sustainable financing mechanisms, etc. (Outcome 1 of the project). In addition, three ministries of the Government of Cuba (Ministries of Tourism, Fishing, and Sugar) will take lead responsibility for execution of activities in their respective sectors (Outcomes 2-4 of the project). Together, these institutions, as well as other governmental and non-governmental partners, will constitute a coordinated, cross-sectoral team designed to address the complex issues related to mainstreaming biodiversity conservation across several productive sectors and varied land and seascapes. Additional details on the roles, responsibilities and inputs of various entities in project implementation are explained in further detail below, and displayed in Diagram 1. Details on Project Coordination and Oversight arrangements also are provided below, and in Diagram 2.

169. In order to accord proper acknowledgement to GEF for providing funding, a GEF logo should appear on all relevant GEF project publications, including among others, project hardware and vehicles purchased with GEF funds. Any citation on publications regarding projects funded by GEF should also accord proper acknowledgment to GEF. The UNDP logo should be more prominent -- and separated a bit from the GEF logo if possible as, with non-UN logos, there can be security issues for staff.

Implementation and Management Activities

170. The Project Management Unit (PMU) will be headquartered within the Environment Agency (AMA) of CITMA in Havana, with some members located at the provincial offices of CITMA within the SCE, and productive sector members of the PMU located within their respective ministries (see Diagram 1 in Section IV, Part II). The PMU will have responsibility for project implementation and management of resources on a day-to-day basis, and PMU staff will prepare workplans, budgets, project proposals, progress reports, etc. The Project Coordinator (CITMA) and the three Sector Focal Points (MINTUR, MIP and MINAZ) are responsible for leading and controlling the implementation of project activities with an integrated approach, although each of the three productive sectors will utilize its own procedures and norms for implementing activities. To ensure effective coordination of activities, however, the Project Coordinator will oversee the activities of the three productive sectors, including the inputs of the sector-specific Technical Working Groups

171. Provincial technical groups will be created *ad hoc* with representatives of relevant sectors and other research or technical agencies, under the direction and coordination of the Project Management Unit. During the project, some permanent provincial and municipal technical groups could arise, and some groups or group members could be shared between localities (horizontally) and territorial levels (vertically) according to the relevant needs and possibilities. The formation of Technical Groups for Tourism, Fisheries and Agriculture/Livestock/Forestry is certain; in addition, other technical groups that may be established are:

- ICM Technical Group. (DMA-CITMA)
- Sustainable Finance Technical Group (DMA-CITMA)
- Terrestrial biodiversity Technical Group (IES-CITMA)
- Marine Biodiversity Technical Group (IDO-CITMA)
- Forestry Technical Group (MINAGRI)
- Planning Technical Group (IPF-MEP)
- SCE Information System Technical Group (IGT-CITMA)
- Environmental Education Technical Group (AMA-CITMA)
- Social Sciences Technical Group (CIPS-CITMA)

172. Implementation of Outcome 1, which will establish the enabling environment to support the reforms introduced and operationalized within the key economic sectors under Outcomes 2-4, will be directed by CITMA, under the direct leadership of the Project Coordinator. Key enabling activities will include inter-sectoral coordination (consolidation of the Integrated Coastal Management Authority - ICMA), sustainable financing, education and awareness, and linkages between protected areas and the productive sectors (synergy with the UNDP/GEF project devoted to strengthening the National Protected Areas System). In addition, execution of Outcome 1 will ensure that management and decision-making is based on accurate knowledge of relevant scientific and socio-economic information. CITMA's Institute of Oceanology (marine biodiversity) and the Institute of Ecology and Systematics (terrestrial biodiversity) will support these activities.

173. Outcomes 2-4 will be the responsibility of the three productive sector ministries, which will be assisted by Technical Working Groups that include representatives of various stakeholders relevant to each sector (see Diagram 1). In addition, designated CITMA staff will provide technical inputs and coordination assistance to the productive sector ministries, in particular for MINAZ which has limited experience in some of the sustainable agriculture, livestock raising and forestry activities proposed for the project.

174. The following two tables summarize the projected inputs by CITMA and the productive sector ministries during project implementation. The majority of the staff will be working at the local level within the Sabana Camaguey Ecosystem, and as with Phases 1 and 2 of this project, for the most part these managers, technicians and specialists will be devoting a significant part of their time to the project, although they will also retain some normal duties.

Table 1: Projected Participation of Ministry Personnel in Project Activities

MINISTRY	PERSONNEL				
	Researchers	Professionals	Technicians	Workers	Total
CITMA	51	48	26	12	137
MINAG	4	10	82	194	290
MINAZ	3	28	4	218	253
MIP	7	13	8	32	60
MINTUR	-	10	12	175	197
OTHER	2	3	-	-	5
TOTAL	67	112	132	631	942

Table 2: Projected Resource Contributions by Various Ministries to support Project Activities

MINISTRY	EQUIPMENT	FACILITIES AND MISCELLANEOUS
MINAZ, MINAGRI	Tractors and accessories, Personal Computers	Milking facilities, cattle and pig stables, seeds, biological products, food for animals, animals, nursery infrastructure, classrooms and schools for training workers of the sector
MIP	Boats, pumps for experimental works, laboratory equipment	Chemical and biological laboratories Infrastructure for pilot projects (sponge culture, FADs and molted Blue Crab)

CITMA	Equipment in 5 ecological stations. Equipment in a central laboratory of Chemistry and Biology of marine waters. Infrastructure for terrestrial activities, including: landscape ecology, environmental planning, socio-economic assessment of impact of sectoral activities on terrestrial biodiversity. GPS, Personal Computers, motorboats (5)	Laboratory facilities Infrastructure for information networks (SIAESC)
MINTUR		Classroom and Schools for training workers of the sector

175. In addition to the participation of the various PMU members, the following institutions or persons have been identified as key contributors to the project:

- The Ministry of Higher Education, to assist the project's objectives related to the agriculture/livestock rearing. Researchers belonging to the Institute of Animal Sciences will participate in the development of the pilot project engaged in buffalo management; teachers from the Faculty of Economy of the University of Havana will be in charge of specific project tasks for the implementation of the Sustainable Finance Program; the Marine Research Center (CIM) of the University of Havana will participate in monitoring of marine biodiversity; and the Higher Poly-technical Institute "Jose Antonio Echevarría" (ISPJAE) will participate in the Sustainable Financing Program.
- The Ministry of Finances and Prices will participate in the Sustainable Financing Program
- The Ministry of Economy and Planning, through its Institute of Physical Planning (IPF) and the Provincial Directions of Physical Planning (DPPF), will participate in the Sustainable Financing Program implementation; in the integration of environmental and territorial planning and the sustainable design of tourism development; and in the adoption of ecosystem approaches in land use planning for sugar cane conversion.
- The National Institute of Hydraulic Resources and its provincial offices will participate in inter-sectoral coordinating activities, including the strengthening of ICMA; in sugar cane conversion planning; and in the Sustainable Financing Program.
- Given the new approach to be adopted for mainstreaming biodiversity into productive sectors, it is expected that international expertise in the form of consultants or specialized companies would be required

176. Execution of the project will be carried out on the basis of annual workplans. The PMU is in charge of designing and implementing the activities in the annual workplans, while the Project Steering Committee will approve and review the plans.

Coordination and Oversight Activities

177. Project management and oversight will be carried out at several levels (national, provincial, municipal and sectoral – see Diagram 2 in Section IV, Part II). Administrative and financial issues will be overseen by a Project Tripartite Committee, following normal UNDP procedures.

178. The Project Steering Committee (PSC), chaired by the Project Coordinator, will be responsible for overseeing the project, approving plans and budgets, coordinating the inputs and support of national and international partners, and monitoring and evaluation of results and lessons learned. In addition, any

decisions that require modification of the outputs and activities of the project, or changes to legal structures and mechanisms, will be of the responsibility of the Project Steering Committee. The PSC also will also have an important role in the strengthening of ICMA mechanisms, ensuring that appropriate environmental regulations are established and that the functions of ICMA are executed and improved. The Project Steering Committee will be composed of representatives of various ministries and other governmental and non-governmental institutions with policy and technical expertise relevant to the project objectives (see Diagram 2). The PSC will meet quarterly during the first year of the project, and twice yearly in subsequent years.

179. At the provincial level, each of the five provinces within the Sabana Camaguey Ecosystem (SCE) will have a Provincial Steering Committee. These committees will be chaired by the Provincial Coordinator (CITMA members of the PMU), and will include representatives of the provincial delegations of MINAZ, MINTUR, MINAG, and MIP, as well as provincial Universities.

Potential capacity gaps in the management and oversight of the project

180. Most of the parties identified as part of project implementation and/or oversight have participated in the management and implementation of the two previous UNDP/GEF projects in the Sabana-Camaguey Ecosystem. This level of experience, along with effective institutional coordination mechanisms and demonstrated project management and technical capacities, provides a high likelihood for successful project implementation. Some of the participating ministries were incorporated only recently (e.g. MINAZ, MEP, MFP), but their personnel have participated extensively in the PDF-B preparation phase.

181. In addition, during the PDF B process, the most critical capacity needs were identified (particularly for agriculture-livestock raising-forestry), as well as different modalities (workshop, training courses, seminars, scientific visits to foreign institutions) for addressing these needs, and these have been incorporated into the project design and management/oversight structure.

PART IV: Monitoring and Evaluation Plan and Budget

182. Project monitoring and evaluation will be conducted in accordance with established UNDP procedures, by the Project Management Unit (PMU) and the UNDP Cuba Country Office with support from UNDP/GEF. The logical framework matrix provides *impact* indicators for project implementation, along with their corresponding *means of verification*, which will form the basis for Monitoring and Evaluation. Following UNDP procedures, quarterly progress and financial reports will be prepared by the PMU and presented to the Project Steering Committee (PSC) at its quarterly meetings. A joint Annual Project Review (APR) will be undertaken annually. In addition, independent mid-term and end-of-project evaluations will be made to identify project strengths, document lessons, and facilitate the correction of weaknesses. Additional details on monitoring and evaluation procedures, including a budget, are provided in Annex 17. [Further information on monitoring and evaluation is provided in the GEF Tracking Tool – Annex 15](#)

183. Because this is the 3rd Phase of the GEF intervention in the Sabana Camaguey Ecosystem, technical and scientific monitoring protocols have already been developed for use in the project. For reef monitoring, the project will use the AGRRA Protocol to monitor corals, black sea urchin, algae, and herbivore and carnivore fish. For diving impacts, the project will use Dustan's (1987) reef vitality method. ReefBase data sheets (coral bleaching) will be used for early warning monitoring of coral reefs by volunteer dive guides from Dive Centers. Other volunteer data relevant to coral reef condition (coral disease, mortality events, polluting accidents, etc.) will be collected in easy-use datasheets. For sea-grass

bed assessments, the project will estimate biomass shoot density and leaf height using a CARICOMP (1994) protocol and other methods described in Short et al. (2001), and for mollusk species richness as a focal indicator of associated macrofaunal species diversity, the protocols of Alcolado and Espinosa (1996). For mangroves, the project will use a CARICOMP (1994) protocol and other traditional indicators in Snedaker and Snedaker (1984). For sea water and wastewater chemical analysis, the project will use APHA et al. (1992), FAO (1975) and IOC-UNESCO (1983, 1993) manuals. For fisheries, the project will use traditional methods, including cohort analysis.

184. Overall, monitoring of biophysical conditions will emphasize rapid assessment methods that are cost effectiveness, rapid and ease to use, and will rely significantly on community participation. For example, tourist dive guides will implement an early warning system about coral reef conditions at dive sites and neighbouring reefs, reporting on problems such as breakages, anchor damage, boat groundings, trash, sediment suspension by dive fins, etc.). These guides will work under the direction of specialists at the local Monitoring Laboratories created by the project, who will collect, analyze and disseminate the data.

PART V: Legal Context

185. This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement between the Government of CUBA and the United Nations Development Programme, signed by the parties. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

The UNDP Resident Representative in Habana, Cuba is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP-GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes:

- a) Revision of, or addition to, any of the annexes to the Project Document;
- b) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation;
- c) Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility; and
- d) Inclusion of additional annexes and attachments only as set out here in this project document.

SECTION II: STRATEGIC RESULTS FRAMEWORK AND GEF INCREMENT

PART I: Incremental Cost Analysis

1. Regional Context and Broad Development Goals

The Sabana-Camagüey Ecosystem (SCE) occupies a strip of approximately 465 km along the central north coastline of Cuba, including watersheds along the northern mainland and an archipelago that includes 2,515 cays, which represent 60% of all the Cuban cays and the largest system of cays in the Wider Caribbean. Approximately 2.3 million persons live within the 40 municipalities belonging to the Sabana Camaguey Ecosystem (SCE). Of these 40 municipalities, 16 are located in the coastal zone, with a total population of 747,123 inhabitants. Fishing, tourism, agriculture and sugar production are the main economic activities in the project zone. Economic activity and human populations are concentrated in the mainland areas of the SCE, with the exception of fisheries activity in the sea and tourism, which is highly

concentrated on the coastal cays. However, even with tourism development in the cays, human populations are still located on the mainland, and construction workers and hotel employees are largely prohibited from living on the cays on which they work. The variety of habitats in the SCE, including coastal forests, mangrove forests, seagrass areas, coral reef systems, etc., support a great diversity of marine and terrestrial biota and a high level of terrestrial endemism, which places this zone among the richest in biodiversity in Cuba and the Caribbean. This biodiversity plays a critical role in local socio-economic development, particularly as essential inputs to the tourism, fisheries and agricultural sectors. The overall goal of the proposed full project is to protect the marine and coastal biodiversity of global significance in the productive landscapes and seascapes of the Sabana-Camaguey Ecosystem of Cuba, while contributing to the country's social and economic development.

2. Global Environmental Objective

The Project will help to conserve globally significant biodiversity in the Sabana Camaguey Ecosystem (SCE). The SCE has considerable regional importance due to its high diversity of marine and terrestrial species and the high level of endemism of terrestrial flora and fauna, in terrestrial and marine ecosystems that are much less degraded than most similar areas in the Caribbean. The project area includes extensive areas of globally significant ecosystems distributed throughout the landscape and seascape (cays, marine shelf and mainland watersheds), including mangrove forests, dry forest and coastal shrub systems, coral reefs and seagrass beds. Species of global significance include migratory birds, endemic plant and animal species, flamingos and other threatened and charismatic birds, marine turtles, manatee, dolphins, crocodiles, etc.

The project will conserve this biodiversity by supporting the transformation of the tourism, fisheries, and agriculture/livestock sectors. The project will support development of these sectors (thereby supporting local development) along a path that conserves and sustainably uses biodiversity, thereby providing the region and the world invaluable experiences of mainstreaming biodiversity conservation in productive sector activities. Furthermore, the project will demonstrate operational and institutional mechanisms for Integrated Coastal Management, with valuable potential for replication in coastal areas worldwide.

3. Baseline

Outcome 1: In spite of the high priority that the Government of Cuba places on the conservation of biodiversity and the sustainability of its development programs, social and economic pressures can still promote decision making based on short-term revenue decisions that will compromise globally significant biodiversity. In the baseline scenario, the primary criteria for development and planning decisions in the Sabana Camaguey Ecosystem will be short-term profitability and economic growth on a sector by sector basis. Sector-based decision making will continue to minimize the role that biodiversity and ecologically sustainable practices play in economic development, and as a result biodiversity resources will be ignored and degraded. The planning and management processes for the SCE at the inter-sectoral and regional level will continue to pay scant attention to environmental concerns, while environmental planning and oversight will remain sector specific and unable to address issues at the landscape or ecosystem levels. Moreover, the legal, regulatory and enforcement framework for environmental management, and particularly for biodiversity conservation, will remain incomplete and ineffective. What regulation and protection does exist for biodiversity in the SCE will continue to be focused on protected areas, and the productive landscape and seascape will continue to be heavily impacted by human activity.

In the baseline scenario, the possibility of acquiring relevant understanding about species, populations and ecosystems of national and global importance to enable informed management and decision making would be severely reduced. In addition, economic incentives for biodiversity friendly investments and practices will remain almost non-existent, providing no impetus for change in the traditional high-impact

development and resource management practices common in the area. As well, actual models of successful sustainable tourism, fisheries, and agriculture and livestock raising economic activities will not be available to promote understanding and support for biodiversity conservation among productive sector stakeholders, or to provide demonstrable alternatives to traditional development models. Opportunities to develop local capacity for integrated coastal management will also be severely limited in the baseline, as existing efforts (e.g. Capacity 2015) will not have resources adequate to carry on their programs.

Baseline funding for activities related to the enabling environment for mainstreaming biodiversity conservation into the productive sectors is low at \$202,884, reflecting low investments in intersectoral coordination and planning (see Baseline Funding Table below). The role of CITMA and other environmental agencies in the baseline scenario will be limited largely to basic environmental monitoring and protection activities, largely through the five monitoring stations established during Phase II. CITMA will continue to implement small projects, including: automating environmental and biological diversity information; carrying out ecological assessments of bird communities; and in cooperation with the National System of Protected Areas, monitoring and protecting terrestrial and marine ecosystems in Caguanes National Park, monitoring the West Indian manatee within Caguanes National Park, and monitoring the impacts of public use in Caguanes National Park.

Outcome 2: In the Tourism Sector, the baseline scenario will see continued negative impacts of tourism development and operations on coastal and marine ecosystems and the biodiversity they harbor, primarily from poorly planned infrastructure development, solid and liquid wastes, invasive species, and visitor impacts. The traditional “sun and beach” model of tourism will continue to be the only tourism development pursued in the SCE, as tourism sector stakeholders remain unaware of the options for and benefits of alternatives such as nature related tourism. Some projects for improved management of existing tourism infrastructure will take place, such as a project for use of indigenous flora for gardening in tourist facilities in the Northern Cays of Ciego de Ávila and creation of an ISO 14000 Environmental Award for tourist resorts in the North Eastern cays of Villa Clara Province, but essential technical and organizational capacity will be inadequate to fundamentally diminish environmentally damaging practices and inefficient use of resources. Baseline programs and projects also will carry out some environmental assessment for planned tourism development, including studies of littoral dynamics on beaches and modeling of sediment dynamics in the northeastern cays of Villa Clara province, but information sharing and consultative systems will not be in place to ensure that such information is used so that planned tourism development takes account of critical environmental factors such as impacts on particularly fragile or ecologically important ecosystems. Baseline funding for biodiversity-friendly activities in the tourism sector is significant at \$6,630,861, reflecting the importance of the sector in the Cuban economy.

Outcome 3: In the Fisheries Sector, the baseline scenario will see continue overfishing and destructive fishing gear and practices leading to significant deterioration of fish stocks and marine biodiversity. For the most part, baseline activities will continue to focus on research of marine ecosystem processes, through such projects as a study of the life cycle and fisheries of the spiny lobster (*Panulirus argus*) and the impact to them of human activities; a study of coral reef composition and structure in the area north of Coco Cay, and development of methods and technologies to forecast oceanographic processes in the Cuban insular shelf. However, the results of these studies will not necessarily be readily available to fisheries managers, nor applied in fisheries resource management practices. Baseline programs and projects for management of fisheries stocks will be largely limited to species-specific management plans for critically declining species such as lobster, Queen conch, and commercial sponges, and broader scale and proactive approaches to fisheries management will remain unfulfilled. Moreover, although fisheries managers have recently implemented new gear restrictions, the capacity to monitor and enforce these restrictions is limited, and the sector has no plans or capacity to provide alternative livelihoods for fishermen put out of work by these management changes. Baseline funding for biodiversity-friendly activities in the fisheries sector is \$1,520,377, a relatively low amount reflecting the strong focus of the sector on maximizing fisheries production.

Outcome 4: In the Agriculture and Livestock Sector, the baseline scenario will see continued degradation of terrestrial ecosystems and downstream effects on marine ecosystems from soil degradation, pollution, the spread of exotic species and other impacts stemming from poor agricultural practices. The large-scale conversion program of former sugar cane producing lands will implement programs of intensive monocrop production, high impact livestock management, and plantation forestry using exotic species in the absence of viable, sustainable alternative production systems. In the baseline scenario, resources will be devoted to improved forest management, through such projects as improved forest pest management, reforestation and forest planning in the northern part of Camaguey province, and reduced timber harvesting in Sancti Spiritus province, but these actions will not focus on conservation of the coastal forests that provide a critical buffer between agricultural production areas and the marine environment. The baseline will also see some efforts at improving waste management, such as the development of bio-digesters for the treatment of wastes from small, medium and large agricultural and livestock facilities, but these efforts will be purely technical and will not include changes to the planning or monitoring systems to sustain long-term changes in waste production and management in the sector. Baseline funding for biodiversity friendly activities in the agriculture, livestock and forestry sectors is \$7,458,291, reflecting the significant investments of the Ministry of Sugar in the land conversion process.

4. GEF Alternative

Outcome 1: By the end of the project, there will be an operational framework for management of natural resources and economic activities within the Sabana-Camaguey Ecosystem that is supportive of the protection and sustainable use of biodiversity. This framework will depend on the active participation of decision makers, resource managers, fishermen, tourism sectors workers, agriculture, livestock and forestry producers, and local communities in planning and decision-making processes within the context of stakeholder coalitions at the Provincial and SCE levels. Overall responsibility for ensuring the coordinated participation of these various stakeholders, and for ensuring that policies and actions are supportive of integrated coastal management and the mainstreaming of biodiversity conservation into productive sector activities, will lie with ICMA, which has already received a mandate from the Government of Cuba to lead inter-sectoral coordination in the SCE. To support the operations and coordination of ICMA, the productive sectors, and other stakeholders, and Environmental Information System for the SCE (SIAESC) will be established to collect, organize, and disseminate information generated by the project. In addition, the CBC/ICM-N will undertake capacity building activities to allow various stakeholders to participate effectively in new coordination and management processes, and to apply these changes within their own areas of responsibility. The project also will support the dissemination of lessons learned and best practices on integrated coastal management to other areas of Cuba and elsewhere, including the model of ICMA for other coastal zones. Finally, in order to ensure that the benefits of ICMA, the SIAESC, the CBC/ICM-N and other processes for mainstreaming biodiversity conservation across sectors will continue over the long term, the project will design and implement various sustainable financing mechanisms.

In addition to significant support from the Government of Cuba, co-financing for Outcome 1 will be provided by UNDP through the Capacity 2015 program, in particular for the establishment and operation of the Capacity Building Centers for Integrated Coastal Management Network (CBC/ICM-N) (Output 1.2), and linkages between this network and the Capacity 2015 Integrated Learning & Application Networks in other countries (Output 1.3). Additional co-financing for capacity building measure related to mainstreaming biodiversity conservation in the fisheries sector will be provided by WWF-Canada (Output 1.3).

Outcome 2: Activities under Outcome 2 have been designed to ensure that the rapidly expanding tourism industry in the Sabana Camaguey Ecosystem is developed and managed in a way that maximizes consideration of biodiversity conservation and minimizes negative impacts on the globally significant

coastal and marine ecosystems of the area. Awareness raising of environmental conservation will target numerous stakeholders, from educating and providing guidelines to the local workforce, as well as visitors, so as to reduce their individual threats to the coastal and marine ecosystems, to assisting local authorities in understanding and dealing with the linkages between tourism development and operation and threats to local ecosystems, to study tours related to best practices in environmental management and conservation in the tourism sector in the Caribbean. The project also will develop tools and guidance so that new hotels, infrastructure and related services planned for development in the region will comply with the framework and associated principles and standards. Tourism development planning processes, including the Tourism Master Plan for the SCE, environmental impact assessments, and others, will be updated to incorporate biodiversity concerns, through the joint efforts of MINTUR, the Institute of Physical Planning in the Ministry of Economy and Planning, major government tourism companies, Gaviota S.A. and Cubanacan S.A., and others. In addition to reducing negative impacts, the project will also demonstrate an alternative model for tourism development in Cuba from the traditional “sol y playa” experience. By promoting nature related tourism, the project will offer Cuba the opportunity to test a tourism development model with much lower impacts on the environment, and in particular on fragile ecosystems such as the cays and marine areas of the SCE. The project will demonstrate various “packages” for nature related tourism activities within one of the protected areas in the SCE, and based on lessons learned, will replicate these activities at another protected area.

In addition to significant support from the Government of Cuba, co-financing for Outcome 2 will be provided by a Spanish NGO, Ecodesarrollo, through its project for “Technical training and infrastructure creation for ecotourism development and resource sustainable management in public use areas of Cayo Romano”. This cay, which is located within the Protected Area Gran Humedal del Norte, is one of the pilot demonstration sites for ecotourism development under activity 2.2.2. The resources and expertise of Ecodesarrollo will also support project activities for designing ecotourism products in conjunction with existing hotels and tour operators in the SCE (activity 2.2.3), as well as reducing the impact of tourism infrastructure development (activity 2.5.3).

Outcome 3: Activities under Outcome 3, to be implemented by the Ministry of Fisheries (MIP) in cooperation with local governments, government fisheries companies, resource management and conservation agencies, and individual fishermen, will work to reduce activities harmful to the coastal and marine environment. Information on fisheries resources and marine ecosystem conditions will be expanded to allow for improved management. Additional laws, regulations and policies, such as restrictions on the extraction of commercial species and by-catch, new fishery protection zones, harvest quotas, and gear restrictions, will be implemented. To make sure that implementation is successful, significant capacity building will take place to improve monitoring and enforcement within the SCE, complemented by awareness rising among fishermen and other local inhabitants about the impacts of certain practices on long-term fisheries viability, about the details of new regulations, and about new sustainable employment opportunities. The project also will implement pilot project activities to demonstrate sustainable economic alternatives for fishermen, in particular for those fishermen whose jobs are eliminated by new regulations and reduced quotas (estimated at 250 fishermen working in 37 boats). By offering alternative livelihoods, these pilot projects will ensure that these fishermen do not switch to other activities that might negatively impact biodiversity. Several different alternative sustainable fisheries options will be developed. There are several areas with suitable ecological conditions for sponge cultivation, and existing natural stocks of sponges are sufficient to support the seeds for this activity without any population decline. In addition, blue crab cultivation will be developed, as these are among the most abundant species in inshore areas and have a high market value. Finally, the use of FADs (Floating Aggregating Devices) for attracting fish in open waters close to the marine shelf is also a promising alternative which diverts fishing pressure away from depleted shelf resources.

In addition to significant co-financing by the Government of Cuba for activities under Outcome 3, WWF Canada will provide co-financing through its project “Development of a Modern Sustainable Fishing Sector” during the years 2006-2008. This project will primarily support activities for awareness building and local capacity under Output 1.4, by establishing Local Committees to support fisheries management and to develop local management capacities; by modernizing fishing enterprises with environment-friendly equipment and skills and awareness building and training on principles of sustainable development; and by co-administration of the project by the Local Committees in preparation for transfer of responsibilities.

Outcome 4: The overall objective of the activities under Outcome 4 is to develop and implement alternative models for the conversion of lands formerly under sugar cane production, including sustainable and biodiversity-friendly agriculture, livestock raising and forestry, and to simultaneously develop capacities and an enabling environment that will ensure that these models are replicated throughout the conversion program (within the SCE and elsewhere in Cuba). The Government of Cuba, represented by both MINAGRI and MINAZ (which will have primary responsibility for implementing activities under Outcome 4), has asserted its willingness to explore a variety of sustainable production alternatives on lands that were formerly under sugar cane production. The project will develop and implement mechanisms for improving existing planning for the conversion of sugar lands, and promote the integration of coastal and marine biodiversity conservation factors into existing plantation/enterprise level planning processes. To enable adequate management, the project also will build capacities within MINAZ to enable it to plan and manage more sustainable and biodiversity friendly types of agricultural, livestock and forestry production in converted areas. In order to demonstrate the viability of sustainable agricultural models, the project will establish demonstration (and replication) projects for sustainable agricultural production (crops, fruit trees, timber), for biodiversity friendly management of water buffalo, and for sustainable management of coastal forest ecosystems as buffer zones protecting marine ecosystems from land-based impacts. The project will also establish positive incentives for producers of sustainable products, for example by developing market strategies and distribution linkages to enable sale of agricultural and livestock products to the tourism centers within the SCE. This will serve to make such products more attractive to producers and to the government alike, as tourists are more willing and able to pay a premium for agricultural goods.

Co-financing for activities in this sector will come solely from the Government of Cuba, but at a very high level (\$13,600,546), of which approximately 80% is for personnel and equipment for management of coastal forests.

5. System Boundary

The project area is defined by the Sabana-Camaguey Ecosystem (SCE), which occupies a strip of approximately 465 km along the central north zone of Cuba, between Punta Hicacos (west) and Nuevitas Bay (east) (see Annex 4, Map 1). The SCE includes the northern watersheds of the provinces of Matanzas, Villa Clara, Sancti Spíritus, Ciego de Ávila, and Camaguey; as well as a marine archipelago, adjacent shallow marine shelf, and oceanic Exclusive Economic Zone. Overall, the project is intended to impact biodiversity conservation in the productive landscape and seascape of the SCE. Unlike Phases 1 and 2, which focused on establishment and operation of protected areas, Phase 3 is specifically designed to affect the management of fisheries, tourism and agriculture activities, which for the most part take place outside of the protected areas system in the SCE. In so doing, Phase 3 will provide a critical complement to Phases 1 and 2, so that together the long-term investment of the GEF over all three phases results in the conservation of globally significant biodiversity across the entire breadth of the project area.

The project will be implemented across the following areas of landscape and seascape within the Sabana Camaguey Ecosystem (see Annex 15 for more details):

- Buena Vista Biosphere Reserve + Great Wetland of the north of Ciego de Ávila (tourism pilot projects): 540,377 ha
- Marine areas (fishery pilot projects): 277,000 ha
- Former sugar cane producing lands (agriculture pilot projects): 3,057 ha
- Former sugar cane producing lands (water buffalo pilot projects): 2,740 ha
- Former sugar cane producing lands and bordering areas (forestry pilot projects): 42,446 ha
- Total Landscape indirectly covered by the project: 2,280,000 ha
- Total Seascape indirectly covered by the project: 831,100 ha

6. Incremental Costs

The Baseline associated with the project is estimated at US\$15,812,413. The GEF Alternative is US\$43,285,090. The total Project Cost is US\$27,472,677, of which US\$4,119,498 is GEF funding (not including the PDF-B budget of US\$200,000). These GEF funds have leveraged US\$23,353,178, and the ratio of GEF to other financing is 15% to 85%. Costs have been estimated for five years, the duration of the planned project.

7. Incremental Cost Matrix (US\$)

Cost/Benefit	Baseline	Alternative	Total Increment	GEF Contribution
Domestic Benefits	Government efforts to reduce tourism impacts, restrict and reduce fishing, and find alternatives for sugar production provide some improvements to productive resource conditions and economic production	Improved environmental management and coordination capacities, with legal, policy and financial frameworks that support conservation, lead to sustained economic growth and resource conservation		
Global Benefits	Sector specific management practices provide protection to some globally significant biodiversity, but only in limited areas, mostly incidental to resource production priorities, and without accounting for cross-sectoral impacts	Inter-sectoral mechanisms and integration of biodiversity concerns into sector decision making enables more effective conservation of globally significant biodiversity		
Outcome 1: Enabling Environment	202,884	4,942,202	4,739,318	861,618
Outcome 2: Tourism Sector	6,630,861	10,622,223	3,991,362	1,326,184

Cost/Benefit	Baseline	Alternative	Total Increment	GEF Contribution
Outcome 3: Fisheries Sector	1,520,377	6,661,828	5,141,451	1,161,151
Outcome 4: Agriculture / Livestock Sector	7,458,291	21,058,837	13,600,546	770,456
Cost Totals	15,812,413	43,285,090	27,472,677	4,119,498

Additional details on the funding provided for each outcome by each co-financing partner is provided in the UNDP Project Document (Annex 16).

8. Summary of baseline funding by outcome

Outcome	GEF budget	Baseline sources (acronyms below)	Nature of baseline activities	Start (year)	End (year)	Baseline funding (US\$)
Outcome 1: A strengthened enabling environment for biodiversity conservation in the productive sectors in the ESC	861,618	PRCT/CITMA/IES	Automation of Cuban environmental and biological diversity information. (Methodology)	2006	2007	91,600
		PRCT/CITMA/IES	Ecological assessments of bird communities in tropical ecosystems	2006	2007	95,400
		FNMA/CITMA	Surveillance and protection of terrestrial and marine ecosystems in Caguanes National Park.	2006	2007	8,910
		FNMA/CITMA	Monitoring the West Indian manatee within Caguanes National Park.	2006	2006	2,130
		FNMA/CITMA	Monitoring the public use in Caguanes National Park.	2006	2006	4,844
		Total baseline funding: Outcome 1				
Outcome 2: The tourism sector develops in accordance with the conservation of marine and terrestrial ecosystems within the ESC	6,630,861	PRCT/CITMA/IGT	Methodological basis for the environmental zonation in tourist development areas.	2006	2006	6,100
		FNMA/CITMA	Strategy for the creation of the tourist environmental culture in the local population of Remedios and Caibarien cities.	2006	2006	3,500
		PTCT/CITMA (Ciego de Ávila)	Littoral dynamics in the beaches of “Jardines del Rey” Tourist Destination, Sabana Camagüey Archipelago	2006	2006	201,919
		PTCT/CITMA (Ciego de Ávila)	Characterization of the Sabana – Camagüey Archipelago.	2006	2006	65,013
		PTCT/CITMA (Ciego de Ávila)	Archaeological researches on the lodging system in the North Lagoon (Laguna Norte), Ciego de Ávila.	2006	2006	256,685

		PTCT/CITMA (Ciego de Ávila)	Technological management of the indigenous flora for its conservation and exploitation for gardening in tourist facilities in the Northern Keys of Ciego de Ávila.	2006	2006	50,944	
		MINTUR / CITMA	Local certification of the beaches in the northern coast of the Matanzas Province.	2006	2008	250,000	
		MINTUR / CITMA / ALMEST	Ecological restoration of the beaches in the northern coast of the Matanzas Province.	2006	2011	1'090,000 each year= 5'450,000	
		ALMEST / CITMA	Modelling of sediment dynamics in the North Eastern keys of the Villa Clara Province	2006	2008	100,000	
		ALMEST/ GEOCUBA	Environmental diagnoses according to the standards ISO 14 000 for the Environmental Award in five tourist resorts in the North Eastern keys of the Villa Clara Province	2006	2010	40,000	
		MINTUR /CITMA	Environmental management of the Northern coastal zone of the Camaguey Province	2006	2019	206,700	
		Total baseline funding: Outcome 2					6,630,861
Outcome 3: Sustainable fisheries are practiced within the ESC so that fish populations and marine ecosystem functions are maintained and/or restored	1,520,377	MIP/CIP	Assessment, control and management of lobster fisheries in Cuba.	2006	2009	260,000	
		MIP/CIP	Interrelation between life cycle and fisheries of the spiny lobster (<i>Panulirus argus</i>) in the Cuban shelf.	2006	2009	244,000	
		MIP/CIP	Management measures for the fisheries of Queen conch and other mollusks in Cuba.	2006	2009	152,000	
		MIP/CIP	Management, evaluation and improvement of the efficiency in the fisheries of commercial sponges (<i>Spongidae</i>) in the Cuban shelf.	2006	2009	164,000	
		MIP/CIP	Integral environmental assessment and state of the feeding potential of the lobster resource. Influence of anthropogenic activities on the oceanographic variables and their relation to the lobster resource in the north-central region of Cuba.	2006	2009	332,000	
		PRCT/CITMA/IDO	Marine Biodiversity in Cuba	2006	2006	59,400	
		PRCT/CITMA/ CEBIMAR	Conservation and assessment of marine microorganisms in collection.	2006	2006	74,200	
		PRCT/CITMA/IDO	Development of methods and technologies to forecast oceanographic processes in Cuban insular shelf.	2006	2006	80,000	
		PRCT/CITMA/IDO	Diagnosis of the environmental situation existing in Jagüey Bay (northeast of Cuba) with regard to food intoxication of marine origin.	2006	2006	74,600	

Outcome 4: The declining sugar cane industry transitions into sustainable land use practices, with greatly reduced negative impacts on the coastal region of the ESC.		PTCT (Ciego de Ávila)	Composition and structure of coral reefs north of Coco Key.	2006	2006	80,177	
		Total baseline funding: Outcome 3					1,520,377
	7,458,291	PRCT/MINAG	Morphological characteristics of <i>Leucaena spp.</i> collections and selection of actions for agro-forestry systems.	2006	2007	79,591	
		PRCT/MINAG/IIF	Integral characterization of forest species.	2006	2007	40,000	
		PRCT/MINAG/IIF	Improvement of forest pest management in Cuba.	2006	2006	28,600	
		PRCT/UH/ICA	Climate change and the forest sector: second approximation.	2006	2006	19,300	
		PRCT/MINAG/IIF	Development of bio-digestors for the treatment of wastes from small, medium and large agricultural/cattle rearing productions.	2006	2007	99,500	
		FNMA/CITMA	Promotion of the agroecological productivity from farmer to farmer for a sustainable agriculture.	2006	2009	187,800	
		FNMA/CITMA	Sustainable decrease in tree logging in CP Contramaestre, Sancti Spiritus.	2006	2006	42,200	
		FONADEF/MINAG	Forest plantations in northern sector of Camaguey province.	2006	2009	2,214,300	
		FONADEF/MINAG	Reforestation Projects for the conservation of the flora and fauna in northern sector of Camaguey province.	2006	2009	3,998,000	
		CITMA	Reforestation Project of Limones-Tuabaquey sector, Camaguey province.	2006	2007	559,000	
		FONADEF/MINAG	Forestry planning in Camaguey province.	2006	2007	190,000	
		Total baseline funding: Outcome 4					7,458,291
	Grand Total Baseline Funding					15,812,413	

Acronyms:

CEBIMAR: Marine Bioactives Research Center

CIP: Fisheries Research Center

FNMA: National Fund of Environment

FONADEF: National Forestry Funds

ICA: Institute of Animal Sciences

IDO: Institute of Oceanology

IES: Institute of Ecology and Systematic

IGT: Institute of Tropical Geography

IIF: Institute of Forestry Research

MINTUR: Ministry of Tourism

MIP: Ministry of Fisheries

PRCT: Sectoral Scientific Technical Programs

PTCT: Territorial Scientific Technical Program

PART II: Logical Framework Analysis

Table 1: Objectively Verifiable Impact Indicators

Project Strategy	Objectively verifiable indicators (Unless otherwise noted, all target values are for end of project)				
GOAL:	Protect the marine and coastal biodiversity of global significance in the productive landscapes and seascapes of the Sabana-Camaguey Ecosystem of Cuba, while contributing to the country's social and economic development				
Project Purpose	Indicator	Baseline	Target	Sources of Verification	Risks and Assumptions
OBJECTIVE: The fisheries, tourism and agriculture sectors in Sabana Camaguey adopt operational changes that enable biodiversity conservation.	1. Key measurements of biological health of coral reefs, seagrass beds & mangroves within SCE stabilize or improve: <ul style="list-style-type: none"> - Avg. coral cover of sea bottom - Total area of mangroves - Density of seagrass beds (shoots/m²) 2. Key measurements of biological health of selected indicator fish species within SCE stabilize or improve: <ul style="list-style-type: none"> - Average size of parrotfish - Average size of snappers - Average size of groupers 3. Area of seascape within SCE benefiting from biodiversity friendly management by productive sectors (sustainable fisheries) 4. Area within SCE affected benefiting indirectly over the long term by changed productive sectors: <ul style="list-style-type: none"> - Landscape - Seascape 	12% 1627 km ² 548.8 15.02 cm 19.02 cm 19.61 cm 0 km ² 0 km ² 0 km ²	0% decrease 0% decrease 0% decrease 0% decrease 0% decrease 0% decrease 2,770 km ² 22,800 km ² 8,311 km ²	- Monitoring stations: 30 reef (15 shallow & 15 deep), 50 seagrass bed, and 50 mangrove - Rapid ecological assessments - Project monitoring reports - Project monitoring reports	- Stable political and socio-economic environment continues in Cuba - The 3 target sectors continue to show commitment to cooperating in biodiversity conservation and to achieve sustainable use of resources and the environment
Outcome 1: A strengthened enabling environment will exist for the financial, institutional, environmental and social sustainability of	1. % of hotels in ecologically sensitive areas within the SCE that are built according to planning guidelines that have incorporated biodiversity conservation recommendations (developed during project by tourism sector) 2. Frequency of access to an Environmental Information System for the Sabana Camaguey Ecosystem (SIAESC) by key stakeholders, including: <ul style="list-style-type: none"> - SCE municipal authorities - State enterprises 	0% 0% usage 0% usage	75% 75% 60%	- Statutes, rulings, and operating documents of ICMA-SCE - Surveys of ICMA-SCE managers, ICM local coalitions,	- Legislation, regulations and enforcement mechanisms to enable environmental conservation are supported within the Govt. of Cuba

<p>biodiversity conservation in the tourism, fisheries and agriculture / livestock sectors in the SCE.</p>	<ul style="list-style-type: none"> - CITMA, EIA licensing authorities 3. Financial sustainability of biodiversity mainstreaming activities: <ul style="list-style-type: none"> - % of operating costs of ICMA derived from sector based resources/mechanisms - Increase in sector budgets for actions related to environmental conservation in the SCE <ul style="list-style-type: none"> - Tourism Sector - Fisheries Sector - Agriculture Sector 	<p>0% usage</p> <p>0%</p> <p>\$2,820,000</p> <p>\$456,700</p> <p>\$3,959,770</p>	<p>90%</p> <p>50%</p> <p>\$4,075,000</p> <p>\$840,697</p> <p>\$6,667,281</p>	<p>and local and national govts</p> <p>- ICMA budget documents</p> <p>- Sector budget</p> <p>- Sector budget</p> <p>- Sector budget</p>	<p>- Political will exists within CITMA, MIP, MINTUR and MINAZ to enable integrated coastal management within the SCE, and to advance the conservation of biodiversity within each ministries respective sector</p>
<p>Outcome 2: The tourism sector develops in accordance with the conservation of marine and terrestrial ecosystems within the SCE.</p>	<ol style="list-style-type: none"> 1. % of new hotels in ecologically sensitive areas within the SCE that are planned with specific guidelines for biodiversity conservation in the following categories <ul style="list-style-type: none"> - With liquid waste treatment systems (tertiary treatment plants) - Use of native vegetation in gardens and landscaping 2. Percentage of visitors to the SCE participating in nature related activities 3. Increase in the percentage of tourist packages that offer alternative models to “sun and sand” 4. # of new roads built following biodiversity friendly construction guidelines in ecologically sensitive areas 5. Decrease in coral reef mortality from diving activity 6. Revenues from taxes and fees on tourism activities invested in biodiversity conservation within the SCE 	<p>50 %</p> <p>50 %</p> <p>5%</p> <p>0%</p> <p>0%</p> <p>0.01cases/10 m²</p> <p>\$0</p>	<p>100%</p> <p>100%</p> <p>10%</p> <p>10%</p> <p>100%</p> <p>50% decrease</p> <p>\$200,000/year</p>	<p>SCE Tourism Master Plan; on-site inspections; EIAs and building permits.</p> <p>Surveys of hotel & tour managers, and tourists</p> <p>EIA and inspections</p> <p>Coral monitoring</p>	<p>- The tourism sector continues to show willingness to look at development options apart from the traditional “sun and beach” model of tourism in Cuba</p>
<p>Outcome 3: Sustainable fisheries are practiced within the SCE so that fish populations</p>	<ol style="list-style-type: none"> 1. # persons deriving incomes at least equal to that previously earned in commercial fishing, from the following sustainable practices: <ul style="list-style-type: none"> - Cultivation of sponges - Use of Floating Artificial Devices (FADs) - Cultivation of Blue Crabs 	<p>0 fishermen</p> <p>0 fishermen</p> <p>0 fishermen</p>	<p>14 fishermen</p> <p>22 fishermen</p> <p>36 fishermen</p>	<p>- Project reports on fisheries sustainable livelihoods pilot projects</p>	<p>- Political will continues in the MIP to establish and enforce a systems of fisheries regulations</p>

<p>and marine ecosystem functions are maintained and/or restored</p>	<p>2. # of hectares of seascape under legal protection and demarcated for fishery reserves (estimate based on UNESCO guidelines of 12% of total fishing area - to be confirmed during year 1 of the project)</p> <p>3. Number of incidents of illegal fish catches per unit effort of enforcement per year within the SCE decreases</p> <p>4. % of fish captured by commercial fisherman in bottom trawl nets and set nets that are below the legal size limit is reduced: - Bottom trawl nets - Set nets</p> <p>5. Stabilization of habitat and fish stock conditions after bottom trawling ban in north of Villa Clara Province: <i>Health of seagrass beds</i> (shoots/m²) - North of Villa Clara Province - Bahía de Nuevitas - Playa Bagá <i>Increase in fish biomass</i> (grams / m²) - Nazabal region - Caibarién Zone - Puerto de Sagua</p> <p>6. Decrease of Total Fishing Mortality (Z) per year for key finfish species, at Caibarién fishing grounds</p>	<p>0 ha</p> <p>19.8 incidents / inspector in 2004</p> <p>65% 47%</p> <p>250 350</p> <p>0.57 1.06 0.68</p> <p>Lane snapper: Z = 1.15 Mutton snapper: Z = 0.94 Yellowtail snapper: Z = 0.86 Porgy: Z = 0.67 Grunts: Z = 1.23</p>	<p>90,000 ha</p> <p>40% decrease</p> <p>10 % 0 %</p> <p>0% decrease 0% decrease</p> <p>0% decrease 0% decrease 0% decrease</p> <p>35% decrease 20% decrease 20% decrease 5% decrease 15% decrease</p>	<p>- Formal resolutions from MIP establishing fisheries reserves</p> <p>- Fishery Inspector Corps reports (MIP)</p> <p>- MIP statistics</p> <p>- Biological surveys</p> <p>- Stock assessment and linearized catch curves</p>	<p>- The political will to create fisheries reserves exists within the MIP, and the GoC on a larger scale</p>
<p>Outcome 4: The declining sugar cane industry transitions into sustainable land use practices, with greatly reduced</p>	<p>1. No. of hectares within the SCE formerly dedicated to sugar cane production now under biodiversity friendly agriculture, livestock and/or forestry management in pilot projects (demonstration and replication sites)</p> <p><i>1a. Guamuta Cooperative Farm – Sergio Gonzalez Enterprise</i> (demonstration site)</p>			<p>- Land surveys and reports from productive sector ministries</p> <p>- Project reports</p>	<p>- Sugar cane land conversion processes continues to receive political support, and there is no delay of the entry into force of new</p>

negative impacts on the coastal region of the SCE.	Protected Forest	0 ha	145 ha	- Vegetation surveys	land use regulations
	Plantation Forest (native and exotic species)	8.3 ha	578 ha		
	Fruit trees	3.1 ha	67 ha		
	Various Crops	9.4 ha	91 ha		
	Livestock area	0 ha	142 ha		
	<i>1b. Monte Lucas Cooperative Farm (Unidad Proletaria Enterprise) (replication site)</i>				
	Forest (natural and plantation)	4.0 ha	300 ha		
	Fruit trees	1.0 ha	50 ha		
	Various Crops	16.6 ha	80 ha		
	Livestock area	844.2 ha	1,605 ha		
	2. Area of sustainable, biodiversity-friendly management of livestock (buffalo):				
	<i>2a. La Magdalena Cooperative Farm (Aracelio Iglesias Enterprise) (demonstration site)</i>	0 ha	1,520 ha		
	<i>2b. Yarual Cooperative Farm (Bolivia Enterprise) (replication site)</i>	0 ha	1,220 ha		
	3. Number of local inhabitants benefiting directly from sustainable livelihoods in biodiversity friendly agriculture, forestry, or livestock raising at the pilot sites				
	<i>3a. Guamuta Cooperative Farm</i>	0 persons	552 persons		
<i>3b. Monte Lucas Cooperative Farm</i>	0 persons	596 persons			
<i>3c. La Magdalena Cooperative Farm</i>	0 persons	24 persons			
<i>3d. Yarual Cooperative Farm</i>	0 persons	24 persons			
4. Number of persons employed on all reconverted sugar lands within SCE benefiting indirectly from demonstration of sustainable livelihoods opportunities for these lands					
0 persons		14,000 persons			
5. Area of natural coastal forest protecting coastal and marine biodiversity:					
a. Chambas Municipality (Ciego de Avila province)	1,246 ha	2,246 ha			
b. Bolivia Municipality (Ciego de Avila province)	2,000 ha	3,959 ha			
c. Moron Municipality (Ciego de Avila province)	4,000 ha	4,300 ha			
d. Minas Municipality (Camaguey Province)	8,000 ha	8,500 ha by yr 3			
e. Marti Municipality (Matanzas Province) (replication site)	21,075 ha	23,441 ha			

	<p>6. Decrease in organic contaminant loads, measured in Nitrogen (NT), Potassium (PT), and Biological Oxygen Demand (DBO_{sed}), from converted sugar cane lands to inshore marine areas and reef areas</p> <ul style="list-style-type: none"> - W Bahía de Cárdenas: - W Bahía de Santa Clara: - Ensenada de Carbó (Bahía Buenavista): - Cerca de Río Máximo: 	<p><u>2003 figures:</u></p> <p>NT=34.65 µmol/L PT=0.31 µmol/L DBO_{sed}=1.57 mg/L</p> <p>NT = 27.29 µmol/L PT = 0.40 µmol/L DBO_{sed}=2.31 mg/L</p> <p>NT=175.41 µmol/L PT = 5.00 µmol/L DBO_{sed}=5.58 mg/L</p> <p>NT = 15.52 µmol/L PT = 0.88 µmol/L DBO_{sed}=1.97 mg/L</p>	<p>Stable or less than baseline values</p>	<p>Annual reports of the Management Centers of the Provincial Environmental Units</p>	
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Table II: Indicative Outputs, Activities and Quarterly Workplan

Outputs	Activities	Year 1				Year 2				Year 3				Year 4				Year 5			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Output 1.1: Integrated Coastal Management Authority (ICMA)	Activity 1.1.1: Fully operationalize the Integrated Coastal Management Authority	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Activity 1.1.2: Develop and implement an Environmental Information System - SCE			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Output 1.2: Environmental education and capacity building on ICM	Activity 1.2.1: Capacity Building Centers Network for ICM (CBC /ICM-N)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Activity 1.2.2: Capacity building and awareness-raising for productive sectors, local authorities and communities and ICMA staff			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Activity 1.2.3: Monitor progress attitudes and behavior of relevant stakeholders		X			X				X				X				X	X	X	X
Output 1.3: Lessons learned for integrated coastal management, and the mainstreaming of biodiversity conservation	Activity 1.3.1: Collect lessons learned on ICM and mainstreaming of biodiversity conservation							X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Activity 1.3.2: Disseminate lessons on ICM and mainstreaming of biodiversity conservation													X	X	X	X	X	X	X	X
	Activity 1.3.3: Project M&E of ICM, mainstreaming, and adaptive management	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Output 1.4: Institutional, policy and legal frameworks and mechanisms for long-term financing	Activity 1.4.1: Evaluation of international models for sustainable financing of conservation	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Activity 1.4.2: Implement program of Sustainable Financing (PSF)	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Activity 1.4.3: Develop and implement specific sustainable funding mechanisms									X	X	X	X	X	X	X	X	X	X	X	X
Output 2.1: Awareness and capacity building for use of environmentally sustainable practices by tourism sector stakeholders	Activity 2.1.1: Training of local tourism authorities	X	X	X	X	X	X	X	X	X	X	X	X								
	Activity 2.1.2: Technical assistance to hotels and tour operators in environmental education and developing guidelines for human activity	X	X	X	X	X	X	X	X	X	X	X	X								
	Activity 2.1.3: Capacity building and training for the tourism sector labor force	X	X	X	X	X	X	X	X	X	X	X	X								
	Activity 2.1.4: Awareness-raising campaigns for tourism visitors	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Activity 2.1.5: Study tours for designers / architects, tour operators, etc.	X	X	X	X	X	X	X	X	X	X	X	X								

Outputs	Activities	Year 1				Year 2				Year 3				Year 4				Year 5			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	<u>Activity 2.1.6:</u> Awareness-raising of dive center directors and dive guides			X	X			X	X			X	X			X	X			X	X
Output 2.2: Development of nature related tourism at two pilot demonstration sites	<u>Activity 2.2.1:</u> Pilot demonstration of ecotourism and others possible alternatives of tourism	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 2.2.2:</u> Replication of ecotourism and possible alternatives of tourism													X	X	X	X	X	X	X	X
	<u>Activity 2.2.3:</u> Promote nature based tourism out of existing tourism centers	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Output 2.3: Capacity building for replication of successful demonstration strategies for nature tourism and ecotourism	<u>Activity 2.3.1:</u> Tourism marketing strategies based on ecotourism and nature-based tourism	X	X	X	X	X	X	X	X	X	X	X	X								
	<u>Activity 2.3.2:</u> Information and capacity to enable replication of nature-based tourism and ecotourism									X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 2.3.3:</u> Capacity building to enable protected areas network manage ecotourism and nature-based tourism	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Output 2.4: Sustainable financing mechanisms for tourism sector	Activity 2.4.1: Development and implementation of revenue mechanisms to generate financial resources for biodiversity conservation	X	X	X	X	X	X	X	X	X	X	X	X								
Output 2.5: Regulations and planning strategies for the tourism sector based on environmentally friendly practices and models	<u>Activity 2.5.1:</u> Development of a common vision among local tourism sector participants	X	X	X	X	X	X	X	X	X	X	X	X								
	<u>Activity 2.5.2:</u> Integration of environmental concerns into tourism sector planning processes	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 2.5.3:</u> Reduce impact of tourism infrastructure development	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 2.5.4:</u> Guidelines for environmentally friendly tourism operations	X	X	X	X	X	X	X	X	X	X	X	X								
	<u>Activity 2.5.5:</u> Establish nurseries of native plant species for use in hotel landscaping and for the rehabilitation of degraded areas	X	X	X	X	X	X	X	X	X	X	X	X								
Output 3.1: Biophysical and socio-economic information necessary to make	<u>Activity 3.1.1:</u> Up-date biophysical and socio-economic information related to fisheries	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 3.1.2:</u> Establish areas and seasons for spawning, recruitment and breeding					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 3.1.3:</u> Determine and monitor baseline		X	X							X	X							X	X	X

Outputs	Activities	Year 1				Year 2				Year 3				Year 4				Year 5			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
well informed decisions on necessary regulations, fisheries practices and sustainable fisheries development activities	environmental conditions inside and outside of proposed fishery reserve areas																				
	<u>Activity 3.1.4:</u> Assess impacts of causeways, contamination, and other land-based factors					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 3.1.5:</u> Improve understanding of the connectivity of marine species and water bodies					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 3.1.6:</u> Evaluate socio-economic impacts of changes in fishing regulations and practices		X								X								X	X	X
Output 3.2: Appropriate fisheries regulations and practices of benefit to fish populations and habitats	<u>Activity 3.2.1:</u> Reduction in official target levels for fishing effort by commercial fishing industry		X	X	X	X	X	X	X												
	<u>Activity 3.2.2:</u> Strengthening of regulations and mechanisms					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 3.2.3:</u> Strengthened enforcement capacity for fisheries regulations					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Output 3.3: Pilot projects to demonstrate sustainable livelihood alternatives for fishermen	<u>Activity 3.3.1:</u> Establish floating aggregating devices (FADs) for sustainable fishing	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 3.3.2:</u> Pilot demonstrations for commercial cultivation of molted Blue Crab	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 3.3.3:</u> Establishment of pilot farm for commercial cultivation of sponges					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Output 3.4: Fishermen and decision-makers support new fishing levels and practices	<u>Activity 3.4.1:</u> Technical assistance, training and exchange of sustainable fishing practices		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 3.4.2:</u> Awareness-raising activities for fishermen in targeted municipalities			X	X	X	X	X	X	X	X	X	X								
Output 4.1: Land use planning/zoning for former sugar cane lands and facilities within the SCE, based on landscape level ecological and socio-economic assessments	<u>Activity 4.1.1:</u> Framework for improving the landscape planning for conversion of sugar lands	X	X		X		X	X	X												
	<u>Activity 4.1.2:</u> Monitor biodiversity impacts of land use changes on former sugar lands			X								X								X	
	<u>Activity 4.1.3:</u> Monitor marine-coastal water and sediments as response to changes in sugar sector			X								X								X	
	<u>Activity 4.1.4:</u> Assess and control exotic species moving from converted sugar lands to natural landscapes		X				X					X				X				X	
Output 4.2:	<u>Activity 4.2.1:</u> Planning processes for	X	X	X	X	X	X	X	X												

Outputs	Activities	Year 1				Year 2				Year 3				Year 4				Year 5				
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Establish management and technical capacity for biodiversity friendly agricultural, livestock and forestry production on former sugar cane lands	sustainable and biodiversity friendly production on former sugar lands																					
	<u>Activity 4.2.2:</u> Capacity building and training of key stakeholders for biodiversity friendly production on former sugar lands	X	X	X	X		X		X		X		X		X		X					
	<u>Activity 4.2.3:</u> Economic incentives for workers on former sugar lands to participate biodiversity friendly production on former sugar lands									X	X	X	X	X	X	X	X	X	X	X	X	X
Output 4.3: Demonstrations of sustainable management of water buffalo	<u>Activity 4.3.1:</u> Biodiversity friendly livestock raising practices and controls (water buffalo)				X	X	X	X	X	X	X	X	X	X	X	X						
	<u>Activity 4.3.2:</u> Replication of best practices on biodiversity friendly livestock raising									X	X	X	X	X	X	X	X	X	X	X	X	X
Output 4.4: Demonstrations of biodiversity friendly production on former sugar cane lands	<u>Activity 4.4.1:</u> Biodiversity friendly agriculture, livestock and forestry activities on a cooperative farm				X	X	X	X	X	X	X	X	X	X	X	X						
	<u>Activity 4.4.2:</u> Replication of the best practices for biodiversity friendly agriculture, livestock and forestry									X	X	X	X	X	X	X	X	X	X	X	X	X
Output 4.5: Sustainable forest management of biodiversity-rich coastal forests within the SCE	<u>Activity 4.5.1:</u> Implementation of sustainable forest management for coastal forest areas	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 4.5.2:</u> Forest management plans and processes for forest land managers	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	<u>Activity 4.5.3:</u> Native species tree nurseries to supply saplings for reforestation efforts	X	X	X	X																	

SECTION III: Total Budget and Workplan

Award: (Tbd)

Award Title: PIMS 3254 BD FSP: Cuba Sabana Camaguey

Project ID: (tbd)

Project Objective (Atlas Output/Project): Mainstreaming and Sustaining Biodiversity Conservation in three Productive Sectors of the Sabana Camaguey Ecosystem

Project Outcomes /Atlas Activity	Responsible Party	Source of Funds	PLANNED BUDGET & WORKPLAN							Total Amount
			ERP/Atlas Budget Code	ERP/Atlas Budget Description	Year 1 US\$	Year 2 US \$	Year 3 US\$	Year 4 US\$	Year 5 US \$	
1.0 Enabling environment for biodiversity conservation in the tourism, fisheries and agriculture / livestock sectors	CITMA	GEF	71200	International consultants	18,949	18,949	18,949	18,949	18,949	94,748
			71600	Travels	15,530	15,530	15,530	15,530	15,530	77,652
			72100	Contractual Services-Companies	47,676	47,676	47,676	47,676	47,676	238,382
			72200	Equipment	231,895	0	0	0	0	231,895
			72300	Materials & goods	16,796	16,796	16,796	16,796	16,796	83,984
			72400	Communic. & Audio Visual equip.	2,413	2,413	2,413	2,413	2,413	12,067
			72500	Supplies	11,934	11,934	11,934	11,934	11,934	59,672
			73400	Rental and Maint. other Equip.	7,169	7,169	7,169	7,169	7,169	35,847
			74200	Audio Visual & Print Prod costs	2,413	2,413	2,413	2,413	2,413	12,067
		74500	Miscellaneous Expenses	3,060	3,060	3,060	3,060	3,060	15,300	
			Subtotal GEF		357,839	125,944	125,944	125,944	125,944	861,617
		Cap 2015 in cash	72200	Equipment	20,000	20,000	0	0	0	40000
				TOTAL OUTCOME 1 COST	377,839	145,944	125,944	125,944	125,944	901,617
2.0 Tourism sector supports conservation of marine and terrestrial ecosystems within the SCE	MINTUR	GEF	71200	Internatio nal consultants	19,773	19,773	19,773	19,773	19,773	98,867
			71600	Travels	41,129	41,129	41,129	41,129	41,129	205,645
			72100	Contractual Services-Companies	65,760	65,760	65,760	65,760	65,760	328,803
			72200	Equipment	394,400	0	0	0	0	394,400
			72300	Materials & goods	23,168	23,168	23,168	23,168	23,168	115,840
			72400	Communic. & Audio Visual equip.	3,328	3,328	3,328	3,328	3,328	16,644
			72500	Supplies	16,461	16,461	16,461	16,461	16,461	82,307
			73400	Rental and Maint. other Equip.	9,889	9,889	9,889	9,889	9,889	49,445
			74200	Audio Visual & Print Prod costs	3,328	3,328	3,328	3,328	3,328	16,644
74500	Miscellaneous Expenses	3,517	3,517	3,517	3,517	3,517	17,585			
				TOTAL OUTCOME 2 COST	580,756	186,356	186,356	186,356	186,356	1,326,183
3.0 Sustainable fisheries are practiced within	MIP	GEF	71200	International consultants	29,660	29,660	29,660	29,660	29,660	148,301
			71600	Travels	36,523	36,523	36,523	36,523	36,523	182,617
			72100	Contractual Services-Companies	39,456	39,456	39,456	39,456	39,456	197,281

the SCE			72200	Equipment	398,720	0	0	0	0	398,720
			72300	Materials & goods	13,900	13,900	13,900	13,900	13,900	69,504
			72400	Communic. & Audio Visual equip.	1,997	1,997	1,997	1,997	1,997	9,986
			72500	Supplies	9,876	9,876	9,876	9,876	9,876	49,384
			73400	Rental and Maint. other Equip.	5,933	5,933	5,933	5,933	5,933	29,667
			74200	Audio Visual & Print Prod costs	1,997	1,997	1,997	1,997	1,997	9,986
			74500	Miscellaneous Expenses	13,140	13,140	13,140	13,140	13,140	65,700
				TOTAL OUTCOME 3 COST	551,206	152,486	152,486	152,486	152,486	1,161,150
4.0 Declining sugar cane industry transitions into sustainable land use practices	MINAZ	GEF	71200	International consultants	14,006	14,006	14,006	14,006	14,006	70,031
			71600	Travels	13,923	13,923	13,923	13,923	13,923	69,619
			72100	Contractual Services-Companies	11,508	11,508	11,508	11,508	11,508	57,540
			72200	Equipment	499,200	0	0	0	0	499,200
			72300	Materials & goods	4,054	4,054	4,054	4,054	4,054	20,272
			72400	Communic. & Audio Visual equip.	582	582	582	582	582	2,912
			72500	Supplies	2,880	2,880	2,880	2,880	2,880	14,403
			73400	Rental and Maint. other Equip.	1,730	1,730	1,730	1,730	1,730	8,652
74200	Audio Visual & Print Prod costs	582	582	582	582	582	2,912			
74500	Miscellaneous Expenses	5,000	5,000	5,000	5,000	5,000	25,000			
				TOTAL OUTCOME 4 COST	553,469	54,269	54,269	54,269	54,269	770,545
TOTAL by Source of Fund/Donor				GEF	2,043,271	519,056	519,056	519,056	519,056	4,119,498
				GoC	4,642,650	4,642,650	4,248,900	4,248,900	4,248,900	22,032,000
				Ecodesarrollo	44,339	44,339	3,500	0	0	92,178
				Cap 2015 in kind	95,400	95,400	115,400	115,400	115,400	537,000
				Cap. 2015 in cash	20,000	20,000	0	0	0	40,000
				WWF	217,334	217,334	217,332	0	0	652,000
SUB TOTAL					7,062,994	5,538,779	5,104,188	4,883,356	4,883,356	27,472,675
				GEF-PDFB						200,000
GRAND TOTAL										27,672,676

SECTION IV: ADDITIONAL INFORMATION

PART I: Other agreements

(Endorsement Letter and Co-Funding letters are attached as a separate file)

Summary Descriptions of Co-Financing

Government of Cuba: GoC co-funding resources will be allocated through the variety of line ministries and sectors that are involved in the project. These resources will cover a range of inputs supporting all of the outputs in the proposed project. (see paragraphs 170-173 for additional details on GoC contributions)

EcoDesarrollo: Co-Financing will be provided by a Spanish NGO, Ecodesarrollo, in the amount of CUC 92,178, through its project for “Technical training and infrastructure creation for ecotourism development and resource sustainable management in public use areas of Cayo Romano”. This cay, which is located within the Protected Area Gran Humedal del Norte, is one of the pilot demonstration sites for ecotourism development under activity 2.2.2. The resources and expertise of Ecodesarrollo will also support project activities for designing ecotourism products in conjunction with existing hotels and tour operators in the SCE (activity 2.2.3), as well as reducing the impact of tourism infrastructure development (activity 2.5.3).

Capacity 2015: Capacity 2015 will support the establishment and operation of the CBC/ICM-N (Outputs 1.2 and 1.3) throughout the period of project implementation (2006-2010) through training in knowledge management strategies and tools, including technical courses, manuals, methodologies, etc., specifically designed for application to the three productive sectors targeted by the project. Capacity 2015 support will consist of US\$537,000 of in-kind financing, as well as US\$40,000 of cash co-financing (the latter are funds originally allocated by Capacity 21 for Phase II of the Sabana Camaguey project that were covered by the Government of Cuba, and now have been passed through to Phase III). Through the Capacity 2015 Project, the CBC/ICM-N will be connected to – and form part of – a larger framework of Integrated Learning & Application Networks (ILANs) that are planned in several countries of the region.

World Wildlife Fund – Canada: WWF Canada will provide co-financing through its project “Development of a Modern Sustainable Fishing Sector” during the years 2006-2008. This project, whose national counterpart is the Ministry of Fisheries (MIP), is designed to test and validate innovative best practices for the fishing sector, including: substituting trawling and other destructive techniques with more sustainable methods; protecting reproduction areas and seasons; and enforcing regulations with the participation of cooperatives and coastal communities. The project was developed in collaboration with community fishing cooperatives located in the northern region of the Villa Clara province (Quemados de Güines municipality, Caibarién municipality), which is the location of the Lanzanillo-Pajonal-Fragoso Protected Area established during Phase 2 of the Sabana Camaguey Project. Three primary objectives of the WWF project are linked to the design and objectives of the proposed GEF project: 1) establishing an adequate working environment for sectors and institutions, including creation of Local Committees to support the implementation process and develop management capacities; 2) modernization of fishing enterprises with environment-friendly equipment and skills, and awareness building and training on principles of sustainable development, to promote mainstreaming of environmental considerations within the fisheries sector; and 3) co-administration of the project by the Local Committees in preparation for transfer of responsibilities.

The WWF project cofinancing will be directed primarily toward support and collaboration of GEF project activities 1.3.2 (dissemination of lessons learned on ICM), 3.1.6 (evaluation of socio-economic impacts of changes in fishing sector), 3.4.1 (technical assistance and training in sustainable fishing practices), and

3.4.2 (awareness raising in targeted fishing communities on new fishing regulations). The project will have validated new practices and developed a replicable model for the above-mentioned activities by 2007, which will provide substantial benefits in achieving the stated objectives of the proposed GEF project. In addition, the WWF project will benefit from guidance and training in participatory planning, systematization methods and non-formal approaches to capacity development that are developed by the GEF project.

PART II: Organigram of Project

Diagram 1: Project Management Structure

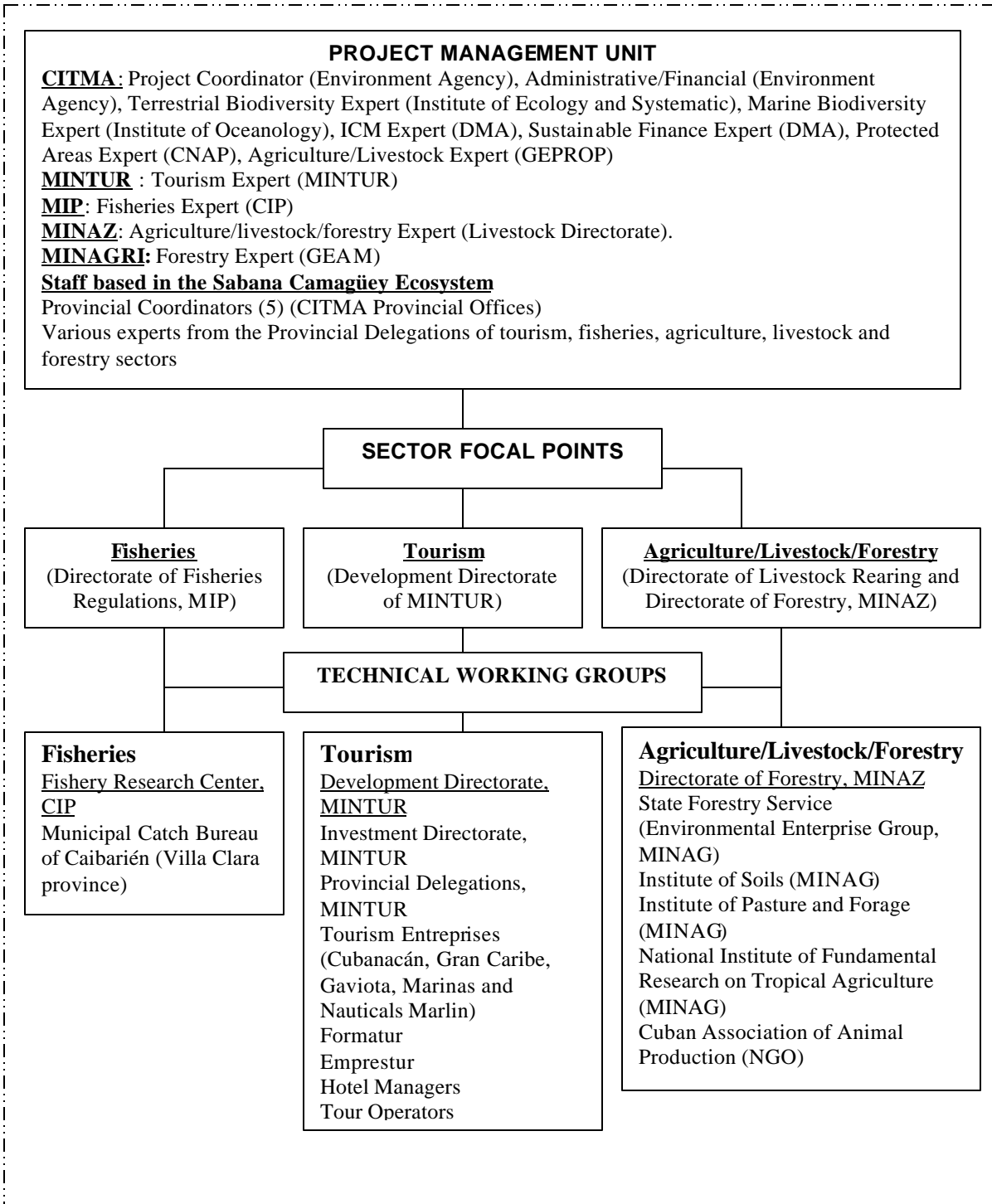
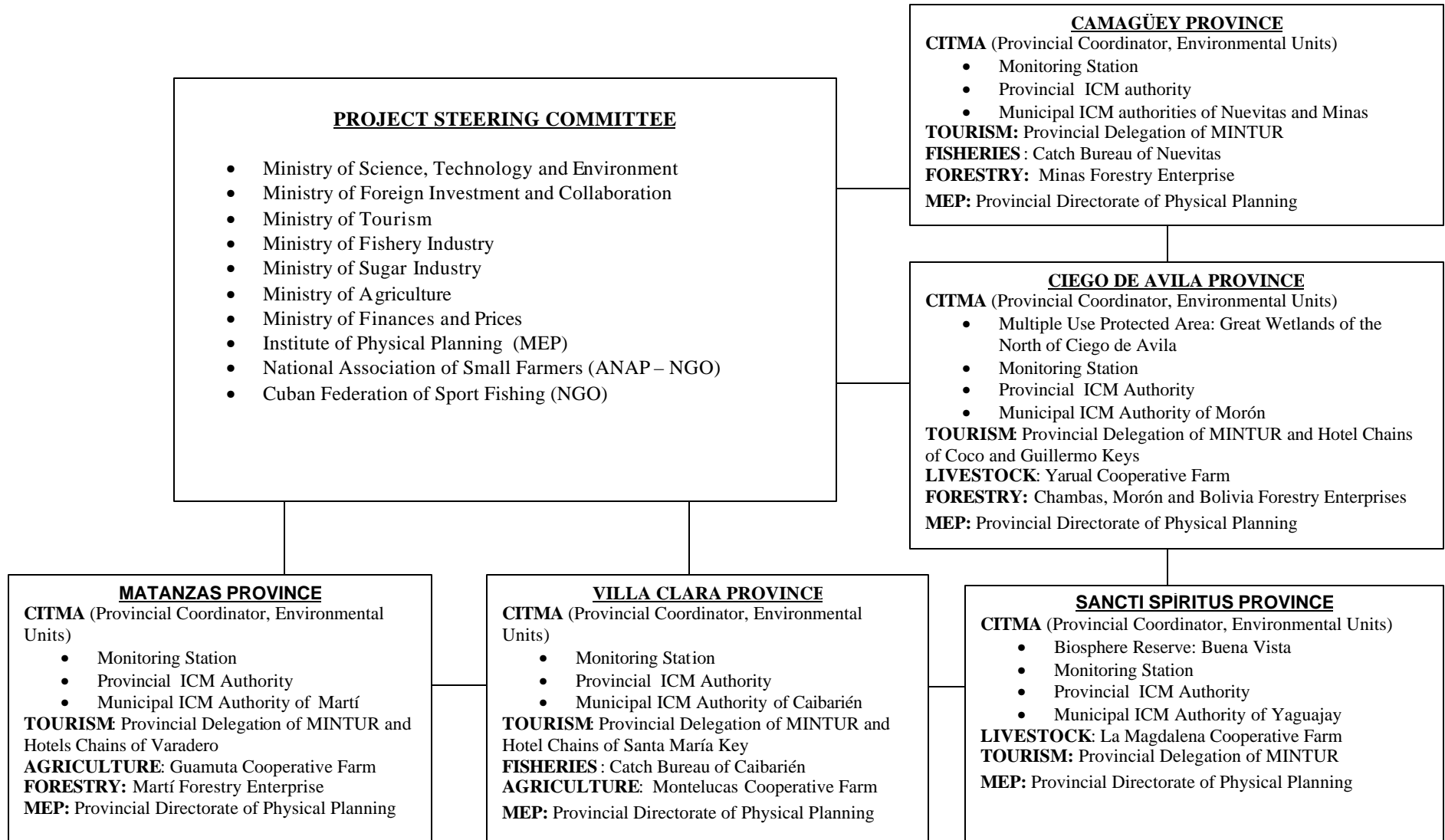


DIAGRAM 2: Project Oversight Structure



PART III: Terms of Reference for key project staff and main sub-contracts

(NOTE: This Part will be added after the GEF has approved the project, and before requesting CEO endorsement)

PART IV: Stakeholder Involvement Plan

1. Stakeholder Identification

The following institutions and organizations were key stakeholders during the project design process:

- Ministry of Science, Technology and Environment (CITMA)
 - o Directorate of Environment (DMA)
 - o Environment Agency (AMA)
 - Institute of Oceanology (IDO)
 - Institute of Ecology and Systematics (IES)
 - Institute of Tropical Geography (IGT)
 - o National Center of Protected Areas (CNAP)
- Ministry of Fisheries (MIP)
 - o Fishery Regulation Office
 - o Fishery Research Center (CIP)
- Ministry of Tourism (MINTUR)
- Ministry of Sugar Industry (MINAZ)
 - o National Direction Livestock-rearing
 - o National Direction of Forestry and National Direction of Crops.
 - Enterprise Sergio González (UBPC Guamuta)
 - Enterprise Unidad Proletaria
 - Enterprise Aracelio Iglesias
 - Enterprise Bolivia
- Ministry of Agriculture (MINAG)
 - State Forestry Service
- Non-Governmental Organizations
 - Antonio Nuñez Jiménez Foundation of Nature and Humanity
 - Cuban Association of Animal Production (ACPA)

2. Information dissemination, consultation, and similar activities during preparation (PDF-B phase)

Stakeholder participation at the institutional level was a result of Phase 1 of the Sabana Camaguey project, and this established the pattern of inter-institutional relationships and set the stage for the design of the Phase 2 project. Phase 2 included the participation of 66 governmental and non-governmental institutions, all of which played a role in project implementation. These stakeholders have continued to be involved in the development of Phase 3, and in fact the degree of involvement of many agencies changed significantly with the greatly increased participation of the stakeholders from the tourism, fisheries, and agriculture/livestock sectors. A summary of activities developed with the stakeholders during the PDF B process is provided in the following paragraphs.

1. Identification of threats and barriers to biodiversity conservation in the SCE and establishment of the programmatic baseline.

The initial workshop of the PDF phase was dedicated to threats and barriers, in which the General Team of the Project was created, being integrated by the Focal Points of the three sectors and their respective

Technical Groups. The workshop included the participation of specialists from the research institutes of environment and productive sectors, and leaders from the provinces, with 63 participants that sat in plenary and in 3 Commissions (fisheries, tourism, agriculture/livestock rearing and forestry). Following this, 4 technical workshops were carried out for the agriculture/livestock rearing and forestry sector, 3 for the fisheries sector, and 2 for the tourism sector.

2. Elaboration of the Logical Framework and proposed project interventions and activities

The logical framework was first drafted at a general, inter-sectoral workshop, and then refined in follow-up sector specific workshops. In the tourism sector, a workshop of 12 persons was held with the participation of the research institutes dedicated to terrestrial and marine biodiversity, and representatives of Physical Planning and the Environmental Authority. In the fishery sector, follow up included 3 technical meetings (10 participants at each meeting), led by experts from the Center of Fishery Researches and two international consultants. For the agriculture sector, 3 technical meetings also were held. Overall, this process involved about 50 stakeholders in total.

3. Analysis of Integrated Coastal Management Issues

The project took advantage of a meeting in Havana of the ICM Leaders Network for Latin America to discuss the current state of the art for integrated coastal management in the SCE, the area of Cuba represented within the Network. The first version of the logical framework was presented at this meeting, in order to compare project indicators with established strategies for ICM. The meeting was directed by an International Consultant who is one of the Network leaders, and included the participation of six Network members, the Cuban National Group for Coasts, and various participants from the productive sectors. In addition, a two-day field trip to Caibarien municipality was organized for about 20 members of the Network as well as representatives from the Government and other authorities and specialists. A subsequent workshop was organized with representatives from the SCE provinces that have led the development of ICM mechanisms under the guidance of CITMA's Directorate of Environment, in order to identify the gaps in the ICM implementation in the SCE. The meeting took place as a special session of the II International Workshop of Environmental Education and Integrated Coastal Management, in Matanzas province, with participants from Brazil, Costa Rica, Chile, Mexico and Peru, who together with about 20 Cubans. Finally, an additional workshop was conducted to design the Environmental Information System for the SCE (SIAESC), which will support ICM processes in the SCE.

4. Sustainable Financing of Biodiversity Conservation

Activities to design sustainable financing mechanisms began with a Workshop on Payment for Environmental Services (PES), led by four invited regional experts coming from the Regional Program for Sustainable Agriculture in Hillsides of Central America (PASOLAC). The workshop had 40 participants, including the Protected Areas within the SCE, three universities, decision-makers from the Ministry of Finances and the Ministry of Economy and Planning, specialists from the productive sectors, and participants from CITMA. The objective of this workshop was to demonstrate for both environmental authorities and productive sectors the concepts of Environmental Goods and Services and their applicability for the proposed project, and to discuss alternative mechanisms for financial sustainability of the protection and conservation of natural resources in the key productive sectors and in the territory of the project. A second workshop was held to further instruct participants in "Economic valuation of the natural resources, environmental goods, services and impacts", and 20 participants were selected to participate in a 2-month training course in this area.

5. The Role of Protected Areas and Productive Landscapes

Two workshops were conducted on the role of the PAs and the productive sectors. The first, attended by executives of the National System of Protected Areas (CNAP), identified synergies between the proposed project and the PNUD/GEF project “Strengthening of the National System of Protected Areas”. The second workshop, which included participants from the Protected Areas located within the SCE, as well as invited executives from other PAs, executives of the CNAP, and representatives of the productive sectors, led to an agreement to include the following activities in the project design: environmental zoning of agricultural and forestry activity; promotion of the use of sustainable technologies in buffer zones and productive landscapes surrounding Protected Areas; the development of Nature Tourism in the SCE; sustainable agriculture; joint agreement between CNAP and the Ministry of Fisheries on the appropriate limits of marine buffer zones; joint agreement between CNAP and the agriculture sector on enforcement of agricultural, livestock and forestry activities; sustainable coexistence with exotic fauna; and promoting the incorporation of women in new employment activities.

6. Implementation of Pilot Projects

In order to select specific activities for the pilot projects identified by the productive sectors, the project Team, together with the Focal Points and national experts from the sectors, carried out visits and meetings with executives, technicians and workers at the places where pilot projects will be developed. For agriculture, meetings were held at each of the participating agricultural production enterprises. The pilot projects of the fishery sector were formulated with the participation of the Catch Bureau of Caibarién, in workshops attended by 28 participants, mostly fishermen. The design of the pilot projects for the tourism sector included the participation of executives of the sector, specialists from the Protected Areas, and international consultants. In addition, hotel managers and tour operators were consulted on issues such as the tourism development potential of the Buenavista Biosphere Reserve.

7. Role of the NGOs in Project Implementation

Contacts were established with the national NGOs most closely linked to the objectives of the project, including the Cuban Association of Animal Production (ACPA), the Cuban National Union of Architects and Engineers of the Construction (UNAICC), the National Association of Small Farmers (ANAP), the Antonio Nuñez Jimenez Foundation of Nature and Humanity (FNJ) and the Cuban Federation for Sport Fishery (CFSF). The ACPA participated in all of the activities, meetings and workshops developed by the agriculture/livestock rearing and forestry sector. The FNJ participated in an analysis of the projects that it manages in the SCE, with a view to identifying synergies that could be achieved during Phase 3. With the UNAICC, the collaboration established in Phase 2 regarding waste disposal problems that affect coastal ecosystems was extended to Phase 3. Finally, the SFCF and ANAP worked with the project team to identify the support they will be able to provide with their members during the execution of the project.

3. Stakeholder Participation in Project Implementation

An overview of the most important stakeholders during project implementation is provided in the section on Stakeholder Involvement in the main text of the document. Details on the entire range of stakeholders are provided below, as well as a table listing the stakeholders and their possible interests in and conflicts with the project.

Ministries with Responsibility for Environmental Management

The Ministry of Science, Technology and Environment (CITMA) has overall responsibility for project implementation, and will coordinate technical actions through its various agencies. Among these is Direction of International Cooperation (DCI), which is the GEF Focal Point in Cuba, and is in charge of supervising and establishing coordination agreements for CITMA. The DCI is also in charge of

reviewing and approving the acquisition of resources with project's funds. Another key agency is the Directorate of Environment (DMA), which has addressed and organized all the activities related to the creation of the Integrated Coastal Management Authority (ICMA) during Phase 2 and the PDF-B, and which will be the representative of the ICMA on the Project Steering Committee. The DMA also will participate in implementation of the Sustainable Financing Program. The project will be executed by the Environment Agency (AMA), which will have overall responsibility for the project and will be responsible for facilitation of operational procedures with UNDP and co-financing sources. AMA will host the Project Management Unit, and will coordinate the inputs of its scientific institutes (listed below). It will manage the environmental information system and education/awareness issues.

Several institutes within AMA will play a critical role as scientific/technical partners in the project. The Institute of Oceanology (IDO) is responsible for the work of the existing monitoring stations in the SCE (established during Phase 2), and possesses expertise in ecosystem/population connectivity, pollution, and the response of biodiversity to implemented environmental practices and regulations. The IDO will participate in issues related to the improvement of fishery regulations and practices; research and monitoring related to marine biodiversity, fishery and pollution issues; and data management of early warning voluntary monitoring of coral reefs by dive guides of tourism dive centers. The Institute of Ecology and Systematics (IES) is in charge of terrestrial biodiversity and will participate in monitoring of terrestrial ecosystems and species, and issues related to planning, regulations and practices in the tourism, agriculture/livestock rearing and forestry sectors. The Institute of Tropical Geography (IGT) will be in charge of the Environmental Information System (SIAESC), and will also work with the Institute of Physical Planning in planning activities. Finally, the Institute of Meteorology (INSMET) will act as an advisor in carbon sequestration issues (forestry).

Apart from institutes within the AMA, a number of other agencies within CITMA also will participate in the project. The National Center of Protected Areas (CNAP) will work jointly with the productive sectors in mainstreaming the protection of biodiversity for activities relevant to the productive and protected landscapes (e.g. ecotourism businesses, establishment of appropriate buffer zones around marine protected areas) and will participate in issues related to the sustainable financing of biodiversity conservation (see Annex 13 for more details). The Center of Environmental Information, Management and Education (CIGEA) is responsible for monitoring pollution in the SCE, and will evaluate and officially report pollution trends. The Management Project Center (GEPROP) will act as a technical and scientific advisor on agriculture and livestock rearing issues. The Center of Psychological and Sociological Research (CIPS) will develop Environmental Perception Studies with key stakeholders (communities, decision makers, economic sectors) on the social impact of changes in sectoral practices toward sustainability. The National Enterprise for the Protection of Flora and Fauna (ENPFF) will participate in managing impacts on both protected areas and productive landscapes. The Center of Environmental Audit and Control (CICA) will participate in the establishment of environmental regulations and norms. The Coastal Ecosystem and Environment Research Centers, including Biodiversity Monitoring Stations in the five provinces of the SCE, will conduct research and monitoring related to marine and terrestrial biodiversity and fisheries issues, and will assist the fisheries pilot projects. Finally, the Provincial Delegations of CITMA will be responsible for the oversight of project activities within the 5 provinces of the SCE, with a focus on participation in pilot projects and in awareness and education strengthening in economic sectors and communities.

Ministries and Other Entities of the Targeted Productive Sectors

The Ministry of Fisheries (MIP) is the agency responsible for implementing activities to mainstream biodiversity conservation in the fisheries sector. Within MIP, the Fishery Regulation Office will manage improvement of fishery regulations, licensing and management practices, training of fishermen in more sustainable practices, and establishment of no take-areas. The Fishery Research Center (CIP) will carry

out research related to fishery management and will guide pilot demonstration experiences. The Provincial Catch Bureaus (Caibarién at Villa Clara province and Nuevitas at Camaguey province) will implement the pilot demonstration experiences and conduct data gathering.

The Ministry of Tourism (MINTUR) is the agency responsible for implementing activities to mainstream biodiversity conservation in the tourism sector. During the execution of the FSP Project, National Direction of Development will be the focal point within MINTUR for the project, charged with improving the existing systems for Sustainable Indicators, for diversification of tourism types, for the ecotourism pilot projects, and for environmental planning and sustainable design issues. Also within MINTUR, the Tourism Development Group will direct environmental planning and sustainable design issues, while the Tourism Provincial Delegations will assist with implementation of pilot projects in the provinces. Apart from the agencies of MINTUR, tourism activities will also be implemented and supported by other State and Public/Private Entities of the Tourism System, which will play a significant role in designing and promoting ecotourism, and in making existing tourism infrastructure and practices more biodiversity friendly. These entities include Hotel Chains (e.g. Cubanacán, Gran Caribe, Gaviota and Palmares), Marinas and Dive Centers (participation in early warning voluntary monitoring of coral reefs by tourism dive centers), the Tourism Training System (FORMATUR) (for the training of tourism workers and directives), and the Enterprise of Services for Tourism (EMPRESTUR) (for environmental planning and sustainable design issues).

The Ministry of the Sugar Industry (MINAZ) and the Ministry of Agriculture (MINAGRI) are the agencies responsible for implementing activities to mainstream biodiversity in the agriculture, livestock and forestry sectors. Within MINAZ, the Vice Ministry of Agriculture and Livestock Rearing will oversee implementation of the agriculture, livestock and forestry activities of the project, as well as improved land use planning in sugar cane conversion areas. The Vice Ministry will coordinate the efforts of several agencies, including: the National Directorate of Forestry, for technical and institutional support for forestry activities; the National Directorate of Crops, for technical and institutional support for agriculture activities; and the National Directorate of Livestock Rearing, for technical and institutional support for livestock rearing activities. In addition, four agriculture/livestock/forestry enterprises within MINAZ will be the sites for implementation of field-based activities on former sugar cane lands. These enterprises are: the Basic Unit of Cooperative Production (BUCP) Guamuta, which will undertake activities in sustainable agriculture, livestock raising and forest management and will serve as a Training Center for the agriculture/livestock sector; the Agriculture/livestock Enterprise Unidad Proletaria, which will replicate best practices from the Guamuta site; the Agriculture/livestock Enterprise Aracelio Iglesias, which will undertake sustainable water buffalo management activities; and the Agriculture/livestock Enterprise Bolivia, which will replicate best practices from the Aracelio Iglesias site

Although site interventions will take place primarily on lands owned by MINAZ, the Ministry of Agriculture (MINAGRI) also will play a significant role in project implementation, in particular for the pilot demonstrations of reforestation and sustainable management of coastal forests. Within MINAGRI, the State Forestry Service (SEF) will supervise sustainable forest management activities; the Environmental Enterprise Group (GEAM) and the Forestry Research Institute (IIF) will implement on-the-ground reforestation, enrichment and sustainable management activities; the Institute of Soils (IS) will work within the ICMA framework to improve land use planning in sugar cane conversion areas; and the National Institute of Tropical Agriculture Fundamental Research (INIFAT) will participate in the pilot demonstration activities at BUCP Guamuta.

Other Ministries and Institutions

A number of other Government institutions will play an important role in project implementation. The Ministry of Foreign Investment and Collaboration (MINVEC) is the official government representative to

the project. MINVEC is UNDP's counterpart in Cuba, and the Public Authority in charge of coordination of international collaboration and its execution. The Ministry of Economy and Planning (MEP) is responsible for the assimilation of financial sustainability mechanisms and instrument for biodiversity conservation. Within MEP, the Institute of Physical Planning (IPF), as well as its Provincial Directorates (DPPF), will play a key role in strengthening the integration between territorial planning processes and the design of sustainable tourism development, and in applying ecosystem level approaches in land use planning to the sugar cane conversion process. The Ministry of Finance and Prices (MINFP) will participate in the project through the development of financial sustainability mechanisms and instrument for biodiversity conservation.

Cuba possesses a very strong educational and technical framework, and the Ministry of Higher Education (MES) will support the project at several levels. The University of Havana (UH) will participate through its Faculty of Economy, which will evaluate sustainable finance mechanisms and instruments for biodiversity conservation, and through its Marine Research Center (CIM), which will provide training in Integrated Coastal Management. The University of Camaguey, Faculty of Economy and the Higher Technical Institute "Jose Antonio Echevarría" (ISPJAE) will evaluate sustainable finance mechanisms and instruments for biodiversity conservation, while the Animal Science Institute (ICA) will support the pilot demonstrations for water buffalo management. Apart from the education sector, the project will also include participation by the Ministry of Revolutionaries Armed Forces (FAR) through its GEOCUBA Enterprise Group (GEOCUBA), which will participate in the implementation of the Environmental Information System for the SCE; by the National Institute of Hydraulic Resources, which will participate in project activities related to the water resources management; and by the Ministry of Construction (MICONs), which will help to establish sustainable practices for tourist resort construction.

Regional, Provincial and Local Governments and Entities

In addition to the Government of Cuba institutions and productive enterprises noted above, the project will depend on the widespread participation of regional, provincial and local level governments, enterprises, individuals, NGOs, and other entities. In most cases, the institutions and agencies listed below will be critical partners and/or lead agencies in the on-the-ground activities of the project, in particular for the pilot demonstration activities. Moreover, participation of these actors will be ensured by the substantial project resources devoted to operationalizing the Integrated Coastal Management Authority (ICMA), and establishing Capacity Building Centers for ICM in each of the five provinces of the SCE. (see the description of Outcome 1 in the main text and Annex 1 for additional details).

In this regard, the National Watershed Council (CNCH), which will host the ICMA, will be a critical partner in project implementation. The Provincial and Municipal Governments of the five provinces, which also are expected to participate in the ICMA framework, also will participate in areas such as implementation of ICM mechanisms, environmental education and awareness, and pilot demonstration experiences.

Non-Governmental Organizations

A number of NGOs will participate through training activities, support of community initiatives, and dissemination of lessons learned regarding sustainable practices. The Cuban Association of Animal Production (ACPA), a key player in the social and economic development of the livestock-rearing sector of Cuba, will participate in implementation of capacity building actions for farmers and rural communities, as well as of mobilizing funds devoted to that purpose. The National Union of Architects and Engineers of the Construction of Cuba (UNAICC), which includes architects and engineers engaged in environmental rehabilitation, will continue its work to reduce the contamination of coastal ecosystems from inadequate management of domestic wastes. The National Association of Small Farmers (ANAP),

will support actions to increase farmers' knowledge about the importance and economic value of biodiversity, and to solve potential conflicts arising from measures adopted to favor biodiversity conservation. The Antonio Nuñez Jimenez Foundation of Nature and Humanity (FNJ) will execute community-based projects to support biodiversity conservation. The Sport Fishery Cuban Federation (SFCE) will work with fisheries managers to reach out to fishing communities, strengthening fishermen's awareness of the importance and necessity of sustainable fishing practices. Finally, the National Association of Economists (ANEC) will assist in implementing the Sustainable Financing Program.

Impact on Local Stakeholders

The positive impacts of the Project will be felt by the majority of coastal communities of the SCE, which will benefit from improved quality of life through sustainable production alternatives and new employment sources for fishermen (particularly those affected by gear and practice restrictions), for workers formerly involved in sugar industry, and for tourism workers (by diversification into new forms of nature related tourism). The project will have direct benefits for women, as a high number of new jobs will be occupied by women, who will be trained and hired as tourist guides in nature based pilot projects, in the sustainable production of vegetable and fruits in Agriculture Enterprises, and in the processing of marine products of aquaculture pilot projects for sale. In addition, women will benefit from capacity building, for example in capacity building for technical and scientific personnel involved in the project, in which women are well represented, particularly at the local level. There are no indigenous groups in Cuba.

TABLE: GOVERNMENTAL, NON GOVERNMENTAL AND PRIVATE STAKEHOLDERS, THEIR INTERESTS AND POSSIBLE CONFLICTS WITH THE PROJECT

		Mandate, interests, concerns, authority, statutory powers	Interests			Possible Conflicts	Conflict avoidance measures
			Sustainable Practices	Research for management	Sustainable financing		
National Governmental Stakeholders.							
1. Ministries overseeing environmental protection and research/monitoring							
Acronym	Organization/Institution						
	Ministry of Science, Technology and the Environment	Ministry in charge of leading the ICMA-SCE consolidation process coordination with the economic sectors and local governments	X	X	x	As supervising entity, CITMA has a mandate that is broader than its current institutional capacity, especially in monitoring activities and extending activities throughout the project area. Although ICM mechanisms for the SCE are a laboratory for institutional strengthening of GoC entities, including CITMA, conflicts could be generated by the actions generated from these mechanisms vis-à-vis existing processes	Through the project activities, the Institutes and Centers dealing with project implementation will be strengthened by capacity building for monitoring of marine and terrestrial ecosystems, and monitoring of environmental perception in the communities. CITMA will strengthen the awareness of the Government at different levels about the benefits of ICM processes through existing mechanisms such as the National Council of Watersheds; and it will stimulate the replication of the ICM processes in other territories of the country to create further understanding and support

MINVEC	Ministry of Foreign Investment and Collaboration	State body in charge of promoting the foreign-owned investment in Cuba, on the base of State and Government strategies and policies. In coordination with relevant bodies, it directs the corresponding negotiation processes, and it coordinates and advises the instrumentation and execution of the State and Government policies related to economic collaboration.				Conflicts are not expected.	
2. Ministries governing the main productive sectors							
MIP	Ministry of the Fisheries Industry	MIP is the State body in charge of managing, protecting and commercializing fishery resources.	x	x	x	Conflicts could be generated with sport and illegal fishermen due to inspection and control mechanisms, lack of environmental awareness and due to lack of sufficient alternatives livelihoods	During the execution of the FSP, it is necessary to work directly with the Cuban Federation of Sport Fishery to implement alliances with the fishermen in order to minimize the cause of conflicts. The project will work to strengthen the integration of the efforts from all the Inspection Corps to protect natural resources (Keepers, Contamination, Water Resources, and Fisheries)

MINTUR	Ministry of Tourism	MINTUR is the State body in charge of State policies related to tourism activities	X		x	Insufficient of willingness of the tourism sector to finance biodiversity actions	<p>CITMA will assess the costs of biodiversity conservation and the activities it implies, as well as contribute to the creation of new tourist products to develop nature tourism. This will be done by providing the relevant information about the values of biodiversity resources that are integral components of new tourist products.</p> <p>Transparent mechanisms will be created which enable the tourism sector to evaluate periodically the use of the funds provided for biodiversity conservation.</p>
MINAZ	Ministry of Sugar Industry	MINAZ is the State body in charge of State policies related to sugar cane. With the conversion of sugar cane industry, MINAZ is the body in charged of implementing the land use changes, towards development of more sustainable agriculture production, livestock raising and forestry.	X	x	x	<p>The MINAZ could give higher priority to maximizing short term agricultural production, to the detriment of biodiversity conservation in the coastal marine ecosystems.</p> <p>MINAZ may continue to develop intensive buffalo raising, without having enough knowledge about the behavior of this species and its impact on the ecosystem.</p>	<p>From the beginning of the PDF process, the highest levels of MINAZ were involved in identifying objectives and commitments required for the project's execution, including the priority placed on conservation of biodiversity in the coastal marine ecosystems of national and global importance.</p> <p>The Pilot Projects and other results of the project in the agriculture, livestock, and forestry sectors, at the same time that they contribute to biodiversity conservation, also will contribute to providing much need models for MINAZ to use in managing their responsibilities for sustainable land use changes on former sugar cane lands</p>

MINAGRI	Ministry of Agriculture	MINAGRI is in charge of State policies in the use, conservation and improvement of the soils; property and ownership of the agricultural and forest lands; vegetative health; conservation, management, rational use and sustainable development of forest resources; wild fauna and flora; protection and increment of the cattle heritage; mechanization and irrigation; programs of non-sugar cane agriculture, livestock raising and forestry.	x	x	Due to the lack of adequate seeds and of saplings in nurseries of native forest species, the State Forest Service may be forced to carry out reforestation projects with non-native species	Pilot projects and the results that will be introduced by the project implementation, which favor biodiversity conservation, not only will contribute to nursery production, but also will recover and enrich important coastal forest areas with native species.
MICONS	Ministry of Construction	MICONS is the State body in charge of state policies for geologic research relevant to construction; civil construction and industrial assembly; maintenance and rehabilitation of housing and urbanization; industrial production of construction materials; as well as implementing measures to control the General Law of the Housing and the Housing Fund of the country.	x		Non-understanding of ecosystem fragility and of the necessary incorporation of environmental models to tourism infrastructure design, application of good construction practices and the use of native species for gardening in ecologically sensitive areas (cays areas)	Elaboration and application of a system of regulations and norms for infrastructure construction in ecologically sensitive areas, starting from best practices identified and validated in previous stages of the Project.
3. Ministries governing the overall national development framework						

MEP	Ministry of Economy and Planning	MEP is the State body in charge of directing, executing and controlling the application of State policies related to economic planning, statistics, communal services, physical planning and industrial design.			x	Non-acceptance of some of proposed changes related to economic policies for the biodiversity conservation financing	From the beginning of the PDF process, MEP directors and specialists have participated in the creation of a new vision on sustainable financing of biodiversity conservation Continued operation of the CITMA-MEP Inter- Ministerial Commission, and periodically discuss the advances of pilot projects, as well as proposing modifications in the economic policies related to biodiversity conservation financing.
IPF	Institute of Physical Planning	Entity belonging to the MEP, which in agreement with the objectives, tasks and guidelines of the economic and social development of the country, and by means of the research of natural, demographic, economic and technical conditions, is in charge of the territorial planning, to achieve the most correct territorial distribution of the productive forces of the country.	x			Risk of insufficient incorporation of environmental issues in the Master Plans for the development of the tourism infrastructure in ecologically sensitive areas. Risk of not applying an ecosystem approach in land use planning in areas that were previously dedicated to sugar cane production	Considering the experiences acquired in previous stages of the project, the execution of this FSP will allow the strengthening of interdisciplinary work among all involved institutions, including the IPF. Territorial planning is mandated to be a participatory process, and the project will further strengthen the ability of diverse stakeholders to participate and ensure that environmental issues are incorporated in territorial planning

MFP	Ministry of Finances and Prices	State body in charge of the application of financial and pricing policies, as well as the organization of State finances and the use of the financial resources			x	Non-acceptance of changes proposed by the project with regard to economic policies for biodiversity conservation financing	Since the beginning of the PDF process, MEP directors and specialists have participated in the creation of a new vision on sustainable financing of biodiversity conservation Continued operation of the CITMA-MEP Inter- Ministerial Commission, and periodically discuss the advances of pilot projects, as well as proposing modifications in the economic policies related to biodiversity conservation financing.
MES	Ministry of Higher Education	State body in charge of State and Government policies in Higher Education.		x	x	Conflicts are not expected.	
MINFAR	Ministry of the Revolutionary Armed Forces	State body in charge of State and Government policies of defense of the country.	x	x		Conflicts are not expected.	
INRH	National Institute of Hydraulic Resources	The NHRI is in charge of implementation of State policies on national hydraulic resources activities.	x			During periods of low availability of water resources, delivery of water to human populations and agriculture may be prioritized, without taking into account necessary delivery of water to the coastal area that assures the health of the marine and coastal ecosystems.	Even though the water supply to the population constitutes the first priority, the minimization of the negative impacts on marine ecosystems of global significance is considered in planning processes (supported by ICMA)
4. Local Government							

Provincial and Municipal Governments	Provincial and Municipal Governments	Government structures that direct the society in economic, social and policy aspects at their respective administrative levels.	x		x	Local interests prevailing over ecosystem approaches during decision-making	Ensure that ICM mechanisms are functioning and able to solve conflicts
5. Organizations of Farmers (including private sector)							
1. CCS (F) 2. CCS (NF) 3. CPA 4. UBPC	1. Cooperative of Credits and Services (Strengthened) 2. Cooperative of Credits and Services (Non-strengthened) 3. Agricultural and Livestock Production Cooperative. 4. Basic Union of cooperative Production.	1. Farmers that join into a Cooperative, but each retaining their land property and apply for State credits. 2. Farmers that join into a Cooperative, but each retaining their land property but do not apply for State credits. 3. The landowner farmers join and donate them to the cooperative (State). 4. State lands are worked under free usufruct.	x			Economic interest conflicts from private farmers can arise with regard to biodiversity conservation interest.	It is necessary to create an environment for discussion with farmers, through the ANAP, that contribute to elevate the understanding of sustainable practices and the environmental ethics.
6. Non Governmental Organizations							
ANJF	Antonio Núñez Jiménez Foundation of Nature and Humanity	Promotion of a Nature Culture with the aim of harmonizing society and environment by means of conservation projects, environmental recovery, and training on environmental topics	x			Conflicts are not expected	
UNAICC	National Union of Architects and Engineers of the Construction of Cuba	Association of architects and engineers dedicated to the construction of engineering works, including those engaged to the environmental rehabilitation and other branches of the Geosciences.	x			Conflicts are not expected	

ANAP	National Association of Small Farmers	Organization that represents the social and economic interests of private sector farmers, and collaborates and coordinates with the relevant national entities in the social and cultural development of rural communities	x			Economic interests of private farmers can conflict with biodiversity conservation goals	A work program will be elaborated with ANAP leaders aimed to enhance farmer awareness and training about the significance of biodiversity conservation to assure its sustainable use and the long-term existence of their income sources.
ACPA	Cuban Association of Animal Production	Association devoted to capacity strengthening and promoting sustainable practices in livestock rearing.	x			Conflicts are not expected	
ACTAF	Cuban Association of Agriculture and Forestry Technicians	Association devoted to capacity strengthening and promoting sustainable practices in agriculture and forestry.	x			Conflicts are not expected	
FMC	Federation of Cuban Women	Volunteer group of Cuban women devoted to defend woman rights and to support activities that elevate the role of women in the community and society.	x			Conflicts are not expected	
SEC	Cuban Speleological Society	Association devoted to the study of karst and caves, to the environmental protection of karst natural resources, and to the environmental education related to karst-linked human populations.	x			Conflicts are not expected	

FNPB	Cuban Sport Fishery Federation	Association of sport fishermen	x			Continued negative impacts on biodiversity by legal and illegal fishing practices	FNPB leaders have been involved during the PDF-B process in developing strategies for participation by fishermen in sustainable management of marine resources. During the full size project, integration of existing entities in charge of natural resource protection in the SCE will be strengthened (Forest Ranger Corp, Environmental Inspectors and Fishery Inspectors), and will include participation of FNPB
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Country: _____

UNDAF Outcome(s)/Indicator(s):

(Link to UNDAF outcome., If no UNDAF, leave blank)

Expected Outcome(s)/Indicator (s):

(CP outcomes linked t the SRF/MYFF goal and service line)

Expected Output(s)/Indicator(s):

(CP outcomes linked t the SRF/MYFF goal and service line)

Implementing partner:

(designated institution/Executing agency)

Other Partners:

Programme Period: _____
Programme Component: _____
Project Title: _____
Project ID: _____
Project Duration: _____
Management Arrangement: _____

Total budget: _____
Allocated resources: _____
• Government _____
• Regular _____
• Other: _____
○ Donor _____
○ Donor _____
○ Donor _____
• In kind contributions _____

Agreed by (Government): _____

Agreed by (Implementing partner/Executing agency): _____

Agreed by (UNDP): _____

PART V: ANNEXES

Annex 1: Integrated Coastal Management Authority (ICMA)

Background on Existing Management and Planning Processes for Environmental and Natural Resource Management in Cuba

ICMA is designed to build linkages among existing sectoral and provincial planning and monitoring systems within the Sabana Camaguey Ecosystem, rather than to replace existing structures. Among the existing systems that will be incorporated into ICMA processes are:

- National Environmental Strategy, which is the strategic basis for Cuba's environmental management and development. The Strategy is elaborated, reviewed, updated and controlled by the Direction of Environment (agency of CITMA), and each economic sector also develops a Sectoral Environmental Strategy, approved and monitored by CITMA.
- Territorial Master Plans, which are developed and implemented by the Institute of Physical Planning (IPF), at national and local levels, and by Provincial Delegations of Physical Planning (DPPF) at the provincial level. These plans vary in length and detail according to the sectors involved.
- Annual Production Plans, developed by productive sector institutions to set production target levels, these plans also include details on planned investments related to environmental issues and resources.
- Environmental Impact Assessments (EIA), and other licensing and monitoring processes for investment and development activities, monitored and approved by CICA (Centre of Environmental Auditing and Control within CITMA).
- Environmental legislation that supports and guides planning and control of development and conservation (related with coastal zone development, protected areas, fishing, forestry, environmental regulations, foreign investment, etc.).
- Enforcement bodies, such as CICA, the Fishery Inspection Corps, and the Forest Ranger Corps, which have lead responsibility for surveillance and control.

There is substantial precedent in Cuba for this kind of cross-sectoral planning coordination. The experience of the National Watershed Council (CNCH), which coordinates the actions of numerous sectors in 8 key watersheds in Cuba, and which will eventually be the institutional host of ICMA (see Structure section below), is a successful example of this. In addition, CITMA, which will host ICMA during the first 2 years of the project and will provide technical and financial resources for its development, is very experienced in cross-sectoral coordination. Law 81/97 on Environment, Article 12, states that "CITMA is the government agency of the Central Administration of the State in charge of proposing environmental policy and guiding its execution through the coordination and control of the nation's environmental management, promoting its coherent integration in order to contribute to sustainable development". On this basis, CITMA has created successful structures to coordinate actions necessary to implement the environmental policy of the country. These structures take several forms, all of which include participants from multiple planning and resource management sectors:

National Working Groups: The NWGs are charged with developing solutions for priority environmental problems in Cuba (National Group of Bays, National Group of Coastal Zone, National Group of Chemical Products, National Group of Dangerous Wastes Management).

National Programs: The NPs develop programs with specific environmental objectives (Development of the Mountain Program, Program of Soil Conservation and Rehabilitation, Cleaner Production Program, Fight against Desertification and Drought Program).

Other Environmental Groups: These Groups address environmental issues that require the establishment of long-term strategies (Nature Tourism Group, Health and Environment Group, Economy and Planning Group, Trade and Environment Group).

Background on Development of ICMA

The functions, scope and structure of the Integrated Coastal Management Authority (ICMA) for the Sabana Camaguey Ecosystem were developed, agreed to, and formally approved (April 2004) during Phase 2 of the UNDP-GEF project. In addition to developing the formal institutional and inter-institutional structures for ICMA, several components of ICM capacity strengthening were accomplished during Phase 2, including: 1) capacity-building and training of different sectors and decision-making levels in ICM strategies and practices; 2) acquisition of basic equipment for integrated coastal management, including equipment necessary for biodiversity inventories; and 3) monitoring of ecosystems and processes. Together, these actions have assisted CITMA and other key stakeholders in the SCE in achieving technical self-sufficiency and sustainability in many ICM functions.

As for actual implementation of ICM activities, to date these have been implemented at the provincial and local levels, primarily by provincial and local governments, although in some areas coalitions of stakeholders representing different sectors work closely with governments (or even assume the lead role) on critical issues (e.g. the Management Group for Varadero Beach, and the Jardines del Rey Group for Tourism Development in Ciego de Ávila). In some locales, local technical committees also have been formed. These provincial and local structures can vary widely in the way that they plan, coordinate, solve conflicts, etc., depending on the issues and stakeholders involved in any given locale. In each case, however, these entities have declared their willingness to apply ICM mechanisms, have included necessary representatives of productive sectors (fisheries, agriculture and tourism have participated most closely), and have met annually to review strategies and action plans. An outline of the management structure and current participation is shown in Figure 1 (see below).

The participants in ICM processes have identified several priorities that are crucial for the consolidation of ICMA within the SCE:

- Establish the regional planning and coordinating component of ICMA, which will strengthen the capacities of provincial and local entities and incorporate them into a nested system that allows for decision-making at the cross-sectoral and ecosystem-wide level. Although ICMA's role is not to take authority from other sectors, it must take measures to ensure that changes in practices (tourism development, land management, fisheries) have an ecosystem level focus and mainstream biodiversity concerns.
- Elaboration or selection of indicators for monitoring of functioning of ICM mechanisms by local governments and existing local ICM coalitions, and assessing their impact on the sustainable development of the coastal zone.
- Differentiate government budgets related to environmental protection, so that sector-based spending on biodiversity conservation in coastal ecosystems can be accurately measured.
- Establishment of an Environmental Information System to support environmental analysis, planning and decision making
- Capacity building of local stakeholders to enable their effective participation in ICM processes

Purpose of ICMA

Although ICMA was legally established in April 2004, it does not yet constitute an operational or sustainable system for integrated coastal management in the SCE. While progress has been made in promoting an ecosystem-based approach within a traditionally centralized and sector-driven development planning framework, a fully functioning system at the local, provincial and regional levels waits to be

implemented, and for the most part, development planning practices in the targeted productive sectors still need to be harmonized with ICM functions and procedures. Further, sufficient human and technical resources with specific responsibility for ICM need to be invested at every level, from the national government to coastal communities. If this is achieved, the prevailing sectoral approach to biodiversity management, and the lack of co-ordination and integration in decision making, will have been eliminated, and a single legal authority will be responsible for coastal management, with clear lines of authority, guided by strategic plans, and supported by well-defined decision making procedures and channels of communication.

ICMA is designed to be a coordination and decision-making body that operates simultaneously at different levels (local, provincial, regional). ICMA is not a management or implementing body, but is instead a body of decision makers, planners and representatives of diverse stakeholders (productive sectors, resource users, communities, conservation interests, etc.) that builds upon and strengthens existing governmental and non-governmental entities to enable them to participate effectively in integrated coastal management. ICMA is not designed to take authority that is currently vested in productive sectors (for example, ICMA will not have the authority to approve environmental impact assessments – this authority will remain within existing institutions), but instead to ensure that evolving practices for tourism development, land management, fisheries management, etc. have an ecosystem level focus and incorporate biodiversity conservation concerns. In so doing, ICMA will harmonize existing sectoral and territorial planning and management systems within the context of a long-term vision and goals for integrated coastal management within the SCE.

The Government of Cuba (GoC) has demonstrated support for ICMA in its structural design (granting it authority at the supra-ministerial level) and its commitment to providing sufficient staffing levels once ICMA is operational. Given Cuba's centralized political system, the high-level support for ICMA from the Government will ensure that the targeted productive sectors will support and participate in the coordinating activities undertaken by ICMA.

Functions of ICMA

ICMA will undertake a variety of actions to support integrated coastal management, and more specifically the mainstreaming of biodiversity conservation into targeted productive sectors, within the Sabana Camaguey Ecosystem. On a general level, ICMA will assist local and provincial planners across the SCE in establishing a clear and broadly-shared long-term vision for the environmental, social, cultural and economic sustainability of the SCE, and in developing common goals and measurable objectives to achieve that vision. ICMA also will assist the sectors in understanding the actions and activities within their existing development planning processes that could be made more sustainable, and to estimate the economic resources necessary to carry out such changes. By operating at the local, provincial and regional levels, ICMA will be able to integrate planning within the SCE in a way that is currently not feasible, for example in assessing the cumulative impact of many local level development plans on a shared ecosystem, and in providing conflict resolution across sectors, territories, and levels of government.

ICMA will provide provincial and local authorities to integrated planning and decision making, coordination, conflict resolution, community education and participation, disaster contingency planning, etc. ICMA will empower local level authorities by giving them more access to provincial and national authorities, and by providing them with models of successful ICM from other municipalities within the SCE. In addition, ICMA will give local level resource users a stronger role in decisions affecting their livelihoods, and will assist in the identification and promotion of alternative livelihoods to replace those that have a negative impact on biodiversity.

ICMA will also play a key role in maximizing the usefulness of the information management activities proposed under Output 1.2. The Environmental Information System for the SCE (SIAESC) that is to be developed under Output 1.2 will collect, organize and then provide to ICMA data coming from monitoring of productive sector activities. The Institute of Tropical Geography within CITMA will design and operate the Environmental Information System of the SCE. ICMA, in turn, will use this information to create and distribute periodic state-of-the-ecosystem reports that summarize information on trends, disseminate best practices and information on progress achieved, related to integrated coastal management and biodiversity conservation goals defined by ICMA participants.

In addition, ICMA is designed to coordinate planning processes across sectors so that coastal natural resources and biodiversity are best managed at the cross-sectoral and ecosystem level. Among the specific cross-sectoral issues on which ICMA may play a constructive role are:

- Ensuring that the processes of the Institute of Physical Planning within the SCE incorporate environmental planning as a key component in development planning
- Ensuring that tourism development is not carried out in areas of critical habitat for commercial or globally significant fish species (e.g. Caibarien Municipality), in protected areas (Yaguajay Municipality) or in other critical ecosystems (Cayo Coco);
- Creating a market for locally grown sustainable agriculture products at hotels within the SCE;
- Resolution of potential conflicts between tourism development and oil extraction (Varadero Beach)
- Limitations on industrial development within protected areas (Sagua La Grande Municipality) or in important fishing grounds (Nuevitas Municipality)
- Promoting sustainable practices for agriculture and livestock raising within protected areas (Yaguajay Municipality) and critical ecosystems (Greater Flamingo habitat in Minas Municipality)

Another function of ICMA will be to integrate indicators for environmental investments into the planning processes of the Government of Cuba. Currently, the annual National Plan of the Economy includes the indicator “Investments for the Environment”, which reflects the financing assigned by the State for environment related activities in all of the sectors. ICMA will work to get government approval to change this indicator to reflect specific spending, by sector, for biodiversity conservation activities, which will allow ICM entities at all levels to use this information to measure impacts and priorities related to spending on biodiversity conservation.

Structure of ICMA

ICMA is a nested system of management and consultative entities, at the regional (SCE), provincial and local levels (see Figure 2). At each level, representatives of government ministries, productive sector enterprises, and communities will meet twice a year to review information and activities from their own sectors so as to integrate and coordinate their decision making at the level of landscape planning and (in the second meeting of the year) review accomplishments and design the annual work plan. The information to make decisions will be provided by the ongoing monitoring activities of the various sectors (e.g. fisheries, tourism, agriculture, protected areas), which will be collected, organized and provided to ICMA by the Environmental Information System for the SCE (SIAESC) listed under Activity 1.1.2. In addition, capacity building, information coordination and outreach by ICMA at the local levels will be facilitated by the Capacity Building Centers for Integrated Coastal Management Network (CBC/ICM-N) described under Output 1.2.

At the Sabana-Camaguey regional level, the ICMA Regional Coordinating Committee will meet twice yearly to assess short, medium and long-term development plans, including those of productive sectors (tourism, fisheries and agricultural/livestock). At the provincial and municipal levels, ICM mechanisms will be implemented using already existing governmental mechanisms (local governments, provincial delegations of CITMA, economic sectors and their municipal dependencies) and already existing ICM groups (local multi-sectoral and multi-disciplinary coalitions). Diagram 1 shows examples of existing ICM mechanisms in the SCE, and Diagram 2 shows the general format for regional, provincial and local mechanisms.

To support the effective operations of the various ICM mechanisms, particularly at the local level, the project will consider implementing an integrated coastal management benchmark system, based on models that have been successfully implemented in other countries. This benchmark system would be a relatively simple and yet robust system by which local and provincial governments and national government entities can set targets and measure advances in the development of ICM processes, including adequate benchmarks to ensure that biodiversity conservation objectives are being met. The benchmark system can be adjusted and adopted to make larger project wide interventions more consistent and to help to institutionalize the project objectives within the local government system up to national level. If implemented, the benchmark system may also lead to certification for ICM entities that meet the designated benchmarks.

In operational and structural terms, legal documentation for the design of ICMA states that it is initially to be housed within the Ministry of Science, Technology and the Environment (CITMA). CITMA was chosen because it has the necessary legal status and coordinating responsibility for this umbrella role (for example, ICMA will request the intervention of the Minister of Environment when productive sectors do not include in their plans the actions deemed necessary to ensure biodiversity conservation of the coastal ecosystems of the SCE), because it has the technical capacity to support ICM activities, and because it chairs and coordinates the National Watershed Council (CNCH), which is composed of ministers of economic sectors directly involved in the use and protection of natural resources in eight key watersheds in Cuba.

The first two years of the project implementation will be a monitoring period during which ICMA staff will be located at CITMA headquarters. The Government of Cuba recognizes that, despite the successful model of the CNCH, the implementation of ICMA in a territory as large and complex as the Sabana Camaguey Ecosystem requires a period of close institutional support and testing of process and strategies that allows gaps and structural and functional shortcomings to be recognized and remedied. During this period, CITMA will provide basic financial and logistical support to these staff as well as local ICM initiatives. The Vice Minister of CITMA will chair the regional-level ICMA committee for the SCE, which will be composed of representatives of government ministries and productive sector enterprises from each of the 5 provinces of the SCE. At the local and provincial levels, local ICMA committees will be chaired by local authorities, and will have the active participation of fishermen, tourism and agriculture personnel, and local communities in planning and decision-making processes. During these two years, the regional ICMA committee will convene an annual plenary with representatives of the ICM entities of the SCE (provincial, municipal and coalitions), and will carry out meetings as necessary with these entities to revise strategies and plans of action, to establish priorities, to carry out top to bottom and bottom up information sharing, and to assess and design short, medium and long-term development plans. The regional ICMA committee will also be charged with developing stronger links with the new Masters Degree Program in ICM that is a cooperative effort among the Universities of Havana, Cienfuegos, and Oriente.

By year 3 of the project, it is expected that ICMA will be integrated into the existing structure of the National Watershed Council (CNCH), and the President of the CNCH will chair ICMA from that point

forward. As the highest national authority for watershed planning and management, the CNCH is in charge of coordinating, monitoring, and evaluating economic and social development strategies at the watershed level (without replacing the specific functions of the different economic sectors). The decision to locate ICMA within the structure of the CNCH was made for several reasons. First, the CNCH has been instructed by government mandate to extend its management operations to coastal zones of the country that have begun to implement ICM mechanisms, and currently all local level ICM initiatives (including those active in the Sabana Camaguey Ecosystem) are subordinated to the eight Watershed Councils. Second, coastal zone processes in the SCE are strongly influenced by watershed-based activities. Third, the CNCH operates at the watershed level, so that it incorporates national, provincial and local planning processes. As such, it provides an effective model for the multi-layered structure and operation of ICMA. Finally, because ICMA's operations are specifically mandated to build on existing structures, rather than creating new ones, the CNCH provides a relevant existing institutional structure in which to locate ICMA.

Project Budget for ICMA

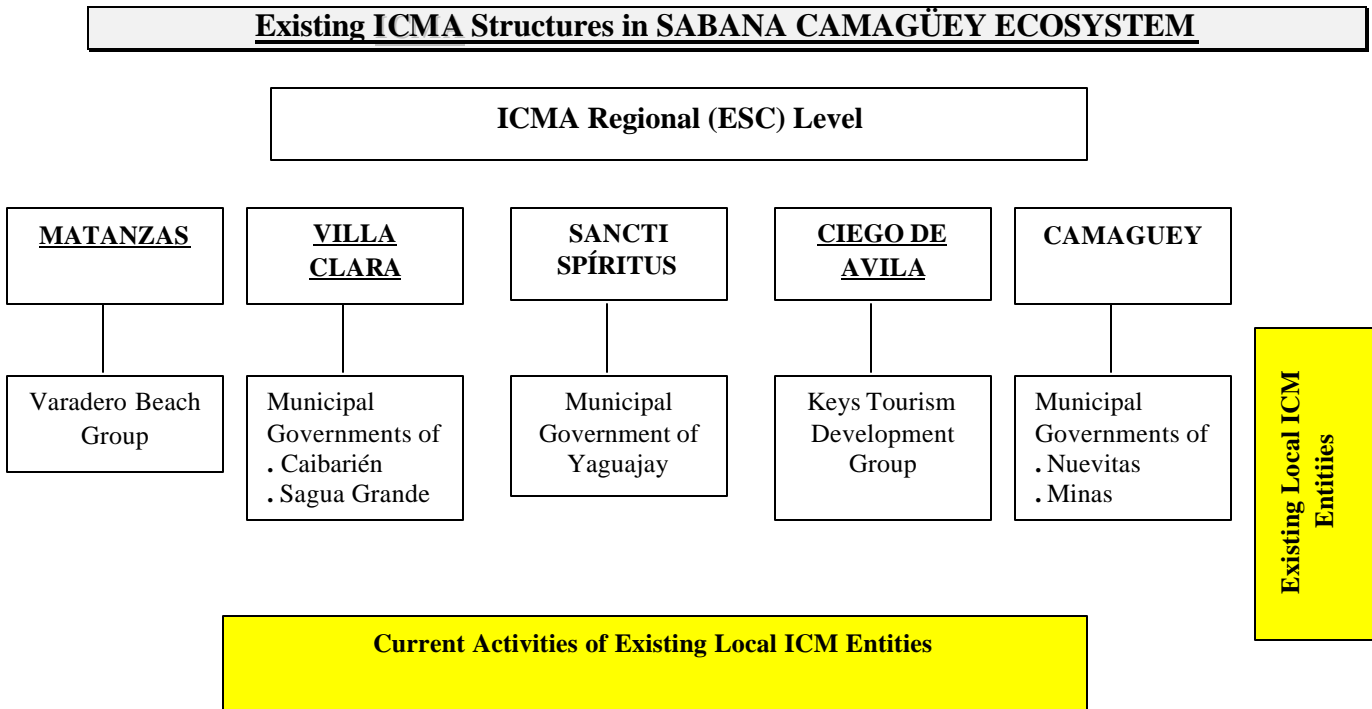
GEF contributions for the operation of ICMA, including the SIAESC, during the project will amount to US\$252,800 over 5 years. For the most part, these costs will be distributed to the three targeted productive sectors, where most of the information collection, organization and dissemination will take place. In addition, CITMA will contribute 1,442,800 Cuban pesos, primarily in the form of staff support and institutional organizing, as well as for computing and telecommunications equipment.

Long-Term Funding of ICMA

During implementation of the Full Project, project activities will be devoted to identifying the legal mechanisms that can enable various incomes from sector activities (taxes, fees, etc.) to be allocated to the conservation of biodiversity. Investments will be focused on supporting local-level ICM implementing authorities, and ICMA will have the authority to recommend to the relevant authorities (CITMA, Ministry of Fishery Industry, Ministry of Sugar, Ministry of Tourism, Ministry of Finances and Prices, etc.) the most appropriate way to invest resources for the conservation of biodiversity, based on ecosystem-wide and cross-sectoral priorities.

Costs for the operation of ICMA during implementation of the Full Project will be paid for with both GEF and Government of Cuba (GoC) funds. However, this funding will decrease during the project period, so that most long-term (post-project) costs for ICMA are covered by sustainable financing sources by the 4th and 5th years of the project. The costs for long-term funding of ICMA will be borne in part by the Government of Cuba, which will pay for the costs of staff, participation of member institutions/agencies, and support services (offices, equipment) at the national, provincial and local levels. The GoC will also cover the ongoing costs for operation of the Environmental Information System for the SCE (SIAESC). Other long-term costs for the operation of ICMA, such as document production, workshops, and exchanges among municipalities, etc. will be funded through long-term sustainable finance mechanisms. Thus far, it is expected that various fees and taxes to be implemented within the SCE will provide approximately \$250,000/year in funds for sustainable financing of biodiversity conservation, including ongoing operations of ICMA and the SIAESC (see Output 1.4).

Fig. 1



Varadero Beach: Conciliation of potential conflicts of tourism development and oil extraction. Varadero is the main tourist destination of Cuba, located at the west end of the SCE. The Varadero Beach Group was the first to apply ICM mechanisms in Cuba (pilot experience of the project)

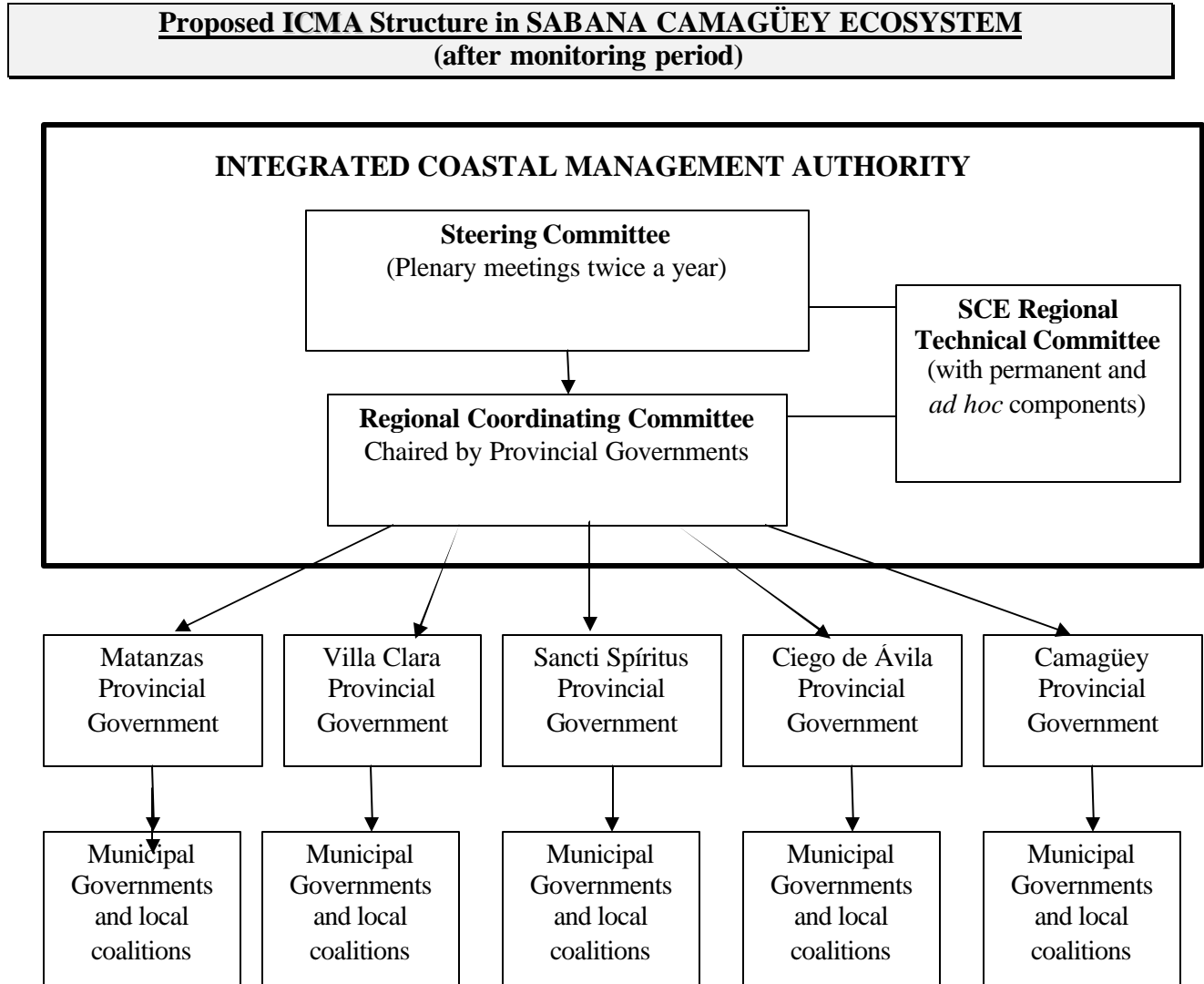
Caibarién Municipality: Tourism development at north keys. 2nd significant fishing area in Cuba
Sagua la Grande Municipality: Industrial development and great extensions with Protected Areas.

Yaguajay Municipality: Includes most of the Buenavista Biosphere Reserve (a RAMSAR Site). Extensive development of agriculture and buffalo-rearing. Nature tourism and ecotourism

Cayo Coco: Second tourist destination of Cuba, which requires the accomplishment of the strategy resulting from the first phase of the Project to ensure biodiversity conservation.

Minas Municipality: Greatest flamingo (*Phoenicopterus ruber*) nesting site of the Caribbean; extensive agricultural development.
Nuevitas Municipality: Industrial development. Second significant fishing area of the SCE. Bay ecosystem of first economic importance in Cuba

Fig. 2



Notes to Diagram:

Steering Committee: Composed of high level representatives charged with overseeing all processes; members include Ministries of Fisheries, Tourism, Agriculture, Sugar Industry, Hydraulic Resources, Protected Areas system, Forest rangers, etc.; chaired by CITMA during first 2 years of FSP

Regional Coordinating Committee: Composed of ICMA staff and participating staff of line ministries charged with coordination, planning, implementation of activities, etc.

Regional Technical Committee: Composed of technical experts providing scientific and technical advice, research and monitoring proposals and evaluations, etc.

Local Level ICM Mechanisms:

- Municipal Entities: Composed of local stakeholders; members include local representatives of Ministries, Protected Areas staff, Forest rangers, Popular Power (Delegates), NGOs, etc.; chaired by Municipal Vice Presidents
- Municipal Information and Monitoring Groups: Technical support, provided by Municipal Specialists of CITMA and the staff of the Planning Directorate, Municipal Government
- Capacity Building Centers for Integrated Coastal Management Network: Local level information and coordination centers (planned for Martí, Caibarién, Yaguajay, Morón and Nuevitas municipalities)

Annex 2: Project Scope

Geographic Scope of Project Area

The project area is defined by the Sabana-Camaguey Ecosystem (SCE), which occupies a strip of approximately 465 km along the central north zone of Cuba, between Punta Hicacos (west) and Nuevitas Bay (east) (see Annex 4, Map 1). The SCE includes the northern watersheds of the provinces of Matanzas, Villa Clara, Sancti Spiritus, Ciego de Ávila, and Camaguey; as well as a marine archipelago, adjacent shallow marine shelf, and oceanic Exclusive Economic Zone. The marine archipelago includes the largest system of cays in the Wider Caribbean, as well as extensive mangroves, coral reefs, and seagrass beds that provide a variety of marine habitats and ecosystem services. On land, the SCE is composed primarily of agricultural lands, as well as extensive coastal forests.

Overall, the entire project area covers approximately 75,000 km², including:

- 19,400 km² of mainland terrestrial landscapes, defined as the watersheds or hydrographic basins draining into the coastal waters of SCE;
- 8,311 km² of sea shelf, which includes all shallow water marine habitats up to a depth of approximately 50 meters at the outer shelf edge;
- 3,400 km² of cays, of which there are 2,517 cays in the archipelago, representing 60 % of all cays in Cuba;
- 43,800 km² of Exclusive Economic Zone (oceanic zone), which encompasses all areas up to 200 miles beyond the sea shelf.

Priority Geographic Areas for Project Interventions

Overall, the project is intended to impact biodiversity conservation in the productive landscape and seascape of the Sabana Camaguey Ecosystem (SCE). Unlike Phases 1 and 2, which focused on establishment and operation of protected areas, Phase 3 is specifically designed to affect the management of fisheries, tourism and agriculture activities, which for the most part take place outside of the protected areas system in the SCE. In so doing, Phase 3 will provide a critical complement to Phases 1 and 2, so that together the long-term investment of the GEF over all three phases results in the conservation of globally significant biodiversity across the entire breadth of the project area.

The project will be implemented across the following areas of landscape and seascape within the Sabana Camaguey Ecosystem (see GEF Tracking Tool – Annex 15 for more details):

- Buena Vista Biosphere Reserve + Great Wetland of the north of Ciego de Ávila (tourism pilot projects): 540,377 ha
- Marine areas (fishery pilot projects): 277,000 ha
- Former sugar cane producing lands (agriculture pilot projects): 3,057 ha
- Former sugar cane producing lands (water buffalo pilot projects): 2,740 ha
- Former sugar cane producing lands and bordering areas (forestry pilot projects): 42,446 ha
- Total Landscape indirectly covered by the project: 2,280,000 ha
- Total Seascape indirectly covered by the project: 831,100 ha

Selection of Communities for targeted interventions of Project

Five Municipalities were selected as the focal areas for the application of integrated coastal management (ICM) mechanisms and community participation activities within the project, including their participation

in the Integrated Coastal Management Authority. These municipalities (and their respective marine areas) are: Martí (in the east of Matanzas Province; 925 km² and 23,560 inhabitants); Yaguajay (extended along the whole northern coast of Sancti Spíritus province; 1,042.3 km² and 59,103 inhabitants); Caibarién (in the northeast of Villa Clara Province; 212.2 km² and 38,047 inhabitants); Minas (in the north of Camagüey province; 1,004.8 km² and 38,197 inhabitants); and Nuevitas (in the east of Camagüey province; 1,777.5 km² and 45,444 inhabitants).

These areas were selected for their economic importance (in particular, within the three targeted productive sectors), for their current and potential impact on critical ecosystems; and for their willingness to move to greater institutional, social, economic and ecological sustainability. Each of these communities is dependent on one or more of the three sectors targeted for mainstreaming of biodiversity conservation, as follows: agricultural and livestock activities in Martí, Yaguajay and Minas; fishing and tourism activities in Caibarién; and fishing in Nuevitas. In addition, these municipalities are important because many of the underlying causes of threats to biodiversity are concentrated in their jurisdictions, including tourism development (concentrated in nearby cays), fishing in the neighboring marine areas, and significant agricultural land-use changes related to sugar cane industry conversion.

Finally, these municipalities were selected for their demonstrated capacity and willingness to participate in environmentally friendly development activities. Each of these municipalities was active in developing community managed coastal integrated management mechanisms and processes that began during implementation of the Sabana Camagüey Project Phase II. Each municipality has implemented small-scale initiatives for local participation and capacity building for environmentally sensitive development, both outside and inside protected areas. In some cases, these municipalities lead decision-making processes involving other provinces (e.g., Caibarién has some power over the whole SCE fisheries). In addition, some of these initiatives have influenced economic policies at the national level, for example with the a program to raise young, abandoned flamingos for sale to zoos, which has demonstrated a model for returning incomes generated to a protected area (in this case, a Faunal Refuge). These municipalities also represent a cross-section of Cuba's socio-economic conditions, with the incomes of their inhabitants varying considerably when compared with the Country's average (higher in Morón and Caibarién, while much lower in Martí, Yaguajay, Nuevitas and Minas).

Criteria for Selection of Pilot Demonstration Sites

The selection of Pilot Demonstration Sites was done through a process that began with workshops for each of the three relevant productive sectors during the PDF-B phase, with the participation of government representatives from relevant sectoral institutions and from NGOs specializing related to the 8 Centers of Investigation related to the sectors. The institutions were brought together to present ideas for pilot projects. The project team received 23 proposals for projects; of these, 8 projects were selected.

Areas for specific project actions were selected according to the following criteria: sites with globally significant biodiversity; sites where biodiversity is threatened, but where threats are considered manageable; geographic and ecosystemic cohesion among sites; manageable geographic size and human population; strong political organization and management with good coordination between provincial and municipal governments; existing and potential productive activities that can be reoriented to mainstream biodiversity conservation; areas where partnerships with outside institutions already exist; and potential for replication within the sector, within the SCE, the country and the region.

In addition, sites were selected based on their potential as demonstrations to overcome specific barriers to mainstreaming BD into the three sectors, including: 1) remove policy, technical, and financial barriers to the introduction of sustainable alternatives that could provide biodiversity-compatible employment in targeted productive sectors; 2) remove technical barriers to transforming the use of lands previously

dedicated to sugar cane production to biodiversity-friendly production systems; 3) remove policy and information barriers to sustainable management of fisheries resources and conservation of globally significant marine biodiversity sites; and 4) remove technical and financial barriers to the development of instruments and mechanisms for long-term financing of biodiversity conservation in targeted productive sectors

Details on the specific sites chosen for pilot project interventions are provided in Annexes 7-12, the Sector Assessments and Pilot Projects for each of the three productive sectors.

Annex 3: Environmental Context and Globally Significant Biodiversity

Overview of Cuban Environment and Biodiversity

The cays and the mainland of Cuba contain extensive plant formations, such as the Cuban wetlands and dry forests that are considered to be of global significance (Dinerstein *et al.*, 1995⁵), as well as mangroves that are common on the cays and along the main island's coast. The biggest cays, as well as the mainland, are populated with a variety of vegetation types, including mangroves, semi-deciduous forests, microphyllous evergreen forests, coastal xeromorphic plant complexes on sandy and rocky coasts, and halophytic communities. Other ecosystems with highest priority at the regional scale, present in the mountains, are the Cuban moist forests and Cuban pine forests. Other outstanding plant formations are the savannas and pine forests over white sands (cuarcitic) and the xeric scrubs over serpentine soils.

The rich mosaic of terrestrial and marine habitats in Cuba contains a high diversity of plants and animals and high levels of endemism. In fact Cuba is considered the country with the greatest diversity in the West Indies. Cuba also ranks unusually high relative to the US and Canada when compared on an area-by-area basis: 39 times as many bird species per hectare, 30 times as many amphibian and reptile species per hectare, and 27 times as many plant species per hectare.

A notable component of the global significance of biodiversity within Cuba is the high diversity of flora and fauna in the area, and the very high level of endemism among these species. To date, 936 freshwater algae, 2,667 fungi, 921 bryophytes (8.5% endemic), 500 pteridophytes (10.6% endemic), 20 gymnosperms (65% endemic), and 6,500 species of angiosperms (52.4% endemic) have been recorded. Cuba also harbors a wide diversity of species of terrestrial fauna: 278 zoonematods (28.4% endemic), 35 annelida (42.9% endemic), 176 plathelminths (36.4% endemic), 1,468 molluscs (94.1% endemic), 200 crustaceans (6% endemic), 43 chilopodans (60.5% endemic), 83 diplopodans (94.0% endemic), 7,493 insects (30.7% endemic), 1,302 arachnids (53.0% endemic), 57 fishes (40.4% endemic), 46 amphibians (93.4% endemic), 121 reptiles (75.2% endemic), 350 birds (6.3% endemic), and 38 mammals (39.5% endemic) (Vales *et al.*, 1998⁶). To date in Cuban seas, 533 bacteria, 11 fungi, 38 yeasts, 300 protozoa, about 600 macroalgae, 360 microalgae, 6 seagrasses, 1 milleporid, 58 scleractinians, 68 gorgonians, 11 antipatarians, 13 anemones, 279 sponges, 338 polychaeta, 1479 molluscs, 393 echinoderms, 981 crustaceans, 76 ascidians, 4 reptiles and 3 mammals have been identified up to species level. The diversity of fish species is also very high, with 906 registered species (Vales *et al.*, 1998⁷; Alcolado *et al.*, 2003⁸; Beatriz Martínez, pers. comm.).

The Cuban Archipelago is a critical component in the biogeographic processes related to biological diversity in the northern Greater Caribbean, and therefore in conservation and sustainable use of regionally shared natural resources. Migratory marine species, (turtles, sharks, beak fish, tuna) and numerous metapopulations of reef, mangrove and seagrass species are shared with both the United States and the Bahamas (and possibly Bermuda), as well as with the remaining Wider Caribbean (turtles, sharks,

⁵ Dinerstein, E., D. M. Olson, D. J. Graham et al. 1995. A Conservation Assessment of the Terrestrial Ecoregions of Latin America and the Caribbean. The World Bank, Washington, D.C. 129 p.

⁶ Vales, M., A. Álvarez, L. Montes and A. Ávila (compilers). 1998. *Estudio Nacional sobre la Diversidad Biológica en la República de Cuba*. CESITA, Madrid. 480 p.

⁷ Vales, M., A. Álvarez, L. Montes and A. Ávila (compilers). 1998. *Estudio Nacional sobre la Diversidad Biológica en la República de Cuba*. CESITA, Madrid. 480 p.

⁸ Alcolado, P. M., R. Claro-Madruga, G. Menéndez-Macías, P. García-Parrado, B. Martínez-Daranas and M. Sosa. 2003. The Cuban Coral Reefs. In: E. J. Dahlgren and J. Cortés, (eds), *Latin American Coral Reefs*. Elsevier Science. 508 p.

swordfish, tuna).

Due to its geographic location, Cuba serves as a destination and migratory corridor for many birds. Of birds found on the island, 48% migrate between Cuba, North America and South America. It is estimated that from 35% to 52% of the total number of birds found on the cays, depending on vegetation type, are migratory. Of migratory birds, four are endangered (*Charadrius melodus*, *Vermivona celata*, *Falco peregrinus* and *F. columbarius*) while one is subject to lesser risk under managed conditions (*Phoenicopterus ruber*). Eleven endemic bird genera have been recorded. Birdlife International lists Cuba as among the top fifteen conservation priorities worldwide, by virtue of being an endemic bird area.

Cuba is surrounded by coral reefs, ecosystems of great regional and world significance and very valuable for tourism. More than 95% of the entire outer border of the marine shelf is fringed by reefs (approximately 3,200 km) of a great diversity of types: barrier reef, reef crests, long stretches of shelf margin reefs, fringing reefs, patch reefs, bank reefs, reef banks on muddy bottom, etc. Cuban coral reefs lure multitudes of snappers, groupers, lobsters and corals to spawn there. Seagrass beds comprise more than half of the Cuban shelf. Muddy bottoms extend through estuarine areas and several very sheltered inshore zones. Sandy bottoms are also frequent, in more exposed areas, beaches and coral reef areas.

Ecosystems and Biodiversity in the Project Area and their Global Significance

Description of Area and Primary Ecosystems

The Sabana-Camaguey Ecosystem (SCE) occupies a strip of approximately 465 km along the central north zone of Cuba, between Punta Hicacos (west) and Nuevitas Bay (east). It includes the northern watersheds of the provinces of Matanzas, Villa Clara, Sancti Spiritus, Ciego de Ávila, and Camaguey; as well as an archipelago, the adjacent shallow marine shelf and the oceanic Exclusive Economic Zone (see Map 1). The Sabana Camaguey Archipelago (SCA) constitutes the largest system of cays in the Wider Caribbean and represents 60% of all the Cuban cays in number (2,515 cays). Mangrove swamps are profusely distributed among the cays and along the mainland coast. The cays, beaches and coral reefs of the region are well known for their quality and beauty. This variety of habitats encompasses a great diversity of marine and terrestrial flora and fauna, and shelters a high level of terrestrial endemism, which categorizes this zone as being among the richest in biodiversity in Cuba and the Wider Caribbean.

The cays of the SCA contain assorted diverse formations of regional significance: semideciduous forests, microphyllous evergreen forests, mangrove forests, halophyte communities, coastal xeromorphic shrubs, and sandy and rocky coast vegetation complexes, among others.

The main biotopes in the sea are: coral reefs (of great global, regional and local concern), seagrass beds, muddy sites and sandbanks, and extensive beaches. Within the reef systems are varied coral formations including reef crests, patch reefs, beautiful and deep submarine slopes, spurs and grooves systems, buttresses, canyons, etc. Marine sea grass beds are present with quite varied flora and fauna associations and different development levels. Many in-shore water species migrate to pre-reef and reef zones to spawn. Likewise, many reef species use macrolagoon habitats as breeding and nourishing zones, so there is constant matter and energy exchange among these systems.

The reef slope along the SCA, in addition to being an important fishing and diving area, is a spawning area for the most important species of commercial fish of the neritic water (snappers, groupers, jacks, grunts, etc.), as well as lobster, the most important fishery resource. Some of these species (lane snapper, mutton snapper, grouper, black grouper, and others) form spawning aggregations in specific places on the fore reef, e.g. fore reef zone to the north of Cayo Mono, Mégano de Nicolao, northwestern border of Cayo Fragoso, and northern Francés, Caimanes, Media Laguna, Paredón Grande and Sabinal cays.

For its natural, archaeological, cultural and scientific values, this archipelago has been nominated as an area of great priority for biodiversity conservation by the Ministry of Science, Technology and Environment. Also, because of its great natural values and vulnerability to the organic pollution, the Sabana Camaguey Archipelago (SCA) has been declared by the International Maritime Organization as Protected Sensitive Sea Area (PSSA), only the second approved after the Australian Great Barrier Reef. The SCA and the coastal zone of the mainland have been proposed as a Sustainable development special Region, that includes other protected areas (a National Park, Ecological reserves, Faunal Refuges, among others). Recently, within the SCE was declared by UNESCO the Buenavista Biosphere Reserve, as well as three RAMSAR sites.

Globally Significant Biodiversity

The Sabana-Camaguey Ecosystem (SCE) has considerable regional importance due to its high diversity of marine and terrestrial species, the high level of endemism of terrestrial flora and fauna, and the enormous variety and abundance of migratory birds which use the area as a stopping point between North America and points south. The project area includes extensive areas of globally significant ecosystems distributed throughout the landscape and seascape (cays, marine shelf and mainland watersheds), including mangrove forests, dry forest and coastal shrub systems, coral reefs and seagrass beds. Species of global significance include migratory birds, endemic plant and animal species, flamingos and other threatened and charismatic birds, marine turtles, manatee, dolphins, crocodiles, etc.

Marine Species

The marine fauna of the Sabana Camaguey Archipelago (SCA) represent an outstanding example of biodiversity in the Wider Caribbean. 340 species of marine flora have been identified, as well as 1,354 species of marine fauna. Diversity values for gorgonians also match the highest ones in Cuba and the region (Alcolado *et al.*, 1999⁹). During Phase 2 of this project, 608 new records of species were added to the marine biota of the SCA. The highest values in species diversity in the sea were found in reefs and, to a lesser extent, in seagrass bed areas not affected by high salinity.

Among the most notable species in the marine and coastal zone are: the manatee (*Trichechus manatus*), dolphins (*Tursiops truncatus* and *Stenella coeruleoalba*), the hawksbill turtle (*Eretmochelys imbricate*), the loggerhead turtle (*Caretta caretta*), the green turtle (*Chelonia mydas*), the leatherback turtle (*Dermochelys coriacea*), crocodiles (*Crocodylus rhombifer* and *Crocodylus acutus*), the queen conch (*Strombus gigas*), the flamingo (*Phoenicopterus ruber*), the iguana (*Cyclura nubila nubila*), the jutia rat (*Mesocapromys auritus*), snails belonging to the genera *Cerion* and *Ligus*, and several plant species (e.g., Cactacea and Orchidacea), among others.

Several charismatic species are significantly threatened by human activities (see Table 1 below). The West Indian manatee, probably the only species in danger of extinction in the Sabana-Camaguey Archipelago, was once found throughout the marine coastal zone of La Gloria, Jigüey and Los Perros bays, and also in Buenavista, San Juan de los Remedios and Nazabal bays. However, habitat degradation in these areas has greatly reduced the population of this charismatic species. Dolphins, in particular *Tursiops truncatus*, can be observed along the whole archipelago, both at in-shore and offshore waters. A higher frequency of dolphins has been observed in eastern and western San Juan de los Remedios bay, in northern Cayo Santa María, and in Sagua la Grande bay. The highest threat to this species is currently

⁹ Alcolado, P.M., E. E. García and N. Espinosa (Eds.) (1999) *Protecting Biodiversity and Establishing Sustainable Development in the Sabana-Camaguey Archipelago*. GEF/UNDP Project Sabana-Camaguey CUB792/G31. CESYTA S.L. Madrid, 145 p.

illegal fishing. Queen conch (*Strombus gigas*) breeding areas are found mostly in the seagrass beds of reef lagoons and sandbanks. The populations of this species are seriously affected by over-fishing, and most probably by low recruitment rates of larvae coming from other Caribbean zones because of over-fishing in those areas. Currently, an environmental license is required for fishing queen conch, and only in areas where monitoring indicate densities higher than 0.3 individuals/m².

Terrestrial Species

Terrestrial flora in the SCE has great significance in the context of Cuba and the entire Caribbean. 874 species have been reported for terrestrial flora, 151 of them being endemic, 12 having restricted distribution. Terrestrial fauna is characterized by both high diversity of species and subspecies and large numbers of endemic and migratory species, and also is of extraordinary national and regional value. More than 1000 species are invertebrates, and there are 77 mollusk species. Among vertebrates, 239 birds, 45 reptiles, 10 amphibians, and 27 mammals (including local endemic species) have been identified. Eleven endemic genera, 107 endemic species and 47 endemic subspecies have been recorded, and 33 subspecies are exclusive for this zone. The highest levels of endemism are found among gastropod mollusks and reptiles. It is also worth noting that the Río Máximo Faunal Refuge (south of Cayo Guajaba, N of Camagüey Province) has the largest nesting colony of Pink Flamingoes (*Phoenicopterus ruber ruber*) in the Caribbean, with more than 40,000 nests and approximately 100,000 individuals.

In the SCE, critical areas for conservation have been identified for terrestrial fauna of particular concern, including the Pink Flamingo (*Phoenicopterus ruber*), the iguana (*Cyclura nubila nubila*), the jutia rat (*Mesocapromys auritus*), and mollusks belonging to the genera *Cerion* and *Ligus*. These and other species are considered among the most threatened IUCN conservation categories, and as many of them have endemic value or have economic importance, 60 fauna species were included in threatened categories: 3 mammals, 19 birds, 5 reptiles, 20 mollusks, 3 arachnids and 9 insects. (See table 1 below)

The areas of greatest terrestrial diversity and endemism are concentrated in the large cays, and on these, the coastal xeromorphic shrubs and semideciduous forests constitute the areas of greatest biodiversity, with a high number of endemic species of flora and fauna. Specifically, the highest fauna richness is located in the semideciduous forest of Cayo Coco and Cayo Guajaba; and in the evergreen forests of Cayo Coco. These are followed in order of importance by the coastal xeromorphic shrub of Sabinal, Romano, Paredón Grande and Santa María cays, as well as the evergreen forests of Cayo Guillermo. The highest number of floral endemic species has been found in the coastal xeromorphic shrub systems, mainly in Romano, Coco, Guillermo, Guajaba, Sabinal, and Santa María cays; and in the semideciduous forest of Coco, Romano, Guajaba, Guillermo, Sabinal and Santa María cays.

Table 1: Classification of selected species of the SCE according to their conservation status or category, their importance, and the main causes of decrease of their populations. CE = critically endangered; E = endangered; VU = vulnerable; LR = lower risk; LE = local endemic; CI = CITES; RC = species that require strict regulation and control; EI = traditional economic importance; OP = overfished populations; and HD = populations reduced by habitat damage; PA = populations reduced by pathologies; F = poaching or illegal fishing, or illegal extraction; wcn = without common name; * = It is referred to at international level, and not at national level.

Species or subspecies	Common name	Classification											
		Conservation category					Importance		Impacts				
		CE	E	VU	LR	LE	CI	RC	EI	OP	HD	PA	F
ANIMALS													
Sponges													
<i>Hippospongia lachne</i>	Whool sponge				X				X	X?	X		
<i>Spongia spp.</i>	Macho sponge				X				X	X?	X		
Stony corals													
<i>Porites astreoides</i>	Stars coral			X			X				X	X	X
<i>Agaricia agaricites</i>	Lettuce coral			X			X				X	X	X
<i>Cavernous Montastrea</i>	Eyes coral			X			X				X	X	X
<i>Montastrea annularis</i>	Little eyes coral			X			X				X	X	X
<i>Acropora palmata</i>	Elkhorn			X			X				X	X	X
<i>Acropora cervicornis</i>	Deer horn			X			X				X	X	X
<i>Millepora alcicornis</i>	Fire coral			X			X				X	X	X
Other corals	Several			X			X				X	X	X
Gorgonians													
<i>Gorgonia flabellum</i>	Sea fan			X							X	X	X
<i>Gorgonia ventalina</i>	Sea fan			X							X	X	X
Mollusks													
<i>Strombus gigas</i>	Queen Conch			X			X		X	X			X
<i>Cassis spp.</i>	Helmet shell			X									X
<i>Charonia variegata</i>	Triton			X									X
<i>Cypraea zebra</i>	Negro maco			X									X
<i>Cerion spp.</i>	Cerion			X		X					X		X
<i>Ligus fasciatus sanctamariae</i>	Ligus			X		X			X		X		X
<i>Ligus fasciatus romanoensis</i>	Ligus			X		X			X		X		X
Echinoderms													
<i>Diadema antillarum</i>	Black long-spined sea urchin		X									X	
Crustaceans													
<i>Menippe mercenaria</i>	Stone crab				X				X	X	X		
Fish													
<i>Lutjanus analis</i>	Mutton snapper				X				X	X			
<i>Lutjanus synagris</i>	Lane snapper				X				X	X			
<i>Albula vulpes</i>	Banana fish				X				X	X?	X		
<i>Ophistonema oglinum</i>	Atlantic thread herring				X				X	X?	X		

<i>Megalops atlanticus</i>	Tarpon				X				X	X			
<i>American Dasyatis</i>	Ray				X				X	X			
<i>Aetobatus narinari</i>	Sting ray				X				X	X			
Gerridae	Pataos and mojarras				X				X	X?	X		
Mugilidae	Mulletts				X				X	X			
Sciaenidae	Corvina and croaker				X				X	X			
Chondrichtes	Sharks				X				X	X			
Reptiles													
<i>Eretmochelys imbricata</i>	Hawkbill turtle		X*					X	X	X	X*		X
<i>Caretta caretta</i>	Loggerhead turtle		X*					X	X	X	X*		X
<i>Chelonia mydas</i>	Green turtle		X*					X	X	X	X*		X
<i>Dermochelys coriacea</i>	Leather-back turtle		X*					X	X	X	X*		X
<i>Cyclura nubila</i>	Iguana		X					X				X	X
<i>Crocodylus acutus</i>	American crocodile	X						X		X		X	X
<i>Anolis pigmaequestrus</i>	Dwarf lizard	X				X						X	
<i>Anolis equestris potior</i>	Blue lizard					X						X	
Birds													
<i>Charadius melodus</i>	Piping Plover		X									X	
<i>Torreornis inexpectata varonai</i>	Zapata Sparrow			X		X						X	
<i>Xiphidiopicus percussus cocoensis</i>	Green Carpenter				X	X						X	
<i>Phoenicopterus ruber</i>	Flamingo				X		X					X	X
<i>Saurothera merlini santamariae</i>	Cuban Lizard Cuckoo				X	X						X	
Mammals													
<i>Trichechus manatus</i>	West Indian Manatee	X						X			X	X	X
<i>Tursiops truncatus</i>	Dolphin			X				X		X			X
<i>Mesocapromys auritus</i>	Rat hutia	X				X						X	X
PLANTS													
<i>Heliotropium myriophyllum</i>	Weed (wcn)			X		X							
<i>Chamaesyce paredonensis</i>	Weed (wcn)			X		X							
<i>Crescentia mirabilis</i>	Güirita			X		X							
<i>Cameraria microphylla</i>	Shrub (wcn)			X		X							
<i>Isocarpa glabrata</i>	Shrub (wcn)			X		X							
<i>Juniperus lucayana</i>	Sabina									X			
<i>Consolea millspaughii</i>	Cactus (wcn)					X	X						
<i>Coccothrinax salvatoris</i>	Palm (wcn)					X							

Annex 4: Maps

Note: Maps are attached in a separate computer file

Explanation of Maps

Biodiversity: During Phase I of the UNDP-GEF Sabana Camaguey project, 24 sites of global biodiversity importance were identified in the Sabana Camaguey Ecosystem (SCE). Based on this identification, Phase II of the project established eight new protected areas within the SCE to conserve these sites. These eight areas, as well as other pre-existing protected areas, are shown on the maps in this document. Because these protected areas are clearly delimited and constitute an integrated representation of sites of global biodiversity importance, these sites have been identified in the maps to show where the areas of globally important biodiversity are, in particular with relation to existing human activities, as well as activities proposed by the Phase III project.

List of Maps

Map 1: Overview of Sabana Camaguey Ecosystem

Map 2: Tourism Pilot Projects in the Sabana Camaguey Ecosystem

Map 3: Proposed Tourism Pilot Projects (Package Tours) in the Buena Vista Biosphere Reserve

Map 4: Fisheries Pilot Projects and Critical Areas for Fisheries Stocks and Marine Biodiversity

Map 5: Destructive Fisheries Activities in the Sabana Camaguey Ecosystem

Map 6: Agriculture, Livestock and Forestry Pilot Projects and Critical Areas of Biodiversity

Annex 5: Matrix of Threats, Root Causes and Solutions

Threat/Impact	Root causes	Management issues/key barriers	Solutions: Project Interventions / Barrier removal activity	Baseline activity
<p>TOURISM SECTOR: Because of the unique ecosystems and species found in the Sabana Camaguey Ecosystem (SCE), including over 2,500 cays, a significant percentage of the coral reef ecosystems in Cuba, and high concentrations of migratory birds, as well as extensive beaches and a tropical climate, the SCE is a major tourism attraction. However, tourism development thus far in the area has followed the intensive “sun and beach” model prevalent throughout the country. Impacts from existing tourism development (habitat destruction, pollution, introduction of exotic species) have been significant only in several concentrated locales, but the potential for widespread replication of intensive development (with a potential level of 10 times the current number of hotel rooms) presents the biggest single potential threat to biodiversity within the area. At the same time, less intensive nature-based tourism has not been tested in the area. Thus, levels of tourism development, and the model of development followed, are critical to the long-term ecological health of the SCE.</p>				
<p>Degradation/destruction of critical habitat from tourism development</p> <ul style="list-style-type: none"> - Resort construction in ecologically sensitive areas (e.g. cays), and destructive construction practices (e.g. land filling and widespread vegetation clearing) - Causeway construction linking cays and main island, which changes patterns of marine currents and increases salinity, with significant impacts on fish and crustacean populations - Damage to reefs, mangroves and seagrass beds from marine-based tourism activities (boat propellers, anchors, etc.) - Collection of marine fauna and flora by visitors 	<ul style="list-style-type: none"> - Rapid development of intensive “sun and beach” tourism is dominant model for tourism in Cuba - Regulatory framework governing tourism development is not fully developed or enforced 	<p>Understanding/Awareness</p> <ul style="list-style-type: none"> - Lack of awareness among policy makers, tourism industry participants, or local populations of advantages of nature tourism and/or ecotourism <p>Systemic Capacity</p> <ul style="list-style-type: none"> - Tourism Master Plan for Sabana Camaguey does not sufficiently integrate tourism development and environmental conservation - Income from tourism-related activities (e.g. hotel and tour payments, visitor fees) does not stay within area, and is not allocated to environmental conservation - Tourism development activities are not subject to Strategic Impact Assessments (SIAs) - Tourism development plans and activities are created without consultation with resource management agencies <p>Institutional Capacity</p>	<ul style="list-style-type: none"> - Awareness and capacity building for adoption of environmentally sustainable practices by tourism sector stakeholders (Output 2.1) - Strengthen the integration of environmental concerns into tourism sector planning processes (Activity 2.5.2) - Visitor fees, license/use fees, and other revenue generating systems to fund conservation (Activity 2.4.1) - Reduce the impact of tourism infrastructure development on terrestrial and marine ecosystems (Activity 2.5.3) - Strengthen the integration of environmental concerns into tourism sector planning processes (Activity 2.5.2) 	<ul style="list-style-type: none"> - Environmental awareness programs for tourists and hotel sector employees (MINTUR, hotels) - Training of environmental auditors for tourism sector (FORMATUR) - Application of sustainable tourism indicators (MINTUR) - Network of Coral Reef Monitoring (Dive centers of MINTUR-CITMA) - EIA Licensing, and Environmental Control and

Threat/Impact	Root causes	Management issues/key barriers	Solutions: Project Interventions / Barrier removal activity	Baseline activity
		<ul style="list-style-type: none"> - Lack of capacity in MINTUR or private tour operators to develop and effectively market ecotourism products <p>Financial</p> <ul style="list-style-type: none"> - Lack of models or incentives for biodiversity friendly and economically viable nature related tourism 	<ul style="list-style-type: none"> - Integration of new tourism marketing strategies based on nature related tourism into overall Cuban tourism marketing strategies and processes (Activity 2.3.1) - Pilot demonstration of nature related tourism at the Buena Vista Biosphere Reserve (BBR) (Activity 2.2.1) 	<ul style="list-style-type: none"> Auditing in tourist resorts (CICA) - Environmental Awards program for tourist resorts (CITMA)
<p>Pollution</p> <ul style="list-style-type: none"> - Solid and liquid waste outflows from tourism facilities directly into the marine and terrestrial environment 	<ul style="list-style-type: none"> - Inadequate waste management capacity (outdated treatment technologies, wasteful production processes, insufficient recycling and reuse) - Regulatory framework governing tourism development is not fully developed or enforced 	<p>Systemic Capacity</p> <ul style="list-style-type: none"> - Environmental licensing system does not include provisions for rehabilitation (e.g. in quarry areas) <p>Institutional Capacity</p> <ul style="list-style-type: none"> - Lack of experience with water re-use and treatment, and management and disposal of solid wastes at tourism facilities 	<ul style="list-style-type: none"> - Develop and implement guidelines for environmentally friendly tourism operations (Activity 2.5.4) - Develop and implement guidelines for environmentally friendly tourism operations (Activity 2.5.4) 	<ul style="list-style-type: none"> - Environmental Control and Auditing in tourist resorts (CICA) - Monitoring of water quality in fresh water courses (INRH) and beaches (MINSAP) - Assessments of marine pollution (CITMA and MITRANS)
<p>Exotic Species</p> <ul style="list-style-type: none"> - Invasion of exotic species on cays due to importation of ornamental plants and substrate from main island for landscaping of tourism facilities - Causeway construction 	<ul style="list-style-type: none"> - Tourism development on cays prioritizes short-term benefits and does not take into account conservation of biodiversity 	<p>Systemic Capacity</p> <ul style="list-style-type: none"> - Regulatory system does not address exotic species or other affects on biodiversity <p>Technical Capacity</p> <ul style="list-style-type: none"> - Use of exotic ornamental plant species because of inadequate 	<ul style="list-style-type: none"> - Develop and implement guidelines for environmentally friendly tourism operations (Activity 2.5.4) - Establish nurseries of native plant species for use in hotel landscaping and for the rehabilitation of areas degraded 	<ul style="list-style-type: none"> - Local assessment and control of alien species (CITMA, ENPFF)

Threat/Impact	Root causes	Management issues/key barriers	Solutions: Project Interventions / Barrier removal activity	Baseline activity
allowing introduction of exotic terrestrial species		supplies of native plant species	by existing tourism infrastructure (Activity 2.5.5)	
<p>FISHERIES SECTOR: Fisheries production is the 4th largest component of the Cuban economy, and the Sabana Camaguey Ecosystem (SCE) is the second most important fishing area in Cuba, with 20% of the total national catch (35% of finfish and 15% of lobster). The primary fisheries resources include lobster, lane snapper, mutton snapper, groupers, jacks, grunts, rays, commercial sponges, blue crabs, queen conch, etc. The fisheries sector in the SCE is dominated by commercial fishing, which is organized in four state-run enterprises. Sport fishing and subsistence fishing play a smaller role in the area. Certain existing fishing technologies (bottom trawling, set nets), fishing practices (harvesting of juvenile fish) and management shortcomings (unsustainable levels of commercial fishing effort, lack of fishery reserves for critical habitat, for example spawning areas) pose an ongoing threat to fisheries resources and to marine ecosystems in general (note: significant threats to fisheries resources and marine ecosystems also come from the agriculture and tourism sectors).</p>				
<p>Destruction of critical habitat from fisheries practices</p> <ul style="list-style-type: none"> - Bottom trawling and other practices that destroy seagrass beds and coral communities 	<ul style="list-style-type: none"> - Regulatory framework governing fisheries practices is not fully developed or enforced 	<p>Systemic Capacity</p> <ul style="list-style-type: none"> - Overlapping institutional responsibilities for environmental inspection and control between CITMA and Ministry of Fisheries - Inadequate legal and regulatory frameworks for fisheries conservation - Inadequate capacity to enforce laws and regulation <p>Information</p> <ul style="list-style-type: none"> - Little data on ecological processes relevant to fisheries management (e.g. connectivity among ecosystem health and fish populations; location and dynamics of fish reproduction; potential impacts of no-take areas; oceanic larval life cycle of key marine species) 	<ul style="list-style-type: none"> - Strengthening of regulations and mechanisms to ensure sustainable fishing practices (Activity 3.2.2) - Strengthened enforcement capacity for fisheries regulations (Activity 3.2.3) - Determine baseline environmental conditions inside and outside of proposed fishery reserve areas (Activity 3.1.3) - Assess impacts of causeways, contamination, and other land-based factors (Activity 3.1.4) - Improve understanding of connectivity between and among populations of marine species and interacting water bodies (Activity 3.1.5) 	<ul style="list-style-type: none"> - Legal resolution for gradual ban of bottom trawling (25% of fishermen per year until 2007) (MIP) - Fishery Consultative Commission (MIP)
<p>Over-harvesting of fish stocks and depletion of marine biodiversity</p> <ul style="list-style-type: none"> - Unsustainable levels of 	<ul style="list-style-type: none"> - Ministry of Fisheries policy to maximize returns (short-term) 	<p>Understanding/Awareness</p> <ul style="list-style-type: none"> - Limited understanding and awareness among fishermen and 	<ul style="list-style-type: none"> - Technical assistance, training and exchange of experiences on sustainable 	<ul style="list-style-type: none"> - Resolution banning the use of set nets (MIP).

Threat/Impact	Root causes	Management issues/key barriers	Solutions: Project Interventions / Barrier removal activity	Baseline activity
<p>legal fishing (project area has largest quantify of fishing ships/km² and of set nets in all of Cuba)</p> <ul style="list-style-type: none"> - Unsustainable practices, such as set nets that capture fish before spawning, and bottom trawling that creates high levels of bycatch and depletes juvenile populations - Illegal fishing and hunting of marine species (e.g. turtles, dolphins, manatees, ornamental species) 	<p>from fisheries resources</p> <ul style="list-style-type: none"> - Increased illegal fishing due to reduced employment for sugar industry workers (following sugar industry conversion process) 	<p>policymakers of ecological processes, the long-term threat to fisheries resources, and the need for sustainable fishing practices</p> <p>Systemic Capacity</p> <ul style="list-style-type: none"> - Fishery regulations and systems for granting licenses are outdated and lack integration <p>Financial</p> <ul style="list-style-type: none"> - Absence of demonstrated alternatives of ecologically and economically effective sustainable fisheries practices 	<p>fishing practices (Activity 3.4.1)</p> <ul style="list-style-type: none"> - Awareness-raising activities for fishermen (Activity 3.4.2) - Reduction in official target levels for fishing effort (Activity 3.2.1) - Strengthening of regulations and mechanisms to ensure sustainable fishing practices (Activity 3.2.1) - Pilot projects to demonstrate sustainable livelihood alternatives for fishermen affected by new restrictions on fishing effort and practices (Output 3.3) 	<ul style="list-style-type: none"> - Fishery Consultative Commission (MIP) - Management of lobster, queen conch and other mollusks, sea cucumber and sponge fisheries (MIP/CIP) - Analysis of liquid wastes from the fisheries industry (MIP/CIP) - Research on oceanographic processes in face of climate change (CITMA-IDO)
<p>AGRICULTURE SECTOR: Sugar production has long been the mainstay of the Cuban agriculture sector. However, declining world prices and out-of-date technical capacity and resources have had a major impact on sugar production in the past few years. Since 2002, 70 of the 155 sugar mills in the country have been closed, including 23 of the 44 sugar mills within the SCE. As a result, significant land area (approximately 62% of the sugar cane lands nationally) are in the process of conversion to new uses. The Government of Cuba is considering many land use options, primarily in the areas of agriculture, livestock and forestry, but decisions on land use allocations for most of these lands is still pending, thus presenting an important opportunity to mainstream biodiversity conservation objectives into the management of these areas. This is of particular importance because erosion and runoff of pesticides/herbicides/fertilizer from former sugar cane lands, and to a lesser extent liquid and solid wastes from sugar processing facilities still in operation, pose a significant threat to critical marine ecosystems (mangroves, seagrass beds, etc.) in the SCE.</p>				
<p>Degradation of soil and water quality</p> <ul style="list-style-type: none"> - Agricultural, cattle-raising and forestry practices that cause deforestation and soil degradation, and 	<ul style="list-style-type: none"> - Government policy promotes intensive crop, animal and forest production, even on marginal lands 	<p>Systemic Capacity</p> <ul style="list-style-type: none"> - Inter-institutional coordination at and between national and local levels is insufficient for ecosystem level planning and management 	<ul style="list-style-type: none"> - Develop and implement a framework for improving existing planning for the conversion of sugar lands (Activity 4.1.1) 	<ul style="list-style-type: none"> - Selection of tree species for reforestation of livestock grazing areas (MINAG/IIF)

Threat/Impact	Root causes	Management issues/key barriers	Solutions: Project Interventions / Barrier removal activity	Baseline activity
<p>resulting sedimentation, turbidity and salination of rivers and the marine environment</p>	<ul style="list-style-type: none"> - Land use management (including sugarcane land conversion) decisions do not take account of downstream effects 	<ul style="list-style-type: none"> - Agricultural land use decisions are made without consultation with downstream natural resource managers - Overlapping institutional responsibilities for environmental inspection and control between CITMA and forest rangers <p>Technical Capacity</p> <ul style="list-style-type: none"> - Capacities of local authorities to assimilate and make management decisions based on biodiversity information are low - Little experience in growing or marketing sustainable agriculture products (e.g. certification and labeling options) - Lack of capacity/experience at local level with production of crops/livestock/forests other than sugar (i.e. increased degradation) <p>Financial</p> <ul style="list-style-type: none"> - Lack of economic incentives for farmers to produce sustainable agricultural products 	<ul style="list-style-type: none"> - Establish management and technical capacity for biodiversity friendly agricultural, livestock and forestry production on former sugar cane lands (Output 4.2) - Build capacities within MINAZ to enable more sustainable and biodiversity friendly agricultural, livestock and forestry production (Activity 4.2.1) - Capacity building and training of key stakeholders from the sugar industry in selected biodiversity-friendly agriculture, livestock and forestry activities (Activity 4.2.2) - Test and implement the best management practices for biodiversity friendly agriculture, livestock and forestry activities on a cooperative farm (Activity 4.1.1) - Economic incentives for workers on former sugar cane lands to continue participation in sustainable resource production (Activity 4.2.3) 	<ul style="list-style-type: none"> - Introduction of new technologies for managing soil erosion (MINAG/IS) - Economic valuation of environmental goods and services in forest ecosystems (MINAG/IIF) - Establishment of composting technologies in the sugar industry (MINAZ/INICA) - Sustainable agriculture strategies for farmers to increase productivity (CITMA/MINAG) - Conservation of biodiversity in grazing areas (UH/ICA)
<p>Pollution</p> <ul style="list-style-type: none"> - Solid and liquid waste flows from agricultural operations which affect coastal and marine 	<ul style="list-style-type: none"> - Resource management practices do not take account of 	<p>Systemic Capacity</p> <ul style="list-style-type: none"> - Decisions on siting and practices of processing operations are made without 	<ul style="list-style-type: none"> - Monitor impacts on biodiversity stemming from land use changes on former sugar cane lands, including new management practices, changes in 	<ul style="list-style-type: none"> - Pollution control measures at the level of polluting

Threat/Impact	Root causes	Management issues/key barriers	Solutions: Project Interventions / Barrier removal activity	Baseline activity
<p>ecosystems, including pesticides, fertilizers, etc.</p>	<p>downstream effects</p>	<p>consultation with downstream natural resource managers</p> <p>Institutional Capacity</p> <ul style="list-style-type: none"> - Monitoring and control of management practices and zoning regulations for converted sugarcane lands are insufficient 	<p>technology, and introduced and/or invasive species (Activity 4.1.2)</p> <ul style="list-style-type: none"> - Land use planning/zoning for former sugar cane lands and facilities within the SCE, based on landscape level ecological and socio-economic assessments (Output 4.1) 	<p>enterprises (CITMA and socioeconomic sectors)</p>
<p>Exotic Species</p> <ul style="list-style-type: none"> - Introduction of alien species (water buffalo, non-native trees) that affect ecosystems and out compete native species - Invasions of alien species (e.g. rats and mongooses) from defunct sugarcane fields into native habitat (incl. protected areas) 	<ul style="list-style-type: none"> - Sectoral policy promotes intensive crop, animal and forest production without taking sufficient account of ecosystem health or biodiversity 	<p>Technical Capacity</p> <ul style="list-style-type: none"> - Little experience with technologies and systems for control of non-native animal and plant species 	<ul style="list-style-type: none"> - Assessment of movements and impacts of populations of exotic species from converted sugar lands to natural landscapes, and elaboration of plans for the control or eradication of high-priority species (Activity 4.1.4) 	<ul style="list-style-type: none"> - Control of wild dogs to protect endemic mammals (CITMA/UMA) - Control of introduced flora and fauna in the Rio Maximo Refuge (MINAG/ENPFF)

ANNEX 6: THREATS RANKINGS ANALYSIS

Ranking of Significance of Productive Sectors with Regard to Impact on Coastal and Marine Biodiversity in the Sabana Camaguey Ecosystem

In order to measure the comparative impacts of the productive sectors on biodiversity in the SCE, a rankings system was developed which measured the impact of specific activities within each sector on specific ecosystems within the area. The cumulative effect of each sector could then be assessed, as well as a conceptual framework for considering which activities are most detrimental to biodiversity and which ecosystems are most threatened. Additional details are provided below, and a summary quantitative analysis is provided in Table 1 below.

1. Main ecosystems impacted

According to the impact analysis (see table), the main ecosystems impacted by the identified sectors are: seagrass beds (score = 34), coral reefs (score = 26), coastal dry forests (score = 25), coastal xeromorphic shrubs (score = 25), and mangroves (score = 24).

2. Connectivity and environmental stress threshold of terrestrial and marine ecosystems

The marine environment, given its greater connectivity and narrower environmental thresholds of its community and species, is comparatively more vulnerable to impacts than terrestrial areas. The impact of various sector activities on the marine environment is further increased by increasing water temperatures driven by the climate change.

3. Sectors with the most impact

The sector of highest impact was tourism (score = 79), followed by agriculture and livestock (score = 60) and fishery (score = 53). It is important to note that the scoring indicators used do not compare the actual extent of area impacted by the sectors, but instead just the categories of area impacted (see table). For that reason a comparison of real area impacted is needed for a more objective ranking of sectors, and is given in the next paragraph.

Scoring system for impact ranking of threats, ecosystems and sectors:

0 = no threats of relevance;

1 = threats to only a few sites and very low impact on ecosystem functioning or structure or endemic species;

2 = threats to more sites but low degree of impact;

3 = threats to more sites and medium degree of impact;

4 = threats to more sites and high degree of impact;

5 = threats to all the sites of this type of ecosystem within the SCE, and at a level that seriously endangers ecosystem functioning or structure or endemic species

4. Geographic Extent of the Impact of Productive Sectors on Marine and Terrestrial Biodiversity

Tourism: The estimated total area of marine and cay ecosystems impacted by tourism is approximately 2,900 km². This area includes about 150 km² of cays (approximately 4% of the total area of cays), which are impacted by tourism infrastructure (habitat fragmentation, land conversion, land modification, disturbance of flora and fauna, and exotic/invasive species), primarily on the cays of Las Brujas, Ensenachos, Santa María, Guillermo and Coco. To date, coral reefs have been impacted only slightly by

tourism (primarily anchoring by dive boats), but approximately 105 km² of marine area are at risk from such activity (N of Matanzas Province, NW and NE of Villa Clara Province, from Cayo Guillermo to Cayo Paredón, and Cayo Sabinal). In addition, the construction of causeways (largely to support tourism development) has affected to a varying degree the hydrology and sediments of marine areas, as well as the biological dispersion patterns (migration, dispersion, recruitment and reproduction) of fish and other marine biota, in approximately 2,480 km² of bay environments (Bahía de Buenavista, Bahía de Los Perros and Bahía de Jigüey) (see Annex 4, Map 5). There is no significant tourism development on the mainland of the SCE. While the impacts of tourism are relatively localized, it is important to note that they are focused in some of the most diverse and fragile ecosystems in the SCE (the cays and inshore marine areas).

Fisheries: The impact of fisheries activities extends over virtually all of the 8,311 km² marine shelf of the Sabana-Camagüey Archipelago, which encompasses 390 km² of coral reefs, 5,625 km² of seagrass-beds, and remaining areas that include non-seagrass bearing soft (sandy and muddy) bottoms, and some non-reef rocky bottoms. The primary impact from fishing activities is in the reduction of fish stocks and the degradation of marine ecosystems (esp. seafloor) from overfishing and destructive fishing practices (e.g. bottom trawling) (see Annex 4, Map 5).

Agriculture and Livestock Raising: This sector impacts coastal and marine biodiversity over a total watershed/marine area of approximately 26,420 km². Of this area, 19,400 km² corresponds to the watersheds of the SCE, which are affected by habitat loss, fragmentation, land conversion and modification, removal of native flora and fauna, exotic and invasive species, and loss of agro-biodiversity, including approximately 500 km² of native coastal vegetation (semideciduous forests, swamp forests and mangroves, etc.). In addition, 6,520 km² of seagrass-bed and non-seagrass soft bottom areas are affected by eutrophication (induced mesotrophy), eutrophication and enhanced silt/particulate organic sedimentation (see Annex 4, Map 6). There is no significant agriculture or livestock raising on the cays.

In summary, marine ecosystems are impacted most widely by fisheries activities (virtually 100% of marine areas), followed by agriculture/livestock-rearing (60% of marine areas) and tourism (24% of marine areas). For terrestrial ecosystems on the mainland, agriculture/livestock-rearing has the only significant impact (more than 50% of the area). For terrestrial ecosystems on the cays, tourism has the only significant impact (roughly 4% of the land area) (see Annex 4, Map 2). With respect to the combined total of the cay/mainland/marine areas, agriculture and livestock-rearing has the most widespread impact (26,420 km²), followed by fishing (10,788 km²) and tourism (2,900 km²).

Thus, while tourism has the highest degree of impact on natural systems, the geographic range of tourism impacts on terrestrial and marine ecosystems within the Sabana Camaguey Ecosystem is more limited than that for the other sectors. Conversely, fisheries activities affect the widest area, but with the least amount of impact, while agriculture falls in the middle in both degree and range of impact. This analysis leads to the general conclusion that the three sectors are roughly equally important for their current and potential impact on biodiversity.

5. Distribution of GEF funds for activities among the Productive Sectors

Taking into account the above results, allocations of GEF funds were made based primarily on the array of activities necessary to remove the relevant barriers in each sector, and the costs of carrying out those activities:

Fisheries: GEF funding assigned to the fishery sector was highest because of the much higher costs of work done in marine environments (boats, operations, etc.) as well as the high price of equipment and

materials employed for marine issues, derived from the natural constraints imposed by an aquatic realm to technology development, comparatively much more than in the terrestrial realm.

Agriculture/Livestock/Forestry: The agriculture/livestock sector received the 2nd highest GEF allocation, largely because of the costs of equipment and materials needed for biodiversity friendly technologies and practices.

Tourism: Because activities planned for the tourism sector require relatively smaller equipment and material inputs, this sector will receive slightly less in GEF funding.

Cross-Sectoral: Cross-sectoral activities, such as development of ICMA, the SCE Ecosystem Information System (SIAESC), stakeholder capacity building, and a Program for Sustainable Financing, require financing to enable their effective participation and coordination in the Integrated Coastal Management of the SCE, but with relatively low equipment and material inputs.

Matrix of Sector Threats to Ecosystems

	Coral reefs	Seagrass beds	Mangroves	Coastal lagoons	Swamp forests and swamp grasslands	Sandy and rocky vegetation complexes	Coastal xero-morphic shrubs	Coastal dry forests	Agro-ecosystems	Total Impact of Threat
Tourism										
Resort construction in ecologically sensitive areas (e.g. cays), and destructive construction practices (e.g. land filling and widespread vegetation clearing)	0	0	2	2	0	3	4	4	0	15
Causeway construction linking cays and main island, which changes patterns of marine currents, with significant impacts on fish and crustacean populations	0	4	3	4	0	0	0	0	0	11
Damage from marine-based tourism activities (boat propellers, anchors, etc.)	2	2	0	0	0	0	0	0	0	4
Collection of coastal and marine fauna and flora by visitors	3	1	1	0	0	2	2	2	0	11
Pollution from solid and liquid waste outflows from tourism facilities directly into the marine and terrestrial environment	1	2	2	2	0	0	3	3	0	13
Invasion of exotic species on cays due to importation of ornamental plants and substrate from main island for landscaping of tourism facilities	0	0	0	0	0	4	4	4	0	12
Causeway construction allowing introduction of exotic terrestrial species	0	0	2	0	0	3	4	4	0	13
TOTAL PER ECOSYSTEM	6	9	10	8	0	12	17	17	0	79
Fisheries										
Bottom trawling (chinchorros) that destroys habitats through mechanic damage to bottoms	3	4	0	0	0	0	0	0	0	7
Unsustainable levels of legal fishing	5	4	4	3	0	0	0	0	0	16
Unsustainable practices, such as set nets that capture fish before spawning, and bottom trawling that creates high levels of bycatch and depletes juvenile populations	5	5	3	2	0	0	0	0	0	15
Illegal fishing and hunting of marine species (e.g. turtles, dolphins, manatees, ornamental species)	5	5	3	2	0	0	0	0	0	15

TOTAL PER ECOSYSTEM	18	18	10	7	0	0	0	0	0	53
Agriculture/Livestock										
Agricultural, cattle-raising and forestry practices that cause deforestation and soil erosion, and resulting sedimentation of rivers and the marine environment	0	3	0	3	0	0	0	0	0	6
Pollution by solid and liquid waste flows from agricultural operations into rivers, lakes and marine ecosystems, including pesticides, fertilizers, etc	2	4	2	4	4	0	0	0	4	20
Introduction of alien species (water buffalo, non-native trees) that affect ecosystems and out compete native species	0	0	0	0	4	0	4	4	4	16
Invasions of alien species (e.g. rats and mongooses) from defunct sugarcane fields into native habitat (incl. protected areas)	0	0	2	0	4	4	4	4	0	18
TOTAL PER ECOSYSTEM	2	7	4	7	12	4	8	8	8	60
Ecosystem Level Analysis										
Tourism	6	9	10	8	0	12	17	17	0	79
Fisheries	18	18	10	7	0	0	0	0	0	53
Agriculture/Livestock	2	7	4	7	12	4	8	8	8	60
TOTAL	26	34	24	22	12	16	25	25	8	

Average Degree of Threats to Marine and Terrestrial Ecosystems

	Marine	Terrestrial
	26	24
	34	12
	22	16
	24	25
	26.5	25
		8
		22
Average	26.5	18.9

ANNEX 7: SECTOR ASSESSMENT - TOURISM SECTOR

1. Tourism Sector in Cuba

Overview

Tourism in Cuba has grown dramatically in the past 15 years. In 1990, some 300,000 tourists visited Cuba, and by 2004 that number had risen to 2 million. Despite some deceleration after the September 11 terrorist attacks, some 2.3 million tourists are expected to visit Cuba in 2005. The rapid growth in tourism, combined with the decline of the sugar cane industry and the agriculture sector overall, has made tourism the most important economic sector in the Cuban economy. Tourism now accounts for 41% of national foreign currency income earnings (as compared to 2% in 1990), and it contributes 43% to the national balance of payments (as compared to 4% in 1990). Tourism development has provided significant employment in underdeveloped rural communities (each US\$15,000 invested in tourism development provides one new job), and at the end of 2004, the tourism sector employed 89,000 persons, in comparison with 52,000 in 1990. The tourism sector consumes an increasingly greater amount of national products (fresh vegetables, textile products, furniture, clean products, rum, beer, bottled mineral waters, construction materials, and equipment for transportation). In 1990, only 12% of the products consumed by the tourism sector were produced in Cuba, and by 2004 that number had increased to 69%. Currently, 81% of tourist income remains in the country.

Institutional Structures

The Ministry of Tourism (MINTUR) is charged with directing tourism development and implementing tourism policies throughout the country. MINTUR is the outright owner or partnership owner in all tourism sector enterprises in the country, including hotels, tour operators, etc. Of the available hotel rooms in Cuba, 89% are the sole property of the government, and the remaining 11% are owned in association with foreign companies. Foreign investment in the tourism sector has been a major factor in increasing tourism development and visitation by foreign tourists, and it has allowed the Cuban tourism industry to obtain new technologies, management experiences and capital, and to rely on foreign partners to manage global marketing and promotional campaigns. Mixed-ownership hotel companies have been created in partnership with well-established international partners, on the basis of participation of Cuban and foreign capital at a ratio of 50/50. These joint venture companies are generally created for an operational period of 25 years, with the option to extend to 50 years if it is mutually agreed.

Regulation and Permitting

MINTUR regulates all activities in the tourism sector, and official Cuban tourism development policies place a priority on environmental quality, based on integrated planning and the use of technical and scientific data. Law 81 of the Environment states in Article 139: "The sustainable development of tourism is designed to harmonize the effective use of the aesthetic, recreational, scientific, and cultural qualities of the natural resources upon which it depends, thereby protecting these resources and guaranteeing that they will provide the same or superior benefits to the future generations". MINTUR participates with conservation agencies (e.g. CITMA) in management of the environment and natural resources. For example, the first scientific installation constructed in the major tourism destination of Cayo Coco, the Center for Coastal Ecosystem Research of CITMA, was paid for with monetary funding from MINTUR. MINTUR has also supported numerous environmental studies and investigations carried out by GEOCUBA.

MINTUR is required by law to abide by environmental conservation laws and regulations in its development activities. In Cuba, Resolution No.77/99 establishes the obligation to conduct EIAs for construction/development projects; in the case of tourism, this includes infrastructure works (causeways, roads, etc.), hotel facilities, waste processing plants, etc. EIAs are conducted by the Institute of Physical Planning (within the Ministry of Economy and Planning), which grants all environmental licenses and which will deny licenses in the absence of an EIA. Once construction/development projects are approved, local environmental inspectors oversee the fulfillment of the measures established in the license. In the case of large investments, governmental inspections are carried out with the participation of the relevant ministries, headed by the Regulatory Office of CITMA.

Tourism Development Policies

Tourist development in Cuba has focused primarily on “sol y playa”, or “sun and beach” tourism, which consists almost exclusively of large-scale tourism facilities (frequently all-inclusive resorts) designed to accommodate foreign visitors who are looking for a traditional Caribbean beach vacation. Many of these visitors, who often come on package tours, never leave the grounds of the hotels at which they are staying. However, realizing that there are limits to the number of visitors that it can attract with this model of tourism, and seeing the success of other countries in the Caribbean and Latin America with alternative forms of tourism development, the Government of Cuba has begun to investigate and promote additional models of tourism to supplement the sol y playa model. As a part of MINTUR’s official strategy for tourism development in Cuba, priority for the next few years has been placed on developing more diversified lodging and activity alternatives, such as small lodges, boating and scuba diving, nature tours, agricultural and cultural tourism, specialized restaurants, etc.

Competition

Among the countries of the Greater Caribbean, Cuba has had the most consistent growth over the past fifteen years, in terms of quantity of tourists, revenues and number of rooms. At present, Cuba ranks 8th in the Western Hemisphere in number of visitors, up from 23rd place in 1990.

Despite the rapid growth of tourism in Cuba, the country faces strong competition, in particular for its main product, “sol y playa” tourism, from the Dominican Republic, the Bahamas, the United States (Florida) and México, and to a lesser extent from Puerto Rico, Jamaica and other islands belonging to the Lesser Antilles. With respect to ecotourism and cultural tourism, the strongest competition comes from Costa Rica and Mexico, both of which receive many more of these visitors than Cuba.

In spite of the existing competition, sustained growth in tourism has continued during the past 4 years. The following table shows the percentage increase (based on the year 2000 as a reference point) in visitors to the SCE during this period from the primary tourism source countries for Cuba:

Years	2001	2002	2003	2004
Canada	107 %	116 %	128 %	140 %
UK	108 %	120 %	132 %	145 %
Italy	102 %	98 %	104 %	106 %
France	104 %	106 %	110 %	111 %
Spain	109 %	112 %	119 %	127 %
Others	105 %	106 %	112 %	118 %
Total	106 %	116 %	125 %	135 %

Overall, tourism in the SCE has grown by approximately 35% during this period. This growth has been possible because of a 12% increase in the number of rooms in the area, and a 23% increase in the intensity of exploitation of the facilities.

2. Tourism Sector in the Sabana Camaguey Ecosystem

Overview

With the commercial name “Jardines del Rey”, the Sabana-Camaguey Ecosystem (SCE) is envisioned as the second most important tourism development area in Cuba. Currently, there are 14 hotels with 4,337 hotel rooms in the SCE, primarily on Coco, Guillermo, Santa María and Las Brujas cays, and the area received 96,000 visitors in 2004 (and 130,000 visitors expected in 2005). Tourism is expected to continue to grow rapidly in the SCE, with plans for 250,000 visitors and 34 hotels with 10,000 hotel rooms by 2010.

Socio-Economic Context

The development of tourism in the SCE has had a significant impact on the socioeconomic conditions of the communities on and nearby the cays (Coco, Guillermo, Santa María, Las Brujas and Ensenachos) within the SCE. Tourism directly employs approximately 12,000 persons in the SCE, and these jobs are widely sought after for their high pay, opportunity for foreign currency earnings, and training in marketable skills. Although wages in the fishing sector are higher than in tourism, the working conditions in fisheries are generally very difficult.

Tourism also employs a high number of people indirectly through support services. Services such as transport, stores, fuel distribution, merchandise sales and production (largely artisanal work), and many other employ numerous people from the local labor force. An important contribution to the increase of the quality of life of the residents of those communities has been the construction of modern human settlements in the mainland, for the residence of workers of the tourism and of other support sectors. The Government of Cuba also has recently prioritized the increase of environmentally friendly food production (primarily vegetables) to satisfy the demand from hotels, and this will be an additional source of employment in the area (Cuba’s declining transportation infrastructure limits the capacity to bring in substantial amounts of food from outside of the area).

Tourism Operations

Tourist resorts in the SCE are the property of hotel chains owned by the Cuban Government, but jointly administered with foreign hotel companies. The largest chains are Gran Caribe, Cubanacán, Gaviota, Palmares, and Isla Azul, while the joint companies are dominated by Sun, Blau, Red Deer and Iberostar, Marine and Nautical Marlín. There are also 23 dive centers operating in the SCE, belonging to two national enterprises (Cubanacán Náutica and Gaviota), as well as six marinas operating in Varadero, Cayo Las Brujas and Cayo Coco. These facilities are served by government-run service and supply companies such as Emprestar (environmental care, waste management, maintenance, gardening) Servisa (laundry), and Caracol (stores, retail sale of goods, food services).

The vast majority of visitors to the SCE come in group tours operated by one of the major government-owned tour operators (e.g. Transtur, Havanatur, Transgaviota, Cubanacan), or through foreign travel agencies that are accredited to sell tourist services in Cuba. These tour operators establish contracts with the hotel chains for lodging, and they jointly offer excursions designed by the Hotel Chains or personalized to request of the Client.

Tourism Development Planning

Tourism development is strictly planned and controlled in the SCE, so that areas for development, size of development, control and monitoring of operations, etc. is all carefully controlled by MINTUR. The tourism sector, as with other sectors of the economy, has established and implemented its own Sectoral Environmental Strategy, implemented throughout its institutional system (hotel facilities and installations, companies, etc.). However, of the 14 hotels in the SCE, only 5 have obtained “National Environmental Recognition” status as determined by CITMA, which requires that installations submit to a rigorous process of inspections and evaluations on their environmental performance. Because this process can take up to 5 years, it is not mandatory, but hotel operators desire such certification because it increases the marketability of their hotels to tour operators and tourists.

As a result of Phase 2 of the GEF project, a number of changes have been made in the past few years to the planning, approval and oversight policies for tourism in the area. For example, on Cayo Coco (one of the largest resort areas), inventories confirmed biodiversity levels and endemic species surpassing original estimations; which led to more stringent environmental controls for tourism and infrastructure development. In addition, the participation of 119 scuba-diving instructors from the tourism sector in marine biodiversity monitoring, initiated by the project, will be expanded on a national scale to approximately 1,000 diving sites along Cuba’s coast.

Another result of the Phase 2 project is that the Institute of Physical Planning and MINTUR have reduced the official planned density of rooms/ha for the cays from 40 (as planned in 1994) to 30 rooms/ha today. In addition, the total number of rooms that will be allowed to be built in the SCE (based on the 2004 Tourism Master Plan for the Sabana Camaguey Archipelago) has decreased from 67,350 rooms to 44,474 rooms (see Table 2). As a result, the SCE now only accounts for 21% of the total planned room capacity for the country, down from 37% in 1990. This reduction is a result, in great measure, of the introduction of regulations for sustainable development, in particular limitations on development in fragile ecosystems.

Table 2: Tourism Potential in the ESC and Tourism Potential in Cuba (# of rooms)			
Province	Approved Planning Limits		
	1990	1997	2002
Villa Clara	9 550	8 420	7 574
Ciego Ávila	22 800	22 200	19 140
Camaguey	35 000	17 750	17 760
TOTAL ESC	67 350	48 370	44 474
Total Cuba	182 095	156 661	207 300
% ESC	37%	31%	21%

Changes in planning and management policies extend beyond a reduction in the number of rooms, to a shift in the planning and design of tourism infrastructure, the acceptable locations for new infrastructure, in better site design to decrease negative impacts on natural vegetation, in more rational design of roads, and in improved application of legislation and regulations governing construction in coastal areas.

Even though substantial advances were achieved during Phase 2, many barriers to effective planning and management of existing and planned tourism development remain, including inadequate regulations and enforcement mechanisms; poor awareness of environmental issues (especially biodiversity conservation) among stakeholders in the tourism sector; knowledge gaps about the economic and ecological consequences of inappropriate practices; and the lack of models of effective economically and

ecologically sound alternatives for infrastructure and economic activities (wetlands friendly building practices, environmentally friendly materials, marine transportation versus causeways, etc.).

During the PDF-B process, participatory workshops with actors of the tourism sector were held to discuss and revise sustainable tourism indicators. Cuba is a signatory to the Convention on Declaration of the Caribbean as a Zone of Sustainable Tourism, and under the auspices of the Association of States of the Caribbean (AEC), Cuba is working together with other countries in the region in the application of Sustainable Tourism Indicators. Draft indicators were proposed by Cuba in the XII Meeting of the Special Committee on Sustainable Tourism of the AEC, in April 2004. The indicators are structured in four dimensions (Normative, Economic, Patrimonial and Social). Analysis of each of these dimensions during the workshops indicated that the indicators do not take into account sufficient measures specifically related to biodiversity protection and conservation, even though these resources are of fundamental importance to the tourism sector in Cuba and in the whole Caribbean region.

Ecotourism and Nature Tourism

In Cuba as a whole, approximately 9,500 ecotourists visit on an annual basis, primarily from Germany, Holland, France and the United Kingdom, and together they spend approximately US\$4 million/year (note: in Cuba, “ecotourists” are defined as visitors coming to Cuba specifically for nature activities, while “nature tourists” are defined as visitors who come to Cuba for more traditional “sol y playa” vacations, but who also participate at least once in activities and attractions related to the natural landscape). These visitors are interested primarily in hiking on nature trails, in bicycle tours, and in observing flora, fauna and the landscape. Most of the ecotourism in Cuba is located in mountainous areas. In addition to the ecotourists, approximately 500,000 nature tourists each year visit at least one natural area during their visit to Cuba.

Of the approximately 60,000 tourists who visited the SCE in 2003, 8,000 participated in environmentally-related tourism activities (diving, bird observation, visits to parks, etc.). Of these 8,000 visitors, the vast majority were nature tourists. One exception to this are the 60 or so ecotourists who visit Cayo Coco and Cayo Paredon Grandes each year to observe migratory birds and other species such as cranes and flamingos. The potential for ecotourism within the SCE is high, given the natural attractions of the area and the large amount of land and sea territory located within protected areas. There are 49 Protected Areas covering 11,640 km² within the SCE, including among others 7 Areas of National Significance, (1 Biosphere Reserve, 3 Faunal refuges, 2 Floristic Management Reserves, and 1 National Park).

3. Geographic Areas for Tourism Related Project Interventions

Tourism development oversight and control: The project will work primarily on Cayo Las Brujas, Cayo Ensenachos, Cayo Santa María (north of Villa Clara province), Cayo Guillermo, Cayo Coco and Cayo Paredón Grande (north of Ciego de Ávila province) to mainstream BD conservation into tourism development. In addition, the project will select a few small cays in the north of Villa Clara province for tourism development control and management as part of the Buenavista Biosphere Reserve demonstration site activities. These cays all are outstanding for their biodiversity, and all face some degree of threat, posed mainly by infrastructure development (existing and potential) and introduction of exotic species. To date, construction of tourism resorts within the SCE have been limited to the cays Coco, Guillermo, Santa María, Las Brujas and Ensenachos, although plans for additional construction have been developed for a number of other cays. Despite some progress in incorporating environmental concerns into tourism infrastructure planning, construction and operation, the development of hotels, roads, and other facilities continues to be highly detrimental to native ecosystems, with poor oversight and no integration of planning across sites (e.g. no strategic impact assessments). The most impacted ecosystems are coastal

xeromorphic shrubs, semideciduous forests and evergreen microphyllous forests, all of which have very high endemism of flora and fauna, and are also very important for the migratory birds.

Ecotourism development: Within the SCE, numerous areas have the potential for successful ecotourism development because of their biodiversity assets, natural attractions, accessibility, etc. Among the sites with ecotourism potential two areas have been selected for implementation of ecotourism development: the Buenavista Biosphere Reserve, which includes the Caguanes National Park, and the Humedales del Norte de Ciego de Avila (see Annex 4, Map 3). These areas were selected for several reasons. First, as detailed below, both areas shelter high levels of globally significant biodiversity. Second, each area has a variety of natural features and attractions that will attract ecotourists. Third, both areas are easily accessible from existing developed tourism areas (the cays of Santa María, Las Brujas, Ensenachos, Guillermo and Coco), so that they can be visited on day trips from the hotels in those areas. Finally, both the National Directorate of Tourism Development, as well as a number of local hotel managers, have stated their strong interest in developing nature-based tourism in these areas.

The Buenavista Biosphere Reserve (BBR), established in 2000, encompasses 3,135 km² of the northern portions of the provinces of Villa Clara, Sancti Spíritus and Ciego de Ávila, and includes both marine and coastal terrestrial ecosystems with high levels of globally significant biodiversity. The BBR has a human population of 25,524 inhabitants, distributed in four towns and six small human settlements. The BBR encompasses 11 protected areas, including, the Caguanes National Park, the Cayo Santa María National Park, the Ecological Reserve Cayo Francés and the Ecological Reserve Cayo Guillermo. The area includes numerous coral reefs, sea-grass beds, mangrove forests, cays, beach dunes and aquatic bird nesting sites (González y Castañeira, 2004)¹⁰. Among the significant terrestrial species residing within the BBR are: the endemic Cuban Crane (*Grus canadensis nesiotis*), which is the southernmost species of its genus, and is threatened at both the global and national levels; the local endemic blue lizard (*Anolis equestris*); and the racer snake (*Antillophis andreaei*). Important marine species within the BBR are the manatee (*Trichechus manatus*); the dolphin (*Tursiops truncatus*), and the American crocodile *Cocodrilus acutus*, all of which are threatened and of regional concern (see Annex 3) for list of species and their conservation status).

A large part of the BBR (between the provinces of Villa Clara and Sancti Spíritus) was declared a RAMSAR Site in 2002. This area, which includes Caguanes National Park, encompasses extensive beaches and dunes, mangrove forests, coastal lagoons and karst areas covered by semideciduous forests and evergreen microphyllous forests. Caguanes National Park (204.87 km²), a well preserved and scenic marine/coastal protected area in the mainland of Sancti Spíritus province (Yaguajay Municipality), is comprised of a group of small cays (Cayo de Piedra, Cayo Caguanes), the marine areas that connect them, and a freshwater coastal swamp. These cays are the only examples of this type of cay in Cuba because of their karst structure, which includes well-developed and generally well-preserved cave ecosystems (the caves are of high archaeological value). Terrestrial flora in the Caguanes National Park includes 24 endemic species, while fauna includes more than 100 endemic taxa. This park hosts one of 8 populations (and one of the 2 populations in the SCE) of the endemic Cuban Crane, and ranks second in terrestrial biodiversity and endemism at the species level within the SCE after Cayo Coco, which is 10 times larger than the land area of Caguanes National Park.

¹⁰ González, A. and M.A. Castañeira (eds.). 2004. *Áreas Protegidas de Cuba*. Centro Nacional de Áreas Protegidas, Ministerio de Ciencia, Tecnología y medio Ambiente. Escandón impresores, Sevilla - España, 112 p.

ANNEX 8: TOURISM SECTOR – PILOT PROJECTS

1. Overview of Proposed Pilot Demonstration Activities

During the course of the PDF-B phase, MINTUR investigated approximately 30 optional products for the diversification of tourism in the Sabana Camaguey Ecosystem (SCE). Six of these products, scuba diving, boat tours, boat visits, hiking and tracking, bird observation and speleological activities, were selected to be developed through pilot demonstration projects during implementation of the proposed project, all of them located in the Buenavista Biosphere Reserve. In addition, fees and taxes on tourism related activities, designed to support long-term financing of biodiversity conservation within the SCE, have been proposed for development and implementation during the project.

2. General Characteristics of the Buenavista Biosphere Reserve

The Buenavista Biosphere Reserve (BBR) is a Multiple Use Protected Area. The BBR includes 10 **core areas**: Caguanes and Cayo Santa María National Parks; Cayo Francés and Cayo Guillermo North Ecological Reserves; Loma la Tasajera and Central and Western Cayo Coco Ecological Reserve (Outstanding Natural Elements); Cayo Santa María Western and Cayo Las Loras Fauna Refuges; the eastern sector of the Jobo Rosado Protected Area; and the watershed sector Boquerones Protected Area. These core areas have more restricted management according to relevant IUCN categories (Faunal Refuge, Ecological Reserve, etc), as they are considered as zones of higher ecologic sensitivity, higher biodiversity and higher genetic funds (more than 20 endemic flora species). The **buffer** zone is constituted by marine and terrestrial areas with different degrees of conservation and the presence of some human activities. In the case of the marine areas, there are many cays with one or more habitats with high degree of conservation. In the terrestrial areas, the remaining zones of the Jobo Rosado and Boquerones Protected Areas are considered buffer zones, as well as a coastal buffer zone of approximately 1 km in width surrounding the core areas of terrestrial and marine zones. The **transition** area of the BBR is the zone devoted to economic activities, such as tourism and its infrastructure, traditional agriculture and cultivation of sugar cane, forest exploitation, and livestock and fisheries activities.

Since the beginning of the 20th century, the sugar cane industry has been an important actor in most areas of the SCE, occupying a great part of the territory. Other lands traditionally were employed for pasture for livestock, and for production of food and wood. Traditional and commercial fisheries have been active historically throughout the entire marine area. In more recent decades, tourism began to develop in the area, and the construction of a number of hotels in the cays took place, following a Master Plan of Tourism Development approved by the environmental authorities. Today, the primary land uses within the BBR are sugar cane plantations, natural pasture, traditional agriculture to produce foods for local consumption, and forestry (for wood production).

The population of the BBR is close to 25,044 inhabitants. The BBR extends across 5 municipalities of 3 provinces of the SCE: Sancti Spíritus (Yaguajay municipality), Villa Clara (Caibarién municipality), and Ciego de Avila (Morón, Chambas and Florencia municipalities). Very significant natural, historical and cultural values are preserved in the area, including an outstanding archaeological heritage (the BBR has one of the highest densities of archaeological sites in Cuba), speleological heritage, as well as floristic, faunistic and landscape values, a unique national geomorphologic formation (Cayos de Piedra), and the highest dunes of the country (Cayo Guillermo). An Ecological Station (Playa Vitoria, Yaguajay Municipality) established during Phase 2 of the GEF project, and the Center of Research of Coastal Ecosystems at Cayo Coco, are located within the BBR.

3. Evaluation of Nature Related Tourism Market in the BBR

Evaluation of the potential for nature related tourism products in the BBR

During the PDF B process, an evaluation of the potential for nature historical, cultural and other tourism products in the BBR was carried out. The basic elements for this evaluation were the following:

- Compilation of surveys of tourists in hotels at Cayo Coco before departure from Cuba
- Interviews of hotel managers (5 managers, in Cayo Coco, 2 managers in Cayo Santa María).
- Information collected in the Ministry of the Tourism (Directorate of Development).
- Information collected in the National Center of Protected Areas
- Exchanges with ecologists, biologists and persons responsible for cultural activities in the three provinces

As a result of these surveys and other activities, the following summary information was compiled:

- 92% of tourists stated that their expectations for their trip had been met;
- 90% of tourists were satisfied with the quality/price ratio;
- 85% of tourists were satisfied with the quality of food served;
- 90% of tourists were satisfied with the recreational and cultural opportunities inside of the hotel complexes;
- Almost 100% of tourists were satisfied with the level of personal security.
- Less than 10% of tourists were satisfied with the availability of activities outside of the hotel complexes, including nature tourism and adventure tourism activities.

Information (based on surveys of departing tourists) that the average tourist leaves Cuba with over US\$200 unspent because of a lack of opportunities (activities, shopping, etc.) would seem to support the notion that a strong market exists for the proposed tourism packages.

Tourist Preferences for Activities

23% of tourists are most interested in nautical activities (in general), 20% in nature tourism, 17% in adventure tourism, 14% in cultural activities and 12% in golf. This implies that only 1 in 5 tourists did not value environmentally related activities as their highest preference.

4. Design and Implementation of Nature Related Tourism Products in the BBR

Design of Tourist Packages

Based on the expressed interest of visitors to the SCE in additional tourism activities, and the preference for nature based activities in the marine environment, the proposed project has designed six Tourist Packages to be implemented as pilot experiences during years 1-2, as well as an ecotourism development strategy to be implemented starting in year 3.

Table 1: Overview of Tourist Packages (Detailed descriptions of the tourist packages are provided in Table 4 at the end)

Package	Tourist Package	Distance among sites, time	Transportation
1	Santa María Cay / Caguanes National Park	Marine tour. 25 nautical miles, 2 hours 15 minutes	Catamarán, capacity up to 70 persons
2	Coco Cay –Guillermo/ Caguanes National Park	Marine tour. 40 nautical miles, 4 hours	Catamarán, capacity up to 70 persons
3	Santa María Cay/ APRM	Terrestrial tour. 110 –130 km., 1	Bus, capacity 40 persons

	Jobo Rosado	hour 30 minutes	
4	Coco Cay- Guillermo /APRM Jobo Rosado	Terrestrial tour. 150 –170 km., 2 hour 30 minutes	Bus, capacity 40 persons
5	Coco Cay -Guillermo/ Yaguajay municipality	Terrestrial tour, 2 hours 30 minutes	Bus, capacity 40 persons
6	Santa María Cay/ Yaguajaymunicipality	Terrestrial tour. 170 km., 1 hour, 30 minutes	Bus, capacity 40 persons

Infrastructure improvements necessary to support tourism in the BBR

In order to develop the proposed tourist packages, additional infrastructure will be required (as noted in Table 2 below). These infrastructure improvements will be paid for by MINTUR.

Table 2: Infrastructure Improvements

No.	Activities	Available Infrastructure	Infrastructure necessary
1	Recreational diving	5 Diving Centers 130 diving sites 24 professional instructors	Available
2	Sport fishing	Catamarans (more than 5) with on-board services	Available
3	Trails, hiking, tours and horse riding	Horses, interpretive trails, interpretive visitor centers	Improved access to sites (e.g. Caguanes National Park) Specialized vehicles Eating facilities
4	Speleological activities	None	Improvement of access to the caves.
5	Bird watching	None	Training to Specialized Guides. Watching tower

Capacity building needs

MINTUR has estimated that the proposed pilot demonstration activities will require the training of approximately 150 guides, each of whom will participate in training courses of 120 to 150 hours. Local inhabitants with intimate knowledge of the local landscape will be sought out for training, as will a smaller number of professionals with expertise related to the proposed activities (biologists, geographers, agricultural experts, etc.). Other capacity building activities will focus on strengthening the system of educating young people in skills relevant to nature related tourism, as well as improving means of communication, computers and specialized transport to support these activities.

Marketing

Discussions and consultations carried out during the PDF-B phase made it clear that the tourism sector currently lacks the capacity to establish an effective marketing strategy for nature-related tourism in Cuba. MINTUR has identified the following areas as ones in which it must strengthen capacity in order to make nature related tourism viable in the country: studies of the international market for nature related tourism, the preferences of visitors to Cuba for nature related activities, and assessment of best practices from other countries for developing nature related tourism; training of tour-operators in nature related tourism marketing strategies and in the products offered by Cuba (and the SCE specifically); the design of promotional materials for nature related tourism products (pamphlets, advertising campaigns, videos,

etc.); the elaboration of specialized guidebooks and other materials for visitors; and the creation of visitor information centers at pilot demonstration sites.

During the project, MINTUR will work closely with the main Cuban tour operators -- Havanatur, Cubatur, Viajes Cubanacan, Gaviotatur, Ecotur and Paradiso -- to increase their participation in nature related tourism promotion. Currently, these entities sell optional activities (e.g. day trips to Havana or other cities, adventure trips, etc.) that supplement hotel tour packages both through offices in foreign countries (e.g. Italy, Spain, Germany, Canada), as well as in sales bureaus located within the resort hotels in Cuba. Each of these entities has its own products and specialization (for example, Ecotur specializes in nature tourism, while Paradiso specializes in cultural tourism).

The resort hotels located within the SCE are also expected to be strong partners in developing nature related tourism activities for their guests. Surveys of hotel managers have demonstrated that the all-inclusive hotels (the majority of the hotels in the SCE) are eager to have guests spend as much time out of the hotels as possible because of the high costs of feeding and entertaining guests. They also believe that their guests are eager for additional activities such as nature related tourism.

5. Development and Application of Fees and Taxes for Nature Related Tourism Activities

The planning and control mechanisms of Cuba's economy are highly centralized, and revenues from the tourism sector, together with those coming from all other economic sectors, are reverted to the national budget for the socioeconomic development of the country. However, the level of investment necessary for resource management and conservation, including biodiversity conservation, is decided at the local level by each sector in accordance with its Master Plans for each local area. Furthermore, the legal and institutional framework in Cuba does support implementation of systems of revenue control and redistribution towards investments at the local level dedicated to biodiversity conservation. Within this framework, appropriately designed taxes for the use of environmental goods and services can be implemented that contribute to the financial sustainability of biodiversity conservation.

As a complement to the development of nature related tourism packages in the BBR, the proposed GEF project also will carry out experimental work, in cooperation with selected hotels in Coco and Santa María cays, in applying taxes and user fees for conservation to visitors and tour operators participating in selected nature related tourism activities (see Table 3 below). Over 2 years, the project will evaluate potential taxes and fees and the willingness to pay of visitors and tourism operations, and based on this, establish and implement mechanisms for collecting and managing/distributing monies collected. The project will also propose rules for the distribution of these sums, to be split between tourism sector participants, resource management and conservation agencies, and the Integrated Coastal Management Authority (ICMA). MINTUR estimates that with the application of these taxes, an annual income of approximately US\$250,000 can be obtained, depending on the actual number of people interested in these activities in the SCE. Following is a summary of potential taxes to be developed and applied:

Table 3: Tourism taxes to support the conservation of marine and terrestrial biodiversity (estimated)

Tourist Activity	Value to be established	Potential income/year	Possible destination of financial resources
Recreational diving	US\$2/dive	US\$10-20,000	Protection of marine bottoms in the SCE through monitoring.
Sport fishing	US\$5/boat departure	US\$2,500	

Trails, hiking, tours and horse riding	US\$1/tourist	US\$40,000	Reforestation in sectors of the SCE that contribute to the conservation of coastal ecosystems.
Hotel stays	US\$1/tourist	US\$130,000	Beach maintenance and recovery.
Car rent	US\$1/vehicle/day	US\$10,000	Reforestation in sectors of the SCE that contribute to the conservation of coastal ecosystems.

6. Economic Analysis of Pilot Demonstration Projects

Approximately 96,000 tourists visited the SCE in 2004. From the results of the surveys carried out during the PDF-B process, it is known that 23% of the sun and beach tourists who visit the SCE for a minimum of 7 days have requested access to additional nature-related activities. Of the 23% (22,080 tourists) interested in additional activities, if only 60% (13,248) actually participate in the hiking, horse riding and other activities, and estimating an average tax paid of US\$3, the annual income from these taxes would be around US\$40,000. An additional US\$130,000 would be generated by the US\$1 tourist payment for staying in hotels (based on an estimate of 130,000 visitors in 2006). Finally, the potential direct income from diving and fishing activities is approximately US\$22,000/year, based on an estimated 11,000 dives/year and a tax of US\$2/dive (a tax of \$2 is reasonable given that the average cost of participation in nautical activities ranged from US\$35 for each recreational dive to US\$59 for boat tours).

7. Replication of Pilot Demonstration Project in the Gran Humedal del Norte de Ciego de Avila

The results of the pilot demonstration project in Buena Vista Biosphere Reserve will be assessed in terms of differentiated tourism product, marketing strategies, implementation of tours and other activities, and the viability of the financial instruments created to generate funds for biodiversity conservation. Once obtained, these results will be replicated in the Managed Resource Protected Area "Great Wetland of the North of the Province of Ciego de Avila". The Great Wetland area was selected as a site for replication because of its natural and cultural assets, many of which are in close proximity to the existing tourism infrastructure on Coco and Guillermo cays. Additionally, this site possesses characteristics (geomorphology, landscapes, biota, culture, history and traditions) that are different from those of the Buena Vista Biosphere Reserve, thereby reducing the risk of commercial competition between the two areas.

In order to ensure that replication can begin quickly and effectively, training of protected areas and tourism sector personnel at both the BBR and the Great Wetland sites will actually commence at the beginning of the project, before the results of the pilot demonstration are available. This will allow for additional time to identify and design different tourism products at the Great Wetland site, so that implementation can begin quickly during the third year of the project execution.

Table 4: Detailed Description of Tourist Packages

Name	(1) Cayo Santa María/ Caguanes National Park	(2) Cayos Coco- Guillermo/ Caguanes	(3) Cayo Santa María/ PA Jobo Rosado	(4) Cayo Coco - Guillermo/ PA Jobo	(5) Cayo Coco- Guillermo/ Yaguajay	(6) Cayo Santa María/ Yaguajay

	National Park	Rosado	Municipality	Municipality
Activities	Nautical Tour- lodging at “ San José del Lago” Hotel - Visit to Cayo Caguanes	Tours along the trails of the Protected Area	Different tours in the municipality	
Principal Assets	<p>Caguanes NP occupies the north part of Yaguajay municipality, in Sancti Spíritus province. It is integrated by Caguanes peninsula - cay, which gives its name to the Park, ten small cays called Cayos de Piedra, and Guayaberas Swamp. Its surface covers 22,650 ha (587 ha of them correspond to the cays, 3,850 ha of mainland and 17,303 ha of maritime area). It constitutes the core area of Buenavista Biosphere Reserve. Caguanes wetlands are part of Buenavista Ramsar Site.</p> <p>-Observation of Buenavista Bay (Cayos de Piedra: Palma, Caguanes del Obispo, La Ermita, the cave, Ají Grande, Ají Chico, Fábrica, Salinas, Lucas and La Aguada).</p> <p>-Trekking in Caguanes for the observation of flora and fauna, and visits to the caves in Cayo Caguanes*</p>	<p>- The Protected Area of Managed Resources Jobo Rosado is located in Yaguajay municipality and possesses high biodiversity values.</p> <p>- Observation of the site’s typical vegetation, waterfalls, streams and fauna (especially terrestrial birds).</p> <p>- Félix Torres’s guerrilla camp in Jobo Rosado (Local Monument)</p>	<p>Yaguajay municipality, to the north of Sancti Spíritus province, has an area of 1,032 km². In its southern part there is a relief of heights and karstic valleys with attractive landscape contrasts, with caves, rivers running through the mountains, historical places and rural landscapes. The area is representative for its typical songs and dances, traditional handicrafts and popular legends. The sugar cane industry was developed in the northern plains, where today there is the only sugar mill that produces sugar and honey in all the northern coasts of Villa Clara, Sancti Spíritus and Ciego de Ávila provinces.</p> <p>The Museum of aborigine archaeology and several buildings of architectural interest stand out.</p>	

* **More detailed information about the Packages 1-2:** Among the most significant natural values that Caguanes National Park presents are the following:

- **Speleological Values:** The caves of the area are of phreatic origin and they conform a unique typology for this sector, denominated “Caves of the Caguanes type”, thus the name of the Park. Speleological formations stand out in the area, such as the *fungiforms*, *columns*, *elliptic*, *cave pearls*, and others. It is estimated a total of 79 caves, 36 of which are in Caguanes karstic hill.
- **Floristic Values:** In the area there are 13 vegetal formations, with more than 200 species inventoried so far that represent 145 genera and 64 families, 24 of them are endemic, for a 12 % endemism. The most representative formations in the study area include:
 - Mangrove swamp (4 mangrove varieties)
 - Semideciduous forest on limestone.
 - Xeromorphic coastal shrub.
 - Vegetation of rocky coast.
 - Vegetation on karst.

- **Fauna Values:** More than 200 species have been identified in the area, representing 70 genera and 50 families. An important representation of bat species is reported in the caves, including the biggest colony of fishing bats existing in the island and a colony of the butterfly bat, with a number estimated between 80 000 and 100 000 specimens, located in the cave Tres Dolinas.
- **Endemism**
 For the whole area, 86 endemic species and subspecies are registered. Of the total of endemic species, 20 are molluscs, 4 arachnids, 11 insects, 4 crustacean, 4 amphibians, 17 reptiles, 21 birds and 5 mammals. Of them, 52 are pan-Cuban, 8 are distributed along the Central-Western Cuba; 5 in Central-Eastern Cuba; 8 in Central Cuba, 1 in Central-Eastern Cuba; 4 are endemic of Sancti Spiritus province, 3 regional and 5 local among which there are: *Opistosiphon insulanon* and *Torrecoptis parvula*, in Cayo Aguada, *Opistosiphon insulanon scopulorum* in Cayo Salinas, *Opistosiphon caguanense*, so far present only in Cayo Caguanes and recently also collected in Cayo Palma, *Opistosiphon detectum lucasense*, distributed from Lucas to Ajcico. In the area, it is observed the presence of high rates of current and potential use of its fauna, what enhances its importance: 266 species are useful from the ecological point of view, 137 species are charismatic, 23 species have ornamental value, 13 species with cynegetic value, 21 species of medicinal interest, 20 species can be used for feeding, 2 in the elaboration of footwear, 6 species can be used as laboratory material.
- **Landscape Values:** They are represented by the geomorphologic formations of the area where the Cayos de Piedra stand out, unique formation of their type in the country with abrasive natural arches, tide niches, coastal cliffs, etc., supplemented by the predominant types of vegetation, all that in a marine and coastal environment.
- **Important Areas:** Areas for the reproduction, spawning and development of marine and/or terrestrial species of high economic and ecological value.
- **Archaeological Patrimony:** The area is one of the more densely populated by archaeological places in the whole national territory with more than 35 sites, representative of all the categories established in Cuba. Most of these sites are in caves.

ANNEX 9: SECTOR ASSESSMENT- FISHING

1. Overview of Fisheries Sector in Cuba

Fishing is the fourth largest economic sector in Cuba, with production reaching close to 50,000 tons in 2004, with an approximate value of US\$100 million. Primary fishing resources include lobster, lane snapper, mutton snapper, groupers, jacks, grunts, rays, commercial sponges, blue crabs, and queen conch.

The Ministry of Fishing Industry (MIP) in Cuba is vertically integrated to incorporate all aspects of fish capture, processing and distribution. The cycle begins with the capture of different species, their industrial processing, the transfer of the products to refrigeration, and the final sale to their different clients. Fish products are sold to export markets, and also distributed within Cuba by means of the monthly basic distribution of food in the country for all of the population.

Extractive activity is carried out by Provincial Enterprises and their Units. These entities are in charge of marine catch, aquaculture production and shrimp culture production. The institutional framework is organized in Enterprise Groups, which are directly subordinated to the ministry (e.g. PESCACUBA, INDIPES, GEDECAM, ARGUS, PESPORT), as well as Independent Companies (e.g. Enserva, Sepromip, Telemar, Pescavante, Uca, and Atlas). Several Basic Fishing Units are distributed on the Cuban marine shelf, which include fish and lobster gathering centers (built on platforms at sea), from which catches are taken to the mainland.

The fisheries sector has a network of enterprises, of different complexity and production capacities, with responsibility for processing, packing and freezing (if necessary) fisheries products. By means of a system of refrigerated transportation, fisheries products are transferred to Havana, from where most export products are shipped. The construction and repair of ships, within a network of shipyards found throughout the country, are also the responsibility of the MIP.

The payment system established by the MIP promotes production increases. Salaries for fishermen (in domestic currency) are based on the value of the catch obtained by each ship (calculated in function of an Official List of Prices, specific for each species). In addition, 20% of total payments is paid to each fisherman in foreign currencies (based on the total weight of the catch). Fishermen have the autonomy to carry out fishing according to their own strategies, and instead of returning to port on a daily basis, they transfer their catches to transport ships which go to the different fishing areas to transfer the capture to the processing facilities.

The institutional management structure for the fisheries sector has numerous components. Within the Ministry of Fisheries (MIP), the Superior Institute of Fishing trains technicians and specialists, the Center of Fishing Research (CIP) is devoted to scientific research that supports the development of the sector, and the National Center is in charge of providing information and analysis to decision makers.

The legal framework for fisheries includes a system of Fishing Regulations exists for the conservation and management of the fisheries resources and its habitat. Law 164 "Regulation of the Fisheries", promulgated in 1996, is the basis for all of the regulations. New regulations and policies are discussed and approved in the Consultative Commission of Fishing of the MIP, which was established under Law 164 to regulate the following: catch levels, fishing effort, use of fishing gear, fishing methods, protection of breeding and reproductive areas and other measures to protect marine habitats (including a prohibition on the use of explosives), management of funds, restrictions on run off of polluted waters, and regulation of landings (minimum legal sizes, prohibition on capture of toxic species, etc.). These and other regulations are enacted by means of resolutions published in the Official Gazette of Cuba, and are

enforced by the Inspectors of the National Office of Fishing Inspection, which has a network of offices throughout the country. (*see end of document for list of other relevant fisheries laws and regulations*)

Several categories of protected zones exist for the conservation of fisheries resources and marine biodiversity, the most important of which are Fishery Reserves and Marine Protected Areas. Fishery Reserves, managed by the MIP, are designed to support fish stock recovery as well as sustained management. Marine Protected Areas, managed by the National System of Protected Areas (CNAP), are designed primarily to protect priority ecosystems and species (e.g. manatees, flamingos), and frequently impose limitations on productive activities.

Fishery Reserves are generally large areas, which might encompass several no-take areas (usually about 20% of the Fishery Reserve), as well as other waters that are part of the reserve but are not no-take areas. Within these latter areas, there would be restrictions on fishing practices, times, and equipment, and generally more regulation and enforcement than in other parts of the ocean. Within the No-Take Areas, which are focused on protected fish spawning and nursery sites, there would be no fishing allowed at all. There are several Fishery Reserves in Cuba already, but none in the SCE.

2. Fisheries in the Sabana-Camaguey Ecosystem (SCE)

Status of Fisheries in the SCE

The marine shelf of the Archipelago Sabana-Camaguey is the second most important fishing area of Cuba, accounting for 20% of total national catches (35% of finfish and 15% of lobster) (Cruz-Izquierdo *et al.*, 1987¹¹; Claro *et al.*, 1994¹²). Fishing employs approximately 3,300 persons in the SCE, of whom 21% are women.

The current focus of development of the fishing sector in the SCE is based on promoting the recovery of the valuable but declining fishing resources in the area. The program includes policy, legal and institutional support for new regulations and restrictions on fishing effort and other activities affecting fish stocks and marine ecosystems, and the development of alternative fisheries production practices to reduce pressure on fishing resources of high value. At present, MIP is implementing new restrictions on fishing gears, including a prohibition on set nets (tranques) and the gradual reduction of the employment of bottom trawlers (chinchorros), in order to protect fish spawning patterns, the survival of small individuals, and the conservation of the marine bottom. These prohibitions are expected to affect more than 250 fishermen, and MIP is required by law to offer these persons new employment sources or to provide them continued wages until they find new employment.

In 2004, the Ministry of Fisheries (MIP) banned fishing using set nets (tranques), and began implementing a gradual removal (25% reduction per year, with total phase-out in 2007) of bottom trawling (chinchorros) in Cuba. By eliminating bottom trawling, approximately 37 fishing vessels will be retired in the SCE. In addition, MIP will reduce commercial fishing quotas over the next several years, which will eliminate another 99 fishing vessels in the SCE. For fishermen whose boats are retired, salaries will be guaranteed until they find new employment, and during this time they will all receive job training and assistance in finding new employment. The decision by MIP to reduce and restrict fishing effort within the SCE presents an opportunity to develop more sustainable fishery practices, such as sponge aquaculture, blue crab cultivation, and fishing with artificial devices (FADs), which will offer

¹¹ Cruz-Izquierdo, R., J.A. Baisre-álvarez, E. Díaz-Iglesias, R. Brito-Pérez, C. García-Díaz, W. Blanco-Aviés and C. Carrodegua-Rodríguez. 1987. *Atlas biológico-pesquero de la langosta en el Archipiélago Cubano*. Ministerio de la Industria Pesquera

¹² Claro, R., y J.P. García-Arteaga (1994): Estructura de las comunidades de peces en los arrecifes del grupo insular Sabana-Camaguey, Cuba. *Revista de Oceanología y Ecología Tropical Avicennia*, 2:83-107.

employment to laid off fishermen while simultaneously reducing pressure on marine/coastal natural resources. Pilot demonstrations of these sustainable practices will take place in the Municipality of Caibarién, which is the primary fishing port within the SCE.

Sectoral Structure

The fishing sector in the SCE is structured in two differentiated systems -- State and Private.

a. State System: Four Companies belong to the Enterprise Group PESCACUBA, which is active in 4 of the 5 provinces of the SCE: Matanzas (EPIMAT, in the municipalities of Cárdenas and Matanzas), Villa Clara (EPICAI, in the communities of Panchita, Carahatas, Isabela, and the municipality of Caibarién), Ciego de Avila (EPIVILA, in the communities of Turiguanó and Punta Alegre) and Camaguey (EPISUR, in the municipality of Nuevitas). The total number of workers for PESCACUBA within the SCE is as follows:

WORKERS	EPIMAT	EPICAI	EPIVILA	EPISUR	Total
Fishermen	35	600	130	110	875
Indirect Workers	200	639	300	200	1339
TOTAL	235	1239	430	310	2214
Women	60	223	90	90	463

The fishing fleet of the state system active within the SCE is composed of 221 ships. Of these, 50 ships are dedicated to the lobster fishery, 99 to the finfish fishery, 5 to the mussel fishery, 12 to the crab fishery, 7 to the sponge fishery, 9 to the tuna fishery, 2 to the turtle fishery, and 37 are bottom trawlers. The number of boats devoted to different fishery resources is as follows:

SPECIES	Boats
Lobster	50
Finfish	99
Mixed (bottom trawl)	37
Oyster (mangrove oyster)	5
Blue crabs	12
Sponges	7
Tuna	9
Turtles	2
TOTAL	221

b. Private System: Private fishermen are allowed to exploit the fishing resources in Cuba within a specifically defined and controlled relationship with MIP. In addition, legally licensed sport fishermen have proliferated significantly in the SCE, although sport fishing is considered “irregular” and is occasionally restricted. The quantity of these fishermen is given in the following table:

Province	Sport fishermen	Private fishermen
Matanzas	600	
Villa Clara	300	45
Ciego	40	
Camaguey	120	
TOTAL	1060	45

Catch Levels

Within the SCE, there are substantial catch levels for fish species, mainly snappers, which are for local and national consumption, as well as for the tourist industry that contributes important revenues in foreign currencies for the country. Lobster catches are also important in the area, although these are dedicated mainly to exports and to the tourist industry. Other species, such as mussel, crabs and conch, have been captured traditionally in the region. Sponges, after declining market rates, have recovered well and have the potential to become a significant source of local income. Catch levels (in tons) of lobster and finfish during the past 5 years are shown as follows:

Year	EPIMAT		EPICAI		EPIVILA		EPISUR		TOTAL	
	Lobster	Finfish	Lobster	Finfish	Lobster	Finfish	Lobster	Finfish	Lobster	Finfish
00	214	466	1033	1966	72	1187	10	450	1329	4069
01	105	190	897	2024	51	1413	9	450	1062	4077
02	90	142	1049	1956	50	949	10	482	1199	3529
03	74	129	726	1406	30	970	9	433	839	2938
04	56	150	754	1223	25	772	8	321	843	2466

As this table demonstrates, there has been a steady decrease in fish catches during the past five years, caused by over harvesting and the use of aggressive fishing gears damaging to critical fish habitat (especially breeding and spawning grounds).

Regulations and Controls

A range of regulatory measures are applied to the fishing sector within the SCE, linked to each specific resource and to the protection of the ecosystem, by means of the Provincial Office of Inspection and the Safety and Protection Agency (both within the MIP). Nevertheless, it is considered necessary to improve and invigorate the entire regulatory activity of control, surveillance and protection. As a result of numerous investigations in the area, since 2004 the use of set nets (tranques) has been eliminated, and the use of bottom trawls (chinchorros) has been greatly reduced (in the finfishing sector). These measures protect spawning areas and the development of juveniles.

In the past decade, the MIP has made efforts and investments to improve the fisheries in the SCE including: improving working conditions for fishermen; upgrading the fishing fleet; introducing new strategies and practices in fishing operations; reducing the use of aggressive and unsustainable extractive practices; guaranteeing the conservation of resources through the enactment and application of fishing regulations; and creating spawning areas to promote the breeding and recruitment of commercial species. In spite of this, barriers to the conservation of biodiversity and the long term sustainability of the fishing resources still persist (see Threats Analysis for details).

3. List of important fisheries laws and regulations

- Decree-Law No. 164/1996 on “Fishery Regulations” (Decreto- Ley No. 164/1996 “Reglamento de Pesca”): Defines MIP (Ministry of Fisheries Industry) in charge of direct, control and implement State Policy on research, conservation, extraction, culture, processing and marketing.

- Fisheries Consultative Commission (Comisión Consultiva de Pesca del MIP): Declared by the former Decree-Law, Establishes regulation agreements on capture quotas, fishing effort, construction and use of fishing gears, fishing practices, and fishing conservation areas (conservation needs; nursery, recruitment and reproduction areas, areas for tourist activities); environmental protection measures (ban of explosives

and poisons in fisheries, bottom protection, waste-water pouring); and landing regulations (minimal sizes, ban of toxic species landing, close season banned species).

- Sectoral Resolutions (published in the Gaceta Oficial): Official agreed regulations.

- Decree-Law of “Fishing and Fishery Inspection Corps”. Creates the corps responsible for enforcement of the fisheries legal framework.

- Inspection Corp of the National Office of Fishery Inspection (Cuerpo de Inspectores de la Oficina Nacional de Inspección Pesquera): Belongs to MIP. It was created by the former Decree Law, enforces the legal and resolution framework. This corps is represented at all the provinces by offices.

- Resolution No. 31/1999 del MIP on Declaration as Zone Under Special Regime of Use and Protection of Marine Waters (Resolución No. 31/1999 del MIP sobre la Declaración como Zona Bajo Régimen Especial de Uso y Protección de las Aguas Marítimas): Declares no-take areas.

- Joint Resolution of MIP-CITMA No. 1/97 (Resolución Conjunta MIP-CITMA No. 1/97): Establishes important regulations for the protection and sustainable use of coral reefs.

- Resolution 058/2004 Ban of deployment of Set Nets (Resolución 058/2004 Prohibición del calado de tranques): Bans of deployment of set nets.

- Decreto 63/09: Prohibits hunting of manatees.

4. Geographic Areas for Fisheries Related Project Interventions

Establishment of no-take areas: No-take areas will be proposed and approved during the project, based on the results of relevant assessments of marine ecosystems and fisheries stock conditions. As noted in the project logical framework, the total size of the eventual no-take area is estimated at 90,000 ha, based on UNESCO guidelines of 12% of total fishing area

Ban on bottom trawl fishing: Several areas, including seagrass beds currently affected by bottom trawling at Isabela de Sagua, Bahía Remedios, Bahía Buenavista (north of Villa Clara province) and Nuevitas (northeast of Camaguey province), will be monitored to assess the ecosystem impacts of the gradual elimination of bottom trawling. These areas were selected for their close marine proximity to existing monitoring laboratories and research centers, and to coastal towns from where monitoring activities will be carried out. The sites are all within a relatively small area of the SCE and thus will be cost effective for project implementation, with the exception of the Nuevitas site, which was selected because of the excellent baseline information available for the site, and the existence of a nearby research center and monitoring laboratory (Cayo Sabinal) (see Annex 4, Map 5 for bottom trawling and set net areas)

ANNEX 10: PILOT PROJECTS - FISHERIES

PILOT PROJECT 1: Molted Blue Crab production in Caibarién Bay (Villa Clara province)

Overview Information

With the logistical collaboration of the Fishery Research Center (Centro de Investigaciones Pesqueras - CIP) of the Ministry of the Fishery Industry of Cuba, and the Caibarién Fishing Enterprise (EPC), a pilot system for molted blue crab production will be implemented in two locales: 1) terrestrial production systems with open-circulation in localities proposed by the CIP and the EPC; and 2) existing lobster-storing center modified into a molted blue crab production center.

This relatively simple cultivation practice has an excellent potential as a sustainable income source for fishermen. Blue crabs that are nearing the molting period are separated from other crabs, and kept in special tanks until they have molted. Once they have molted, the crabs are harvested. The practice is environmentally sustainable, as crabs in the molting period stop feeding and thus inputs and wastes are minimal. Once harvested, molted blue crabs have a significant economic value (US\$16,000/ton), superior to crabs caught in the wild due to an increasing demand in the international market.

Blue crab production will take place in the town of Caibarién, where crabs are plentiful and where many fishermen likely to be affected by the bans on aggressive fishing practices reside. Landing takes place and were many fishermen affected by ban of aggressive practices live. The production will be tested in a pilot plant during years 2006-2008. The other places to a possible replication will be the towns of Punta Alegre and Nuevitas to the East of Caibarién in the provinces of Ciego de Avila and Camaguey. These replication areas were selected because they are close to fishing villages and close to the areas where fishermen currently use fishing practices that will be eliminated during the project. Replication could also potentially take place on the south coast of Cuba.

Market situation

In Cuba, the blue crab fishery represents 1.4% of the total annual catch in value. Lobster, on the other hand, account for 17% of the catch in value, despite being much less abundant. This discrepancy is due to the high demand for lobster and attractive prices at international level. Within this context, the production of molted blue crab (genus *Callinectes*), starting from organisms extracted from the natural environment, is foreseen as a feasible aquaculture alternative to grant to this fishing resource a higher added value than it possesses at present.

Examples of this kind of process exist in the Gulf of Mexico, in the coastal U.S. and on the coasts of Veracruz, Tabasco and Campeche, where molted blue crab production is a successful activity that uses *Callinectes sapidus* as basis organism. This activity was initiated over a hundred years ago in the U.S.A., while the first farms in the Mexican coast date back to the 1970's. It is through the experience accumulated for so many years that it has been possible to fine tune the techniques used today with *Callinectes sapidus*.

The project will sign export agreements through PESCACUBA Enterprise Group and CARIBEX Enterprise, both belonging to the Ministry of the Fishery Industry.

Objectives

General Objective

- Develop a pilot system, using existing technologies, for molted (soft) blue crab production in Caibarién Bay, Villa Clara province, as an alternative fisheries production and employment activity, to reduce pressure on species of global significance and high commercial value and for the sustainable management of the crab resource

Specific Objectives

- Train fishermen and other participants in the production system in the necessary skills to establish production of molted blue crab, including crab morphology, the recognition of the molting patterns, final processing procedures, and distribution and marketing
- Validate the economic feasibility of the pilot production system.

Reduction of threats to biodiversity as a result of the project activities and their replication

- The economic alternative diminishes the stress on traditional resources and of high commercial value such as: lobster, crab, oysters, finfish, etc.
- This productive alternative does not use extraction arts that damage the marine ecology and the reef ecosystems.
- The technology does not generate pollution or negative impacts on the other species.
- It provides employment to fishermen unemployed due to the prohibitions for traditional species, decrease in the catches, prohibition of use of certain fishing arts, and deterioration of the vessels.
- It also generates new employment all year round and a subsistence alternative for the fishing communities in the SCE.

Economic feasibility of the project***Initial Investment***

The technology proposed for this productive alternative is a terrestrial system with open circulation. The necessary initial investment for this system is the following:

Item	Cost per Unit (US)	Units	Total Cost
Tubs of 2.40*0.90*0.30 m	6	803,27	4,819.62
Hydraulic components (plastic tank, pipes, hydraulic pump, unions, pipe elbows, stopcocks, etc.)	-	-	3,403.50
Electric components	-	-	328.93
Wood	4 m ³	325	1,300.00
Paint	2 buckets	50.00	100.00
Plastic boots	8	7.25	60.00
Ultraviolet lamp and bulbs of 40-watts	-	1064.00	1488.00
Sand filter	1	500.00	500.00
Other (valves and other accessories)	-	-	500.00
Power Generator	1	2,500	2,500.00
Total (Initial Investment)			14,999.75

Operating costs

The costs of operation for this system are basically the salary expenses for 4 operators, raw materials, maintenance and fuel:

Description	Total
Salary (4 operators)	12,000
Maintenance	480
Raw material	1,440
Fuel	1,080
Total Operation Costs (OC p)	15,000
Total Cost, CT (includes investment cost)	30,000

Yields and Potential Revenues (Total Revenues)

The yields of this productive alternative are based on the productivity of the three tanks during the season.

2 batteries of three tanks each: Each battery produces 30 dozens of molted blue crab a week. Each battery produces 120 dozens of molted blue crab a month. Each battery produces 1440 dozens of molted blue crab a year. Annual production of the two batteries 2880 dozens of molted blue crab.
Total Revenues (TR): $2,880 \times \text{USD } \\$15/\text{dozen} = \text{USD } \\$ 43,200.00$

Summary Economic Assessment

This economic activity has an international market that can generate foreign currencies that contribute to the national economy. However, it is important to make a financial assessment to determine the economic feasibility of this productive alternative:

NP = TR - TC	US\$13,200
Profitability = TR /TC	1.43
PR = Total Investment /NP	0.53 years

NP = Net profits

Total revenues (TR) = Total Revenues

Total cost (TC) = Initial Investment + Operating Cost

Profitability (P) = TR/TC

Period of Recovery (PR) = Cost of Investment /Annual average cash flow

(Annual average cash flow: Total Revenues - Total Operation Expenses)

Term of Investment Recovery (PBP):

Annual average cash flow = TR - COp = \$43,200 - \$15,000 = \$28,200.

PBP = 15,000 / 28,200 = 0.53 years ~ 6 and a half months.

PBP = 6 and a half months.

PILOT PROJECT 2: Sponge Cultivation (Caibarién Municipality, Villa Clara Province)

Overview Information

Sponge cultivation is an ecologically responsible practice, consisting in inserting fragments of commercial sponges along horizontally suspended nylon lines. During the first culture cycle the sponge fragments are taken from natural sponge populations, but in the following cycles an increasing amount of sponge fragments are taken from the cultured sponges. This activity does not generate pollution, and it is a comparatively economically attractive fishing activity. Commercial sponges are prized in the market (40.0 usd/kg), and cultured sponges (*Hippospongia lachne*) have a significant aggregated value, reaching a mean value of 53.5 usd/kg. Commercial sponge cultivation has been attempted in the south of Cuba, which will provide useful lessons learned for this activity (although environmental conditions will be different).

The experience will take place in Caibarién Municipality (Villa Clara Province), and will be tested during years 2005-2009. A pilot demonstration will be initiated on a 1 hectare plot to observe the progress of the culture growth, and to determine the technical and economic feasibility of this production alternative, with the expectation of expanding the culture area beginning in year 2 of the project (this will be a 5-year pilot experience). The technology proposed for the farm uses in its first implementation phase minimum-size sponges from the natural environment (cut in pieces that later on become mature sponges). From each original sponge, 6-9 pieces are used in the farm and 4-6 pieces are released to the natural environment.

There is the potential replication during the project at other sites within the SCE, specifically in an area east of Puerto de Sagua and on the southern part of Cayo Fraguoso. These replication areas were selected because, apart of being habitats with clear and productive waters as required by sponges of genera *Spongia* and *Hippospongia*, are close to fishing villages and close to the areas where fishermen currently use fishing practices that will be eliminated during the project.

Market Situation

There is an unsatisfied market for sponge, whose main uses are the production of cosmetics, medicines, handicrafts and ornamental uses. According to official data from PESCACUBA Enterprise Group and Caribex Enterprise, catches and exports have continuously increased in the last decade (in 2002, 42.2 tons were captured and 34.6 tons were exported). However, in the last 2 years, the catch has diminished and, in consequence, so has the export (in 2004, 33.5 tons were captured and hardly 27.4 tons were exported). This decrease is justified mainly because of the overexploitation of the resource and not for the reduction in the demand. Thus, if it is possible to increase production through farms, there exists a market willing to buy these products.

Commercial sponges are prized in the world market from \$40 to \$150/kg depending on the species while Cuban species from fisheries have a price ranging from \$10 to \$60/kg. The practice of sponge culture has been preliminarily assayed in the south of Cuba but need to be tested and adapted in the SCE different environment.

The project will sign export agreements through PESCACUBA Enterprise Group and CARIBEX Enterprise, both belonging to the Ministry of the Fishery Industry.

Socio-economic Impacts

Sponge culture is an ecologically responsible practice. This activity does not generate pollution (sponges do not require feed or fertilizer), and is comparatively attractive fishing activity. Sites of the SCE selected for further replication during the project are east of Puerto de Sagua and south of Cayo Santa María. These replication areas were selected because, apart from being habitats with clear and productive waters as required by sponges of genera *Spongia* and *Hippospongia*, they are close to fishing villages and to the areas where fishermen are likely to lose traditional employment with the advent of new fishing restrictions.

Objectives of the Project

- Reduce the stress on species of global significance and high commercial value on the part of fishing communities in the SCE, starting from the development of other alternatives of environmentally sustainable subsistence.
- Generate revenues for the fishing communities, with distribution of benefits among those depending on the resources for the investment in biodiversity conservation measures.
- Increase the community awareness on the biodiversity values of global significance in the SCE, and the understanding by the fishery sector of the need to contribute part of the revenues generated by the artificial breeding of sponges to the financial sustainability of the conservation of these values, by means of appropriate economic mechanisms.
- Reduction of threats to biodiversity conservation as a result of the project activities and their replication.
- Reduces stress on species of global significance and high commercial value.
- Recovers the natural areas from where sponges are presently extracted and in any way, 25% of the commercial production is equally disposed in the natural environment.
- In the first 2 years, the execution of the project will benefit near 40 families that will depend directly on the potential revenues of this activity.

Economic feasibility of the project

Initial Investment

The initial investment mainly consists of the acquisition of a 7-meter vessel and two boats that allow for the monitoring of daily activities in the farm. Likewise, prior to beginning the operations it is necessary to provide the workers with certain equipment and materials.

Description	US \$
Purchase of a 7m vessel	12,000
Acquisition of materials	6,000
Acquisition of 2 boats	1,200
TOTAL	19,200

Operating costs

Once the farm has been installed, the main operation costs are salary expenses for the permanent staff (4 - 6 fixed workers) and the fuel expenses to supervise the daily activities.

These costs have been calculated for two years, being this the necessary period for sponges to reach the minimum size required to be harvested and marketed.

Description	US \$
Staff - salaries	1,000
Fuel	3,000
TOTAL/year	4,000
Total harvest period (2 years)	8,000

Yields and Potential Revenues

A hectare produces an average of 1.1 tons of sponges during an approximate 2-year period and the market price oscillates between \$ 40 and \$ 150 per kilogram. For this analysis a conservative price of \$ 45/kg is assumed.

Description	Units
Harvest (Kg/Ha)	1,100
Harvest (Kg/Ha) minus 25% devoted to repopulating	825
Market Price \$/kg	45
TOTAL	37,125

Summary Economic Assessment

NP = TR - TC	9,925
Profitability = TR/TC	1.36
PR = Total Investment/NP	1.93

NP = Net Profits

Total Revenues (TR) = Total Revenues

Total Cost (TC) = Initial Investment + Operative Cost

Profitability (P) = TR /TC

Recovery Period (RP) = Total Investment /NP

The activity of sponge culture is evaluated financially with three main indicators: Net Profits, Profitability and Investment Recovery Period. It may be observe that even when 25% of the harvest is dedicated to the genetic bank (to repopulate the natural areas), the sale of the first harvest will be enough to cover the initial investment and the operation costs. The Net Profits after the first harvest are positive and reach approximately \$9,925, with a profitability of 36%. Under these conditions, the investment is recovered approximately in the second year, coinciding with the harvest period when, once sold the first harvest, it covers not only the investment but also the operative expenses incurred during the growth period of the sponge.

PILOT PROJECT 3: Fish Aggregating Devices (FADs) (Villa Clara province)

Overview Information

Floating aggregating devices present an opportunity to increase the size of fisheries stocks within the SCE without detriment to coastal and marine ecosystems. The project will test the potential for converting fishing effort on overfished demersal resources into fishing effort on medium-sized pelagics, using systems of FADs installed offshore from ports close on the outer shelf. This could provide income both to commercial trawlers, and to coastal communities who may be encouraged to provide day trips to sport fishermen/tourists. FADs are floating structures deployed in the open sea to attract and catch fish. The use of FADs is considered one of the most sustainable alternative fishery practices for several reasons. First, FADs have no affect on bottom habitats because they are used in deep-water areas. Second, the use of FADs does not require bait, thus benefiting species commonly overharvested for use as bait, such as the Queen Conch *Strombus gigas* (an endangered mollusk).

The project will take place in the north of Villa Clara Province. Additional sites within the SCE for replication during the project are near La Panchita - Isabela. These replication areas were selected because, apart from being habitats of the target species, they are close to fishing villages and close to the areas where fishermen currently use fishing practices that will be eliminated during the project. Another area with high potential for replication (outside of the project) is the south west coast of Cuba.

Economic feasibility of the project

Initial Investment

Required Capital Investment for construction of FAD'S:

- a. Plastic floaters 600 mm, (12), turn remover, cord keeper, shackles, chain, plaited line of 19 - 22 mm in diameter and 700 - 900 m long.
- b. Luminic buoy with solar battery
- c. Radar reflector

Approximate cost of one FAD = \$ 2,500; number of FADs to use = 5; Working depth = 700 - 900 m;
Total value of FADs = \$ 12,500.00.

Equipment for the work vessel for using FADs.

- d. Eco-sounder; (1700 – 190 m). \$ 2,500
- e. Radar (24 miles). \$1,500.
- f. GPS. \$ 250.

Total Investment Capital (IC); \$ 16, 750.00

Operating Expenses

Salaries

- o Crew: 10 persons
- o Salary: \$ 250 (\$ 10 / day).
- o Days per month devoted to the activity: 10
- o Months of the year: 8.
- o Years of the Project: 2
- o $10 \times \$ 10 \times 10 \times 8 \times 2 = \$ 16,000.$

Fuel

- o Consumption of fuel per day: 300 litres of oil
- o Price of oil: \$ 0.45 / L

- Number of days per month: 10
- 8 months per year
- 2 years of the project.
- $300 \times \$ 0.45 \times 5 \times 8 \times 2 = \$ 21,600$

Vessel maintenance

- \$ 100 per month
- 8 months per year
- 2 years
- $\$ 100 \times 8 \times 2 = 1,600.$

Vessel repair

- At the end of one year: \$ 2, 000

Ice for 2 working years: \$ 1, 550

Operation cost (OpC) = \$ 43,250

Total Cost (TC) = IC + OpC = \$ 60,000

Yields and Potential Revenues

Total Incomes (TI):

- Annual expected catch of tuna or bonito = 50 t
- Price of eviscerated in frontier (for hotels) + \$1,000/t.
- Expected catch in 2 years of the project = 100 t.
- Total value of two year catch = \$100,000.

TI = \$100,000.

Net Benefit (NB) = TI - TC = \$ 100,000 – \$ 60,000

NB = \$ 40,000.

Profit (P) = TI / TC = \$ 100,000 / \$ 60,000

P = 1.66

Investment recuperation term (IRT)

$$\text{IRT} = \frac{\text{Investment Cost}}{\text{Average annual cash flux}} \quad (\text{given in years})$$

Average annual cash flux = TI – OpC = \$ 100,000 – \$ 43,250 = \$ 56,750.

IRT = $16,750 / 56,750 = 0.3$ years ~ 4 months.

Summary Economic Assessment

FAD fishing is financially profitable with net benefit of US \$40,000 (for a culture park of 1 ha) and a predictable yield (Total Income/Total Cost) of 1.66. The predicted term of investment recuperation of 4 months.

ANNEX 11: SECTOR ASSESSMENT - AGRICULTURE AND LIVESTOCK RAISING

Overview

Until recently, sugar cane and livestock have dominated agricultural land-use in the SCE. The morphology of the area, characterized by large plains, as well as the availability of subterranean hydrological resources, made the provinces of the SCE among the most important producers of sugar cane, fruit trees, and agriculture products in general, and the most important area in the country for livestock products. The predominance of sugar cane led to losses in species diversity and reduced ecosystem stability as a result of the simplification of habitats and ecosystems (Santana 1991¹³). The sugar cane industry also was the principal cause of organic pollution and nutrient sources.

Policy, regulatory and institutional frameworks for agriculture sector

Two ministries are responsible for productive land use in Cuba – the Ministry of Agriculture (MINAGRI) and the Ministry of Sugar (MINAZ).

From an institutional point of view, MINAZ is responsible for lands under sugar cane production. However, with the advent of the Sugar Industry Conversion Program that began in 2003, MINAZ is also responsible for the ongoing management of its lands that are being converted from sugar cane production to other uses (see details below). The Ministry of Agriculture, on the other hand, is responsible for the use, conservation and improvement of agricultural and forest lands; the conservation, management, rational use and sustainable development of forest resources; and the protection and increase of the cattle heritage and livestock raising, among other functions. MINAGRI has extensive experience and technical capacity in these areas, represented by agencies such as the State Forestry Service (SEF), the Environmental Enterprise Group (GEAM), Forestry Research Institute (IIF), the National Enterprise for the Protection of Flora and Fauna (ENPFF), the Institute of Soils (IS), and the National Institute of Tropical Agriculture Fundamental Research (INIFAT). As a consequence, the norms and technical regulations to be applied in agriculture, livestock-raising and reforestation activities on former sugar cane lands are those established by the Ministry of Agriculture, although management responsibility remains with MINAZ.

To accomplish its new management responsibilities, MINAZ has restructured its institutional framework to include a new Agricultural Vice-ministry with three National Directorates for Crops, Forest and Fruit-Trees, and Livestock. In each province, Agricultural Managerial Groups (GEA) have been created and these groups manage areas devoted to agricultural production within the framework of land use changes. In addition, MINAZ has established formal inter-institutional coordination mechanisms with the Ministry of Agriculture to develop and implement land use policies.

Gaps in Capacity to Implement Sugar Conversion Program

From the environmental point of view, the sugar land conversion program has not taken into account all of the potential impacts on coastal and marine ecosystems. While the program has considered the existence and technical state of waste treatment systems for sugar production processes and their by-products as one of the elements in deciding on which mills to close, it did not consider the potential impacts of agriculture and livestock activity on coastal and marine ecosystems in selecting areas for land use conversion.

¹³ Santana E. (1991). Nature Conservation and Sustainable Development in Cuba. Conservation Biology. Volume 5, No. 1

More generally, land use planning and distribution has been based largely on local level criteria, without an ecosystem or landscape level approach. In addition, while planning of the sugar land conversion has incorporated criteria on production level, market potential and employment opportunities, it has not incorporated assessments of the impacts on biodiversity (locally or at the ecosystem level) of these land use changes. These shortfalls are due in large part to the lack of information on conditions at the ecosystem level, or more commonly, the lack of mechanisms for sharing such information when it does exist. Although one of Cuba's strengths is the existence of numerous scientific institutions that have carried out many high quality studies of agricultural/livestock conditions, coordination between these institutions and MINAZ in planning and implementing the Conversion Program has been minimal. Furthermore, MINAZ, despite having ultimate responsibility for the sugar cane land conversion process, does not have a Geographic Information System that would allow it to compare areas targeted for conversion and their uses, type of soils, vegetation, their proximity to the coastline and to areas of high biodiversity, and other elements that may be necessary for decision-making.

Another area of insufficient capacity is in technical knowledge of sustainable agricultural, livestock and forestry management. Much of the previous management in these sectors has focused on intensive cultivation aimed at maximizing short-term productivity, and decision-makers, professionals, technicians and workers, particularly those from the sugar industry, are not experienced in long-term, sustainable production goals and processes. Among the most important gaps in technical knowledge are: sustainable agro-ecological production; exploitation of small livestock in fragile ecosystems; sustainable exploitation of buffalo livestock; measuring environmental goods and services; methodological aspects of Environmental Impact Assessments; introduced species and their impact on ecosystems; planning and zoning of land use; and use of sustainability indicators in agro-ecological systems.

Socio-Economic Context of Sugar Production

In the past few years, prices of sugar in the world market have declined significantly, so that today sugar sells for US\$0.06/pound. At present, forty sugar producing countries manage their production with the use of sugar quotas, with a guarantee of prices to producers that hovers around US\$0.21/pound. Even though this price is almost four times higher than that of the world market, for many producers sugar production even at this price is unsustainable. In terms of its relative value in the global economy, again sugar has diminished steadily for the past 50 years. In the 1960s, 1 ton of sugar could purchase 6 tons of petroleum; by the 1980s, this had been reduced to 3 tons, and today 1 ton of sugar can only purchase 0.7 tons of petroleum on global markets. On the other hand, sugar-based products such as corn syrup are in a consolidation process and already account for 20-25% of the total market of these products.

Between the years 1900 and 1950, sugar production in Cuba grew at an average yearly rate of 5%, while in the years from 1950 to 2000 production growth declined to a 1% annual rate. In light of the steady decline in prices for sugar in the past decades, the export-dependent Cuban sugar industry has been forced to contract. In 2002, the GoC decided to produce approximately 700,000 tons of sugar for domestic consumption, and to sell sugar in the export market only when the price generated in foreign currency was superior to the cost of production. The practical result of this strategy has been a drastic reduction in sugar production in Cuba. In 2003, the Government of Cuba (GoC) decided to implement an Integrated Program of Conversion of the Sugar Industry.

Conversion of the Cuban sugar industry

The Sugar Conversion program calls for the reordering and improvement of all aspects of sugar cane production, including industrial facilities, agricultural lands, and the labor force. In 2003, the program made the decision to close 70 of the 155 existing sugar cane processing facilities in the country. Of the

85 sugar mills still in operation, 71 are devoted to sugar production and the remaining 14 are dedicated to the production of molasses and other diversified sugar products. In the SCE, 23 of the 44 sugar mills were closed, and their associated lands (62% of the total in the SCE) were taken out of sugar cane production (all sugar cane fields and mills are managed by MINAZ). The distribution of these sugar mills within the SCE is as follows:

<i>Provinces</i>	Closed	Working
Matanzas	6	3
Villa Clara	11	10
S. Spíritus	2	2
C. de Ávila	3	3
Camagüey	1	1
TOTAL	23	21

Current land use plans call for the sugar cane lands in the SCE to be converted to forest (20%), family cooperative livestock raising (30%); and other crops and fruit trees (50%). Within the SCE, 166,000 ha of land, distributed in 9 Agricultural Enterprises (2 each in Matanzas, Villa Clara, Sancti Spíritus and Ciego de Ávila provinces, and 1 in Camagüey province), will be converted to new agricultural and livestock uses. The attention of the project is focused on demonstration sites in Agricultural Enterprises located in coastal municipalities, where the potential impacts of land-use decisions on coastal and marine ecosystems is highest.

In its efforts to convert the sugar industry, the Ministry of Sugar (MINAZ) is in the process of establishing policies to guide the financial and labor strategies of this sector, in coordination with the Ministry of Education (MINED) and the Ministry of Higher Education (MES). Plans are being developed for the conversion of industrial facilities, and for the disassembly, conservation, use and sale of sugar mill equipment. In addition, MINAZ will work together with the Ministry of Agriculture (MINAGRI) and other institutions to develop programs for agricultural diversification (land use changes). This new role for MINAZ is in response to a formal agreement for restructuring the sugar industry reached in April 2002 by the Executive Committee of the Council of Secretaries. To accomplish its goals, MINAZ has changed its institutional framework to include a new Agricultural Vice-Ministry with three departments: Crops, Forests and Fruit Trees, and Livestock. In each province, Agricultural Management Groups (GEA) have been created and these groups manage areas dedicated to agricultural production in the framework of the land use changes.

The program for restructuring the sugar industry has three primary objectives: 1) competitiveness and efficiency in sugarcane production and processing (short-term); 2) food production by means of agricultural and industrial diversification (medium term); and 3) development of sustainable agriculture (long term). With regard to the second and third objectives, national targets and plans for conversion of lands formerly in sugar cane production, which encompass 1,580,000 ha, will be dedicated to the following agricultural activities:

- Forests: Forestry management activities are to be expected to employ 5,600 workers and to reforest 1,000,000 ha nationwide by 2015 with both production and natural forests. Production forests will contain a mix of native and exotic species; and will include wood production for pulp, energy plantations, chip production for boards, exotic wood, and crop-protecting strips, as well as at least 10% of fruit tree species to assist in supplementing national diets.
- Livestock: Cattle production, intended to increase milk production in the short term to 88 million litres and meat production to 10,500 tons, and to achieve 400,000 head of cattle as well as horses

for transport and work, is expected to cover approximately 505,000 ha. In addition, approximately 17,000 water buffalo (*Bubalus bubalus*), will be managed on former sugar cane lands.

- Crops: Approximately 312,000 ha will be converted to crop production (various crops)

Other conversion programs include: Swine Development, using sugar production by-products (molasses as a feed source and torula yeast as protein); Veterinary, Training and Human Resources, for the reorientation of decision makers, specialists and other workers, according to the new objectives of the conversion program; Plant Protection, to develop and implement state regulations for protection as well as higher quality production; Mechanization, directed towards the reduction of costs, technological development and innovation, best employment of animal draught power, and the introduction of low cost technologies and improved use of equipment; Irrigation, intended to increase the land area with irrigation systems, and to improve exploitation of those lands that already have these systems. In addition, MINAZ is developing a sub-programme for Soils and Seeds, as well as a sub-programme for Pisciculture with the MIP (over the long term). It is expected that 139 nurseries for reforestation will be established, with the great majority of them using low level technological solutions due to limited financial resources.

Assessment of Impacts of the Sugar Conversion Program on Producers in the SCE

The closing of 23 sugar mills in the SCE as part of the Sugar Conversion Program has eliminated approximately 14,000 jobs. A significant number of these workers are participating in alternative agriculture and livestock activities that are now being undertaken on former sugar cane lands. For the remainder, the GoC has sought to minimize the impact of job losses by providing general support services, and by subsidizing them with continued salaries until they find new employment (at the level of the mean salary of all workers during the last sugar cane harvest season). The government also is supporting additional education for these persons, with goals of 95% of the workers completing secondary education and 80% completing higher education. In addition, the government is training technicians and skilled workers in specialties related to the sustainable production activities envisaged for converted lands.

Of the workers involved, nearly 58% opted to remain in the sugar sector and work in newly converted areas (and another 4% have stayed temporarily); 9 % are now working on farms managed by the Ministry of Agriculture; 20% are receiving training and/or studying; 8% transferred to other sectors; and only 1% are still undecided. Overall, approximately 8,000 workers in the SCE are now working on the 166,000 hectares of land that will be part of the Sugar Conversion Program. Of these, approximately 1,200 will benefit from sustainable livelihood activities in biodiversity-friendly agriculture, forestry, or livestock raising as part of the demonstration activities of the proposed project.

The traditional predominance of sugar production in much of the SCE, in particular in Villa Clara and Camaguey provinces, means that the reorientation of communities to other agricultural activities presents an opportunity to learn new skills and to improve quality of life over the long term. In the process of change, many workers are receiving new technical training, and planning is taking into account new options for land tenure and land use changes, providing positive incentives for local inhabitants to remain in rural resource production. For example, producers are being allowed to keep the income from surplus production of some crops and livestock. Producers are also beginning to benefit from the increased aggregate value of organic-based products (fruits, vegetables, honey), particularly as markets for these products are developed for consumption by tourists.

Geographic Areas for Agriculture, Livestock and Forestry Related Project Interventions

Sugar cane cultivation and production was widespread within the SCE, and numerous communities have been significantly impacted by the recent (2003) sugar cane industry conversion program, which led to the closure of 23 sugar mills and the abandonment of sugar cane production on thousands of hectares of land. The project has selected the Municipalities of Martí (closed sugar mill “Esteban Hernández”) and Yaguajay (closed sugar mill “Aracelio Iglesias”) for implementing demonstration pilot projects for the conversion of former sugar cane lands towards ecologically sustainable alternatives of agriculture, livestock rearing and forestry management. Pilot projects will include sustainable agricultural production, management of water buffalo, and reforestation, rehabilitation and sustainable management of coastal forest areas previously devoted to sugar-cane plantations, in particular where sugar-cane fields are in close proximity to priority coastal and marine ecosystems (e.g. mangroves, seagrass beds). Sustainable agriculture, livestock and forestry activities will reduce the impacts of these sectors on coastal and marine ecosystems by reducing land-based pollution and sedimentation (by reducing use of agricultural inputs, reducing erosion, and acting as buffer zones). In addition, coastal forests will provide important habitat for migratory birds, which has declined in the past decade due to tourism infrastructure development in the cays. By providing sustainable alternative livelihood options, these activities will also decrease the need for local inhabitants to engage in illegal hunting in easily accessed protected areas, or to engage in illegal fishing activities. These areas were selected both because of their proximity to and level of impact on coastal and marine biodiversity, and because of the willingness of local agricultural, livestock and forest managers to move towards more sustainable development, with the support and guidance of this project.

ANNEX 12: AGRICULTURE SECTOR – PILOT PROJECTS

OVERVIEW: Demonstration Sites in the Agriculture and Livestock Raising Sector

The project will undertake pilot projects at demonstration (and replication) sites intended to demonstrate the potential for economically sustainable production activities on former sugar cane producing lands that contribute to the conservation of biodiversity in coastal and marine ecosystems. The demonstration sites identified and designed during the elaboration of the PDF B are:

Demonstration Sites	Replication Sites	Key Objective
Guamuta Cooperative Farm, Matanzas province (1,022.6 ha)	Monte Lucas Cooperative Farm, Villa Clara Province, 20,108.5 ha	Agriculture and Forestry (Center of Reference for the sector within the SCE)
La Magdalena Cooperative Farm, Sancti Spiritus province (16,590.4 ha)	Yarual Cooperative Farm, Ciego de Avila province, 15,826.0 ha	Buffalo Management
Coastal forests in Ciego de Ávila province (Chambas, Bolivia and Morón municipalities, 10,865 ha.) and Camaguey province (Minas municipality, 8,500 ha.)	Coastal forest in Matanzas province (Martí municipality), 23,441 ha	Reforestation, Rehabilitation, and Sustainable Forest Management

Agriculture Pilot Project Sites - Selection: All of the proposed pilot project sites are in close proximity to areas identified during Phase 1 and Phase 2 of the project as critical to globally significant biodiversity (see Annex 4, Map 6). In addition, the pilot sites selected were chosen in part for their proximity to the coasts (all are located in a zone that ranges from between 2 and 5 kilometers inland), and thus for their potential impact on coastal and marine ecosystems, and for their proximity to protected areas (e.g. Guamuta Cooperative Farm is an important corridor linking four existing protected areas). Finally, all four of the agriculture and buffalo sites (demonstration and replication) are located on lands formerly under sugar cane cultivation; while the five sites for coastal forest management are a mix of ownership between the Ministry of Sugar and the Patrimonio Forestal (the latter are neighboring to former sugar cane lands).

Agriculture Pilot Project Sites – Geographic Scope: The total potential area for replication (i.e. total # of hectares of sugar conversion land) within the SCE is 165,943.5 ha, which equals the areas of the 23 sugar enterprises that have been closed. The total area available for productive use (the remaining area consists of developed areas, reservoirs, rivers, roads, etc.) is approximately 141,550 ha, of which 90,875 ha have been designated for livestock production, 28,593 ha for production of various crops, and 22,082 ha for forests and fruit trees. None of the 23 centers is dedicated to any single use, but rather each enterprise is developing a mix of livestock, agriculture and forestry activities, based primarily on soils, topography, climate, local food demand and other community needs (e.g. wood), personnel requirements and expertise, etc.

PILOT PROJECT 1: Sustainable Agriculture, Livestock and Forestry Development -- UBPC¹⁴ Guamuta

In order to develop working relationships with MINAZ so that sustainable long-term partnerships are formed, the project will establish a center for pilot project activities related to the agricultural sector at the UBPC Guamuta, with the potential replication to the rest of the SCE and possibly to the country. Guamuta already is an official Center of Reference for agricultural activity within the SCE (as designated by MINAZ), intended to develop models for land use for lands formerly under sugar cane cultivation

Overview Information

The Guamuta Cooperative Farm is located in Matanzas province, in Colón (Guamuta) municipality, around 25 Km. from the coast, 20 Km. away from Majagüillar Swamp, 30 Km. away from the Cayos de Cinco Leguas Fauna Refuge, and 30 Km. away from the Zapata Swamp National Park (Biosphere Reserve and RAMSAR Site). Guamuta Community, where the Sergio Gonzalez Sugar Mill facility was located until 2003, has 250 inhabitants grouped in a village that is the residence for 75 families.

The total arable area of the site is 1022.6 ha. Of this, 722.3 ha, or 70% of the total arable area, will be set aside for the establishment of forestry activities. The remaining 30% will be dedicated to agricultural/livestock raising activities that will be developed in three Modules: Livestock management on 14% of the area; Diverse Crops on 9% of the area, and Fruit Trees on 7% of the area.

The objective of the pilot demonstration project is to develop economically viable, biodiversity-friendly agricultural practices with the potential for widespread replication on other converted sugar cane lands in the SCE, through implementation of the following strategies:

- Implementation of technologies that allow for the efficient management of liquid and solid organic wastes, thereby reducing pollution loads into coastal and marine ecosystems;
- Development of forest management processes, including native forest management and plantation forestry, to produce timber with high commercial potential while also meeting biodiversity conservation goals, thereby reducing the logging of natural coastal forests within the SCE, and ensuring the economic and social sustainability of local communities;
- Establishment of nurseries for the development of seedlings of native species, thereby enabling reforestation of coastal forest habitat;
- Development of organic agriculture, including crop rotation, improved tillage, biological control of pests, weeds and diseases, and the use of green fertilizers, thereby reducing soil erosion and the use of inorganic fertilizers and pesticides, which severely degrade marine and coastal biodiversity;
- Development of ecologically sustainable animal production systems, thereby reducing soil erosion, sedimentation, and organic pollution and the resulting eutrophication of coastal and marine ecosystems

Economic Feasibility – Financial Sustainability

Three primary uses are planned for the area of the UBPC Guamuta:

1. Forestry (722.3 Ha)

¹⁴ UBPC: Unidad Básica de Producción Cooperativa (Basic Unit of Cooperative Production). The lands are State property.

59% of the forest area will be dedicated to the production of exotic wood species; while 41% of the area will be managed as a genetic bank for the reproduction of different species (Mahogany, Cedar, Teak, Acacia, Gemelita, etc.). Thus, part of the forest area will be used for commercial purposes and another part will be used to internalize the environmental costs, providing a genetic bank. Forests managed as a genetic bank will be composed of different species in order to ensure a forest ecosystem that provides habitat for wild flora and fauna and acts as a viable biological corridor between neighboring protected areas.

A simple analysis of the net profits obtained from the forestry use is presented below, based on the average of the value per hectare of exotic wood. Even with only 59% of the area under forestry use dedicated to commercial purposes, the activity can generate profits reaching US\$554,000/year.

Description	Unit/ measurement
Cost per hectare (US\$/Ha)	500
Average annual volume produced (m ³)	10
Price per m ³ (US\$)	180
Revenue per hectare (US\$/Ha)	1,800
<i>Net Profit per Ha</i>	<i>1,300</i>
Area under forest management (Ha)	722
Area dedicated to forestry production (59%)	426
Total Net Profits US\$/year	554,000

It is important to take into account that in this analysis it has been considered as average that there exists a growth of 10 m³ a year. It is necessary to develop a management plan that indicates the year (considering a 20-year cycle) in which the plantation may begin to be commercially exploited.

2. *Diverse Crop Production (91.3 Ha)*

Crop production will involve the planting of a variety of crops, which not intended for export, but rather they will constitute a direct contribution to the local and national economy.

Crop	Production (metric tons)	Cost per metric ton (\$)	Market Price per ton (\$)	Net Profits per ton	Total Net Profits (\$)
Yucca	138.00	535.60	630.00	94.40	13,027.20
Sweet potato	82.20	278.70	630.40	351.70	28,909.74
Bean	11.40	199.80	5,435.00	5,235.20	59,681.28
Chickpea	5.50	2,377.10	21,951.20	19,574.10	107,657.55
Tomato	60.00	322.50	521.80	199.30	11,958.00
Onion	11.00	94.80	2,826.20	2,731.40	30,045.40
Net Profits per Cultivated Area in Cuban pesos					251,279.17
Net Profits (US \$)					9,306.64

The net profits of this production are 251,279.17 Cuban pesos. For the purposes of homogenizing the values in this analysis, these benefits are US\$9,306.64.

3. *Livestock Use (141.9 Ha)*

The area dedicated to this activity will be used to establish a livestock farm that will consist of: a dairy, a sheep pen, a horse stable, a pigsty, a pen for rabbit fattening, a yard for rustic hens and an area for the cultivation of animal food.

Livestock	Total Production	Cost per Unit \$/TM	Market Prices	Net Profits /Unit	Total Net Profits
Cattle	36,000 (liters of milk)	0.48	0.84	0.36	12,960.00
Sheep	4.50 (metric tons)	1,134.67	2,500.00	1,365.33	6,143.99
Pigs	2.20 (metric tons)	1,982.73	17,018.00	15,035.27	33,077.59
Poultry	36,000 (birds)	0.01	0.50	0.49	17,748.00
Net Profits (Cuban pesos)					69,929.58
Net Profits (US \$)					2,589.98

It is observed in the economic analysis, according to the estimation of the production and the market behavior that the annual net profits ascend to US\$2,589.98.

4. Summary

In summary, if the conversion area begins implements forestry plantations, diverse crops and livestock use, it could generate total net profits of US\$565,895 annually.

Forestry Plantations	554,000
Diverse Crops	9,306
Livestock Use	2,589
Total Net Profits of the productive area	565,895

National and local context - social impacts of the economic alternative

The most important impact to be highlighted is the diversification of the soil use. Until 2003, when the lands dedicated to this project ceased to be exploit, an annual loss of 3555.1 million Cuban Pesos was generated because of the sugar cane production. The implementation of this project generates economic and productive alternatives for the local communities, as well as a reduction of the dependence on a single crop. Moreover, the agricultural/livestock and forestry activities are economically feasible and can generate enough financial resources for the local stakeholders.

Replication at the Monte Lucas Cooperative Farm

Although the experiences of the sustainable practices developed at the Guamuta Cooperative Farm will be introduced systematically in the agricultural/livestock raising enterprises found throughout the coastal areas of the SCE, targeted replication will be carried out at the Monte Lucas Cooperative Farm, part of the Unidad Proletaria Enterprise in Villa Clara province (20,108.5 ha). The farm is located around 20 kilometers from the coast and borders the Lanzanillo-Pajonal-Fragoso Fauna Refuge, one of the 8 protected areas implemented during the phase 2 of the Sabana-Camaguey project.

PILOT PROJECT 2: Sustainable management of Water Buffalo – La Magdalena Cooperative Farm

This pilot project has been designed to apply alternative strategies for the sustainable management of water buffalo, thereby ensuring sustainable alternative livelihoods for local producers and mitigating the impacts of water buffalo management of coastal and marine ecosystems.

Overview Information

The pilot project for water buffalo management will be developed on the La Magdalena Cooperative Farm, part of the Aracelio Iglesias Agricultural/Livestock Enterprise, in the province of Sancti Spiritus. The farm is an area of 16,590 km. sq., primarily coastal humid soils covered formerly under sugar cane production, and is located five km. from the coast. The farm falls within the Buena Vista Biosphere Reserve, and is in the buffer zone area of Caguanes N.P., one of the eight protected areas implemented during the Phase 2 of the Sabana-Camaguey project.

The water buffalo is a species that has been introduced only recently in Cuba. Water buffalo in the SCE are raised for meat and milk production, and because they increase rapidly (in size and population), they are being promoted by the Government of Cuba through agricultural extension support and tax incentives. However, due to their physical strength, buffalo are responsible for significant damage to rural infrastructure and native vegetation, including fences, live hedges and trees. In addition, buffalo are an increasingly problematic source of organic pollution within the SCE.

At present, there are no water buffalo on the La Magdalena Cooperative Farm. However, MINAZ has existing plans to expand the farm's herd rapidly (as it does for other converted sugar lands in the SCE), adding approximately 3,000 animals within the next five years. The proposed pilot project will apply and evaluate methods for sustainable buffalo raising in order to limit the negative impacts on coastal and marine biodiversity associated with MINAZ's plan to expand the herd on the La Magdalena Cooperative Farm, and thereby provide a model that can be extended to other areas in the SCE and the country. The project will also demonstrate where buffalo raising is not appropriate (areas of importance for biodiversity, of fragile soils and vegetation, of steep topography, etc.), so that lessons learned in this regard can be applied to decision making by MINAZ for buffalo production at other sites throughout the SCE. Where production is pursued, the methods and systems developed will need to produce adequate profits from the production of meat, milk and other dairy products from water buffalo so as to provide viable alternative livelihoods for local producers. To achieve this, the following activities are foreseen:

- Introduction of techniques to reduce damage to natural ecosystems by water buffalo (e.g. castration of animals to reduce aggressive behavior, electric fences to avoid animals escaping from pens)
- Use of residues such as distillery must (from sugar production) and stubble from sugar cane and other crops as animal feed
- Recycling solid and liquid wastes from animal production for use as fertilizer on pasture soils (note: low-cost technologies for management and re-use of livestock waste, and the knowledge of how to apply them, already exist in Cuba)
- Improved treatment of liquid wastes using a constructed wetland for tertiary treatment, with reuse of the water for irrigation and/or animal wallows.
- Planting of pasture species that can sustain water buffalo grazing

Economic Feasibility and Financial Sustainability

Initial Investment: Following is an analysis based on the Cooperative Farm's initial plans to purchase 288 water buffalo by the end of 2005. The initial investment is directed towards the acquisition of animals, construction of stables and milking areas, as well as fences for pasture areas.

Description of Costs	Quantity	Cost per Unit (US\$)	Total
Acquisition of buffaloes	288	1200	345,600
Construction of Breeding Centers (each holds 100 animals)	3	5,000	15,000
Dairy facilities (60 animals)	3	7,450	22,350
Development areas	2	4,000	8,000
TOTAL			390,950

Operating costs

The main operating costs are salary expenses for the permanent staff (4-6 fixed workers), electricity, water, and fuel to supervise the daily activities and the transfer of milk. The calculation of these costs is done for one year, this being the necessary period for a buffalo to grow enough to be productive.

Description	US\$/year
Staff – salaries	35,400
Fuel	6,600
Others (electricity, water, etc)	20,000
TOTAL/year	62,000

Yields and Potential Revenues

The Production Program of the Enterprise estimates an annual potential production of 11 tons of standing meat and 56 thousand liters of milk per each cattle facility in one year.

Description	Price/Unit	Units	Total per Facility	No. of Facilities	Total per activity per year
Milk	0.37 USD/L	56,000 liters	\$20,720	3	\$62,160
Meat	3.02 USD/ton	11 tons	\$33,220	2	\$66,440
Grand Total					\$128,600

With a total gross income/year of \$128,600, the investment recovery time is 5.87 years. Profitability after investment recovery is 2.07. As conclusion, buffalo meat and milk display a profitable market within the country.

Replication of the Pilot Project Water Buffaloes on the Yarual Cooperative Farm

The project will be replicated, during the execution of the FSP, on the Yarual Cooperative Farm within the Agricultural/livestock raising Enterprise "Bolivia" (15,826 ha), in Ciego de Avila province. This Enterprise will devote 70% of its area to the breeding of water buffalo. This site was selected in part because it is located only 2 km. from the coast, from which it is separated by a strip of coastal shrub that is threatened by water buffalo grazing, and there are 4 drainage channels that lead to the coast, which contribute to the pollution of coastal ecosystems. In addition, the Enterprise is surrounded by Protected Areas of National Significance.

PILOT PROJECT 3: Reforestation, enrichment and sustainable forest management in coastal forests of the Sabana Camaguey Ecosystem

The planned pilot demonstration projects for coastal forest management will design and test biodiversity-friendly alternatives of land use on converted sugar cane lands, as well as income generation alternatives for producers put out of work by the conversion program. The proposed forest management activities represent a source of employment for 1,500 workers in five municipalities within the Sabana Camaguey Ecosystem.

Overview Information

The mainland forest area in the five provinces of the SCE encompasses 98,388 ha. Setting aside non-forestry areas and mangrove areas (approximately 15%), the remaining forest area (primarily semi-deciduous and swamp forests) is composed of forests in the following condition: 29,723 ha require reforestation; 29,630 ha require enrichment, and 35,035 ha require improved sustainable forestry management (see table below for details).

Province	Reforestation	Enrichment	Sustainable Management
Matanzas	2,366	8,507	12,568
Villa Clara	-	6,900	9,632
Sancti Spiritus	48	2,704	248
Ciego de Avila	3,259	6,159	1,087
Camaguey	24,050	5,000	11,500
TOTAL	29,723	29,630	35,035

Of this total forest area, the project will focus solely on coastal forest ecosystems located on or bordering to former sugar cane producing lands. The project will undertake reforestation using diverse native species on a total of 6,125 hectares of throughout the SCE. In addition, the project will promote sustainable management of another 36,321 hectares of existing coastal forests, including enrichment, protection activities, and soil conservation. Together, these actions will increase the area of healthy protective coastal forests in the SCE, and the Ministry of Sugar and local enterprises have agreed that future management of these areas will be oriented towards biodiversity conservation (not wood production or other uses).

Following is the projected management activities by municipality:

Province:	Ciego de Avila			Camaguey	Matanzas	Total
Municipality:	Chambas	Bolivia	Moron	Minas	Marti	
Activities						
Sustainable Management	1,246	2,000	4,000	8,000	21,075	36,321
Reforestation	1,000	1,959	300	500	2,366	6,125
Total	2,246	3,959	4,300	8,500	23,441	42,446

The timetable for implementing reforestation activities is as follows:

- Ciego de Avila: Reforestation of 652 ha per year, for a total of 3,259 over 5 years.
- Camaguey: Reforestation of 250 ha per year, for a total of 500 over 2 years
- Matanzas: Reforestation of 473 ha per year, for a total of 2,366 over 5 years.

Rationale

The coastal forest ecosystems of the Sabana Camaguey constitute an important habitat for biodiversity of national and global importance, including many endemic species of flora and fauna and numerous species of migratory birds. Equally importantly, by acting as a buffer zone between areas of human activity (agriculture, livestock, settlement) and the waters of the Sabana Camaguey Archipelago, the coastal forests play a critical role in protecting coastal and marine ecosystems.

Historically, coastal forests were significantly reduced for the development of the sugar cane industry and livestock raising. However, with a large area of sugar cane lands near the coast now in the process of conversion to other uses, there is a real possibility to recover coastal forest areas, thereby restoring forest biodiversity, creating new habitat for wild species, and diminishing impacts on coastal and marine ecosystems by mitigating the effects of point and non-point pollution sources, sediment flows, and other run-off from the watersheds of the SCE.

However, due to insufficient technical and material resources, to date the level of reforestation, forest enrichment and sustainable forest management has been low, and in some areas illegal logging continues to take place. Sustainable management practices, such as the use of rubber tractors instead of caterpillar tractors, the production of low-cost, high quality saplings, and the use of native species for reforestation efforts, have been implemented in only a few areas.

The sugar conversion process in the Sabana Camaguey Ecosystem has left extensive coastal areas available for potential for reforestation. The project has selected areas of intervention with the following characteristics; high coastal and marine biodiversity values; where coastal forests have been severely affected or constitute very narrow fringes buffering the marine and coastal ecosystem. The project proposes to work in areas of the provinces of Ciego de Ávila and Camaguey where sugar cane cultivation (and livestock raising in some cases) reached virtually to the coastline. In addition, these sites are in or near the following protected areas: the Buena Vista Biosphere Reserve, the Managed Resource Protected Area “Gran Humedal del norte de Ciego de Ávila” (a RAMSAR Site) and the Managed Resource Protected Area “Wetlands of Cayo Romano and North of Ciego de Ávila” (site of a project by the co-financing partner EcoDesarrollo).

In Matanzas province, the site selected for replication is located in Martí municipality, on the border of the Majagüillar Swamp, which is very important for its values of coastal flora and fauna. Furthermore, the impacts on marine biodiversity produced by the sugar cane industry in this area have been severe, and the closure of two sugar mills in the area provides a critical opportunity for restoring coastal forests. This site also borders the Guamuta Cooperative Farm, site of additional activities under Pilot Project 1 for enhancement of forest areas with native species.

Activities

Areas formerly under sugar cane cultivation will be sustainably managed, including enrichment, protection, and soil conservation activities, and in some areas lands will be reforested using seedlings and saplings of diverse native species. In addition, the project will establish a forestry nursery in Morón municipality, which already has the technical staff with the training necessary to manage the plant production technologies foreseen. The nursery will have a production capacity of approximately 1,250,000 saplings, which is sufficient to supply the reforestation and enrichment of the targeted coastal forests of Chambas, Bolivia and Morón, of the province of Ciego de Ávila (3,259 ha), and the coastal municipality of Minas, in the province of Camaguey (500 ha), as well as the replication of the forestry pilot project in Matanzas province, and the forest management activities planned for the Guamuta Cooperative Farm.

The forestry nursery will enable, apart from production of certified seed and saplings of species commonly used for reforestation, the production of saplings of other forest species and to incorporate into practice the results on eco-physiology of germination of Cuban tree species. During the workshops held during the PDF-B implementation, a number of native species were identified that could be incorporated in reforestation, as well as species that could be used in reforestation with commercial purposes, in the different pilot projects of the agriculture/livestock and forestry sectors. Among the most notable are: *Buchenavia capitata* (Vahl) Eichl., *Bucida spinosa* (Northrop) Jennings, *Caesalpinia violacea* (Mill.) Standl., *Gliricidia sepium* (Jacq.) Steud., *Lysiloma sabicu* A. Rich., *Pithecellobium obovale* (A.Rich.) Sauvalle, *Samanea saman* (Jacq.) Merr., *Guarea guidonia* (L.) Sleumer, *Calycophyllum candidissimum* (Vahl) DC, *Calophyllum antillanum* Britton, *Cordia gerascanthus* L., *Tabebuia angustata* Britt., *Hibiscus elatus* Sw., *Colubrina arborescens* (Mill.) Sarg., *Bursera simaruba* (L.) Sargent, *Swietenia mahagoni* (L.) Jacq., *Cedrela odorata* L., *Andira inermis* Kunth., *Guazuma ulmifolia* Lam., *Prunus occidentalis* Sw., *Myrica cerifera* L.

Use of Environmental Funds

The project will promote increased use of the Fund for Forest Development, the Fund for Environmental Conservation, and/or other existing national funds (environmental financing mechanisms) to enhance incomes (and offset costs) for forest workers. The Fund for Environmental Conservation, administered by CITMA, supports projects by any agency that protects the environment and also helps local communities. The Fund for Forest Development, administered by MINAGRI, supports projects by any agency that conserves forests and also helps local communities.

The Cuban Government provides approximately CUC 42 million each year to the Forest Fund to finance projects for the promotion of new plantations and for the management of already existing forests. Based on registrations, approximately CUC 9 million of this total has been made available within the SCE. The projects can be requested by any person (that is to say, a private producer or a state business). Requests are carried out through the Forest State Service (within the Department of Agriculture) of each municipality, and take on average one year to be approved and distributed. The funds include provisions for bonuses, whereby forest managers (both for plantations and for management of native forests) are paid a bonus of up to 30% if the tree survival rate is above 85%.

Currently, these funds are not well known and are not fully subscribed, and thus represent unused capacity for promoting sustainable forest management. The project will assist local communities, cooperatives and enterprises in applying for financial support from these Funds based on plans for reforestation and more environmentally friendly forest management.

Economic feasibility of the project

Initial investment: US\$2,006,972 per year (almost entirely salaries for forest workers, paid for by the Government of Cuba)

Operational costs: The calculation of these costs is made for five years, as it is the necessary period for species to attain the size required to consider a reforestation of protecting coastal forests as successful. In this forest category management activities will be minimal, and will be basically directed to the improvement, enrichment and conservation of species.

<i>Description</i>	US\$
Staff – salaries	9,646,875
Fuel	153,125

Construction of nurseries, equipment and tools	234,860
Total for 5 years	10,034,860

Economic valuation

Expected benefits will not be of monetary character, as the fate of these forests is not wood production with commercial purpose. Benefits will be of environmental type because areas lacking tree cover or formerly used for sugar cane culture will be reforested, and will have a coastal protection function, thus warranting mainstreaming of biodiversity by the sector.

Profit will be permanent because of the environmental services and non-wood products forest that the forests provide (habitats for species, seed production, saplings, honey, fruits, medicinal plants, among others). Recovery of investment will take place in the long term and will be assessed according to the different environmental services that forest provide, including carbon sequestering (see potential profits).

Market situation

Nowadays Cuba has received several offers from Europe and Canada for developing Carbon Sequestering projects (MDL). These offers are being analyzed prior to negotiations.

Financing Mechanisms Implemented

- Agreements for selling sapling produced from certified seeds to enterprises and entities that develop reforestation plans in the SCE and in the country.
- Implementation of projects MDL (Carbon Sequestering), according to country's regulations

National and local context – Social Impact of the Economic Alternative

Forestry practices that will be implemented in the pilot experiences are environmentally responsible and feasible from the ecologically point of view, because negative impacts on ecosystems will not be produced, but on the contrary, well managed forests will enable to diminish the impacts of organic pollution and excessive sediment loads on marine and coastal ecosystems, to avoid soil erosion, and to improve water and air quality, among the main benefits.

These projects represent a job source for about 1,500 workers (including technical personnel and field workers) of five important municipalities of the SCE. The experiences obtained during the project in the mentioned municipalities will be extended afterwards also to other coastal municipalities of the SCE and to the rest of the country as required.

ANNEX 13: SUSTAINABLE FINANCING

1. Existing institutional, policy and legal frameworks to support mechanisms for sustainable financing of biodiversity conservation

Policy framework

Financing for biodiversity conservation in Cuba is provided by the government through official allocations in the state budget. Despite the severe economic constraints facing Cuba during the past 15 years, ever since the creation of CITMA in 1994 the state budget for environmental conservation has increased yearly, thus demonstrating the political will of the government to preserve the quality of natural resources in the country (see table 1). In addition, Cuba has formally established a number of financing sources to contribute to environmental conservation, including the National Environmental Fund (FAN), the State Forestry Fund (FFE), and others.

Table 1: Investments for Environmental Protection in Cuba (Thousands Cuban \$)

Resources	2002	2003	2004	TOTAL
Water	68.1	82.4	81 043.0	81 193.5
Soils	24.6	25.4	18 634.7	18 684.7
Atmosphere	27.3	45.3	41 725.5	41 798.1
Forest	41.9	62.7	63 041.1	63 145.7
Solid Wastes	9.6	7.0	7 005.0	7 021.6
Other	7.6	10.1	9 813.6	9 831.3
TOTAL	179.2	233.0	221 262.9	221 675.1

Although understanding, awareness and support for environmental conservation is strong among policymakers in Cuba, awareness on the importance of biodiversity specifically as a cultural, social and economic resource and its contribution to the economic development of the country is very limited. Thus, while mechanisms for funding environmental conservation exist in Cuba, and environmental concerns are integrated into planning processes, specific attention to biodiversity in these areas does not yet exist. Biodiversity concerns have become more prominent in the past few years, and Cuba's National Environmental Strategy identifies the development of economic instruments for biodiversity conservation as a priority activity. However, actual mechanisms to implement sustainable financing of biodiversity conservation remained to be developed.

In order to change this situation, it will be necessary to implement awareness raising programs for the main decision-makers of the economic sectors in order to demonstrate the advantages of biodiversity conservation, the feasibility of sustainable financial mechanisms for biodiversity conservation, as well as to assure the training of national specialists to apply assessment methods for environmental finance.

Financial Controls of Revenues

The planning and control mechanisms of Cuba's economy are highly centralized, and revenues from the tourism sector, together with those coming from all other economic sectors, are reverted to the national budget for the socioeconomic development of the country. However, the level of investment necessary for resource management and conservation, including biodiversity conservation, is decided at the local level by each sector in accordance with its Master Plans for each local area. Furthermore, the legal and institutional framework in Cuba does support implementation of systems of revenue control and redistribution towards investments at the local level dedicated to biodiversity conservation. Within this

framework, appropriately designed taxes and fees for the use of environmental goods and services can be implemented that contribute to the financial sustainability of biodiversity conservation.

Institutional and Legal framework

The institutional framework for decisions regarding sustainable financing of biodiversity conservation is centered in the Ministry of Economy and Planning, the Ministry of Finances and Prices, and CITMA. In Law 81 of Environment, Article 61 “establishes the use of economic regulation as instrument of the politics and the environmental management is conceived on the base of the employment, among others, of tariff, tax politics or of prices differentiated, for the development of activities that impact on the environment”. Law of the Tributary System No.73/97, in Chapter XI, Article 50, “establishes a tax for the use or exploitation of natural resources and for the protection of the environment”, while Article 52 authorizes the Minister of Finances and Prices to establish the tax bases, tax types and procedures for the payment of this tax, as well as to grant the pertinent exemptions and concessions (based on consultations with CITMA). Resolution 50/96 establishes rules for applying taxes for the exploitation and conservation of natural and artificial forest resources and wild fauna; and the Joint Resolution of the Ministers of CITMA, Agriculture and Tourism regulates all aspects including the design of tourist products, the permissible carrying capacities of people in the case of Protected Areas, the need of existence of visitors' centers, the administrative and environmental restrictions and the organization in charge of the administration. Despite these various supporting laws, to date, Cuba has not established specific legal mechanisms to allow productive sectors the economy to finance activities for the conservation of the biodiversity.

2. Sustainable Financing Program - Overview

Development Process for the Sustainable Financing Program

During the PDF-B phase, a number of workshops were held in conjunction with the sustainable financing team from the National System of Protected Areas (CNAP), which is implementing the UNDP/GEF Project “Strengthening of the National System of Protected Areas”. These meetings were held to discuss a range of principles, concepts, mechanisms and strategies for long-term funding of biodiversity conservation, both within and outside of the protected area system. Initially, these meetings considered the formal creation of a Sustainable Financing Unit which would coordinate the development of financial mechanisms and instruments for biodiversity conservation for the Government of Cuba. However, it was generally agreed that the formal creation of a new “Unit” within the internal structure of a Ministry would be a complicated and long administrative process, and it was decided instead to design and establish a Sustainable Financing Program (SFP), which will allow for an efficient and coordinated use of economic resources, a stronger capacity to influence decision-makers, and a greater potential for replication. While the SFP will address all issues related to sustainable financing of biodiversity (including protected areas), this project will provide support only for those issues related to the productive sectors and landscape.

Summary of Activities of the Sustainable Financing Program

The objective of the project’s participation in the SFP is to generate additional long-term financial resources for biodiversity conservation and its sustainable management in the productive landscape of the Sabana Camaguey Ecosystem. These financial resources will be directed towards supporting inter-sectoral entities that support biodiversity conservation (e.g. the Integrated Coastal Management Authority, the Capacity Building Centers for ICM Network), towards sectoral institutions attempting to mainstream biodiversity conservation into productive sector activities (e.g. Ministries of Tourism, Fishing, Sugar,

Agriculture), and towards communities, enterprises and individuals who participate in the development of economically sustainable and biodiversity friendly production income generating activities.

During implementation of the project, the SFP will: 1) create and/or strengthen institutional, policy and legal frameworks for the sustainable financing of biodiversity conservation; 2) design and implement specific sustainable financing mechanisms for biodiversity conservation; and 3) monitor the results of the pilot demonstration projects for sustainable economic production (carried out under Outcomes 2-4). Each of these activities will complement the other, so that the enabling environment created will provide the legal and policy basis for the financing mechanisms and pilot projects to operate, while the financing mechanisms and the pilot projects will provide lessons learned for adapting policies, laws and institutional structures. Thus, by project's end, structures, mechanisms, and instruments for the sustainable financing of biodiversity conservation activities within the productive sectors of the SCE will have been developed at the national level and tested, and implemented at the local level.

Activities related to the enabling environment for sustainable financing of biodiversity conservation (part 1 above) will be coordinated by CITMA, which will create a small team, led by an economist with experience in economic valuation of ecosystems, supported by an International Consultant with expertise in sustainable financing of biodiversity conservation, and also including (part-time) a biologist and two economics professors from the University of Havana, who directed the environmental economics components during the Phase 2 of the Project. The creation and implementation of some of the specific mechanisms to support sustainable financing (part 2 above) will be the shared responsibility of the CITMA team and the relevant productive sectors, in particular the Tourism Sector (see Output 2.4 for details). Finally, demonstration and replication of pilot projects that will create models for financially sustainable and biodiversity-friendly tourism, fisheries, and agriculture, livestock and forestry activities (part 3 above) will be directed by the relevant sector partners, though the CITMA team will apply lessons learned to policy, legal and institutional changes.

Activity 1.4.1: Evaluation of international models of mechanisms for the sustainable financing of conservation (e.g. the Latin American and Caribbean Network of Environmental Funds and the Inter-Agency Planning Group on Environmental Funds), and analysis of the applicability of these models to the Cuban political and socio-economic context

Activity 1.4.2: Implement a Sustainable Financing Program (SFP), directed by CITMA, with the participation of targeted productive sector ministries, the Ministries of Economy and Planning, Finances and Prices, the National System of Protected Areas, and ICMA, which will guide the process of developing a legal, policy and institutional framework supportive of mechanisms and structures for financial sustainability of biodiversity conservation

- Implement priority changes to the existing enabling environment (e.g. clear regulations on retention of fees generated by biodiversity friendly activities for ongoing conservation) and identify additional priorities
- Implement awareness raising program for decision-makers in order to demonstrate the economic benefits of biodiversity conservation and the feasibility of sustainable financial mechanisms
- Technical studies and economic evaluations of environmental goods and services in selected pilot sites, in order to generate support among decision makers for financial mechanisms for biodiversity conservation
- Continue work initiated during the PDF-B phase in strengthening the capacity of technicians from relevant institutions in designing and implementing sustainable financing mechanisms
- Implement an information dissemination program to ensure that the experiences obtained in relation to sustainable finance will be made available to other national, provincial, and municipal

programs, and to ensure awareness about modification of laws, regulation, and practices that enable sustainable financing of biodiversity conservation throughout the country

Activity 1.4.3: Develop and implement specific sustainable funding instruments and mechanisms for biodiversity conservation, drawing on lessons learned from pilot projects for sustainable income generation (Outputs 2.2, 3.3, 4.3, 4.4 and 4.5) and in coordination with sustainable financing mechanisms in the tourism sector (Output 2.4 – a key long-term funding source for ICMA, the SIAESC, and the CBC/ICM-N)

- **Government Contributions:** The project will explore the potential to ensure ongoing direct payments by productive sectors entities to ICMA, based on the demonstrated benefits to the sectors of the ongoing operation of ICMA (see Output 1.1)
- **Taxes, Fees and other Payments:** Options include visitor and user fees; license fees and taxes; payments for environmental services; resource extraction fees; pollution taxes; fines and penalties for illegal resource extractions (e.g. illegal fishing); taxes on timber sales, etc.
- **Mechanisms:** Options include fiscal instruments; biodiversity enterprise funds; economic instruments for valuing and charging for environmental services; facilitation of partnerships and investment opportunities among productive sector Ministries and productive enterprises, and use of existing financial funds for sustainable environmental management (see Output 4.5)

Annex 14: Cost Effectiveness

The project management team has executed two previous GEF/UNDP Projects in the Sabana-Camaguey Ecosystem (Phase I from 1994 to 1996 and Phase II from 2000 to 2004). The Terminal Evaluation of Phase II highlighted the extraordinary cost effectiveness achieved in these previous project phases through the considerable effort made to ensure efficient use of funds and to leverage in-kind support from institutions and consultants. During the PDF-B period in preparation of Phase 3, the work of the Project Coordinating Unit has continued to search out cost saving strategies. As a result, during Phase 3 all of the core staffing costs of the project are to be covered by GoC co-funding, which will not only provide cost efficiencies by allowing GEF resources to focus on the provision of needed additional skills and equipment, but will also support the sustainability of impacts and the maintenance of new capacities within the Government after project closure. Additionally, costs for consultants will be minimized by using experts from within Cuba and/or the Caribbean region in all cases where this is feasible. With regard to procurement of project inputs, standard procedures of the Government of Cuba and of UNDP will be carefully applied to ensure value for money in all purchases of goods and procurement of services for the project, and the project will use strict internal and external audit controls that meet international standards.

The project strategy aims at sharing conservation management costs between different stakeholder groups: government, public-private enterprises, and local communities, as much as possible accommodating costs within the regular costs of doing business. For the pilot demonstration projects, this will be achieved through improving efficiencies in production, marketing and distribution of sustainable and biodiversity friendly products and services, so that the productive sector activities become self-sustaining and all costs are internalized. Furthermore, as best practices from the pilot demonstrations begin to be replicated in the last two years of the project, only the most cost-effective production and marketing strategies will be used, and economies of scale achieved through wider implementation will further improve cost efficiency over the course of the project. In addition, the cost effectiveness of the pilot demonstrations will be enhanced further by the fulfilment of efforts to mainstream biodiversity management objectives into the policies, plans and incentive structures of the targeted productive sectors, so that economically viable alternative livelihoods models are not constrained by perverse policies and economic structures.

The accumulated experience of the project participants, the existence of the recently formally approved Integrated Coastal Management Authority of the SCE, the full participation of three prioritized economic sectors (Tourism, Fisheries, and Agriculture/Livestock/Forestry) and local Governments as direct implementation entities of the four Outcomes of the projects, and the introduction of urgent approaches to move toward the application of mechanisms and instruments for financial and institutional sustainability, will enhance the efficiency and effectiveness of project implementation. Unlike Phases I and II, the proposed project involves the direct participation of productive sectors of the Cuban economy, each of which will provide significant financial inputs to the project as well as technical expertise, management experience, market and product knowledge, etc.

The project is designed to be cost effective for biodiversity conservation, based on three factors: 1) the amount of globally significant biodiversity that it conserves; 2) the likelihood of success of the project; and 3) the amount of funding spent. To support this design objective, careful assessments of all three of these factors were carried during the PDF-B phase.

With regard to globally significant biodiversity, Annex 3 details the globally significant biodiversity within the Sabana Camaguey Ecosystem, including levels of habitat diversity, species diversity, and

genetic diversity/intra-species diversity, all of which must be considered for effective biodiversity conservation. In this regard, the Sabana-Camagüey Ecosystem (SCE) has considerable regional importance due to its high diversity of marine and terrestrial species, the high level of endemism of terrestrial flora and fauna, and the enormous variety and abundance of migratory birds which use the area as a stopping point between North America and points south. The project area includes extensive areas of globally significant ecosystems distributed throughout the landscape and seascape (cays, marine shelf and mainland watersheds), including mangrove forests, dry forest and coastal shrub systems, coral reefs and seagrass beds. Both the marine and terrestrial flora and fauna of the SCE represent outstanding examples of biodiversity in the wider Caribbean. For terrestrial flora, 874 species have been reported, 151 of them being endemic, 12 having restricted distribution. Terrestrial fauna is characterized by both high diversity of species and subspecies and large numbers of endemic and migratory species, and also is of extraordinary national and regional value. More than 1000 species are invertebrates, and there are 77 mollusk species. Among vertebrates, 239 birds, 45 reptiles, 10 amphibians, and 27 mammals (including local endemic species) have been identified. Eleven endemic genera, 107 endemic species and 47 endemic subspecies have been recorded, and 33 subspecies are exclusive for this zone. Marine biodiversity in the Sabana Camaguey Archipelago (SCA) also represents an outstanding diversity, with 340 species of marine flora identified, as well as 1,354 species of marine flora.

With regard to the project's likelihood of success, Cuba has a proven track record in implementing biodiversity conservation projects, including a decade-long record of success in the Sabana Camaguey Ecosystem. Furthermore, paragraph 140 assesses the risks faced by the project from such potential sources as government inability and/or unwillingness to coordinate efforts, lack of support for alternatives to traditional tourism development and fisheries management, and unwillingness of the Ministry of Sugar to consider sustainable land management alternatives. Although these risks are real, analysis of these issues concluded that sufficient mitigation measures are in place and that the Overall Risk Rating for the project was low.

Finally, with regard to the cost of the project, as noted above the project is designed to leverage the significant material and technical resources of three productive sectors, including the largest economic sector in the country (tourism). In addition, after identifying the important species and ecosystem diversity in the SCE, the project team assessed the relative impacts of the three targeted productive sectors on biodiversity, so that project interventions could be most efficiently targeted to those sectors and activities with the greatest impact. Annex 6 provides a detailed assessment and ranking of the impacts of each sector on each kind of critical ecosystem type. By combining this assessment with the biodiversity information summarized in Annex 3, the project team has succeeded in designing project interventions to channeling resources to those productive sectors that have the greatest potential to damage biodiversity resources and to geographic locations of high biodiversity value, thus reducing risks of biodiversity loss in a cost effective way.

Annex 15: GEF Tracking Tool

Tracking Tool for GEF Biodiversity Focal Area
Strategic Priority Two:
“Mainstreaming Biodiversity in Production Landscapes and Sectors”

I. Project General Information

1. Project name: Mainstreaming and Sustaining Biodiversity Conservation in three Productive Sectors of the Sabana-Camaguey Ecosystem.

2. Country: Cuba (National Project)

3. Name of reviewers completing tracking tool and completion dates:

	Name	Title	Agency
Work Program Inclusion			
Project Mid-term			
Final Evaluation/project completion			

4. Funding information

GEF support:	\$4,119,448 (Full Size Project)
Co-financing:	
- Government of Cuba	\$22,032,000
- WWF Canada	\$652,000
- EcoDesarrollo	\$92,178
- <u>Capacity 2015</u>	<u>\$577,000</u>
Total Funding:	\$27,353,178 + 200,000 (PDF-B)

5. Project duration: **Planned** 5 years **Actual** _____ years

6a. GEF Agency: UNDP

6b. Lead Project Executing Agencies: Ministry of Foreign Investment and Collaboration and Ministry of Science, Technology and Environment

7. GEF Operational Program: Coastal, marine, freshwater (OP 2)

8. Project Summary (one paragraph):

The national and global significance of the outstanding wealth of the Sabana-Camaguey Ecosystem has long been recognized and was endorsed through the early commitment of GEF to support a three-phase Program for its conservation. This constituted three sequential interventions evolving from the definition of priorities, to the building of capacities and consolidation of processes, to finally enhancing prospects

for long-term sustainability. Phase 1 identified problems and opportunities, completed bio-geophysical, economic and social characterization of the SCE and developed a Strategic Plan. Phase 2 secured the conservation of particularly sensitive or high biodiversity value areas in a network of protected areas that covers 20% of the SCE. Implementation of Phases 1 and 2 of this Program were rated as highly satisfactory in independent evaluations. For the first time, the five provinces that share the SCE have a common goal, partnerships have been built and new doors opened for environmental authorities to convene other sectors and ensure environmental compliance. Now that these key elements are in place, there is a need, and an opportunity, to work outside of protected areas and to focus on biodiversity across the productive land and seascape, and thereby to create change within the key productive sectors in the SCE. The proposed FSP would be the third and final phase of the Program and would promote operational changes within the tourism, fisheries and agriculture sectors to ensure biodiversity conservation across the sea and landscape that make up 80% of the Sabana-Camaguey Ecosystem.

9. Project Development Objective:

The long-term goal or development objective of the project is to protect the marine and coastal biodiversity of global significance in the productive landscapes and seascapes of the Sabana-Camaguey Ecosystem of Cuba, while contributing to the country's social and economic development.

10. Project Purpose/Immediate Objective:

The purpose or immediate objective of the project is to promote operational changes within three key productive sectors to enable biodiversity conservation in the SCE and to support these changes through improvements to the enabling environment.

11. Expected Outcomes (GEF-related):

5. A strengthened enabling environment will exist for the financial, institutional, environmental and social sustainability of biodiversity conservation in the tourism, fisheries and agriculture-livestock sectors in the SCE.
6. The tourism sector develops in accordance with the conservation of marine and terrestrial ecosystems within the SCE
7. *Sustainable fisheries are practiced within the SCE so that fish populations and marine ecosystem functions are maintained and/or restored*
8. The declining sugar cane industry transitions into sustainable land use practices, with greatly reduced negative impacts on the coastal region of the SCE.

12. Production sectors and/or ecosystem services directly targeted by project:

12a. Please identify the main production sectors involved in the project. Please put “**P**” for sectors that are primarily and directly targeted by the project, and “**S**” for those that are secondary or incidentally affected by the project.

Agriculture ___P___
 Fisheries ___P___
 Forestry ___P___
 Tourism ___P___
 Other (please specify) ___ Livestock ___P___

12b. For projects that are targeting the conservation or sustainable use of ecosystems goods and services, please specify the goods or services that are being targeted, for example, water, genetic resources, recreational, etc

1. recreational and tourist
2. fisheries maintenance
3. coastal protection
4. forest genetic resources
5. coastal and marine water quality
6. biodiversity maintenance
7. soil conservation
8. livelihood for local communities
9. reduction of the emissions of greenhouse effect gases (methane, nitrous oxide, etc.)

II. Project Landscape/Seascape Coverage

13a. What is the extent (in hectares) of the landscape or seascape where the project will directly or indirectly contribute to biodiversity conservation or sustainable use of its components?

Targets and Timeframe	Foreseen at project start	Achievement at Mid-term Evaluation of Project	Achievement at Final Evaluation of Project
Project Coverage			
Landscape/ seascape area directly covered by the project (ha)	Tourism pilot projects: 0 ha	Tourism pilot project 1: 313,502 ha (Buena Vista Biosphere Reserve)	Tourism pilot projects 1 and 2: 313,502 ha + 226,875 ha = 540,377 ha (Buena Vista BR + Great Wetland of the north of Ciego de Ávila)
	Physical area covered by fisheries pilot projects: 0 ha	Physical area covered by fisheries PP 1, 2, and 3: 21,000 ha + 1,500 ha +10,000 ha = 32,500 ha	Physical area covered by fisheries PP 1, 2, and 3: 43,000 ha 3,000 ha + +15,000 ha = 61,000 ha
	Estimated marine area directly benefited by fishery pilot projects: 0 ha	Estimated marine area directly benefited by fishery pilot projects: 200,100 ha	Estimated marine area directly benefited by fishery pilot projects: 277,000 ha
	Agriculture pilot projects: 21 ha + 866 ha	Agriculture pilot projects: 511 ha +1018 ha	Agriculture pilot projects: 1,022 ha + 2035 ha
	Livestock pilot projects: 0 ha	Livestock pilot projects: 760 ha + 610 ha	Livestock pilot projects: 1520 ha + 1220 ha
	Forestry pilot projects: 36,321 ha	Forestry pilot projects: 39,633 ha	Forestry pilot projects: 42,446 ha

Landscape/ seascape area indirectly covered by the project (ha)	0 ha landscape 0 ha seascape	2,280,000 ha 831,100 ha	2,280,000 ha 831,100 ha
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Explanation for indirect coverage numbers: The area indirectly covered by the project includes the watersheds of the five provinces in the mainland, the cays and the marine shelf of the Sabana-Camaguey Ecosystem. This larger area will be affected indirectly through education and awareness raising, capacity building, better enforcement, new management structures for the integrated coastal management, new no-take areas, and new regulations and sustainable practices to mainstream biodiversity in the economic sectors.

13b. Are there Protected Areas within the landscape/seascape covered by the project? If so, names these PAs, their IUCN or national PA category, and their extent in hectares.

	Name of Protected Areas	IUCN and/or national category of PA	Extent in hectares of PA
1.	Buena Vista Biosphere Reserve (RAMSAR site)	Multiple Use Protected Area that includes other protected areas of more restricted management levels	313,502 ha
2.	Great Wetland of the North of Ciego de Ávila (RAMSAR site)	Multiple Use Protected Area that includes other protected areas of more restricted management levels	226,875 ha
3.	Las Picúas	Faunal Refuge	55,972 ha
4.	Lanzanillo	Faunal Refuge	87,071 ha

The above mentioned areas are directly involved in the project's pilot demonstrations, but the area indirectly covered by the project includes all of the protected areas located in the watersheds of the five provinces in the mainland, the cays and the marine shelf of the Sabana-Camaguey Ecosystem. The Protected Area System of the SCE includes 49 protected areas that cover 1,164,000 ha (including the multiple use protected areas). The core protected areas (areas with more restrictive classifications according to their IUCN management categories, such as faunal refuges, floristic management reserves, ecological reserves) cover 398,800 ha (approximately 12.8% of the SCE area).

III. Management Practices Applied

14a. Within the scope and objectives of the project, please identify in the table below the management practices employed by project beneficiaries that integrate biodiversity considerations and the area of coverage of these management practices? Note: this could range from farmers applying organic agricultural practices, forest management agencies managing forests per Forest Stewardship Council (FSC) guidelines or other forest certification schemes, artisanal fisher folk practicing sustainable fisheries management, or industries satisfying other similar agreed international standards, etc. An example is provided in the table below.

Targets and Timeframe	Area of coverage foreseen at start of project	Achievement at Mid-term Evaluation of Project	Achievement at Final Evaluation of Project
Specific management practices that integrate BD			

1. Implementation of integrated coastal management mechanisms	1'171,100 ha	1'269,488 ha	3'111,100 ha
2. Diversification of tourism with emphasis in nature tourism	0 ha	313,502 ha	313,502 ha + 226,875 ha = 540,377 ha
3. Mainstreaming biodiversity related indicators in the Tourism Sustainability Indicator System	0 ha	0 ha	3'111,100 ha
4. Improvement of tourism planning and management	1'177,100 ha	1'177,100 ha	1'177,100 ha
5. Sustainable fishing gears and practices	0 ha	200,100 ha	277,000 ha
6. Improved fishery management regulations	831,100 ha	831,100 ha	831,100 ha
7. Sustainable agricultural management practices	887 ha	1,529 ha	3,057 ha
8. Lower impact water buffalo rearing practices	160 ha.	1,370 ha	2,740 ha
9. Sustainable forestry management for biodiversity conservation	0 ha	3,063 ha	6,125 ha

14b. Is the project promoting the conservation and sustainable use of wild species or landraces?

Yes

If yes, please list the wild species (WS) or landraces (L):

Wild Species

Classification of selected species of the SCA according to their conservation status or category, their importance, and the main causes of decrease of their populations. CE = critically endangered; E = endangered; VU = vulnerable; LR = lower risk; LE = local endemic; CI = CITES; RC = species that require strict regulation and control; EI = traditional economic importance; OP = overfished populations; and HD= populations reduced by habitat damages; PA = populations reduced by pathologies; F = poaching or illegal fishing, or illegal extraction; w.c.n. = without common name; * = It is referred to at international level, and not at national level.

Species or subspecies	Common name	Classification											
		Conservation category				Importance				Impacts			
		CE	E	VU	LR	LE	CI	RC	EI	OP	HD	PA	F
ANIMALS													
Sponges													
Hippospongia lachne	Whool sponge				X				X	X?	X		
<i>Spongia spp.</i>	Macho sponge				X				X	X?	X		
Stony corals													
<i>Porites astreoides</i>	<i>Stars coral</i>			X			X				X	X	X

<i>Agaricia agaricites</i>	Lettuce coral			X			X				X	X	X
Cavernous <i>Montastrea</i>	Eyes coral			X			X				X	X	X
<i>Montastrea annularis</i>	Little eyes coral			X			X				X	X	X
<i>Acropora palmata</i>	Elkhorn			X			X				X	X	X
<i>Acropora cervicornis</i>	Deer horn			X			X				X	X	X
<i>Millepora alcicornis</i>	Fire coral			X			X				X	X	X
Other corals	Several			X			X				X	X	X
Gorgonians													
<i>Gorgonia flabellum</i>	<i>Sea fan</i>			X							X	X	X
<i>Gorgonia ventalina</i>	Sea fan			X							X	X	X
Mollusks													
<i>Strombus gigas</i>	Queen Conch			X			X		X	X			X
<i>Cassis spp.</i>	Helmet shell			X									X
<i>Charonia variegata</i>	Triton			X									X
<i>Cypraea zebra</i>	Negro maco			X									X
<i>Cerion spp.</i>	Cerion			X		X					X		X
<i>Ligus fasciatus sanctamariae</i>	Ligus			X		X			X		X		X
<i>Ligus fasciatus romanoensis</i>	Ligus			X		X			X		X		X
Echinoderms													
<i>Diadema antillarum</i>	Black long-spined sea urchin		X									X	
Crustaceans													
<i>Menippe mercenaria</i>	Stone crab				X				X	X	X		
Fish													
<i>Lutjanus analis</i>	Mutton snapper				X				X	X			
<i>Lutjanus synagris</i>	Lane snapper				X				X	X			
<i>Albula vulpes</i>	Banana fish				X				X	X?	X		
<i>Ophistonema oglinum</i>	Atlantic thread herring				X				X	X?	X		
<i>Megalops atlanticus</i>	Tarpon				X				X	X			
<i>American Dasyatis</i>	Ray				X				X	X			
<i>Aetobatus narinari</i>	Sting ray				X				X	X			
Gerridae	Pataos and mojarras				X				X	X?	X		
Mugilidae	Mulletts				X				X	X			

Sciaenidae	Corvina and croaker				X				X	X			
Chondrichtes	Sharks				X				X	X			
Reptiles													
<i>Eretmochelys imbricata</i>	Hawkbill turtle		X*					X	X	X	X*		X
<i>Caretta caretta</i>	Loggerhead turtle		X*					X	X	X	X*		X
<i>Chelonia mydas</i>	Green turtle		X*					X	X	X	X*		X
<i>Dermochelys coriacea</i>	Leather-back turtle		X*					X	X	X	X*		X
<i>Cyclura nubila</i>	Iguana		X					X				X	X
<i>Crocodylus acutus</i>	American crocodile	X						X		X		X	X
<i>Anolis pigmaequestrus</i>	Dwarf lizard	X				X						X	
<i>Anolis equestris potior</i>	Blue lizard					X						X	
Birds													
<i>Charadius melodus</i>	Piping Plover		X									X	
<i>Torreornis inexpectata varonai</i>	Zapata Sparrow			X		X						X	
<i>Xiphidiopicus percussus cocoensis</i>	Green Carpenter				X	X						X	
<i>Phoenicopterus ruber</i>	Pink Flamingo				X		X					X	X
<i>Saurothera merlini santamariae</i>	Cuban Lizard Cuckoo				X	X						X	
Mammals													
<i>Trichechus manatus</i>	West Indian Manatee	X					X			X	X		X
<i>Turciops truncatus</i>	Dolphin			X			X		X				X
<i>Mesocapromys auritus</i>	Rat hutia	X				X						X	X
Plants													
<i>Heliotropium myriophyllum</i>	Weed (w.c.n.)			X		X							
<i>Chamaesyce paredonensis</i>	Weed (w.c.n.)			X		X							
<i>Crescentia mirabilis</i>	Güirita			X		X							
<i>Cameraria microphylla</i>	Shrub (w.c.n.)			X		X							
<i>Isocarpa glabrata</i>	Shrub (w.c.n.)			X		X							
<i>Juniperus lucayana</i>	Sabina								X				
<i>Consolea millspaughii</i>	Cactus (w.c.n.)					X	X						
<i>Coccothrinax salvatoris</i>	Palm (w.c.n.)					X							

In general, all the activities of the project have the purpose to mainstream biodiversity in the three productive sectors involved. This will improve the conservation of different terrestrial and marine ecosystems of global importance as well as native species of flora and fauna, including the migratory birds.

Landraces

Landraces Species	Common name
1. Bos taurus var. Criollo	Ganado vacuno criollo
2. Ovis spp. var. pelibuey	Ovino pelibuey
3. Orytolagus spp. var. pardo criollo	Conejo pardo criollo
4. Gallus domesticus var. Cubalaya	Gallina cubalaya
5. Gallus domesticus var. semirústica	Gallina semirústica

14c. For the species identified above, *or other target species of the project not included in the list above (E.g., domesticated species)*, please list the species, check the boxes as appropriate regarding the application of a certification system, and identify the certification system being used in the project, if any.

Certification Species	Certification system is being used	Certification system will be used	Name of certification system if being used	Certification system will not be used
1. Bos taurus var. criollo	X		Cuban Decree-Law 1279 about Animal Register of Pure Races	
2. Ovis spp. var. pelibuey	X		Cuban Decree-Law 1279 about Animal Register of Pure Races	
3. Orytolagus spp. var. pardo criollo	X		This variety is recognized by the Cuban Animal Control Centre (CENCOP)	
4. Gallus domesticus var. cubalaya	X		This race was recognized in 1939 by the standard of American Poultry Association	

14d. Is carbon sequestration an objective of the project?

No

IV. Market Transformation and Mainstreaming Biodiversity

15a. **For those projects that have identified market transformation as a project objective**, please describe the project's ability to integrate biodiversity considerations into the mainstream economy by measuring the market changes to which the project contributed.

Name of the market that the project seeks to	Unit of measure of market impact	Market condition at the start of the	Market condition at midterm	Market condition at final

affect (sector and sub-sector)		project	evaluation of project	evaluation of the project
Tourism (eco-tourism)	Number of ecotourists/year, US\$ revenues/ ecotourist, Total US\$ revenues from ecotourism/year	No ecotourism activities	2,000 ecotourists / year, US\$300 revenues / ecotourist = US\$600,000 of revenues from ecotourism/year	4,000 ecotourists / year, US\$300 revenues / ecotourist = US\$1,200,000 of revenues from ecotourism/year
Fisheries (commercial sponge cultivation)	US\$/ton	35 - 40	37 – 42	39 – 44
Fisheries (molted blue crab cultivation)	US\$ per dozen crabs	15 (=US\$18,000/ton)	16	17
Fisheries (fishing with floating aggregation devices)	US\$/ton	1,000	1,000	1,000
Sustainable agricultural production (Fruits, grains, vegetables, cow milk and meat)	US\$/ ton of fruit	800	1,200	1,600
	US\$/ ton of grain	600	900	1,200
	US\$/ ton of vegetables	1,800	2,700	3,600
	US\$/ton of tubers, roots and bananas	500	750	1,000
	US\$/liter of cow milk	0,10	0,15	0,20
	US\$/ ton of beef	3,000	4,500	6,000
Sustainable forestry (timber processing in Guamuta Cooperative Farm)	Cubic meters of sustainably produced wood processed per year	83 cubic meters of sustainably produced wood processed per year	2,130 cubic meters of sustainably produced wood processed per year	4,260 cubic meters of sustainably produced wood processed per year
Sustainable water buffalo management	US\$/liter of milk	0,37	0,55	0,74
	US\$/ ton of meat	3,020	4,530	6,040

15b. Please also note which (if any) market changes were directly caused by the project.

Tourism: The project will change the tourism market by creating new sources of revenue based on diversification, specifically with the introduction of nature related tourism

Fisheries: The project will change the fisheries market by creating new sources of revenue based on various sustainable fishing practices.

Agriculture, livestock and forestry: The project will change agriculture related markets by creating new sources of revenues bases on sustainable agro-ecological production and sustainable forestry production. The project will help to develop new markets for organic agricultural products in the tourism sector within the SCE.

V. Improved Livelihoods

16. For those projects that have identified improving the livelihoods of a beneficiary population based on sustainable use /harvesting as a project objective, please list the targets identified in the logframe and record progress at the mid-term and final evaluation. An example is provided in the table below

Improved Livelihood Measure	Number of targeted beneficiaries (if known)	Please identify local communities project is working with	Improvement Foreseen at project start	Achievement at Mid-term Evaluation of Project	Achievement at Final Evaluation of Project
New jobs in tourism pilot project in the Buena Vista Biosphere Reserve	100 beneficiaries	Municipalities of Yaguajay and Mayajigua	0	50	100
New jobs in tourism pilot project in the Great Wetland of the North of Ciego de Ávila	50 beneficiaries	Municipalities of Moron and Falla	0	25	50
New jobs in commercial sponge culture	14 beneficiaries	Caibarién municipality	0	6	14
New jobs in molted blue-crab culture	36 beneficiaries	Municipalities of Caibarién and Nuevitas	0	20	36
New jobs in fishing with floating artificial devices	22 beneficiaries	Municipalities of Caibarién and Isabela de Sagua	0	12	22
New jobs in sustainable agriculture	552 beneficiaries	Guamuta Cooperative Farm	0	280	552
New jobs in sustainable agriculture	596 beneficiaries	Monte Lucas Cooperative Farm	0	300	596
New jobs in lower impact in water buffalo rearing	48 beneficiaries	La Magdalena and Yarual Cooperative farms	0	48	48
New jobs in reforestation of coastal forest	1500 beneficiaries	Five coastal municipalities (Chambas, Bolivia, Morón, Minas and Martí)	0	1,000	1,500

VI. Project Replication Strategy

17a. Does the project specify budget, activities, and outputs for implementing the replication strategy?

Yes

17b. Is the replication strategy promoting incentive measures & instruments (e.g. trust funds, payments for environmental services, certification) within and beyond project boundaries?

Yes

If yes, please list the incentive measures or instruments being promoted:

Tourism:

- Certification of nature related tourism operations
- Taxes and fees for visitors and tour operators

Fisheries:

- Higher payments for fish catches that use more sustainable gears and practices

Agriculture, livestock and forestry:

- Higher payments for organic products for sale to tourism centers
- Higher salaries for jobs that use more sustainable practices

17c. For all projects, please complete box below. Two examples are provided.

Replication Quantification Measure	Replication Target Foreseen at project start	Achievement at Mid-term Evaluation of Project	Achievement at Final Evaluation of Project
Hectares dedicating to ecotourism	4,000 ha		
Hectares dedicated to sustainable fishery practices	77,000 ha		
Hectares of sustainable agricultural management practices that incorporate biodiversity considerations	2,035 ha		
Hectares of sustainable management of water buffalo incorporating biodiversity considerations	1,220 ha		

VII. Enabling Environment

For those projects that have identified addressing policy, legislation, regulations, and their implementation as project objectives, please complete the following series of questions : 18a, 18b, 18c.

18a. Please complete this table at **work program inclusion for each sector** that is a primary or a secondary focus of the project.

Please answer YES or NO to each statement under the sectors that are a focus of the project.

	Agriculture	Fisheries	Forestry	Tourism
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Statement: Please answer YES or NO for each sector that is a focus of the project.	And Livestock			
Biodiversity considerations are mentioned in sector policy	YES	YES	YES	YES
Biodiversity considerations are mentioned in sector policy through specific legislation	YES	YES	YES	NO
Regulations are in place to implement the legislation	YES	YES	YES	NO
The regulations are under implementation	YES	YES	YES	NO
The implementation of regulations is enforced	YES	NO	YES	NO
Enforcement of regulations is monitored	NO	NO	YES	NO

Note: The project team feels that the requirement of answering a simple yes or no distorts the actual situation in Cuba. In fact, each of the sectors would probably answer “partially” for most of the questions, because this would more accurately reflect actual realities in the country. Hopefully, the project team can work with UNDP monitoring personnel to clarify this during use of the Tracking Tool.

18b. Please complete this table at **the project mid-term for each sector** that is a primary or a secondary focus of the project.

Please answer YES or NO to each statement under the sectors that are a focus of the project.

Statement: Please answer YES or NO for each sector that is a focus of the project.	Agriculture And Livestock	Fisheries	Forestry	Tourism
Biodiversity considerations are mentioned in sector policy				
Biodiversity considerations are mentioned in sector policy through specific legislation				
Regulations are in place to implement the legislation				
The regulations are under implementation				
The implementation of regulations is enforced				
Enforcement of regulations is monitored				

18c. Please complete this table at **project closure for each sector** that is a primary or a secondary focus of the project.

Please answer YES or NO to each statement under the sectors that are a focus of the project.

Statement: Please answer YES or NO for each sector that is a focus of the project.	Agriculture And Livestock	Fisheries	Forestry	Tourism
Biodiversity considerations are mentioned in sector policy				
Biodiversity considerations are mentioned in sector policy through specific legislation				
Regulations are in place to implement the legislation				
The regulations are under implementation				

The implementation of regulations is enforced				
Enforcement of regulations is monitored				

All projects please complete this question at the project mid-term evaluation and at the final evaluation, if relevant:

18d. Within the scope and objectives of the project, has the private sector undertaken voluntary measures to incorporate biodiversity considerations in production? If yes, please provide brief explanation and specifically mention the sectors involved.

An *example* of this could be a mining company minimizing the impacts on biodiversity by using low-impact exploration techniques and by developing plans for restoration of biodiversity after exploration as part of the site management plan.

VIII. Mainstreaming biodiversity into the GEF Implementing Agencies’ Programs

19. At each time juncture of the project (work program inclusion, mid-term evaluation, and final evaluation), please check the box that depicts the status of mainstreaming biodiversity through the implementation of this project with on-going GEF Implementing Agencies’ development assistance, sector, lending, or other technical assistance programs.

Time Frame	Work Program Inclusion	Mid-Term Evaluation	Final Evaluation
Status of Mainstreaming			
The project is not linked to IA development assistance, sector, lending programs, or other technical assistance programs.			
The project is indirectly linked to IAs development assistance, sector, lending programs or other technical assistance programs.	X		
The project has direct links to IAs development assistance, sector, lending programs or other technical assistance programs.			
The project is demonstrating strong and sustained complementarity with on-going planned programs.			

IX. Other Impacts

20. Please briefly summarize other impacts that the project has had on mainstreaming biodiversity that have not been recorded above.

Annex 16: Output Budget

OUTCOME	OUTPUT	GEF	Capacity 2015	WWF Canada	Ecodes arrollo	Govt. of Cuba	Total
1: Enabling environment for biodiversity conservation in productive sectors	1.1 Integrated Coastal Management Authority	\$258,532	\$0	\$0	\$0	\$1,442,800	\$1,701,332
	1.2 Environmental ed. & capacity building on ICM	\$189,672	\$346,200	\$0	\$0	\$900,000	\$1,435,872
	1.3: Lessons learned for ICM and conservation	\$264,467	\$230,800	\$57,900	\$0	\$600,000	\$1,153,167
	1.4: Mechanisms for long-term financing	\$148,948	\$0	\$0	\$0	\$300,000	\$448,948
	SUB-TOTAL	\$861,618	\$577,000	\$57,900	\$0	\$3,242,800	\$4,739,318
2: Tourism sector supports conservation of marine and terrestrial ecosystems within the ESC	2.1: Awareness and capacity for tourism	\$298,554	\$0	\$0	\$0	\$770,000	\$1,068,554
	2.2: Nature tourism at demonstration sites	\$317,508	\$0	\$0	\$81,678	\$620,000	\$1,019,186
	2.3: Capacity building for replicating nature tourism	\$146,220	\$0	\$0	\$0	\$965,000	\$1,111,220
	2.4: Sustainable financing for tourism	\$159,043	\$0	\$0	\$0	\$120,000	\$279,043
	2.5: Regulations and planning for tourism	\$404,859	\$0	\$0	\$10,500	\$98,000	\$513,359
	SUB-TOTAL	\$1,326,184	\$0	\$0	\$92,178	\$2,573,000	\$3,991,362
3: Sustainable fisheries are practiced within the ESC	3.1: Biophysical and socio-economic information for fisheries	\$432,059	\$0	\$171,500	\$0	\$881,600	\$1,485,159
	3.2: Fisheries regulations and practices	\$388,258	\$0	\$0	\$0	\$527,100	\$915,358
	3.3: Pilot projects for livelihoods for fishermen	\$212,430	\$0	\$0	\$0	\$1,632,000	\$1,844,430
	3.4: Awareness for fishermen/policy makers	\$128,404	\$0	\$422,600	\$0	\$345,500	\$896,504
	SUB-TOTAL	\$1,161,151	\$0	\$594,100	\$0	\$3,386,200	\$5,141,451
4: Declining sugar cane industry transitions into sustainable land use practices	4.1: Land use planning for former sugar lands	\$116,947	\$0	\$0	\$0	\$293,000	\$409,947
	4.2: Capacity building for agricultural and livestock	\$103,015	\$0	\$0	\$0	\$816,700	\$919,715
	4.3: Sustainable mngmt. of water buffalo	\$134,544	\$0	\$0	\$0	\$933,000	\$1,067,544
	4.4: Sustainable prod. on former sugar lands	\$156,105	\$0	\$0	\$0	\$272,000	\$428,105
	4.5: Sustainable mngmt. of coastal forests	\$259,935	\$0	\$0	\$0	\$10,515,300	\$10,775,235
	SUB-TOTAL	\$770,546	\$0	\$0	\$0	\$12,830,000	\$13,600,546
	PDF-B Funding	\$200,000					\$200,000
	TOTAL	\$4,119,498	\$577,000	\$652,000	\$92,178	\$22,032,000	\$27,672,676

Annex 17: Monitoring and Evaluation Plan

Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures. The Logical Framework Matrix in Section II of the Project Document provides impact indicators for Project implementation along with their corresponding means of verification. These will form the basis on which the Project's Monitoring and Evaluation system will be built. This Annex includes: (i) a detailed explanation of the monitoring and reporting system for the Project; (ii) a presentation of the evaluation system; and (iii) a matrix presenting the workplan and the budget for M&E section.

I. MONITORING AND REPORTING

A. Project Inception Phase

The Project Steering Committee (PSC) will conduct an inception workshop with the key stakeholders responsible for Project management and implementation at the commencement of the Project with the aim of assisting the Project team to understand and take ownership of the Project's goals and objectives, as well as finalize preparation of the Project's first annual work plan on the basis of the Project's logframe matrix.

The key objectives of the Inception Workshop are to:

- review the logframe (indicators, means of verification, assumptions), imparting additional detail as needed;
- finalize the Annual Work Plan (AWP) with precise and measurable performance indicators, and in a manner consistent with the expected outcomes for the Project;
- develop specific targets for the first year implementation progress indicators;
- introduce Project staff with the representatives of the UNDP Country Office and the Regional Coordinating Unit (RCU);
- detail the roles, support services and complementary responsibilities of UNDP-CO and RCU staff vis à vis the Project team;
- provide a detailed overview of UNDP-GEF reporting and monitoring and evaluation (M&E) requirements, with particular emphasis on the annual Project Implementation Reviews (PIRs) and related documentation, the Annual Project Report (APR), Tripartite Review Meetings, as well as mid-term and final evaluations;
- inform the Project team on UNDP Project related budgetary planning, budget reviews, and mandatory budget rephasings;
- present the ToR for Project staff and decision-making structures in order to clarify each party's roles, functions, and responsibilities, including reporting and communication lines, and conflict resolution mechanisms;

B. Monitoring responsibilities and events

The Project Steering Committee in consultation with relevant stakeholders will develop a detailed schedule of Project reviews meetings, which will be incorporated in the Project Inception Report. The schedule will include: (i) tentative time frames for Tripartite Reviews, Steering Committee Meetings, (or relevant advisory and/or coordination mechanisms) and (ii) Project related Monitoring and Evaluation activities.

Day to day monitoring of implementation progress will be the responsibility of the Project Coordinator, based on the Project's Annual Work Plan and its indicators. The Project Steering Committee will inform

the UNDP-CO of any delays or difficulties faced during implementation so that the appropriate support or corrective measures can be adopted in a timely and remedial fashion. Measurement of impact indicators related to global benefits will occur according to the schedules defined in the Inception Workshop and tentatively outlined in the indicative Impact Measurement Template at the end of this Annex. The measurement, of these will be undertaken through subcontracts with relevant institutions or through specific studies that are to form part of the projects activities.

Periodic monitoring of implementation progress will be undertaken by the UNDP-CO through quarterly meetings with the Project Steering Committee, or more frequently as deemed necessary. This will allow parties to take stock and to troubleshoot any problems pertaining to the Project in a timely fashion to ensure smooth implementation of Project activities. UNDP Country Offices and UNDP-GEF RCUs as appropriate will conduct yearly visits to the Sabana Camaguey Ecosystem to assess first hand Project progress. Any other member of the Project Steering Committee can also accompany, as decided by the PSC. A Field Visit Report will be prepared by the CO and circulated no less than one month after the visit to the Project team, all PSC members, and UNDP-GEF.

Annual Monitoring will occur through the Tripartite Review (TPR). This is the highest policy-level meeting of the parties directly involved in the implementation of a Project. The Project will be subject to Tripartite Review (TPR) at least once every year. The first such meeting will be held within the first twelve months of the start of full implementation. The Project Steering Committee will prepare an Annual Project Report (APR) and submit it to UNDP-CO and the UNDP-GEF regional office at least two weeks prior to the TPR for review and comments. The APR will be used as one of the basic documents for discussions in the TPR meeting. The Project Steering Committee will present the APR to the TPR, highlighting policy issues and recommendations for the decision of the TPR participants and will inform the participants of any agreement reached by stakeholders during the APR preparation on how to resolve operational issues. Separate reviews of each Project component may also be conducted if necessary. The TPR has the authority to suspend disbursement if Project performance benchmarks (developed at the inception workshop) are not met.

Terminal Tripartite Review (TTR) is held in the last month of Project operations. The Project Steering Committee is responsible for preparing the Terminal Report and submitting it to UNDP-CO and LAC-GEF's Regional Coordinating Unit. It shall be prepared in draft at least two months in advance of the TTR in order to allow review, and will serve as the basis for discussions in the TTR. The terminal tripartite review considers the implementation of the Project as a whole, paying particular attention to whether the Project has achieved its stated objectives and contributed to the broader environmental objective. It decides whether any actions are still necessary, particularly in relation to sustainability of Project results, and acts as a vehicle through which lessons learnt can be captured to feed into other projects under implementation of formulation.

C. Project Monitoring Reporting

The Project Coordinator in conjunction with the UNDP-GEF will be responsible for the preparation and submission of the following reports that form part of the monitoring process:

Inception Report (IR) - will be prepared immediately following the Inception Workshop. It will include a detailed First Year/ Annual Work Plan divided in quarterly time-frames detailing the activities and progress indicators that will guide implementation during the first year of the Project. This Work Plan would include the dates of specific field visits, support missions from the UNDP-CO or the Regional Coordinating Unit (RCU) or consultants, as well as time-frames for meetings of the Project's decision making structures. The Report will also include the detailed Project budget for the first full year of implementation, prepared on the basis of the Annual Work Plan, and including any monitoring and

evaluation requirements to effectively measure Project performance during the targeted 12 months time-frame. The Inception Report will include a more detailed narrative on the institutional roles, responsibilities, coordinating actions and feedback mechanisms of Project related partners. In addition, a section will be included on progress to date on Project establishment and start-up activities and an update of any changed external conditions that may effect Project implementation. The finalized report will be distributed to the UNDP Country Office and UNDP-GEF's Regional Coordinating Unit and after that to the Project counterparts who will be given a period of one calendar month in which to respond with comments or queries:

Annual Project Report (APR) - is a UNDP requirement and part of UNDP's Country Office central oversight, monitoring and Project management. It is a self -assessment report by Project management to the CO and provides input to the country office reporting process and the ROAR, as well as forming a key input to the Tripartite Project Review. An APR will be prepared on an annual basis prior to the Tripartite Project Review, to reflect progress achieved in meeting the Project's Annual Work Plan and assess performance of the Project in contributing to intended outcomes through outputs and partnership work. The format of the APR is flexible but should include:

- An analysis of Project performance over the reporting period, including outputs produced and, where possible, information on the status of the outcome;
- The constraints experienced in the progress towards results and the reasons for these;
- The three (at most) major constraints to achievement of results;
- Expenditure reports;
- Lessons learned;
- Clear recommendations for future orientation in addressing key problems in lack of progress.

Project Implementation Review - is an annual monitoring process mandated by the GEF. It has become an essential management and monitoring tool for Project managers and offers the main vehicle for extracting lessons from ongoing projects. Once the Project has been under implementation for a year, a Project Implementation Report must be completed by the CO together with the Project. The PIR can be prepared any time during the year and ideally prior to the TPR. The PIR should then be discussed in the TPR so that the result would be a PIR that has been agreed upon by the Project, the executing agency, UNDP CO and the concerned RC. The individual PIRs are collected, reviewed and analyzed by the RCs prior to sending them to the focal area clusters at the UNDP/GEF headquarters. The focal area clusters supported by the UNDP/GEF M&E Unit analyze the PIRs by focal area, theme and region for common issues/results and lessons. The TAs and PTAs play a key role in this consolidating analysis. The focal area PIRs are then discussed in the GEF Interagency Focal Area Task Forces in or around November each year and consolidated reports by focal area are collated by the GEF Independent M&E Unit based on the Task Force findings

Quarterly Progress Reports - Short reports outlining main updates in Project progress will be provided quarterly to the local UNDP Country Office and the UNDP-GEF regional office by the Project Steering Committee. The format will be provided.

Periodic Thematic Reports - As and when called for by UNDP, UNDP-GEF or the Implementing Partner, the Project Steering Committee will prepare Specific Thematic Reports, focusing on specific issues or areas of activity. The request for a Thematic Report will be provided to the Project team in written form by UNDP and will clearly state the issue or activities that need to be reported on. These reports can be used as a form of lessons learnt exercise, specific oversight in key areas, or as troubleshooting exercises to evaluate and overcome obstacles and difficulties encountered. UNDP is requested to minimize its requests for Thematic Reports, and when such are necessary will allow reasonable timeframes for their preparation by the Project team;

Project Terminal Report - During the last three months of the Project the Project team will prepare the Project Terminal Report. This comprehensive report will summarize all activities, achievements and outputs of the Project, lessons learnt, objectives met, or not achieved structures and systems implemented, etc. and will be the definitive statement of the Project's activities during its lifetime. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the Project's activities.

Technical Reports - Technical Reports are detailed documents covering specific areas of analysis or scientific specializations within the overall Project. As part of the Inception Report, the Project team will prepare a draft Reports List, detailing the technical reports that are expected to be prepared on key areas of activity during the course of the Project, and tentative due dates. Where necessary this Reports List will be revised and updated, and included in subsequent APRs. Technical Reports may also be prepared by external consultants and should be comprehensive, specialized analyses of clearly defined areas of research within the framework of the Project and its sites. These technical reports will represent, as appropriate, the Project's substantive contribution to specific areas, and will be used in efforts to disseminate relevant information and best practices at local, national and international levels.

Project Publications - Project Publications will form a key method of crystallizing and disseminating the results and achievements of the Project. These publications may be scientific or informational texts on the activities and achievements of the Project, in the form of journal articles, multimedia publications, etc. These publications can be based on Technical Reports, depending upon the relevance, scientific worth, etc. of these Reports, or may be summaries or compilations of a series of Technical Reports and other research. The Project team will determine if any of the Technical Reports merit formal publication, and will also (in consultation with UNDP, the government and other relevant stakeholder groups) plan and produce these Publications in a consistent and recognizable format. Project resources will need to be defined and allocated for these activities as appropriate and in a manner commensurate with the Project's budget.

II. INDEPENDENT EVALUATION

The Project will be subjected to at least two independent external evaluations as follows:

Mid-term Evaluation - will be undertaken at the end of the second year of implementation. The Mid-Term Evaluation will determine progress being made towards the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of Project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about Project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the Project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the Project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

Final Evaluation - will take place three months prior to the terminal tripartite review meeting, and will focus on the same issues as the mid-term evaluation. The final evaluation will also look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental goals. The Final Evaluation should also provide recommendations for follow-up activities. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

Audit Clause

CITMA will provide the UNDP Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to the status of UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the CITMA, or by a commercial auditor engaged by CITMA/the Project.

III. MONITORING AND EVALUATION WORKPLAN AND CORRESPONDING BUDGET

Table 1 presents the M&E workplan and corresponding budget.

Table 1: Indicative Monitoring and Evaluation Work plan and corresponding budget

Type of M&E activity	Responsible Parties	Budget US\$ Excluding Project team Staff time	Time frame
Inception Workshop	<ul style="list-style-type: none"> ○ Project Coordinator ○ UNDP CO ○ UNDP GEF 	7,000	Within first two months of Project start up
Inception Report	<ul style="list-style-type: none"> ○ Project Team ○ UNDP CO 	500	Immediately following IW
Measurement of Means of Verification for Project Purpose Indicators	<ul style="list-style-type: none"> ○ Project Coordinator will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members 	8,000	Start, mid and end of Project
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis) + workshop for dissemination	<ul style="list-style-type: none"> ○ Oversight by Project GEF Technical Advisor and Project Coordinator ○ Measurements by regional field officers and local IAs 	12,000	Annually prior to APR/PIR and to the definition of annual work plans
APR and PIR	<ul style="list-style-type: none"> ○ Project Team ○ UNDP-CO ○ UNDP-GEF ○ 	None	Annually
TPR and TPR report	<ul style="list-style-type: none"> ○ Government Counterparts ○ UNDP CO ○ Project team ○ UNDP-GEF Regional Coordinating Unit 	None	Every year, upon receipt of APR
Steering Committee Meetings	<ul style="list-style-type: none"> ○ Project Coordinator ○ UNDP CO 	0	Following Project IW and subsequently at least once a year
Periodic status reports	<ul style="list-style-type: none"> ○ Project team 	10,000	To be determined by Project team and UNDP CO
Technical reports	<ul style="list-style-type: none"> ○ Project team ○ Hired consultants as needed 	12,000	To be determined by Project Team and

			UNDP-CO
Mid-term External Evaluation	<ul style="list-style-type: none"> ○ Project team ○ UNDP- CO ○ UNDP-GEF Regional Coordinating Unit ○ External Consultants (i.e. evaluation team) 	40,000	At the mid -point of Project implementation.
Final External Evaluation	<ul style="list-style-type: none"> ○ Project team, ○ UNDP-CO ○ UNDP-GEF Regional Coordinating Unit ○ External Consultants (i.e. evaluation team) 	50,000	At the end of Project implementation
Terminal Report	<ul style="list-style-type: none"> ○ Project team ○ UNDP-CO ○ External Consultant 	None	At least one month before the end of the Project
Lessons learned	<ul style="list-style-type: none"> ○ Project team ○ UNDP-GEF Regional Coordinating Unit 	25,000	Yearly
Audit	<ul style="list-style-type: none"> ○ UNDP-CO ○ Project team 	20,000	Yearly
TOTAL COST Excluding Project team staff time and UNDP staff and travel expenses		184,500	