WHC Nomination Documentation

File Name: 928.pdf **UNESCO Region: LATIN AMERICA AND THE CARIBBEANS**

SITE NAME: Area de Conservación Guanacaste

DATE OF INSCRIPTION: 4th December 1999

STATE PARTY: COSTA RICA

CRITERIA: N (ii)(iv)

DECISION OF THE WORLD HERITAGE COMMITTEE:
Excerpt from the Report of the 23rd Session of the World Heritage Committee

The Committee decided to inscribe the Guanacaste Conservation Area on the World Heritage List under criteria (ii) and (iv).

The site demonstrates significant, major biological and ecological processes in both its terrestrial and marine-coastal environments, as exemplified by: a) evolution, succession and restoration of Pacific Tropical Dry Forest; b) altitudinal migration and other interactive biogeographic and ecological processes along its dry forest - montane humid forest - cloud forest - lowland Caribbean rain forest transect; and, c) the major upwelling and development of coral colonies and reefs in regions long considered to not have either (the marine area near the coast of the Murcielago sector of Santa Rosa National Park).

The site contains important natural habitats for in-situ conservation of biological diversity (2.4% of global diversity), including both the best dry forest habitats and communities in Central America and key habitat for threatened animal species such as the Saltwater Crocodile, False Vampire Bat, Leatherback Sea Turtle, Jaguar, Jabiru Stork, Mangrove Hummingbird and threatened plant species such as Mahogany, Guyacan Real (Lignum Vitae), five species each of rare cacti and rare bromeliads.

BRIEF DESCRIPTIONS

The Area de Conservación Guanacaste contains important natural habitats for the conservation of biological diversity, including the best dry forest habitats and communities from Central America to northern Mexico and key habitat for threatened or rare plant and animal species. The site demonstrates significant ecological processes in both its terrestrial and marine-coastal environments. These processes include: the evolution, succession and restoration of Pacific Tropical Dry Forest; altitudinal migration and other interactive biogeographic and ecological processes and major upwelling and the development of coral colonies and reefs.

1.b State, Province or Region: Guanacaste and Alajuela provinces

1.d Exact location: 10° 51' N, 85° 37' W

AREA DE CONSERVACION GUANCASTE

Nomination for inclusion in the World Heritage List of natural properties

Submitted by the Government of Costa Rica

1 July 1998

Area de Conservacion Guanacaste (ACG)

"Nomination for inclusion in the World Heritage List of natural properties"

1. Specific location

a. Country

Costa Rica

b. State, Province or Region

primarily Guanacaste Province, plus a small portion in Alajuela Province.
northwestern Costa Rica marine, island and continent

c. Name of property

Area de Conservacion Guanacaste (ACG)

Note: an acceptable English translation would be Guanacaste Conservation Area, but proper geographic names are best left as proper names - for example, San Jose, the capital of Costa Rica, is called San Jose in English, rather than Saint Joseph.

d. Exact location on map and indication of geographical coordinates.

The primary GIS geo-reference point next to the Research Building in the Area Administrativa, Sector Santa Rosa, ACG is at Lambert N 313499.3995 and E 359241.3176 (about 10 51' N Lat and 85 37' W Long) (295.168 msl). The ACG covers much of the rectangle defined by 10 44' and 11 06' N by 85 15' and 86 00' W. This area is in northwestern Costa Rica and covers, as a continuous unit of irregular shape, approximately 88,000 terrestrial hectares and 43,000 marine hectares (Fig. 1, and see the ACG web site at http://www.guanacaste.ac.cr). It begins 12 miles out into the Pacific and extends inland across the Pacific coastal lowlands, over three tall volcanos (1500-2000 m), and down into the Atlantic coastal lowlands, for a total distance of about 105 km.

It is important to emphasize that the 15,800 ha of pale gray inholding that covers the southern portion of the Santa Elena Peninsula in Fig. 1 (also known as the "Santa Elena property", Janzen 1998d) is not included in the above-mentioned calculation of area for the ACG. This inholding is is not yet part of the ACG, but it is the subject of an expropriation case being conducted by the governm nt of Costa Rica, with the intent of including the Santa Elena property in the ACG (ICSID CASE NO. ARB/96/1). It is anticipated at the time of this submission for World Heritage listing that the expropriation case will be completed by mid-1999, well before the World Heritage Committee will make its decision on this application in late 1999. The Santa Elena property is, however, biologically part of the ACG as a unit of biodiversity and conservation to attempt to conserve as a wildland, and is meant to be included in generalizations made about biodiversity and conservation of the ACG.

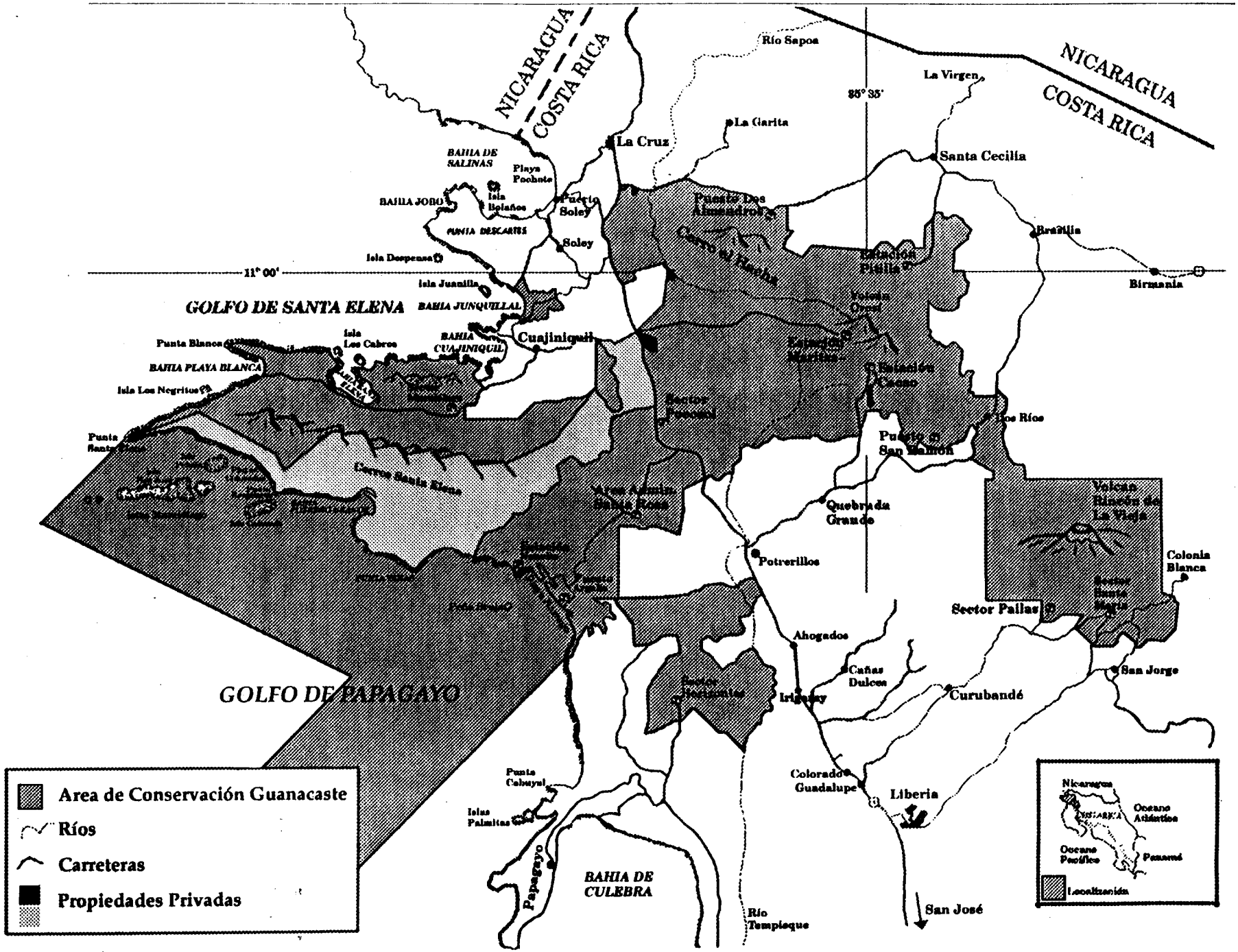

Figure 1. Current boundaries of the Area de Conservacion Guanacaste (ACG) (1998).

e. Maps and/or plans.

Figures 1-4 include maps and aerial photographs providing additional information on the ACG

Fig. 1. Current boundaries of the Area de Conservacion Guanacaste (ACG) in 1998. These boundaries will creep outword by a few hectares at points of key habitat over the next several years, and hopefully absorb totally the Santa Elena property in 1999.

Fig. 2. Historical map of the ACG, showing the government-owned or -controlled areas when the ACG was first conceived in 1985. The gray areas, except for the Santa Elena property inholding, have now been purchased for inclusion in the ACG, as well as all but about 400 ha within the black areas in Fig. 2. About 3% further expansion of the ACG is anticipated on the northern slopes of the Volcan Rincon de la Vieja massif in 1999-2000, and a few other small marginal expansions may occur as more biological knowledge is gained.

Fig. 3. The eight Holdridge Life Zones that occur within the approximate boundaries of the Area de Conservacion Guanacaste (Humid Tropical Forest, Premontane Very Humid Forest, Humid Tropical Forest Transition to Premontane, Premontane Rain Forest, Lower Montane Rain Forest, Very Humid Tropical Forest Transition to Premontane). Yellow and green are two kinds of tropical dry forest, while the other colors to the east are wetter and higher Life Zones (colder).

Fig. 4. Representation of the protected areas of the ten continental conservation areas in the National System of Conservation Areas (SINAC) (derived from Garcia 1996). The ACG = Area de Conservacion Guanacaste, and ACT = Area de Conservacion Tempisque, are the two primarily dry forest conservation areas.

Topographic maps: Excellent standard Costa Rican Instituto Nacional Geografico topographic maps (1:50,000 with Lambert coordinates) are available for the entire ACG, based on aerial photographs taken in the late 1960's and subsequently updated. The ACG has excellent aerial photographs taken by Canada in 1984 and USA NASA in 1988. At present, the ACG is, in collaboration with the Catastro Nacional, restituting new GIS layers (contour, vegetation, streams, roads, etc.) for all of the ACG from 1996 GPS geopositioned aerial photographs (scale about 1:20,000) taken by Hansa Luftbild. These should be available in ArcInfo in 1999, and will then be used as base GIS layers on which to record ACG history, former land ownership, vegetational changes, climate data, etc.

2. Juridical Data

a. Owner

i. Republic of Costa Rica owns the black areas in Fig. 2, except that a portion of the Pitilla-Orosi-Cacao black area (northeast) is still owned by the Fundacion de Parques Nacionales (FPN). These FPN lands are held in custodianship until they are donated to the State, which will occur when there is appropriate national legislation authorizing the ACG (and any other Area de Conservacion) to conduct any and all activities that it needs to conduct to guarantee the survival of its biodiversity and their ecosystems into the indefinite future (see later discussions of this important point).

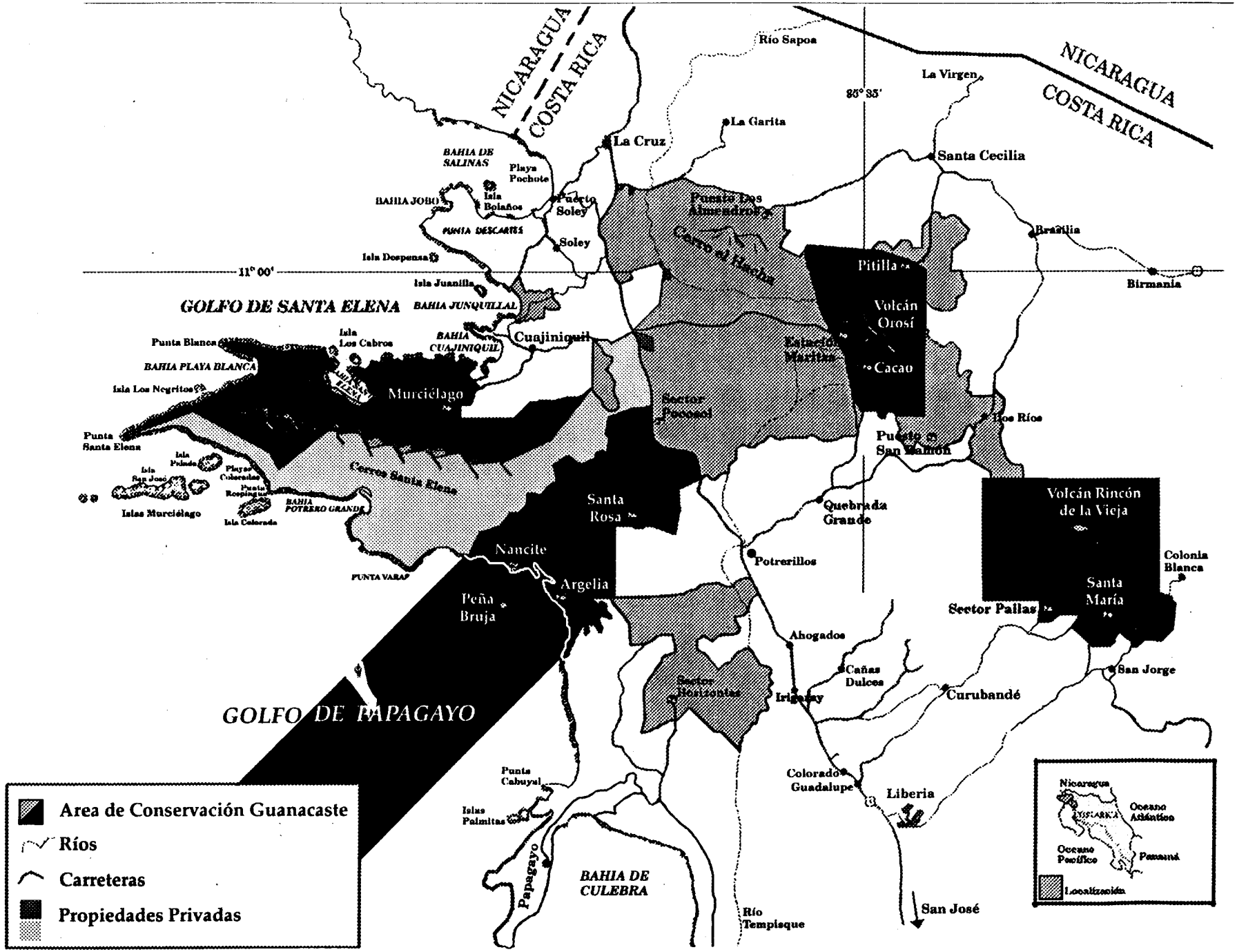

Figure 2. Area de Conservacion Guanacaste, with the areas marked in black being those that were government-owned (Santa Rosa, Murcielago, Rincon) or government-controlled (Orosi, Cacao) in 1985 when the ACG began to take form.

ii. The FPN, as a parastatal NGO established in support of the conservation of Costa Rica's natural areas, owns those medium gray areas in Fig. 1 that are not owned by the Republic of Costa Rica.

iii. The light gray area in Fig. 1, the Santa Elena property (approximately 15,800 ha), is, as mentioned earlier, currently being expropriated by the Republic of Costa Rica for inclusion in the ACG, hopefully in 1999.

iv. Two tiny areas, indicated in dark gray/black in Fig. 1, are currently being negotiated with their owners for purchase by the ACG. The center portion of the south-north connection between Rincon and Cacao, which is the area around and to the east of Dos Rios, has now been purchased by the ACG (FPN title holder) and the last payment will be made January 1999.

b. Legal Status

The ACG has a complex internal legal status, as well as legal status as a unit, the ACG (note: the dates below refer to the date of publication of laws or decrees in the La Gaceta, which is what makes them legal, rather than their date of pronouncement/signing by a public figure).

i. Parque Nacional Santa Rosa (PNSR), its Sector Murciélago and additions.

a) PNSR was first established on 1 Jul 1966 as a National Monument (Law 3694), 1000 ha around the Casona (the original ranch headquarters for Hacienda Santa Rosa, the second oldest ranch in Costa Rica, established in the late 1500's).

b) On 27 Mar 1971, the area was decreed Parque Nacional Santa Rosa (Executive Decree 1562-A) as 9,904 terrestrial ha (including the 1000 ha of the national monument) lying between the Interamerican Highway and the marine waters 12 miles out to the national limit.

c) On 21 May 1977, PNSR was broadened to the south by 860 terrestrial ha and the marine waters 12 miles out to the national limit (Executive Decree 7013-A) .

d) On 3 Dec 1980, PNSR was broadened (Executive Decree 12082-A) in the north by 13,478.8 terrestrial ha through the inclusion of a large part of Hacienda Murcielago (other parts of Hacienda Murcielago went to IDA for distribution to small land-holders), recently expropriated for this purpose from the Somoza family

e) On 27 Dec 1982, all of Costa Rica's national park Executive Decrees were ratified into law (6794), including those for PNSR.

f) On 12 Aug 1987, PNSR was broadened (Executive Decree 17656-MAG) to include the 15,800 ha of Hacienda Santa Elena, and a marine area 6 km out to sea, and about 300 ha of islands (Islas Murcielagos, Isla Colorado, Isla Pelada, etc.) in this marine area. The terrestrial portion of this decree, covering the "Santa Elena property" lying between Santa Rosa and Murcielago, is, however, in abeyance until the earlier-mentioned expropriation case has run its course, the owners have been paid, and the State takes possession.

g) On 6 Nov 1991, PNSR was broadened (Executive Decree 20792-MIRENEM) to include the 15 ha of Isla Bolaños (in Bahia de Salinas), formerly Refugio de Vida Silvestre Isla Bolaños (RVSIB).

The above sum to 40,357.8 - 15,800 = 24,557.8 terrestrial ha and approximately 43,000 marine ha owned by the Republic of Costa Rica.

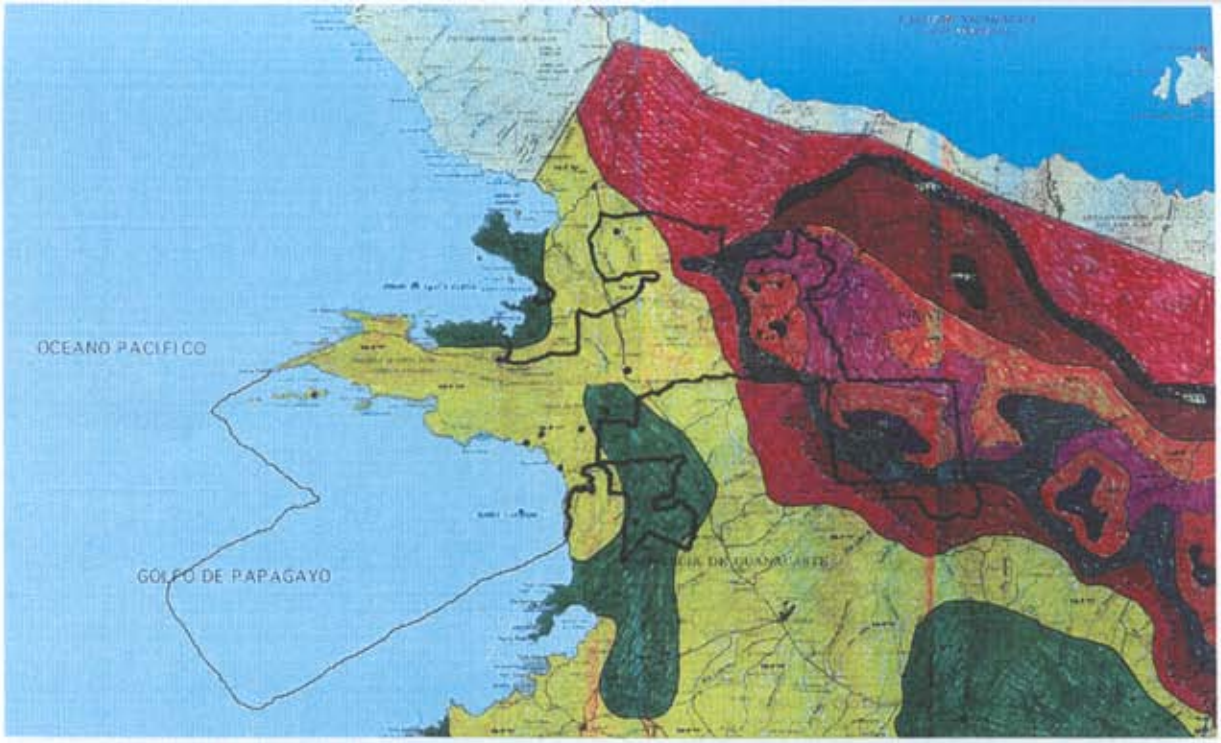

Fig. 3. The eight Holdridge Life Zones that occur within the approximate boundaries of the Area de Conservacion Guanacaste (Humid Tropical Forest, Premontane Very Humid Forest, Humid Tropical Forest Transition to Premontane, Premontane Rain Forest, Lower Montane Rain Forest, Very Humid Tropical Forest Transition to Premontane). Yellow and green are two kinds of tropical dry forest, while the other colors to the east are wetter and higher Life Zones (colder).

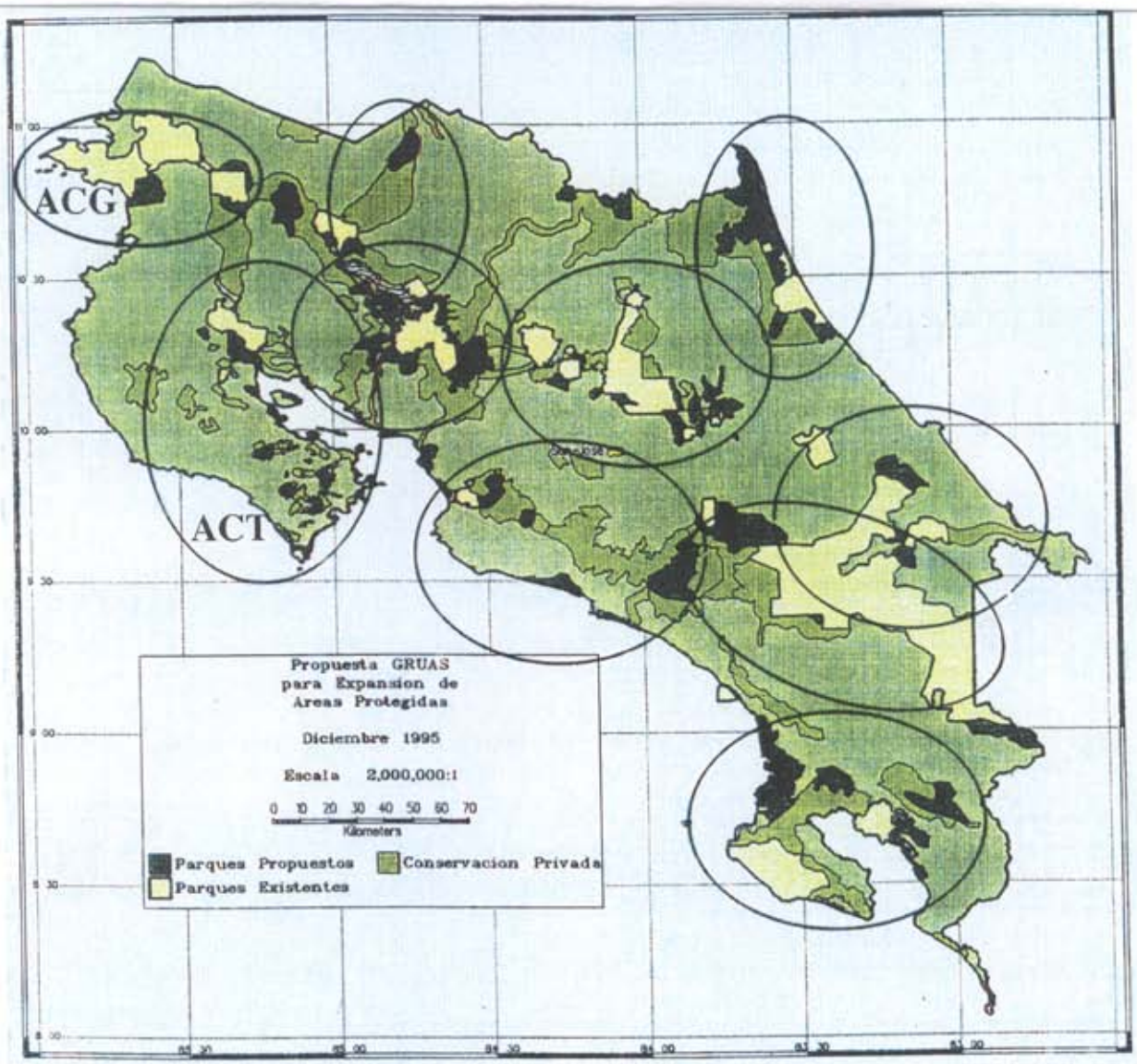

Fig. 4. Representation of the protected areas of the ten continental conservation areas in the National System of Conservation Areas (SINAC) (derived from Garcia 1996). The ACG = Area de Conservacion Guanacaste, and ACT = Area de Conservacion Tempisque, are the two primarily dry forest conservation areas.

ii. Parque Nacional Rincon de la Vieja (PNRV)

a) PNRV was first established on 10 May 1974 (Law 5398), with an area of 11,700 ha.
b) PNRV was enlarged (Executive Decree 8493) by 2384 ha on 1 Jun 1978.
c) On 27 Dec 1982, all of Costa Rica's national park Executive Decrees were ratified into law (6794), including those for PNRV.

The above sum to 14,084 terrestrial ha owned by the Republic of Costa Rica.

iii. Parque Nacional Guanacaste (PNG)

a) PNG was first established (Executive Decree 19124-MIRENEM) as 32,512 terrestrial ha on 16 Aug 1989, but this decree was declared inconstitutional, so PNG was re-decreed (Executive Decree 20516-MIRENEM) on 9 Jul 1991.
b) Much of PNG was initially the Reserva Forestal Orosi (RFO), and the area around the RFO became the Zona Protectora Guanacaste (ZPG) before it was decreed as PNG.
c) PNG has been enlarged by the purchase of about 4853 ha of bordering lands since 1989.
d) Two small private in-holdings, summing to about 300 ha, are still being negotiated within the boundaries of PNG.

The above sum to 37,365 terrestrial ha owned by the Republic of Costa Rica and the FPN (for passage to the State when there is appropriate legislation). It is anticipated that the PNG area will increase by another 1000-2000 ha in fine- tuning its margins over the years to come.

iv. Refugio Nacional de Vida Silvestre Bahia Junquillal

a) RNVSBJ, first called Area Recreativa Bahia Junquillal of the ACG, was received as a donation to the FPN to be part of the ACG on 11 Oct 1988, and formally created (Executive Decree 23867-MIRENEM) 10 Jan 1995, which also included Isla Juanilla and Isla Los Muñecos, summing to 438.7 ha.

RNVSBJ is 438.7 of FPN owned land (for passage to the State when there is appropriate legislation) plus the marine and beach area which is already owned by the State but does not bear a special conservation decree.

v. Estacion Experimental Forestal Horizontes (EEFH)

a) The 7317.3 ha EEFH was received as a donation to the FPN for the ACG on 10 Dec 1987, and is maintained as a tropical dry forest experiment station by the ACG as a service to the Guanacaste agroscape. It will be passed to the State when there is appropriate conservation area legislation.

vi. Marine area. The marine areas that are covered by the laws and decrees above (1562-A, 7013, and 17656-MAG) sum to approximately 43,000 ha. In addition to their national park status, they are also included within Executive Decree 24282 as Marine Multiple Use Area, explicitly

subject to the laws and regulations of the national parks and conservation area that contain them. This area will likely expand to include a narrow strip along the northern margin of the Santa Elena Peninsula, as part of the gradual adjustment of the coastal fishing community to this protected area.

vii. Area de Conservacion Guanacaste as a unit (Fig. 1; this area has been variously known as the Unidad Regional de Conservacion Guanacaste, Megaparque Guanacaste, and Area de Conservacion y Desarrollo Guanacaste, and is not to be confused with "Area de Conservacion Guanacaste" as currently applied to the entire area from the Nicaraguan border south to Liberia by MINAE (agroscape plus ACG, and as used in the new Ley de Biodiversidad, No. 7788, Ley de Biodiversidad, 27 May 1998). That is to say, this application for World Heritage Listing is only for the ACG as represented in Fig. 1, and not as the words Area de Conservacion Guanacaste are used by MINAE.

a) Under the name of Unidad Regional de Conservacion Guanacaste, the ACG was first formed by Executive Decree 19124-MIRENEM on 16 Aug 1989. The ACG (URCG) was made up of PNSR, PNRV, RVSIB, ARBJ, EEFH and PNG.

b) The ACG was first formally recognized as the Area de Conservacion Guanacaste (ACG) by Executive Decree 20516-MIRENEM of 16 Aug 1989, and formally made up of PNSR, PNRV, RVSIB, ARBJ, EEFH and PNG. While this decree was declared unconstitutional, it was then re-decreed as Executive Decree 20516-MIRENEM of 9 Jul 1991.

c) Executive Decree 22998 of 15 March 1994 decreed PNSR, PNRV, RVSIB, ARBJ, EEFH and PNG (called Zona Protectora Guanacaste) to be the Area de Conservacion y Desarrollo Sostenible Guanacaste (an undesirable alteration of the site's name that has been ignored ever since). This decree also included in the ACG (Art. 1) the estuarine wetlands lying between Bahia Salinas and Punta Zapotal. This decree also authorized the ACG to set up a Technical Committee (Comite Tecnico) and a Local Board (Comite Local), and to appoint a "coordinator" (= Director) who carries out the policies of MIRENEM (today known as MINAE).

d) The Local Board (= Comite Local) for all conservation areas, including the ACG, was further decreed (Executive Decree 22481) and its detailed responsibilities/functions defined on 9 Sept 1993. Further responsibilities and powers of the Comite Local, now termed "Consejo Regional" are established, but not yet reglemented, in the new Biodiversity Law (No. 7788, Ley de Biodiversidad, 27 May 1998).

e) The ACG was again formally decreed (Executive Decree 22909, dated 7 Feb 1994) to be part of SINAC (Sistema Nacional de Areas de Conservacion) within MINAE, called SINACODES at that time, and now established as SINAC by the new Biodiversity Law (No. 7788, Ley de Biodiversidad, 27 May 1998). However, as noted in the introduction to this section, the use of the words "Area de Conservacion Guanacaste" in Decree 22909 (to mean both the State-owned lands and the surrounding private areas) are not in accordance with the way they are used in this WHS application, a usage of "ACG" that is meant only to cover the area indicated in Fig. 1, and not the surrounding privately owned agroscape. This use of the ACG for the "protected area" is in full accordance with the past 12 years of usage by the ACG and its antecedents. However, the result of Decree 22909 (and the new Ley de Biodiversidad) is that the ACG also has the responsibility of enforcing and otherwise administrating any law related to MINAE in the private agroscape in the northwestern corner of the country. This broad coverage was never the initial intent of the ACG and its management plans, and is not the sense/intent of the ACG as described in this application for listing as a World Heritage Site. Here, the application for World Heritage Site

status is only for those protected wildland areas of the ACG as indicated in Fig. 1. These lands are owned by the State now, or destined to be soon passed to the State if they are still in the hands of the Fundacion de Parques Nacionales (FPN) (the State-controlled NGO that serves as a transitional land holder at the time of some purchases).

f) The ACG was also established to be part of SINAC in Article 3 of Executive Decree 25721-MINAE that was published on 23 Jan 1997 to set up the internal MINAE regulations for the operation of the Forestry Law.

g) The overall function of the ACG is that of a large and state-owned wildland area maintained as such for the conservation of its wild biodiversity and related ecosystems into perpetuity. A major method for this maintenance is through its non-damaging use by all sectors of society, under the strict control and surveillance of the staff of the ACG (see description at the ACG web site at http://www.acguanacaste.ac.cr, and in Janzen 1998c). Both the ACG overall function and this specific maintenance method is strongly supported by the new Biodiversity Law (No. 7788, Ley de Biodiversidad, 27 May 1998), a law that establishes both SINAC and the Areas de Conservacion. Once the provisions for SINAC included in law 7788 are "reglementado" and operative, the ACG will have the legally authorized internal flexibility and self-governing status that will cause it to instruct the FPN to pass all of its remaining "privately-held" ACG lands (all of which are included in the gray area in Fig. 1) to the State. Until this date, select marginal lands and key use areas have been kept under FPN ownership by the ACG because the traditional national park laws, while very important conservation tools, have been too inflexible and restrictive to allow the land trades, innovative biodiversity projects, and user-interactions that are imperative for the ACG to carry out its conservation responsibilities. It is now hoped that the new Biodiversity Law will permit the ACG to carry out its activities on State-owned lands, as technically, economically and sociologically appropriate for its overall function of the conservation of its wild biodiversity and related ecosystems into perpetuity.

C. Responsible national agency and/or administration.

The ACG is managed by the organic logic of its conservation goal, its staff's technical expertise, the oversight and policy of its Comite Tecnico, its Director, its Comite Regional, the Consejo Nacional, and SINAC (Sistema Nacional de Areas de Conservacion) of MINAE (Ministerio del Ambiente y Energia, formerly known as Ministerio de Recursos Naturales y Energia (MIRENEM)). As a decentralized organ of the State, the ACG's management policies and specific actions are dictated by the overarching goal of the conservation of its wildland biodiversity and ecosystems into perpetuity, according to the specific biological, sociological and economic considerations of the ACG itself, and in accordance with the sociological environment in which it is embedded. Its management details are a combination of the stability expected of a State bureaucracy and private sector flexibility.

The financial aspects of the ACG are based on annual use of income generated by the ACG endowment (legally held and invested by the FPN in coordination with the ACG and investment institutions), income from services rendered by the ACG, and grants to specific projects in the ACG. Financial aid from the State is largely restricted to certain services. The ACG is the consolidation of government-owned national parks, forest reserves, wildlife refuges, and recently purchased (formerly) private agroscape into one cohesive administrative unit. This consolidation is the key to its ability to manage, conserve and even permit light use of such a large area (2% of Costa Rica) with only 120 staff members and an annual operating budget of only $1.6-1.8 million.

As a single unit with a single all-consuming objective - survival of this tropical dry forest into perpetuity - the ACG is able to fine-tune the appropriate conservation and management tactics and actions to the entire area, hectare by hectare, according to the specific biological needs of any given specific hectare. This allows the ACG to make the very best use of its scarce human and dollar resources. This means that the ACG does not attempt to fit its various hectare-by-hectare management practices into the classical conservation categories, though retrospectively this could be achieved as a historical exercise. This philosophy also allows the ACG to explore highly controlled and researched specific collaborative actions with members of the agroscape surrounding the ACG, actions that will both benefit the ACG and its neighbors. To use the words of the Global Environmental Facility of the World Bank (Faries et al 1998:87): "An exemplary application of this approach is given by the Area de Conservacion Guanacaste (ACG), in the northwest portion of the country".

Fortunately, the national conservation and environmental legislation of Costa Rica is rapidly evolving from the older (and originally necessary) very "black and white" laws that left an area or species either bluntly under total species-wide or site protection, or without any protection at all, to the more socially-sensitive laws that allow the management of a conserved wildland to enter into collaborations with the agroscape and the remainder of society in those cases where the ACG management determines that a benefit can be offered without damaging the ACG biodiversity and ecosystems.

The examples are multiple:

a) providing high quality run-off water by the ACG to all of its surrounding communities (more than 50,000 residents in ten neighboring villages and towns) is one such (long-appreciated) service,

b) being the base for careful and highly-controlled ecotourism,

c) being a living laboratory for the biological education for all elementary schools and high schools in the zone, and for adult researchers likewise doing more explicit research on everything from biological control and natural history to biodiversity prospecting,

d) conducting the Horizontes Forest Experiment Station (the extension of the southern boundary of the ACG to be seen in Fig. 1) as a public service to the ongoing conversion of Guanacaste Province from marginal cattle pasture to plantation forestry, and

e) processing organic material from commercial neighbors on some of the ACG's very damaged landscape as a way of improving soil quality and speeding regeneration, while being paid for these biodiversity services by the commercial neighbor, and the income then supports other ACG activities (see Faries et al 1998 for more detail).

All of the above activities and others like them require that the ACG staff and infrastructure have modern equipment and modern technical understanding of biodiversity and ecosystem management. It is no simple task to extinguish more than 50 wildfires per year, control the activities of tens of thousands of ecotourists (63,169 person/visits in 1997, half of them being Costa Rican), teach basic biology to more than 2,000 children from the surrounding schools, monitor and facilitate the regeneration of more than 60,000 ha of damaged forest, research the interactions with more than 200,000 species of organisms distributed in three major ecosystems and uncounted more in the marine world, and stay good neighbors to hundreds of ranches, farms

and other forms of agroscape use - and do all this locally, nationally and internationally.

The management process of the ACG can be brought into focus with a summary listing of the use of the $1,693,346 budget for 1998. All of these funds are derived from interest income on the endowment - about 90% - and payment for services by users (including ecotourists) - about 10% - (ACG 1998b):

Ecotourism	6.5%
Directorate	9.6%
Research	5.9%
Biological Education	9.9%
Marine Activities	1.4%
Restoration and Forestry	9.8%
Fire Control and Prevention	8.6%
Protection (Police)	4.5%
Station Maintenance	16.5%
Computer Support	1.5%
Operations	8.8%
Survey and Land Boundaries	2.9%
Accounting and Finance	5.7%
Human Resources	1.8%
Research/Dining Buildings	6.5%

"Running a Conservation Area" is not a lucrative endeavor, despite its importance in the overall sustainable development of Costa Rica. The actual annual investment is that of the entire ACG endowment ($12-$13 million) plus the above actions, from which there is a cash "return" of about 1%, which is then spent on a combination of land payments and depreciating buildings and equipment. Such accounting does not include the very large subsidy by the Costa Rican government as a whole, through the MINAE policy support structure and SINAC overall, and through essential public services (roads, police, schools, telecommunications, electricity) for which the ACG makes no direct payments. The ACG does not in fact "break even" and must increase its future income from environmental services if it is to do so. This will not be easy. When significant user fees were imposed for tourists in 1994, MINAE asked $15 per foreign tourist and about $2 per Costa Rican, but the foreign visitors complained so bitterly that their fee was dropped to $6 per visit.

The initial financing of the ACG was achieved through cash and sweat-equity contributions by more than 4000 private donors, more than 45 philanthropic foundations, and six governments (Costa Rica, Sweden, USA, Norway, England, and Canada) in the period 1985-1998. The basic endowment was established in 1987-1989 through a debt-for-nature swap by the Swedish government, Costa Rican Central Bank, the Fundacion de Parques Nacionales, and MINAE. However, equally significant has been the sweat-equity invested by the ACG staff and a host of national and international biologists and conservationists.

But more even than technical ability and basic funding, motivation is absolutely critical to the administrative existence of the ACG. It would probably cost more than five times the annual budget to directly purchase the aggregate services and sweat equity currently being applied to the ACG by the ACG and all those who use it and believe in it. Social services and community life are so poorly developed in the agroscape of this isolated and distant portion of Costa Rica (the canton of La Cruz, containing more than half of the ACG, is one of the poorest in the country) that the

ACG staff must be inspired to invest their lives here by some much greater goal than simple survival and salary.

There are two major elements to this inspiration. First, the ACG has evolved upward from the classical structure of stolid government "custodian/guard" for the ACG biodiversity, to a process of complex local ownership and control of the process, with "local" ranging from the staff (all Costa Rican and nearly all from the area and trained up into their responsibility) to the Comite Local (the Board of Directors for the ACG, elected from a local governing assembly drawn from community leaders). Second, it is clear that the act of carrying forward a major project for all of humanity gives the esprit d'corps and sense of mission that has enabled the ACG human resources, and much of its neighboring community, to have the drive to have achieved this in just 12 years, and to be on a steady route towards ensuring permanence.

D. Collaborating national agencies and organizations

Ministerio de Educacion
Ministerio de Obras Publicas y Transporte
Ministerio de Seguridad
Ministerio de Agricultura y Ganaderia
Ministerio de Hacienda
Ministerio de la Presidencia
Ministerio de Relaciones Exteriores
Museo Nacional
Catastro Nacional
ICE (Instituto Nacional de Electricidad)
ICT (Instituto Costaricense de Turismo)
IDA (Instituto de Desarrollo Agricola)
ING (Instituto Nacional Geografico)
INM (Instituto Nacional Meteorologico
INBio (Instituto Nacional de Biodiversidad)
Municipality of Liberia
Municipality of La Cruz
Universidad de Costa Rica
Universidad Nacional
Fundacion de Parques Nacionales
Fundacion Neotropica
Centro Cientifico Tropical

3. Identification

a. Description and inventory.

1) National and regional overview of the ACG as a Conservation Area

Costa Rica, the size of Denmark or West Virginia, has a substantially greater biodiversity and ecosystem diversity than do most small continental tropical land areas. About 4% of the world's terrestrial species have some portion of their populations in Costa Rica (Government Costa Rica 1992). The marine percent is probably about the same, but it is difficult to say since Costa Rica's marine areas have been much less thoroughly researched than have been the terrestrial habitats.

This great biodiversity in a tiny area is due to the combination of

a) a wealth of highly varied topography and soils,
b) standing at right angles to the trade winds, a positioning that generates massive rain shadows and hence very wet habitats next to very dry habitats,
c) being directly on the biological highway between South and North America,
d) exposure to millions of years of climate fluctuation,
e) millions of years of evolutionary history as part of a Central American archipelago of large islands,
f) being a very poor Spanish colony in the beginning of European colonization, and
g) (still) having a relatively low population density (Coates and Obando 1996, Janzen 1983a).

While Costa Rica has received four centuries of post-conquest European development of its rural areas, it was sufficiently isolated and sufficiently poor (in the goods of importance to those four centuries) that its biodiversity and ecosystems were much less thoroughly deforested and environmentally damaged than have been many other coastal neotropical areas. The second major deforestation push, leading to approximately 65% of the country being today in some form of pasture, plantation or other agricultural landscape (Fig. 5, Savitsky et al 1995, Savitsky and Lacher 1998), occurred between WWII and the late 1980's. However, during that period also, for a wide variety of socioeconomic, biological and geographic reasons, approximately a quarter of the country's vegetation survived as old-growth forest, albeit sometimes having suffered both light logging and heavy hunting

This forested quarter of Costa Rica is today the backbone of the National System of Conservation Areas (Sistema Nacional de Areas de Conservacion, or SINAC) (Fig. 4, and see Garcia 1996). The "protected areas" of SINAC have been established philosophically and pragmatically by the government of Costa Rica (initially by the Ley de Parques Nacionales, and most recently by the new Ley de Biodiversidad), with support from a large array of international and national conservation NGO's. The goal, every year more clearly perceived, is to preserve this large complex of wildlands into perpetuity for both their (1) intrinsic scientific/social importance, and (2) their major actual and potential contribution to the sustainable development and the quality of life in Costa Rica through carefully planned/controlled non-damaging use (Janzen 1998c). If their conservation and consolidation continues as is occurring at present, and all signs are that it will, then SINAC will end up conserving in these wildlands at least 80% and perhaps as much as 90% of the biodiversity and ecosystems that have survived in Costa Rica to date (Garcia 1996). The Area de Conservacion Guanacaste (ACG) was the first to be formed of Costa Rica's ten continental Conservation Areas (Cocos Island Marine and Terrestrial Conservation Area, Costa Rica's eleventh Conservation Area, was placed on the World Heritage List in 1998).

In 1985, the ACG was visualized as a conservation area to be constituted of diverse parts drawn from national parks, wildlife refuges, forest reserves and new conservation purchases (Janzen 1988a). It was first decreed as a unit in 1989 as the Unidad Regional de Conservacion Guanacaste. The initial goal was to conserve at least one large viable tropical dry forest ecosystem in Central America. The immediate ACG need was to begin the process of dry forest restoration (Janzen 1988a, 1988c, 1990, 1992a, 1992b, 1992c, 1995, Janzen and Hallwachs 1992) and enlargement of the area restored/conserved. This urgency was not only driven by the seriously damaged nature of tropical dry forest globally (and especially in Mesoamerica), but also by the fact that of the total area of conserved wildlands in Costa Rica, only about 13% are/were dry forest (Appendix 1 in Janzen 1988a). Only two of Costa Rica's ten continental conservation areas (Fig. 4) are based on dry forest. To put this in yet a larger context, the Pacific dry forest in Mesoamerica

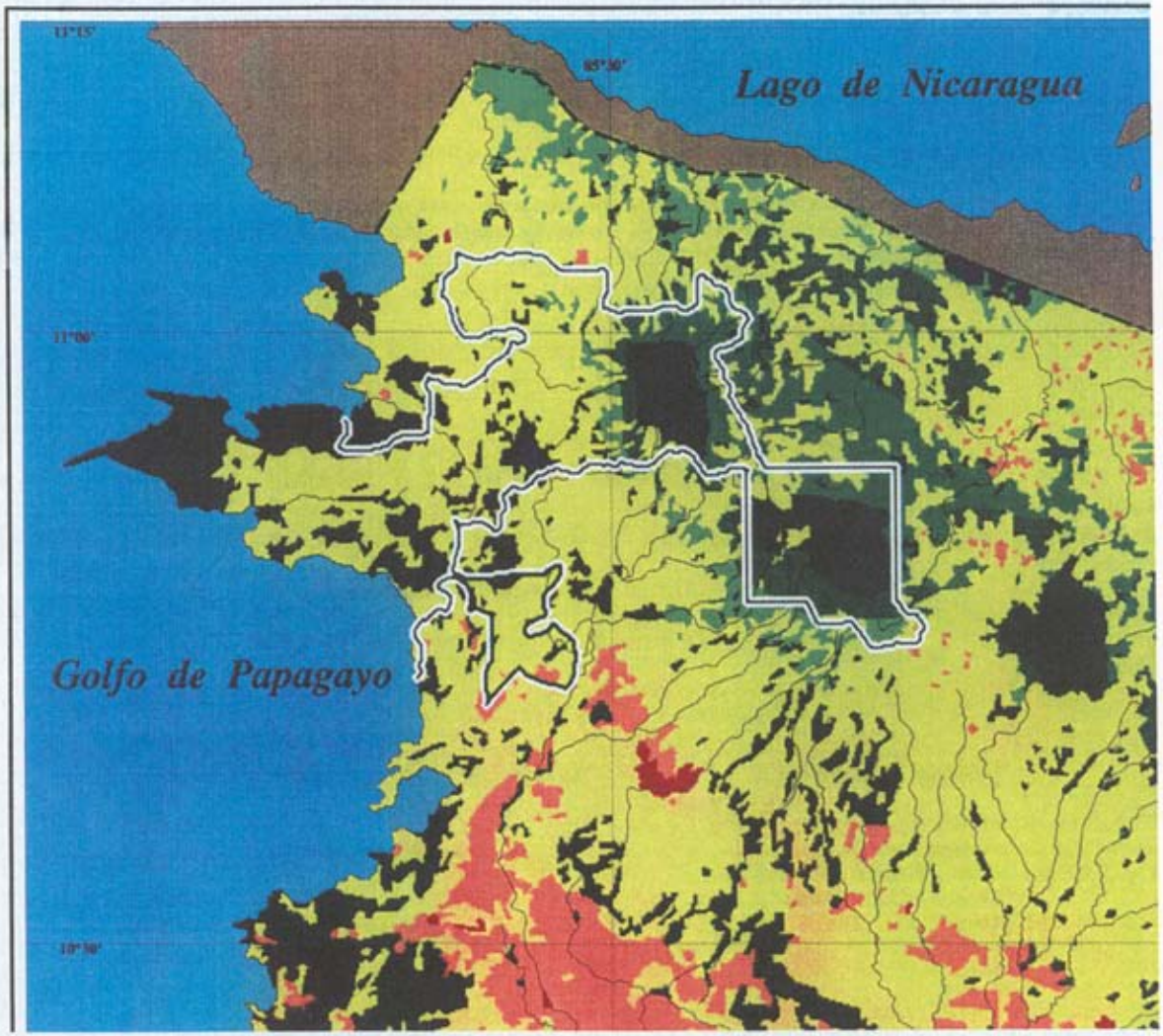

Figure 5. 1995 map of the contemporary, rather than original, vegetation of Costa Rica (Savitsky et al 1995, Savitsky and Lacher 1998). This map shows very clearly the small areas of old-growth forest (dark colors) that remain in the countryside (and in the ACG) against a vast backdropof agriculture and pasture (orange and yellow, respectively). The large patch of old-growth dwarf forest at the western end of the Santa Elena Peninsula is especially noteworthy.

Figure 6. Aerial view of the central portion of the ACG from over the Pacific looking east (inland), with Playa Naranjo in the right foreground, Playa Nancite in the left foreground, and Volcan Orosi and Volcan Cacao under the clouds in the background. The pale flatland yellow in the center is jaragua pasture (1987).

once covered an area the size of France but in 1985 only 0.08% (59,000 ha or less than one tenth of one percent) had conservation status, and only about 2% was relatively intact (Janzen 1988a).

The formation of the ACG (Fig. 6), about 1.5% of Costa Rica in area, has roughly doubled this total amount of Mesoamerican protected dry forest, to about 0.16% of what once was. Unfortunately, the patterns of national agricultural development from Mexico to Panama (and indeed, globally) are all in the direction of little or no further conservation of dry forest being likely. As mentioned earlier, this is due to these once dry-forested lands being a) very easily damaged by human-set fires, b) very attractive for subsistence livestock production, c) extensively occupied by subsistence farmers and ranchers, and d) generally apt for conversion to industrial-grade agriculture and pasture in those cases where the soils are good and water available. And today, tropical dry forest areas with their sunny skies are also attractive in general for relaxational tourism, adding a new kind of human threat and pressure to the very few dry forests remaining.

It should be noted that "dry tropical forest" covers a range of habitat types when considered globally (Murphy and Lugo 1986, Bullock et al 1996). In the ACG, dry forest is characterized not so much by its annual rainfall of 800 to 2800 mm but by the virtual absence of rain from middle to late December, to middle to late May (e.g., Fig. 7-8). During this six month dry, sunny, hot, and windy period, many plant species are deciduous (especially those of secondary succession), most species of herbivorous insects cease reproduction, granivorous rodents reproduce but most other vertebrates are non-reproductive, aquatic systems are reduced to mere remnants, and woody plants often reproduce. The highly inflammable herbaceous vegetation and litter of the ACG is, however, not subject to natural fires (though anthropogenic ones are a constant threat). While some aspects of ACG dry forest biology have been quite thoroughly studied, in general terms tropical dry forests are much less studied than are/have been tropical rain forests, both because of their lesser "spectacularity" and because of their much more thorough elimination over the past centuries.

The isolated bits of semi-conserved dry forest remnants represented by Parque Nacional Santa Rosa and its Murcielago sector in the mid-1980's (Fig. 2) were not large enough, contiguous enough, or sufficiently representative to approximate a dry forest restoration and survival plan in themselves. The Area de Conservacion Tempisque (ACT), the other Costa Rican dry forest conservation area (just to the south of the ACG in Fig. 4), was formed later as a consequence of the ACG discovering that there still remained the chance to restore and save this (much smaller and yet more damaged) area spread over very different soils (limestone and riverine/swamp) and constituted of yet smaller and more fragmented conserved areas. The ACG and ACT taken together contain more formally conserved dry forest than is in all of the remainder of Mesoamerica. In all the world, the only tropical dry forest national park that is larger than these tiny conserved dry forests is Kakadu National Park in tropical northern Australia (but which also has had very heavy human impact and contains a completely different, though convergent, suite of organisms).

It should be emphasized that the Costa Rican Conservation Areas are much more than just "hopefully large enough to save their biodiversity". They also represent the administrative and pragmatic consolidation of goals, budgets, products, administrations, and staff professionalization that are mandatory for the decentralization of wildland conservation. The ACG staff is far more than just a wildland custodian (and see previous discussion of administration). The ACG is a pioneer project due to its act of decentralized administration and its methods of integration of wildlands into society (Janzen 1998b-c). This process is now being carried forward and enlarged as part of Costa Rica's national policy of sustainable development (e.g., Faries et al 1998), as well as encouraging the new science-based management philosophy that is currently reshaping the US National Park Service (Sellars 1997).

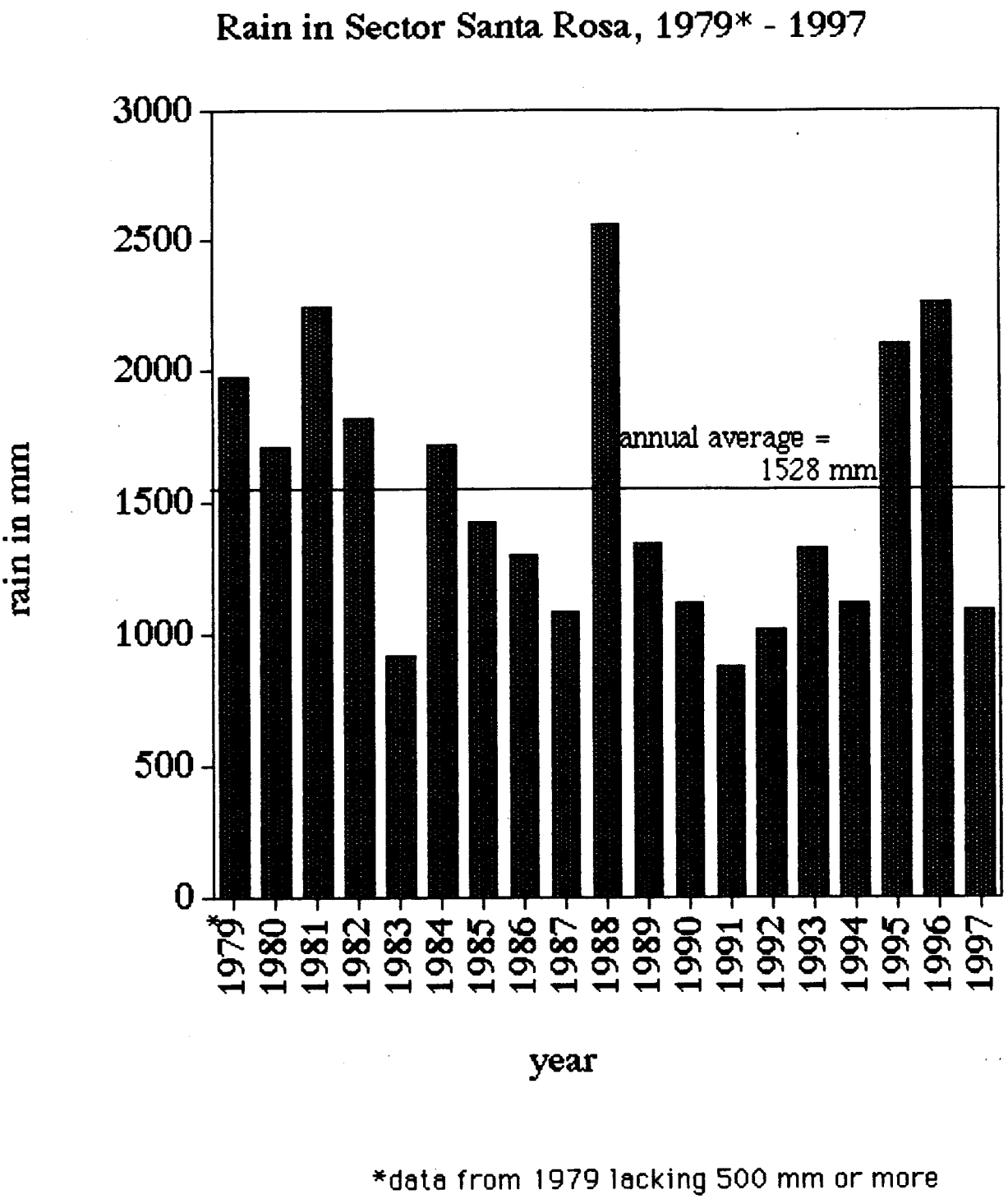

Figure 7. Annual rainfall for the Sector Santa Rosa weather station (Janzen 1998a).

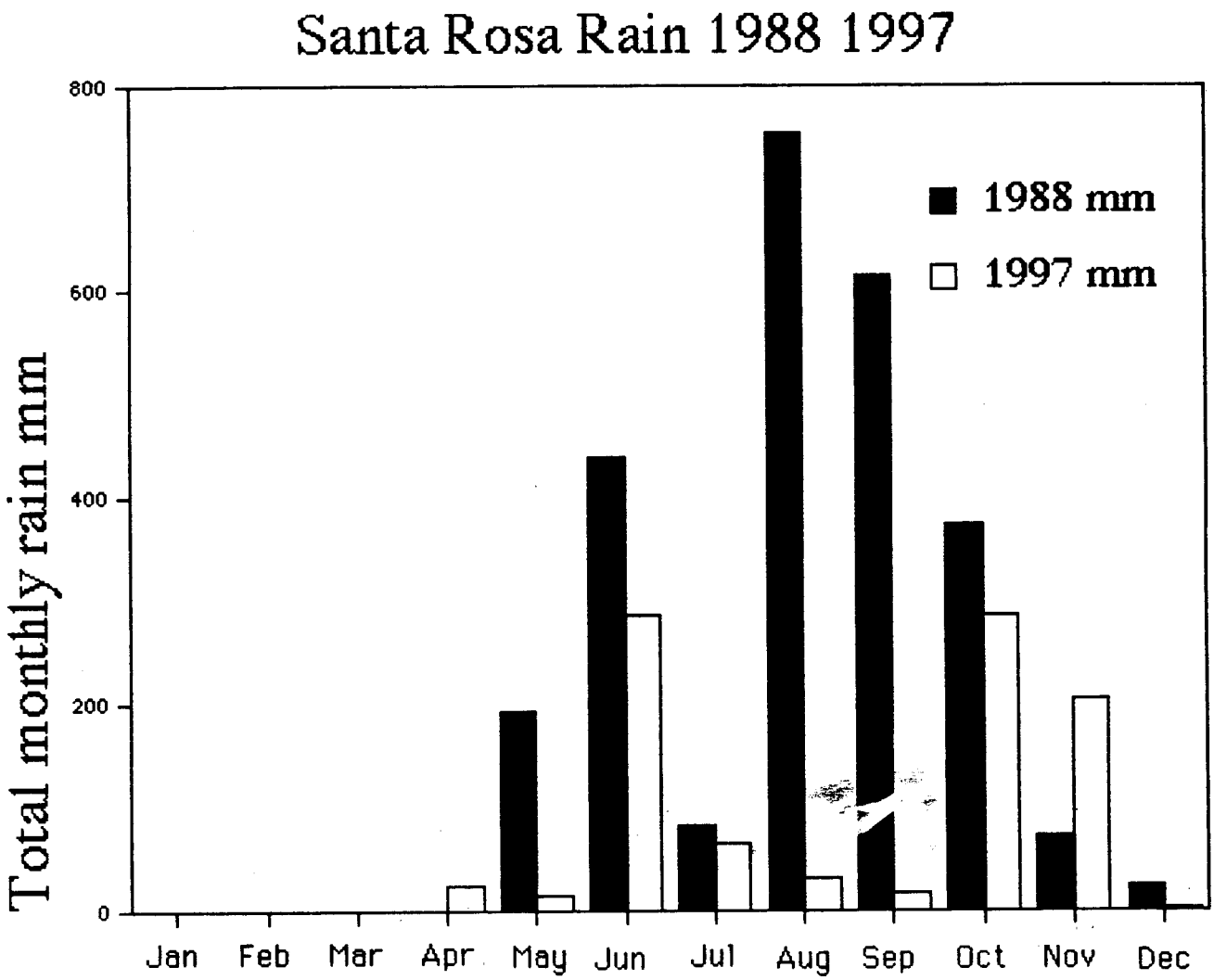

Figure 8. Monthly rainfall in a wet (1988) and a dry (1997) year, Sector Santa Rosa weather station, ACG (Janzen 1988a).

2) The ACG biologically

The ACG today is about 88,000 ha of land and about 43,000 ha of marine habitat that stretches about 105 km from 12 miles out in the Pacific ocean through the Cordillera Guanacaste to 400 m elevation on the Caribbean lowlands (Fig. 1, 6, 9-12). These figures do not include an anticipated approximately 3,000-5,000 ha being added gradually over the next 2-3 years around the margins as small land acquisitions to finalize the interface between the ACG conserved wildlands and the general agroscape that extends beyond it in all terrestrial directions. Likewise, as mentioned previously, the 15,800 ha of the Santa Elena property (lighter gray in Fig. 1) is not included in these figures, since this property is still in the process of being expropriated by the Government of Costa Rica for inclusion in the ACG (Compañía del Desarrollo de Santa Elena, S.A. v. Republic of Costa Rica (ICSID Case No. ARB/96/1).

About 60% of the species that occur in Costa Rica are known or estimated to occur somewhere in the ACG. It contains about as much uncut old-growth forest as does the eastern United States. Current estimates of the numbers of species are about 235,000 (Janzen 1996a), though a thorough virus and bacterial inventory might double this figure. This exceptionally high number of species in such a small area (about the size of the greater area of London or New York) is directly attributable to the ACG being a swath placed across

i) the Pacific coastal dry forest strip that extends south from the piedmont inland from Mazatlan, Mexico, at least to the Panama Canal (and then hopping over to the dry forests of Venezuela and Colombia),

ii) the central highlands (Cordillera Guanacaste) that are ecologically (not geographically) contiguous with the highlands from Mexico to the Andes, and

iii) the Atlantic rainforests that extend(ed) from coastal Caribbean Guatemala to Brazil and the foothills of the Andes.

The ACG inventory of plants, vertebrates, insects, vertebrate parasites, aquatic biota, and a smattering of other taxa have been ongoing in the ACG since 1973 by private individuals, international institutions, the ACG itself, the Museo Nacional, and the national biodiversity inventory being conducted by INBio (e.g., Janzen and Liesner 1980, Janzen 1983a, 1996a-b). For example, more than two million pinned and labeled insects from the ACG inventory, mostly collected between 1978 and 1998 by parataxonomists, are deposited in the INBio collections. A major portion of the published part of the research that has been conducted in the ACG may be found in the files of the ACG Research Program (and see Appendix 1). However, more and more of it is now finding its way into web-based public databases (e.g., http://www.acguanacaste.ac.cr, http://janzen.sas.upenn.edu/index.html). It is general ACG policy to continue to conduct, facilitate and encourage the inventory of its biodiversity across all taxa, for the basic purpose of understanding what is where, what it can/does do, and how much use it can tolerate by a wide variety of users (e.g., 1986 a-c, 1987c-e, 1988a-e, Janzen 1996a-b, 1998b, Janzen and Hallwachs 1994, Janzen and Gamez 1997, Rossman et al 1998), as well as encourage those users. It is not appropriate to burden this application with long lists of the organisms already known to occur in the ACG, but these can be provided to the interested reader either directly by the ACG Research Program, from specific inventoriers, or the databases in INBio.

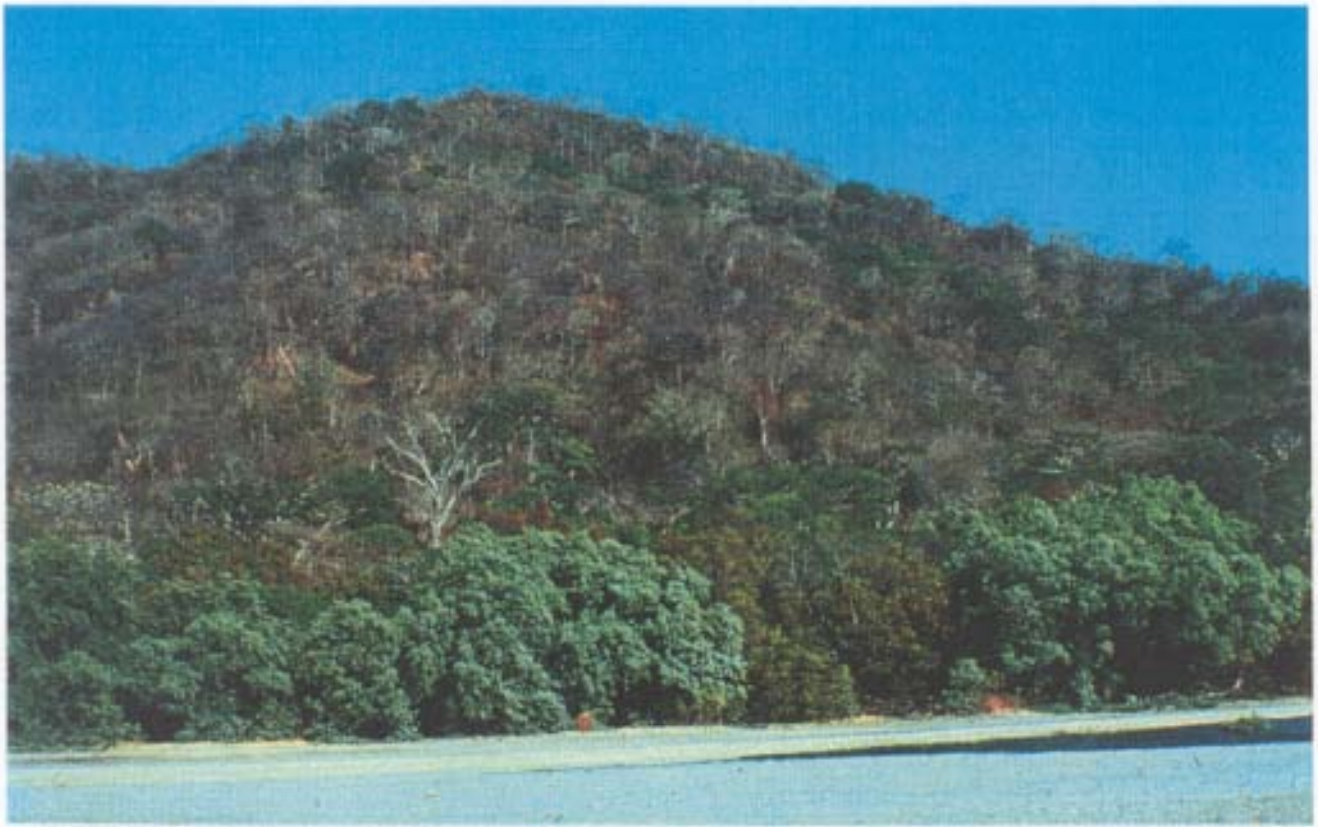

Figure 9. Middle-aged secondary tropical dry forest at the western end of the ACG, deciduous during the dry season (March). Saline mud flat in the foreground and evergreen mangroves (Avicennia germinans) lie to the east of Playa Naranjo, near Argelia in Sector Santa Rosa.

Figure 10. Middle-aged secondary tropical dry forest interior at the western end of the ACG, deciduous during the dry season. Dark green understory cactus (Stenocereus aragonii), an endangered species, will be eventually shaded out as forest becomes old-growth. Photograph taken in March, at the same time as the photograph in Fig. 12.

Figure 11. Western slopes of Volcan Orosi (center, 1400 m) and Volcan Cacao (right, 1500 m) under the clouds of moisture from the Atlantic trade winds blowing from right to left (end of rainy season, January). These evergreen forests grade into dry forest at the far left. Yellow ancient pastures are filled with jaragua grass and now slowly regenerating back to forest.

Figure 12. Interior of 40-m tall old growth evergreen forest at 1200 m elevation just below the cloud line in Fig. 11, on the upper western slopes of Volcan Cacao. Photograph taken in March (dry season), at the same time as the photograph in Fig. 10.

ACG history is that of development through both planning and biological exploration. So as to create the ACG over the past decade, there have been many site exploration and biological planning studies to aid in deciding what lands to purchase around the already-established national parks and forest reserve (see Janzen 1986a, 1988a, and Fig. 2 for the location of the original pieces). These studies quickly discovered that, among other generalizations:

(a) the Pacific marine area along the ACG coast is unique both in its biology and its relatively undamaged nature (due to difficulty of access for fishermen, and relative isolation on the Costa Rican coast), thereby meriting conservation in its own right, irrespective of the terrestrial adjacent sites (and see Cortes 1996-1997, Cornelius 1986, Cornelius and Robinson 1987),

(b) the unique and relatively undisturbed Pacific marine area is congruent with adjacent continental dry forest that, while it has been variously perturbed over the past four centuries of European use, is still relatively intact and now undergoing widespread restoration (beginning in Sector Santa Rosa when the colonists were removed in the 1970's, and beginning in Murcielago in the mid-1980's with the cessation of ranching, and beginning in Santa Elena as much as a hundred years ago, Janzen 1998d),

c) the wetter and higher lands on the three (largely inactive) volcanos in the eastern ACG (Fig. 11-12) have a special importance for the dry forests to their west - the dry forests (Fig. 9-10) of Santa Rosa, Santa Elena and Murcielago. A very large number of species of dry forest insects migrate seasonally to these eastern wetter areas to pass the six-month dry season, and then return to the dry forest to breed in the rainy season (e.g., Hunt et al 1998, Janzen 1987a-b, 1987d, 1988b). It is suspected that some vertebrates migrate as well. In short, in order to conserve the ACG dry forest it is necessary to conserve the wetter and higher forests cloud forest and rain forest to the east of this dry forest. Today, this short-distance seasonal migration has become recognized as an integral part of tropical dry forest biology (e.g., Janzen 1987a,b, 1988b), and the list of species that are found to be seasonally migrating continually grows.

d) as global warming comes upon Costa Rica, its result has been a drying (and warming) of the dry forest area (e.g., Fig. 7), leading to the need for a more moist (eastern) "lifeboat" into which the ACG dry forest organisms can move. The cloud forest, rain forest, and intergrades with dry forest in the eastern part of the ACG are turning out to serve this function. It has been particularly striking to discover viable populations of the less dry season-resistant species of insects surviving at the bases of the volcanos (the habitat in Fig. 11), populations that in former wetter years extended out across the dry forest to the west all the way to the Pacific ocean.

e) as the agroscape expands to its limits under modern economics, approaching the ACG from the north and east (Fig. 1), it has extinguished almost all vestiges of what was once extensive expanses of lowland and foothill rainforest (the dry forest to the south was long ago largely eliminated). Some of the last bits of this forest type in Costa Rica, from 300 to 800 m elevation, lie along and within the northeastern to eastern margins of the ACG. These are extremely species-diverse intermediate-elevation moist to wet forests on fairly good soils, and even a few thousand hectares here and there add substantially to the total list of species conserved in the ACG. As small habitat fragments by themselves, they would have no chance of surviving, but as part of the overall ACG continuous conserved forest ecosystem they will survive in a semi-altered state.

f) the core dry forest area of about 60,000 ha (between the volcanos and the Pacific, Fig. 6) is an incredibly complex mosaic of not only succession ranging from 1 to 400+ years of age, but at least 20 easily identified vegetation associations characterized by combinations of different soils (e.g.,

limestone, alluvial, recent volcanic, ancient volcanic, serpentine), slopes, and exposures to trade winds. Species circulate among, and are distributed among; these associations in as-yet-poorly-understood but very complex ways. As the entire ACG dry forest ecosystem develops into "old-growth" status over the next 500-1000 years, it will take on patterns and aspects that at best can only be guessed at, since no large area of original old-growth forest remains in all of Pacific coastal Mesoamerica for comparison. The largest relatively intact tall old-growth forest, which lacks all of its large mahogany trees and is subject to a steady rain of secondary successional organisms (Janzen 1983b, 1986), is in the central part of the ACG dry forest and is only about 22 ha in area. A larger area of 1000-2000 ha of barely understood and absolutely unique old-growth dwarf dry forest on serpentine soils also still occupies the most western end of the Santa Elena Peninsula, partly in the contested Santa Elena property and partly in Sector Murcielago (Fig. 5, drawn from Savitsky and Lacher 1998, Savitsky et al 1996). Despite this high impact, however, it should be emphasized that agriculture, hunting, logging, burning, and ranching were never sufficiently successful in the ACG area to thoroughly remove the vegetation types or extinguish particular species except for the green and scarlet macaw (the giant anteater was removed from all of Costa Rica by poorly understood processes). The ACG contains healthy populations of all the expected large and conspicuous vertebrates (e.g., three monkeys, Baird's tapir, five cats, two canids, more than 40 bats, more than 500 species of birds, five procyonids, two peccaries, two deer, more than 30 rodents - 940 species of vertebrates in total, Bussing et al 1995). It probably contains more than 50,000 species of fungi (Rossman et al 1998), 12, 000 species of nematodes (Freckman 1995), 20,000 species of Coleoptera (Anderson and Erwin 1995), and 13,000 species of Hymenoptera (Rodriguez and Gauld 1995). Restoration is occurring rapidly as the damaged vegetation and faunas reconstitute themselves, and as they spread onto the abandoned fields and pastures (and in doing so, are removing the only threatening introduced species, jaragua grass (Hyparrhenia rufa, from east Africa).

g) the three volcanos (Orosi, Cacao and Rincon/Santa Maria) in the Cordillera Guanacaste in the eastern ACG rise to 1400-2000 m and are unambiguously ecological islands at the northern end of the archipelago of mountaintops that gradually becomes smaller and more separate moving from south to north through Costa Rica. These ecological islands are just now beginning to be explored and inventoried, and preliminary results make it unambiguously clear that just as with oceanic islands, they have both unique populations and species, and ecosystems constituted of fewer moving parts. For example, the quetzal, so familiar to afficionados of Mesoamerican cloud forests, is naturally missing from these three volcanos, and therefore so are its impressive abilities to disperse large seeds in the Lauraceae.

As the ACG has taken form to protect its dry forest ecosystem, as mentioned earlier, it has found itself to be the only conserved contiguous band of habitat from the Atlantic lowland rain forest up through cloud forest on the volcano tops and down through dry forest and out to sea (Fig. 1), in all of the tropics. In this one 105 km long strip - the size of a large metropolitan area - occurs about 60% of Costa Rica's species (because so many of Costa Rica's diverse habitats and ecosystems occur in it). This extraordinarily biodiverse area therefore contains about 2.4% of the world's biodiversity, since Costa Rica overall contains portions of about 4% of the world's terrestrial species. Given the nature of tropical habitat destruction over the past four centuries, and the socioeconomic politics of today's globe, viewed in hindsight, the ACG was the only place remaining in all of the New World tropics where such a habitat transect could have been conserved without massive relocation of people and disruption of moderately productive agroecosystems.

This strip of vegetation contains many Life Zones (Fig. 3). This diversity of climates and vegetation takes on particular importance in the face of today's global warming. While global

warming is bringing on many unpredictable changes throughout the tropics, it is clear that hot and dry lowland areas such as the ACG dry forest area are becoming drier (Fig. 8) and hotter (Janzen 1998a). It was particularly striking that the 1997 El Niño generated a band of Pacific ocean warming that hit the eastern Pacific rim exactly at the ACG (Janzen 1998d), which is why the first half of the 1997 "rainy" season was the driest in the past two decades of records in Sector Santa Rosa (Janzen 1998a). (This stands in contrast to the wetter parts of Costa Rica, which are widely believed to be becoming wetter and cooler with global warming.)

The heating and drying of the dry forest ecosystem in the ACG, a sort of human-generated "desertification" of the western ACG, means that dry forest ecosystem survival requires a cooler and wetter area to which this complex of species can gradually move. As mentioned earlier, this cooler and wetter "lifeboat" are the cloud forest, rain forest, and various moist transitional forests, in the eastern end of the ACG. Unfortunately, the vast majority of conserved tropical wildlands were not established with strong rainfall or elevational gradients in them (among which their organisms can migrate), and they are experiencing extreme difficulties with the effects of global climate change. The ACG will likewise experience difficulties (ideally, its more moist eastern end should be at least as large or larger than the dry forest that may find itself moving into the area), but at least it has some possibility for microgeographic relocation within the entire ACG expanse.

As mentioned before, the terrestrial portion of the ACG is roughly 88,000 ha in area (not including the contested Santa Elena property). With anticipated expansions along a few margins until it abuts directly with the intense agroscape, and inclusion of the Santa Elena property, the ACG may reach 110,000 - 115,000 ha in size. This will be its basic size and habitat/ecosystem coverage forever, since the agroscape is very unlikely to retreat from this area of Costa Rica and allow massive wildland restoration (however, such is in fact conceivable, since were "developed world" standards of productivity to be applied, much of the agroscape surrounding the ACG would be classed as "marginal farmland" at best, and perhaps some day returned to forest uses).

Is 115,000 ha enough area for the survival of all of the current ACG species, habitats and ecosystems into perpetuity? The answer is "no", as is the answer for *all* conserved continental wildlands the world over. *All* continental conserved wildlands are habitat islands, *all* are smaller than their original size, and *all* are being impacted by humans. All three factors reduces the final number of species and "old-growth" ecosystems that will survive in them when they reach their new equilibria. However, the final equilibrium density of species, habitats and ecosystems in the ACG can only be determined empirically over the centuries to come. Equally, which particular habitat and species units, and in what form, will survive the insularization, climate shifts, edge effects, carefully managed human uses, and other forms of assault, can only be determined empirically. What *can* be said with certainty is that 115,000 ha is large enough, and this particular 115,000 ha is diverse enough, that at least 80%, and perhaps more, of what is there today will survive into the indefinite future (unless there is some as-yet-unperceived drastic global modification on the way). The ACG is in far better survival mode than are the little 1,000-10,000 ha patches of isolated forest that are dotted over the New World tropical "conserved" landscape. However, the ACG is still small enough and heterogeneous enough that any further fragmentation will have major effects through loss of area of specific habitats and ecosystems, subsequent species loss, and creation of edge effects (e.g., Janzen 1983b, 1986).

The marine ACG is approximately 43,000 ha in area (Fig. 1) and may increase to about 50,000 ha with the anticipated future marine expansions along the northern coast of Peninsula Santa Elena. The marine portion of the ACG, while having been damaged recently by sport fishing and subsistence fishing, is the best conserved of any marine area of the entire Costa Rican dry forest

coast and probably the best for all of Central America to the north as well. The aquatic marine area blends into the mangroves and other coastal habitats, which themselves blend into the terrestrial habitats extending to the Caribbean lowlands. This transect from marine to terrestrial has not, however, been studied sufficiently to be able to make detailed observations on its biological interactions. However, it has now become clear that the ACG has the only chance anywhere in the entire New World tropics to discover how a coastal tropical dry forest depends on and interacts with a restoring and "old-growth" forest bordering marine habitat, and vice versa.

b. History.

The Casona Santa Rosa, the focus of the original World Heritage Site application in 1979 (application No. 107, 17 April 1979), was established in 1580-1600 as the headquarters of the second oldest ranch in Costa Rica (apparently, Hacienda Inocentes, part of which is now contained within the northern part of the ACG on the flanks of Volcan Orosi, is the oldest ranch in Costa Rica). Between then and the time of the declaration of the Casona (and 1000 surrounding hectares) as a national monument in 1966, all or some portion of Sector Santa Rosa has had more than 40 owners (source: "lost" Peace Corps study conducted in the 1970's and based on Spanish archives in Granada, Nicaragua). This constantly shifting ownership strongly suggests that it was never sufficiently successful to be the focus (fortunately) of major agroscape development. Hacienda Santa Rosa was apparently initially used to grow mules for the cross-isthmus transport that begin in Atlantic ports and then went up the Rio San Juan to cross Lake Nicaragua and offload at Rivas, for mule-transport to the Pacific (and thence to Chile or California). Later Santa Rosa grew cattle for the hide and tallow extraction butchering fields at Puntarenas (for transport around South America to Europe). Then its pastures became sources of beef to support the field labor in the Indigo plantations in Nicaragua to Guatemala. Far later, it contributed to the beef flow to the Central Valley of Costa Rica. At the time of the expropriation of the Casona from the Somoza family by the government of Costa Rica to become a national monument in 1966, it was still producing cattle for Costa Rican markets, but it had also experimented with dryland rice and cotton. As mentioned earlier, however, none of these impacts were thorough across the landscape in space or time, which is why sufficient dry forest remnants survived to allow the restoration that is occurring today.

From 1966 to the original Parque Nacional Santa Rosa national park decree of 1971 for 9,904 terrestrial hectares laying between the Interamerican Highway and the Pacific Ocean (and 12 miles out to the territorial limit), and for several years after 1971, Dr. Kenton Miller and a small group of US Peace Corps members (e.g., Cornelius 1986) worked out management plans and the boundaries in tight coordination with the founders of Costa Rica's national park system, Alvaro Ugalde and Mario Boza (both of whom are still very active players in the development of Costa Rica's national system of conserved wildlands, and see especially Wallace's 1991 review of the history of Costa Rican conservation).

While tropical dry forest was only lightly understood to be a highly threatened ecosystem at that time, while restoration was not part of the tropical conservationist mind-set at that time, and while the anthropogenically fire-ravaged old pastures and abandoned fields were viewed incorrectly as "savannahs" or "grasslands", the early intent was unambiguously to conserve a major wilderness area (which differed strongly from Costa Rica's rainforest national parks) as well as conserve the context of Costa Rica's historical center at the Santa Rosa Casona.

The new Santa Rosa National Park became one of the heavily visited "jewels" of the new Costa Rican National Park Service, with the visitation strongly driven by the historical Casona, the very

fine surfing and swimming beach at Playa Naranjo, the fine dry season weather for tourism, the spectacular "arribadas" of Olive Ridley's Turtles at Playa Nancite (Cornelius 1986, ACG 1998a), the proximity of the Interamerican Highway, and the steadily increasing research attention to dry forest organisms. By 1977, the colonists/squatter families in the lowlands behind the beach at Playa Naranjo had been removed and the park boundary extended to the south along the coast by another 860 terrestrial hectares (and again, the marine area out to the territorial limit was conserved as well).

In the same burst of enthusiasm for conservation of remote wilderness areas as national parks, Parque Nacional Rincon de la Vieja was established in 1974, and Sector Murcielago added to Parque Nacional Santa Rosa (by expropriation) in 1980. A yet other independent act established the Reserva Forestal Orosi in 1976. All of these state-owned or controlled areas are shown in black in Fig. 2.

However, most of the dry forest remnants in the above national parks were being steadily whittled away at by the seasonal anthropogenic fires that raged through the general region. These fires were "caused" by everything from broken bottles to magic to hunters to "them", but in fact were largely set by ranchers in the region so as to keep woody vegetation out of their pastures, and remove secondary forest to make way for grass. Virtually all of Guanacaste Province was burned by the end of the dry season every year between the mid-1960's and mid-1980's (as well as for several centuries before).

In 1982 a national-level study by the Centro Cientifico Tropical recommended that the disparate parts in the vicinity of Parque Nacional Santa Rosa be joined into a single large unity (Anonymous 1982) but no action was taken.

The turning point was that following a three-year court case, Parque Nacional Santa Rosa finally received a court order allowing removal of the 2000+ cattle that were ranging free within the park (originating in a neighboring ranch to the south). 1000 head of cattle were removed by the owner and 1000 shot by the Guardia Rural in 1976-1977. The immediate consequence of what appeared to be a reasonable conservation management decision was that the jaragua grass stand at the end of the next rainy season was a dense 2 m tall block of fuel, rather than the closely grazed sward that had been present for centuries. The consequences of the annual fires was thus dramatic and devastating. The annual fires began destroying patches of forest that had remained in equilibrium with the fire/grazing process for centuries. In 1985 D. H. Janzen and W. Hallwachs visited (formerly) dry-forested northwestern Australia and witnessed how very thoroughly anthropogenic fires in ungrazed grasslands can eliminate all of the woody vegetation (Janzen 1986b, 1988e), with the subsequent realization that both an anthropogenic fire-control program was mandatory for Parque Nacional Santa Rosa, and that lacking that, cattle could/should function as biotic mowing machines until there was fire control. This observation was one of the two stimuli for the formation of the original ACG "plan" in September 1985 (Janzen 1988a).

Associated with the observation of how devastating were the dry season anthropogenic fires (lightning occurs during the rainy season in the ACG, thereby not starting fires except where humans have created large patches of highly inflamable materials, such as an ungrazed pasture), came the opposite observation that when the fires were *stopped*, there was amazingly rapidly invasion of the pastures (and fields or other kinds of cleared areas) by wind- and animal-dispersed plants, and their associated animals (e.g., Janzen 1988c). This concept, at first received with disbelief by academic ecologists, was viewed as a given by the ranchers who annually destroyed large amounts of perfectly useful cattle fodder by (unadmittedly) setting fires to keep out the

woody invasion.

Simultaneously with the realization of the need for anthropogenic fire elimination came the realization that Costa Rica's dry forest national parks were in fact too small both for their basic biological survival as units (a 10,000 ha dry forest park is almost entirely "edge", given that edge effects can easily extend inward 5-10 km), and too small to allow the kinds of human uses that would be required if the conserved wildland was to be anything other than an expensive "set-aside", a bauble that would go the way of all baubles. One cannot dream of and construct interactions with society such as the ACG's now world-famous provision of the environmental services of degrading orange peels for the neighboring orange juice industry (Faries et al 1998) without having ample geographic, ecosystem, and biodiversity space within which to operate. Happy campers are not compatible with tiny fragile ecosystems.

So, in late 1985, the classical national parks of Santa Rosa, Murcielago and Rincon, along with the classical Orosi Forest reserve, leaped into the invention of the conservation area (Janzen 1986a, 1988a) - large enough and diverse enough to survive, be user-friendly, be guided by scientific understanding of the biodiversity processes contained within it. And, it was determined to be embedded in the local as well as national and international financial and intellectual economy.

The basic task was to stop the fires (and logging, ranching, hunting, farming), raise the money (donations) to purchase the private adjacent marginal farm/ranchland and give it back to dry forest biodiversity, facilitate the appearance of decrees and regulations allowing financial and administrative decentralization, set up a management endowment, and train and stimulate the ACG staff to not only do the internal things but do things that would integrate them with the neighbors (= hire local, train local, and run an all-inclusive biological education program for all school children). The ACG has done these things, and is continuing them on a regular, annual basis. All indications are that Costa Rican society's attitude, and the government itself, are highly supportive of the idea and process that the ACG continues being what has been described of it here.

C. Photographic and/or cinematographic documentation.

The Research Program of the ACG maintains a collection of tens of thousands of color slides of biology and events in the ACG that dates from the late 1970's. It is currently being catalogued and digitally captured (slides scanned at low dpi for fast use on web sites and in databases, slides scanned at 2700 dpi for archival quality preservation of their information) for public use and display through the ACG web site (http://www.acguanacaste.ac.cr). The ACG library also maintains copies of all films and videos made in the ACG, again for public and research reference use. Current research projects in the ACG, to do such things as a plant Species Home Page for each species of plant in the ACG (see new items at the ACG web site), are heavily based on thousands of color slides that are then digitized for both storage and use. In addition to the above ACG-based image collections and management, individual researchers working in the ACG are accumulating very large organismal and scenery image collections of and for the ACG (e.g., http://janzen.sas.upenn.edu/index.html). These image collections, being passed to the ACG in electronic form, provide time series photographs of changes in vegetation beginning in the late 1970's, time series that are particularly relevant to the widespread forest restoration process occuring throughout the ACG dry forest, cloud forest and rain forest.

D. Public awareness.

Notwithstanding its location in remote northwestern Costa Rica, the ACG has very high visibility in Costa Rica owing to schoolchildren being taught about the battles that occurred at the Casona (e.g., Jamison 1909, Walker 1860), battles and stories that are the base for the original expropriation of the Casona as a national monument (and the base for the original application for World Heritage Site status in 1979 (no. 107). Following onto this very historical visibility, the establishment of Parque Nacional Santa Rosa led to frequent Costa Rican visitation to the very beautiful and large Playa Naranjo, for basic rustic recreation. This beach, and the Olive Ridley's Turtle arrivadas at Playa Nancite immediately to the north, have received both national and international attention both through word-of-mouth from visitors, and frequent mention in guidebooks and books about Costa Rican national parks (e.g. Boza and Mendoza 1981, Boza 1992, Wallace 1991, Maslow 1996).

Beginning in the 1980's, the dry forest itself within Parque Nacional Santa Rosa (Sector Santa Rosa of today's ACG) began to be recognized as a different and interesting kind of biology - and one that is especially easy to observe in the dry season. The leafless vegetation makes vertebrates much easier to see, and the lower stature dry forest vegetation brings the viewer close to the dry season floral displays and other treetop biology. Currently the ACG receives about 40,000 Costa Rican visitors and 20,000 international visitors per year, though these numbers will easily multiply when the ACG formally begins to advertise its biology and visitor facilities about the turn of the century. They learn about the ACG dry forest through direct observation on site and from Costa Rican's tourism guidebooks, and at a distance through children's books such as "Water Hole, Life in a Rescued Tropical Forest" (Mallory 1992), full length PBS films (e.g., the 1988 BBC film "Paradise reclaimed"), numerous TV documentaries, and books about Costa Rica's national parks (e.g., Boza and Mendoza 1981, Boza 1992, Wallace 1991, Maslow 1996).

The five formal ACG biological stations and 20+ additional administrative posts are currently "advertised" only by word-of-mouth owing to preoccupation until now with conservation and development functionality rather than maximizing the number of visitors to the ACG. The ACG lands, through these biological stations, have been the subject of a very large amount of biodiversity research (see Appendix 1 list of references), with the primary focus initially on dry forest ecology (e.g., Janzen 1983a) and today an emphasis on biodiversity and ecosystem inventory of the entire ACG (e.g., Janzen 1996a, Janzen and Gamez 1996).

However, and this is a very large however, in 1986 the ACG established the Programa de Educacion Biologica (PEB) designed to teach basic biology and natural history/ecology to all 4th, 5th, and 6th grade students in the schools adjacent to the ACG. Twelve years later this program has expanded to cover annually about 2,500 students in more than 40 schools and two high schools, and consumes about 10% of the ACG annual budget. The students are bussed to the ACG and guided through field studies designed to render them bioliterate and to understand wildland biodiversity, so that when they are the decision-making adults in this region, they will make heir decisions based on this understanding. This program has created a general public awareness of the ACG that very strongly complements the public awareness created by the ACG being the largest full-time employer in the region (more than 80% of the 120-member ACG staff is "local", and all are Costa Rican). The newly computerized issues of Rothschildia, the bimonthly journal of PEB, are available at the ACG web site as examples of the very high quality information generated by the ACG on everything from very basic biology to local and national biodiversity administration and conservation policy.

The ACG and its activities are introjected into provincial life through a third and very different process. The cattle industry, four centuries old in Guanacaste Province, has abruptly diminished to

about 20% of its former self and continues to dwindle (due to both the lowering of national protective tariffs on beef, and the rising cost of beef production by a progressively more educated work force). This process, easily visible by the mid-1980's, has led to hundreds of thousands of hectares of (formerly dry forest) marginal pasture with no economic future (46% of Costa Rica is pasture, with about 90% of that no longer being economically viable on today's beef and milk market). When the ACG was donated a 7,000 ha ranch on its southern boundary in 1987, the decision was made to convert it to a forest experiment station dedicated to growing native dry forest trees in various patterns and treatments as an "extension" service to a province desperate for knowledge as to how to convert from mammal products to wood products (or anything else). The Horizontes Forest Experiment Station has been, and continues to be, the site of 10-20 forestry workshops and meetings per year - all aimed at contributing to the local and national process of converting from marginal cattle pasture to woody crops and various kinds of wildland reforestation for watersheds and timber. These public events for provincial private landowners have made the ACG extremely visible at a local level to a different group than the schoolchildren, tourists and ACG employees mentioned above. While the Horizontes Forest Experiment station is not "conservation" per se, it is a major contributor indirectly to overall awareness of the various values and opportunities in forest-based development, which in turn increases biodiversity survival on the countryside and lowers pressure on the ACG.

All of the above processes, plus many smaller ones not described, have led to a regional populace that is very aware of and very respectful of the ACG as a "wildland farm". This in turn has led to the accusation that the ACG can do much of what it does because it has "tame and docile neighbors". Quite to the contrary, when the ACG began its process in the mid-1980's, it was embedded in a society rich in automatic weapons, accustomed to border violence, harvesting natural resources largely on a "finder's keepers" mode, and certainly not dedicated to anything even approximating a "love of nature" or sustainable use of natural resources. At least half of the $1.7 million budget of the ACG is dedicated to activities that can be broadly lumped into "public awareness and good neighbor relations" that were not contemplated in traditional inwardly-directed national park management, which is a large part of why the ACG now has "tame" neighbors.

D. Bibliography.

Appendix 1 contains a partial bibliography of published material about the ACG ecosystems, habitats, organisms and processes (both administrative and natural). A select subset of these has been placed in the Literature Cited section at the end of this document. However, in addition to these hundreds of papers, the ACG Research Program continues to discover papers written in the 1970-1990 period about ACG organisms, so the historical bibliography will continue to grow. New publications about ACG biodiversity and ecosystems (in the broadest sense) are now accumulating at a rate of about 100 per year (not counting newspaper and radio articles).

4. State of preservation/conservation.

A and B. Diagnosis and history of preservation.

As referred to at numerous points above, the ACG is an area that has received about four centuries of highly heterogeneous, sporadic and irregular damage from anthropogenic fires, lumbering, ranching, hunting, farming and general resource perturbation (rechanneling water for irrigation, a sulphur mine, introduction of African grasses, road construction, selective fencepost collection, pesticide applications, etc.). As an example, the ACG contained 50,000-60,000 ha of variously abandoned marginal pastures in its formative years.

However, due to low grade soils, erratic seasonality, geopolitical isolation from the Costa Rican seats of power, and foreign ownership, none of this agroscape damage was sufficiently thorough over a large area to render the ACG dry forest unrestorable. While in the early years the ACG did some active tree planting in the knowledge that this would speed the dry forest invasion process, it quickly became apparent that forest restoration was much more economically and speedily achieved by spending limited resources on anthropogenic fire elimination, stopping hunting (of the animals who were important seed dispersal agents), and purchasing more trashy ranch and farmland so as to increase the area and contiguousness available to the newly expanding wildland populations. Only on the wetter and higher elevation pastures in the eastern part of the ACG has it been found to be moderately useful to plant trees and attempt to break the dense sod and stands of introduced African grasses. And, even in these cases, natural invasion will eventually do the job, even if much slower than is the case on the (formerly dry forest) pastures in the western ACG.

Based on the vegetation structure of the tiny remaining patches of old-growth forest, and the vegetation structure of the much larger successional patches ranging from 1-400 years of age in the ACG dry forest, it is clear that a) throughout the ACG the forest restoration process is in full motion, and b) it will be at least 500 years before greater part of the entire area will be sufficiently "old-growth" to fool an ecologist into thinking that it was never cleared, burned, logged, hunted, etc. It will take at least 1000 years before the only human impact remaining will be that which is unavoidable (edge effects, global warming, introduced organisms, extinctions, island-size effects, etc.) and that which is deliberate (roads, buildings, user/observer activities, etc.). However, it should be noted that even as early as today, 27 years after the establishment of Parque Nacional Santa Rosa, and 12 years after setting the ACG in motion, the ACG is blessed with tens of thousands of ha of young dry forest of various heights in various ecological circumstances with healthy and growing populations. This success, however, should be tempered with the realization that succession from many young ages to old-growth forest will be accompanied by decline in numbers and extent of many "second-growth species" which will be balanced by quite unpredictable increases in many (today rare) "old-growth" species. For example, white-tail deer and mountain lion density will decline, while jaguar, tapir, and peccary density will increase.

The ACG 43,000 ha marine area along the Pacific coast has, as mentioned earlier, survived in relatively intact condition due to its geopolitical isolation and difficult currents and winds. Its coastal margin/backbeach vegetation is in especially good condition due to the absence of small coastal farms (Janzen 1998d). The mangrove swamp behind Playa Naranjo has now made major regeneration comeback following the removal of the settlers in the late 1970's, and the mangrove swamp in Bahia Potrero Grande (to the north of Naranjo) is in outstanding old-growth status. There is even a healthy saltwater crocodile population along the Pacific coast of the ACG (Ortiz et al 1997).

Now that the ACG is terrestrially relatively secure and administratively experienced, the somewhat longer (and needing much research and practice) exercise of restoring this inshore marine area will begin. The first major step was been the process begun in 1987 with the hiring of a marine biologist to live in the major fishing village of Cuajiniquil, give a strong marine emphasis to the PEB in the local grade school, and begin the years of discussion that are necessary to wean the local artesanal/subsistence fishermen from depending in part on these waters. They are already beginning to agree to leave some of the area unfished, and the ACG will begin in these coming years to move them out both through legislative enforcement and more intellectual persuasion. The second major step has already occurred, with the construction in 1995 of the Marine Biological Station and permanently occupied Administrative Post on Isla San Jose in the Islas Murcielagos off

the western tip of the Santa Elena Peninsula.

The conservation situation in the more moist eastern end of the ACG is somewhat different than that of the initially desperate situation requiring the immediate rescue of the dry forest fragments in the western drier ACG through fire elimination. The eastern portion of the ACG (formerly Orosi Forest Reserve on Volcan Orosi and Volcan Cacao; Rincon de la Vieja National Park) is about half original (or appearing to be) old-growth cloud forest, rain forest and intergrades with them and dry forest. Some of the perturbed areas were logged in the 1960's and then allowed to regenerate immediately into today's secondary successional forest, while other areas became croplands or pastures with dense stands of several species of African wet forest pasture grasses. The secondary successional forest is moving rapidly back to old-growth forest without any management required (other than cessation of hunting, which has now been achieved). The pastures and fields, however, do require either explicit tree planting and plowing to break the sod, or a 1-2 decade wait for broadleaf secondary succession to be established. Additionally, the ACG is currently contemplating a single rotation of the plantation gmelina trees to shade out the grass, followed by understory woody plant release by killing the gmelina.

The more moist lower elevation areas at the extreme eastern end of the ACG (Atlantic rainforest) is also suffering unavoidable biodiversity damage by losing its once huge area further to the east. In other words, along the eastern rim of the ACG the rainforest (400-600 m elevation) has no choice but to suffer "island effects" since its populations will be reduced to that which can survive on the small strip lying between the volcano middle-elevation slopes and the clean agroscape further to the east on the Atlantic coastal plain. This sad fate of Costa Rica's Atlantic rainforest is universal along the Caribbean side of Costa Rica. Fortunately a major area of this lowland Atlantic rainforest still exists in eastern Nicaragua.

C. Means for preservation/conservation.

The basic means for preservation and conservation of the ACG into perpetuity have been referred to throughout this document to this point. The basic means has been to purchase all the land on the open market or through compensated expropriation, or receive it through donations. Once in the hands of the State or an intermediate holding institution such as the FPN, the basic assault has been rapidly reduced to near zero by the ACG by stopping all (anthropogenic) fires, hunting, logging, pesticide use, and farming. Additionally, the locations of buildings, roads, and other intense human uses are planned such that they are not impacting the regeneration process or the extant biodiversity.

The above has been achieved by creating a decentralized and local-based administrative process dependent on interest income from the ACG $12 million management endowment joined to project-based grants and research projects, as well as user payments in cash and barter for biodiversity and ecosystem services. This administration has also been molded around a professionalization concept whereby all ACG staff are trained, facilitated and encouraged to specialize at whatever program they are permanently imbedded in, thereby doing away with the generalized category of (gun-toting) park guard or guardaparque. The above process has also been a central contributor to the new and current national-level reorganization of the Servicio de Parques Nacionales, Direccion General Forestal, and Direccion de Vida Silvestre into the new Sistema Nacional de Areas de Conservacion (SINAC) initiated by the Ministerio del Ambiente y Energia (MINAE) in the mid-1980's and still ongoing. This process also has many parallels to the so-called "Community Based Conservation" that is both causing so much current controversy in Kenya (last week of May and first week of June 1998 issues of Science), and new efforts to integrate US national parks with

many external areas of society (e.g., Sellars 1997).

The means for further conservation and preservation of the biodiversity and its ecosystems in the ACG consist principally of a mosaic of continued

1) inclusion of the few remaining marginal wildlands to the point where the ACG abuts directly with a highly successful agroscape (as it already does around more than half of its margin),
2) development of non-damaging environmental services to be offered locally, nationally and internationally,
3) internal efforts to understand the biology, location and functions of ACG biodiversity and its ecosystems - biodiversity and ecosystem inventory for development of wildland biodiversity and ecosystems, and
4) outreach at all levels to constitute a useful pilot project for these kinds of activities nationally and internationally.

All this must be, and is being, planned, driven and executed by a highly goal-directed and technically competent staff supported by modern technology.

D. Management plans.

The ACG "management plan" consists of a several-hundred page document generated each year by the ACG programs to accompany its annual budget. The specific actions to be carried out are developed by each of the different ACG programs, according to the specific needs at that time, all in the context of carrying out the four general goals listed at the end of the previous section. In other words, the complex, diverse and ever-shifting management plans of the ACG originate in the interface between what professionals recognize as needed to meet their specific responsibilities and opportunities, the budget available, and the four general goals. The ACG believes firmly that constant striving toward these four goals will result in the single goal of wildland conservation into perpetuity, given continued government solidarity, an educated national populace dedicated to sustainable development, and no major outside perturbation such as war or gross global climate change.

The ACG annual management plan and budget are generated and approved at the first instance by the ACG itself, followed by discussion and approval by the Consejo Regional (formerly the Comite Local), and approval by SINAC/MINAE (and now the Consejo Nacional under the new 1998 biodiversity law). As new opportunities for environmental services arise, new funds will be allocated according to the challenges of the time, but always with the goal of wildland biodiversity and ecosystem survival into perpetuity. There are in fact many roads to this Rome, though as secondary succession (= restoration) moves ahead, some of these roads will be closed but others may open.

5. Justification for inclusion in the World Heritage List.

Why should the ACG apply for World Heritage Site status when it already has a very solid internal process in motion for the conservation of its biodiversity and its integration into society, and it is firmly backstopped by Costa Rican legislation, decrees, regulations and its own organic logic?

The first reply is that this application follows very directly onto the recommendation by the World Heritage Committee when it deferred Costa Rica's 1979 application for World Heritage Status for the historic Santa Rosa Casona alone, and stated that "Costa Rica might wish to extend the site

nominated to cover the natural heritage of this area" (4th Session, Paris, 19-22 May 1980, no. 107).

The second ACG reply is that the regime of challenges to a large conserved wildland, even if it pays its own costs and offers major non-damaging services to local, national and international society, is large, diverse, unknowable, unpredictable, and ever-present. Humans are hard-wired to eliminate and replace wildlands with themselves and their domesticates (e.g., Janzen 1998c). A major subset of humans will *always* want to remove the ACG wildlands and replace them with humans and human domesticates, and/or allow them to become the passive recipients for society's contaminants. For survival into perpetuity, the ACG needs the formal approval and support of every major international conservation-based process, from CITES to the Biodiversity Convention, from convenios with other national park services to programs supported by the World Bank. The ACG and the government of Costa Rica feel strongly that ACG inclusion in the World Heritage List by UNESCO's Intergovernmental Committee for the Protection of the World Cultural and Natural Heritage would be a major step forward in insuring ACG survival into the indefinite future.

The ACG has always viewed one of its functions to be a pilot project, a test of concept, for the varied efforts spread around the tropics to conserve tropical biodiversity and its ecosystems. The ACG believes that by becoming a World Heritage Site, it is also expressing its solidarity with other conservation efforts around the world, both by explicitly "joining" this UNESCO effort and explicitly stating that it is transparent to any examination and very happy to share its experiences.

In a more conventional sense, the reasons why the ACG is an appropriate member of the World Heritage List have been obliquely referred to throughout this document. Some are briefly summarized in the following list:

1. The ACG is the largest conserved dry forest in the neotropics, with Kakadu National Park in northestern Australia being the largest - 88,000 ha of terrestrial habitat and 43,000 of marine, anticipated to be about 110,000 contiguous terrestrial ha and 50,000 contiguous marine ha when completed. This is 2% of Costa Rica and about 8% of what Costa Rica has and will maintain as its conserved wildlands into perpetuity.

2. The ACG contains a complete dry forest ecosystem, complete with rivers from their origin to the sea, adjacent cloud forest and rain forest habitats, and coast/marine interfaces. This 105 km-long transect also contains sufficient elevational and climate diversity to include the ranges of a wide variety of kinds of seasonally migrating and moving species.

3. Tropical dry forest is the most severely threatened of the all the major tropical habitat types. Less than 0.02% remains of the tropical dry forest that once constituted more than half of the woody vegetation in the tropics. The ACG is the only conserved neotropical dry forest large enough and contiguous enough to sustain its full complement of species indefinitely (except for international migrants).

4. The ACG contains portions of the populations of at least 60% of the species of terrestrial and freshwater organisms in Costa Rica, which in turn means that it contains as much as 2.4% of the world's biodiversity - in area the size of a major metropolitan center. This extreme diversity is largely due to both its relatively intact nature, and because it contains both the Mesoamerican Pacific dry forest ecosystem and the adjacent cloud forest and Atlantic rainforest. This means that many species in the ACG range as far north as the region of Mazatlan and Tampico, Mexico and as

far south as Brazil and Bolivia. Current estimates of are that the ACG contains about 230,000 species, but this estimate may be as much as doubled by inventory of the bacteria and viruses.

5. In addition to conserving an entire tropical dry forest ecosystem and the adjacent parts in and out of which move its organisms, the ACG contains and protects some unique habitats within this ecosystem, all of them being within 1-2 hours drive of each other and available for research and non-damaging use:

a) a serpentine barren occupying approximately 24,000 ha (Bergoeing et al 1982, Tournon and Alvarado 1996), a portion of which is still covered by several thousand ha of old-growth dwarf forest (Fig. 5) (most but not all of this serpentine barren is within the "Santa Elena property" that is currently being expropriated by the government of Costa Rica for inclusion in the ACG). This ancient habitat has been above the sea for 85 million years, and was an island in the eastern Pacific long before the Central American isthmus formed and connected North and South America. The Santa Elena Peninsula is exceptionally rich in plants and vegetation associations that occur only there in Costa Rica, and widespread species with likely odd genetics associated with living on the very dry and mineral rich soils. Undoubtedly there is an equally unique animal and microbial biota, but neither has been explored owing to the conflicts associated with the expropriation (Janzen 1998d).

b) three intact volcanos (1400 to 2000 m), each with many thousands of hectares of old-growth middle- to upper-elevation forest, and each displaying amazingly sharp gradients from soupy wet cloud forest to the severe dry forest on their western slopes.

c) the last remaining large block of old-growth forest in Central America on the soils and microclimates appropriate for coffee. This Life Zone has been virtually extinguished in Costa Rica (and elsewhere in Mesoamerica). A poignant example is the listing of the spectacular cauliflorous tree, Parmentiera valerii (Bignoniaceae), as near extinction in Costa Rica (IUCN 1997), while at the same time there is a healthy population of thousands of adults on the middle-elevation slopes of the three ACG volcanos, in exactly the kind of forest that once grew where today grows most of Costa Rican coffee.

d) the most intact inshore marine Pacific ecosystem from the Canal Zone to Mexico, an area that survived not only because of its geopolitical remoteness, but because of its violent currents and unpredictable violent winds. The site is highly productive and hence very rich in marine species owing to an incoming upwelling cold and nutrient currents (e.g., Cortes 1996-1997).

e) exceptionally intact mangrove forests (containing eight species of mangroves) that abut both the relatively intact marine area and the regenerating and relatively intact coastal dry forests. This leads to a permanently wet mangrove interacting strongly with an area of no rainfall for six months, across a gradient only tens of meters in width (Janzen 1998d).

f) every kind of flowing aquatic system found in Mesoamerica, from extremely seasonal rivers and streams (and seasonally dry swamps) to massive continuous water output from year-round volcano-top clouds and rain, mud pots, and hot springs. This diverse and intact set of river systems covers both the Atlantic and Pacific drainages, and is being studied from an aquatic-biased biological station constructed exactly on the continental divide.

g) the only large patches (old-growth plus regenerating) of semi-pristine old-growth lowland dry forest on the entire Pacific coast of Costa Rica. This is the only fully protected entire dry forest

ecosystem in Mesoamerica (though hopefully this will not always be the case).

h) the only wet-forest-to-dry-forest (Atlantic lowlands to Pacific Ocean) protected ecosystem gradient at low elevation (300-500 m) in all of Mesoamerica.

i) about 20 km of marine turtle nesting beaches, including a massive Olive Ridley's Turtle arribada site (Cornelius 1986, Valverde et al 1998) and two nesting sites for the highly threatened (Behler et al 1996, Spotila et al 1996) Leather Back Turtle (Janzen 1998d).

6. The ACG as a single unit contains and protects an entire elevational and east-west seasonal migratory route and destinations from the coast to 2000 m, from dry forest to cloud forest to rain forest.

7. The ACG is a living and growing example of the full biodiversity and ecosystem restoration process following centuries of anthropogenic damage. This is being achieved technically and administratively by eliminating anthropogenic fires from 50,000-60,000 ha of highly inflammable vegetation, and demonstrating that tropical forests can be restored if the seed and animal sources are available, and the threats removed.

8. The ACG operates under an administrative philosophy of saving biodiversity and its ecosytems into perpetuity through the mechanism of using them non-destructively, and causing these environmental services to pay the bills and render the area to be productive as well as maintained as a wildland area. Please see http://www.acguanacaste.ac.cr for a web site description of the overall ACG.

9. The ACG has a highly-developed and still-evolving administrative capacity to enter into collaborative and integrated interactions with the private sector in the surrounding agroecosystem. A specific example is that the ACG teaches basic bioliteracy - field ecology, natural history, biodiversity science - to all the 4th, 5th and 6th graders, and those of two high schools, in the area. This program of more than 2,500 students per year uses about 10% of the ACG budget and is no cost to the Ministerio de Educacion Publica. Equally, the ACG is now demonstrating that its wild biodiversity can degrade massive amounts of orange peels in return for the barter payment of additional forested land by the orange juice industry (Faries et al 1998).

10. The ACG maintains five user-friendly biological research stations (and several dozen more lightly used administrative stations) scattered over the diverse ACG habitats. They are connected by a highly serviceable road system (and the Interamerican Highway passes through the center of the ACG) and are easily accessible from neighboring towns.

11. Over a period of 12 years the ACG has built its own management endowment ($12 million and growing), contains no uncompensated inholdings (except for the Santa Elena property currently being expropriated by the government of Costa Rica), supports a highly professional staff (organized in discipline-based programs) of about 120 Costa Ricans (more than 80% of whom are "local"), is self-administrating, operates under a local board of directors as well as the Ministerio del Ambiente y Energia, and has been a test bed for much of the restructuring of Costa Rica's entire conservation system into a national system of conservation areas.

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Appendix 1.

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WORLD HERITAGE NOMINATION - IUCN TECHNICAL EVALUATION

AREA DE CONSERVACION GUANACASTE (COSTA RICA)

1. DOCUMENTATION

i) **IUCN/WCMC Datasheet:** not available as at 8 April 1999.

ii) **Additional Literature Consulted:** Cordoba, R. *et.al*. 1998. **Inventario de los humedales de Costa Rica.** UICN-MINAE. San José, Costa Rica. 380 p; Janzen, D. 1983. **Costa Rican Natural History.** University of Chicago Press. Chicago. 816 p; Janzen, D. 1986. **Guanacaste National Park: tropical ecological and cultural restoration.** Editorial UNED. Costa Rica. 103 p; Janzen, D. 1995. Neotropical restoration biology. **Vida Silvestre Neotropical.** Vol. 4(1). pp. 3-9; Janzen, D. 1998a. Gardenification of wildland nature and the human footprint. **Science.** Vol. 279. pp. 1312-1313; Janzen, D. 1998b. **Conservation analysis of the Santa Elena property, Península Santa Elena, northwestern Costa Rica.** Philadelphia, USA. 129 p; Jiménez, G. 1998. **Proyecto manejo y tratamiento natural de cascaras de naranja. Area de Conservación Guanacaste.** Guanacaste, Costa Rica. 25 p; Molina, Maria de los Angeles. 1995. **Inducción del proceso de restauración del Bosque Seco Tropical en el Area de Conservación Guanacaste.** ACG, MINAE. Guanacaste, Costa Rica. 16 p; Morales, D. *et al.* 1997. **Informe técnico: Proyecto de Restauración del Bosque en el Corredor Biológico Rincón-Cacao.** ACG, MINAE. Liberia, Costa Rica. 25 p; Thorsell, J. *et al*. 1997. **A global overview of wetland and marine protected areas on the World Heritage List.** IUCN. 63 p; Thorsell, J. 1997. **A global overview of forested protected areas on the World Heritage List.** IUCN. 58 p.

ii) **Consultations:** High level Costa Rica government officials; almost 40 persons in and near GCA; other local resource user group/local community representatives; and visiting scientists.

iv) **Field Visit:** February 1999. Craig MacFarland and Juan Carlos Godoy.

2. SUMMARY OF NATURAL VALUES

The nominated site (GCA) comprises 88,000 terrestrial hectares (ha) and approximately 43,000ha of marine area. The entire area extends from 19km (12 miles) out in the Pacific Ocean to the coast of north-western Costa Rica and then inland through lowland Pacific dry tropical forests, up into the mountains to over 2,000 meters elevation (montane humid and cloud forests), then down on the Atlantic/Caribbean side into the upper portions of lowland rain forests . The GCA is located between 10^0 and 11^0 North latitude and 85^0 and 86^0 West longitude in Costa Rica's most northern and western province (see Map 1).

The GCA is a complex of almost entirely contiguous protected areas forming a single larger protected area, as follows (see Map 2):

- Santa Rosa National Park (terrestrial) 4,558ha
- Rincon de la Vieja National Park 14,084ha

- Guanacaste National Park 37,365ha
- Junquillal Wildlife Refuge 439ha
- Horizontes Forestry Experiment Station 7,317ha
- Marine Area (part of Santa Rosa National Park) approximately 43,000ha

Approximately 60% of all species present in Costa Rica are found in the GCA, or from a global point of view approximately 2.4% of all the biological diversity (species level) of the planet. In addition, the GCA's fauna and flora are characterised by a major intercontinental convergence of species with their origins in the Nearctic and Neotropical Realms. Many species in the GCA range as far north as the region of Mazatlan and Tampico in Mexico and others as far south as Brazil and Bolivia. Current estimates are that the GCA contains approximately 230,000 species (not including bacteria and viruses).

Three elements are fundamental determinants of the great biological richness of the GCA:

- The most intact inshore Pacific marine ecosystem between the Panama Canal Zone and Mexico, with major nutrient-rich upwelling currents, causing high productivity in the surface layers;
- The only remaining significant area of Central American to northern Mexican (Mesoamerican) Pacific dry tropical forest, i.e. a complete dry forest ecosystem;
- A major altitudinal transect (relatively wide in almost all of its length) of 105km, including 8 Life Zones (*sensu* Holdridge), within which there is a continuous band from mangroves on the Pacific coast, Mesoamerican Pacific dry tropical forest, humid montane tropical forest, cloud forest, and finally on the Caribbean/Atlantic slope tropical rain forest. This transect includes complete river basins from their origin to the Pacific Ocean.

The marine area includes various near shore islands and islets (mostly uninhabited), open ocean marine zones, beaches, rocky coasts, and approximately 20km. of sea turtle nesting beaches. More specific surface habitats include coral reefs, rocky reefs, sandy bottoms, rock fields, deep water, algal beds and upwelling currents. The GCA possesses, among other marine features, a beach (Nancite) of 1.7km length, where thousands of Olive Ridley sea turtles nest simultaneously in major waves, called "arrivals", or "arribadas" in Spanish. This is one of the few protected arribada beach for this species in all of Mexico and Central America. Also, the GCA contains two nesting beaches of the highly threatened Leather Back sea turtle.

The GCA contains 37 wetland areas, among which are included major ones for Central America such as Puerto Soley, Cuajiniquil, Santa Elena, Potrero Grande, Nancite and Playa Naranjo mangrove complexes; Limbo Lagoon; Iguanito Estuary; and, Rincon de la Vieja Volcano Lagoon (freshwater in this last case). Its mangrove forests contain eight species of mangroves and are exceptionally intact.

The GCA's dry tropical forest, totalling approximately 60,000ha, is a complex mosaic of old growth patches and regenerating areas varying up to 400 years in age. It is characterised by an annual average total precipitation of 800 - 2,800 mm, and because of a well-defined dry season with a virtual total absence of rainfall from mid-December to mid-May. Because of this dry season, hot and with strong winds, climax conditions are a dry deciduous tropical forest, with at least 20 recognised vegetative associations. This dry forest consists of the only large stands (old growth plus regenerating) of pristine and semi-pristine old-growth lowland dry forest on the Pacific coast of Costa Rica. It is the only fully protected complete dry forest ecosystem in Mesoamerica.

The GCA contains important and apparently healthy populations of many of Central America's most typical vertebrates, with a grand total of 940 known vertebrate species. It is estimated to possess more than 50,000 species of fungi, 12,000 species of nematodes, 20,000 species of Coleoptera (beetles), and 13,000 species of Hymenoptera (ants, bees, wasps and relatives). The intact altitudinal transect contained within the GCA protects an entire elevational and east-west seasonal migratory route from the Pacific coast to 2000 meters above sea level, from dry forest to cloud forest and down to Atlantic rain forest, which is critical for the range and life histories of many species of animals.

The geological diversity is also of interest. It has 24,000ha of a serpentine barren (periodyte) on the Santa Elena Península, which has existed for more than 85 million years above sea level (Jurassic - Eocene). It has pyroclastic areas in Santa Rosa NP (Miocene) and Pleistocene volcanic complexes in the region of the Orosi and Cacao volcanoes (Guanacaste NP).

3. COMPARISON WITH OTHER AREAS

In summary the GCA can best be compared with other similar areas at worldwide, Neotropical and Mesoamerican (Central America and southern Mexico) levels, as follows:

- The sample of dry tropical forest protected in the GCA is the third largest in the world, after Kakadu NP in north-eastern Australia and Thungyai-Huai Kha Khaeng Wildlife Sanctuaries in Thailand;

- The GCA contains a complete dry forest ecosystem. Tropical dry forest is the most severely threatened of all the major tropical habitat types, with less than 0.02% remaining of the tropical dry forest that once constituted more than half of the woody vegetation of the planet's tropical regions. The GCA is the only conserved dry forest in the Neotropics large and contiguous enough to sustain its full complement of species indefinitely; The GCA would be the only World Heritage Site in the Neotropical Realm which protects dry tropical forest;

- Its 60,000ha of dry tropical forest is the largest and by far the best protected of such forests in the Americas (the coastal and near inland dry and semi-dry tropical coastal and scrub thorn forests of northern Peru and southern Ecuador are fundamentally a different complex than typical dry tropical forests of Central America, plus they have been severely deforested, grazed and/or otherwise disturbed over almost all their extension);

- All the other protected areas including dry tropical forests of the Central American to northern Mexican type in the region are far smaller in size (circa 5,000ha and smaller), scattered widely and with no biological corridors connecting them, and subject to much greater edge effects;

- The GCA is the only protected area in all of Central America and southern Mexico which includes a continuous transect from Pacific marine areas, to dry tropical forest, and then with altitudinal variation, a variety of adjacent forests onwards almost to the Caribbean coast (humid forests, cloud forests and wet lowland tropical forests). This 105km long transect is the only one in the region that contains such a broad range of contiguous habitats, with sufficient elevational and climatic diversity to include the ranges of a wide variety of types of seasonally migrating species;

- This complete altitudinal transect will become even more critical as global warming impacts reach Central America. The heating and drying of the dry forest ecosystem, i.e. a human-generated "desertification" of the western part of the GCA, will mean that a cooler and wetter area (refugia) will be needed to which the dry forest complex of species can retreat in order to survive. The vast majority of protected areas in the tropics do not have such altitudinal gradients and almost certainly will lose many of their ecosystems and complexes of species under current climate change scenarios;

- There are currently two marine World Heritage Sites in the Neotropical Realm (the Belize Barrier-Reef Reserve System and Cocos Island National Park in Costa Rica). The GCA would add significantly to these areas. In addition, the sea turtle nesting beaches in the GCA are considered of global significance; and the marine zone of the GCA is the most pristine of all the continental coastal marine areas of the Central American and Mesoamerican Pacific region.

The GCA is internationally significant and it represents the only remaining possibility of protecting and conserving a large-sized and ecologically complete dry tropical forest ecosystem (and in contiguous association with its nearby coastal marine and humid montane, cloud and wet lowland Atlantic/Caribbean rain forests) left in the Americas.

4. INTEGRITY

The GCA has the greatest amount of its area in government ownership within Costa Rica. It is noted that some portions of Guanacaste National Park are currently owned by the Costa Rican National Parks Foundation and this is currently being passed to the government. In other words, almost 100% of the terrestrial and all the marine area of the existing, decreed protected areas which make up the GCA are in government ownership.

The one major area (> 15,000ha) still in private hands, which should be added to the GCA sometime over the next 1-2 years, is the Santa Elena Property. This contains unique geological features and a highly conserved dwarf tropical dry forest, which will add significant conservation value to the GCA. The case is now being mediated through an international legal civil process and it appears that it will be resolved favourably.

The borders of the GCA are well-defined, protected and in virtually all areas relationships with bordering land owners are good, or at least civil and peaceful. Moreover the current strategy calls for the current 88,000ha of terrestrial habitat and 43,000ha of marine zone in the GCA to be gradually expanded to approximately 110,000ha of contiguous land and 50,000ha of marine areas. The major addition will be the Santa Elena Property, but negotiations for the Del Oro (1,500ha at present, to be greatly enlarged) and Rincon Rainforests (6,000ha) areas (see Fig. 1) are well advanced.

In general the GCA has widespread and solid local support from its neighbours and the public in general in Guanacaste Province. That in large part is due to the extensive efforts of the GCA to incorporate local leadership into the process of GCA management. A Local Committee was established 10 years ago with a 5-6 representatives of major local social and economic interests as members, along with the GCA's leadership. It mainly acts at advisory level, but does take part in major budget allocations decisions for the overall program. Under the new Biodiversity Law in Costa Rica and other legislation, the Conservation Areas will be required to promote and establish Regional Committees for essentially this same purpose. The GCA will be gradually converting its already well-functioning Local Committee into the Regional Committee. Support also comes from the fact that the GCA is reaching some 2,500 school children in all of the primary schools and several high schools surrounding its borders, with its basic biological/ecological literacy campaigns (Biological Education Program). Moreover, the GCA itself, the extensive biological inventory programs within the area and many visiting scientists which use its five biological research stations, have been providing new sources of employment for a nationally already marginalized region, which also is suffering the effects of a major economic downturn over the past 1.5 decades (due to general collapse of the cattle industry).

In terms of its economic sustainability, the GCA is in far better condition than the majority of protected areas in the developing world. This is due to the strategy and activities of the GCA leadership and its advisors. Its core budget is mostly covered by interest produced from investment of a US$ 12 million endowment (trust fund), supplemented by user fees for environmental and other services. It also obtains additional funds for specific projects from international and national sources.

This guaranteed income allows the GCA to project at least several years ahead when making plans and strategic decisions as well as effectively plan its annual program of activities. The GCA is actively pursuing alternative revenue generation strategies. It is suggested that the GCA leadership and relevant authorities prepare a revised financial strategy for the next 15-20 year period. If needed, outside specialist advice should be sought.

There appear to be three potential conflicts for future biodiversity and natural resources conservation in the GCA, which have been recognised by the GCA administration and strategies are being developed.

(1) Ecotourism

Ecotourism, if planned and managed properly, could become a main economic force in the GCA and its surrounding rural and semi-urban region. Ecotourism is already growing in the region, but most of it is resort beach oriented and the main economic investments and flows are to companies outside of Guanacaste (and partly foreign in many cases). The much smaller part of it is nature tourism to wild areas and for wildlife viewing, and with only very limited local benefits so far, although that is growing slowly. The GCA has begun to promote and facilitate such development and activities with local communities and interest groups through a series of initial contacts, technical meetings and workshops. However, most of its efforts have still been within its protected areas borders, representing a reactive rather than a proactive process. Instead of always trying to "catch up" to commercial development interests (as in the vast majority of Latin American protected areas) the GCA could explore proactively a process of participatory evaluation, design, planning and development of the type of nature-oriented tourism it really wants to offer within the GCA. This also would provide for helping local communities and resource user groups to participate in the entire process, setting realistic goals and gradually developing alternative and supplemental sources of work and income. Relevant experience from elsewhere should also be sought and applied as necessary.

(2) Marine Area Use

Harvests of traditional products (snapper mainly, sometimes crabs and other species) by local fisherman are showing decreases in sizes of individual animals and increases in effort required for the same catch. Moreover, outside fishing interests (mainly shrimpers for Punta Arenas, Costa Rica) are causing damage by use of small-mesh nets and resulting capture of a vast array of species which are simply dumped. Conflicts between outside fishing interests and local fishermen are growing. The GCA has established good relations with local fishermen and has started a program of applied research and participation with them. However, these are complex social-economic-ecological problems and trends, without easy prescribed formulas for solution; they are cutting edge. The recommendation is to share information with and study examples of other attempts to deal with similar trends and problems in other areas of the world, in order to get additional input for the development of a comprehensive strategy and process for management of the Marine Area. One suggestion is to explore staff and information exchanges with the Galapagos National Park/Marine Reserve, as well as seek advice from specialists and additional training for GCA marine area staff.

(3) Agro-landscape

Use of the land in areas around the GCA protected areas is gradually evolving, due to economic market forces mainly. Large scale extensive cattle ranching is being replaced by smaller scale cattle ranching, large to medium scale tree crops (e.g. citrus juice production) and other forms of agriculture. However, local communities and resource user groups, i.e. some of the main neighbours of the GCA, are still not receiving much technical aid to improve their land and resources use, because the Ministry of Agriculture and others responsible for such are virtually absent in Guanacaste province. The GCA has good relations with those neighbours and is employing some of them in various GCA programs. Likewise, the GCA is creating some new technology through its forestry

work in the Horizontes Forestry Experiment Station. The recommendation is that the GCA become more actively involved in promotion and facilitation of innovative approaches to new land and resource use alternatives in the agro-landscape, where such involvement will result in clear benefits for the values of the GCA, through ensuring compatible land and resource uses around the GCA area.

5. ADDITIONAL COMMENTS

In general, management of the GCA appears to be very effective. The limited staff is well-distributed throughout the area, patrolling interaction with neighbours through educational programs and management of facilities and programs for visitors are all extensive. Management is guided by an annual detailed Management Plan (referred to as an Operations Plan). This is a very necessary, well-organised and conducted process. However, there is a need for a longer-term plan, as well as a detailed zoning scheme and process for regular evaluation and revision as conditions change and/or knowledge increases.

The recommendation for approaching both the needs for improved planning and monitoring, which are totally interrelated, is the following: establish a process of regular, medium-term planning, implementation and monitoring, using a method such as Limits of Acceptable Change, or the Recreational Opportunity Spectrum (ROS).

Finally, there are two other issues:

- That the GCA could be considered to be so well financed, compared to the rest of the conservation areas in SINAC, that it needs no more financial support. This is, of course, not true at all. If other areas have financial problems those will be solved by improving their management capacity and funding support, not by reducing the GCA's management capacities and funding; and

- That there is a potential risk that designation as a Conservation Area may be translated as meaning that much of the effort must be focused on the agroscape around and between the Protected Areas which make up the GCA, rather than on management and protection of those areas themselves. It is essential to clarify that the primary functions of the conservation areas is conservation of biodiversity for perpetuity. The emphasis in the surrounding agroscapes should be to stabilise and improve biodiversity/resources/land uses, in order to decrease pressure on the protected areas and promote peaceful coexistence, not development per se.

6. APPLICATION OF WORLD HERITAGE NATURAL CRITERIA

The nomination in this case complies well with the four criteria established by the World Heritage International Committee because:

Criterion (i): Earth's history and geological features

It contains significant ongoing geological processes and major stages of the earth's history represented by the formations of the Santa Elena Península, the Santa Rosa Plateau (Tableland), and its Quaternary volcanoes, including the thermal features of Rincon de la Vieja volcano.

Criterion (ii): Ecological processes

It demonstrates significant, major biological and ecological processes in both its terrestrial and marine-coastal environments, as exemplified by: a) evolution, succession and restoration of Pacific Tropical Dry Forest; b) altitudinal migration and other interactive biogeographic and ecological processes along its dry forest - montane humid forest - cloud forest - lowland Caribbean rain forest

transect; and, c) the major upwelling and development of coral colonies and reefs in regions long considered to not have either (marine area near the coast of the Murcielago sector of Santa Rosa NP);

Criterion (iii): Superlative natural phenomena, scenic beauty

It has significant areas of exceptional scenic beauty such as Cacao Volcano with its lush cloud forests, the rocky coasts of the Murcielago sector of Santa Rosa NP, and large areas of dry forest with their incredible displays of bright flowering trees at certain seasons of the year; and

Criterion (iv): Biodiversity and threatened species

It contains important natural habitats for in-situ conservation of biological diversity, including both the best dry forest habitats and communities in Central America to northern Mexico and key habitat for notable threatened or rare animal species such as the Saltwater Crocodile, False Vampire Bat, Olive Ridley Sea Turtle, Leatherback Sea Turtle, Jaguar, Jabiru Stork, Mangrove Vireo, Mangrove Hummingbird, and threatened or rare plant species such as Mahogany, Guyacan Real (Lignum Vitae), five species each of rare cacti and rare bromeliads.

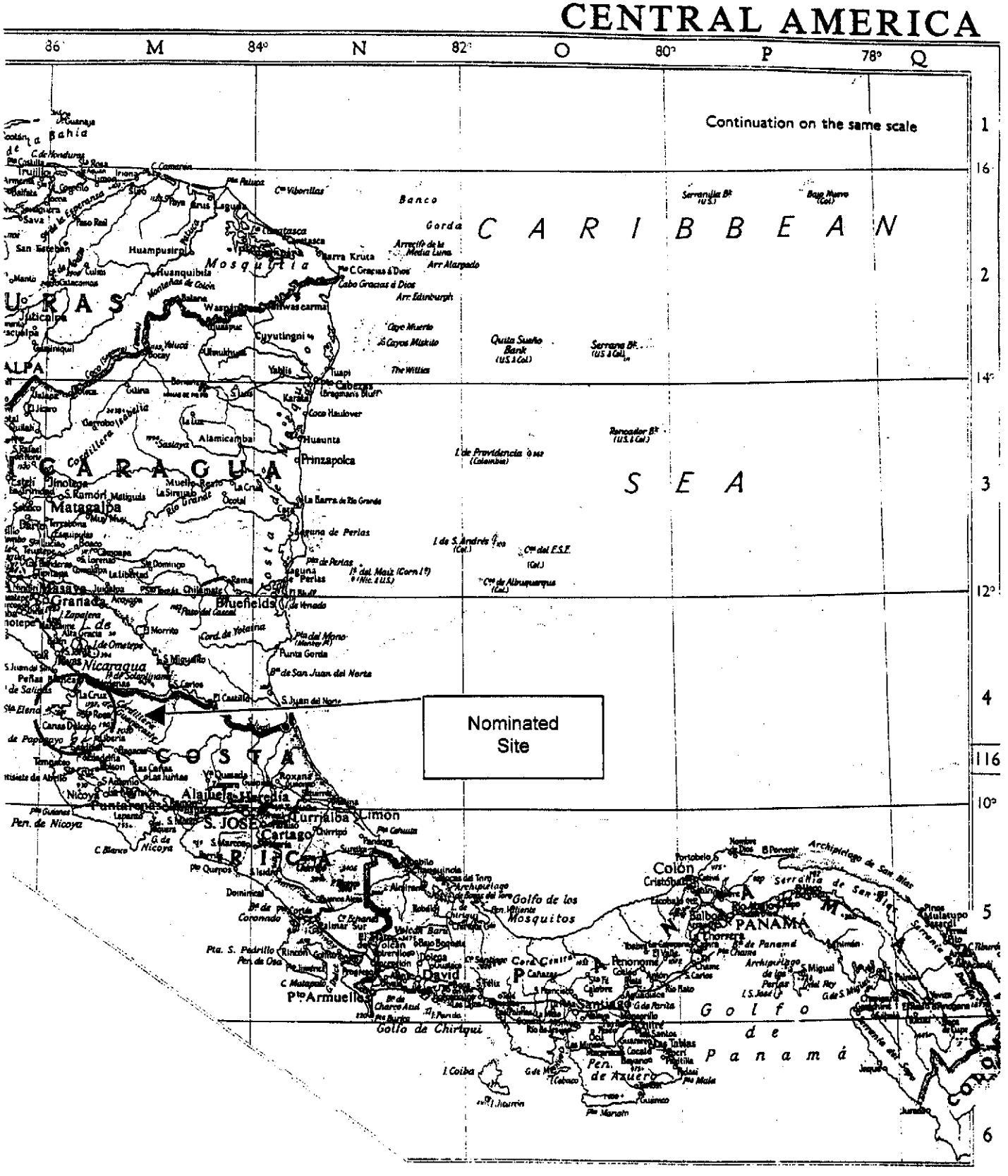
7. RECOMMENDATION

At its twenty-third ordinary session, the Bureau recommended that the Committee **inscribe** the Guanacaste Conservation Area on the World Heritage list under criteria (ii) and (iv).

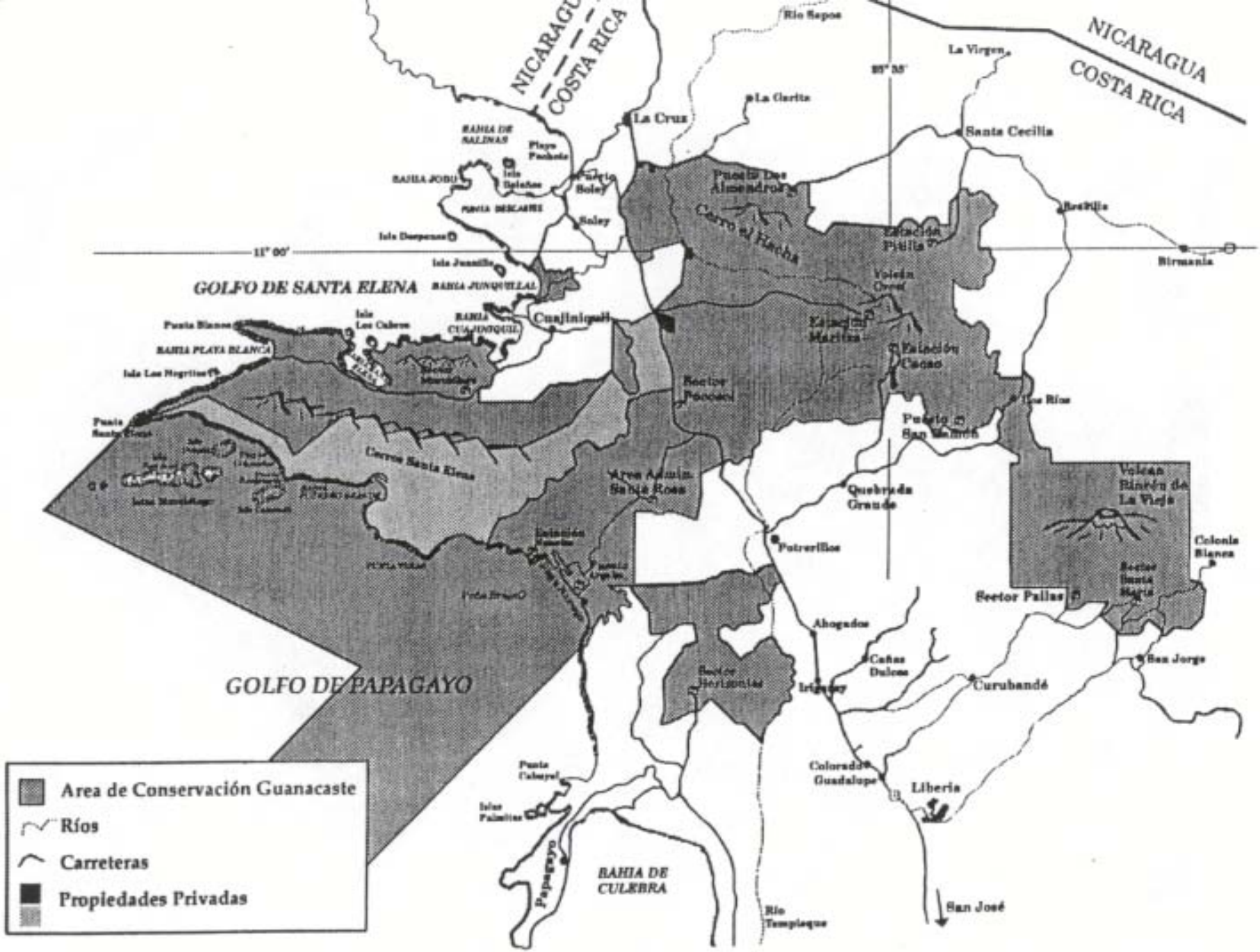
The Committee may wish to commend the Costa Rican authorities for submitting such a well- and thoroughly-presented nomination and for the overall excellent strategy prepared and well-executed for expanding and consolidating the GCA and its management. At the same time, the Committee may wish to recommend that:

- GCA authorities place attention on: a) reviewing the long-term financial strategy for guaranteeing further consolidation and long-term management of the protected area; b) refining the planning, zoning and monitoring process for management of the GCA; c) improving marine biodiversity and resources protection and management; d) improving nature tourism development and management in and around the GCA for the benefit of the protected area and local communities/resource user groups; and e) promoting and facilitating improved agro-landscape management; and

- via legislation, policies, government financial appropriations, international efforts and any other possible means the Costa Rican Government authorities support the GCA's efforts to: a) expand its financial base and broaden its sources of international and national financial and technical support; b) guarantee the consolidation and recuperation of the GCA's contiguous complex of protected areas and biological corridors to ensure its ecological integrity and protection of its biodiversity; and c) promote and facilitate more harmonious land and resource uses in the interstitial areas lying between and around the GCA protected areas (terrestrial and marine).



Map 1. Location of Nominated Site



Map 2. Nominated Site **Current boundaries of the Area de Conservacion Guanacaste (ACG) (1998).**

CANDIDATURE AU PATRIMOINE MONDIAL - ÉVALUATION TECHNIQUE UICN

ZONE DE CONSERVATION DE GUANACASTE (COSTA RICA)

1. DOCUMENTATION

i) Fiche technique UICN/WCMC: non disponible au 8 avril 1999

ii) Littérature consultée: Plus de 20 publications; plus de 15 directement sur l'écologie, la gestion et la conservation de la Zone de conservation de Guanacaste; 4 de l'UICN et de l'UNESCO sur les biens naturels du patrimoine mondial; et le reste sur d'autres aspects de la diversité biologique et de l'environnement du Costa Rica.

iii) Consultations: Hauts fonctionnaires du gouvernement du Costa Rica; près de 40 personnes dans la Zone de conservation de Guanacaste et aux environs; d'autres représentants des communautés locales/groupes d'utilisateurs des ressources; chercheurs invités.

iv) Visite du site: février 1999. Craig MacFarland et Juan Carlos Godoy.

2. RÉSUMÉ DES CARACTÉRISTIQUES NATURELLES

La Zone de conservation de Guanacaste (ZCG) se compose de 88,000 hectares terrestres et environ 43,000 hectares marins. Le site s'étend de 19 kilomètres à l'intérieur du Pacifique jusqu'à la côte du nord-ouest du Costa Rica, remonte vers l'intérieur à travers les forêts tropicales sèches de plaine du Pacifique jusqu'à 2,000 mètres d'altitude (forêts montagnardes humides et forêts de brouillard) puis redescend sur le versant atlantique/caraïbe jusqu'aux secteurs les plus élevés des forêts pluviales de basse altitude. La Zone de conservation de Guanacaste est située entre le 10° et le 11° de latitude Nord et le 85° et le 86° de longitude Ouest, dans la province nord-ouest du Costa Rica (voir carte 1).

Il s'agit d'un complexe d'aires protégées presque entièrement contiguës formant ensemble une seule grande aire protégée, comme suit (voir carte 2):

- Parc national de Santa Rosa (terrestre) 24,558 hectares
- Parc national Rincón de la Vieja 14,084 hectares
- Parc national de Guanacaste 37,365 hectares
- Refuge de faune sauvage de Junquillal 439 hectares
- Station forestière expérimentale de Horizontes 7,317 hectares
- Zone marine (qui fait partie du Parc national de Santa Rosa) environ 43,000 hectares

Dans la Zone de conservation de Guanacaste, on trouve environ 60% de toutes les espèces présentes au Costa Rica soit, à échelle mondiale, environ 2,4% de toute la diversité biologique (niveau spécifique) de la planète. En outre, la faune et la flore de la ZCG sont caractérisées par une grande convergence intercontinentale d'espèces des domaines néarctique et néotropical. L'aire de répartition de nombreuses espèces de la ZCG atteint, en direction du nord la région de Mazatlán et de Tampico au Mexique tandis que l'aire de répartition d'autres espèces va, en direction du sud, jusqu'au Brésil ou en Bolivie. Selon les estimations actuelles, la Zone de conservation de Guanacaste contient environ 230,000 espèces (bactéries et virus non compris).

Trois éléments expliquent fondamentalement l'extrême richesse biologique de la Zone de conservation de Guanacaste:

- l'écosystème marin le plus intact du littoral pacifique, entre la zone du canal de Panama et le Mexique, caractérisé par de grands courants d'upwelling riches en matières nutritives qui favorisent une productivité élevée dans les couches de surface;

- le dernier vestige important de forêt tropicale sèche du Pacifique, de l'Amérique centrale au nord du Mexique (région méso-américaine), c'est-à-dire un écosystème complet de forêt sèche;

- une importante coupe altitudinale (relativement large sur presque toute sa longueur) de 105 kilomètres de long qui comprend huit zones biologiques (*sensu* Holdridge), dans laquelle on trouve une bande continue: des mangroves de la côte pacifique à la forêt tropicale pluviale, du versant atlantique/caraïbe en passant par la forêt tropicale sèche méso-américaine du pacifique, la forêt montagnarde tropicale humide et la forêt de brouillard. Cette coupe comprend des bassins hydrographiques complets, de leur source à l'océan Pacifique.

La zone marine compte plusieurs îles et îlots côtiers (pour la plupart inhabités), des zones marines océaniques ouvertes, des plages, des côtes rocheuses et environ 20 kilomètres de plages de ponte des tortues marines. Parmi les habitats de surface les plus spécifiques, on trouve des récifs coralliens, des récifs rocheux, des fonds sableux, des champs rocheux, des eaux profondes, des lits d'algues et des courants d'upwelling. La ZCG possède, entre autres caractéristiques marines, une plage (Nancite) de 1,7 kilomètre de long où des milliers de tortues olivâtres viennent pondre simultanément en immenses vagues que l'on appelle «arribadas» («arrivées»). C'est l'une des rares plages protégées pour l'espèce, dans toute la région du Mexique et de l'Amérique centrale. En outre, la ZCG possède deux plages de ponte pour la tortue luth gravement menacée.

La ZCG comprend 37 zones humides dont certaines sont importantes pour l'Amérique centrale telles que les complexes de mangroves de Puerto Soley, Cuajiniquil, Santa Elena, Potrero Grande, Nancite et Playa Naranjo; la lagune de Limbo; l'estuaire d'Iguanito; et la lagune du volcan Rincón de la Vieja (eaux douces dans ce dernier cas). Les forêts de mangroves contiennent huit espèces d'arbres de mangroves et sont dans un état exceptionnel.

La forêt tropicale sèche de la ZCG qui couvre environ 60,000 hectares est une mosaïque complexe de peuplements anciens et de peuplements en voie de régénération, avec des différences d'âge de 400 ans. Elle se caractérise par des précipitations moyennes annuelles de

800 à 2,800 millimètres et par une saison sèche bien définie, avec une absence quasi totale de pluie de la mi-décembre à la mi-mai. En raison de cette saison sèche, chaude et caractérisée par des vents violents, les conditions climaciques correspondent à la forêt tropicale décidue sèche qui présente au moins 20 associations végétales reconnues. Cette forêt comprend les seuls grands peuplements (forêt ancienne et forêt en régénération) de forêt sèche de basse altitude ancienne, vierge et semi-vierge, de la côte pacifique du Costa Rica. C'est le seul écosystème complet de forêt sèche entièrement protégé en Méso-Amérique.

La Zone de conservation de Guanacaste contient des populations importantes et apparemment en bon état de nombreuses espèces de vertébrés parmi les plus typiques d'Amérique centrale avec un total général de 940 espèces de vertébrés décrites. On estime qu'elle possède plus de 50,000 espèces de champignons, 12,000 espèces de nématodes, 20,000 espèces de coléoptères (scarabées) et 13,000 espèces d'hyménoptères (fourmis, abeilles, guêpes et espèces apparentées). La coupe altitudinale intacte que l'on trouve dans la ZCG protège dans sa totalité une voie de migration saisonnière altitudinale est-ouest, de la côte pacifique à 2,000 mètres d'altitude, de la forêt sèche à la forêt de brouillard puis à la forêt pluviale atlantique sur l'autre versant, qui joue un rôle d'importance critique pour l'aire de répartition et le cycle biologique de nombreuses espèces animales.

La diversité géologique est également intéressante. Sur la péninsule de Santa Elena, se trouve un filon de serpentine (péridotite) de 24,000 hectares qui se trouve depuis plus de 85 millions d'années au-dessus du niveau de la mer (Jurassique-Éocène). Il y a des zones pyroclastiques dans le Parc national de Santa Rosa (Miocène) et des complexes volcaniques du Pléistocène dans la région des volcans d'Orosi et de Cacao (Parc national de Guanacaste).

3. COMPARAISON AVEC D'AUTRES AIRES PROTÉGÉES

En résumé, la ZCG peut être comparée avec d'autres aires semblables ailleurs dans le monde, au niveau néotropical et au niveau méso-américain (Amérique centrale et sud du Mexique), comme suit:

- la superficie de forêt tropicale sèche protégée dans la ZCG est la troisième du monde après celle du Parc national de Kakadu au nord-est de l'Australie et des Sanctuaires de faune sauvage de Thungyai-Huai Kha Khaeng, en Thaï lande;

- la ZCG contient un écosystème complet de forêt sèche. La forêt tropicale sèche est, de tous les types principaux de biotopes tropicaux, le plus menacé: il reste moins de 0,02% de forêt tropicale sèche alors que cette formation constituait autrefois plus de la moitié de la végétation boisée des régions tropicales de la planète. La ZCG contient la seule forêt sèche protégée, dans la région néotropicale, assez grande et suffisamment contiguë pour entretenir indéfiniment toutes les espèces que l'on y trouve; la ZCG serait le seul bien du patrimoine mondial, dans le domaine néotropical, protégeant une forêt tropicale sèche;

- les 60,000 hectares de forêt tropicale sèche constituent la forêt la plus vaste et, de loin, la mieux protégée des Amériques (les forêts sèches côtières et proches du littoral et semi-sèches côtières tropicales et d'épineux du nord du Pérou et du sud de l'Équateur forment un complexe fondamentalement différent des forêts tropicales sèches typiques d'Amérique centrale; en outre, elles ont été gravement déboisées, surpâturées et/ou perturbées sur presque toute leur superficie);

- toutes les autres aires protégées comprenant des forêts tropicales sèches entre l'Amérique centrale et le nord du Mexique sont beaucoup plus petites (environ 5,000 hectares au maximum) et largement éparpillées; aucun couloir biologique ne les relie et elles subissent des effets de lisière beaucoup plus marqués;

- la ZCG est la seule aire protégée, entre toute l'Amérique centrale et le sud du Mexique, qui comprenne une coupe continue allant de la zone marine de Pacifique aux forêts tropicales sèches et, grâce à la variation altitudinale, une variété de forêts adjacentes, presque jusqu'à la côte caraï be (forêts humides, forêts de brouillard et forêts tropicales humides de basse altitude). Cette bande de 105 kilomètres de long est la seule de la région qui contienne une telle gamme de biotopes contigus avec une diversité altitudinale et climatique suffisante pour comprendre les aires de répartition d'une grande variété d'espèces migratrices saisonnières;

- cette bande altitudinale complète verra son importance croître à mesure que les effets du réchauffement climatique frapperont l'Amérique centrale. En raison de l'assèchement de l'écosystème de forêt sèche, résultat de la «désertification» induite par l'homme dans la partie occidentale de la ZCG, le complexe d'espèces de forêt sèche aura besoin d'une région plus fraîche et plus humide (refuge) où se retirer pour survivre. La vaste majorité des aires protégées des tropiques n'ont pas de tels gradients altitudinaux et il est presque certain qu'elles perdront une bonne partie de leurs écosystèmes et de leurs complexes d'espèces si l'on en croit les scénarios actuels de changements climatiques;

- il y a actuellement deux biens marins du patrimoine mondial dans le domaine néotropical (le Réseau de réserves du récif de la barrière du Belize et le Parc national de l'île Cocos au Costa Rica). La ZCG serait un complément important pour ces deux régions. En outre, on considère que les plages de ponte des tortues marines de la ZCG sont d'importance mondiale; et le secteur marin est la région la plus intacte de toutes les zones côtières continentales de la région d'Amérique centrale et du Pacifique méso-américain.

La Zone de conservation de Guanacaste est d'importance internationale et représente la dernière possibilité de protéger et de conserver un grand écosystème de forêt tropicale sèche écologiquement complet (contigu avec des forêts maritimes côtières, montagnardes humides, de brouillard et pluviales de basse altitude du versant atlantique et caraï be) dans les Amériques.

4. INTÉGRITÉ

Le gouvernement du Costa Rica est propriétaire de la majeure partie de la Zone de conservation de Guanacaste. Il convient de noter que certaines portions du Parc national de Guanacaste appartiennent actuellement à la Fondation des parcs nationaux du Costa Rica et que la propriété est en train d'être transférée au gouvernement. En d'autres termes, près de 100% de la région terrestre et la totalité de la région marine comprises dans des aires protégées créées par décret et qui constituent la Zone de conservation de Guanacaste sont propriété du gouvernement. La propriété de Santa Elena est le principal secteur (plus de 15,000 hectares) qui soit encore propriété privée et qui devrait être ajouté à la ZCG d'ici deux ans. Santa Elena contient des caractéristiques géologiques uniques et une forêt tropicale sèche naine extrêmement bien conservée qui ajoutera beaucoup de valeur à la ZCG. Une procédure internationale civile est en cours pour régler le cas et il semble que l'issue en sera favorable.

Les limites de la Zone de conservation de Guanacaste sont bien définies, protégées et dans l'ensemble, les relations avec les propriétaires voisins sont bonnes ou du moins civiles et paisibles. En outre, la stratégie actuelle prévoit que les 88,000 hectares de biotopes terrestres et la zone marine de 43,000 hectares se trouvant dans la ZCG seront progressivement étendus respectivement à environ 110,000 hectares de terres contiguës et à 50,000 hectares. Le principal ajout sera celui de la propriété de Santa Elena mais des négociations sont en cours pour les régions de forêts pluviales Del Oro (1,500 hectares actuellement, il est prévu d'agrandir fortement ce secteur) et Rincón (6,000 hectares) (voir Figure 1).

Globalement, la ZCG bénéficie d'un appui général et solide de la part de la population locale et du public en général dans la province de Guanacaste. Cette situation est, en grande partie, le résultat des efforts exceptionnels qui ont été déployés par la Zone de conservation de Guanacaste dans le but d'associer la population locale au processus de gestion. Un comité local, établi il y a 10 ans, compte, outre les gestionnaires de la ZCG, 5 à 6 représentants des principaux intérêts économiques et sociaux locaux. Ce comité a essentiellement un rôle consultatif mais il prend part aux principales décisions portant sur les attributions budgétaires pour le programme global. Au titre de la nouvelle Loi du Costa Rica sur la biodiversité et d'autres lois, les zones de conservation seront tenues de promouvoir et d'établir des comités régionaux dans le même but. La ZCG transformera progressivement son comité local qui fonctionne déjà bien en comité régional. La ZCG trouve un autre appui dans le fait qu'elle est en contact avec environ 2,500 écoliers dans toutes les écoles primaires et dans plusieurs écoles secondaires du voisinage où elle a lancé des campagnes d'apprentissage de l'écologie et de la biologie (programme d'éducation biologique). En outre, la ZCG elle-même, les vastes programmes d'inventaire biologique qui ont lieu dans le site et de nombreux chercheurs invités qui travaillent dans les cinq stations de recherche biologique ont fourni de nouvelles sources d'emploi à une région marginalisée au plan national, qui souffre également des effets d'une grave récession économique depuis une quinzaine d'années (due à l'effondrement général de l'élevage intensif).

Du point de vue de sa viabilité économique, la ZCG est dans une bien meilleure situation que la plupart des aires protégées des pays en développement. Elle le doit à la stratégie et aux activités lancées par ses gestionnaires et leurs conseillers. Le budget central est essentiellement financé par les intérêts issus de l'investissement d'une dotation de 12 millions de dollars (en fonds fiduciaires), qui sont complétés par des droits versés par les utilisateurs pour les services environnementaux, entre autres. Elle obtient également des fonds complémentaires pour des projets spécifiques versés par des sources internationales et nationales. Ce revenu garanti permet à la ZCG d'établir ses programmes plusieurs années à l'avance lorsqu'elle doit prendre des décisions stratégiques et de planifier efficacement son programme d'activités annuel. La ZCG recherche activement de nouvelles stratégies génératrices de revenu. Il est suggéré que les gestionnaires de la ZCG et les autorités compétentes préparent une stratégie financière révisée pour les 15 à 20 ans à venir. Si nécessaire, un avis expert extérieur devrait être recherché.

Il existe, semble-t-il, trois domaines de conflit potentiel à propos de la conservation des ressources naturelles et de la diversité biologique dans la Zone de conservation de Guanacaste; l'Administration de la ZCG est en train de préparer des stratégies à cet égard.

(1) Écotourisme

L'écotourisme, s'il est correctement planifié et géré pourrait devenir une force économique principale pour la ZCG et la région rurale et semi-urbaine des environs. L'écotourisme est déjà en expansion dans la région mais pour l'essentiel s'intéresse aux plages; les principaux investissements sont faits par des entreprises qui ne se trouvent pas dans la région de Guanacaste (et sont partiellement étrangères dans certains cas) et qui sont aussi celles qui retirent les avantages économiques. Le tourisme qui s'intéresse à la nature, aux régions sauvages et à l'observation de la faune sauvage, constitue une infime proportion et jusqu'à présent n'apporte que des avantages extrêmement limités au niveau local bien que ceux-ci soient en lente progression. La ZCG a commencé à promouvoir et faciliter le développement de ce tourisme ainsi que des activités avec les communautés locales et les groupes d'intérêt par l'intermédiaire de rencontres, de réunions techniques et d'ateliers. Toutefois, la majorité des activités ont lieu dans les limites des aires protégées ce qui est un processus réactif plutôt que proactif. Au lieu de toujours essayer de courir après les intérêts commerciaux (comme la vaste majorité des aires protégées d'Amérique latine), la ZCG pourrait explorer, de manière proactive, un processus d'évaluation, de conception, de planification et de mise en valeur en participation du type de tourisme naturel qu'elle souhaite réellement offrir au sein de la ZCG. Cela permettrait aussi d'aider les communautés locales et les groupes d'utilisateurs des ressources à participer au processus dans son ensemble, à établir des objectifs réalistes et à élaborer progressivement des sources de substitution et supplémentaires de travail et de revenu. Il serait bon également de chercher à prendre connaissance d'expériences pertinentes, dans d'autres régions du monde, et à les appliquer au besoin.

(2) Utilisation de l'espace marin

Les produits traditionnels (vivaneaux, essentiellement, parfois des crabes et d'autres espèces) que récoltent les pêcheurs locaux se caractérisent par une diminution de la taille des animaux et l'augmentation de l'effort nécessaire pour la même prise. En outre, des intérêts halieutiques extérieurs (essentiellement des crevettiers de Punta Arenas, Costa Rica) causent des dommages en utilisant des filets à petites mailles qui capturent une vaste gamme d'espèces qui sont simplement rejetées à la mer. Les conflits entre les intérêts halieutiques extérieurs et les pêcheurs locaux s'aggravent. La Zone de conservation de Guanacaste entretient de bonnes relations avec les pêcheurs locaux et a entamé un programme de recherche appliqué auquel ils participent. Il s'agit de problèmes et de tendances socio-économiques et écologiques complexes pour lesquels il n'y a pas de solution toute prête mais ils sont importants. Il est recommandé d'échanger des informations et d'étudier des exemples de cas où l'on a essayé de résoudre des problèmes et tendances semblables dans d'autres régions du monde afin de pouvoir élaborer une stratégie complète et un processus de gestion de l'espace marin. Une des suggestions serait d'envisager un échange de personnel et d'information avec le Parc national/Réserve marine des Galápagos et de rechercher l'avis de spécialistes ainsi qu'une formation supplémentaire pour le personnel de l'espace marin de la Zone de conservation de Guanacaste.

(3) Secteur agro-paysager

La mise en valeur des sols dans les régions qui environnent les aires protégées de la Zone de conservation de Guanacaste évolue lentement, essentiellement sous l'impulsion des forces économiques. L'élevage de bétail à grande échelle est en train d'être remplacé par un élevage à plus petite échelle, une arboriculture de grande à moyenne échelle (production d'agrumes pour le jus) et d'autres formes d'agriculture. Toutefois, les communautés locales et les groupes d'utilisateurs des ressources, c'est-à-dire certains des principaux voisins de la ZCG

ne reçoivent pas encore suffisamment d'aide technique pour améliorer leurs sols et leurs modes d'utilisation des ressources parce que le ministère de l'Agriculture et les autres services compétents sont pratiquement absents dans la province de Guanacaste. La ZCG a de bonnes relations avec ses voisins et en emploie quelques-uns dans ses différents programmes. De même, elle crée de nouvelles technologies dans le cadre de son travail en sylviculture à la Station forestière expérimentale d'Horizontes. Il est recommandé que la ZCG participe plus activement à la promotion de modes novateurs d'utilisation de la terre et des ressources dans le secteur agro-paysager; cette participation apportera des avantages nets aux valeurs de la ZCG en garantissant la compatibilité des modes d'occupation des sols et de l'utilisation des ressources autour de la Zone de conservation de Guanacaste.

5. AUTRES COMMENTAIRES

En général, la gestion de la ZCG semble très efficace. Le personnel, peu nombreux, est bien distribué dans toute la région; et il y a une bonne interaction avec les voisins, dans le cadre de programmes pédagogiques; la gestion des locaux et des programmes pour les visiteurs est bien organisée. Il y a un plan de gestion annuel précis (appelé plan d'opération) extrêmement utile, bien organisé et bien piloté. Toutefois, il serait bon de préparer un plan à plus long terme ainsi qu'un plan de zonage détaillé et de procéder à une évaluation et une révision régulières à mesure que les conditions changent et/ou que les connaissances augmentent. Il est recommandé de traiter à la fois la nécessité d'améliorer la planification et la surveillance continue, qui n'ont actuellement aucun lien, par les moyens suivants: établir un processus régulier à moyen terme de planification, de mise en œuvre et de surveillance à l'aide d'une méthode telle que celle des «seuils de changement acceptables» ou le «spectre de possibilités récréatives».

Il convient, enfin, de mentionner deux questions:

- l'allégation selon laquelle la ZCG peut être considérée comme tellement bien financée par rapport aux autres aires de conservation du SINAC qu'elle n'a pas besoin d'appui financier supplémentaire est, naturellement, erronée. Si les autres aires ont des problèmes financiers, ils seront résolus par l'amélioration de leurs capacités de gestion et d'appui de financement et non par la réduction des capacités de gestion et de financement de la ZCG;

- l'allégation selon laquelle l'inscription en tant que zone de conservation présente un risque potentiel, à savoir que l'essentiel des efforts pourraient être concentrés sur le paysage agricole alentour et entre les aires protégées qui composent la Zone de conservation de Guanacaste plutôt que sur la gestion et la protection de ces aires elles-mêmes. Il est essentiel de préciser que les fonctions primaires des zones de conservation sont de conserver la diversité biologique à perpétuité. L'accent mis sur les paysages agricoles du voisinage sert à stabiliser et améliorer les modes d'occupation des sols, l'utilisation de la diversité biologique et des ressources afin d'alléger des pressions sur les aires protégées et de promouvoir la coexistence pacifique et non le développement.

6. CHAMP D'APPLICATION DES CRITÈRES NATURELS DU PATRIMOINE MONDIAL

Le texte de la proposition d'inscription de la Zone de conservation de Guanacaste invoque les quatre critères établis par le Comité du patrimoine mondial:

Critère (i): histoire de la terre et processus géologiques

Elle est un exemple éminemment représentatif des grands stades de l'histoire de la terre et de processus géologiques en cours représentés par les formations de la péninsule de Santa Elena, du plateau de Santa Rosa et de ses volcans du Quaternaire, y compris des caractéristiques thermales du volcan du Rincón de la Vieja.

Critère (ii): processus écologiques

Elle est un exemple éminemment représentatif de processus écologiques et biologiques en cours tant pour les milieux terrestres que côtiers-marins comme on peut le voir dans: a) l'évolution, la succession et la restauration de la forêt sèche tropicale du Pacifique; b) la migration altitudinale et autres processus biogéographiques et écologiques interactifs le long de la forêt sèche – forêt humide de montagne – forêt de brouillard – bande de forêt pluviale des plaines du versant caraï be; et c) les grands courants d'upwelling et colonies de coraux et de récifs dans des régions où l'on a longtemps pensé qu'il n'y avait rien de tout cela (région marine près de la côte du secteur de Murcielago dans le Parc national de Santa Rosa);

Critère (iii): phénomènes naturels exceptionnels, beauté naturelle exceptionnelle

Elle contient des aires d'une beauté naturelle exceptionnelle tel que le volcan Cacao avec ses forêts de brouillard luxuriantes, les côtes rocheuses du secteur de Murcielago dans le Parc national de Santa Rosa et les vastes étendues de forêt sèche avec leur profusion incroyable d'arbres à la floraison flamboyante à certaines saisons de l'année;

Critère (iv): biodiversité et espèces menacées

Elle contient les habitats naturels les plus représentatifs et les plus importants pour la conservation *in situ* de la diversité biologique y compris les meilleurs habitats et communautés de forêt sèche de l'Amérique centrale jusqu'au nord du Mexique et des habitats clés pour des espèces animales rares ou menacées telles que le crocodile marin, le faux vampire, la tortue olivâtre, la tortue luth, le jaguar, le jabiru, le vireo des mangroves, l'ariane de Boucard et des espèces de plantes rares et menacées telles que l'acajou, le guayacan real (*Lignum Vitae*), cinq espèces de cactus rares et cinq espèces de broméliacées rares.

7. RECOMMANDATION

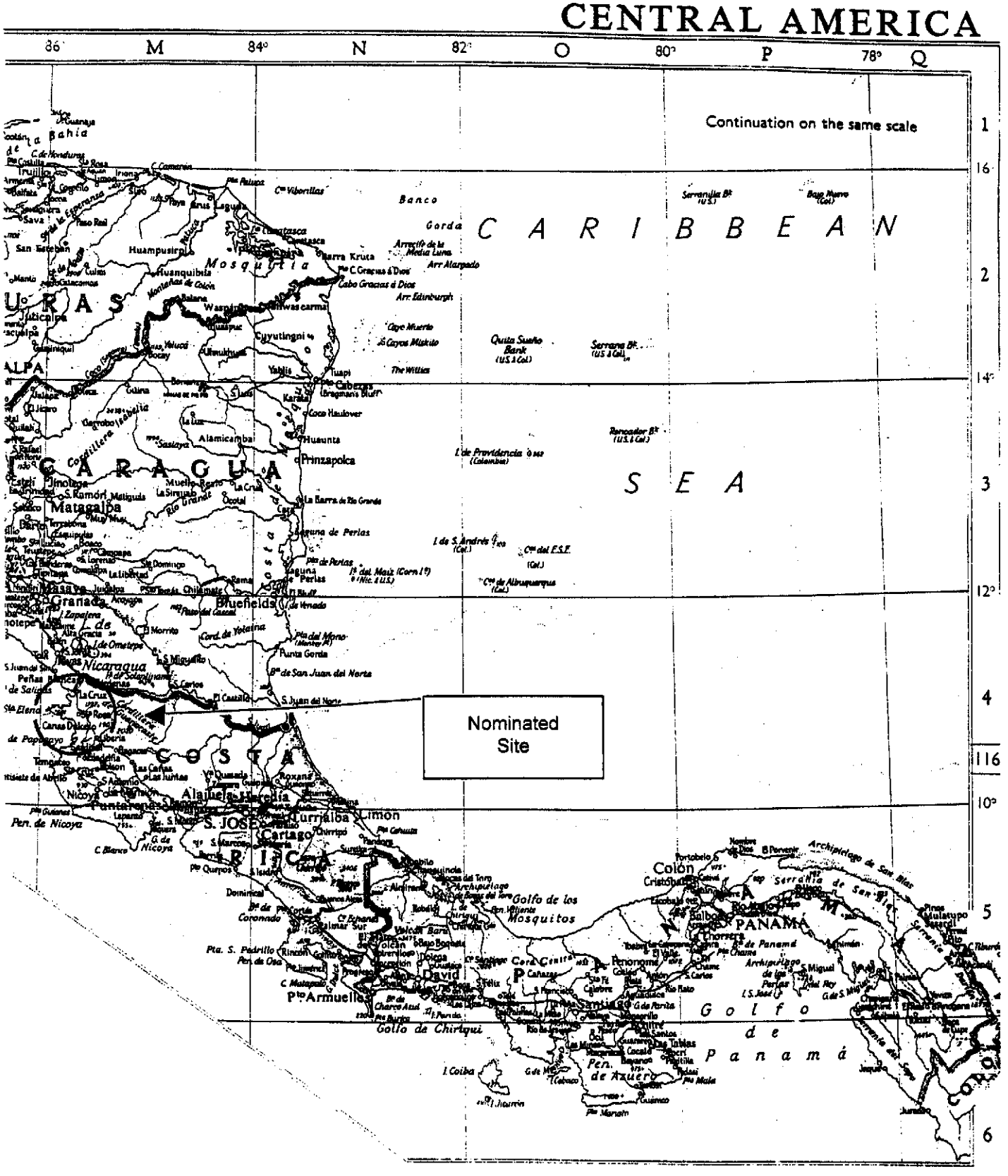
À sa vingt-troisième session ordinaire, le Bureau a recommandé que le Comité inscrive la Zone de conservation de Guanacaste sur la Liste du patrimoine mondial au titre des critères ii) et (iv).

Le Comité souhaitera sans doute féliciter les autorités du Costa Rica qui ont soumis une proposition extrêmement exhaustive et bien présentée ainsi qu'une excellente stratégie préparée et bien exécutée en vue d'élargir et de consolider la ZCG et sa gestion. Le Comité souhaitera peut-être aussi recommander que:

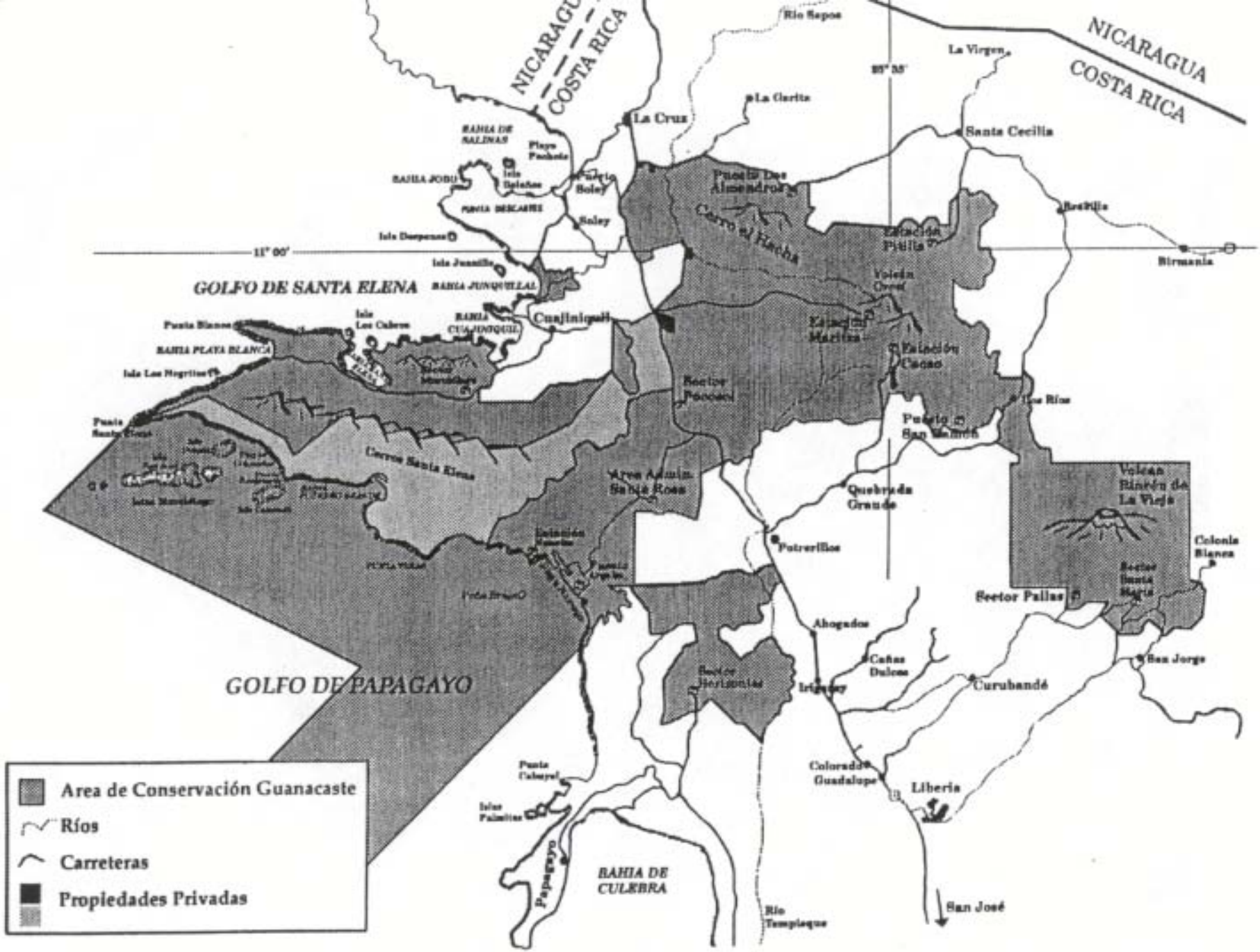
les autorités de la ZCG prêtent attention à : a) revoir la stratégie financière à long terme pour garantir une consolidation et une gestion à long terme de l'aire protégée; b) affiner la planification, le zonage et le processus de surveillance pour la gestion de la ZCG; c) améliorer

la gestion et la protection de la diversité biologique et des ressources marines; d) améliorer le développement et la gestion du tourisme dans la nature au sein et aux alentours de la ZCG en faveur de l'aire protégée et des groupes d'utilisateurs des ressources/communautés locaux; e) promouvoir et faciliter l'amélioration de la gestion agro-paysagère;

par l'intermédiaire de lois, de politiques et de subventions du gouvernement, d'efforts internationaux et par tout autre moyen, les autorités gouvernementales du Costa Rica soutiennent les efforts de la ZCG en vue de: a) renforcer sa base financière et d'élargir ses sources d'appui financières et techniques internationales et nationales; b) garantir la consolidation et la restitution du complexe contigu d'aires protégées et de couloirs biologiques de la ZCG afin de soutenir l'intégrité écologique et la protection véritable de la diversité biologique; c) promouvoir et faciliter des utilisations plus harmonieuses des sols et des ressources dans les régions intermédiaires, entre et autour des aires protégées de la ZCG (terrestres et marines).



Map 1. Location of Nominated Site



Map 2. Nominated Site **Current boundaries of the Area de Conservacion Guanacaste (ACG) (1998).**

SITE NAME: **Area de Conservación Guancaste (Extension to include the Sector Santa Elena)**

DATE OF INSCRIPTION: 7th July 2004

STATE PARTY: COSTA RICA

CRITERIA: N (ii)(iv)

DECISION OF THE WORLD HERITAGE COMMITTEE:
Excerpt from the Report of the 28th Session of the World Heritage Committee

BRIEF DESCRIPTIONS

Iinscribed in 1999, it was extended with the addition of a 15,000-ha private property, St Elena. It contains important natural habitats for the conservation of biological diversity, including the best dry forest habitats from Central America to northern Mexico and key habitats for endangered or rare plant and animal species. The site demonstrates significant ecological processes in both its terrestrial and marine-coastal environments.

1.b State, Province or Region: Guanacaste and Alajuela provinces

1.d Exact location: N10 51 W85 37

Sector Santa Elena
Area de Conservacion Guanacaste (ACG)

"Nomination for expansion of Area de Conservación Guanacaste in the World Heritage List of natural properties"

1. Specific location

a. Country

Costa Rica

b. State, Province or Region

Guanacaste Province, northwestern Costa Rica

c. Name of property

Sector Santa Elena, Area de Conservacion Guanacaste

(ACG)

d. Exact location on map and indication of geographical coordinates.

Ministerio del Ambiente y Energía
MINAE

Area de Conservación Guanacaste
Sitio de Patrimonio Mundial

Sistema Nacional de Areas de Conservación
SINAC

364 000 Lambert Este
85° 34' 38" Longitud Oeste

N
W E
S

Nicaragua
Costa Rica

Penas Blancas
Vueltas
Río Sapoá
La Garita
La Cruz
Río Mena
Santa Cecilia
Nicaragua
Costa Rica

Bahía de Salinas
Isla Bolaños
Puerto Soley
Bahía Jobo
Punta Descartes
Soley
Isla Dispensa
Puesto El Hacha
Río Sábalo
Río Las Haciendas
Brasilia
Birmania
Río Pizote
Cerro El Hacha
Estación Pitilla
Golfo de Santa Elena
Isla Juanilla
Bahía Junquillal
Puesto Junquillal
Colonia Bolaños
Volcán Orosí
Estación Marítza
Punta Blanca
Bahía Playa Blanca
Isla Los Negritos
Isla Los Cabros
Bahía Cuajiniquil
Cuajiniquil
Río Cuajiniquil
Río Tempisquito
Estación Cacao
Volcán Cacao
Río Cucaracho
Bahía Elena
Bahía Santa
Puesto Santa Elena
Puesto Murciélago
Punta Santa Elena
Puesto Islas
Punta Respingue
Islas Murciélago
Fila Santa Elena
Río Potrero Grande
Isla Colorada
Bahía Potrero Grande
Puesto Pocosol
Río Góngora
Dos Ríos
Puesto San Gerardo
Buenos Aires
Colonia La Libertad
Quebrada Grande (García Flamenco)
Puesto San Cristóbal
Río Azul
Río Penjamo
Río Cucaracho
Estación Santa Rosa
Potrerillos
Río Ahogados
Las Lilas
Volcán Rincón de La Vieja
Colonia Blanca
Puesto Pailas
Estación Nancite
Punta Varas
Bahía Nancite
Playa Nancite
Peña Bruja
Playa Naranjo
Puesto Naranjo
Bahía Naranjo
Ahogados
Buenavista
Cañas Dulces
Irigaray
Curubandé
Puesto Santa María
San Jorge
Las Delicias
SECTOR SANTA ELENA
Golfo de Papagayo
Area Marina Protegida
Estación Forestal Horizontes
El Triunfo
Río Colorado
Punta Cabuyal
Guadalupe
Río Tempisque
Papagayo
Bahía de Culebra
Bahía Panamá
Liberia
Puesto La Virgen
Guardia

322 000 Lambert Norte
10° 55' 4" Latitud Norte

Simbología

- Puestos
- Estación
- Ciudades y Pueblos
- Coordenadas
- Límite Fronterizo
- Costa
- Ríos
- Carretera Interamericana
- Caminos
- Sector Santa Elena
- Area Terrestre Protegida
- Islas
- Area Marina Protegida
- Propiedades Privadas

Escala:
4 0 4 8 12 Kilometers

Fuente: Instituto Geográfico Nacional
Proyección Lambert Costa Rica Norte

Elaboró: Waldy Medina
Area de Conservación Guanacaste
Febrero, 2003

See maps and location on CD.
(See Nomination_WHS_ACG.document)

e. Maps.

See maps and location on CD

f. Area of property proposed for inscription (ha.) and proposed buffer zone (ha.) if any.

The expansion area of *Area de Conservación Guanacaste in the World Heritage List of natural properties* know as Sector Santa Elena, are 16,000 ha.

2. Justification for Inscription

Sector Santa Elena located in the southern portion of the Santa Elena Peninsula was not included in the original nomination of the Area de Conservación Guanacaste, because at that time was not yet part of the ACG. It was the subject of an Expropriation Case (ICSID CASE NO. ARB/96/1) conducted by the government of Costa Rica, with the intent of include Hacienda Santa Elena in the ACG. The expropriation case finished by mid-1999. Since that time Sector Santa Elena has been part of the ACG.

Sector Santa Elena is an important part of the Area de Conservación Guanacaste and constitutes a major part of

the Peninsula Santa Elena. Its unique biodiversity and relations with all the others ecosystems of the ACG justify the extension to be included as WHS like the rest of the ACG.

Sector Santa Elena is a crucial component for the sustainability of the Murcielago-Santa Rosa dry forest management and survival processes of the ACG biodiversity. (See Nomination_WHS_ACG.document) Because of its location in the center of the ACG, is critical to ACG existence, its highly seasonal climate, serpentine-based geology, ancient origin, restorability and pristines constitute a unique combination as does its favorable position for permanent conservation in the middle of a consolidate and endowed conservation area that is large enough to survive.

This ancient habitat has been above the sea for 85 million years, and was an island in the eastern Pacific long before the Central American isthmus formed and connected North and South America. The Santa Elena Peninsula is exceptionally rich in plants and vegetation associations that occur only there in Costa Rica, and widespread species with likely odd genetics associated with living on the very dry and mineral rich soils. Undoubtedly there is an equally unique animal and microbial biota, but neither has been explored.

Exceptionally intact mangrove forest in Potrero Grande (containing eight species of mangroves) that about both the relatively intact marine area and the regenerating and relatively intact coastal dry forests. This leads to a permanently wet mangrove interacting strongly with an area of no rainfall for six months, across a gradient only tens of meters in width.

Punta Respingue is approximately 75 ha., freshwater wetland by the cost (the only one on the entire Pacific coast of Costa Rica), formed by eroded alluvial soil washed down from the slopes behind. It forms a soggy swamp in the rainy season with open water in the center. The flat is held in place by a distinctive steep, fragile, and raised cobble beach that is the barrier against the high waves that roll in off the open Pacific throughout the rainy season. The very strong south west blowing dry season winds in January-March push these waves back out to sea. These winds have created the highest and thickest sand dunes to be observed along the entire Guanacaste coast. These dunes are in pristine condition and demostrate clearly the interaction between a coastal forest and shifting sand.

3. Description

Description of Property

Santa Elena was born by ther distortion and buckling uward of deep seabed rocks. These gray-blue-rocks, rich in magnesium, are known in the vernacular as peridotites or serpentines, its the only significant area of this kind of rock and geology in Costa Rica. 85 millions years ago Santa Elena Peninsula was an island in the Pacific Ocean.

Santa Elena eastern connection with mainland is buried beneath young white volcanic materials that where deposit about a million years ago. Santa Elena is a unique platform on wich a unique biological community has developed, owing to its origin as insolated oceanic island, extreme age and serpentine soils.

This biological community has been futher molded by an extremely seasonal tropical climate, and damaged by the past four centuries old European ranching, logging, hunting and human fires; an is now in a second stage of restoration. The first stage of restoration in Santa Elena began a hundred or more years ago, when the deforested (lumbered maybe?) valley bottoms in the vicinity of the Rio Potrero Grande mouth were allowed to regenerate uniformly back to today's old growth mixed deciduos forest.

With several centuries of fire-free restoration, even the “seemingly natural” Trachypogon grasslands on the hills will regenerates back to the dwarf forest that is found in small patches and as a large area of 1000-2000 ha; this old-growth dwarf dry forest on serpentine soils is barely understood and absolutely unique still occupies the most western end of the Santa Elena Peninsula

4. Management.

(See Nomination_WHS_ACG.document)

Legal Status

Originally Sector Santa Elena was an extension of Parque Nacional Santa Rosa. (See Nomination_WHS_ACG.document).

Parque Nacional Santa Rosa was first established on 1 Jul 1966 as a National Monument (Law 3694), 1000 ha around La Casona (the original ranch headquarters for Hacienda Santa Rosa, the second oldest ranch in Costa Rica, established in the late 1500's).

On 27 Mar 1971, the area was decreed Parque Nacional Santa Rosa (Executive Decree 1562-A) as 9,904 terrestrial

ha (including the 1000 ha of the national monument) lying between the Interamerican Highway and the marine waters 12 miles out to the national limit.

On 12 Aug 1987, PNSR was broadened (Executive Decree 17656-MAG) to include the 15,800 ha of Hacienda Santa Elena, and a marine area 6 km out to sea, and about 300 ha of islands (Islas Murcielagos, Isla Colorado, Isla Pelada, etc.) in this marine area. The terrestrial portion of this decree, covering the "Santa Elena property" (now Sector Santa Elena) lying between Santa Rosa and Murcielago was under an expropiation case for several years.

The expropriation case finished by mid-1999. Since that time Sector Santa Elena have been part of the ACG, and owned by

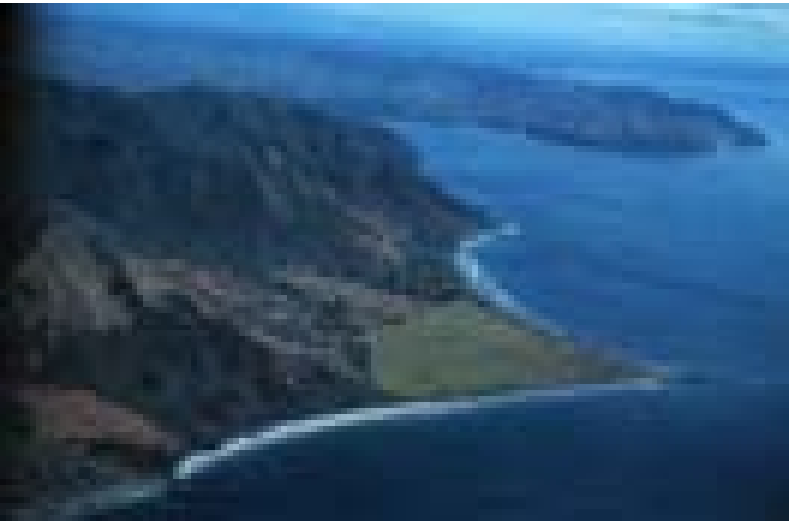
the Republic of Costa Rica.

5. Factors Affecting the Property.

(See Nomination_WHS_ACG.document)

6. Monitoring.

(See Nomination_WHS_ACG.document)



Costa Rica's Area de Conservación Guanacaste: A long march to survival through non-damaging biodevelopment.

Daniel H. Janzen

Department of Biology
University of Pennsylvania
Philadelphia, PA 19104
USA
djanzen@sas.upenn.edu

Daniel Janzen has researched as biologist, ecologist, and conservationist in the forests of Costa Rica. In September 1999 he gave the following paper at The Norway/UN Conference on the Ecosystem Approach for Sustainable Use of Biological Diversity in Trondheim. The paper has been slightly adapted for publication in the journal and Biodiversity *thanks both the author and Odd Sandlund at NINA (Norwegian Institute for Nature Research) for permitting publication in the journal in advance of the publication of the proceedings. All photos were taken by Daniel Janzen.*

INTRODUCTION

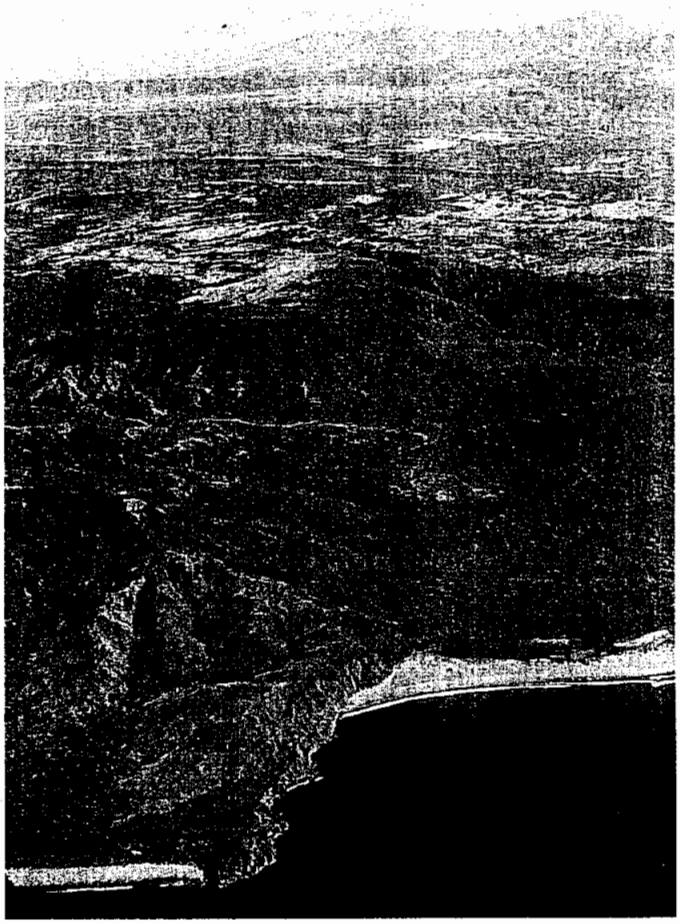
A large conserved wildland that is developed for its biodiversity and ecosystem services in a non-damaging way is an anthroecosystem. For that matter, so is a large city with its agroscape and trade links. If a large wildland is to survive today, it must be conserved by an "ecosystem approach for sustainable use of biological diversity." I view a conserved wildland as a somewhat disorderly garden that produces its crops in unconventional kinds of sacks and boxes. It is multi-cropped and multi-tasked, and has multi-users. And it requires the same intensity of care and thinking as does any highly successful agroscape or urban centre (Janzen 1998a, b, 1999a, b). Conservation into perpetuity demands the abandonment of models in which society is fenced out and the wildland placed in passive institutional custody.

The Area de Conservación Guanacaste (ACG) in northwestern Costa Rica (http://www.acguanacaste.ac.cr) is such an ecosystem approach to the sustainable use of biological diversity and its resultant ecosystems. The ACG is one of 11 such conservation units at various stages of evolution in Costa Rica. Altogether they cover about 25% of the country and form the Sistema Nacional de Areas de Conservación (SINAC) (http://sinac.ns.minae.go.cr). In this essay on wildland management theory, I use the ACG

One of the secrets to successful wildland conservation is a dedicated and self-interested group of staff. Here, Roger Blanco, Coordinator of the ACG Research Program and in front of Maria Marta Chavarría (also of the ACG Research Program), is intensely explaining the work of two paraecologists (seated Gloria Sihezar, standing Freddy Quesada) to visitors from UNDP Costa Rica (out of sight). They are in the new caterpillar rearing barn at San Gerardo in Sector San Cristóbal in the ACG rainforest, and Oscar Quesada getting an eyeful of role models (18 January 2000).

as an example because it is the entity that I understand best (Janzen 1983a, 1984, 1986a,b, 1987, 1988 a-e, 1993a, 1996a,b, Janzen *et al* 1993) and because it truly is non-damaging sustainable biodiversity development (a.k.a. biodevelopment) and ecosystem development. I do not avoid being "personal" and making person-specific commentary because specific persons are as much ingredients of the construction and custodianship of a conserved wildland as are impersonal "natural" elements and social forces.

There is no such thing as *impersonally* conserving and



View from over the Pacific northeastward across the dry forested coastal plain to the clouds over the cloud forests on Volcán Orosi and Volcán Cacao in the eastern ACG (dry season, 1987).

constructing a wildland so it survives into perpetuity. We have to move beyond the myth that a conserved wildland is a generic object that can be passively generated and maintained by bureaucratic processes that are institutionalized in national and international laws, regulations, and structures. While these social constructs, their technology, and their technical information are necessary and useful, they do not guarantee success. They are no more sufficient than they are for the emergence and function of universities, corporations, medical systems, stock markets, wars, political parties, internet, and other multi-person social synergies. The key ingredient is the dedicated and self-interested staff who takes responsibility for all relevant processes, and it is vital to sustain the cost of generating these kinds of personnel.

RELEVANT HISTORY OF THE ACG

ACG history is deeply imbedded in social events. The ACG has not been carved out of seemingly pristine wilderness in a battle with an encroaching agroscape, nor is it the result of an exercise in top-down biodiversity conservation mapping of the kind fashionable among contemporary academic and international absentee custodial processes and organizations. Instead it was born in the friction and flames of a classical national park evolving into a conservation area. This evolution has been the direct response to the biological needs of the ACG coupled with those of the resident, national, and international societies in which it is exists. When the ACG staff explore the area's biodiversity, it is for its non-damaging biodevelopment, and hence survival, rather than to find out whether or not it should be conserved.

The ACG's conservation process was set in motion in 1966. Kenton Miller (cf., Miller 1980) was then a young professor of natural resource management at the Instituto Interamericano de Cooperación para la Agricultura (IICA) at Turrialba in eastern (rainforested) Costa Rica. The Costa Rican government asked him to draw up a plan for a visitor-friendly national monument on 1000 hectares (ha) surrounding the Casona, the ancient central ranch house for the Hacienda Santa Rosa in northwestern Guanacaste Province. (The Casona was also the site of Costa Rica's two international battles.) This vaguely defined ranch of about 100,000 ha originally stretched from the evergreen-forested volcanoes on the east (Volcán Orosí, Volcán Cacao) across a dry-forested coastal plain to the Pacific Ocean. Santa Rosa, the second oldest ranch in Costa Rica, dates from the late 1500s when it was established as part of an area to produce mules for part of the Caribbean to Pacific Ocean cross-isthmus international transport system. Over the centuries its dry forests were largely converted to pasture (a.k.a. "savannah") for cattle to feed the indigo trade in more northern Central America, the hide and tallow trade operating out of Puntarenas to the south, and eventually, the growing urban populations in central Costa Rica. Hacienda Santa Rosa was also used for timber, wild meat, water for irrigation, and croplands (Rice, Cotton, Sorghum, garden crops, fruit and nut trees, etc.), and much of it was burned annually during the six-month dry season. The Interamerican Highway was carved through its centre in the 1940s, and Jaragua pasture grass (*Hyparrhenia rufa*) was intentionally introduced from East Africa (via southern Costa Rica) about the same time. In the mid-1960s, when a major portion of it was expropriated, Santa Rosa was still an extensively managed cattle ranch owned by the Somoza family.

When Miller visited the site in 1966, the cowboys themselves showed him the magnificent complex of heterogeneously damaged dry forest stretching in a crude 20-km-long rectangle between the Pacific and the Interamerican Highway. In his report, he recommended the establishment of Parque Nacional Santa Rosa (Executive Decree 1562-A in 1971), which eventually came to replace the national monument (Law 3694 in 1966). Unconsciously, this classical national park establishment was an act of restoration biology. Miller's management plans also argued that the area immediately around the Casona should be preserved as cultural heritage, with operating pastures, range cattle, and cowboys (Miller and von Borstel 1968). This was never realized, however, because that was the very agroscape that the park was established to counter.

The vast area of "savannah" was, in fact, nothing more than introduced grass pasture and old fields, intermingled with many different ages of woody succession following centuries of burning and logging. The free-ranging cattle (from a large ranch to the south) were not shot out until 1978 and the anthropogenic fires (largely set regionally as part of pasture management) continued until the mid-1980s. It wasn't until the early 1990s that the last free-ranging Horses were removed because they grew fond of eating things out of tourist tents and backpacks. As these agromanagement processes were gradually snuffed out in Santa Rosa, the dry forest gradually began its overall self-restoration by drawing on the multitude of biological fragments that ranged in size from single organisms to secondary successional blocks several hundred hectares in area. Hacienda Santa Rosa, with more than 40 different owners over the centuries, had never been sufficiently successful as a farm/ranch for it to have been truly cleared of its biodiversity, nor were its original ecosystems altered beyond recovery.

Beginning in 1963, I was a highly esoteric ecologist who was exploring the incredible diversity of animal-plant interactions in Costa Rica's dry forests (e.g., Janzen 1967, 1974a,b, 1980, 1983a, 1993a). Conservation was "something" being done by Miller, Alvaro Ugalde, Mario Boza, the IUCN, the WWF, TNC, the Government –"those other people." I studied it, they saved it. Ugalde and Boza constructed the nascent Costa Rican Servicio de Parques Nacionales (SPN) in the 1970s and early 1980s with the "blessing" and appreciation of esoteric biologists like me, but with virtually no assistance from us other than friendship and snippets of information. Conservation information and guidance came from a desire by Miller, Ugalde, Boza, and many other conservationists and environmental consultants to conserve "wilderness" before it could be taken over by the expanding population on a widening and intensifying agroscape.

My movement into the conservation cause began in May 1985, when Ugalde, then the Director of Costa Rica's SPN, asked me as a friend to do an environmental impact study of the 1500 gold miners who had invaded the rainforests of Parque Nacional Corcovado in southern Pacific Costa Rica. The situation was sufficiently catastrophic that Costa Rica was on the verge of a quasi-military operation to remove the miners. With a day on-site, the "environmental impact" study was complete. Intensive placer and pump gold mining totally trashes a tropical aquatic ecosystem and unrestrained people do equally well in destroying the adjacent rainforest. For the remaining six days we studied the gold miners, and we asked them to study themselves. The instant discovery was that they felt perfectly legitimate doing something productive, such as mining for gold, on "land with no owner," which is how they defined the park because there was no visible social presence. Incidentally, this is the socio-political base for much "squatting" on formally titled lands in Costa Rica. We concluded that if the miners were clearly told that they were illegally "parked," so to speak, and on Day X they would get a parking ticket and be towed, they would leave (Janzen et al 1985). Ugalde's park service did just that, and on Day X in March 1986 only 298 remained to be symbolically arrested and peacefully removed.

Jaragua pasture with scattered secondary successional dry (deciduous) forest remnants in central upland (300 m elevation) of Sector Santa Rosa of the ACG at the time that forest restoration began and when it was annually swept by anthropogenic fires; this view is in the centre of the photo on the opposite page (16 March 1987).

Quite independently, Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) asked my wife, field biologist Winnie Hallwachs, and me to spend August 1985 in northern and northwestern Australia, thinking with them about "how to create an Australian

presence in this enormous expanse of tropical dry forest" (an ecosystem not intrinsically attractive to a society derived directly from southern English counties). We largely concluded that science and agroscape-based ecotourism, research, conservation, low-yield long-term forestry, watershed management, etc., carried out and administrated by resident Australians, was the way to go. While such a horizontal conclusion was popular in the Australian tropics, it did not sit well with the centralized and vertical national-level command and control structure for CSIRO research, management, conservation, and educational systems.

A grass fire with its traditional dense flames 2-3 m high burning through ungrazed Jaragua (Sector Santa Rosa, 18 March 1987).

We returned to Costa Rica in September 1985. This was a time when the national economy had taken a severe hit through a global drop in coffee prices, a drastic rise in fossil fuel prices, and the beginning of the decay of the Guanacaste Province cattle crop. Along with many other government programs, the SPN found itself with rising costs and severely shrunken budgets, yet increased needs and opportunities for staff, land acquisition, operations, and administration. Many national parks, including Santa Rosa, were effectively in stasis. In 1985, Santa Rosa's annual operation budget was approximately $65,000, including salaries, for about 20 "guardaparques" (many on loan from the Guardia Rural) and an administrator.

We returned with three realizations. First, we had never asked the question for Santa Rosa that CSIRO had put to us about the Australian dry forest area. Second, we had not understood how critical a visible social presence is for wildland conservation until we had been confronted with the moral conclusion reached by Corcovado's gold miners. Third, having seen in Australia that a century of ranchers' fires will polish off the last remnants of tropical dry forest—so much so that many Australian biologists had even come to believe that there never had been forest on those rolling grass plains dotted with fire-resistant eucalyptus trees (Janzen 1988b, d)—we knew we had to act on behalf of Santa Rosa's tropical dry forest...fast. Why?

With the removal of cattle—biotic mowing machines—from Santa Rosa in 1978 by SPN, the introduced Jaragua grass had made a 2-m tall solid mass of fuel. This fed ravenous fires that annually consumed trees and patches of forest that had survived for centuries in a delicate balance with the low-fuel fires on the closely cropped grass swards. Australia showed us unambiguously that if the anthropogenic fires were not eliminated, very shortly there would be no battered dry forest to conserve in Santa Rosa and no fragments from which to restore the forest. (There are no natural fires in the Santa Rosa region.)

THE NEXT STAGE: FROM NATIONAL PARK TO CONSERVATION AREA

In the first two weeks of September 1985, Winnie and I generated an unsolicited strategic plan for the long-term survival of Santa Rosa's dry forest through creating for it the psychological and sociological presence of owners, the "owners" being both its direct custodians and society near and far. Internationally it was called Guanacaste National Park or GNP (Janzen 1986c, 1988a) and became known in Costa Rica as the Projecto Parque Nacional Guanacaste (PPNG). GNP had in its mission statement:

1. "Use existing dry forest fragments as seed to restore about 700 km^2 of topographically diverse land to a dry forest that is sufficiently large and diverse to maintain into perpetuity all animal and plant species, and their habitats, known to originally occupy the site. It also must be large enough to contain some habitat replicates that can absorb intense visitation and research use."
2. "Restore and maintain this tropical wildland so as to offer a menu of material goods...and wildland biology

This top photo shows Bill Durham, today a professor of anthropology at Stanford University, in a Jaragua grass pasture in 1972, long before the elimination of anthropogenic fires (Cliff Top Regeneration Plot, Sector Santa Rosa, 25 July1972).

data which will in turn be part of the cultural offering..."

3. "Use a tropical wildland as the stimulus and factual base for a reawakening to the intellectual and cultural offerings of the natural world; the audience will be local, national and international, and the philosophy will be 'user-friendly'."

Restoration of tropical dry forest, itself severely threatened and at that time virtually ignored in favour of the more spectacular "rainforest," was the initial technical focus. It was clear that dry forest restoration on a large scale could not be achieved by planting trees, but rather by stopping the annual anthropogenic fires (pasture fires, with creeping fires in the litter of forest remnants) or lowering their impact until they could be eliminated.

Fire control required a break from classical national park management tradition. The PPNG hired, as an NGO rather than as a government agency, neighbouring residents to be staff dedicated to this single-minded purpose, and gave them the tools and administrative freedom to address the "no fire" challenge. They went right on doing what they had been doing all their lives on their own lands and jobs, which was to manipulate fire to manage vegetation. The progression was from guardaparques hating the smoke to "bomberos" (firemen and firewomen) exercising their professional ability.

Lowering fire impact required a break with the tradition of eradicating Human presence in a national park. During its first five years as PPNG, the to-be-restored-to-forest pastures were rented out as grazing land for as many as 7,000 cattle at one time. Their explicit purpose was to keep fuel loads so low that the nascent fire-control program could manage the occasional fire. As the tree load grew in the fire-free pastures, the less needed the cattle were. They were later removed completely so as to protect the waterways that they so loved to trash (though a megafauna-free stream is hardly "natural", see Janzen and Martin 1982, Janzen 1983b).

The concept of hiring residents and specializing staff for particular themes, which is an integral part of any university or corporation, was applied to all aspects of the PPNG cum ACG, not just to fire control. Thus we developed our own on-the-job-trained experts in fire control, research, police, biological education, restoration/forestry, ecotourism, administration, and maintenance. But the idea also brought a problem. While a well-trained ACG resident specialist feels on a quality career track (rather than on hardship duty to be tolerated as a short-term job assignment from the national urban centre), there are far greater costs of operation to support such a specialist. You don't train a heart surgeon and then provide only a machete, running water, and a kitchen table. On a per staff basis (approximately 100 to manage 2% of Costa Rica), the ACG costs three to four times as much to operate as did the original Santa Rosa National Park (though the area under this "hands on" custody is ten times as large). With further biodevelopment as a quality conserved wildland, this cost will at least double.

But in 1985, forest restoration itself was a "new idea," a departure from classical national park tradition, even though it was occurring serendipitously in parks throughout the world in which there had been some agropastoral activity before park establishment. In late 1985 and 1986, I received broad disapproval from international conservation NGOs for expounding a restoration focus. These NGOs were largely surviving on the fund-raising message of "help us save the tropical (rain) forest now before it is cut, because once cut, it is gone forever." We

This bottom photo shows the pasture after 19 years of natural woody succession following the elimination of anthropogenic fires in 1980. Some of these trees will eventually be 25 m tall and live hundreds of years (Sector Santa Rosa, 25 April 1999)

were told that the donor public was not sufficiently sophisticated to be able to handle both a conservation and a restoration message. By 1987, however, management for conservation through restoration, alongside the conservation of old-growth tracts, became acceptable to both the donor and NGO communities, and this form of resistance largely disappeared internationally (though nationally it has its forms of persistence).

In the first five years of PPNG evolution, national approval was also essential. In 1986, Rodrigo Gámez, the biodiversity advisor to President Oscar Arias, led us to the new Minister Alvaro Umaña of the newly formed Ministerio de Recursos Naturales, Energía y Minas (MIRENEM) (today known as MINAE, or Ministerio del Ambiente y Energía). SPN had just moved from its original home in the Ministerio de Agricultura y Ganado (MAG). After hearing a half hour of description of the PPNG, Umaña had one question. Can it be done in four years? Innocently we replied that we thought it could be. That was our introduction to national politics. We thus had the government's blessing complete with the Presidential observation, "Sounds fine to me, but do not count on us for any funds." Our reply, innocent to be sure, was "Oh, that should be our responsibility."

Senior government approval was accompanied by a critical administrative step. Its necessity was self-evident to us, but we did not appreciate its administrative novelty. In 1986 the SPN, the Dirección General Forestal (DGF), the Dirección de Vida Silvestre (DVS), and the two reigning conservation NGOs (Fundación de Parques Nacionales, Fundación Neotropica) agreed informally (and with some legal wiggling) to allow all of their administrative responsibilities (and terrain) in the area of the PPNG to be pooled under one administration, one director, one site-specific staff, one work plan, and one budget. These entities were the formal owners of the State-owned lands and the newly purchased lands filling in the space between three national parks, one forest reserve, and one wildlife refuge. On site, Randall García, Roger Morales, Johnny Rosales, and Sigifredo Marín in succession have directed the PPNG cum ACG process, guiding this self-forming ship through shoals, low tides, storms, hurricanes, and wars. But always as one ship with one goal, and not as a fleet with many agendas, captains, and goals.

This ship, embarked on a journey of decentralization and horizontalization, was not eagerly welcomed by the centralized and verticalized administrative and social structure that initially generated the excellent SPN raw materials and conservation spirit. We met with much the same experience as had occurred in Australia. Even as the PPNG was decreed the Unidad Regional de Conservación Guanacaste in 1989, and then later the Area de Conservación Guanacaste, as well as partly inspiring the formation of SINAC, its reception still vacillates between tolerance, welcome, and rejection. Constantly labeled as separatist and independent for pursuing site-specific sustainable and non-damaging ecosystem development, the ACG wends its weary and battle-scarred way towards the same stable state of decentralized and horizontal wildland conservation that is aspired to by Costa Rica's other conservation areas. Simultaneously it lives through the perturbations created by a government that is itself evolving from a highly centralist and state-oriented governance to a more entrepreneurial, decentralized, and circumstance-dependent governance by a daily more aware and educated populace. The nation-wide rush toward urbanization also creates no end of obstacles (and opportunities) for a conserved wildland area to gain recognition as a rural social institution, an equal at the table of cross-cultural negotiation rather than just one more field on the agroscape.

WHERE THE ACG IS TODAY

The ACG is far from having completed its evolution from a classical protectionist national park into a true conservation area. It still suffers pains of nascent decentralization, the last pieces of land are still being purchased, it still runs afoul of legislation created by other agendas for the agroscape and urbanity, and it labours with only faint praise from a society nurtured on a view of a national park as (pseudo) pristine nature. However, within the ACG, many things are now being done that will always be part of its negotiated peace with society.

The fires have been stopped, and 40,000 ha of old pastures have been flipped to young regenerating forest. Involved resident custodians balance their internal "protectionist" mission with the beginnings of a "production" mode that is compatible with their conservation mission. An endowment gives stability to staff and allows the application of performance-based employment criteria. Its elected board of directors (Comité Local) is drawn from the neighbouring resident communities and has survived through the waxing and waning of centralized approval and resentment. The ACG serves as a major platform for esoteric and applied research and development of wildland

biodiversity, and it is the classroom for basic biology classes for all kids within 20-30 km radius. Two percent of the country is, therefore, being managed and biodeveloped at almost no cost to the Costa Rican taxpayer. Needless to say, these things have been made possible because of a huge amount of support from national and centralized institutions and personalities.

Now several projects that integrate all aspects of the ACG into specific place-based actions are being conducted. These projects are similar to those of any institution that decides to conduct a specific project that simultaneously satisfies some portion of many different agendas. Here I briefly describe three of these sustainable-use projects, but I ask readers to remember that the ACG *as a whole* is also the sustainable use of a conserved wildland to generate the primary "product" – the act of keeping its biodiversity and ecosystems on Earth for the future.

Why the emphasis on use? Because society owns the world, and only accepts and keeps those portions that are useful to some degree to someone (Janzen 1998a). Winnie and I, and you, may well invest our lives in the esoteric conservation of an area for biodiversity's sake (thereby demonstrating its existence value to us as well as showing how we choose to contribute to the payment of that existence value). However, "our" energy is not enough to meet the bills, and a tenant who fails to pay the rent gets evicted. We do not aim for the pragmatism of "use" because we want to "make money" per se from wildlands, but because a wildland does need to pay its bills in one coinage or another. It may earn votes, payments for environmental services, or religious or aesthetic appreciation. But it must earn. It must meet its opportunity costs. The very fact that there are different coinages for different folks once again emphasizes that *every* permanent conservation area is a place-based solution, paid in local currency, tailor-made to the circumstances, both biological and social. The staff and the strategy for any given conservation area must be oriented toward this social integration. There is no general recipe other than "conservation through non-damaging use," though obviously any particular conservation area may well find a use for this or that tool that was created in some other conservation area. These three examples are offered as examples of specific tools, and as examples of process.

PROJECT ONE: THE ACG AS A BIODEGRADER OF AGROSCAPE WASTE

As mentioned in the 1985 mission statement, the ACG needed to be large enough to absorb Human activities as part and parcel of the survival of the conservation area and Human ownership presence. At least 20,000 ha of ancient pasturelands were purchased for this purpose, without knowing specifically what Human activities would occur on them as they gradually revert back to old-growth forest over the next thousand years. In 1992 the ACG suffered the very pleasant surprise of discovering that an industrial-level orange plantation was being established on thousands of hectares of low-grade ancient pastures along its northern boundary. To make a long story short, the ACG bet that among its 235,000 estimated species (Janzen 1996a) there would be some that would dearly love to eat orange peels.

Here in 1990 six-year-old Maya Zumbado is learning about plant biodiversity development from Petrona Ríos, an ACG parataxonomist. Today Maya is a high school student and volunteer biologist at INBio in San Jose, and Petrona is part of a husband, wife and two children parataxonomist team that is conducting the plant and insect inventory of the rainforested Sector Pitilla of the ACG (Sector Santa Rosa, 30 June 1990)

In 1996 the ACG asked Del Oro for an experimental 100 truckloads to be dumped and leveled onto a centuries-old former pasture and former cashew orchard in the ACG. Within one-and-a-half years, the project yielded a deep black soil, elimination of the Jaragua grass, and a fine stand of multi-species broadleaf herbs—in short, an ideal substrate for forest regeneration. The ACG then negotiated a contract with Del Oro in which ACG organisms would degrade 1000 truckloads of peel a year for 20 years in the same manner (along with providing 20 years of other environmental services such as water, biological control, and environmental isolation). In return, Del Oro would pay the ACG with 1400 hectares of Del Oro forested lands

contiguous with the ACG forests (Janzen 1999a, Blanco 1997, Jiménez 1998). It was hoped, and still is hoped, that once this agro-industry has exhausted its supplies of land to pay for these services, it will then pay in cash, cash that can in turn be used to meet many ACG needs.

The biodegradation of clean agricultural waste as a management tool in forest restoration/management is not novel (e.g., Harris 1992) and yet is a major step beyond the tradition of expensive fossil fuel-fed peel processing plants in some parts of the fruit industry . Once the details were understood, the Del Oro-ACG contract did not permanently raise eyebrows within the conservation and environmental management community. However, in a country that is environmentally and conservation-oriented at the level of heart-felt emotions, and whose populace is only lightly grounded in the science and engineering of the environment, this project became a revealing political controversy. It exposed as-yet-unresolved weaknesses in the ACG's sociological underpinning.

These four photos, showing the biodegradation project in action, were all taken at exactly the same location: La Guitarra, Sector El Hacha, ACG. First, starting from the top, you can see centuries-old abandoned pasture filled with Jaragua and weeds (August 1987). The second photo shows the site with 1000 truckloads of processed (essential oils extracted) orange peels newly placed (January 1998). Third down is the site after activity by microbes and wild fly larvae (July 1998). The bottom photo shows the site in December 1999. Note, all Jaragua grass is gone and more than 90 species of herbs and woody plant seedlings are growing in a deep organic loam.

In constructing its juicing facilities, Del Oro had broken the fruit-processing monopoly in northern Costa Rica previously held by Ticofrut, another company. This set the stage for Ticofrut to take Del Oro to court for "sullying a national park," quite irrespective that the ACG was the initiator and developer of the relationship. Given that an attack on the ACG is an attack on its Ministry, MINAE (and vice versa), the situation quickly escalated to become political rather than technical. The most recent stage involves Costa Rica's judiciary deciding that the project must be terminated and the orange peels removed on the grounds that there might be something wrong with the project. This is the same judiciary that would never dream of telling an individual farmer that he had to grow melons instead of Carrots.

The irony is that the lands of the biodegradation site were purchased explicitly by the ACG for biodiversity use. Today, at no gain to the ACG, Del Oro is conducting its own peel biodegradation as a costly agricultural activity of formal composting just across the road from the ACG biodegredation site. The unique forest that was to be paid by Del Oro for the ACG's environmental services hangs in jeopardy. The current government is making an effort to re-establish the contractual relationship between MINAE and Del Oro in a format comfortable to the judiciary. The ACG is particularly anxious to once again receive massive amounts of biodegradable agricultural materials to hasten its forest restoration process (through soil improvement), facilitate the fire management process (through Jaragua grass elimination), and gain cash resources to meet other conservation needs.

However, this project illustrates that the centralized, biodiversity-naïve and ecosystem-naïve, urban national process has not yet come to be comfortable with a conservation area conducting its own management decisions in accordance with the needs of its wildlands, especially when those decisions smack of facts or ideas unfamiliar with whatever classical environmental awareness the urban centre carries. Breakdown ranged from a gross unwillingness by centralized urbanity to recognize ACG staff as anything other than janitors. They failed to understand that the staff of any conservation area is like the staff of a hospital. While it is important to have general system-wide goals and guidelines that reflect the commonality among hospitals, the staff has to have both the technical capability and the political authority to act specifically at the moment in the best interests of the patients and the community. Likewise conservation

"doctors and nurses" must be able to act independently in the interests of biodiversity and the ecosystems within a conservation area. The centralized powers also didn't realize that this piece of "State property" (a.k.a. national park) was in fact being managed to meet the financial and technical needs that the State had long ago abandoned. Even the discussion of this process, as presented here for the good of global biodiversity, is frowned upon.

But in sum, what is the significance of the orange peel biodegredation site in a conservation area? It proves that a wildland can conduct an environmental service for the agroscape and be compensated directly for it. It shows a wildland making use of management tools from the agroscape that are normally associated with "the enemy." It illustrates the staff of a conserved wildland determining specifically what to do to increase the quality of the area's biodiversity and ecosystem conservation. For the sake of forest restoration and wildland increase in this instance, the staff was using the tools at hand, rather than blindly responding to a passive and exclusionist tradition in wildland conservation. It is, in short, a win-win partnership between the conservation area and its agricultural neighbours, even if it is disruptive to the conservation image held by its more distant neighbours.

PROJECT TWO: THE ACG AS GMELINA FORESTER

It is no secret that Gmelina tree plantations, for fibre or cheap timber, are anathema to the tropical conservationist. The economics of Gmelina lends itself to the clearing of both old-growth and secondary successional rainforest. As well, Gmelina plantations directly block possible regeneration of wildland forests on old pastures and fields. However, like the agricultural waste mentioned above, Gmelina can also be a tool for the tropical conservationist. Abandoned pastures on former rainforest soils are notoriously slow to begin the rainforest regeneration process, even when there is forest nearby as a seed source and animals to move the seeds (e.g., the rainforest pastures in the eastern ACG, and see for example, Holl 1999, Holl and Cappelle 1999, Harvey and Haber 1999, Toh et al 1999, Janzen 1986d, 1988c, 1990, Aldrich and Hamrick 1998). This is in striking contrast to the rapid forest invasion of dry forest pastures when fire is stopped (if there are seed sources available). However, Gmelina planters are particularly fond of starting their plantations on old rainforest pastures. If not weeded, these plantations develop a dense shade-tolerant understory of rainforest shrubs, vines and tree seedlings, dispersed there by vertebrates. The shade from the Gmelina canopy and understory weeds kills the pasture grasses. The phenomenon is well known to foresters, and has been thoroughly documented throughout the tropics with many species of plantation trees (Parrotta and Turnbull 1997).

To the rainforest restorationist, Gmelina (and sometimes, other species of plantation trees) therefore offers a self-financing tool. One simply purchases old rainforest farms and ranches to restore to rainforest by enlarging the area of existing old-growth and successful secondary succession. Now find a Gmelina planter and go into business. He or she pays the costs of the plantation, but does not weed it and eventually shares the harvest profits with the conservation area at some level. Instead of going into the second to the umpteenth rotation, after one 8-12 year rotation of Gmelina the planter pulls the logs and the conservationist herbicides the stumps. The unweeded understory is left to continue on upwards as a young rainforest.

Here is a six-year-old Gmelina plantation, with its extremely speciose native understory that can now be allowed to continue upward as rainforest restoration by killing or harvesting the Gmelina. The person in lower right corner is 1.5 m tall (Rincón Rainforest, 10 March 1999).

A grant from a conservation NGO has now put this concept into practice in the eastern ACG (project description available on request). It has generated resident employment and a sense of active construction, will generate gross agricultural production from the early stages of restoration for conservation, has minimal operations cost for the ACG, and may offer future gain for the ACG endowment.

Why, then, by a grant from an NGO? What commercial grower will invest in a project that will be subject to the political whim of a government to be elected two elections from now, when the time comes to harvest and sell the trees? Why invest in something that runs afoul of traditional national park legislation that dictated, for good reason in its time, "Thou shalt not commit commercial activity in a national park nor extract products from it"? Why touch something that runs afoul of national legislation restricting commercial activities on

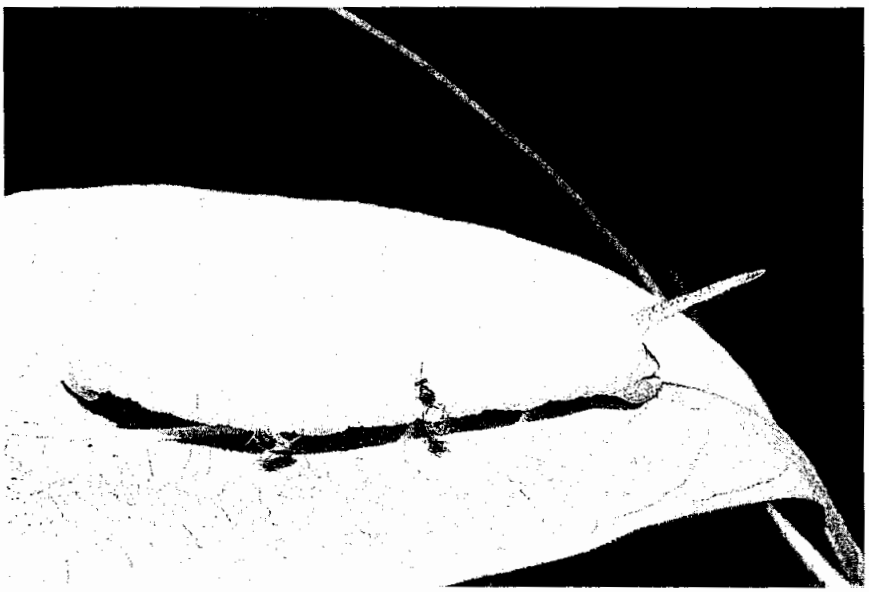
State-owned land by government employees (irrespective of whether they are paid from the ACG's endowment) and violates policies forbidding a State agency to keep the proceeds from its activities? And why set yourself up for attack by a competitor who may want to damage you or the ACG for quite other reasons?

PROJECT THREE: ACG YELLOW PAGES

If the hundreds of thousands of wildland species in a large conservation area are to be used by society at large, and if the footprints left by that use are to be monitored and controlled to hold them within the "natural" ups and downs of wildland processes, then those species, and the ecosystems that contain them, need to be understood. They need to be understood at the species level for biodiversity services and at the ecosystem level for ecosystem services, and this understanding requires staff ecologists and taxonomists with knowledge management abilities, and it requires the knowledge itself (e.g., Janzen 1992, 1993b, 1996b, Janzen and Gámez 1997).

Fortunately, much of the information, and its management, can be handled through a combination of today's computerization and on-the-job "learning while doing." Not every biodiversity manager has to spend ten years, and a half a million dollars, getting a Ph.D. and academic research experience. Instead the conserved wildland becomes an on-site graduate school. Costa Rica's parataxonomists and paraecologists (e.g. Janzen *et al* 1993) are living demonstrations of the success of this strategy and are now being emulated elsewhere in the tropics. (See http://www.bishop.hawaii.org/bishop/natsci/ng/ngpara.html and http://www.bishopmuseum.org/bishop/natsci/guyana/LOGGING4.HTM and Novotny et al 1998, Basset et al 1999.)

An on-going example of their work is the ACG plant Species Home Pages project at http://www.acguanacaste.ac.cr/paginas_especie/plantae_online/division. This project is financed at $100,000/year by CRUSA (CR-USA Foundation), which pays for five resident parataxonomists and paraecologists (one person with a BSc degree, one student with three years of college, and three grade school graduates), their hardware and software, and their field operations costs. At the rate of 500-1000 species a year, their goal is to generate an electronic Yellow Pages for the estimated 6000-7000 species of ACG plants by taking pictures of the species, writing the descriptions, and posting them on the ACG web site. They want to set up all those plant species for use by everyone and anyone—clean taxonomy (strongly supported by efforts such as Species 2000 at http://www.atcc.org/sp2000/ and INBio at http://www.inbio.ac.cr), micro-geographic distribution, basic natural history, and maybe most important of all, where to find the species (and how to know you have found it when you have). They are doing all this, on their own with no supervision, with what they are learning on the job and with what they learned formerly as parataxonomists, parabiodiversity prospectors, research assistants, and bioadministrators. It is an "on-the-job-created" career in resident wildland biodiversity management, not something done as a student who then goes on to other things in distant societies. The real bonus is that these staff members come to know and understand "their" conservation area as only resident biologists do.



Two of more than 100,000 species of arthropods in the ACG; a caterpillar of *Manduca barnesi* being oviposited in by a parasitoid wasp *Euplectrus* (voucher 94-SRNP-4497 at http://janzen.sas.upenn.edu) (Sector Santa Rosa, 18 June 1994).

The ACG will heterogeneously conduct this kind of inventory for all of its organisms (e.g., see the caterpillar databases at http://janzen.sas.upenn.edu) thereby performing a global service, freely available over the Internet. Thus, this project is not just for the ACG or Costa Rica, but for all the conserved wildlands throughout the neotropics. A huge proportion of ACG species range from Mazatlan and Tampico in coastal lowland Mexico south to southeastern Brazil and

Bolivia. This concept was even cranked up as an All Taxa Biodiversity Inventory (ATBI), which would have performed the entire exercise as a seven-year white hot effort with coordination of resident, national, and international abilities (Janzen 1996a,b). However, that dream was cannibalized by national-level forces, which dictated that the resources were better spent spread on inventory throughout five other conservation areas.

Such biodiversity "inventories" are not exercises to determine where and what to conserve, though their information is clearly tools for those who confront such a challenge in those few parts of the world where we still have the luxury of such conservation planning. Rather, inventory is basic infrastructure for a multitude of expected and unexpected, passive and active management decisions, about both the internal processes and users from society. Sadly, such practical outcomes for biodiversity inventory seem to compete with the widespread academic desire to conduct biodiversity inventory as a *planning* exercise. Apparently, the ATBI process also conflicts with the "taxasphere's" understandable desires to focus widespread study on a particular taxon wherever it occurs, rather than on "all" the diverse array of unrelated taxa at some particular area struggling for its conservation. Ironically, such decentralized, place-based inventory activity also receives attacks from centralized traditional academic universities, as well as centralized biodiversity authorities, both of which view decentralized biodiversity inventory efforts as competitively threatening their hegemony rather than an extension and expansion of their very legitimate centralized processes.

IN CONCLUSION

All of the above activities can be wiggled into an expanding concept of the ACG providing environmental services to resident, national, and international social sectors, along with the more traditional uses such as ecotourism, biodiversity prospecting, water production, biological control, research, education, etc. In all cases, the conservation area is being treated as an extremely complex garden that must be cared for by knowledgeable caretakers who focus on maintaining the highest quality biodiversity and ecosystem conservation into perpetuity. This high-quality ecological decision-making must be done in such a manner that the conservation area causes a social welcome rather than an allergic rejection. Any particular process may be a blessing or a curse, depending on the context of that particular place-based conservation project.

A major obstacle is that each entity touching on the conservation efforts of the ACG has its own agendas. In contrast to the permanent focus on a particular place, those agendas are generally process- or institution-based. It is as though everyone in the medical profession is good at healing a certain body part, and wants to apply his or her favourite procedure, but no one is concerned about the patient as a whole—and the patient is deaf, mute and blind. Nature is similar to a deaf, mute and blind patient; she does not come forth and ask us to be her doctors in the face of advancing Humanity. We must be proactive on nature's behalf.

As I listen to different sectors of the conservation community approach the subject, it is quite startling to observe the repeated rediscovery of wheels long turning in other sectors of society. Conservation biologists, their academic biologist associates, and their government agency counterparts have long operated far from the standard stresses of cut-throat business competition, government regulation, legislation created by distant forces, protective tariffs, zoning, politics, etc. The forest does not hold grudges, hate your mother-in-law, or react to your passport.

While it is true that the narcissistic process of self-discovery swirling within the human anthill is a major motivator, we cannot afford the temporal luxury of thinking that an "ecosystem approach to sustainable use of biological diversity" is pioneering anything. Sustainable (and unsustainable) use of resources has been a trait of Human societies as long as they have existed - put the principle in the right place, live off some of the interest income, roll some over. This is the time for us "biologists" to form teams with those sectors that spend their entire lives on the investment and management frontier. Let's ask them to apply their verbs to our nouns, and let's be open to the few places where the unique traits of some of our nouns leaves room for the evolution of new verbs.

Two of the most serious obstacles confronting the conservationist facilitating the movement of a classically conserved wildland into a conservation area that is truly integrated with society are that a) society largely turns on the selective withholding of information (e.g., Janzen 1998a) and b) members of society are motivated by maximizing their inclusive fitness. For business people, in particular, that means managing their sector of society to make money—a very malleable "fitness" unit. Conservationists, on the other hand, measure much of their

Here are Roberto Espinoza, a resident botanist for the ACG, and Felipe Chavarría, a parabiodiversity prospector, taking a break from collecting plants for an INBio-ACG biodiversity-prospecting project at Estación Cacao. Without the parataxonomist program, Roberto would be living a risky life on a small fishing boat, and without biodiversity prospecting, Felipe would be languishing in a customs warehouse in San Jose (25 March 1992).

fitness by the long-term survival of the particular wildland with which they are involved. So, when conservationists team up with business people to help their conservation area pay its bills and meet its opportunity costs, they throw themselves in with people whose traditions have a vastly different bottom line. Almost no business person, or business institution, sets aside some significant portion of earnings to facilitate the survival into perpetuity of the object bought or sold. Everything is for sale and anything can go bankrupt. This creates its traditions. When conservationists make a pact with this devil, it needs to be a cautious and ephemeral pact. Biodiversity prospecting is, perhaps, the most recent example of the ephemeral nature of the pact between two partners with different goals. The technology of finding and using interesting molecules from wildland organisms (obviously possible, as many millennia of indigenous grandmothers and shamans have demonstrated) has been successful. However, the commercial practitioners' partners have their stockholders' decisions and their own bank accounts as the ultimate measure of success, rather than the survival into perpetuity of the conserved wildland from which the molecules came. The ACG conservationist is left with one option—we are pro bono negotiators on behalf of 235,000 species of unknowing and uncaring wee beasties and green lumps.

It is essential that society permit the conserved wildland to evolve and operate under a set of legislation and traditions that works best for *its* sustainable biodiversity and ecosystem development. This set will not be the same as what works best for the agroscape and its occupants. A huge portion of the current conflict between conservationists and the remainder of society comes from the attempt by the conservation community to impose on the agroscape what boils down to uncompensated zoning regulations. The dislike for this attempt is coupled with the lack of respect for the sovereignty of conserved wildlands by occupants of urbania and the agroscape. We need a peace treaty, much the same as the one the medical profession has developed with society, as it cuts, hacks, probes, and drugs its patients into good health. As an unabashed advocate for the survival of tropical wildland biodiversity, I have no problem with "to-the-death" protection of large conserved wildlands while simultaneously relegating the wild and not-so-wild biodiversity of the agroscape to being yet one more tool in the agroscape's toolbox. This agroscape biodiversity is certainly something to be understood and treated well, largely for very Human purposes, but whose ultimate survival is not the top priority for that land use. We need a peace treaty with society, and we need to get on with making each kind of land use the top quality anthroecosystem that it can be.

It is the destiny of all conserved wildlands to be anthroecosystems—ecological islands carved out of a much larger anthro-ocean. As islands they are going to lose species until they come to some sort of equilibrium. They will be hotbeds of evolution and display place-based community structures other than that with which they started. Eventually they will settle into some sort of old-growth status that reflects not only their original composition, but also their particular overlay of climate changes, impeded migrations, altered water regimes, size, introduced species flow, edge effects, industrial contaminants, direct footprints, etc. Each island can go down a variety of different pathways as it moves to old-growth status. Many of these pathways offer opportunities for the conserved wildland to be welcomed by the neighbours (e.g., the orange peels and the Gmelina described earlier). Those islands fortunate enough to be allowed by society to reach old-growth status, whatever that may be, will be "grateful" that we made the effort.

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REPUBLICA DE COSTA RICA

Ministerio del Ambiente y Energía

Despacho del Ministro

18 de diciembre de 2003
DM-2534-03

Sr: Francesco Bandarín, Director
Centro del Patrimonio Mundial de la UNESCO
World Heritage Center
7, place of Fontenoy
75352 Paris 07 SP

Dir WHC
rec'd 14/1

Ref.: WHC/209.2/MPsds

Estimado señor

En respuesta a su oficio de referencia, le remito nuevamente la solicitud de nominación para la inclusión del Sector Santa Elena, como parte del sitio de patrimonio de la Humanidad del Área de Conservación Guanacaste.

Adjuntamos la información respectiva en un disco compacto y en forma impresa, siguiendo el formato definido por la UNESCO.

Agradecemos sus gestiones al respecto.

Carlos Manuel Rodríguez Echandi
Ministro

MINISTERIO DEL AMBIENTE Y ENERGIA
COSTA RICA

CMRE/gcs

c.: Raúl Solórzano Soto, Director Superior, SINAC
Marco Vinicio Araya, Gerente Areas Protegidas
Giselle Méndez, Directora ACG
Archivo

REPUBLICA DE COSTA RICA

Ministerio del Ambiente y Energía

Despacho del Ministro

19 de febrero del 2003
DM-376-2003

Excelentísimo
Señor
Koitchiro Miatsuura
Director Mundial de la UNESCO
S.O.

Estimado señor:

A nombre del Ministerio del Ambiente y Energía del Area de Conservación Guanacaste y del pueblo costarricense solicitamos la inclusión formal, en el Sitio de Patrimonio de la Humanidad Area de Conservación Guanacaste, de las 16.000 hectáreas anteriormente conocidas como Hacienda Santa Elena.

En diciembre de 1999, cuando nos fue otorgada por la UNESCO la categoría de Sitio de Patrimonio Mundial, estas 16.000 h. estaban bajo un proceso de litigio internacional para su posesión como área protegida, entre el Estado Costarricense y sus dueños privados. Así fue estipulado en la propuesta que se planteó ante la UNESCO con la salvedad de que estas tierras y otras que estaban en proceso de adquisición debían ser INCLUIDAS una vez adquiridas, como parte del área protegida y por tanto incluidas dentro de la denominación de Sitio de Patrimonio de la Humanidad.

Hoy día, las 16.000 h. de Santa Elena forman parte central e integral ACG y se protegen, restauran y conservan al igual que el resto del área protegida y por tanto pasan a ser Patrimonio de la Humanidad como una de las zonas geológicas más viejas de Centroamérica, con más de 85 millones de años y formada en gran parte por rocas provenientes del manto terrestre (peridotitas); con una vegetación y habitats de bosque seco y zona marino-costera muy particulares que aumentan significativamente la riqueza biológica que conserva el ACG. (mapa anexo).

Agradecemos a nombre del pueblo Guanacasteco y de todos los Costarricenses la formal inclusión de Santa Rosa como parte integral de este Sitio de Patrimonio Mundial.

Cordialmente,

ORIGINAL FIRMADO
Lic. Carlos Manuel Rodríguez Echandi

Carlos Manuel Rodríguez Echandi
MINISTRO

Cc: Ing. Raúl Solórzano, Director General SINAC-MINAE
Sra Giselle Méndez, Directora ACG-MINAE
Sr. Fernando Gutiérrez, ACG-MINAE

BORRADOR

WHC Registration
N 928 bis
14/01/2004
#04a c.

DVM-
23 de setiembre de 2003

Licenciado
Rafael Angel Zamora Fernández
Hacienda Solimar S.A.

Estimado señor:

En atención a su solicitud de apoyar la gestión y restauración del Humedal Laguna Madrigal, localizada en la colindancia con la finca ganadera propiedad de su representada, le informamos que un equipo técnico del Sistema Nacional de Areas de Conservación, SETENA y Departamento de Aguas está coordinando una sesión de trabajo, que permita elaborar un Plan de Restauración de dicho humedal, al cual le estamos invitando a participar.

La actividad tendrá lugar el día jueves 16 de octubre, a las 9:00 am, en Sala Barbilla del SINAC.

Para mayor información comunicarse con el señor Marco Vinicio Araya, Gerente de Areas Silvestres Protegidas, del Sistema Nacional de Areas de Conservación (al teléfono 283-8004, extensión 151).

Atentamente,

Carlos Manuel Rodríguez Echandi
MINISTRO

Ref.: Priv-3902

fc: Raúl Solórzano Soto, Director Superior, SINAC
Marco Vinicio Araya, Gerente Areas Silvestres Protegidas
Eduardo Madrigal, Secretario General SETENA
José Miguel Zeledón, IMN, Dpto.Aguas
María Elena Mora, Directora, ACA-T
Programa Nacional de Humedales, SINAC

WHC Registration
N 928 bis
14/01/2004
#04b c.

Señor
Álvaro González Alfaro
Diputado
Asamblea Legislativa de Costa Rica
S.D.

Estimado señor:

Con relación al oficio FPLN-184-AGA, mediante el cual nos remitió copia de la nota suscrita por el señor Albino Bolaños Bolaños, Administrador del Hogar de Ancianos San Vicente de Paúl de San Carlos, me permito hacer de su estimable conocimiento lo siguiente.

Durante los últimos meses los funcionarios del Sistema Nacional de Areas de Conservación (SINAC) y este Despacho hemos venido trabajando en reglamentar el artículo 39 de la Ley de Biodiversidad Nº 7788, que autoriza a la Administración para otorgar en concesión distintos servicios no esenciales ofrecidos en las áreas silvestres protegidas. Para esto se ha elaborado el borrador de decreto ejecutivo correspondiente y se inició el inventario de los servicios no esenciales potencialmente concesionables, para cada una de las áreas silvestres protegidas que califiquen. Sin embargo, no se ha realizado todavía ningún tipo de invitación formal a los posibles interesados, dado que primero es necesario que se publique el decreto ejecutivo en cuestión y que éste entre en vigor, para luego efectuar el debido proceso de capacitación y divulgación, según lo que procede en estos casos.

Por todo lo anteriormente expuesto la Dirección del Área de Conservación Arenal – Huetar Norte, responsable directa de la administración del Parque Nacional Volcán Arenal, será quien comunique en el futuro sobre los procedimientos y pasos a seguir para la concesión de cualquier servicio no esencial autorizado, en las áreas silvestres protegidas que así lo ameriten. Todo ello se hará después de cumplir con los requerimientos técnicos y jurídicos que apliquen. En ese momento la Asociación Hogar de Ancianos San Vicente de Paúl de San Carlos podría participar en cualquiera de los procesos de adjudicación de concesiones, en tanto cumplan con todos los requisitos establecidos por el ordenamiento jurídico vigente.

Atentamente,

Carlos Manuel Rodríguez
Ministro

c. Albino Bolaños Bolaños, Administrador Hogar de Ancianos San Vicente de Paúl, San Carlos.
Fausto Alfaro, Director Área de Conservación Arenal – Huetar Norte.

WHC Registration
N 928 bis
14/01/2004
#04c c.

Señor
Raúl Solórzano Soto
Director Superior
Sistema Nacional de Areas de Conservación
Ministerio del Ambiente y Energía
S.D.

Estimado señor:

El tema de la participación ciudadana es, sin duda, de capital importancia para democratizar la gestión ambiental en nuestro país. Por esto es de singular valor la contribución que distintos representantes de la sociedad civil, en conjunto con nuestros funcionarios y funcionarias, han venido realizando durante los últimos meses –en el seno de la *Comisión sobre Manejo Compartido de Áreas Silvestres Protegidas*— en torno a la definición de un marco conceptual, de política y de normativa que responda a las necesidades nacionales en el tema.

Considerando lo anterior, estimo necesario que los miembros de dicha *Comisión* cuenten con todo el respaldo de nuestra Institución, de manera que puedan desarrollar su trabajo en forma óptima y con la certeza de que sus aportes serán tomados muy en cuenta por este Despacho.

Por tanto, le solicito girar las instrucciones necesarias con el fin de que la Gerencia de Áreas Silvestres Protegidas asuma la Secretaría de la *Comisión*, facilitando todos los medios necesarios para el desempeño de las funciones de esta última, dentro de las posibilidades reales del SINAC. Así mismo los Directores y Directoras de las Áreas de Conservación deberán apoyar, en la medida de lo posible, el proceso que impulsa la *Comisión*, en lo que respecta a cada una de las áreas de conservación a su cargo.

Atentamente,

Carlos Manuel Rodríguez
Ministro

c. Miembros de la *Comisión sobre Manejo Compartido de Áreas Protegidas*.
Directores y Directoras de Áreas de Conservación del SINAC.
Jorge Polimeni, Dirección de Sociedad Civil del MINAE.
Marco Vinicio Araya, Gerencia de Áreas Silvestres Protegidas del SINAC.
Lesbia Sevilla, Gerencia de Desarrollo Institucional del SINAC.
Gilbert Canet, Gerencia de Manejo de Recursos Naturales del SINAC.

WORLD HERITAGE NOMINATION – IUCN TECHNICAL EVALUATION

Area de Conservacion Guanacaste (Costa Rica) – Extension to include the Santa Elena Sector, ID N° 928 Bis

Background note: The IUCN technical evaluation of the Area de Conservación Guanacaste (Costa Rica) was presented to the twenty-third session of the World Heritage Committee (Morocco, 1999). Based on IUCN's advice the site was inscribed on the World Heritage List under natural criteria (ii) and (iv). The site includes 88,000 terrestrial hectares and 43,000 marine hectares, extending 12 miles into the Pacific Ocean. In its evaluation report, under Section 4 on Integrity, IUCN noted that:

"The one major area (over 15,000 ha) still in private hands, which should be added to the Area de Conservation Guanacaste (ACG) sometime over the next 1-2 years, is the Santa Elena Property. This contains unique geological features and a highly conserved dwarf tropical dry forest, which will add significant conservation value to ACG".

Furthermore in its recommendation to the World Heritage Committee IUCN recommended that:

"Both the central government authorities and the ACG continue to intensify their efforts to incorporate the lands known as the Santa Elena Property into the ACG as soon as possible".

1. ADDITIONAL INFORMATION

By letter to the World Heritage Centre dated 19 February 2003, the State Party officially requested the inclusion of the Santa Elena Sector in the Area de Conservación Guanacaste (ACG) World Heritage site. This follows the successful resolution of the international expropriation case (ICSID Case No. ARB/96/1) between the landowners of the Santa Elena Sector and the State of Costa Rica. In the same letter, the State Party noted that conservation and management activities have started in this sector in order to fully incorporate it in the overall management of ACG. The State Party also provided a location map of ACG showing the boundaries of the Santa Elena Sector, as well as a vegetation map and a geological map of this sector. Finally, technical information was provided on the natural values that support the extension of ACB to include the Santa Elena Sector.

2. BRIEF DISCRIPTION OF NOMINATED EXTENSION: SANTA ELENA SECTOR

The Santa Elena Sector (SES), of 16,000 ha, is an important part of the Area de Conservación Guanacaste (ACG) and constitutes a major part of the Peninsula Santa Elena. Because of its location in the centre of the ACG, SES is critical to maintain the integrity of the site as it contains important areas of Pacific Tropical Dry Forest that characterize the site.

SES represents an ancient habitat that has been above the sea for 85 million years, and was an island in the eastern Pacific long before the Central American isthmus formed and connected North and South America. The SES eastern connection with the mainland is buried beneath young white volcanic materials that where deposited about a million years ago. Thus, SES is a unique geological area representing major stages of the Earth's history. This area is also exceptionally rich in plants that occur only here and are highly specialized to live on the very dry and extremely aged serpentine soils. SES contains exceptionally intact mangrove forests (containing eight species of mangroves) associated with well preserved coastal and marine areas. This leads to a unique association of wetland ecosystems and a very dry area separated by only 10 meters. Most of the vertebrate species occurring in ACG are also found in SES.

Punta Respingue, of approximately 75 ha and located in the coastal area of SES, is the only freshwater wetland on the entire Pacific coast of Costa Rica, formed by eroded alluvial soil washed down from the slopes behind. It forms a soggy swamp in the rainy season with open water in the centre. The flat is held in place by a distinctive steep, fragile, and raised cobble beach that is the barrier against the high waves that roll in off the open Pacific throughout the rainy season. The very strong south-westerly dry season winds in January-March push these waves back out to sea. These winds have created the highest and thickest sand dunes to be observed along the Guanacaste coast. The dunes are in pristine condition and demonstrate clearly the interaction between the coastal forest and the shifting sand system.

3. RECOMMENDATION

IUCN recommends the World Heritage Committee **to extend** the Area de Conservación Guanacaste to include the Santa Elena Sector as part of the natural World Heritage site. Thus, the total area of the Area de Conservación Guanacaste would be 147,000 ha, comprising 104,000 ha of terrestrial area and 43,000 ha of marine area.

The World Heritage Committee may also wish to commend the State Party for its commitment and efforts in solving the legal process concerning the inclusion of this important sector in the Area de Conservation Guanacaste and encourages the State Party to fully integrate this sector in the overall management of this World Heritage site.

CANDIDATURE AU PATRIMOINE MONDIAL - ÉVALUATION TECHNIQUE UICN

ZONE DE CONSERVATION DE GUANACASTE (COSTA RICA) –EXTENSION POUR INCLURE LE SECTEUR DE SANTA ELENA, ID N° 928 Bis

Rappel : L'UICN a remis son évaluation technique de la Zone de conservation de Guanacaste (Costa Rica) à la vingt-troisième session du Comité du patrimoine mondial (Maroc, 1999). Sur avis de l'UICN, le site a été inscrit sur la Liste du patrimoine mondial au titre des critères naturels (ii) et (iv). La Zone de conservation de Guanacaste comprend 88 000 hectares terrestres et 43 000 hectares marins. Elle s'étend jusqu'à 12 milles dans l'océan Pacifique. Dans son rapport d'évaluation, au paragraphe 4 (Intégrité), l'UICN notait :

« La propriété de Santa Elena est le principal secteur (plus de 15 000 hectares) qui soit encore propriété privée et qui devrait être ajouté à la ZCG d'ici deux ans. Santa Elena contient des caractéristiques géologiques uniques et une forêt tropicale sèche naine extrêmement bien conservée qui ajoutera beaucoup de valeur à la ZCG. »

En outre, l'UICN recommandait au Comité du patrimoine mondial :

« *que les autorités centrales et les autorités de la ZCG poursuivent et intensifient leurs efforts pour incorporer les terres de la «propriété de Santa Elena» dans la ZCG dès que possible*. »

1. INFORMATION COMPLÉMENTAIRE

Par lettre adressée au Centre du patrimoine mondial, le 19 février 2003, l'État partie a officiellement demandé l'intégration du secteur de Santa Elena dans le Bien du patrimoine mondial de la Zone de conservation de Guanacaste (ZCG). Cette demande fait suite au règlement positif d'un cas d'expropriation internationale (ICSID cas No ARB/96/1) entre les propriétaires du secteur de Santa Elena et l'État du Costa Rica. Dans la même lettre, l'État partie note que les activités de conservation et de gestion ont commencé dans le secteur afin d'intégrer celui-ci, de manière pleine et entière dans la gestion globale de la ZCG. L'État partie fournit également une carte de localisation de la ZCG avec les limites du secteur de Santa Elena ainsi qu'une carte de la végétation et une carte géologique du secteur. Enfin, sont ajoutées à la documentation des informations techniques sur les valeurs naturelles justifiant l'extension du Bien du patrimoine mondial de la Zone de conservation de Guanacaste afin d'inclure le secteur de Santa Elena.

2. BRÈVE DESCRIPTION DE L'EXTENSION PROPOSÉE: SECTEUR DE SANTA ELENA

Le secteur de Santa Elena dont la superficie couvre 16 000 ha, est une partie importante de la Zone de conservation de Guanacaste (ZCG) et un élément essentiel de la péninsule de Santa Elena. En raison de son emplacement, au centre de la ZCG, le secteur de Santa Elena joue un rôle critique pour le maintien de l'intégrité du site car il comprend d'importantes zones de forêt tropicale sèche du Pacifique qui caractérisent le site.

Le secteur de Santa Elena est un habitat ancien, émergé depuis 85 millions d'années, qui était autrefois une île dans le Pacifique oriental, bien avant que l'isthme d'Amérique centrale ne se forme et ne soit relié à l'Amérique du Nord et à l'Amérique du Sud. Le lien oriental du secteur de Santa Elena avec le continent est enfoui sous des matériaux volcaniques blancs et jeunes, déposés il y a environ un million d'années. En conséquence, le secteur de Santa Elena est une zone géologique unique qui représente d'importantes étapes de l'histoire de la Terre. Cette zone est également exceptionnellement riche en plantes que l'on trouve uniquement dans ce secteur et qui sont hautement spécialisées de manière à pouvoir vivre

sur des sols de serpentine très secs et extrêmement anciens. Le secteur de Santa Elena contient des forêts de mangroves exceptionnellement intactes (comptant huit espèces) associées à des zones marines et côtières bien préservées. En conséquence, il y a là une association unique entre des écosystèmes de zone humide et une zone très sèche, séparés de 10 m seulement. La majeure partie des espèces de vertébrés que l'on trouve dans la ZCG se trouvent aussi dans le secteur de Santa Elena.

Punta Respingue, qui couvre environ 75 ha, se trouve dans la zone côtière du secteur de Santa Elena. C'est la seule zone humide d'eau douce de toute la côte pacifique du Costa Rica, formée par des sols alluviaux érodés qui ont été lessivés des pentes que l'on trouve en arrière-plan. C'est un marécage détrempé durant la saison des pluies, avec des eaux libres au centre. L'étendue plate est maintenue en place par une plage de galets particulière, très en pente, fragile et relevée, qui forme une barrière contre les hautes vagues du Pacifique qui viennent se briser, en saison des pluies. En janvier-mars, les vents très forts de saison sèche, qui soufflent en direction du sud-ouest repoussent ces vagues vers le large. Ces vents ont créé les dunes de sable les plus hautes et les plus épaisses que l'on puisse observer le long de la côte de Guanacaste. Les dunes sont intactes et démontrent clairement l'interaction entre la forêt côtière et le système de sables mouvants.

3. RECOMMANDATION

L'UICN recommande au Comité du patrimoine mondial **d'agrandir** la Zone de conservation de Guanacaste afin d'inclure le secteur de Santa Elena dans le Bien naturel du patrimoine mondial. La superficie totale de la Zone de conservation de Guanacaste serait donc de 147 000 ha, avec 104 000 ha de zone terrestre et 43 000 ha de zone marine.

Le Comité du patrimoine mondial pourrait aussi féliciter l'État partie pour son engagement et les efforts qu'il a déployés pour résoudre le problème juridique de l'intégration de ces secteurs importants dans la Zone de conservation de Guanacaste et encourager l'État partie à intégrer pleinement ce secteur dans la gestion globale du Bien du patrimoine mondial.