UNESCO World Heritage Centre
International Union for Conservation of Nature - IUCN

Reactive Monitoring Mission to Área de Conservación Guanacaste, Costa Rica (N 928 Bis)

24 – 29 January 2018

Mission Report, July 2018

TABLE OF CONTENTS

Cover photograph: Boiling mud pools in Rincón de la Vieja NP. ©IUCN/Tilman Jaeger

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ABBREVIATIONS AND ACRONYMS

AC	Área de Conservación
ACG	Área de Conservación Guanacaste
ACT	Área de Conservación Tempisque
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species
CMS	Convention on Migratory Species
CNC	Consejo Nacional de Concesiones
COLAC	Consejo Local de Áreas de Conservación
CONAC	Consejo Nacional de Áreas de Conservación
CORAC	Consejo Regional de Áreas de Conservación
CSR	Corporate Social Responsibility
EIA	Environmental Impact Assessment
FONAFIFO	Fondo de Financiamiento Forestal de Costa Rica
FPN	Fundación de Parques Nacionales
GDFCF	Guanacaste Dry Forest Conservation Fund
ha	Hectare
IAC	Inter-American Convention for the Protection and Conservation of Sea Turtles
IAS	Invasive Alien Species
IBA	Important Bird Areas
ICE	Instituto Costarricense de Electricidad
INCOPESCA	Instituto Costarricense de Pesca y Acuicultura
INDER	Instituto de Desarrollo Rural
IUCN	International Union for Conservation of Nature
m.a.s.l.	Meters above sea level
MIDEPLAN	Ministerio de Planificación Nacional y Política Económica
MINAE	Ministerio de Ambiente y Energía
MOPT	Ministerio de Obras Públicas y Transportes
MPA	Marine Protected Area
MSP	Marine Spatial Planning
NGO	Non-governmental Organisation
OG	Operational Guidelines
OUV	Outstanding Universal Value
PES	Payment for Environmental Services
PM	Proyecto de Integración y Desarrollo de Mesoamérica
PNCB	Programa Nacional de Corredores Biológicos
PNE	Patrimonio Natural de Estado
PPP	Plan Puebla Panamá
RICAM	Red Internacional de Carreteras Mesoamericanas
SEA	Strategic Environmental Assessment
SETENA	Secretaría Técnica Nacional Ambiental
SINAC	Sistema Nacional de Áreas de Conservación
SIREFOR	Sistema de Información de los Recursos Forestales de Costa Rica
SOC	State of Conservation
TOR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
VU	Vulnerable (IUCN Red List category)

EXECUTIVE SUMMARY

Located in the north-west of Costa Rica, Área de Conservación Guanacaste (ACG) was inscribed on the World Heritage List in 1999 according to natural criteria (ix) and (x), the 'biodiversity criteria'. Following a terrestrial extension in 2004, ACG today has a surface area of some 147,000 hectares (ha), including some 43,000 ha of marine area. The serial World Heritage property is comprised of a contiguous complex of three national parks and the Horizontes Forestry Experimental Station, as well as a smaller, disjunct wildlife refuge. While no formal buffer zone has been established, on land several privately owned conservation areas are situated adjacent to the property, thereby partially preventing abrupt boundaries between the property and the surrounding agricultural landscape. ACG is renowned for encompassing an impressive gradient from the waters of the Pacific to the rugged volcanoes of the Cordillera de Guanacaste, including even parts of the markedly distinct eastern slope of that range.

In response to consistent concerns about multiple threats to the property, at the request of the Committee, the State Party invited a joint World Heritage Centre/IUCN Reactive Monitoring mission to assess: (i) the potential impacts of geothermal projects; (ii) the current status of the planned wind power projects; (iii) the current status of the Pan-American Highway; (iv) potential indirect and cumulative impacts of the above projects; (v) the impacts of known threats, including – but not limited to – forest fires and illegal resource extraction, including water abstraction adjacent to the property and fishing within the marine component of the property, and the adequacy of management responses; (vi) the illegal pet trade and the significant decline in mass nesting of Olive Ridley turtles; (vii) the options for establishing a potential buffer zone for the marine and terrestrial components of the property; and (viii) "any other relevant issues that may negatively impact the Outstanding Universal Value (OUV) of the property (…), including the Interoceanic Dry Canal".

Over the last years, a private sector company has been promoting a so-called Interoceanic Dry Canal, a transportation corridor, which would link Costa Rica's coasts. The project idea continues to be at a very early stage of development: governmental authorities have yet to decide whether the project idea is eligible at all as a formal project proposal. If so, this would trigger a series of procedures, including the formal involvement of the Ministry of Environment and Energy (MINAE) and comprehensive Environmental Impact Assessments (EIA). Maps and other information made public by the proponent and the governmental National Council for Concessions (CNC) suggest the intention to construct and operate an industrial port terminal and associated infrastructure within Santa Rosa National Park, an integral part of the World Heritage property encompassing the Santa Elena Peninsula. The project idea appears to be unrealistic in the currently discussed form due to the absence of any legal basis for such infrastructure within a national park and incompatibility with basic World Heritage expectations. In a public press release dated 17 November 2016, the President of Costa Rica has personally pronounced himself accordingly. Furthermore, the Santa Elena Bay, which apparently is the intended location of the proposed industrial port terminal, was recently declared as a protected area (*Área Marina de Manejo Bahía Santa Elena*) following years of negotiation with local resource users. In the unlikely case of the project going ahead, established World Heritage procedures are to be applied.

Predating the establishment of protected areas in the country, the Inter-American Highway bisects ACG along some 13 kilometres and elsewhere borders with the property along some eight kilometres. The enhancement and expansion of the Inter-American Highway is an explicit regional and national infrastructure development objective. The currently discussed concrete road enhancement and expansion projects, however, are outside of the property and were not active at the time of writing. In the longer term, it would appear to be illogical to enhance and expand the highway elsewhere, while leaving the section within ACG as a bottleneck from a transportation planning perspective. Given that the highway already impacts on ACG's conservation values, expanding it within and adjacent to the property is strongly

discouraged. Any proposal to do so would trigger a need for detailed assessments, including under the World Heritage Convention. The enhancement of National Route 4 might be a viable alternative, which would deliver the transportation objectives according to MOPT and CNC representatives met by the mission, while relieving pressure on ACG. This alternative should be assessed in detail and considered pending confirmation of viability. For the time being, the mission recommends (i) the optimization of existing wildlife passages; (ii) the enforcement of speed limits; (iii) the consideration of temporal road closures; and (iv) systematic impact monitoring.

Renewable energy development is not environmentally neutral. Both geothermal and wind power have been developed in the immediate vicinity of ACG. Further development is highly likely. The property should be off-limits to renewable energy infrastructure, including associated infrastructure. The already operating projects next to ACG require retrospective assessments and monitoring of possible impacts on the OUV. All new renewable energy project proposals within the wider Conservation Area should be brought to the attention of the World Heritage Committee in accordance with Paragraph 172 of the Operational Guidelines, and undergo environmental impact assessments (EIA), specifically considering OUV. The State Party may wish to consider incorporating reference to international conservation designations, including World Heritage status, in the legal and policy framework governing EIA. Taking into account the multitude of existing and proposed projects and that current EIA efforts appear to be restricted to individual projects, the State Party should consider a Strategic Environmental Assessment (SEA) for the entire Conservation Area in order to improve the currently limited understanding of cumulative impacts and to better balance conservation with competing land use interests.

Costa Rica's legal and policy framework determining the governance and management of conservation areas is adequate and even exemplary in terms of the creation of nested councils at the national, regional and local levels. The very creation of "conservation areas" in the sense of large territorial units covering the entire land surface area of Costa Rica is a rare conceptual and legal recognition of the need to go beyond protected areas in comprehensive conservation planning and management. At the level of ACG, dedicated staff, effective alliances with national and international non-governmental and academic actors and leverage of substantial external funding deserve to be highlighted. At the same time, implementation gaps were consistently pointed out. Concretely, it was argued that the councils only partially lived up to their ambitious, legally defined roles, including due to funding constraints. It was consistently suggested that the local (COLAC) and regional (CORAC) councils could and should be more dynamic. Otherwise, the overarching concerns are under-funding and under-staffing despite significant external funding. The general management plan covering the period from 2014 to 2024 and State Party reporting under the World Heritage Convention identify a large number of management challenges. While none amounts to an existential threat to the property at this point in time, these concerns require attention and consolidation of management responses.

Similar considerations, conclusions and recommendations are applicable to the integration of the property into the wider landscape and seascape. The potential offered by the promising legal and policy framework remains to be fully realized. Conservation considerations need to be integrated into spatial and resource use planning on land and sea more effectively. The creation and formalization of currently missing buffer zones on land and sea should be one element of this consolidation process.

Recommendation 1
The State Party should confirm an unambiguous commitment that the World Heritage property in its entirety is off-limits to industrial development infrastructure, including the so-called Dry Canal and any associated infrastructure.

Recommendation 2
Any change of the current State Party position regarding the relationship between the so-called Dry Canal, or any other industrial development infrastructure, and ACG should be communicated to the World Heritage Committee without delay.

Recommendation 3
All options to reduce the impacts of the Inter-American Highway should be considered, including the improvement of National Road 4 as an alternative route.

Recommendation 4
Any possible future enhancement or expansion of the sections of the highway within and bordering the property should be brought to the attention of the World Heritage Committee in accordance with Paragraph 172 of the Operational Guidelines, and should undergo Environmental Impact Assessments with a specific assessment of impacts on the Outstanding Universal Value of the property, in line with IUCN's World Heritage Advice Note on Environmental Assessment.

Recommendation 5
All existing renewable energy projects within the wider Conservation Area should systematically monitor possible impacts on the Outstanding Universal Value of the property as an integral part of management and mitigate any such impacts, as required.

Recommendation 6
Details of any new renewable energy project proposal within the wider Conservation Area of the property should be submitted to the World Heritage Centre in accordance with Paragraph 172 of the Operational Guidelines, and be subject to an Environmental Impact Assessment with a specific assessment of impacts on the Outstanding Universal Value of the property, in line with IUCN's World Heritage Advice Note on Environmental Assessment.

Recommendation 7
Consider integrating World Heritage requirements into the legal and policy framework governing impact assessments.

Recommendation 8
Undertake a Strategic Environmental Assessment (SEA) for the entire Conservation Area including the property, in order to assess the cumulative impacts of expanding renewable energy developments on the OUV of the property, including its conditions of integrity, and to better balance conservation with competing land use interests.

Recommendation 9
Consolidate and diversify conservation financing strategies, including through Payment for Environmental Services (PES) schemes and negotiation with renewable energy actors.

Recommendation 10
Develop a coherent approach to the conservation of all three natural World Heritage properties in Costa Rica as a flagship conservation initiative to address overlapping challenges.

Recommendation 11
Encourages the State Party to harmonize the boundary of the property with the management unit of the larger "protected block" of the same name, and submit a Minor Boundary Modification for approval by the Committee.

Recommendation 12
Encourages the State Party to explore the feasibility of incorporating unprotected land of high-conservation value adjacent to the property, in line with readily available guidance from priority-setting exercises.

Recommendation 13
Encourages the State Party to consider the incorporation of the newly designated Bahía Santa Elena Marine Management Area into the property via a minor boundary modification.

Further invest in land use planning at the level of the wider Conservation Area to consolidate the integration of conservation considerations into the wider landscape, including the establishment of a formal buffer zone.

Recommendation 15
Invest in Marine Spatial Planning beyond the marine parts of the property, including the establishment of a formal buffer zone.

1. BACKGROUND TO THE MISSION

Despite a relatively small terrestrial territory, Costa Rica boasts a disproportionately large share of global biodiversity. Costa Rica's much larger marine territory likewise coincides with areas of global conservation significance. Costa Rica's three natural World Heritage properties capture particularly valuable examples of the country's exceptional natural wealth. Área de Conservación Guanacaste (ACG) – as formally inscribed on the World Heritage List according to natural criteria (ix) and (x) – covers some 147,000 hectares (ha) of land and sea in the north-west of Costa Rica. Besides the World Heritage status, ACG is located within the Mesoamerica Biodiversity Hotspot and overlap with the Guanacaste Lowlands, one of 21 Important Bird Areas (IBA) in Costa Rica. ACG also includes two wetlands of international importance recognized under the Ramsar Convention: Laguna Respinge and Potrero Grande. The name ACG is also used for a slightly larger, overlapping network of public and private protected areas locally referred to as "*bloque protegido*", as well as for one of Costa Rica's 11 conservation regions. Unless otherwise noted, this report refers to ACG as the marine and terrestrial surface area inscribed on the World Heritage List in 1999, including a terrestrial extension formally approved in 2004.

The serial World Heritage property is comprised of a contiguous complex of three national parks (Santa Rosa, Guanacaste, Rincón de la Vieja) and the Horizontes Forestry Experimental Station (*Estación Experimental Forestal Horizontes*), as well as the smaller, disjunct Junquillal Bay Wildlife Refuge (*Refugio de Vida Silvestre Bahía Junquillal*). ACG is for the most part situated within Guanacaste Province, with a smaller area reaching into Alajuela Province. While no formal buffer zone has been established, several privately owned conservation areas are situated adjacent to the property, thereby partially preventing abrupt terrestrial boundaries between the property and the surrounding agricultural landscape.

The property encompasses an uninterrupted gradient from the Pacific Ocean all the way to the peaks of rugged volcanoes reaching almost 2,000 m.a.s.l., including even the markedly distinct eastern slope of the Cordillera de Guanacaste facing the Atlantic (Caribbean) lowlands. One of the justifications for the inscription of ACG on the World Heritage List is its extraordinary ecosystem diversity, both on land and sea. The roughly 43,000 ha of marine area belonging to Santa Rosa National Park include deep water, rocky and coral reefs, algal beds and sandy bottoms. Nutrient-rich cold upwelling currents underpin an exceptionally high marine productivity. The coastline boasts rocks and cliffs, mangroves, dunes, cobble and sandy beaches, including important nesting sites of several species of marine turtles. The famous mass nesting events (*arribadas*) of the vulnerable Olive Ridley sea turtle (*Lepidochelys olivacea*) at Playa Nancite in Santa Rosa National Park are one of the conservation values of the property under criterion (x). Several uninhabited near-shore islands known as the *Islas Murciélagos* (Bat Islands) are located within the marine area of Santa Rosa National Park.

Extraordinary conservation values in the roughly 104,000 ha of terrestrial area include large tracts of rare and highly threatened semi-deciduous tropical dry forests, especially on the Santa Elena Peninsula. Further east and higher up in altitude, the forests transition into lush evergreen rainforests and patches of cloud forests. As detailed in Annex 3, the enormous ecosystem diversity favours extremely high species diversity. For example, over 900 vertebrate species have been confirmed, such as the Central American Tapir, at least 40 species of bat, at least four felids, three primate species and some 500 bird species. The invertebrate diversity remains to be fully documented, but there are estimated to be 20,000 species of beetles and 8,000 species of butterflies and moths, indicating overwhelming diversity. Remarkably, most of ACG is far from "pristine". Rather, the landscape is the result of on-going natural regeneration and active restoration following centuries of cattle ranching, logging, hunting, clearing, anthropogenic fires, and more recent impacts stemming from road construction, water abstraction, agro-chemicals and invasive alien species (IAS). The relatively high degree of naturalness today is a function of decades of effective conservation

efforts and the natural protection that come with remoteness, rugged terrain, limited freshwater resources and seasonally strong, inhospitable winds.

While not specifically recognized for its geological values under the World Heritage Convention, the original IUCN evaluation noted a "unique" geology, namely some 24,000 ha of serpentine barrens on the western end of Santa Elena Peninsula. It is assumed that the barrens have been above the sea for 85 million years on an island in the Eastern Pacific - long before the Central American isthmus was formed. In addition to the natural values, countless artefacts and shell mittens on the coast bear witness to a rich human past and important archaeological heritage. Last but not least, the historic *Casona de Santa Rosa*, an iconic site in Costa Rican history, is located within ACG.

The World Heritage Committee examined the property at its 39th (Bonn, 2015) and 41st sessions (Kraków, 2017), respectively. Upon Committee request, the State Party submitted a formal State of Conservation report in December 2016. The Committee commended the State Party for its comprehensive reporting and its commitment to consider the property off limits to geothermal development. However, consistent concerns about multiple threats to the property were considered to constitute potential impacts on the property's Outstanding Universal Value. Accordingly, the State Party was requested to invite a Reactive Monitoring mission.

The Terms of Reference (ToR, see Annex 2) requested the Reactive Monitoring mission to assess a wide range of conservation concerns following up on Committee Decision 41 COM 7B.12 adopted by the World Heritage Committee at its 41st session (Kraków, 2017, see Annex 1). Specifically, the ToR required the mission to assess: (i) the potential impacts of geothermal projects; (ii) the current status of the planned wind power projects; (iii) the current status of the Pan-American Highway; (iv) potential indirect and cumulative impacts of the above projects; (v) the impacts of known threats, including – but not limited to – forest fires and illegal resource extraction, including water extraction adjacent to the property and fishing within the marine component of the property, and the adequacy of management responses; (vi) the illegal pet trade and the significant decline in mass nesting of Olive Ridley turtles; and (vii) the options for establishing a potential buffer zone for the marine and terrestrial components of the property. In line with paragraph 173 of the *Operational Guidelines*, the mission was further tasked and mandated to review "any other relevant issues that may negatively impact the Outstanding Universal Value (OUV) of the property (…), including the Interoceanic Dry Canal". The mission was conducted by Mr César Moreno-Triana representing the UNESCO World Heritage Centre and Mr Tilman Jaeger representing IUCN.

2. LEGAL AND MANAGEMENT FRAMEWORK

Legally, nature conservation in Costa Rica primarily rests on three pillars established in the 1990s:

- the Environmental Law dated 1995 (*Ley Orgánica del Ambiente Ley Nº 7554 del 13 de noviembre de 1995*);
- the Forest Law dated 1996 (*Ley Forestal Ley Nº 7575 del 05 de febrero de 1996);*
- the Biodiversity Law dated 1998 (*Ley de Biodiversidad Ley N° 7788 del 30 de abril de 1998*).

Article 22 of the Biodiversity Law established the National System of Conservation Areas (*Sistema Nacional de Áreas de Conservación* - SINAC) as a legal entity under the Ministry of Environment and Energy (*Ministerio de Ambiente y Energía* - MINAE) to bring together previously dispersed institutional responsibilities. SINAC goes beyond conventional protected area systems in several ways. For example, SINAC covers the entire terrestrial territory of Costa Rica, which is divided into ten conservation areas, with one additional marine conservation area (*Área de Conservación Marina Isla del Coco*, see map 3 in Annex 6; this

conservation area overlaps with Cocos Island National Park, likewise a World Heritage property). Furthermore, the primary objective is to create a decentralized and participatory system of spatial management units, which permit an integrated approach to conservation and natural resource management beyond the actual protected areas in the strict sense. National, regional and local councils (*Consejo Nacional de Áreas de Conservación* - CONAC; *Consejos Regionales de Áreas de Conservación* - CORAC, *Consejos Locales de Áreas de Conservación* - COLAC) underpin the administrative organization and governance of SINAC.

While ACG has no formal buffer zone recognized at the national level or under the World Heritage Convention, several privately owned and managed protected areas near the property can be interpreted as de facto buffers along some of the property's boundaries. There are additional legal and policy instruments aiming at buffering edge effects and promoting connectivity conservation, such as SINAC's National Programme for Biological Corridors (*Programa Nacional de Corredores Biológicos* - PNCB).

Officially declared protected areas (legally referred to as *áreas silvestres protegidas* in Costa Rican legislation) enjoy a strict level of legal protection in Costa Rica. Costa Rica established a legal concept known as State Natural Heritage (*Patrimonio Natural del Estado* - PNE), which was originally based on the above-mentioned Forest Law. The inalienable PNE estate includes, but is not limited to, all officially declared protected areas regardless of their categories. Furthermore, the Environmental Law establishes in Article 38 that these protected areas can only be reduced in size by law and based on technical studies justifying such measures. The Law of the National Parks Service dated 1977 (*Ley del Servicio de Parques Nacionales, Ley No. 6084 de 17 de agosto del 1977*), widely credited for pioneering protected area legislation in Latin America, in its Article 8 prohibits a wide range of human activities in national parks, including but not limited to logging, extraction of plants or any other forest products, hunting or capturing of wildlife, including any marine turtle species, harvesting of corals, extraction of rocks, sand, gravel, minerals and fossils, carrying firearms, harpoons, introduction of exotic plant or animal species, livestock grazing, apiculture and environmental contamination. Finally, the law prohibits the construction of linear infrastructure, such as power transmission or telephone lines, aqueducts, roads or railways and any commercial, agricultural or industrial activity. In addition, specific wildlife conservation legislation is applicable within and outside the property, establishing severe sanctions for poaching, wildlife and pet trade etc. (*Ley de Conservación de Vida Silvestre Ley Nº 7317 del 30 de octubre de 1992*; note new regulations dated 2017).

Article 83 of the Environmental Law established the National Environmental Technical Secretariat (*Secretaría Técnica Nacional Ambiental* – SETENA). SETENA is the governmental institution in charge of Environmental Impact Assessments (EIA) and, as such, highly relevant as regards the various projects planned, proposed, under construction or operating in or near the World Heritage property. Private sector infrastructure proposals, such as the so-called Dry Canal discussed in the following chapter, need to comply with legal requirements for concessions for public works with public services (*Ley General de Concesión de Obras Públicas con Servicios Públicos Ley N° 7762 del 14 de abril de 1998*), taking into account corresponding regulations (*Decreto Ejecutivo Nº 31836-MOPT del 10 de junio del 2004*).

ACG, understood here as the complex of protected areas (*bloque protegido*), exceeding the surface area of the World Heritage property, has been evolving over decades (for useful overviews see the official World Heritage nomination dossier and Janzen et al., 2016). In 1966, the *Casona de la Hacienda Santa Rosa* was declared a National Monument (*Ley 3694 del 27 de junio de 1966*), along with some 1,000 ha of land around it, an important starting point of legal land and heritage protection in this part of Costa Rica. The national parks of Santa Rosa and Rincón de la Vieja were subsequently declared, albeit much smaller than today, unconnected and managed separately at the time. Over time, Santa Rosa National Park was expanded on land and sea. Eventually, proposals to considerably expand the still

disconnected protected areas, thereby linking land and sea all the way to the peaks of the mountains, took shape and eventually met with political approval in the mid 1980s. While various land purchases and donations helped create an increasingly large conservation block, negotiations about the conditions of expropriating a large private landholding temporarily delayed the process. In 1991, Guanacaste National Park became the third national park within ACG. The growing size and configuration along an uninterrupted altitudinal gradient made it possible to embark on a coherent management approach beyond individual protected areas, while taking advantage of some differences in management categories. For example, the Experimental Forest Station is not subject to the tight restrictions applicable to national parks. This made it possible to develop and test innovative forest regeneration methods, which have been attracting global attention (see for example Treuer et al., 2017). Today, ACG boasts some 163,000 ha as a protected area complex versus the 147,000 ha formally recognized under the World Heritage Convention. The conservation complex continues to evolve and grow, an explicit objective noted in the World Heritage nomination and confirmed to the mission by senior governmental representatives, managers and involved scientists. Both further extensions and a full harmonization between the nationally and internationally recognized surface area are highly desirable. It is clear that the opportunities to expand the area on land will soon reach their limits. However, the opportunities for marine extensions are substantial.

The management of ACG benefits from, and to a certain degree relies upon, several longstanding alliances, for example with the parastatal non-profit organization *Fundación de Parques Nacionales* (FPN), the US-based Guanacaste Dry Forest Conservation Fund (GDFCF) and numerous other partners and working relationships, including several fire brigades. ACG boasts some 20 administrative units and numerous thematic programmes, dedicated, for example, to research, environmental education, ecotourism, fire management etc. The general management plan for 2014 to 2024 establishes six priorities in terms of conservation values (*elementos focales de manejo*): rain forest, birds, dry forest, cloud forest, coastal-marine ecosystems and historic/cultural resources.

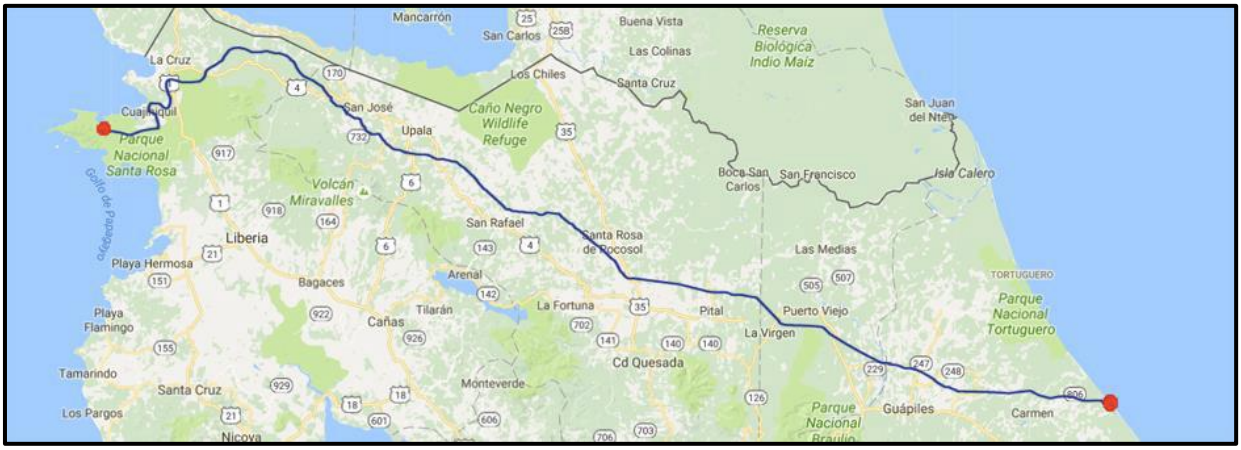
3. IDENTIFICATION AND ASSESSMENT OF ISSUES

3.1 Proposed Infrastructure

3.1.1 The Interoceanic "Dry Canal"

The distance between the Atlantic and the Pacific is relatively small throughout much of the Central American Isthmus. The Panama Canal has been taking advantage of this geography for more than a century. Several competing interoceanic transportation infrastructure projects have since been discussed or proposed in Central America and even Mexico; proposals include actual canals, as well as road and/or railroad corridors, sometimes referred to as "dry canals" in the sub-region.

In Costa Rica, a transportation corridor linking the two coasts has been discussed for at least several decades under the name "canal seco". More recently, a private sector company named CANSEC COSTA RICA CRCRC, S. A. has been actively promoting a concrete project idea and route, which it refers to as the "*Canal Verde Interoceánico de Costa Rica CAN-SEC*".



Proposed location of the so-called “Dry Canal”. **Source**: MOPT press release of 14 November 2016

According to the project profile (*ficha técnica*, see also Map 4 in Annex 6) available on the public website of the governmental National Council for Concessions (*Consejo Nacional de Concesiones* or CNC), which is associated with the Ministry for Public Works and Transportation (*Ministerio de Obras Públicas y Transportes* - MOPT), the proposal can be summarized as follows:

- Design, financing, construction, operation and maintenance of a major transportation corridor of some 320 kilometres for containers and other merchandise consisting of a ten-lane highway and a three lane railroad linking the two coasts;
- modernization of existing port terminals and construction of a new port terminal in Santa Elena Bay in Guanacaste Province;
- estimated budget of USD 16 billion;
- initial stage of project development, in which basic documents are to be verified by CNC to decide upon eligibility as a formally submitted full project proposal.

A press release dated 14 November 2016 issued by MOPT suggests an intention to also develop hydropower in order to establish energy self-sufficiency for the project; moreover, the press release refers to the stated intention to “create 28 communities” (MOPT, 2016). The formal project proposal would trigger a series of procedures determined by the General Law on Concessions and Public Works and Services N° 7762 of 14 April 1998 (*Ley General de Concesiones de Obras Públicas con Servicios Públicos*), modified by Law N° 8643 of 17 July 2008.

The legally defined procedures have the objective to determine the technical, economic and environmental feasibility and possible public interest of private sector projects, compliance with legal requirements and compatibility with the National Development Plan and governmental transportation infrastructure planning etc. According to Law N° 7762 and Executive Decree N° 31836 - MOPT of 10 July 2004, the involvement of the Ministry of Environment and Energy (MINAE) is binding to establish the environmental requirements, including the types of applicable environmental impact assessments (EIA). At the time of writing, MINAE had not been officially informed of, let alone involved in, the formal discussion about the proposed project. Unfortunately, clear and detailed information on the project does not appear to be publicly available.

The technical data publicly available from CNC, as well as maps and project descriptions circulated by the private sector proponent and in the national media suggest that the planned major port terminal be located on the coast within the Santa Elena Bay. The Santa Elena Bay is situated on the northern coast of the Santa Elena Peninsula. The entire coastline of the peninsula is an integral part of Santa Rosa National Park and thus the World Heritage

property. Besides the port terminal, the location would require major access and power transmission infrastructure, which inevitably would have to cross Santa Rosa National Park and thereby the property. While the mission is in no position to comment on the feasibility, desirability and public interest of transportation infrastructure in Costa Rica - and has no mandate to do so - the mission is fully confident that a proposed port and associated infrastructure within the property are obviously incompatible with World Heritage status in addition to being inconsistent with Costa Rican protected area legislation.

MINAE representatives and ACG management made their concerns about the overlap between the proposed route and the property very clear to the mission, consistently emphasizing the absence of any legal basis for such projects within national parks. Costa Rican national park legislation explicitly prohibits any linear transmission and transportation infrastructure or industrial activity within national parks (Article 8, 14/15, *Ley del Servicio de Parques Nacionales*, *Ley 6084, 24 de agosto de 1977*). ACG leadership has publicly pronounced itself on the proposed project accordingly. The President of Costa Rica issued an official press release on 17 November 2016, in which he supported a dry canal per se as a "strategic necessity" for the country. At the same time, the President explicitly stated that no project of this kind would be promoted, which would "affect or hurt Costa Rica's natural heritage", including national parks, protected areas or **World Heritage properties**" (emphasis added).

It deserves to be recalled that an earlier plan to excise an area from Rincón de la Vieja National Park to facilitate geothermal energy development was abandoned in response to massive opposition by civil society, politicians, scientists and even MINAE officials. Against this backdrop, a social license for a major excision from a national park to enable the construction of an industrial port terminal and associated infrastructure is very difficult to imagine even when ignoring the absence of a legal basis. It is even more difficult to imagine such a decision in a country that prides itself on its conservation efforts and has managed to establish itself as a globally renowned nature-based tourism destination.

The unambiguous legal framework and the position of the current government therefore appear to be excluding the possibility of project approval or implementation in the form currently promoted by the private sector proponent. An unexpected change in governmental position would have to be communicated to the World Heritage Committee without delay and would undoubtedly trigger a discussion about the inscription of ACG on the List of World Heritage in Danger. The mission further notes that the only way for the project to proceed within Santa Rosa National Park would appear to be a change of applicable conservation legislation currently in place. As per paragraph 180 b) of the Operational Guidelines (OG), such change of legislation per se would constitute a "potential danger" and, in all likelihood, would likewise trigger an inscription on the List of World Heritage in Danger in its own right. In fact, the decisive paragraph 180 b) explicitly refers to "a modification of the legal protective status of the area" as one of the threats "which could have deleterious effects on its inherent characteristics".

Recommendation 1
The State Party should confirm an unambiguous commitment that the World Heritage property in its entirety is off-limits to industrial development infrastructure, including the so-called Dry Canal and any associated infrastructure.

Recommendation 2
Any change of the current State Party position regarding the relationship between the so-called Dry Canal, or any other industrial development infrastructure, and ACG should be communicated to the World Heritage Committee without delay.

3.1.2 The Inter-American Highway

The direct and indirect impacts of roads in and near protected areas are well documented. They include, but are not limited to, edge effects, disturbance, contamination, run-off, erosion, introduction and spreading of invasive alien species (IAS), road-kill, littering, increased fire risk and access potentially facilitating illicit activities. At the same time, road access can facilitate management, law enforcement and responsible visitation. It is thus surprising that the Inter-American Highway (also known as the Pan-American Highway or Panamericana), bisecting the property, until recently has hardly attracted attention in the formal World Heritage documentation. The World Heritage nomination dossier barely mentions the highway, but the enclosed maps visualize the location of the Inter-American Highway in relation to the then nominated area. The IUCN evaluations of both the original nomination and the subsequent extension make no reference to road infrastructure within ACG.

More recently, key documents have been making reference to the highway, including the current general management plan and the 2017 State of Conservation report produced by the World Heritage Centre and IUCN. The former refers to the highway as a “high risk” to the dry forest and a “medium risk” to the rainforest. Concerns about reported plans to improve and expand the currently undivided two-lane highway triggered the inclusion of the topic in the ToRs of the Reactive Monitoring mission.

It is important to understand that the Inter-American Highway is a fundamental piece of national and regional transportation infrastructure predating the establishment of protected areas in the country. Also known as National Route Nº 1 in Costa Rica, the northern part of the highway links Costa Rica’s capital to Peñas Blancas, the main border crossing to neighbouring Nicaragua, i.e. the road is also relevant from both a commercial trade and security perspective. The regional infrastructure project *Proyecto de Integración y Desarrollo de Mesoamérica* (PM), which builds upon the earlier *Plan Puebla Panamá* (PPP) and is linked to regional free trade agreements, establishes the consolidation of the regional “Pacific Corridor” as a priority objective for the regional road network (*Red Internacional de Carreteras Mesoamericanas* - RICAM). In principle, this includes the 13 km section crossing the property, as well as a slightly shorter section along its boundary further north (see map 1 in Annex 6 and photograph 8 in Annex 7). The currently discussed concrete road enhancement and expansion projects, however, are referring to sections outside of the property and were not active at the time of writing. It deserves to be noted that the highway is accompanied by transmission lines, including within the property where applicable legislation would appear to prohibit such infrastructure.

According to personal communication during the mission, some 2,800 vehicles per day cross ACG on average. Minor security issues related to human migration movements were reported, as well as occasional incidents of poaching and fires along the highway. Langen (2009) investigated the wildlife impacts of roads on Costa Rican national parks, including in ACG. Considerable road-kill was confirmed across a wide range of taxonomic groups, which was confirmed by scientists met by the mission, who are currently investigating road-kill within ACG. One factor appears to be lack of enforcing speed limits. Road-kill of large mammals was found to be relatively scarce in ACG. It is assumed that several culverts permitting small watercourses to pass underneath the highway function as (unintended) wildlife passages. Camera traps have since confirmed the active use of these passages, while also showing that the current design prevents some species from using the passages.

The above study and further, ongoing studies also confirmed that vegetation management along the highway directly influences the intensity and types of road mortality. In some areas, the forest canopy forms a ‘green tunnel’ (*túnel verde*) across the relatively narrow road, enabling wildlife movements of some arboreal species and reducing both the surface area directly disturbed by the removal of vegetation and impacts on micro-climate. At the same time, road mortality for some small mammals, amphibians and reptiles was found to be higher

along the 'green tunnel', probably because the habitat is more attractive to those taxonomic groups than banks cleared of dense vegetation. In other words, there is no simple solution to reducing road-kill, as the behaviour and requirements differ substantially between and among taxonomic groups. Planned investment in the consolidation of the 'green tunnel' is likely to favour some species while increasing road-kill of others and should therefore carefully be assessed prior to decision-making.

There can be no doubt that a possible expansion of the highway in and near the property would increase its impacts. The Transportation Ministry (MOPT) informed the mission that no such project is being planned at this point in time within or along ACG, whereas the improvement of the highway is an explicit objective elsewhere. MOPT representatives pointed out the option to expand National Route Nº 4 just north of the property so as to create an alternative to ground transportation currently dependent on the Inter-American Highway. This alternative, according to MOPT representatives, is technically and economically viable and would considerably reduce traffic traversing the property. From an ACG conservation perspective, this alternative would appear to be highly desirable as far as can be judged by the mission.

As any other road or highway, the Inter-American Highway crossing and bordering ACG results in a physical and behavioural barrier to wildlife movements besides other impacts. It is thus encouraging that conservation authorities are directly communicating with authorities in charge of transportation infrastructure. While there appear to be no current plans to expand the sections of the highway crossing or bordering ACG, the explicit plan to upgrade the highway elsewhere and planned investment in the Peñas Blancas border crossing will eventually turn the section of the highway crossing ACG into a major bottleneck along a route of major national and regional importance. Unless there will be an alternative road, more traffic from both commercial transportation and tourism can be anticipated in line with explicit governmental objectives in these regards. Increased traffic would both increase the impacts and the pressure to upgrade the road. While the current situation is not considered to constitute a fundamental risk to the OUV of ACG including its conditions of integrity, it should not be forgotten that connectivity from 'reef to ridge' is a primary objective and particularity of ACG, which is at odds with a major road bisecting the property. The legally questionable transmission infrastructure along the sections of the highway within and adjacent to ACG should be re-considered and ideally removed and, as a minimum, not be expanded.

The best-case scenario would be to meet the need for transportation infrastructure in a less ecologically valuable and sensitive location. While an assessment is beyond the scope of this report, it is conceivable that the improvement of National Route 4 may offer an attractive solution to reducing the impacts of the Inter-American Highway. Reduced commercial cargo traffic would make it possible to focus on use for touristic and management purposes or even the entire re-modelling of the road as a scenic route within ACG. Regardless of the feasibility of this potential overarching option, a number of activities are encouraged as follows: (i) optimization of existing wildlife passages; (ii) strict control and enforcement of existing speed limits; (iii) consideration of temporal closures in response to seasonal and daily animal migration patterns; and (iv) systematic road impact monitoring. In case the overall plans to upgrade the Inter-American Highway will proceed to include sections crossing or bordering ACG, such a change in position should immediately be brought to the attention of the World Heritage Committee in accordance with Paragraph 172 of the Operational Guidelines, and should undergo Environmental Impact Assessments with a specific assessment of impacts on the Outstanding Universal Value of the property, in line with the IUCN World Heritage Advice Note on Environmental Assessment.

Recommendation 3
All options to reduce the impacts of the Inter-American Highway should be considered, including the improvement of National Road 4 as an alternative route.

Recommendation 4
Any possible future enhancement or expansion of the sections of the highway within and bordering the property should be brought to the attention of the World Heritage Committee in accordance with Paragraph 172 of the Operational Guidelines, and should undergo Environmental Impact Assessments with a specific assessment of impacts on the Outstanding Universal Value of the property, in line with IUCN's World Heritage Advice Note on Environmental Assessment.

3.1.3 Renewable Energy Development

Costa Rica's energy matrix almost entirely draws on renewable energy sources, primarily hydropower. Wind and geothermal energy and, to a lesser degree, biomass and solar energy further contribute to the matrix. While this remarkable particularity is often lauded on environmental grounds, it is also clear that renewable energy development is not environmentally neutral and routinely clashes with other environmental and conservation objectives. Renewable energy development in the vicinity of ACG has been raising corresponding questions for years. It is important to remember that energy and environment are under the roof of a single ministry in Costa Rica (MINAE), ideally an advantage to find common ground between the partially competing and partially overlapping objectives of nature conservation and the promotion of renewable energy.

3.1.3.1 Geothermal Energy

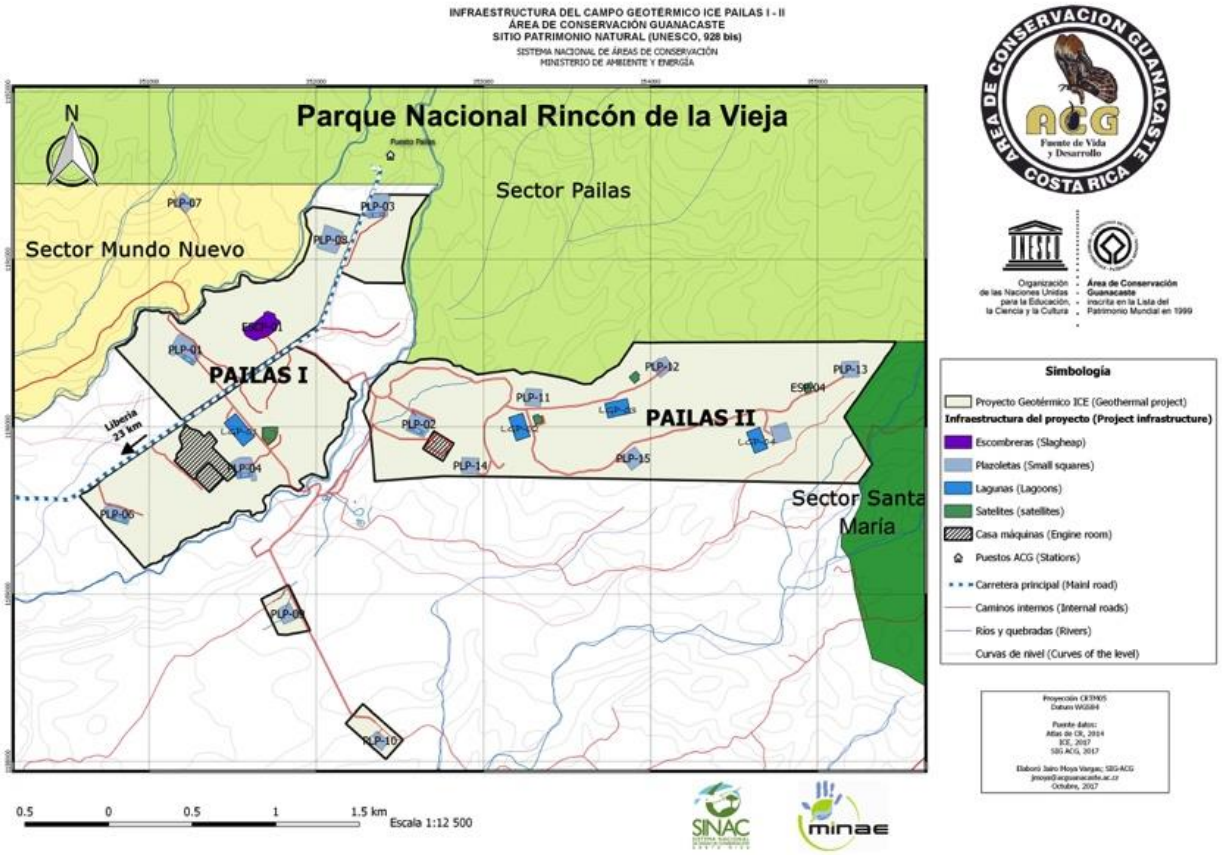
Costa Rica's numerous volcanic complexes have major geothermal potential, the development of which is the mandate of the autonomous governmental Costa Rican Electricity Institute founded in 1949 (*Instituto Costarricense de Electricidad* - ICE). A specific law defines ICE's exclusive and far-reaching mandate and responsibility (*Ley No. 5961 - Facultad del Instituto Costarricense de Electricidad para la Investigación, Exploración y Explotación de los Recursos Geotérmicos del País de 6 de diciembre de 1976*).

Many of the country's volcanic complexes, however, fully or partially overlap with national parks and/or other formally established protected areas (*áreas silvestres protegidas*), i.e. national legislation prohibits industrial development and transmission infrastructure in those locations. ICE's strong mandate thereby often spatially coincides with strict nature conservation legislation. This dilemma became most obvious in the Rincón de la Vieja volcanic complex when ICE put forward a proposal to excise more than 1,000 hectares from the Rincón de la Vieja National Park to enable geothermal development. The area under consideration is located in the Las Pailas Sector in the southeast of ACG and inside the World Heritage property. The proposal met with fierce opposition, peaking around 2013, and eventually had to be abandoned in the originally proposed form.

Beyond the local setting, opponents argued that any excision from the legally inalienable protected area and PNE estate would set a problematic precedent in terms of opening the door to renewable energy and possibly other development inside the country's renowned national parks and other protected areas. While it is clear that any excision would have required full consideration by the World Heritage Committee, it appears that the debate never reached adequate attention of the World Heritage Centre, IUCN or the World Heritage Committee. The mission was informed that the Government of Japan, which is involved in funding geothermal development in the Rincón de la Vieja volcanic complex and elsewhere in Costa Rica via substantial loans, was likewise uncomfortable with the excision of a part of the national park and World Heritage property due to internal policies and reputational risks, which reportedly also influenced decision-making. In this context, the Government of Japan reportedly also agreed to fund research projects in ACG.

Eventually, no physical excision of any part of the national park or World Heritage property took place. Nevertheless, there continues to be an urgent need to understand the impacts and

formal implications from the perspective of the World Heritage Convention. As visualized below, both the Las Pailas I and II geothermal projects are located in the immediate vicinity of Rincón de la Vieja National Park and thereby the property.



Map A: Location of the Pailas I and II geothermal projects and the Las Pailas, Santa Maria and Mundo Nuevo Sectors. Note that all shown sectors are part of ACG as defined in Costa Rica. The Las Pailas and Santa Maria Sectors are integral parts of the inscribed property, whereas the Mundo Nuevo Sector is not. **Source**: Courtesy of the State Party.

The large, already operating Pailas I and II plants literally reach to the boundary of the property, which is fenced in this location. Horizontal drilling techniques used at Pailas II tap on geothermal resources underneath the property, which, according to State Party representatives, is legally permitted in Costa Rica. While there are examples of horizontal drilling (on land and off-shore) tapping into resources “underneath” World Heritage properties elsewhere, no specific World Heritage Committee position is on record in terms of sub-surface development using horizontal extraction methods. The situation can thus best be described as a grey area. The decisive yardstick, however, should be the impacts on OUV, for which clear guidance is readily available.

In the case of ACG, there is no evidence that the environmental impact assessments (EIA) considered the potential impacts on the OUV of the property prior to construction and operation of geothermal plants, e.g. stemming from noise and light disturbance, water use, possible soil and water contamination etc. It is strongly recommended that the State Party assess such potential impacts and engage in systematic monitoring in order to inform the best possible management and, if required, mitigation. It deserves to be noted that the general management plan currently in place does not provide any guidance in terms of geothermal development beyond noting that geothermal development may pose a “high threat” to the rainforest within ACG. Accordingly, the general management plan should be amended in this regard to integrate the findings of pending analysis. The eventual development of systematic Payment for Environmental Services (PES) in order to promote long-term financing /

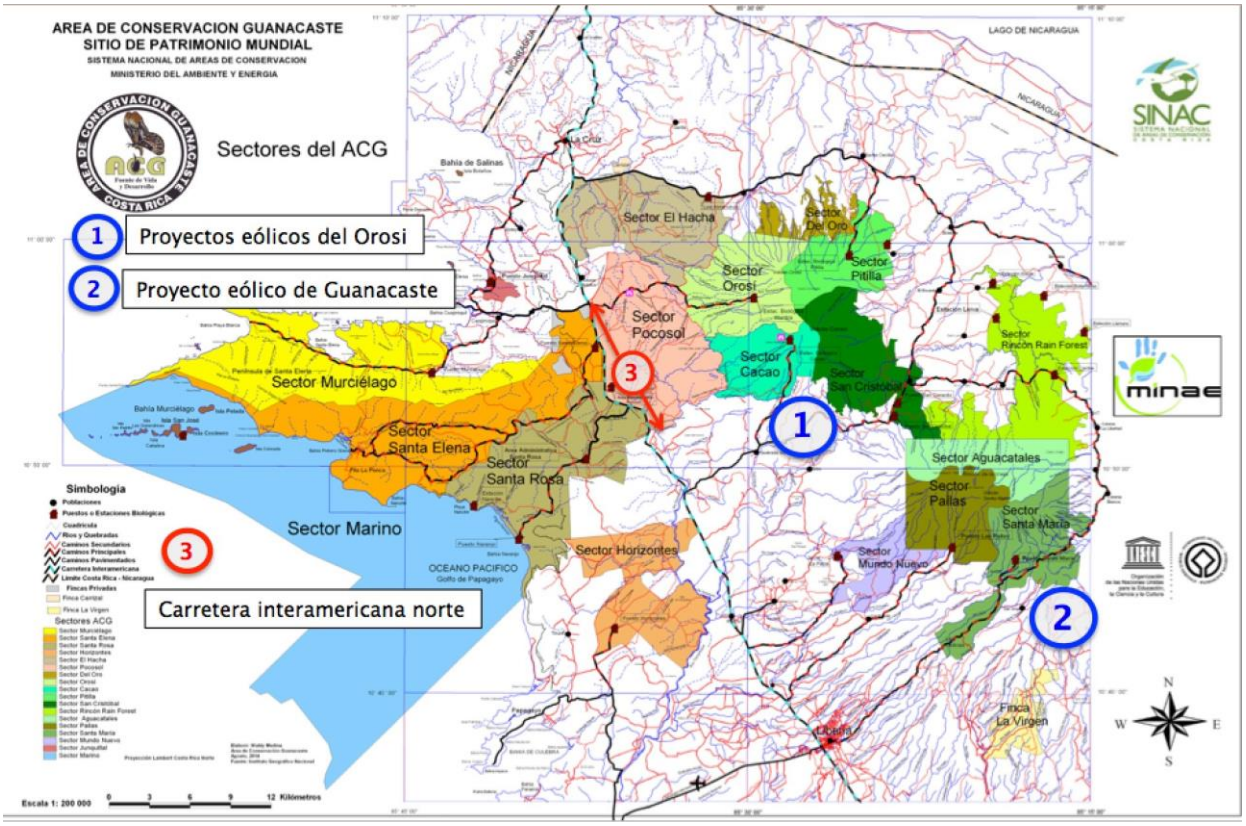
compensation mechanisms rather than support individual research projects is recommended building on an existing cooperation agreement between SINAC and ICE.

As per routine procedure, any new project proposals or expansion of existing geothermal projects should undergo comprehensive EIAs specifically taking into account World Heritage status in accordance with IUCN's World Heritage Advice Note on Environmental Assessment. A case in point is the Borinquen geothermal development in the Mundo Nuevo Sector, just south of the Rincón de la Vieja National Park and the property, where further geothermal development, including pipelines, access and transmission infrastructure, is under current planning.

The location of various major geothermal developments in the immediate vicinity of ACG raises the question of a buffer zone. As per paragraph 103 of the Operational Guidelines "an adequate buffer zone should be provided" wherever "necessary for the proper protection of the property". ACG lacks a buffer zone, which will be discussed in chapter 3.3 below. As the recommendations in terms of geothermal development are in principle identical to any other renewable energy development within or near the property (avoidance of infrastructure within the property, EIAs taking into account OUV elsewhere), no specific recommendations are offered here. Rather, they are included in recommendations 1 and 2 above and the overarching recommendations 4 and 5 below, which are applicable to all renewable energy development.

3.1.3.2 Wind Energy

State Party information provided to the mission noted two wind parks in the immediate vicinity of ACG named Orosi and Guanacaste (see Map B). Both projects are developed and operated by private sector companies. During the mission several additional projects near ACG were mentioned, including Vientos de Miramar, La Perla, Altamira and Campos Azules, some of which were sometimes jointly referred to the Alisios Wind Farm project. The exact locations, status and ownership of possible additional projects could not be determined within the scope of the mission, as online information contains important inconsistencies. Ownership structures appear to be complex and dynamic due to the involvement of national and international companies and investors. Given that private sector representatives consistently emphasized the attractiveness of the location and their interest in further developing wind power near ACG, it can reasonably be assumed that the discussion about wind power development and its relationship to ACG should not be restricted to the Orosi and Guanacaste projects.



Map B: Location of the Orosi (1) and Guanacaste (2) wind energy projects south of ACG. Note that the map also shows the location of the Inter-American Highway (3). **Source**: Courtesy of the State Party.

Public concerns commonly associated with operating wind turbines are visual and (aerodynamic and mechanical) sound impacts. Visual impacts are to a certain degree subjective, as wind turbines are perceived as aesthetic by some, while others perceive them as intrusive modifications of natural and cultural landscapes. It should not be forgotten, however, that associated access and transmission infrastructure can hardly be described as a contribution to landscape aesthetics. Wind turbines next to World Heritage properties inscribed according to criterion (vii), which speaks to “exceptional natural beauty and aesthetic importance” in addition to superlative phenomena, are likely to constitute an unacceptable visual modification depending on their location.

The wind turbines and associated infrastructure of the Orosi and Guanacaste projects undoubtedly change the visual landscape aesthetics and interfere with impressive views of various volcanoes, which are key features of ACG. However, given that ACG was not inscribed according to criterion (vii), there is no obvious World Heritage case against wind energy development outside of the property on the grounds of visual impacts. It remains to be seen how visitors seeking the experience of a renowned protected area will respond to the growing renewable energy infrastructure. The same holds true for noise impacts, which likewise take away from the visitor experience of a natural landscape. Otherwise, noise impacts occurring outside of the property do not obviously amount to non-compliance with World Heritage expectations in the view of the mission. The perception of the wind power development by local communities could not be assessed within the scope of the mission.

The impacts of wind energy on biodiversity are well documented but poorly understood in detail. AWWI (2017) and Arnett et al. (2016) provide useful overviews of available research and information gaps. Fully acknowledging the multiple benefits of wind power development, in-situ conservation considerations include the following:

- Wind energy development affects biodiversity through direct mortality and indirectly through impacts on habitat structure and function;

- scale, location and type of infrastructure strongly influence the impacts, which makes it difficult to generalize and provide generic guidance. At the same time, siting based on in-depth local analysis is one important approach to reduce impacts;
- fatal collisions of birds and bats with rotating turbines and towers are common, but the impacts at the population level remain unclear and depend on the species and a complex web of other factors;
- barotrauma resulting from turbine blades rapidly altering air pressure can fatally injure bats;
- bats appear to be affected more strongly than birds, leading to the hypothesis that some bat species may be attracted to wind turbines, for example by insect concentrations near turbines triggered by habitat modifications and light;
- Arnett et al. (2016) refer to the paucity of data in Mexico, Central and South America as “alarming”;
- several Latin American and Caribbean bat species are known to form large aggregations in caves and fly exceptionally long distances at high altitude to foraging areas. There is evidence from Puerto Rico that such behaviour may render certain species particularly vulnerable to wind turbines when those are located along their commuting routes.

While the available information on birds and bats is unsatisfactory at best, especially in Latin America, the impacts of wind energy development on insect populations is hardly understood at all, let alone the secondary impacts on pollination, plant communities, predators etc. Furthermore, the additional impacts stemming from road and transmission infrastructure have to be taken into account when assessing the impacts of wind power. While there is no indication of any plans to consider wind power infrastructure within the property, the mission was informed that such infrastructure is planned for the Mundo Nuevo Sector of ACG, as nationally defined as the *bloque protegido*. The mission recommends the consistent avoidance of such infrastructure within the entire *bloque protegido*.

The mission had the opportunity to visit one operating wind park next to the Cacao Volcano, *Parque Eólico Orosi*, which was commissioned in 2015. The private sector operator reported to be engaged in standard environmental management, including monitoring and additional Corporate Social Responsibility (CSR) activities. Despite the proximity of the wind park to a World Heritage property inscribed under natural criteria (ix) and (x), i.e. according to biodiversity values, no considerations for the World Heritage status appear to have been given in the project development. Applicable EIAs were conducted but without taking into account the extraordinary biodiversity importance of ACG.

It is regrettable that the now operating projects were not communicated to the World Heritage Committee at the proposal stage so as to consider possible implications under the World Heritage Convention. Accordingly, there was no known effort to attempt to understand the possible impacts on the OUV of ACG. Another consequence is the lack of pre-construction and pre-operation baseline data, which would be needed to permit detailed impact monitoring. It is similarly regrettable that the current general management plan for ACG makes no reference to the growing wind power infrastructure beyond an isolated reference generically suggesting “low risks”.

Following the logic of the mitigation hierarchy commonly used in EIA processes, avoidance is obviously not an option for the operating projects. Options for minimization and rehabilitation should undergo the best possible assessment and monitoring to understand and inform mitigation options. Monitoring bat, bird and insect fatality and activity data can guide some mitigation activities. The operator of the visited project indicated willingness to cooperate with conservation authorities and researchers.

As in the case of geothermal development, any new projects should undergo comprehensive EIA specifically taking into account World Heritage status in accordance with IUCN's World Heritage Advice Note on Environmental Assessment. The location of proposed infrastructure is a major factor determining impacts. It is clear that sites, which are **not** located next to world-class biodiversity areas should be preferred whenever possible. Avoidance is an option if proposed locations are found to coincide with important wildlife migration corridors, such as seasonal bird migrations and routes between bat caves and foraging areas etc.

There is some evidence that operational mitigation can reduce impacts on wildlife. For example, bat mortality caused by turbines appears to peak during relatively low-wind conditions. Experiments could show that increased cut-in speed of turbines (wind speed at which turbines begin producing electricity into the power grid) can significantly reduce bat mortality (Arnett et al., 2016). Similarly, recent research in North America suggests that bird migration forecasts based on radar data, observer sightings and regional weather reports (see http://birdcast.info/scientific-discussion/a-primer-for-new-migration-forecast-tools-from-birdcast/) can warn operators and enable them to shut down turbines during migration peaks.

The conflicts between wind power development and nature conservation are certain to increase in ACG and Costa Rica more broadly - at a time when very limited information is available in the country and region. The State Party and the private sector operators have an opportunity to start addressing the striking information gaps and setting standards in ACG.

3.1.3.3 Hydropower

Both the governmental State of Conservation report dated 2016 and the current general management plan refer to hydropower development as a possible threat to ACG. The former lists hydropower as one of several "other possible developments outside the property requiring careful balancing between negative impacts and benefits". The latter provides a more nuanced consideration by referring to possible hydropower development as a "very high threat" and proposing the strategic development of a contingency plan to prevent hydropower projects from harming propriety conservation values.

While information formally provided by the State Party makes no reference to concrete project ideas or proposals, several colleagues consulted during the mission consistently made reference to apparent ideas to develop hydropower on the Río Cucaracho outside ACG. As outlined above, Costa Rica's conservation legislation prohibits any such infrastructure within protected areas. Therefore, it seems unlikely that such projects could ever reach the implementation stage within ACG. In addition, the World Heritage status adds a layer of protection in this regard. Even if the location of such projects were to be outside of the property, any new projects should be brought to the attention of the World Heritage Committee and undergo comprehensive EIA specifically taking into account World Heritage status in accordance with IUCN's World Heritage Advice Note on Environmental Assessment.

3.1.3.4 Patterns, Implications and Recommendations

Despite the obvious differences between the various renewable energy sources, there are also similarities in terms of applicable considerations and assessments, including under the World Heritage Convention. Unfortunately, projects next to ACG have been developed and approved without assessing any potential impacts on the OUV of the World Heritage property in their EIAs. In all cases, EIA appear to focus on individual projects, thereby failing to capture and assess cumulative impacts of the growing renewable energy infrastructure near the property. The mission therefore offers the following recommendations to be applied to all renewable energy development near ACG, while noting that recommendations 1 and 2 are likewise applicable.

Recommendation 5
All existing renewable energy projects within the wider Conservation Area should systematically monitor possible impacts on the Outstanding Universal Value of the property as an integral part of management and mitigate any such impacts, as required.

Recommendation 6
Details of any new renewable energy project proposal within the wider Conservation Area of the property should be submitted to the World Heritage Centre in accordance with Paragraph 172 of the Operational Guidelines, and be subject to an Environmental Impact Assessment with a specific assessment of impacts on the Outstanding Universal Value of the property, in line with IUCN's World Heritage Advice Note on Environmental Assessment.

Recommendation 7
Consider integrating World Heritage requirements into the legal and policy framework governing impact assessments.

Recommendation 8
Undertake a Strategic Environmental Assessment (SEA) for the entire Conservation Area including the property, in order to assess the cumulative impacts of expanding renewable energy developments on the OUV of the property, including its conditions of integrity, and to better balance conservation with competing land use interests.

3.2 Governance and Management

Both Costa Rica and ACG boast several particularities in terms of governance and management. As noted, Costa Rica's entire land territory is legally divided into conservation areas. In its biodiversity law (*Ley de Biodiversidad Ley N° 7788 del 30 de abril de 1998*), Costa Rica has devised a three-tier administrative approach to encourage stakeholder involvement and intersectoral coordination at the national, regional and local levels for its entire national conservation area system SINAC. At each level, councils are created as an integral part of administering conservation areas (*Consejo Nacional de Áreas de Conservación* - CONAC; *Consejos Regionales de Áreas de Conservación* - CORAC, *Consejos Locales de Áreas de Conservación* – COLAC).

An assessment of the effectiveness of the approach is obviously beyond the scope of this report. Nonetheless, the mission wishes to put on record opinions shared by several colleagues met by the mission. While the administrative governance approach and structure of SINAC was widely considered exemplary from a conceptual perspective, implementation gaps were consistently suggested. Concretely, it was argued that the councils only partially lived up to their ambitious, legally defined roles, including due to funding constraints. It was consistently suggested that the local (COLAC) and regional (CORAC) councils could and should be more dynamic. The mission respectfully notes that the private sector representatives of the visited wind park appeared to be unaware of the existence of a regional council, which, if accurate, suggests that CORAC did not have a meaningful voice in the discussion about the appropriateness of the development of major infrastructure next to ACG. This would be regrettable, as a legally established regional council could serve as an ideal forum to discuss infrastructure development near exceptionally valuable protected areas. Article 30 of the aforementioned biodiversity law defines one of several functions of ROLAC as follows: "(…) to encourage the participation of the different sectors of the area in the analysis, discussion and the search for solutions to the regional problems related to natural resources and the environment."

At the same time, ACG is noteworthy for the highly effective association of a protected area administration with scientists and other national and international non-governmental actors. ACG's journey from small, disconnected national parks to a large, coherent conservation complex is exemplary in many ways. The coincidence of several factors made this possible,

including: (i) exceptional personal dedication of staff and conservation allies; (ii) slow staff turn-over permitting leadership and senior staff to develop deep knowledge and relationships with the area and local actors; (iii) direct, long-term linkages between science and management; (iv) willingness, ability and political clout to engage in experimental approaches, such as unorthodox forest restoration methods; (v) leverage of significant extra-budgetary funding to permit land purchases and numerous other activities; and (vi) considerable investment in communication and environmental education. The mission strongly encourages the State Party to share the encouraging story and lessons learned in the international World Heritage arena, a largely untapped potential.

The general management plan, the 2016 governmental State of Conservation report to the World Heritage Committee and a recently conducted management effectiveness assessment (MINAE/SINAC, 2016) elaborate on the many conservation challenges ACG is facing. The latter resulted in an overall ranking of ACG as "somewhat acceptable" (*poco aceptable*). The main challenges are briefly listed and discussed below, to the degree possible in order of the ToRs, to comprehensively document challenges on the occasion of the first ever Reactive Monitoring mission to the property. Many of the challenges listed below are well known from most, if not all, protected areas in the region.

While none call the OUV of the property into question, they jointly affect the integrity of ACG and require permanent management responses. As noted in the 2016 management effectiveness assessment, the overarching concerns are under-funding and under-staffing despite significant external funding. It appears that the institutional presence is not evenly spread across the large property. It was argued by several colleagues consulted by the mission that there was a direct relationship between presence of staff of ACG and partners, including researchers on the ground, and management effectiveness. The promising situation of Santa Rosa National Park, a longstanding focus of management and research seems to confirm this view. Accordingly, a more consistent management presence across the entire ACG was plausibly recommended. It is clear that adequate and reliable funding is required to make this a reality. As an overarching recommendation the mission therefore wishes to emphasize the importance of securing adequate and reliable funding. For example, the potential of Payment for Environmental Services (PES) schemes remains to be realized more strategically and systematically, including water provision, tourism and recreation and perhaps geothermal resources underneath ACG. Given that Costa Rica boasts three extraordinary natural World Heritage properties, reportedly facing overlapping challenges, a coherent initiative to highlight the global importance of these national treasures is required.

Recommendation 9
Consolidate and diversify conservation financing strategies, including through Payment for Environmental Services (PES) schemes and negotiation with renewable energy actors.

Recommendation 10
Develop a coherent approach to the conservation of all three natural World Heritage properties in Costa Rica as a flagship conservation initiative to address overlapping challenges.

Forest Fires
One can only speculate about the role fires played in the ecology of the Pre-Columbian landscape, which was markedly distinct from ACG today. Over the last decades, active fire suppression has been critical in supporting natural regeneration and active forest restoration. Today, the general management plan refers to fire as an overall high threat and a very high threat to the dry forests. ACG has a well-structured capacity to respond to wildfires bringing together various governmental actors and volunteers. The governmental State of Conservation report dated 2016 singles out fire management as a rare programme able to strategically address and prevent threats rather than simply reacting to threats. Fire

management should go beyond ensuring fire suppression capacity by further investing in a better understanding of the role of fire in the landscape, which is constantly changing even when disregarding the observable and anticipated effects of climate change.

Illegal Resource Extraction, including Poaching and illegal Fishing

According to the general management plan, illegal water abstraction within and near the property for agricultural use, poses a very high threat to both the dry and humid forests. The plan plausibly proposes an inter-sectoral approach to address the challenge, bringing together education and more effective law enforcement.

Despite a strict legal framework (*Ley de Conservación de Vida Silvestre Ley Nº 7317 del 30 de octubre de 1992*), poaching and wildlife trade are recognized as high threats in the general management plan. Several of ACG's parrot species are vulnerable to poaching for the national and international pet trade, the best-known example being the Yellow-naped Amazon (*Amazona auropalliata*, endangered according to the IUCN Red List, see BirdLife International, 2017 and Wright et al., n.d.). As in the case of illegal water abstraction, a combination of law enforcement and education involving several sectors seems to be the most promising avenue forward for this regionally common challenge. State Party representatives expressed optimism about the expected effects of recently revised regulations of the above wildlife conservation law. It was widely acknowledged that the evolving legal framework will have to be accompanied by a change of culture promoted by education. Several colleagues consulted by the mission considered the current law enforcement capacity to be low but increasing. On an encouraging note, ornithologists familiar with Yellow-naped Amazon populations in ACG argued that important breeding sites of the species are too difficult to access and are thus naturally protected.

As other aspects of management, State Party representatives openly acknowledged that illegal fishing remains to be systematically addressed. In the blunt wording of the general management plan, overfishing is a "very high threat" due to a "lack of management". The mission was credibly informed that even commercial sport fishing operators continue to access strictly protected zones. While it is too early to judge, it will be interesting to juxtapose the effectiveness of the strictly protected marine areas within the property with the recently established *Área Marina de Manejo Bahía Santa Elena*, which permits controlled access to local resource users.

Olive Ridley Turtles

According to the general management plan, four species of marine turtles have been documented in ACG, including small numbers of nesting Leatherbacks (*Dermochelys coriacea*, vulnerable (VU) according to the IUCN Red List). The arguably most stunning wildlife spectacle occurring in ACG is probably the mass nesting of Olive Ridley (*Lepidochelys olivacea*) at Playa Nancite. Scientists witnessed a major mass nesting event (*arribada*) at Playa Nancite in the early 1970s, which subsequently attracted international scientific and media attention. To give an idea of the order of magnitude, Valverde et al. (1998) noted 148,000 nesting females in October 1980 alone. Subsequently, the phenomenon was among the many arguments brought forward in support of a case for World Heritage status - even though even larger *arribadas* are known from other beaches, such as Ostional, and despite sharp declines of nesting females prior to the World Heritage nomination.

Systematic monitoring at Playa Nancite since 1980 enabled the detection and detailed documentation of an extremely dramatic decline of the *arribadas* starting in 1983 according to Valverde et al. (1998). The drastic decline triggered scientific and popular interest in the reasons, including speculation about excessive egg exploitation. This appeared plausible as commercial over-exploitation of both turtles and eggs is assumed to be one factor of the overall decline of the species in the Eastern Pacific (see Abreu-Grobois et al., 2008). However, Nancite Beach is not easily accessible, neither from land nor sea. The management

of the beach was consistently and credibly described as effective over the last decades. While egg exploitation may occasionally occur at Playa Nancite, it can be excluded as a factor leading to a massive and abrupt decline of mass nesting assemblages. Large cats, coyotes, racoons and numerous bird species prey on eggs and hatchlings, with jaguar and puma preying also on the adult turtles. Researchers consulted by the mission and ACG staff highlighted the ecological importance of this interaction between land and sea, while rejecting the possibility that natural predators might significantly contribute to sharp and sudden declines of nesting Olive Ridleys at Playa Nancite.

Researcher Luis Fonseca personally met with the mission to share his findings and cautious conclusions (see also Fonseca et al. 2017, 2009). Fonseca and his team were able to document what they refer to as a "downward but stable trend" from 1971 to 2007 amounting to a 90% reduction in the number of nesting females. More recent data, according to these researchers, show a "low, but stable point" with signs of a beginning recovery. While acknowledging uncertainty and pointing out that population dynamics of marine turtles are poorly understood, these authors assume that the numbers of nesting females may reach substantially larger numbers again in the near future.

Olive Ridleys are exposed to numerous threats at all life stages at nesting beaches, along migratory routes and in pelagic foraging zones across vast geographic expanses. The following overview drawing on Abreu-Grobois et al. (2008) give an idea of the complexity:

- Targeted exploitation includes egg harvesting and commercial use of adult turtles for meat and skins. While Olive Ridley turtle fisheries are closed in the Eastern Pacific, illegal take of adult turtles continues to occur widely;
- incidental take in commercial fisheries occurs in trawl fisheries, longline fisheries, purse seines, gill net and other net fisheries and hook and line fisheries worldwide;
- along the coasts of Central America, incidental take in shrimp trawls has been estimated to exceed 60,000 turtles per year, most of which are Olive Ridleys;

Furthermore, El Niño events appear to influence nesting behaviour. The sharp reduction in nesting females at Playa Nancite was not observable on nearby beaches in Nicaragua, which are probably used by the same meta-population. This illustrates that there are no simple explanations. It is clear that marine turtle conservation must go beyond effective protection of nesting beaches. At the international level, Olive Ridley has been moved to Appendix I species under the Convention on International Trade in Endangered Species (CITES) and is also protected under the Convention on Migratory Species (CMS) and the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC).

The mission is in no position to explain the reasons for the drastic past declines of nesting females of Olive Ridley at Playa Nancite. The mission is confident though that the declines are not a function of local management shortcomings. The only advice the mission can give within its scope and mandate is to continue to systematically monitor the *arribadas* and protect them from human exploitation and inappropriate visitor behaviour, while continuing the broader marine turtle conservation efforts at the national and international levels.

Climate Change

Increasing water stress was typically highlighted when the mission asked about the expected local consequences of anticipated climate change. In the longer term, water stress may lead to the vanishing of the cloud forest according to scientists with longstanding experience in ACG. While site level management interventions are obviously limited by the very nature of the challenge, many of the ongoing management efforts contribute to adaptation, for example the highly effective forest restoration efforts. The intended reduction of illegal water abstraction by stepping up law enforcement has the potential to contribute to at least buffering the effects of water stress.

Human-Wildlife Conflict

Livestock predation by jaguars and pumas is well documented within ACG, causing conflicts including retaliation killings, as is common in comparable settings. Research and management efforts are underway to address these conflicts by reducing the vulnerability of livestock to predation. To the knowledge of the mission, there is no indication that these conflicts might threaten the local populations of the felid species under consideration of severely affect the relationship between conservation authorities and local communities. Efforts made to better understand and address the conflicts should be maintained.

Invasive Alien Species (IAS)

To the knowledge of the mission, there is no evidence of IAS posing fundamental threats to the overall integrity of ACG. The most visible change induced by IAS is caused by the various species of exotic grasses introduced to improve cattle pastures. Such grass species continue to be ubiquitous even though their active promotion within the property has long come to an end. The grasses undoubtedly have many direct and indirect effects, for example as regards the fire ecology of vast areas. As the forests regenerate within ACG, exotic grass is successively disappearing. Another example of IAS impacts occurs on the chain of small near-shore islands belonging to Santa Rosa National Park and the property (*Islas Murciélagos* or Bat Islands), which is reportedly infested by non-native rodents. These harm the fragile native vegetation and in all likelihood affecting nesting seabirds and marine turtles through egg predation and should ideally be eliminated, while preventing new infestations.

Marine Water Contamination

The mission was repeatedly made aware of alleged water contamination stemming from inadequate solid waste and wastewater management associated with coastal / tourism development south of the property. The current general management confirms the reports, referring to the situation as a “high threat”. While the mission is in no position to verify or judge the situation, it wishes to put the credible and consistent allegations on record for the State Party follow-up as required.

3.3 Spatial Configuration, Connectivity and Buffer Zones

ACG has been systematically growing over several decades into a conservation complex restoring and re-connecting remarkable ecosystem diversity on land and sea along an almost uninterrupted altitudinal gradient. The ongoing initiative has been and continues to be visionary in many ways. The spatial discrepancy between the formally inscribed property and the larger “protected block” (*bloque protegido*) appears to be unhelpful, especially as the same name is applied to both. The mission strongly recommends the full harmonization of the boundaries, for which the straightforward procedure of a minor boundary modification according to paragraphs 163, 164 and Annex 11 of the Operational Guidelines appears appropriate. The mission appreciates that it may not be possible to achieve full harmonization between the two different configurations overnight, for example because consent of private landowners will be required in some cases. In other cases, some consulted by the mission were concerned about possible restrictions of experimental conservation and restoration approaches. In the view of the mission, these are legitimate pre-conditions and concerns. They can be met and addressed though and the benefits of harmonizing the spatial configuration will outweigh the investment.

Recommendation 11

Encourages the State Party to harmonize the boundary of the property with the management unit of the larger “protected block” of the same name, and submit a Minor Boundary Modification for approval by the Committee.

Compared to many protected areas in the world, the spatial scale and configuration of the property is exemplary. Nonetheless, the property continues to have some potential for further

extension, which is an explicit management objective. The potential on land is limited, as most high-conservation value land is under governmental or private protection already - and also due to currently prohibitive land prices. Several colleagues consulted suggested a maximum of some 20,000 ha of land, which could potentially be added to ACG. The potential areas are known to ACG staff and researchers based on longstanding fieldwork. Systematic guidance is also readily available from national level gap analyses identifying unprotected conservation priorities. The State Party should continue to take advantage of emerging opportunities to add land as long as adequate management can be ensured.

Recommendation 12
Encourages the State Party to explore the feasibility of incorporating unprotected land of high-conservation value adjacent to the property, in line with readily available guidance from priority-setting exercises.

The potential for marine extensions of ACG is widely considered to exceed the potential on land. This is because the configuration, management and law enforcement of the marine areas lags behind the terrestrial conservation efforts and achievements. While the schematic boundaries of the marine parts of Santa Rosa National Park capture highly diverse and valuable and areas, their configuration is not a function of meaningful prior analysis of conservation values, migration patterns, sensitive reproduction sites etc. In fact, along much of the rugged coastline of the Santa Elena Peninsula, the adjacent sea and most of the ecologically valuable bays are not protected at all and reportedly subject to poorly controlled commercial and sport fishing. There is much room for a more ambitious and comprehensive marine conservation approach, building upon the recent declaration of a new marine protected area in a major bay of the Santa Elena Peninsula (*Área Marina de Manejo Bahía Santa Elena*), previously identified as a gap in the coverage of marine conservation priorities. Note that this new marine protected area (MPA) covers the entire bay extending around the proposed location of an industrial port terminal (see 3.1.1).

Contrary to the confrontational approach excluding local resource users from the marine parts of Santa Rosa National Park, the establishment of the Santa Elena Bay Marine Management Area was consistently described as an encouraging milestone following a negotiation process involving local resource users. While the new MPA is still in its very infancy, it is expected to breathe new life into the marine conservation approach and the relationship between conservation authorities and local communities. The inclusion of the new MPA into the property can and should be formalized via a minor boundary modification, the very same procedure outlined above for terrestrial extensions. The procedure would involve additional actors, including local resource users, the Coast Guard, as well as the Costa Rican Fishery and Aquaculture Institute (*Instituto Costarricense de Pesca y Acuicultura* - CONAPESCA).

Recommendation 13
Encourages the State Party to consider the incorporation of the newly designated Bahía Santa Elena Marine Management Area into the property via a minor boundary modification.

The Costa Rican legal and policy framework determines high standards in terms of the integration of formally protected land and sea into the wider landscape and seascape. This includes the decision to divide up the entire land territory and some marine territory into “conservation areas” and the establishment of SINAC as an institution explicitly aiming at conservation beyond individual protected areas and even protected area systems, as conventionally understood. The more recent National Programme for Biological Corridors (PNCB) is another attempt to promote connectivity conservation and balance conservation and other societal objectives at the landscape level. However, it was consistently communicated to the mission that much remains to be done to realize the full potential of the exemplary legal and policy framework. Resources allocated to management of the formally protected area (*bloque protegido*) are stretched, leaving little room for integrating conservation considerations into the wider landscape and seascape. Accordingly, the general management

focuses on the *bloque protegido*, while paying limited attention to the agricultural landscape (*agropaisaje*) and wider marine area around it. Eventually, management planning should become more comprehensive and explicitly address the integration of formally protected areas into broader land and resource planning. The mission was informed that similar efforts are underway in the Área de Conservación Arenal Tempisque (ACAT) just south of ACG, using the elaboration of a master plan beyond the formally protected areas (*Plan Maestro*) as a planning framework. While the analysis of that process is beyond the scope of the mission, the experience deserves to be considered, as it may offer lessons for ACG. Simultaneously, strengthening ACG's regional council (CORAC) would improve the options to integrate ACG into the wider landscape and seascape.

The mission is fully aware that buffer zones are not a legal figure in Costa Rica. However, this is very common; in fact, very few countries have a legal framework for the formal declaration of buffer zones. This should not prevent State Parties to the World Heritage Convention to define functional buffer zones around World Heritage properties as determined in paragraphs 103 – 107 of the Operational Guidelines. For ease of reference, the full text of paragraph 104 is quoted hereafter to give a sense of the understanding of buffer zones under the Convention and corresponding requirements: "For the purposes of effective protection of the nominated property, a buffer zone is an area surrounding the nominated property which has complementary legal and/or customary restrictions placed on its use and development to give an added layer of protection to the property. This should include the immediate setting of the nominated property, important views and other areas or attributes that are functionally important as a support to the property and its protection. The area constituting the buffer zone should be determined in each case through appropriate mechanisms. Details on the size, characteristics and authorized uses of a buffer zone, as well as a map indicating the precise boundaries of the property and its buffer zone, should be provided in the nomination."

Under the World Heritage Convention, buffer zones are formalized via the procedure of a minor boundary modification, unless already formalized at the time of inscription. Buffer zones are not formally part of World Heritage properties but understood and expected to contribute to the effective management and conservation of properties.

Similar considerations are applicable to the marine areas. Marine Spatial Planning (MSP) could and should be used to be able to plan beyond the current marine portion of Santa Rosa National Park, taking advantage of information and methods unavailable at the time of the creation of the national park. A marine buffer zone is likewise recommended. Recent progress in the resolution of an international marine border dispute just north of ACG is expected to facilitate the broadening of MSP in the northwest of Costa Rica.

Recommendation 14
Further invest in land use planning at the level of the wider Conservation Area to consolidate the integration of conservation considerations into the wider landscape, including the establishment of a formal buffer zone.

Recommendation 15
Invest in Marine Spatial Planning beyond the marine parts of the property, including the establishment of a formal buffer zone.

4. ASSESSMENT OF THE STATE OF CONSERVATION

Overall, ACG continues to be in a comparatively good state of conservation. There are no acute threats calling the Outstanding Universal Value of the property into question at this point in time. It can be argued that some of the conservation values have been stable or even improving through decades of active conservation and restoration, namely the recovering dry forests in the lower elevations. It cannot be overemphasized that much of the dry forest

teeming with life today was marginal pastureland only decades ago. In addition to the dedicated conservation efforts by governmental and non-governmental actors, including academia, the harsh environmental conditions, rugged terrain and difficult access add up to a high degree of active and natural protection, at least on the Santa Elena Peninsula. The situation of the rainforest is less favourable, as that environment is more accessible and less inhospitable and thus more vulnerable. In addition, the management presence and level of law enforcement was described as less intense in the mountains compared to the dry forest near the coast. The main concerns for the small patches of cloud forest include the already observable consequences of climate change, with major impacts being anticipated. Several scientists consulted by the mission argued that the cloud forests are likely to disappear within decades due to changing environmental conditions.

Despite the undisputed conservation importance of the formally protected coastal-marine areas, it was consistently acknowledged that the configuration, management and law enforcement of the marine areas lagged behind the terrestrial conservation efforts and achievements. While the schematic boundaries capture very important areas, they are not a function of meaningful prior analysis of conservation values, migration patterns, sensitive reproduction sites etc. Along much of the rugged coastline of the Santa Elena Peninsula, the adjacent sea is not protected at all and reportedly subject to poorly controlled fishing. While a specific analysis is beyond the scope of this mission report, consistent concerns about contamination from touristic facilities south of the property deserve to be noted. There is much room for a more ambitious and comprehensive marine conservation approach, building upon the recent declaration of a new marine protected area in a major bay of the Santa Elena Peninsula (*Área Marina de Manejo Bahía Santa Elena*).

The combination of the considerable size of the property and the exemplary coverage of a full and uninterrupted gradient from “reef to ridge” amounts to a promising landscape approach. Systematic land purchases based on impressive investments have been increasing the land under formal protection. While proposals to develop industrial infrastructure within the property have so far been unsuccessful, the property is exposed to industrial development in its proximity. It is clear that the construction of industrial port and transportation infrastructure within the property would fundamentally change large tracts of the property. Such construction would be incompatible with both World Heritage status and national legislation. The existing Inter-American Highway crossing the property comes with well-documented disturbance and road kill in addition to facilitating access to the protected area. A possible expansion of the Inter-American Highway within the property can be expected to increase the impacts on the property. It is recommended to increase efforts to minimize the impacts of the existing route. Ideally, an alternative route avoiding ACG should be considered.

As anticipated in the nomination dossier, the numerous threats to the integrity of the property have not disappeared over time; many are on the rise. The State Party provided a useful overview of threats in its 2016 State of Conservation report, acknowledging severe underfunding and understaffing, partially compensated by external funding and functional alliances with national and international partners. The threats presented by the State Party draw on information generated to inform the management plan for 2014 to 2024. Out of five rated priority conservation values, three were found to be subject to “very high threat” (rain forest, dry forest, coastal-marine ecosystems), with the two remaining subject to “high threat” (birds, cloud forest), while noting the overarching threat of climate change. The findings suggest a major and acute need to consolidate funding, staffing and management.

Beyond the property itself, there is some potential to add land of high conservation value in line with readily available gap analysis regarding terrestrial conservation priorities (SINAC/MINAE, 2007a). There is even more potential in the marine realm, which could be guided by an existing comprehensive gap analysis targeting marine and coastal conservation priorities (SINAC/MINAET, 2008). Besides extensions, renewable energy development in the

surroundings needs to be better studied in terms of their relationship to the nearby ACG. It is regrettable that large wind parks are operational in the immediate vicinity of the property without meaningful consideration of impacts, for example on birds, bats and insects. As more projects are being proposed, it is ever more important to better understand the risks and impacts, including cumulative impacts, on the property.

5. CONCLUSIONS AND RECOMMENDATIONS

"(…) 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 (…). The ACG and the government of Costa Rica feel strongly that ACG inclusion in the World Heritage List (…) would be a major step forward in ensuring ACG survival into the indefinite future.

Government of Costa Rica, ACG World Heritage nomination, 1998

According to its mission statement, Área de Conservación Guanacaste (ACG) is dedicated to both the conservation and restoration of ecosystems following some four centuries of anthropogenic modifications. Today, rich dry forests are stocking again on pastures abandoned only decades ago. Far from "pristine", ACG is an impressive example of ecosystem resilience, natural regeneration capacity and active restoration using natural processes. The on-going experiment offers many lessons, including for the Bonn Challenge, under which the international community has committed itself to the restoration of 150 million hectares of forest globally. ACG has systematically grown over time and is today encompassing a vast, uninterrupted ecological gradient from Pacific waters all the way to the eastern slopes of the Guanacaste Range across volcanic peaks reaching almost 2,000 m.a.s.l.

While ACG is a remarkable success story facing no existential threats at this point in time, a number of concerns deserve attention and require a consolidation of management responses. The potential threat currently receiving most attention is the so-called "Dry Canal" (*canal seco*). Proposed by a private sector company exclusively established for the purpose, the transportation infrastructure project would link Costa Rica's two coasts. Major industrial port terminals would be required, implying the need to construct a new industrial port terminal on the Pacific side. Maps and project descriptions circulated by the project proponent suggest that the intended location of such a port terminal would be on the Santa Elena Peninsula within Santa Rosa National Park, an integral component of the World Heritage property and the larger conservation area. In addition to the port terminal itself, the location would inevitably imply additional access and energy transmission infrastructure crossing parts of Santa Rosa National Park. In the absence of a legal basis for project implementation within a national park and predictable opposition, project implementation in the proposed form appears to be unrealistic. Besides directly contradicting Costa Rican protected area legislation, the major industrial infrastructure development project would clearly be incompatible with World Heritage status. Project approval would likely result in the inscription of ACG on the List of World Heritage in Danger, and, if implemented, the World Heritage Committee would have to consider the implications of possible permanent damage to the property's Outstanding Universal Value.

Several renewable energy projects in the immediate vicinity of the property have been causing controversy over several years. Around 2013, an initial plan by the Costa Rican Electricity Institute (*Instituto Costarricense de Electricidad* - ICE), the governmental institution in charge of geothermal development, to excise more than 1,000 hectares from Rincón de la Vieja National Park to enable geothermal development met with strong societal opposition. Eventually, the project had to be abandoned in the initially proposed form. It deserves to be

noted that the initial controversy never reached the adequate attention of the World Heritage Centre, IUCN or the World Heritage Committee despite the obvious relevance. While a physical excision of land from the property could ultimately be avoided, operating plants today reach all the way to the boundary of the property on the surface. Horizontal drilling techniques tap on geothermal resources underneath the property. It is very unfortunate that these projects were moved forward without the adequate attention of the World Heritage Committee, which is why the EIA did not consider potential impacts on the OUV of the property prior to construction. Systematic monitoring, the best possible mitigation and the development of systematic Payment for Environmental Services (PES) schemes beyond individual research projects are recommended, building upon existing cooperation agreements between SINAC and ICE. Both institutions are under the same ministry, MINAE, ideally an advantage when addressing the interface between nature conservation and the promotion of renewable energy. The monitoring of all geothermal development should be incorporated into the general management plan for ACG, which currently makes no reference to them. As per routine procedure, any new projects should undergo assessments specifically taking into account World Heritage status in accordance with IUCN's World Heritage Advice Note on Environmental Assessment.

Wind power development near the property differs in several ways from the above geothermal projects. Unlike geothermal development, all projects are promoted by the private sector. At the time of writing, several wind parks were operational next to the boundaries of the property with several additional projects in the pipeline. Perceptions of the visual impacts vary, as is well known from comparable settings. It remains to be seen how visitors will respond to growing industrial infrastructure next to an iconic national park, including as regards visual and noise impacts. Direct and indirect impacts on birds, bats and insects are certain to occur, but remain poorly understood. While the private companies are engaged in compliance with general environmental management requirements and additional CSR efforts, no specific assessments considering the immediate proximity to a World Heritage property inscribed for its exceptional biodiversity values have been conducted. Decision-making appears to have ignored World Heritage status and - as in the case of the geothermal development - no corresponding discussion took place in the World Heritage arena prior to granting project approval. Specific monitoring of the biodiversity impacts is strongly recommended in order to better understand them and inform mitigation options. As per routine procedures, any new projects should undergo assessments specifically taking into account World Heritage status in accordance with IUCN's World Heritage Advice Note on Environmental Assessment.

Finally, ACG staff and scientists informed the mission of possible plans to develop hydropower on the Cucaracho River. As consistently requested by the World Heritage Committee in recent years in decisions made on a wide variety of development proposals in or near many different World Heritage properties, such or any other proposed infrastructure development that could have impacts on a World Heritage property should undergo a rigorous EIA, including a specific assessment of impacts on the Outstanding Universal Value of the property concerned, in line with IUCN's World Heritage Advice Note on Environmental Assessment. The Committee's Decision **40 COM 7** should also be recalled, which *"considers that the construction of dams with large reservoirs within the boundaries of World Heritage properties is incompatible with their World Heritage status, and urges States Parties to ensure that the impacts from dams that could affect properties located upstream or downstream within the same river basin are rigorously assessed in order to avoid impacts on the Outstanding Universal Value (OUV)"*.

Given the complexity of the various renewable energy projects, intensive agriculture and tourism development on the coast, strategic planning beyond reactive consideration of individual projects is highly recommended. A Strategic Environmental Assessment (SEA) is recommended to enable a structured analysis of the multiple existing and emerging interests and societal demands on the natural resources of ACG competing with conservation objectives. Beyond the property itself, the existence of a larger "protected block" totalling more

than 160,000 ha and a much larger “conservation area” offer important conservation opportunities. There is some potential to further expand the land under formal protection. More importantly, the integration of conservation considerations into land and resource use in the surroundings of the property can draw on helpful legal and policy instruments, implementation remains to be consolidated. Such efforts would speak to the consolidation of a de facto buffer zone, which the property is formally lacking. The eventual definition of a buffer zone, as understood under the World Heritage Convention, is strongly recommended. The currently inconsistent boundaries of the World Heritage property and the “protected block”, as defined at the national level, should be harmonized through a minor boundary modification according to the procedures specified in the Operational Guidelines.

Similar considerations are applicable to the marine areas. Marine Spatial Planning (MSP) could be used to go beyond the somewhat schematic configuration of the marine portion of Santa Rosa National Park, taking advantage of information and methods unavailable at the time of the creation of the national park. The establishment of the Santa Elena Bay Marine Management Area is an encouraging example of a process involving local resource users, which is expected to breathe new life into the marine conservation approach and the relationship between conservation authorities and local communities. The inclusion of this new MPA into the property can and should be formalized via a minor boundary modification, ideally jointly with the above harmonization of the boundaries and the creation of a formal buffer zone recommended above.

Numerous other management challenges exist, which are adequately identified in the general management plan. The overarching concern is that human and financial resources are stretched, one factor compromising fully satisfactory management responses. Core funding was described to essentially cover staff costs, but hardly any operational funding. Consequently, adequate resource allocation and further development of sustainable financing strategies are strongly recommended. There is room for further developing more systematic and strategic PES schemes, including based on governmental and private sector renewable energy development. Improved coordination between ACG and the *Fondo de Financiamiento Forestal de Costa Rica* (FONAFIFO) should be considered. ACG is in a good position to guide FONAFIFO in terms of priorities.

From the onset, ACG has been conceived and managed as a pilot area spearheading neotropical forest conservation and restoration. There are opportunities to take this explicit pioneer role and claim to new levels by balancing renewable energy development and biodiversity conservation, expanding the marine conservation efforts, better embedding the property into the wider landscape and seascape and further developing innovative conservation financing strategies, taking advantage of PES among other elements. ACG would thereby write a new chapter of a conservation success story, which would respond to emerging challenges.

Recommendation 1
The State Party should confirm an unambiguous commitment that the World Heritage property in its entirety is off-limits to industrial development infrastructure, including the so-called Dry Canal and any associated infrastructure.

Recommendation 2
Any change of the current State Party position regarding the relationship between the so-called Dry Canal, or any other industrial development infrastructure, and ACG should be communicated to the World Heritage Committee without delay.

Recommendation 3
All options to reduce the impacts of the Inter-American Highway should be considered, including the improvement of National Road 4 as an alternative route.

Recommendation 4
Any possible future enhancement or expansion of the sections of the highway within and bordering the property should be brought to the attention of the World Heritage Committee in accordance with Paragraph 172 of the Operational Guidelines, and should undergo Environmental Impact Assessments with a specific assessment of impacts on the Outstanding Universal Value of the property, in line with IUCN's World Heritage Advice Note on Environmental Assessment.

Recommendation 5
All existing renewable energy projects within the wider Conservation Area should systematically monitor possible impacts on the Outstanding Universal Value of the property as an integral part of management and mitigate any such impacts, as required.

Recommendation 6
Details of any new renewable energy project proposal within the wider Conservation Area of the property should be submitted to the World Heritage Centre in accordance with Paragraph 172 of the Operational Guidelines, and be subject to an Environmental Impact Assessment with a specific assessment of impacts on the Outstanding Universal Value of the property, in line with IUCN's World Heritage Advice Note on Environmental Assessment.

Recommendation 7
Consider integrating World Heritage requirements into the legal and policy framework governing impact assessments.

Recommendation 8
Undertake a Strategic Environmental Assessment (SEA) for the entire Conservation Area including the property, in order to assess the cumulative impacts of expanding renewable energy developments on the OUV of the property, including its conditions of integrity, and to better balance conservation with competing land use interests.

Recommendation 9
Consolidate and diversify conservation financing strategies, including through Payment for Environmental Services (PES) schemes and negotiation with renewable energy actors.

Recommendation 10
Develop a coherent approach to the conservation of all three natural World Heritage properties in Costa Rica as a flagship conservation initiative to address overlapping challenges.

Recommendation 11
Encourages the State Party to harmonize the boundary of the property with the management unit of the larger "protected block" of the same name, and submit a Minor Boundary Modification for approval by the Committee.

Recommendation 12
Encourages the State Party to explore the feasibility of incorporating unprotected land of high-conservation value adjacent to the property, in line with readily available guidance from priority-setting exercises.

Recommendation 13
Encourages the State Party to consider the incorporation of the newly designated Bahía Santa Elena Marine Management Area into the property via a minor boundary modification.

Recommendation 14
Further invest in land use planning at the level of the wider Conservation Area to consolidate the integration of conservation considerations into the wider landscape, including the establishment of a formal buffer zone.

Recommendation 15
Invest in Marine Spatial Planning beyond the marine parts of the property, including the establishment of a formal buffer zone.

6. REFERENCES

Extensive use was made of the official document section of the World Heritage Centre (http://whc.unesco.org/en/list/928/documents/), as well as further online resources listed in chapter 7 below. The State Party provided a useful information package, which was greatly appreciated and of which extensive use was made.

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7. USEFUL LINKS

URL active at the time of writing, in alphabetical order

https://www.acguanacaste.ac.cr, Área de Conservación Guanacaste

https://www.acguanacaste.ac.cr/biodesarrollo/sistemas-de-informacion-geografica/mapas-del-acg, useful maps produced by GIS efforts of Área de Conservación Guanacaste

https://www.acguanacaste.ac.cr/images/phocagallery/mapas/galeria-mapas/thumbs/phoca_thumb_l_acg%20map%201%20km%20grid%20squares%20no%20lat%20long%202008%20small.jpg, map of new protected areas adjacent to Área de Conservación Guanacaste

https://www.acguanacaste.ac.cr/images/phocagallery/mapas/thumbs/phoca_thumb_l_mapa-sectores-acg-12agost14.jpg, conservation sectors of Área de Conservación Guanacaste

https://www.acguanacaste.ac.cr/manejo-de-recursos/corredores-biologicos; Área de Conservación Guanacaste and biological corridors

http://www.cnc.go.cr/, Consejo Nacional de Concesiones

http://costaricaporsiempre.org/, Asociación Costa Rica por Siempre

http://www.fonafifo.go.cr/, Fondo de Financiamiento Forestal de Costa Rica

https://www.fpn-cr.org/, Fundación de Parques Nacionales (FPN)

http://www.gdfcf.org, Guanacaste Dry Forest Conservation Fund

https://www.grupoice.com/wps/portal, Instituto Costarricense de Electricidad

http://www.minae.go.cr, Ministerio Ambiente y Energía

http://www.mopt.go.cr, Ministerio de Obras Públicas y Transportes

https://www.setena.go.cr/, Secretaría Técnica Nacional Ambiental

http://www.sinac.go.cr, Sistema Nacional de Áreas de Conservación

http://www.sinac.go.cr/ES/correbiolo/Paginas/default.aspx, biological corridors within SINAC

http://whc.unesco.org, UNESCO World Heritage Centre (WHC)

http://whc.unesco.org/en/list/928, UNESCO WHC information on ACG

8. ANNEXES

Annex 1: World Heritage Committee Decision 41 COM 7B.12 (Kraków, 2017)

Área de Conservación Guanacaste (Costa Rica) (N 928bis)

The World Heritage Committee,

1. Having examined Document WHC/17/41.COM/7B,

2. Recalling Decision **39 COM 7B.29**, adopted at its 39th session (Bonn, 2015),

3. Commends the State Party on the comprehensive reporting on multiple threats to the property and on its efforts to balance renewable energy and biodiversity conservation objectives;

4. Also commends the State Party on its commitment to consider the property off limits to geothermal development, and requests it to unambiguously confirm that no facilities associated with the projects are or will be located within the boundaries of the property, and to submit to the World Heritage Centre clear maps showing the exact location of all existing facilities;

5. Notes with concern the multiple threats to the property reported by the State Party, and the limited availability of financial and human resources to enable adequate management responses, and therefore also requests the State Party to ensure that appropriate actions are undertaken to address or mitigate these threats and to reinforce the resources available to support this endeavour;

6. Also notes with concern the reported extraction of parrots for the pet trade, and the collection of turtle eggs, and in particular the noted decline in mass nesting (arribada) of Olive Ridley turtles, which may impact the property's Outstanding Universal Value as recognized under criterion (x), and further requests the State Party to provide more information on the measures foreseen to address these issues and to undertake further studies regarding the dynamics of these mass nesting events;

7. Requests furthermore the State Party to invite a joint World Heritage Centre/IUCN Reactive Monitoring mission to evaluate the state of conservation of the property and in particular to review the current and potential impacts of multiple and serious threats to the property, and exchange in more depth with the State Party and other stakeholders, as appropriate, about the option to formally establish a buffer zone;

8. Finally requests the State Party to submit to the World Heritage Centre, by **1 December 2018**, an updated report on the state of conservation of the property and the implementation of the above, for examination by the World Heritage Committee at its 43rd session in 2019.

Annex 2: Terms of Reference of the WHC/IUCN Reactive Monitoring Mission

Joint WHC/IUCN Reactive Monitoring Mission
Área de Conservación Guanacaste (Costa Rica), 24 – 29 January 2018

At its 41st session (Kraków, 2017), the World Heritage Committee requested the State Party of Costa Rica to invite a joint World Heritage Centre/IUCN Reactive Monitoring mission to Área de Conservación Guanacaste (Decision 41 COM 7B.12, Annex 1). The objectives of the monitoring mission are to assess the state of conservation of the property, in particular to review the current and potential impacts of multiple and serious threats to the property, and exchange in more depth with the State Party and other stakeholders, as appropriate, about the options to formally establish a buffer zone. The mission will be conducted by César Moreno-Triana from the Latin America and the Caribbean Unit representing the World Heritage Centre, and Tilman Jaeger representing IUCN.

In particular the mission should assess the following:

1. The potential impacts of geothermal projects on the Outstanding Universal Value (OUV) of the property, including the Las Pailas I and II projects, and discuss the progress made in examining the Environmental Impact Assessment methodology related to geothermal development;

2. The current status of the planned wind power projects;

3. The current status of the Pan-American Highway improvement and expansion project;

4. The State Party's considerations and actions regarding the potential indirect and cumulative impacts of the above projects on the OUV of the property;

5. The impacts of known threats, including – but not limited to – forest fires and illegal resource extraction, including water extraction adjacent to the property and fishing within the marine component of the property, and assess the progress in the development of a systematic strategy to address these threats;

6. The measures taken and foreseen to address illegal pet trade, especially of parrots, and the significant decline in mass nesting (arribada) of Olive Ridley turtles at Playa Nancite, observed since the property's inscription;

7. The options for establishing a potential buffer zone for the marine and terrestrial components of the property, considering several protected areas contiguous with the property and the ongoing State Party efforts to promote and consolidate biological corridors;

8. Any other relevant conservation issues that may negatively impact on the OUV of the property in line with paragraph 173 of the Operational Guidelines, including its conditions of integrity and protection and management. It is noted in this context, that on 5 April 2017, a letter was sent to the State Party by the World Heritage Centre to request information regarding the current status of the "Interoceanic Dry Canal" project and any potential impacts on the OUV of the property, for which a formal response by the State Party remains pending.

The State Party will facilitate necessary field visits to key locations and meetings with stakeholders, including but not limited to, those areas associated with the Las Pailas I and II geothermal projects adjacent to Rincón de la Vieja National Park, the portion of the Pan-American Highway inside of the property that is planned to be upgraded, the location of the planned wind power projects, Playa Nancite, and the location of the "Interoceanic Dry Canal" project site in Santa Rosa National Park.

In order to enable preparation for the mission, the State Party should provide the following items, in addition to any further studies, decisions, or assessments available, in an appropriate

format, including web links where available, to the World Heritage Centre and IUCN as soon as possible, and preferably no later than one month prior to the mission:

a) Map with the precise locations of all infrastructure associated with Las Pailas I and II geothermal projects;

b) Details of the planned wind power and the Pan-American Highway projects, including maps of their locations;

c) Recent species monitoring data and any other relevant data or studies, especially of parrot species and Olive Ridley turtles;

d) Details of the "Interoceanic Dry Canal" project including the state of planning and decision-making, applicable assessment procedures, and the project's potential impact on the OUV of the property.

The mission will hold consultations with the relevant authorities of Costa Rica, particularly the Ministry of Environment and Energy (MINAE), the Costa Rica Electricity Institute (ICE), Costa Rican Fisheries and Aquaculture Institute (INCOPESCA), National Service of Groundwater, Irrigation and Drainage (SENARA), the management authority of Área de Conservación Guanacaste, and representatives from local governments. In addition, the mission will hold consultations with a range of relevant stakeholders, including: representatives of non-governmental organisations (NGOs), relevant scientists, researchers and experts.

Based on the results of the above-mentioned reviews, assessments and discussions with the State Party representatives, authorities and stakeholders, the mission will prepare a concise report on the findings and recommendations within eight weeks following the site visit, following the attached Reactive Monitoring mission report format. The mission's recommendations to the State Party will have the objective of providing guidance that will ensure the ongoing conservation of the property's OUV. The recommendations will be provided within the mission report, and not during the mission implementation.

Annex 3: Retrospective Statement of Outstanding Universal Value

Adopted by the World Heritage Committee in 2013 (Decision 37COM 8E, Phnom Penh, 2013).
Source: WHC-13/37.COM/8E, http://whc.unesco.org/archive/2013/whc13-37com-8E-en.pdf;

Brief synthesis
The Area de Conservación Guanacaste comprises 147,000 hectares of land and sea in the Northwest of Costa Rica. Encompassing several contiguous protected areas of various categories, the property is a mosaic of diverse ecosystems. The 104,000 hectares of land encompass a continuum of roughly 100 kilometres from the shore of the Pacific to the lowland rainforests in the Caribbean basin. Along the way, the gradient passes a variedcoastline, the Pacific coastal lowlands and much of the western side of the Guanacaste Range peaking at Rincón de la Vieja at 1,916 m.a.s.l. The many forest types comprise a large tract of tropical dry forest, an often overlooked, highly vulnerable global conservation priority. Furthermore, there are extensive wetlands, numerous water courses, as well as oak forests and savannahs. The largely intact coastal-marine interface features estuaries, rocks, sandy and cobble beaches rimming the 43,000 hectares of marine area with its various, mostly uninhabited near-shore islands and islets. Major nutrient-rich cold upwelling currents offshore result in an exceptionally high productivity of this part of the Pacific.

The visually dramatic landscape mosaic is home to an extraordinary variety of life forms. Next to the approximately 7,000 plant species, more than 900 vertebrate species have been confirmed. Some notable mammals include the endangered Central American Tapir, at least 40 species of bat, numerous primate species and several felids, namely Jaguar, Margay, Jaguarundi and Ocelot. Among some 500 bird species are the endangered Mangrove Hummingbird and Great Green Macaw, as well as the vulnerable Military Macaw and Great Curassow. Diversity of reptiles and amphibians is likewise high with charismatic representatives like the vulnerable American Crocodile and Spectacled Caiman. Several species of sea turtles occur in the property, with a nesting population of the critically endangered Leatherback and a massive breeding population of the vulnerable Olive Ridley. Invertebrate diversity is extraordinary with an estimated 20,000 species of beetles, 13,000 species of ants, bees and wasps and 8,000 species of butterflies and moths.

Criterion (ix)
A striking feature of Area de Conservación Guanacaste is the wealth of ecosystem and habitat diversity, all connected through an uninterrupted gradient from the Pacific Ocean across the highest peaks to the lowlands on the Caribbean side. Beyond the distinction into land and sea, the many landscape and forest types comprise mangroves, lowland rainforest, premontane and montane humid forest, cloud forest, as well as oak forests and savannahs with evergreen gallery forests along the many water courses. Along the extraordinary transect the property allows migration, genetic exchange and complex ecological processes and interactions at all levels of biodiversity, including between land and sea. The vast dry forest is a rare feature of enormous conservation value, as most dry forests elsewhere in the region are fragmented remnants only. Conservation has permitted the natural restoration of the previously degraded forest ecosystem, today serving again as a safe haven for the many species depending on this acutely threatened ecosystem. Major nutrient-rich cold upwelling currents offshore result in a high marine productivity and are the foundation of a diverse coastal-marine ecosystem containing important coral reefs, algal beds, estuaries, mangroves, sandy and cobble beaches, shore dunes and wetlands.

Criterion (x)
The property is globally important for the conservation of tropical biological diversity as one of the finest examples of a continuous and well-protected altitudinal transect in the Neotropics along a series of marine and terrestrial ecosystems. The enormous variation in environmental conditions favours a high diversity, with two thirds of all species described for Costa Rica occurring within the relatively compact area. Coexisting in the property, there are more than 7,000 species of plants, as diverse as Mahogany in the lush forests and several species of agaves and cacti in drier areas. Over 900 vertebrates have been confirmed. Some notable mammals include the endangered Central American Tapir, at least 40 species of bat, Jaguar, Margay, Jaguarundi and Ocelot, as well as numerous primate species. Among some 500 bird species are the endangered Mangrove Hummingbird and Great Green Macaw, and the vulnerable Military Macaw. Charismatic representatives of reptiles include the vulnerable American Crocodile and the Spectacled Caiman. Several species of sea turtles occur in the property, with the critically endangered Leatherback nesting and a massive breeding population of the vulnerable Olive

Ridley. Invertebrate diversity is extraordinary with an estimated 20,000 species of beetles, 13,000 species of ants, bees and wasps and 8,000 species of butterflies and moths.

Integrity

The transect from the waters of the Pacific across more than 100 kilometres inland constitutes an impressive altitudinal and climatic range, making the Area de Conservacion Guanacaste an ideal place for the conservation of dynamic ecological and biological processes at the scale of a landscape. This is critical for the range, migration and life cycles of many animal species but also for plants and entire communities expected to respond to changing environmental conditions. The largely intact coastal-marine interface is remarkable, particularly in a region where coasts have disproportionally suffered from human pressure. The Pacific and the connected coastal ecosystems like mangroves, wetlands and estuaries mutually protect each other and the associated biological and ecological processes. The remoteness and the rocky, swampy terrain provide a high degree of natural protection of this interface. The ongoing natural regeneration of the large, previously exploited tropical dry forest ecosystem within the property is an indicator of intact processes, favoured by the size, conservation efforts and functioning interaction with neighbouring ecosystems. Adding to the integrity are several connected protected areas in the vicinity of the property, which help avoid genetic isolation, buffer disturbance and facilitate conservation and natural regeneration. Small peripheral areas are regularly bought and added to the protected area and lend themselves for future incorporation into the property.

Protection and management requirements

Area de Conservación Guanacaste is a conservation complex comprised of contiguous protected areas which has expanded over time. The property continues to have potential for further extension, which is an explicit management objective. The formal conservation history goes back to 1971 when Santa Rosa National Park was created to conserve a stretch of land and sea of high conservation valuable. Over the years new national parks, a wildlife refuge and an Experimental Forest Station were established and added. Most of the property is state-owned, except for a corridor owned by the parastatal foundation Fundacion de Parques Nacionales. The administrative unit is headed by a Director and under the overall authority of the Ministry of Environment and Energy. Oversight and participation is foreseen through technical, local, as well as regional councils. The integrated management has the dual long-term objective of conservation and restoration. More specifically, management objectives include incorporation of adjacent areas of conservation interest, payment for environmental services schemes; ecological research and outreach programs. The property enjoys a diverse funding structure with both governmental and non-governmental sources. Entrance fees likewise contribute in addition to a heritage fund established through a debt-for-nature swap. Despite the diverse funding structure, additional and sustainable funding schemes are needed to enhance the operational management capacity in the face of mounting challenges. After historic use by local indigenous groups, the remote and economically marginalised region was exploited for around four centuries in opportunistic form. Past human impacts include clearing of forests for pasture, logging and indiscriminate hunting. However, the poor soils, erratic climate and geographic isolation set natural limits to resource use and land conversion which is why no transformation beyond the natural restoration capacity appears to have occurred. On land, current threats stem from agriculture outside the property, namely pollution by pesticides, deviation of water for irrigation and introduced exotic grasses. Other possible developments outside the property requiring careful balancing between negative impacts and benefits include increasing tourism, road construction and hydropower. Catches by local fishers have shown a decrease in the size of fish and an increase in the effort required per catch, a clear indication of declining populations. Stronger efforts in marine conservation are needed to respond to uncontrolled commercial and sport fishing but also to regulate tourism along the coast.

Annex 4: Mission Agenda as conducted

Time	Location	Focus	Participants
Day 1: Wednesday, 24 January 2018			
07:30-08:15	Meeting of the mission team		César Moreno-Triana, UNESCO/World Heritage Centre representative, Tilman Jaeger, IUCN representative
08:30-12:30	MINAE	Meeting with State Party authorities and official reception of the mission Governmental policies for the management and conservation of World Heritage properties Presentation of the mission objectives and ToRs by the mission team Functiong of the national conservation area system (SINAC) and management of World Heritage properties EIA processes Exchange between State Party representatives and the mission	Edgar Gutiérrez Espeleta, Ministro de Ambiente y Energía (MINAE) Fernando Mora, Viceministro de Aguas, Mares, Costas y Humedales (MINAE) Mario Coto, Director Ejecutivo del SINAC (SINAC-MINAE) Adriana Murillo, coordinadora del Área Multilateral, Ministerio de Relaciones Internacionales y Culto Alejandro Masís, Director Regional ACG (SINAC-MINAE) Adriana Fuentes, Directora Técnica, Secretaría Técnica Nacional (SETENA-MINAE) Natalia Batista, Asesora de la Viceministra de Ambiente (MINAE) Ana María Monge, Punto Focal Patrimonio Mundial Natural (SINAC-MINAE) Carolina Molina, Oficial de Organismos Multilaterales (Ministerio de Relaciones Exteriores y Culto) Viviana Tinoco, Oficial del Área de Medio Ambiente (Ministerio de Relaciones Exteriores y Culto) Juan Criado, Oficial del Programa de Ciencias Naturales, Oficina Multipaís UNESCO San José
12:30-13:40	Lunch		
14:00-16:30	MOPT	Meeting with senior representatives of the *Ministerio de Obras Públicas y Transportes* (MOPT) Possible enlargement of the Interamerican Highway Possible Dry Canal project Exchange between State Party representatives and the mission	Mario Durán, Viceministro de Reformas y Proyectos (MOPT) Mauricio Fernández, Director Ejecutivo del Consejo Nacional de Concesiones (CNC/MOPT) Tomas Figueroa, Director de Unidad Asesora de Programa de Infraestructura (MOPT) Mario Coto, Director Ejecutivo del SINAC (SINAC-MINAE) Alejandro Masís, Director Regional ACG (SINAC-MINAE) Natalia Batista, Asesora de la Viceministra de Ambiente (MINAE) Ana María Monge, Punto Focal Patrimonio Mundial Natural (SINAC-MINAE)
16:30-20:30	Road travel to property and dinner		Sra. Natalia Batista, asesora MINAE Sra. Ana María Monge, Punto Focal Patrimonio Mundial

Time	Location	Focus	Participants
Day 2: Thursday, 25 January 2018			
07:00-08:00	Santa Rosa	Breakfast	**MINAE-SINAC and ICE** Alejandro Masís, Director Regional ACG Roger Blanco, Director Técnico ACG y Gestor del Sitio Patrimonio Mundial María Marta Chavarría, Programa de Investigación, ACG Juan Carlos Carrillo, Encargado de Programa de Ecoturismo del ACG Natalia Batista, Asesora de la Viceministra de Ambiente MINAE Ana María Monge, Punto Focal Patrimonio Mundial Natural Funcionarios ICE Sergio Bermúdez, Planificación Ambiental y Desarrollo, ICE Eddy Sánchez, Director C. S. Recursos Geotérmicos Roberto Fernández, Gestión Ambiental, Centro de Servicio Recursos Geotérmicos, ICE Johan Valerio, Responsable Gestión Ambiental. Centro de Servicio Recursos Geotérmicos, ICE Hartman Guido, Coordinador Gestión Empresarial Administrativa **NGO/ Academia** Daniel Janzen, Investigador y Representante de Guanacaste Dry Forest Conservation Fund (GDFCF) Winnie Hallwachs, Investigadora y Miembro de Guanacaste Dry Forest Conservation Fund (GDFCF)
08:00-09:15	Road travel to Las Pailas Sector of Rincón de la Vieja National Park		
09:15-12:30	Pailas I and II projects	Tour of geothermal plants of the *Instituto Costarricense de Electricidad* (ICE) Operation y localization of the infrastructure Biomonitoring project (Malaise traps) Colaboration ICE-ACG	
12:30-13:30	Lunch at Hotel Guachipelín		
13:30-15:00	Mundo Nuevo Sector	Biomonitoring and joint plans ICE-ACG-Guanacaste Dry Forest Conservation Fund (GDFCF) Borinquen geothermal projects	
15:00-16:00	ICE	Environmental and social management / monitoring of the geothermal projects	
16:00-17:30	Las Pailas Sector, Rincón de la Vieja National Park	Visitor Centre and walk on touristic trail; meeting with local staff	
17:30-18:30	Road travel to Santa Rosa National Park		
18:30-19:30	Dinner in Santa Rosa National Park		
Day 3: Friday, 26 January 2018			
07:00-08:00	Breakfast in Santa Rosa National Park		**MINAE-SINAC** Alejandro Masís, Director Regional ACG Roger Blanco, Director Técnico ACG y Gestor del Sitio Patrimonio Mundial María Marta Chavarría, Programa de Investigación, ACG Milena Gutiérrez, Programa de Restauración y Silvicultura, ACG Gabriela Gutiérrez, Encargada del Programa de Educación Biológica Julio Díaz, Coordinador Programa Manejo del Fuego
08:00-11:00	Inter-American Highway	*Túnel Verde* Monitoring of mortality of fauna (road-kill) Projects (tree-planting and wildlife underpasses)	
11:00-12:00	Pocosol Sector	Biological Education Programme	
12:00-13:00	Lunch in Pocosol Sector		
13:00-15:00	Pocosol Sector	Control and Protection in ACG	

Time	Location	Focus	Participants
		Organization, action and strategies to address Illicit activities: water abstraction, poaching and illegal fishing, wildlife extraction etc.	Luis Fernando Garita, Programa de Sectores ACG Francisco Ramírez, Gerente de Recursos Naturales ACG Raúl Acevedo, Coordinador Programa de Control Natalia Batista, Asesora de la Viceministra de Ambiente MINAE Ana María Monge, Punto Focal Patrimonio Mundial Natural **Academia** Joel Sáenz, Investigador, Académico de la Universidad Nacional de Costa Rica **Governmental institutions** Javier Arturo Cubero Vargas, Servicio Nacional de Guardacostas Carlos Alvarado, Instituto Costarricense de Pesca y Acuicultura (Incopesca) Lineth Camacho, Instituto de Desarrollo Rural (INDER) Organismos no gubernamentales Sr. Luis Fonseca, Investigador independiente
15:00-16:00	Santa Rosa Sector	Prevention, control and management of fire	
16:00-17:30	Santa Rosa and Pocosol Sectors	Visit of fire breaks and demonstration of equipment, prescribed burning trial	
17:30-18:30	Road travel to Santa Rosa National Park		
18:30-19:30	Dinner in Santa Rosa National Park		
19:00-20:00	Santa Rosa Sector	Monitoring of marine turtles in ACG	
Day 4: Saturday, 27 January 2018			
07:00-08:00	Breakfast in Santa Rosa National Park		**SINAC-MINAE** Alejandro Masís, Director Regional ACG Roger Blanco, Director Técnico ACG y Gestor del Sitio Patrimonio Mundial María Marta Chavarría, Programa de Investigación, ACG Milena Gutiérrez, Programa de restauración y silvicultura, ACG Natalia Batista, Asesora de la Viceministra de Ambiente MINAE Ana María Monge, Punto Focal Patrimonio Mundial Natural Funcionarios proyectos eólicos Jay Gallegos, Inversiones Eólicas Orosí Dos S.A. César Suárez, Gestor Ambiental, Inversiones Eólicas Orosí Dos S.A. **Non-governmental Organizations** 4 personas que trabajan como parataxónomos del Proyecto Estación San Gerardo Sigifredo Marín, representante Guanacaste Dry Forest Conservation Fund Daniel Janzen, investigador y representante de Guanacaste Dry Forest Conservation Fund Winnie Hallwachs, investigadora y miembro de Guanacaste Dry Forest Conservation
08:00-08:45	Road travel to Caribbean Zone of ACG	Ecosystem Connectivity and integrity of the World Heritage property	
08:45-11:00	Quebrada Grande community	Site visit to wind park, environmental management and monitoring	
11:00-12:30	San Cristóbal Sector	Site visit to restauration project (*Gmelina* and others) Connection Cacao and Rincón volcanoes	
12:30-15:00	Lunch at San Gerardo Field Station and meeting with para-taxonomists		
15:00-17:30	Road travel to Santa Rosa National Park		
18:15-19:00	Dinner in Santa Rosa National Park		
19:00-20:00	Santa Rosa	Jaguar and other vertebrate monitoring project in ACG	
20:00-21:00	Santa Rosa	35 years of primate research and monitoring in Santa Rosa	

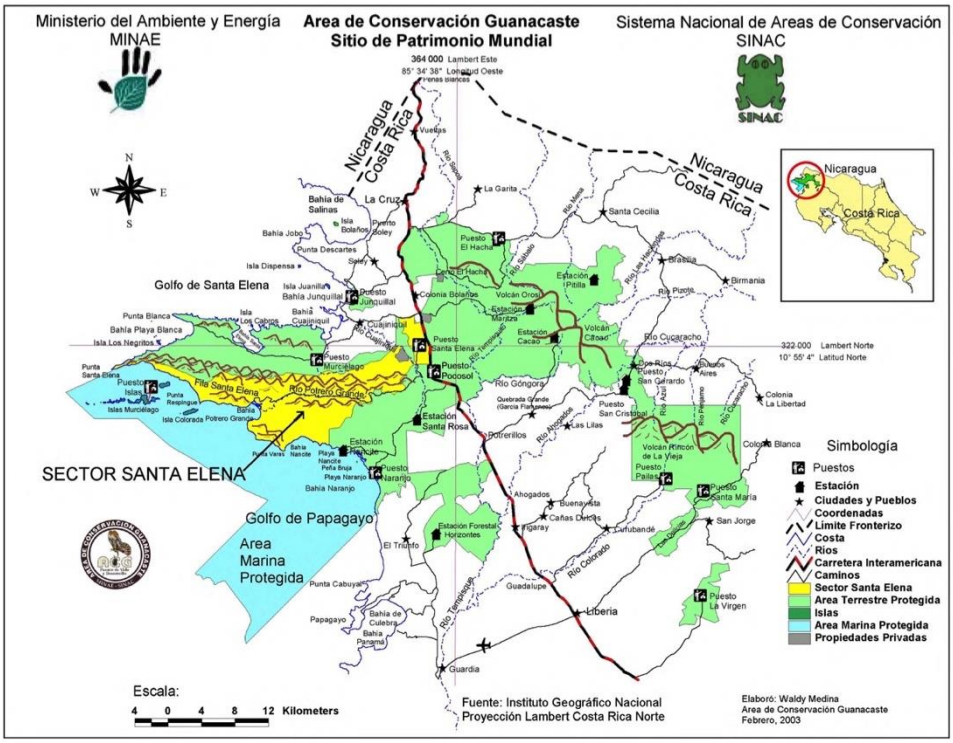
Time	Location	Focus	Participants
			Fund **Academia** Eduardo Carrillo, Investigador Monica Myer, Investigadora
Day 5: Sunday, 28 January 2018			
07:00-07:45	Breakfast in Santa Rosa National Park		**SINAC-MINAE** Alejandro Masís, Director Regional ACG María Marta Chavarría, Programa de Investigación, ACG Natalia Batista, Asesora de la Viceministra de Ambiente MINAE Ana María Monge, Punto Focal Patrimonio Mundial Natural **Non-governmental organizations** Frank Joyce, investigador y representante Guanacaste Dry Forest Conservation Fund Andrés López, ONG Asociación Misión Tiburón Ilena Zanella, ONG Asociación Misión Tiburón
07:45-08:15	Road travel to Cuajiniquil, La Cruz		
08:15-12:00	Boat trip to Bahía Santa Elena, Murciélago Sector		
12:00-13:30	Playa Sortija, Bahía Santa Elena	Snorkelling and lunch	
13:30-15:00	Return to Cuajiniquil		
15:00-16:00	Arrecife Restaurant, Cuajiniquil	BIOMAR project and environmental awareness-raising	
16:00-17:00	Arrecife Restaurant, Cuajiniquil	Sahrk and ray monitoring	
17:00-18:00	Road travel to Santa Rosa National Park		
18:00-19:00	Dinner in Santa Rosa National Park		
Day 6: Monday, 29 January 2018			
07:00-08:00	Breakfast in Santa Rosa National Park		Natalia Batista, Asesora de la Viceministra de Ambiente (MINAE) Ana María Monge, Punto Focal Patrimonio Mundial Natural (SINAC-MINAE)
08:00-12:30	Road travel to San José		
12:30-14:00	Joint lunch and formal closure of the mission		Patricia Madrigal Cordero, Viceministra de Ambiente (MINAE) Pilar Álvarez-Laso, Directora y Representante de la Oficina Multipaís UNESCO San José Alejandro Masís, Director Regional ACG (SINAC-MINAE) Natalia Batista, Asesora de la Viceministra de Ambiente (MINAE) Ana María Monge, Punto Focal Patrimonio Mundial Natural (SINAC-MINAE) Carolina Molina, Oficial de Organismos Multilaterales, Ministerio de Relaciones Exteriores y Culto Viviana Tinoco, Oficial de Asuntos Ambientales, Ministerio de Relaciones Exteriores y Culto Adriana Murillo, Coordinadora del Área Multilateral, Ministerio de Relaciones Exteriores y Culto

Annex 5: Additional colleagues consulted

Jim Barborak, Center for Protected Area Management, Colorado State University
Mario Boza, former senior SINAC staff
Tania Ammour, IUCN/ORMACC
Julio Montes de Oca Lugo, IUCN/ORMACC
José Courrau, IUCN/ORMACC
Maria Pia Hernandez, IUCN/ORMACC
Melissa Marín, IUCN/ORMACC
Alberto Salas, former senior staff at IUCN/ORMA
Michael Schloenvoigt, Programme Director and Country Director a.i., GIZ
Eduardo Muller, UCI
Carlos Manuel Rodríguez, Conservation International

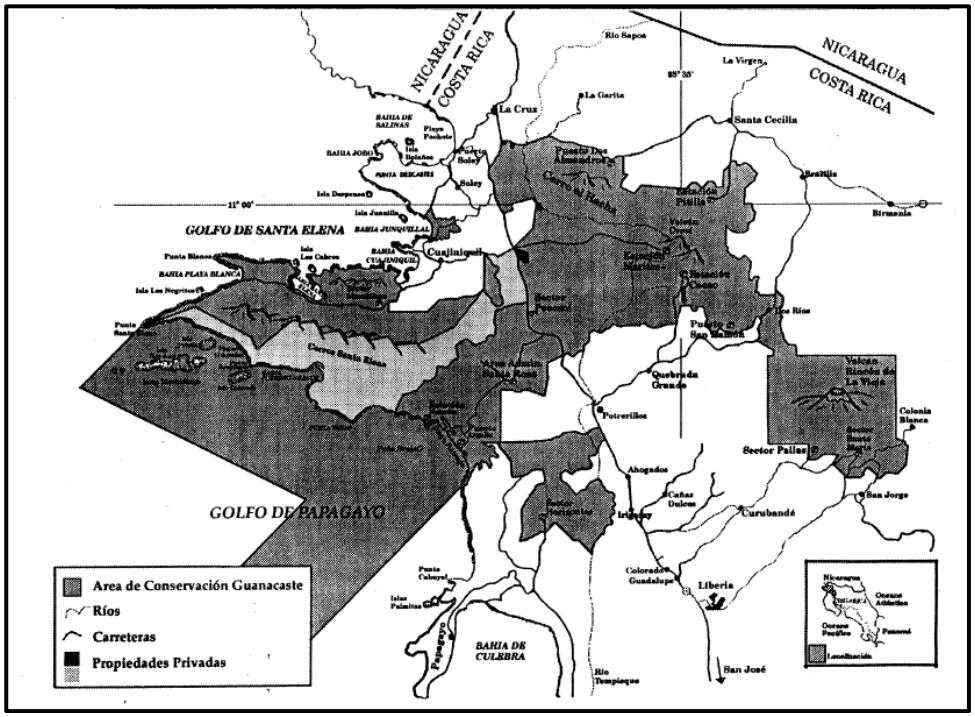
Annex 6: Selected Maps

Map 1: Overview Map of Área de Conservación Guanacaste in 2004



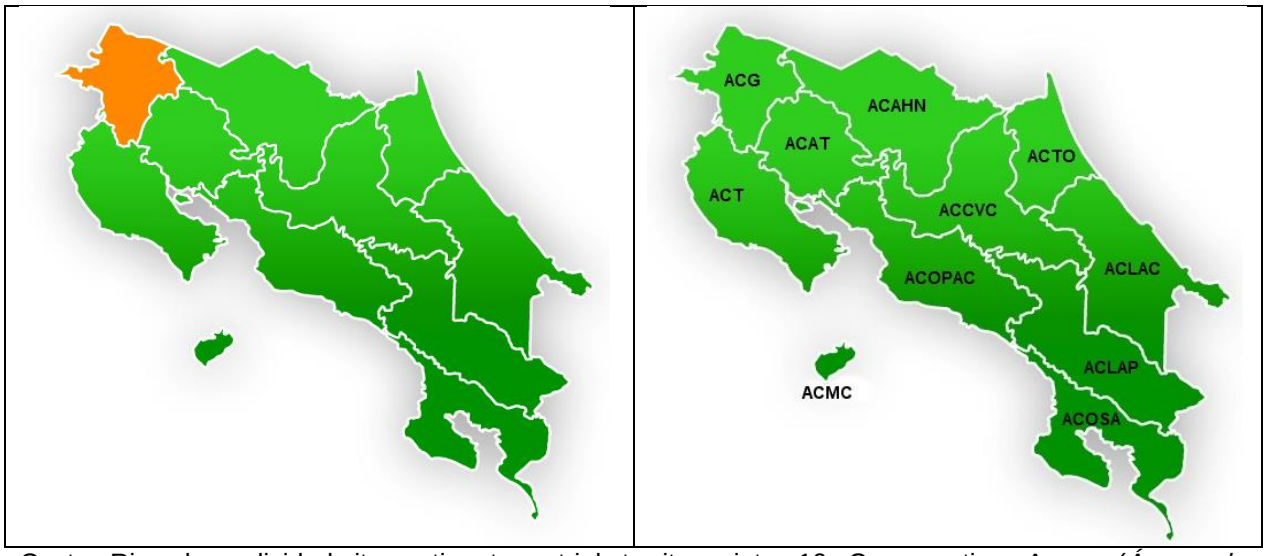
The overview map displays the property as formally inscribed on the World Heritage List since the extension in 2014. Note that the configuration is not identical to the larger area referred to as the "protected block" (*bloque protegído*) today. Note that Puesto La Virgen to the Southeast is not part of the inscribed property. **Source**: World Heritage Centre, http://whc.unesco.org/en/list/928/multiple=1&unique_number=1083.

Map 2: Overview Map of Área de Conservación Guanacaste in 1999



The smaller property as originally inscribed in 1999. Note the privately owned farm in brighter colour, which was subsequently expropriated and purchased by the State Party. **Source**: State Party nomination,1998.

Map 3: The Costa Rican System of Conservation Areas



Costa Rica has divided its entire terrestrial territory into 10 Conservation Areas (*Áreas de Conservación*). Additionally, there is one marine conservation area (*Área de Conservación Marina Cocos*). The orange color in the left map shows the *Área de Conservación* Guanacaste, inside of which the property bearing the very same name is located. **Source**: SINAC see http://www.sinac.go.cr/ES/ac/Paginas/default.aspx

Map 4: Basic project data and possible route of the proposed Dry Canal

Source: CANSEC (proponent) as presented at http://www.eleconomista.net/2016/12/22/cr-fideicomiso-de-500000-para-canal-seco-estaria-listo-en-enero-de-2017.

Annex 7: Photographic Documentation

Photograph 1: Semi-deciduous dry forest in the Las Pailas sector of Rincón de la Vieja National Park. ©IUCN/Tilman Jaeger

Photograph 2: One of the numerous rivers and creeks within the property, a highly valuable ecosystem service provided to residents, as well as the agriculture and tourism sectors. ©IUCN/Tilman Jaeger

Photograph 3: Mangroves in the Santa Elena Bay against the backdrop of the dry forests of the mountainous Santa Elena Peninsula. ©IUCN/Tilman Jaeger

Photograph 4: A remote beach in the Santa Elena Bay, historically used by indigenous peoples, who left major shell mittens. ©IUCN/Tilman Jaeger

Photograph 5: Las Pailas II geothermal project by ICE on the boundary of Rincón de la Vieja National Park. ©IUCN/Tilman Jaeger

Photograph 6: The main plant of Las Pailas II geothermal project by ICE. ©IUCN/Tilman Jaeger

Photograph 7: View of the Orosí project against the backdrop of the nearby Rincón de la Vieja National Park, one of three operational wind parks in the immediate vicinity of property. ©IUCN/Tilman Jaeger

Photograph 8: Some 2,800 vehicles cross the property each day on the Inter-American Highway. ©IUCN/Tilman Jaeger