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**CONVENTION CONCERNING THE PROTECTION OF THE WORLD  
CULTURAL AND NATURAL HERITAGE**

**CONVENTION CONCERNANT LA PROTECTION DU PATRIMOINE  
MONDIAL, CULTUREL ET NATUREL**

**WORLD HERITAGE COMMITTEE / COMITE DU PATRIMOINE MONDIAL**

**Thirtieth session / Trentième session**

**Vilnius, Lithuania / Vilnius, Lituanie  
08-16 July 2006 / 08-16 juillet 2006**

**Item 7 of the Provisional Agenda: State of conservation of properties inscribed on the World Heritage List and/or on the List of World Heritage in Danger.**

**Point 7 de l'Ordre du jour provisoire: Etat de conservation de biens inscrits sur la Liste du patrimoine mondial et/ou sur la Liste du patrimoine mondial en péril**

## **JOINT IUCN/UNESCO MISSION REPORT / RAPPORT DE MISSION**

**Galapagos Islands (Ecuador) (1 bis) / Îles Galapagos (Équateur) (1 bis)**

**February 28 – March 10, 2006 / 28 février – 10 mars 2006**

This mission report should be read in conjunction with Document: WHC-06/30.COM/7B  
Ce rapport de mission doit être lu conjointement avec le document suivant: WHC-06/30.COM/7B

# **GALAPAGOS ISLANDS WORLD HERITAGE SITE**

**Report to the World Heritage Committee on the mission carried out from  
February 28 to March 10, 2006**



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## MISSION MANDATE

### **Decision 29 COM 7B.29 (Durban, 2005)**

The World Heritage Committee,

...

7. Invites the Director General of UNESCO to launch, in cooperation with the State Party, a high level initiative, with the participation of other interested UN bodies and donors, and with the objective of developing a practical, consensus based long term “vision” for Galapagos focusing on conservation and sustainable development

8. Also requests the State Party to invite, in the context of the above-mentioned initiative, a joint UNESCO/IUCN mission to the property to examine its state of conservation and in particular to advise in the development of a long term vision initiative for Galapagos Islands, focusing on conservation and sustainable development, and on whether conditions warrant for inclusion of the property on the List of World Heritage in Danger;

### *Authors' notes:*

- 1. The Galapagos Islands World Heritage Site consists of two very distinct ecosystems – terrestrial and marine. Though there are important and inescapable ecological links between these two ecosystems, current threats and management challenges relating to each tend to be significantly different in scale and nature. For this reason, the two ecosystems will be dealt with distinctly in this report, unless a particular issue warrants otherwise.*
- 2. This report focuses on issues of direct concern to the site's Outstanding Universal Values, as per the mandate of World Heritage Convention. However, as the Galapagos islands are very nearly a closed system in which both the state of conservation of protected areas (both marine and terrestrial) are tightly bound with developments in the sphere of human activities in the non-protected areas, the authors are compelled to include attention to socio-economic issues so that the roots of the conservation issues may be better examined.*
- 3. Given its mandate to work with the State Party in supporting the development of a consensus based long term vision for the Galapagos, the mission team included a member of UNESCO's Ecological Sciences division to provide insights, particularly in regards to contributions from the Man and the Biosphere Programme. The Galapagos is also a UNESCO Biosphere Reserve and the authors noted that there is a good deal of scope for action under this framework.*

## ACRONYMS

AIM	“ <i>Autoridad Interinstitucional de Manejo</i> ” Interinstitutional Management Authority
CDF	Charles Darwin Foundation
CDRS	Charles Darwin Research Station
CIMEI	“ <i>Comité interinstitucional por el Manejo de Especies Introducidas</i> ” Interinstitutional Committees for the Control and Management of Introduced Species
EPO	Eastern Pacific Ocean
GEF	Global Environment Facility
GMR	Galapagos Marine Reserve
GNP	Galapagos National Park (the land base)
GNPS	Galapagos National Park Service (the agency)
IADB	Interamerican Development Bank
IATTC	Inter American Tropical Tuna Commission
INGALA	“ <i>Instituto Nacional para Galápagos</i> ” Galapagos National Institute
IS	Introduced Species
JMP	“ <i>Junta de Manejo Participativo</i> ” Participatory Management Board
OUV	Outstanding Universal Value
SESA	“ <i>Sistema Ecuatoriano de Sanidad Agropecuaria</i> ” Ecuadorian Agricultural Health Service
SICGAL	“ <i>Sistema de Inspección y de Cuarentena para Galápagos</i> ” Inspection and Quarantine System for Galapagos
SLG	Special Law for Galapagos
SP	State Party to the WH Convention (Government of Ecuador)
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Cultural and Scientific Organization
UNF	United Nations Foundation
WB	World Bank
WH	World Heritage

## Acknowledgements

The authors wish to thank the Ministries of the Environment, of Tourism and of Foreign Affairs in preparing this mission and in providing valuable information concerning Galapagos. We also thank the dedicated and professional staff of the Galapagos National Park Service and of the Charles Darwin Foundation, who took a good deal of time out of their busy schedules to help us understand the issues, and to provide us with detailed information on many conservation challenges. The enthusiastic staff of the National Quarantine and Inspection System, in all three islands the team visited, staff of INGALA, and in particular, the PROINGALA project coordinator, also went out of their way to lend their assistance – and we owe them our sincere gratitude. Finally, without the candid contributions from the many people we interviewed, or from those who approached us to volunteer their perspectives, we would not have been able to have produced such a detailed report – thank you.

## PART I – BACKGROUND INFORMATION

### I.1 Outstanding Universal Values of the Galapagos Islands

The Galapagos Islands was among the first sites to be inscribed on the World Heritage List in 1978, the year the first inscriptions to the list were made. At the time of its first inscription only the terrestrial part of the islands was included on the list. At that time the islands were inscribed under natural criteria (ii)<sup>1</sup> and (iv), based on the unique characteristics of the archipelago due to a) its active geological processes (volcanism, coastal dynamics) and b) the presence of rare and endangered species and in particular the large proportion of endemic species. IUCN's evaluation report noted that "*the islands are unique among the ocean islands in the number of species found and the large proportion of endemics*". In relation to the conditions of integrity the IUNC report further noted the need "*to ensure the necessary habitat requirements for the survival of the species*". Thus, at the time of the evaluation of the terrestrial part of this property it was clear the need to ensure that the existing natural habitats were conserved as a requirement to maintaining the high level of endemism.

Later on in 1994 the government of Ecuador nominated the Galapagos Marine Reserve (GMR) as an extension of the Galapagos Islands. The importance of extending the site to cover the marine environment was emphasized at the time of inscribing this site in 1978 as to enhance the protection of the whole islands as a number of species have strong linkages with the marine environment for their survival. After several years during which the GMR's management structure was strengthened and its integrity better assured, the World Heritage Committee inscribed it in 2001 based on the following criteria:

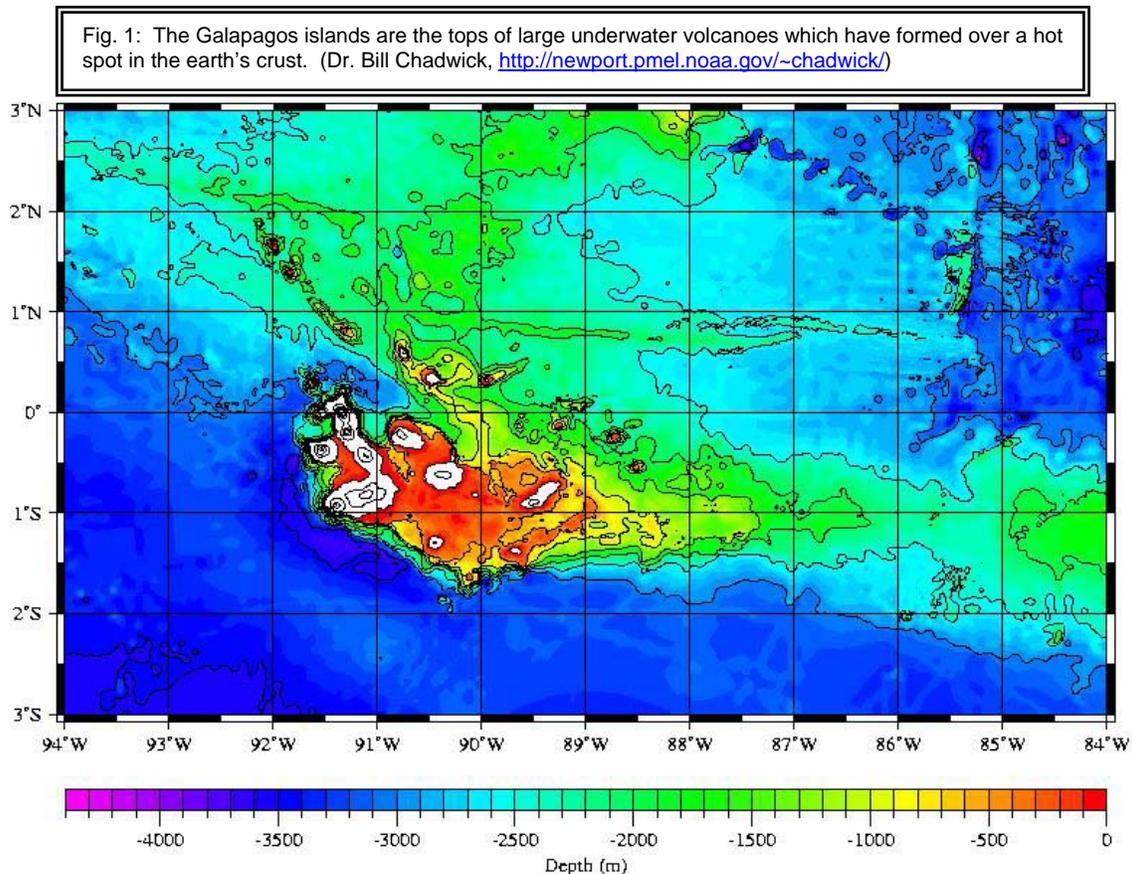
**Criterion (i): Earth's history and geological features:** The geology of the archipelago is clearly apparent above sea level but also extends to the sea floor where processes are equally continuing. The meeting of three major tectonic plates – Pacific/Nazca/Cocos – is the basis for the existence of the islands and is of significant geological interest. The site demonstrates the evolution of the younger volcanic areas in the west and the older areas in the east. On going geological and geomorphologic processes (lava flows, underwater gas flows, small seismic movements, and erosion) also occur in the marine environment although not easily studied. The GMR includes key elements as well as on-going processes that conforms the geological puzzle that originated the Galapagos Islands, almost no other site in the world offered protection of such a complete continuum of geological and geomorphologic features (see fig. 1).

**Criterion (ii): Ecological processes:** The islands are situated at the confluence of 3 major eastern Pacific currents and this convergence has had major evolutionary consequences. The Galapagos marine environment is a "melting pot" of species that biogeographers have recognised as a distinct biotic province. The direct dependence on the sea for much of the island's wildlife (e.g. seabirds, marine iguanas, sea lions) is abundantly evident and provides an inseparable link between the terrestrial and marine worlds.

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<sup>1</sup> Criterion (ii) of the 1977 version of the Operational Guidelines included reference to on-going geological processes that were later on include under criterion (i) in the 1994's revision of the Operational Guidelines; therefore Galapagos was then listed under natural criterion (i).

**Criterion (iii): Superlative natural phenomena or natural beauty and aesthetic importance:** The GMR is an underwater wildlife spectacle with abundant life ranging from corals to sharks to penguins to marine mammals. No other site in the world can offer the experience of diving with such a diversity of marine life forms that are so familiar with human beings that they accompany divers. The diversity of underwater



geomorphologic forms are an added value to the site producing a unique diving experience not to be found anywhere else in Earth. The GMR has justifiably been rated as one of the top dive sites in the world by a popular diving publication.

**Criterion (iv): Biodiversity and threatened species:** With a great diversity of species of fish, sea turtles, invertebrates, marine mammals and sea birds, the GMR is the major stronghold for wildlife in the eastern Pacific. In additions, there is a high rate of endemism in marine life and many species are internationally threatened. The islands and the surrounding marine environment of the Galapagos are thus inextricably linked and together from a unit that meets all four World Heritage criteria.

## I.2 Review of the unique conditions of Galapagos

### A. Biophysical

As noted above, the OUV for Galapagos is inextricably linked to the site's unique physical characteristics, the most important by far being its oceanic nature and its great isolation from other land masses. The archipelago is comprised of over 130 islands and islets of differing sizes (only 7 over 10,000 hectares), altitudes (up to 1,689m) and relative distances from each other. They are affected differently by 3 distinct cold/warm/nutrient rich marine currents that flow past them (figure 2). These factors combine i) to produce a great variety of climates above the ocean's surface, and ii) to contribute to the development of unique marine ecosystems below.

Due to their biological isolation from the continent and to their generally arid nature, only a very few colonizing plants and animal species have been able to overcome the series of nearly insurmountable natural barriers preventing the massive movement of continental

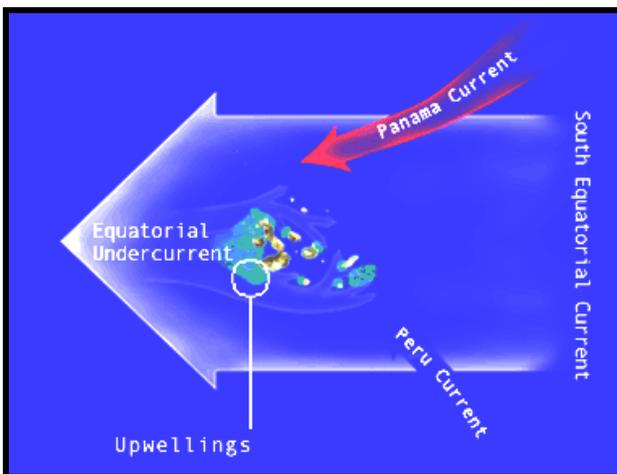


Figure 2: Warm and cold marine currents, along with nutrient rich upwellings, combine to create unique marine ecosystems. (from Bensted-Smith, 2002)

species to the islands. These species first had to i) find their way across 1,000 km of open ocean, ii) find suitable habitat in an arid land once having arrived, and finally, iii) find healthy members of the opposite sex suitable for reproduction before colonization could take place.

Sea birds were no doubt the first non-marine vertebrates to appear in Galapagos. Over tens of thousands of

years, they were likely followed by occasional arrivals of land birds, and with them, a number of plants that i) had seeds of a nature to be transported

by birds (either in their guts, or stuck in their plumage/feet) and ii) could adapt to the near desert conditions of the islands. Reptiles eventually arrived – as they are more able to survive several days without food and water as they floated across, likely on mats of vegetation torn away from continental estuaries by floodwaters. Once plant life was established, insects, probably blown over, or surviving on vegetation mats, made their apparition. Their proliferation made conditions suitable for insectivorous birds and for those plants requiring insect pollination. Mammals, unable to withstand the hardships of a sea crossing are notably absent in Galapagos, save for one of the hardest mammal known, the rat<sup>2</sup> and bats. Amphibians, for whom salt water is toxic, never reached the Galapagos.

<sup>2</sup> Evolving into 7 distinct species of Galapagos rice rats, five of which became extinct after the arrival of humans.

Over time, natural selection exerted a slow but steady pressure on these colonizers, forcing them to evolve to better adapt to local conditions. As these same colonizers evolved, they also managed to colonize neighbouring islands, where, given different conditions, found themselves subjected to different natural selections pressures altogether, driving them to further differentiation. Gradually, over hundreds of thousands, and millions of years, this process led to the unique combination of plants and animals on each Galapagos island that fed Charles Darwin's observations and eventually inspiring him to develop his theory of biological evolution by natural selection<sup>3</sup>. The diversity and interconnectedness of living organisms in Galapagos is now widely recognized as the best manifestation of evolutionary processes remaining on the planet. Also typical for all island ecosystems, species' population sizes tend to be naturally small and under these conditions, highly vulnerable to any number of natural calamities such as volcanic eruptions, tsunamis, forest fires, disease and extreme climate events such as an El Niño (see box).

#### **Climate Change and El Niño in Galapagos**

During El Niño years, Galapagos waters become very warm and very nutrient deficient. As a result, entire marine ecosystems are literally starved to death for over a year. Extreme El Niño events have devastating effects on marine ecosystems and may lead to the extinction of marine species. All Galapagos coral reefs disappeared during the 1983-84 El Niño and have not since been re-established. Species of algae are feared extinct. The impact is also severe on marine dependent species such as the sea lion, Galapagos penguin and marine iguana – who all undergo extreme population declines. Evidence points to more frequent and severe El Niño events in the islands due to climate change. (Boersma, 1998; Snell et al. 1999)

Underwater, the confluence of marine currents, one of tropical origin and another of polar origin, has led to the development of marine ecosystems that include a mix of both tropical and polar regions – nowhere else on the planet can you find sea lions, penguins, fur seals, corals, tropical fish, sponges and hammerhead sharks sharing the same marine reserve (Toral, V. 2006).

## **B. Human History**

Continuous human settlement of the islands was delayed due to their isolation and harsh environment - lack of fresh water sources posing the greatest limitation. Though the islands were first visited by humans in 1535<sup>4</sup>, no permanent human settlement was established until 297 years later – explaining in large part why the islands remained in such a pristine condition until modern times. The total population remained very small, reaching approximately 600 people in 1900, not surpassing the 1,000 mark until the 1940's, and remaining under 2,000 until well into the 1960's (e.g. an average 2% growth rate – see figure 3). Subsequent economic opportunities (see next paragraph) led to a rapid growth in large part due to immigration from the mainland, occurring mostly in the past 15-20 years, during which time the growth rate has been as high as 8.5% in some years and most recently from 5.6% to 6.9%, according to various sources. (MacFarland, C. and M. Cifuentes, 1996). Today, 5 islands (4 of them among the 6 largest, and thus, those with the greatest biodiversity) are host to permanent human habitation, with settlements ranging in size from approximately 120 people to 15,000 people, for a total population of about 25,000 - 27,000 residents in 2006 (figure 3).

<sup>3</sup> The independent formulation of the theory of natural selection is attributed to both Charles Darwin and Alfred Russell Wallace.

<sup>4</sup> There is some much disputed evidence that pre-Columbian visits from Inca civilizations may have occurred.

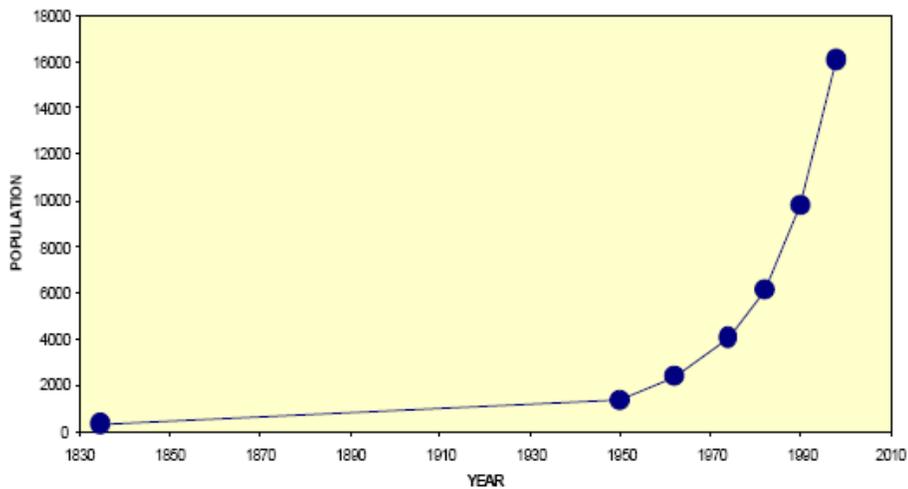


Fig. 3: Exponential population growth in Galapagos – at the current rate, population will rise to 100,000 by 2028 (Bensted-Smith, 2002).

### C. Economy

**Tourism** is by far the single biggest driver of the Galapagos economy. The standard model consists of a 4-7 day live-aboard cruises, with the vast majority of visitors flying to one of 2 commercial airports in Galapagos and immediately embarking on a ship, to disembark at the airport at the end of the cruise, flying back to the continent. Though cruise ship tourism generates up to US\$250M per year in gross revenue, approximately \$40M-\$50M is captured in Galapagos, while the rest is captured either on the continent or abroad. The major cruise ship owners are based out of continental Ecuador or the USA, though a good number of smaller family owned operations, largely based in Galapagos, remain. Galapagos drives a large portion of foreign visitation to Ecuador, resulting in additional important economic effects on the continent.

The value of the **legal fish catch** for the local economy is estimated at \$5M - \$6M, the majority of which is derived from the lucrative but seasonal and rapidly declining sea cucumber and lobster fisheries, and the remaining from usual hook and line fishing to feed the local and cruise ship markets, and for export to the continent. Based on comments from a variety of sources, the mission team was led to assume that roughly the same value is likely generated from illegal fishing (predominantly out of season sea cucumbers and lobsters, along with a growing shark finning fishery).

**Other sectors: Government services, conservation work** (e.g. the Galapagos National Park Service and the Charles Darwin Foundation alone have about 250 staff) have become significant contributors to the local economy, while a small but evolving **agricultural** sector focuses on supplying food stuffs to the local market and cruise ships, along with the export of coffee and cattle. A typical **service sector** economy (retail, trades, construction) accompanies these main economic activities.

### **I.3 CONSERVATION HISTORY**

The Galápagos Islands have always been an emblematic site for nature conservation due to its the unique characteristic of its wildlife's apparent tameness, and to the role they have played in the development of the theory of biological evolution by natural selection. In 1936 the government of Ecuador established the Galapagos National Park and started to implement a limited number of conservation measures. However, a visit in 1957 by Drs. Robert Bowman and Irenaus Eibl-Eibesfeldt, under the sponsorship of UNESCO and IUCN, resulted in the establishment in 1959 of the Charles Darwin Foundation (CDF) with a mission to assist in the preservation of the remarkable flora and fauna of the islands. Later in 1959 the National Park was expanded to cover 97% of the terrestrial territory of the islands. The Charles Darwin Research Station (CDRS) was established on Santa Cruz in 1960 to provide the knowledge and information essential to the conservation of the islands ecosystems.

In 1964, the Californian Academy of Science sent the largest ever expedition to Galapagos, resulting in a large number of scientific papers, as well as the first inventory of plant species, which expanded our knowledge of their natural history and started the 'modern era' of scientific and conservation research in the islands. In 1968 the Ecuadorian Government established the Galapagos National Park Service (GNPS) which gradually took over the hands on management of the islands in partnership with CDRS.

In 1986 the government of Ecuador declared the Galapagos Marine Reserve (GMR) with an extension of 70,000 km<sup>2</sup> which was extended in 1998 to cover 133,000 km<sup>2</sup>; becoming the second largest marine reserve after the Great Barrier Reef Marine Park. GMR was nominated for World Heritage status in 1994 and finally inscribed in 2001.

Since the creation of GNP three management plans (1974, 1984 y 1996) were prepared to guide the conservation and management activities. Each of them responded to different institutional and socio-economic conditions in the islands, reflecting an evolving "vision" for conservation and sustainable development of Galapagos. The management plan for GMR was approved in 1999 after a comprehensive participatory process of consultation with the fisheries and to tourism sector as well as other key stakeholders. The fourth management plan for GNP, also developed through a comprehensive participatory process, was approved in April 2005 and it is already under implementation.

## PART II: IDENTIFICATION AND ASSESSMENT OF ISSUES / THREATS

### II.1 Terrestrial Issues and Threats

One key threat surpasses all others in terms of the risk it presents to Galapagos – that of introduced species. Though warranting focused attention, all other threats are of at least an order of magnitude less in terms of impacts on the Outstanding Universal Values (OUV) and the long term integrity of the islands, given that human activities are restricted to only 3% of the land mass, and to about 60 tiny and well circumscribed terrestrial and marine visitor sites within the park.

#### A. Loss of Ecological Isolation / Introduction of Alien Species

##### Avian Malaria

The unintentional introduction of avian malaria in Hawaii resulted in the rapid extinction of many endemic bird species. Only those birds living at higher altitudes, where the temperatures were too cold for the malarial mosquitoes, escape the effects of this disease. Galapagos islands do not reach such altitudes – and all birds here would be at risk should this disease be introduced.

By far the most important conservation issue in regards to the terrestrial ecosystems of Galapagos is the accelerating erosion of the ecological barrier represented by the 1000km of open ocean separating the archipelago from the mainland, and the smaller barriers separating the islands from each other in the archipelago. The loss of this barrier is manifested in the number and rate of introductions of alien species to the islands, and their movement between islands. Alarmingly, this erosion is happening despite the recent adoption and application of a wide range of measures to counter it. As has been clearly demonstrated in many island ecosystems, introduced species can rapidly overwhelm native

ecosystems that have evolved in the absence of aggressive competitors and predators. The IUCN has formally documented 784 extinctions worldwide since the year 1500, and notes that the vast majority of these on islands colonized by humans.

The IUCN Cooperative Initiative on Island Invasive Alien Species states that.. *“It has become clear to most people working on alien species threats to biodiversity that islands ... are different from continental situations in a number of ways. They are more vulnerable to invasions and more likely to suffer catastrophic loss of biodiversity as a result of invasions, but are also more likely to respond to successful eradication and border control methods to reduce or remove threats.”* (IUCN, 2003)

IUCN lists a full 25% of endemic plant species of Galapagos as either in serious decline, or on the brink of extinction.

Goats, dogs, pigs, cats, rats, blackberry and guava are just a few of the well-known aggressive alien invasive species that have been introduced to the islands, severely disturbing ecosystems. Over the past few years, this list has been augmented by surprising additions: The arrival and successful colonization of the islands by frogs in the late 1990’s illustrates how 1,000 km of ocean no longer represents a barrier even for species which would die after a few minutes of exposure to salt water. Others include the cottony cushion scale insect (affecting mangroves), the African fish tilapia (found in the largest of the very few freshwater lakes in the islands) and the aggressive little red fire ant. A boa and a monkey were detected in April 2006, indicating the relative ease in which supposedly easily detectable animals can still be introduced. Introduced plants

now outnumber native ones, 720 to 500, with aggressive invaders such as elephant grass, quinine and lantana rapidly displacing other vegetation. To date, a total of 463 introduced insect species have been formally identified in the islands (23% of the total insect species recorded there). Scientists have confirmed that 6 of these insects are causing havoc among Galapagos ecosystems – and another 191 of them are considered as very high risk of becoming a problem (Causton et. al, 2006).

**West Nile Virus**

*The non-application of the legal requirement to fumigate passenger aircraft arriving in Galapagos will likely result in the introduction of the West Nile Virus to the islands by 2008. The impact on Galapagos fauna will likely be very important (conclusions of a 2004 international workshop on the West Nile virus threat in Galapagos).*

Though most scientific attention has been focused on plants and animals, there is an increasing awareness of the threat posed by introduced diseases – Galapagos plants and animals have evolved in the absence of the most common pathogens elsewhere. Any resistance to these pathogens has likely been much reduced over hundreds of thousands of years during which such resistance was not necessary for survival. A recent (2004) workshop jointly run by the GNPS and the FCD focused on the risk of West Nile Virus introduction to Galapagos, which could have devastating effects on native and endemic species, both bird and non-bird. An

international workshop on avian disease threats to Galapagos, held at Princeton University in 2000, identified 11 diseases that could cause serious harm to birds of Galapagos should they be introduced. The dengue mosquito (*Aedes aegypti*) was recently introduced to the islands, resulting in the first cases of locally transmitted dengue outbreaks in Galapagos. Though affecting humans exclusively, this case illustrates the erosion of the ecological barrier, even for diseases and their vectors.

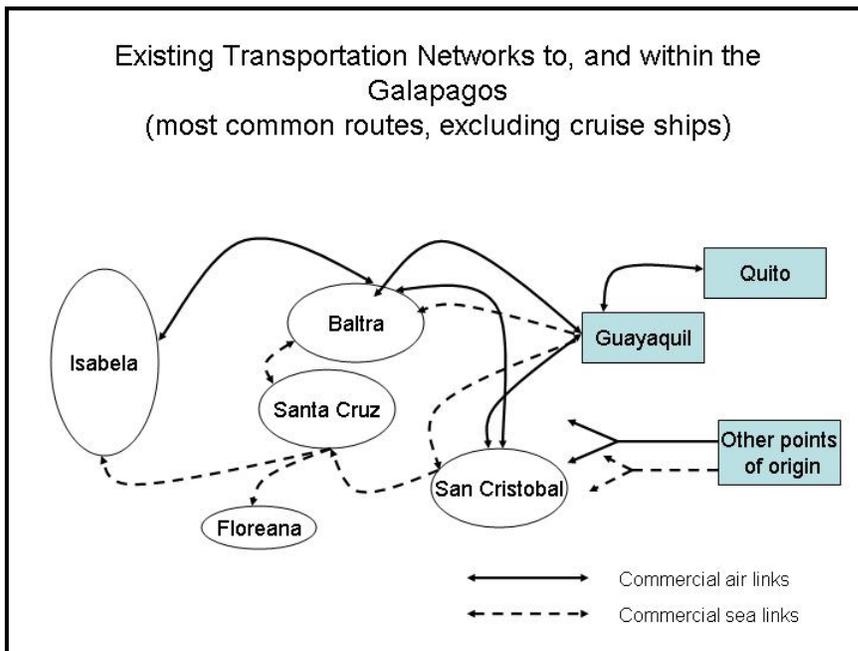
A rapidly growing human presence is directly linked to the increased risk of introducing alien species. Growth is driven by i) migration from the continent in the search for the perceived better economic opportunities in Galapagos and ii) natural population growth. This growth in numbers typically translates into a greater movement of goods and people between the continent and the archipelago, and between islands within the archipelago. The introduction risk is exacerbated by demands for multiple entry points to Galapagos, themselves driven by economic and political factors. There are currently 5 entry points for cargo ships, and 2 for commercial aircraft (with a third under consideration, in the town of Villamil). Those islands with small populations will certainly demand similar services as numbers grow - Floreana, an island with fewer than 50 people for the past 70 years, suddenly increased to 120 residents over the past 8-10 years – leading to water supply problems (highly subsidized water is now shipped from the continent) and first ever demands for a regional airport – both would contribute to ecological barrier erosion.

These growing and efficient transport networks act like a permanent conveyor belt between the continent and several destinations in Galapagos for the transportation, either intentionally or accidentally, of alien species. There are now 33 commercial flights a week between the continent and Galapagos, not counting the occasional military logistical flight to Villamil, which does not (yet) receive commercial flights. Along with tourists and residents, these flights bring significant loads of potentially contaminated perishable food stuffs for local consumption and for cruise ships.

The bulk of goods imported to the islands, including 80% of fresh foods (Fundación Natura, 2002) arrive on one of 4 antiquated and largely unrefrigerated cargo ships (between 35 to 40 years old). These ships take up to 9 days to make the journey from Guayaquil, on the coast, to the 3 main towns of Galapagos. Up to 9 cargo trips a month are made to the islands. Due to lack of on-board facilities such as systematic refrigeration, and to the absence of any systematic decontamination, rodent control or cleaning protocols, the ships could hardly be better breeding grounds for all types of potential invasive species and diseases, as organic residues rot among pools of stagnant water in their rat and cockroach infested holds. Also, due to a lack of any deep water docking facilities, these ships are all off-loaded by hand into barges. These barges are towed to the town docks, and off-loaded again by hand, onto the backs of waiting trucks. Under these circumstances, establishing effective and streamlined inspection procedures is challenging at best.

Even islands not visited by cargo ships are at risk. Cruise ships are the only vessels that effect regular trips between islands that would otherwise not be visited at all and they may present another means through which species are moved about the islands. A recent study carried out by the Charles Darwin Research Station identified 171 species of insects had been attracted to ships' lights at night, and risked being transported from one island to the next (Roque et al., 2006). Naturalist guides working on these ships have also noted the occasional small land bird hitching a ride between islands which would normally be too far apart for regular travel by such birds.

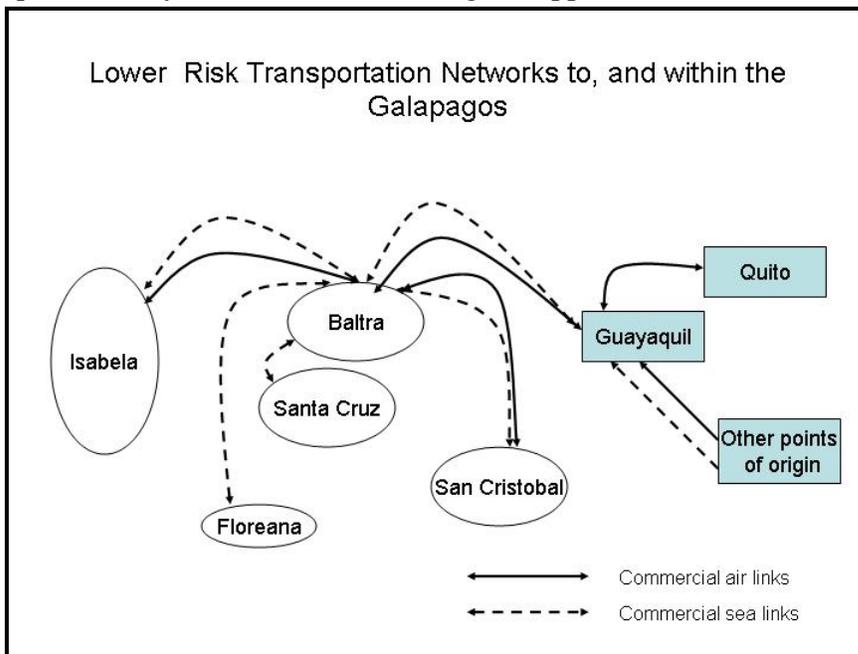
Transportation Network: The web of existing transportation links between the continent and the islands, and between islands, has been identified as a major contributing factor to the introduction of alien species to Galapagos, and to the dispersal of introduced species, and native species, between islands (GEF, 1999). The network currently consists of the following links (see diagramme below):



Clearly, the greater the number of links between islands, and between islands and the continent, the greater the opportunity for species to be transported between different ecosystems. A 100% effective inspection and quarantine system could theoretically be put in place at all departure and entry points and maintain

the ecological barrier between islands and between the Galapagos and the continent. Unfortunately, such a system has yet to be designed – and barring the sudden

development of this capacity, the next best strategy to mitigate the threat of introducing more species is by designing a transportation network that maximizes the effect of a quarantine system, while minimizing the opportunities for the introduction and dispersal of species.



The diagram on the left provides an example of how such a system could be developed. Concentrating all continental departures from one point, and all arrivals to Galapagos at another maximizes the efficiencies in operating a cost-effective inspection system and reduces the risks for the

dispersal of species throughout the islands. Clearly, such an efficient parallel internal transportation system would have to be developed in conjunction with any restructuring of the existing network, taking into consideration the needs of local populations.

In conclusion, the growing human presence in the islands, in combination with the continued incapacity to decouple this presence from the introduction of alien species is the root cause behind the erosion of the ecological barrier that has in the past maintained this fragile and unique insular ecosystem.

## II.2 Marine Issues and Threats

### A. Background to the fisheries in Galapagos

The rich Galapagos waters were first exploited commercially by British and American whalers who regularly hunted this region for sperm whale from the late 1700s to the mid 1800s, leaving this activity only after whale numbers dropped and kerosene started replacing whale oil. Whalers turned to Galapagos fur seals, quickly reducing their numbers to near biological extinction (Jackson, 1994). However, their remoteness and the tiny human population living there until the 1960s resulted in relatively unexploited fisheries until well into the 20<sup>th</sup> century, during which time commercial tuna fishing fleets made their apparition *en masse* in Galapagos waters. Still, the coastal waters and shallow sea bottoms were subjected only to relatively small-scale and subsistence fishing pressure until the 1960s. That modest fishing pressure easily met local subsistence needs, giving local fishermen enough income to meet other basic necessities in the islands at a time when there were few expectations of great material comfort. The development of new markets in the 1970s and 1980s led to a more intensive lobster and grouper fishery, with

frozen lobsters tails shipped to the USA and salt-dried groupers to mainland Ecuador. This fishery occupied up to 200 fishermen during that period.

However, on the continent, a more heavily capitalized fishery was tapping into the internationalization of seafood markets and the increasing buying power of Asian consumers. Among these fisheries developments, the sea cucumber became a prized catch in the late 1980s, highly sought in Asian markets, and bringing attractive income for comparatively little effort. Within a few years however, the mainland resources were quickly depleted and a wave of enterprising fishermen headed for Galapagos in the early 1990s to continue this activity in waters that had not yet been exploited for this species. The sudden influx of sea cucumber fishermen created a gold rush environment, raising the hackles of some of the old-time fishermen and of conservation interests in the islands. A tumultuous period followed, some violence ensued, as efforts to control the sea cucumber fishery were made in the face of fishermen eager to cash in on the resource. It was during this period that the creation of a formal marine reserve was discussed, and received the support of local fishermen. In exchange for their exclusive access rights to fishing in the reserve, the fishermen agreed to restrict themselves exclusively to artisanal fishing practice. Similarly, during this period, a well-designed and systematic fisheries management programme was developed and implemented. The 2006 SP report to UNESCO notes that for the first time, a registration process for fishermen and fishing boats was initiated and regulations were developed dealing with fishing seasons, no-take zones, and size and numbers restrictions.

By the time the struggle to establish an effective management system for the sea cucumber had run its course (e.g. by about the year 2002), the Galapagos was left with a legacy of 417 registered fishing boats and 1059 registered fishermen in the islands – many with high expectations that the gold rush times of relatively easy sea cucumber catches would, and should continue. However, as the sea cucumber catch per unit effort visibly dropped in the first years of the millennium, it became increasingly evident that the resource would no longer provide the attractive returns to which the fishermen had grown accustomed during the periods of poorly controlled fishing.

## **B. Current Status of Fisheries in Galapagos**

Today, many fishermen in Galapagos are despondent over their prospects. There is a fishing overcapacity in the islands, and the only truly valuable species, those that could have guaranteed a relatively comfortable revenue using artisanal practices for a smaller number of fishermen (lobsters and sea cucumber) have been overexploited to the point of economic collapse. The 2006 SP report to UNESCO notes that income per fisherman from the sea cucumber fishing dropped by nearly 50% (from \$4,272 to \$2,332) from 1999 to 2001. The authorized sea cucumber catch for the 2005 season was 3 million individuals. 703 fishermen and 271 boats were engaged in the 60 day open season, catching a total of 1.4 million sea cucumbers – only 45% of the quota. Similarly, the catch per unit effort for the spiny lobster, averaging about 11 kg per fisher per day in the late 1970s, 7 kg per fisher per day in the early 2000s and had dropped to about 4.7 kg per fisher per day in the 2004 season. It has become clear to most astute fishermen that their children best not focus on fishing as an effective means of supporting themselves.

Discussions with fishermen during the monitoring mission point to a small drop in the total number of registered fishermen (from 1,059 in 2002 to 1,001 in 2005). Mission

team discussions with several young fishermen indicate that many registered fishermen are turning to other non-fishing related activities (e.g.: “*I drive my mother’s taxi most of the time, and just go fishing for a few weeks during the sea cucumber season*”), though it appears that a good number (including people who are not even registered fishermen) have become involved in non-fishing activities either as a source of primary income, or to bolster a reduced fishing income, it appears as though a good number have chosen to turn to illegal fishing to maintain the income levels to which they had grown accustomed during the profitable, but fleeting sea cucumber fishery. Their main targets are:

- i) shark fin: which sells for approximately \$20 per kg, feeding the Asian shark fin soup market. Roughly 300,000 to 400,000 sharks are likely fished annually in Galapagos waters to feed the fin market<sup>5</sup>.
- ii) out of season sea cucumber: the sea cucumber fishery is open for only a short period every year, no more than 2 months. It is not unusual for the GNPS to apprehend sea cucumber fishermen and processors carrying out this activity out of season, indicating that this activity is also widespread and practiced by a wide sector of the local population, not only by registered fishermen.

The ecological impacts of the illegal shark fishery in Galapagos are unknown, though scientists have demonstrated wide cascading ecosystem effects in other areas. Anecdotal information from dive operators point to a significant and observable reduction in the number and size of schools of sharks spotted while on dive trips. Shark populations are slow growing, and the effects of a sudden and massive cull of the Galapagos shark populations will likely take many years to redress. Similarly, the effects of an aggressive sea cucumber removal by the local legal and illegal fishery on the marine ecosystem remain unclear. Research to find answers to these questions is urgently needed, but funding is elusive.

### **C. Industrial Fishing**

Incidence of illegal industrial fishing within the Galapagos Marine Reserve appears to be on the decline, though aerial surveillance and deep sea patrolling are sporadic at best – see table 1, page 26 (Bustamante, 2006). Discussions with knowledgeable insiders indicate that recent well-organized boycotts of tuna products following widespread criticism of the industry-wide dolphin by-catch have led to a greater concern for such matters within the industry. The Inter American Tropical Tuna Commission ([www.iattc.org](http://www.iattc.org)), responsible for the conservation and management of fisheries for tunas and other species taken by tuna-fishing vessels in the Eastern Pacific Ocean (EPO region) is apparently requesting that its members be particularly vigilant in their respect of marine protected area boundaries. However, even by remaining outside the limits of the GMR, the impacts of this large industrial fishing operation (there are 3,672 IATTC registered purse seine and long-line vessels operate in the EPO) is thought to be a big factor in the decreasing of shark, tuna and billfish populations within the GMR boundaries. This industry also reports a very important by-catch of non-target species, mostly turtles, seabirds, sea lions, manta rays (Bustamante, 2006).

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<sup>5</sup> Extrapolation based on the numbers of shark fished by one fisher over 12 months (2,000) x an estimate of up to 200 fishermen/people involved in this fishery. This figure is corroborated when compared to information on the total national shark catch, estimated at 3-4 million individuals.

## II.3 Other Conservation Issues:

### A. Water pollution:

- a) Potential oil spills: 6,446,172 gallons (24,401 cubic metres) of diesel fuels were offloaded in Galapagos in 2004 to meet demands for fishing and cruise boat motors (56%), electrical power generation (27%) and terrestrial engines such as trucks (16%).<sup>6</sup> The fuel is delivered to the Galapagos via one or two small and old single hulled oil tankers. Tankers anchor



The oil tanker Jessica founders off the coast of San Cristobal Island, January 2001. @ Heidi Snell

offshore and offload the fuel using a rubber hose onto dockside facilities. In January 2001, the tanker Jessica ran

aground due to human error, a few hundred meters from shore, spilling 285,000 gallons (108 cubic metres) of fuel oil and diesel in coastal waters. Fortunately, marine currents helped disperse the spill fairly rapidly, but environmental impacts were significant (Lougheed et al., 2002; Wikelski et. al., 2002). The potential for a repeat spill exists, with the possibility of much greater impacts on ecosystems, and on the tourism industry.

- b) Absence of waste water treatment: There is no urban/domestic wastewater treatment whatsoever in Galapagos – all waste waters flow into especially dug holes in the ground. The town of Puerto Ayora retrieves its domestic water supply from the same near sea level ground water source. As a result, brackish, untreated and contaminated groundwater is what the majority of residents receive in their homes. These same ground waters flow into the bays around which urban settlements occur, resulting in measurable bacterial and chemical contamination. Though this is an important human health concern that needs to be addressed, impacts on Galapagos ecosystems are very limited, as less than 1% of 1,800 km of Galapagos coastal waters are affected.



The opening of large gravel pits in GNP lands has led to the extinction of several species of endemic snails.

### B. Habitat Alteration:

Only 3% of the total land surface of Galapagos lies outside the park boundaries. These were the lands already occupied by settlers when the park was created. Obviously, these are the best

<sup>6</sup> <http://www.menergia.gov.ec/secciones/electrificacion/dereeproyectos.html>

agricultural lands in the islands – consisting of good soils and reasonable rainfall. Such lands are very rare in the islands and would also have been areas of highest biodiversity, for the same reasons. As such, the impact on biodiversity conservation from the alteration of this 3% of land is quite out of proportion to the relatively small proportion of the total land it represents. Today, in part due to speculative absentee owners, a good part of these private lands are no longer farmed. Left idle, they become centres for the establishment and propagation introduced species, mostly aggressive plants (such as blackberry, elephant grass and quinine) and insects, to the detriment of neighbouring agricultural lands, and to biodiversity in general. Though the Special Law for Galapagos clearly indicates that landowners are responsible for managing the introduced species problem on their land, no formal mechanism is in place requiring them to do so. There are good opportunities for high return conservation investments in dealing with this issue.

**C. Illegal extraction endemic tree species:** The endemic matazarno (*Piscidia carthagenensis*), valued for its strength and resistance to rotting is a prized species for construction and has been under much pressure from illegal extraction for many years. Large specimens have become rare (Bensted-Smith, 2002). The 2006 SP report to UNESCO noted that the GNPS carried out 164 patrol days resulting in 7 apprehensions, and decommissioned one chainsaw and 7.7 cubic metres of wood (no time frame indicated). This issue appears to be satisfactorily addressed by the Galapagos National Park Service (GNPS).

**D. Inadequate waste management practices:** The management of domestic and other urban waste is also a problem, but once again, limited to very small spaces. Waste is a concern more from the broader perspective of badly managed landfills located within the park boundaries acting as centres for the establishment and propagation of introduced species. No systematic control measures are in place to limit these effects. There is an active, albeit incipient, recycling programme in Puerto Ayora, supported in part by the tourism sector, which is helping reduce the amount of waste directed to landfills – though focusing on non-organic waste, this is not reducing the role of landfills as centres of introduced species - and associated disease - propagation.

## PART III: MANAGEMENT RESPONSES

The SP has undertaken a broad and ambitious range of management responses in reaction to the threats posed by the destruction of the ecological barrier, and by the impacts of excessive fishing capacity. Unlike the situation in many other natural World Heritage sites, where the protected areas agency, or national ministry of the environment is largely responsible for WH site management issues, the implementation of these responses is to be carried out through a variety of government departments, agencies and institutes, at each of the national, provincial and municipal government levels. As a result, there is no main focal point for conservation in Galapagos - the Ministry of the Environment, though important, is only one of several similarly, if not more, influential players. This section will review the management responses prescribed by the SP, describe advances in their implementation, and highlight weaknesses that remain to be addressed in regards to the most significant threats.

### III.1 Terrestrial Management Responses

#### A. Special Law for Galapagos

Few countries in the world have passed conservation laws as far-reaching as the 1998 Special Law for Galapagos (SLG)<sup>7</sup>. Prior to even considering such a law, an amendment to the national constitution had to be passed by the national assembly to allow for the imposition of what otherwise would have been unconstitutional restrictions on residency, property and business rights under the SLG. The SLG is a visionary tool, explicitly founded on the recognition that Galápagos is a unique and eminently delicate place whose evolutionary processes warrant indefinite conservation and whose future management needs to be founded on principles of strict ecological isolation principles (SLG, article 2). The SLG establishes the legal framework over which many aspects of island life are to be regulated – among others:

- i) Regional planning
- ii) Inspection and quarantine measures
- iii) Fisheries management
- iv) Residency / migration
- v) Tourism
- vi) Agriculture
- vii) Waste management
- viii) Environmental Impact Assessment (with special focus on IS)

While the SLG provides a legal framework for various sectors, it relies heavily on follow-up regulations to spell out in detail exactly how the law is to be applied. As such, though the 1998 passing of the law itself was a landmark and warrants only hearty congratulations, the real hurdle to overcome in terms of the SLG's application lies in the development of practical and effective regulations governing these various sectors. In this regard, progress has been achieved, but a good deal of work, especially in regards to

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<sup>7</sup> Ley de Régimen Especial para la Conservación y Desarrollo Sustentable de la Provincia de Galápagos. 18 March, 1998. <http://www.ambiente.gov.ec/AMBIENTE/legislacion/docs/GALAPAGOS2.PDF>

tourism related regulations remains to be completed (see Tourism section below). In the absence of regulations for a sector, the situation may be chaotic and can lead to renewed confrontations between stakeholders as various interest groups rally for a strong negotiating position in the eventual regulation development process.

## **B. Inspection and Quarantine System (SICGAL)**

The State Party, to its credit, has vigorously supported the establishment of a inspection and quarantine system in an effort to minimize the introduction of alien species in Galapagos. In the year 2000, Ecuador took on a \$10.4M IADB loan (IADB project EC-0134 “Galapagos Environmental Management Programme”), which, in combination with support received from the United Nations Foundation, the UNDP-GEF and other donors, has helped it install the basic infrastructure, develop human capacity and to construct an



A SESA-SICGAL technician inspects strawberries carried by a Galapagos bound traveller, at Quito airport.

institutional response to the increasingly obvious need to erect a new barrier to the arrival of alien species. Largely with the financial and technical support from the CDF, an integrated Inspection and Quarantine System for Galapagos (SICGAL) was designed and initiated in the late 1990's. Its responsibility was to prevent new arrivals of alien species, monitoring for possible new arrivals, and carrying out rapid responses to eradicate them before they

became widespread. In 2001, the Galapagos office of the national Agricultural Health Service (SESA –

reporting to the Ministry of Agriculture) was inaugurated and mandated to operate SICGAL. The SESA-SICGAL now has a group of approximately 40 highly trained technicians working at 7 Galapagos entry points (air and sea ports), with counterparts working out of Quito and Guayaquil airports, and out of the Guayaquil sea port where cargo ships are loaded. The objective is to have all shipments of goods to Galapagos subjected to inspection and potentially decommissioned by these inspectors.

Infrastructure supporting the work of SESA-SICGAL includes dockside inspection facilities (small office and basic laboratory equipment) on or near the 3 main docks, and airport inspection stations at passenger arrival areas at the 2 commercial airports. On the continent, there are airport inspection stations for travelers en route to Galapagos, and a dockside facility at the Guayaquil docks where the cargo for Galapagos is loaded.

Start-up costs for SESA-SICGAL were provided largely by foreign donations, often channeled through the CDF. With the passing of the SLG in 1998, 5% of the \$100 Galapagos National Park entrance fee was earmarked for quarantine and inspection work. In 2005, this amounted to roughly US\$400,000. SESA-SICGAL also collects inspection fees applied to the shipment of organic goods from the continent. This amounted to \$126,000 in 2005 (apx. 5,000 tonnes per year – or about \$0.025 per kilogram).

Unfortunately, though most of the legal and regulatory elements for the effective screening of goods and passengers traveling to Galapagos are in place, supported by

some infrastructure, they suffer from serious under funding, lack of effective enforcement of basic legal requirements and erosion of recently constructed facilities. In particular:

- a) Despite being a national service, very little national budget is allocated to the operation of SESA in Galapagos<sup>8</sup> – only the director of the Galapagos office is a formal employee of the national SESA. All other staff (apx. 40 both in Galapagos and on mainland) is hired on temporary contracts, with little job security from year to year. A great deal of donor financed investment has gone into building a well trained and professional team of inspectors - their departure would be a great loss to SESA-SICGAL. Their situation needs to be stabilized to ensure long term effectiveness of SESA-SICGAL.
- b) The operational costs (technician contracts, supplies, equipment) are covered by the 5% National Park entry fee allocation and inspection fees. These are insufficient for inspection work, let alone the financing of quarantine and rapid response capabilities.
- c) Staffing levels are far from adequate to deal with the volume of work required to carry out an effective screening of incoming goods and people from the continent. Increasing cargo and passenger volumes, and opening new entry points into Galapagos would further exacerbate this problem.
- d) SESA-SICGAL is currently focused only on inspection, and has no capacity to monitor for, and react to possible alien species incursions, which is part of their mandate.
- e) The director of SESA-SICGAL is an appointed position and at risk of being politicized. It is highly unstable, limiting the ability of the Galapagos office to design and implement necessary activities beyond the day to day operations of the system. 6 directors have come and gone since the office was created in 2001.
- f) The Guayaquil inspection facility built in 2002 with IADB funds at the Galapagos bound cargo loading docks (Caraguay docks) is already obsolete as these docks, with the same financing, were to be reconstructed to meet modern standards. Engineering difficulties have stopped this project and there is no evidence that the project will be completed. Inspectors are working out of a private dock (TIMSA), where cargo is off-loaded from trucks immediately next to the moored ships, often immediately loaded onto ships, making it difficult to carry out effective inspections. This situation needs to be reversed.



A SESA-SICGAL inspector awaits passengers disembarking at the regional airstrip in Villamil.

<sup>8</sup> The mission team was told that the national service did not consider inspection and quarantine services focused on internal movement of goods as a priority, as opposed to those focused on international entry points. The team was also informed that given the major investment of international support to SESA-SICGAL, it had turned into the most professional and internationally recognized branch of the national service, bringing to it significant know-how and visibility.

- g) By formal order of the municipal government, the SESA-SICGAL inspection office on the docks of the town of Puerto Baquerizo Moreno were slated for immediate destruction at the time of the mission, only 3 years after having been built with IADB funds, as the town is building a “*malecón ecológico*” or eco-waterfront in preparation for the arrival of the first 500 passenger cruise ship to visit Galapagos. The mayor explained that there was no need, nor any intention to accommodate the SESA-SICGAL office on the new waterfront.
- h) Passengers on flights to Galapagos are not required to complete a declaration in regards to the transportation of organic goods to the islands. There is no system in place to penalize, or fine, multiple infractions of quarantine regulations. As such, there is little disincentive in trying to smuggle goods.
- i) Airlines flying to Galapagos are not disinfecting planes prior to landing, despite being required to do so by law.
- j) There is little or no inspection of private yachts and aircraft arriving in Galapagos. These may be arriving from any departure point in Ecuador or other countries (often Panama), and pose a major risk. One aircraft arrived directly from Brazil in 2005.
- k) Though the issue of marine introduced species in Galapagos requires a great deal of further study, simple precautionary measures relating to the management of ballast waters on ships are not in place.
- l) There is little or no inspection carried out for inter-island transport.
- m) The risk of cruise ships in transporting species from island to island is great, especially as many islands and visitor sites would otherwise not be at risk.
- n) Having 7 distinct entry points into the islands multiplies the risk of introduction of alien species significantly, as well as costing a great deal more in the provision of effective inspection facilities.
- o) Despite having been budgeted in previous projects, there continues to be a lack of state-of-the-art incineration facilities at each entry point. Decommissioned goods are disposed of in risky conditions.
- p) At \$0.025 per kilogram, the inspection fee levied for the shipment of organic goods is small. Consideration should be given to increasing it to a level that reflects the real costs of running an effective inspection, quarantine and rapid reaction system for the islands. As a positive secondary effect, any increase in the

*“Galapagos is world renowned for its incredible wildlife – but if it isn’t also world renowned for having an effective inspection and quarantine system, it will become better known as one of the greatest ecological tragedies in history.”*  
 Dr. Charlotte Causton, chief, Invertebrate Department, Charles Darwin Research Station.

price of imported goods would also support the development of local agriculture, thus reducing demand for imports, providing local jobs, and reducing the area of agricultural lands currently sitting idle and acting as centres of propagation of introduced species.

**C. Eradication and control of invasive species**

Ideally, an effective inspection system would stop all arrivals of alien species to Galapagos. In reality, even the best such systems cannot achieve such success rates. Under these circumstances, good inspection systems receive the backup of effective

detection, control and eradication programmes that can eliminate or reduce the effect of those species already in the islands.

Under the SLG, responsibility for the control and eradication of introduced species falls on the GNPS and SESA-SICGAL, with the latter having a particular responsibility for detection. The CDF usually provides critical support to this work, contributing scientific backstopping, field trial design and implementation, monitoring and fund-raising support. Though the task is enormous, globally outstanding successes have been achieved.

Some examples:

- Rehabilitation of Espanola island; eradication of goats, captive breeding and repatriation of over 1,000 giant tortoises, re-establishment of vegetation cover.
- Eradication of pigs and goats from Santiago island – the largest island in the world from which pigs have been eradicated, developing state of the art techniques based on satellite images, GIS, GPS and radio-telemetry technologies.
- Eradication of goats from northern Isabela Island (apx. 300,000 hectares).
- Eradication of fire ants from Marchena island using GPS.
- Two species of highly invasive blackberry eradicated from Santa Cruz island.
- Effective control of scale insect (serious effect on mangroves) using an alien bio-control agent (ladybug) under highly controlled trials.
- Eradication of rock doves on Santa Cruz island, working closely with residents, demonstrating the value of communication and education.
- Captive breeding and re-introduction of land iguanas on Baltra Island.
- Eradication of cats on Baltra Island.

A good deal of this recent activity has benefited until recently from strong support out of the GNPS regular budget, along with important financing made available from both the large UNDP-GEF and the UNESCO-UNF projects targeting introduced species, contributing together over \$12M over 7 years to these initiatives. Several other donors, including Lindblad Special Expeditions, Friends of Galapagos organizations and many individuals have also contributed significantly to this work.

These milestones clearly demonstrate that the technical capacity exists to successfully design and successfully complete even the most challenging control and eradication projects. One can only conclude that threats from introduced species already in Galapagos continue to be important in great part due to a lack of national and international support in financing the systematic and on-going work necessary to resolve them.

Controlling introduced species is also a question of preventing their propagation once established. As noted earlier, fallow agricultural lands are notorious as breeding grounds and centres of dispersal for all kinds of introduced plants and insects which aggravate neighbouring farms, and spread into adjacent GNP lands. In addition, any new road punched through park lands quickly becomes a route through which plants further invade hitherto well protected park lands. In 1999, a 5 km road was built through park lands to give better vehicular and popular access to an otherwise isolated beach. Monitoring along this road has since detected the presence of several introduced plants and insects, where they would not normally have been found in undisturbed park lands. This

example clearly illustrates that in spite of the SLG precautionary principle, increased population growth, particularly in the absence of any systematic educational reform in the islands, leads to popular, and political pressures for more roads, disregarding conservation concerns and the threat of introduced species. Similar pressure is building in Santa Cruz for the construction of an airport linking the biggest settlement in Galapagos directly to the continent.

Municipal governments are also obliged (art. 23, SLG) to control introduced species in urban and rural areas. With the support of the UNF-UNESCO project and the CDF, Interinstitutional Committees for the Control and Management of Introduced Species (CIMEI) were set up after many multi-stakeholder meetings, in each of the three island municipalities. CIMEIs are an original, participatory approach to dealing with urban/rural pests; they have been involved in dealing with stray dogs and cats (who, as with poultry, easily become feral and invade the GNP) and have firmly supported the rock dove eradication programme – an introduced bird that can act as a vector for bird diseases. Though innovative and with a proven track record, the CIMEIs were designed as a municipal responsibility. They must depend on municipal financing and have received very little of it, resulting in poor capacity to carry out their mandates<sup>9</sup>. Basic programmes such as the control of domestic pets (vaccinations, control of strays, sterilizations) are left unattended.

Canine distemper: In 2000, canine distemper was introduced to Galapagos, likely through the illegal transport of an infected pet dog. Over a period of 2 months, up to 90% of all dogs in Galapagos died. The disease was easily transmitted thanks to the large number of stray dogs moving freely about human settlements. This disease is also transmissible to sea lions, but thankfully these were not affected. Despite restrictions, the sudden appearance of new breeds of pet dogs is a frequent phenomenon in the islands.

The US\$3M UNF-UNESCO project, now nearly complete, helped attract an additional US\$18M from the UNDP-GEF project, both focusing on dealing with introduced species and establishing an effective inspection system. Both projects also incorporated the establishment of a large trust fund whose proceeds would be dedicated exclusively to providing sustainable financing to dealing with introduced species. The UNF-UNESCO project provides \$1M to be matched 1:1, and the UNDP-GEF provides \$5M to be matched 1:2, with a total minimum joint fund size of \$15M. The UNF-UNESCO has completed its challenge<sup>10</sup> and, due to a prior agreement with the UNDP-GEF initiative, awaits the finalization of that fund's structure and operational manuals before combining its assets with those of the UNDP-GEF fund.

Continuing concerns relating to eradication and control include:

- a) Though extremely successful in conceiving, designing and carrying out control and eradication projects, the GNPS-CDF team is excessively dependent on insecure financing. Two major sources of financing, the UNF-UNESCO and UNDP-GEF projects are in their final year and without any follow-up prospects, it is likely that the proven and highly successful team of field scientists, park

<sup>9</sup> The three municipal governments of Galapagos received nearly US\$1.5M from the Galapagos National Park entrance fee in 2005, to be destined to environmental health activities, in part (SLG, art. 19).

<sup>10</sup> With the support from the Galapagos Conservancy, Galapagos Conservation Trust, Frankfurt Zoological Society and the Global Conservation Fund.

- managers and conservation biologists responsible for much of the success stories over the past 5 years will disperse.
- b) Recent important cuts in GNPS budgets have reduced its ability to field sufficient numbers of park rangers focusing on control and eradication work.
  - c) A good deal of control work calls for low skilled manual labour – consideration should be given to encouraging the formation of local private sector conservation services that could bid for GNPS control contracts, instead of relying on skilled GNPS staff to carry out this work.
  - d) Problems arising from introduced species are often traced back to a near total absence of management programmes in urban and rural areas. Unless dedicated attention to dealing agricultural lands, and urban species is not focused on this issue, controlling introduced species in the park lands of inhabited islands will always be akin to bailing out a leaking ship. CIMEI are a natural ally in dealing with such issues and should be the target of important municipal, national and international attention.
  - e) Rural landowners, legally required under the SLG to control introduced species on their properties, often neglect to do so with impunity, thus compromising their neighbours' ability to carry out agricultural production. These landowners should be the target of a focused initiative that would lead them to become more actively involved in managing their lands.
  - f) The UNDP-GEF introduced species trust has taken an undue amount of time to establish itself, putting at risk the capital raised by the UNF-UNESCO trust fund. Originally targeted at US\$15M, given the scope of the introduced species challenges, it is not unreasonable to aim for a \$30M target, given the real costs of dealing with introduced species in Galapagos.
  - g) Though the CDF has matured into a well-focused and effective applied conservation organization in the past several years, it continues to rely on highly insecure sources of financing, resulting in a great deal of its limited resources having to be dedicated to sustaining itself, as opposed to focusing on the tasks at hand.

## **III.2 Marine Management Responses**

### **A. Participatory Processes / Fisheries monitoring**

Tremendous institutional progress has been made in regards to fisheries management over the past 10 years. As noted in section II.2.A, the tumultuous years following the arrival of large numbers of sea cucumber fishermen led to an intense investment of resources in the establishment of an overall framework for the management of the Galapagos Marine Reserve. Whereas in the very early 1990s, focus was more on patrolling for off-shore fisheries infractions by industrial fleets, by the early 2000s, a sophisticated management framework for the GMR had been developed and implemented, with the support of the CDF and the GNPS.

Perhaps one of the greatest achievements was the conception, development and implementation of a fully-operational multi-stakeholder marine reserve management process designed to take into consideration the multiple uses to which the Marine Reserve was dedicated (fishing, tourism, conservation, research). The “Junta de manejo participativo (JMP)”, or “participatory management board” is a major achievement,

especially as this process took place in the context of recurring outbreaks of civil disobedience, and at times outright violence related to fisheries management questions. The ability to develop and implement this mechanism in such a difficult time attests to the capacity of the GNPS and the CDF to develop working relationships with various sectors and their ability to allocate and invest the necessary resources in ensuring that a complicated participatory process is carried out from beginning to end.

Designed to achieve consensus on various matters pertaining to the use of the marine reserve, the JMP forwards its recommendations to the “Autoridad Interinstitucional de Manejo (AIM)” or Interinstitutional Management Authority, consisting of national government ministries and sector representatives, for a final decision. This decision-making mechanism ensures that all stakeholders have the opportunity to express their perspectives on various marine reserve related matters, and to negotiate amongst themselves in an effort to find common ground. Though there have been setbacks and difficulties (e.g. political circumvention of the JMP directly to the AIM by some JMP members), the system is robust and has become a fixture in the governance landscape of Galapagos.

The JMP allows for increased cooperation between sectors. One such example is the joint monitoring programme operated by the GNPS and the CDF. In an effort to ensure transparency in the collection and interpretation of monitoring data, joint monitoring expeditions were carried out between scientists, marine reserve managers and fishermen. Results on the status of various target species (lobsters, sea cucumbers) and subsequent fishing quotas were thus less likely to be criticized by the fishing sector.

The CDF also developed a fisheries monitoring programme providing a framework for the monitoring of daily catches. The programme institutionalizes a system of permanent daily monitoring of commercial fishing and focuses on: i) captures and unit effort per capture; ii) by-catch, and iii) marketing / consumption. This information is fundamental effective adaptive management strategies of the GMR.

## B. GMR Patrols

The GMR is the 2<sup>nd</sup> largest marine reserve of the world, covering a total of 133,000 square kilometres (equivalent to 364 km X 364 km, or the size of Greece). 34 GNPS staff are assigned to patrolling it. Effectively patrolling such a vast expanse of ocean is extremely difficult and expensive. The current annual cost of carrying out this patrol is about equal the total value of the legal fish catch in Galapagos waters (in the order of US\$4M). To ensure the patrolling of these waters, the GNPS has the following equipment and infrastructure:

**Table 1:** Deficit in GNPS marine patrolling human resources

<b>Infrastructure</b>	<b>Optimal crew/staff numbers</b>	<b>Available Crew/Staff</b>
2 deep sea, high speed patrol vessels	6 each, total 12	10
1 large logistics vessel	6	1
8 small coastal patrol vessels	18 total	15
3 fixed remote monitoring platforms/bases	13	6

Reserve crew	6	0
Technical support	2	2
<b>TOTALS</b>	<b>57</b>	<b>34</b>

From the figures in table 1, one calculates that the marine patrolling capacity for the GNPS is staffed at 60% of levels optimal for the full use of its monitoring resources.

### C. Other Achievements

Long line ban: The SP reports that in November of 2005, long-line fishing (using fishing lines of several hundreds of metres long, at times a few kilometres, to which many hooks are attached) was officially banned within the waters of the GMR. This decision was based on a experimental long line fisheries demonstrating an unacceptable rate of “by-catch” (catching non-targeted species), including albatrosses, sea lions, sea turtles and sharks. Long-line fishing remains a very common industrial fishing practice just outside the GMR boundaries, where by-catch is likely to have an impact on non-target species populations within the GRM.

Ban on export of shark fins: A national ban on the export of shark fins was implemented in 2004, in an effort to control shark fishing in Galapagos.

Continuing concerns relating to marine conservation issues include:

- a) There remains a fishing overcapacity in the islands. Efforts must be made to reduce this capacity and to permanently control the number of registered fishermen and fishing vessels, so that a reasonable living can be made from fishing for a smaller number of fishermen.
- b) The GNPS needs a full complement of staff dedicated to marine patrol work and must receive full support from all authorities in carrying out its work. Banning the export of shark fins is only a small step in controlling the trade.
- c) Sports fishing is promoted and practiced with impunity in the islands, despite its continued illegality. Every effort needs to be made to come to a decision on if/how this activity should be practiced, before commercial and political interests become entrenched, and the situation becomes a “fait accompli” (see annex 3).
- d) Given the very advanced technologies available today (satellite tracking), it is surprising that the GNPS continues to rely on extensive and expensive marine and aerial surveys when on the lookout for illegal intrusions from industrial fishing vessels into Galapagos waters, and out of season fishing activity by Galapagos based vessels.

## PART IV: CROSS CUTTING ISSUES

Some issues, while not falling under the specific framework of this report, have unusually large repercussions on the conservation of Galapagos in the short, medium and long terms, mostly due to the closed system nature of the islands. No report on the state of conservation of Galapagos would be close to complete without a detailed discussion on these issues.

### IV.1 Tourism

As noted earlier, tourism is by far the activity with the greatest economic repercussions in Galapagos. For this same reason, the way tourism is carried out, monitored and regulated has the greatest potential to drive change in the islands.

The first organized cruise in the Galapagos took place in 1967, when a 66 passenger ship carried out one trip to the islands (MacFarland, 2000?). In 2005, 121,410 people arrived in Galapagos (foreign and Ecuadorian nationals) as tourists (according to their declaration forms<sup>11</sup>), the majority embarking on one of 87 registered cruise ships for a 4-7 day cruise. This number has increased by an average of 12.1% between 2000 and 2005. Most tourists are recently retired, or soon to be retired people from developed countries in North America and Europe. As the baby boom generation in these countries enters into its retirement years, there is every reason to believe that the very rapid growth in demand for Galapagos cruises will continue. On the other hand, the SP has effectively frozen the total number of berths available on cruise ships since 1998, creating an upper annual limit of the total possible number of tourists that can join a cruise ship based trip. According to data obtained from the Galapagos Chamber of Tourism, there are approximately 1,775 registered cruise ship beds translating into a maximum capacity of nearly 87,000<sup>12</sup> people per year. Given that several ships run shorter cruises, (e.g. 3 and 4 days), the actual total number of tourists that can be accommodated by cruise ships is somewhat higher. In either case however, there is a current upper limit of about 609,000 tourist cruise nights per year (e.g. 1 tourist on a 7 night cruise = 7 tourist cruise nights).

All tourists following the cruise ship model of tourism typically embark immediately upon a cruise ship from the arrival airport in Galapagos, spend 3, 4 or 7 nights on board, and disembark once again at the airport for a flight back to the continent, spending little more than a few hours in any human settlement in the islands. This model leaves little opportunity for tourists to spend any dollars in land based businesses – a point of increasing contention among Galapagos residents (see next paragraphs). They are accompanied by trained naturalist guides (maximum 16 tourists per guide) who are responsible for interpretation, but also for ensuring that GNPS regulations are observed.

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<sup>11</sup> The term “tourist” is likely interpreted very broadly, and would include Ecuadorians arriving for family visits, perhaps several times a year, or undeclared professionals arriving for very short term business purposes, along with illegal immigrants and more. The real number of arrivals focusing predominantly on tourism is likely somewhat smaller.

<sup>12</sup> Based on the assumption that all berths on registered cruise ships are filled at 100% occupancy, with ships operating 49 weeks per year, and all passengers taking a 1 week cruise.

There are about 60 clearly identified terrestrial and marine visitors sites which can be visited by tourists. The remaining GNP lands are out of bounds.

Though relatively limited, an increasing number of tourists spend all or part of their time in Galapagos based in hotels, and carrying out land-based activities. To accommodate this increasing number, hotels are being enlarged and modernized, as was evident during the UNESCO-IUCN mission. Overall, land based tourism infrastructure (hotels, restaurants) remains, with a few, but growing exceptions, generally modest, family owned and operated, and are more often Spartan than luxurious.

There is a rapidly growing demand on behalf of Galapagos residents that new tourism land based models be opened up which would give them greater business and employment opportunities. “**Land based tourism**” (*turismo con base local*) is the term commonly used when referring to land based investment in infrastructure and products<sup>13</sup>. The UNESCO-IUCN mission team noted that expectations among local populations were very high in this regard. Sensing the pent up demand for such opportunities, some locally elected officials, in their desire to move forward on this issue, were actively promoting activities that, for the lack of an officially adopted regulatory framework, continued to be strictly illegal in the islands. Examples include the aggressive marketing of sports fishing (see annex 3), the building of a modern airport terminal where no large commercial service exists, the promotion of a Caribbean type cruise model, where much larger ships anchor at a town, in the hopes that passengers will spend many dollars in local retail shops.

Locally based tourism is to take place following the development of clear regulations, under the auspices of the SLG. To date, several “modules” have been proposed, including: i) Bay tours on small outboard motor vessels; ii) scuba diving; iii) sports fishing; iv) artisanal fishing outings; v) inter-island passenger transport. Discussions in this regard have been lively in recent months and years. The mission team often heard that such activities would present viable alternative economic opportunities for the fishing community, and there was a sense from fishermen that they should have preferential, exclusive and even subsidized access to these opportunities. However, several people expressed doubt that a significant number of fishermen would have the capacity to engage themselves in such activities, given the level of training, cultural sensitivity towards tourists, capital investment etc. required to successfully mount tourist operations. The UNESCO-IUCN mission team sensed that the on-going expectations on behalf of the fishing community, the continued lack of any initiative to develop a regulatory framework for them, and the on-going illegal incursions into these activities would likely lead to some form of confrontation between various interest groups in the near future.

As the main economic engine for Galapagos, tourism in all its forms is the main driving factor behind illegal immigration. The mission team heard from some individuals that a significant number of cruise ships (proportion unknown) had a tendency of hiring continent based crew, as these would gladly accept salaries much below those accepted

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<sup>13</sup> The authors have translated what is really “*locally* based tourism” into “*land* based tourism”. Though there is an intent on behalf of residents to exclude non-residents from locally based tourism investments, the authors concluded that this likelihood was remote, given the evidence presented to them, and have thus translated used the term “land” based to focus the discussion rather on the alternative to ship based.

by Galapagos residents (where the cost of living is significantly higher). These were hired under a form of temporary permit, but once the permit would expire, crew members would stay in Galapagos and continue to work illegally. With a total of over 1,000 crew members needed to work on the fleet of Galapagos cruise ships at all times (not counting back-up staff, land based logistics and technical staff, which could arguably double this number to 2,000), the potential for fuelling illegal immigration is great. In addition to the direct demand for employees, the multiplier effect of the tourism industry – e.g. the economy generated by provision of goods and services to the 2,000 cruise ship related employees and their families, is also no doubt also a very important driving factor behind illegal migration.

The mission team was given no reason to believe that land based tourism enterprises would not also come to rely on lower cost continental labour, and similarly drive illegal immigration. Given its current relatively small size compared to cruise-ship based tourism, land based tourism is today probably not a significant driver for illegal immigration. However, given its apparently large possibilities for expansion, and given the aggressive growth rate for Galapagos tourism, land based tourism has the potential of fueling a very large wave of development and growth in Galapagos over the next 2 decades. Under current circumstances of weak governance (see section IV.2 below), and under funded conservation, immigration and quarantine agencies, such growth would result in the acceleration of the introduction and dispersal of introduced species, and to irreversible impacts on the values for which the islands were inscribed on the World Heritage List.

Finally, it is important to note that cruise-ships may play a fundamental role in the introduction of species between islands. Cruise ships are the only significant exception to otherwise very restricted access to the vast majority of Galapagos islands and coastal zones. As such, they represent a rare means through which species could conceivably be transported from one island to the next. A study carried out by the CDF (see section II.1 A) has demonstrated that cruise ship lights at night attract many insects – and that these can then be transported to different islands as ships move around the archipelago (Roque et al, 2006). There has also been anecdotal evidence that some terrestrial birds have been spotted on ships far away from land, indicating that they are also being moved about the archipelago.

Technically, a well controlled and strictly limited cruise-ship based tourism model for Galapagos is the least likely to cause significant impacts to the islands. By re-enforcing immigration control, cruise ships would have no choice but to rely on Galapagos residents for their labour needs. Some ship owners pointed to a mismatch between the capacities of Galapagos residents and the specialized needs of a cruise ship. To this end, a medium-term effort to develop appropriate skills among the youth of Galapagos is a reasonable strategy.

Risks associated with dependency on tourism: Revenues from the US\$100 park entrance fee amounted to approximately US\$7.3M in 2005. Table 2 below indicates how these revenues are shared. The contribution to agency budgets from the park entrance fee ranges from 30% (INGALA) to 70% (SESA-SICGAL), underscoring a great dependency

of key conservation institutions on financing that, for any number of reasons<sup>14</sup> could be dramatically scaled back.

Agency / Entity	Percentage allocated	2005 equivalent (US\$)	Proportion of total agency budget
Galapagos National Park Service and GMR	45%	3,285,000	55%
Municipal governments of Galapagos (3)	20%	1,460,000	n/a
INGALA	10%	730,000	30%
Provincial government of Galapagos	10%	730,000	n/a
National Protected Areas Agency (Quito)	5%	365,000	n/a
Inspection and quarantine system (SICGA)	5%	365,000	70%
National Armed Forces	5%	365,000	n/a

**Table 2:** Allocation of the approximately US\$11M Galapagos National Park Entrance fee collected in 2005.

The mission team also considers it worthy to note that, given this direct relationship between tourist numbers and agency budgets, there is a risk that a policy of indefinitely increasing level of tourism may cause subtle conflicts of interest among participating agencies.

#### IV.2 Governance Challenges / State of SLG Implementing Agencies

The mission team, while discussing the mission terms of reference with Ministry of Environment officials prior to traveling from Quito to Galapagos, was told by a number of individuals and institutional representatives that one of the fundamental issues needing to be addressed in Galapagos was governance. The meaning of this statement was not clear until after the visit to Galapagos.

After having met with representatives from several key national government institutions in the islands, the mission team realized that these institutions, though mandated with important responsibilities, were largely kept from carrying them out effectively by a combination of i) political instability at the national level and ii) political in-fighting in regards to appointees to senior government posts in Galapagos, in part fomented locally.

**Table 3:** Average tenures for various elected and appointed posts in Galapagos and Ecuador

Position	Number (since year)	Average Tenure	Notes
Presidency of Ecuador	11 (1996)	11 months	Includes interim and temporary committees.
Minister of Environment	6 (1998)	15 months	
GNPS, director	10 (2002)	5 months	Includes interim directors.
INGALA, director	8 (1998)	1 year	
SESA-SICGAL, director	6 (2001)	10 months	Includes one interim director serving 4 times
Provincial Governor	6 (1998)	16 months	Appointed by president
Mayor of Sta. Cruz	3 (1996)	4 years	Regular terms served
Mayor of S. Cristobal	3 (1996)	4 years	Regular terms served
Mayor of Isabela	3 (1996)	4 years	Regular terms served
Provincial Prefect	3 (1996)	4 years	Regular terms served
Galapagos Members of Parliament	6 (1998)	4 years	Regular terms served, some re-elected (2 national representatives are elected in Galapagos)

<sup>14</sup> Natural calamities such as tsunamis, or volcanoes/earthquakes or civil disturbances in Galapagos on mainland Ecuador, a major air or marine accident, oil spills, West Nile Virus outbreak among visitors to Galapagos...),

Table 3 illustrates the difference between national and local bodies, whereby local processes are stable and national ones are highly unstable. Local elected representatives regularly complete their full mandates, and are at times re-elected, or rotated from one regional elected position to another (e.g. mayor, to provincial prefect, to member of the national assembly), giving them long tenures during which time they can build teams of local supporters and carry out medium to long term visions of Galapagos, be they conservation oriented or not. National government representatives, on the other hand, are rarely in office for more than 12 months at a time. Without greater stability in the leadership of the principle institutions responsible for implementing the SLG and the various measures and programmes destined to conserve Galapagos, it will be difficult to implement any nationally led initiative to strengthen conservation measures for the islands.

Conversely, local authorities are enjoying normal tenures in office. However, these same local authorities are often pressed to focus on the immediate demands of constituents, at the expense of longer term vision of sustainability. As a result, local visions may have an inherent tendency to favour short term solutions to entrenched problems. For example:

- The mayor of the municipality of San Cristobal has unilaterally, and publicly declared his municipality as the “Sports Fishing Capital of the World”. He has helped organize sports fishing derbies, attended by sports fishing vessels based on the continent (see <http://www.galapagosfishing.com/>, and the company Ecu-Gringo <http://www.fishgalapagos.com/> for on-going organized sports fishing businesses focusing on Galapagos). Though sports fishing may be permitted under the SLG, no regulations have yet been adopted, and until they are, it remains strictly illegal. The International Game Fish Association ([www.igfa.org](http://www.igfa.org)), an NGO committed to the conservation of game fish and the promotion of responsible, ethical fishing practices has stated that it would does not condone sports fishing in Galapagos unless it is a fully legal and regulated activity.
- The mayor of the municipality of Villamil (Isabela island) has obtained funds from the national budget to build a new, modern airport terminal for the 2,000 residents of this island, despite the fact that the airstrip cannot currently accommodate the commercial jet aircraft serving Galapagos. This initiative took place in the absence of any region-wide transportation infrastructure planning, and is linked to discussions with representatives of a large luxury hotel chain.
- Some residents in the town of Puerto Ayora are tracing out new residential areas within the boundaries of the GNP lands in an attempt to increase political pressure for the park to cede lands.

It is clear that regional planning processes remain weak, despite the existence of statutory mechanisms within the SLG designed to establish clear development policies and to structure decision-making processes. Until INGALA firmly assumes its full role, and takes on full responsibilities for the revision and approval of development proposals (e.g. new roads, airport terminals, urban zone expansion, water supply, zoning etc), development pressures will continue to overcome conservation concerns. The State Party may wish to consult with UNESCO’s MAB Programme and consider the biosphere reserve model (Galapagos is a UNESCO Biosphere Reserve, following a petition by the

State Party) to help guide this process. Monitoring of results of development and conservation programmes should be implemented as a mechanism to guide management decisions.

### **IV.3 International Cooperation – Bi and multi-lateral, Civil Society**

Until the mid-1990's, the only NGO with any permanent presence in the Galapagos was the Charles Darwin Foundation, established in 1959 and focusing exclusively on Galapagos. Today, over ten international, national and local NGOs<sup>15</sup> vie for a piece of the conservation and sustainable development pie. Though in general, this expansion can be considered as a positive development, it does create the potential for competing or conflicting mandates, a confusion of messages to the local community and decision-makers, a bevy of different visions for the future, all resulting in an overall loss of efficiency in the use of scarce donor dollars and the potential to foment a cynical attitude among residents, which has been detected by the mission team.

A similar expansion of interest in Galapagos amongst bi- and multi-lateral assistance providers<sup>16</sup> was noted by the Ministry of the Environment, and in an effort to ensure the proper canalization of support, it established *Mesa de Donates de Galapagos*, or Galapagos Donors' Round Table, to coordinate their activities. Such a table would have been largely empty in 1995, but now has 14 various development agencies participating. This Ministry of the Environment initiative is critical in ensuring that the SP retain control over how international funds flow into Galapagos.

The Donors' Round Table has met several times over the past 2 years and detailed record keeping of their recent meetings was provided to the mission team. These reveal a shift from encouraging supporting for conservation work towards focusing on human welfare issues. According to the minutes of an October 2005 meeting, one senior member of the Table noted that it “*recognized the emphasis that international cooperation has placed on conservation strategies*”; and affirms that “*from now on, it is necessary to look at the management of the islands in an integrated manner*”. It suggested that international cooperation should seek to deal with “*problems related to human development, such as health, education and support to sustainable production*”. These statements may reflect the fact that most bi- and multilateral development agencies, particularly under the guidance of the Millennium Development Goals, have a reduced leeway in dealing with stricter conservation issues and find it easier to secure funding for human development initiatives.

This shift has also been driven in part by an increasing level of criticism from local stakeholders, directed towards international assistance to the islands, claiming that the international community (NGO and bi-multi lateral assistance) was exclusively focused on “*saving tortoises, while basic human needs are ignored*”. This criticism has been voiced so frequently that it now forms part of the standard political discourse in the

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<sup>15</sup> Including Conservation International, The Nature Conservancy, World Wildlife Fund, Fundación Natura, WildAid, SeaShepherd Society, FUNDAR, among others.

<sup>16</sup> UN Development Programme, World Bank, Inter American Development Bank, UNESCO, Food and Agriculture Organization, Japan (JICA), USA (USAID), Spain (AECI), Italy, European Union, British Embassy, Netherlands, Switzerland, Germany (KFW) are some participants on the round table.

islands. Before it is taken to be factual, it is important to review some basic indicators of human welfare for Galapagos:

**Table 4:** Socio-economic Indicators for Continental Ecuador and Galapagos (values for apx. 2001) from: UNDP, 2005

Indicator	Continental Ecuador	Galapagos
Poverty level	65%	39%
Per capita income	\$1,570 / yr	\$2,670 / yr
Infant mortality (2000)	27.1 / 1000 births	7.9 / 1000 births

These figures indicate that general socio-economic conditions are better in Galapagos than on the mainland.

The UNDP carried out an internal inventory of international assistance projects in 2004 and concluded that indeed, 63% of funds from NGO's, bi- and multilaterals was directed to biodiversity conservation, leaving 37% for other issues. Though no doubt a good representation of where foreign funds were being invested, the report does not carry out a similar assessment of national government investments in the islands. Such a report would likely show a much greater bias towards social services, health, education, public infrastructure than in biodiversity conservation issues – demonstrating that in the end, human communities in Galapagos receive a fair share of public and international investment attention in regards to financing, and, according to some statements made to the mission team, a greater share than the average community on the continent.

It is important not to lose focus on the conservation value added that international cooperation, be it from bi- and multilaterals, or NGOs, has brought and should continue to bring to Galapagos. A national government naturally responds to the basic needs of its people first. Though international support can help overcome some specific barriers in this regard, as it may do equally in any part of Ecuador, the unmistakable comparative need in terms of international support in Galapagos versus similar sized communities on the mainland continues to be related to conservation. The international community has formally committed itself to support conservation in Galapagos under the World Heritage Convention (article 6). To this end, filling this particular financing / technical support gap should continue to be their main focus.

Concern over priorities for project development for Galapagos – Example

In an effort to reduce CO2 emissions and the risk of oil spills by reducing imports, a US\$10M wind energy project is underway on San Cristobal island<sup>17</sup>, funded by private donors (largely the E7, a collection of 10 developed country electrical utilities companies). The electricity is expected to supply about 3,000 residents, replacing 3% of the total 2005 demand for diesel fuel in the islands.

Though inarguably a valid effort to mobilize international private sector cooperation, there is a concern that the only reason such initiatives can be successfully mounted relate not to demonstrated cost effectiveness, nor to a particular conservation or sustainable development priorities for Galapagos. Rather, there is a concern that they can be mounted due to the appealing backdrop that Galapagos provides for any projects that,

<sup>17</sup> [www.e7.org/NewsBriefs/N-050929-Galapagos\\_Joint\\_Venture\\_Signature.html](http://www.e7.org/NewsBriefs/N-050929-Galapagos_Joint_Venture_Signature.html)

frankly, could be much more cost effective if implemented elsewhere, but less appealing to donors. A \$10M project focusing on developing an island wide culture of energy efficiency in Galapagos would likely have resulted in similar, if not greater gains in CO2 emissions reductions, and reduced reliance on fossil fuels in the longer term. Currently, electricity is excessively subsidized reducing incentives to conserve; the majority of offices visited during the mission had air conditioners operating at maximum settings, while doors and windows were routinely left open. The concept of architectural design for passive cooling, and of insulation in building practices is completely absent.

#### **IV.4 Galapagos Vision process**

Part of the mission mandate was to support the SP's efforts in developing a broad vision for Galapagos, against which future decision-making would be made. In preparing for the mission, the team learned of the Galápagos 2020 vision being developed by the Ministry of the Environment. Only basic information was available on this process prior to the mission. Though further information was gathered during the mission, the team concluded that this vision process was still in its initial stages and limited in exposure to bi- and multilateral donor agencies, with a recent opening to Galapagos municipal representatives. Upon questioning other Galapagos based stakeholders on their awareness of the Vision 2020 process, very few had heard of it, and some expressed frustration at yet more top-down visions for the islands, recalling a previous "Vision 2010" document produced by the Ministry of the Environment in 2001.

The Ministry of the Environment, in its efforts to develop a vision for Galapagos, recognizes that the root of many problems in the islands lies in a lack of a coordinated sense of direction for the islands and a lack of a common definition and understanding of the overall island challenges. The mission team noted that there is an awareness among residents and stakeholders that Galapagos is a unique place, that opportunities for establishing healthy human communities while respecting the environmental constraints of the islands abound. These same people are also aware that, as time goes by, events occur, and decisions are made that foreclose future choices, resulting in a sense of powerlessness and frustration (e.g. foreign and continental sports fishing business interests aligning themselves even before a process to discuss if/how this activity should take place begins, international capital beginning to inspect possibilities for investment in Galapagos land based tourism, massive uncontrolled arrival of illegal immigrants). Recent social difficulties, a growing lack of trust, and the unstable institutional framework have muddled the situation, preventing residents from developing an island based, common vision for where Galapagos should be heading.

A vision for Galapagos can only survive the tumultuous institutional environment if it is firmly rooted in the most stable elements of Galapagos society – its residents and its local institutions, while at the same time keeping in line with national policy directions and commitments in Galapagos. Such a vision will only have credibility if Galapagos residents themselves are intimately involved in defining and building it. This process would also contribute to increasing the overall knowledge and sensitivity to Galapagos issues among residents who may not normally have the opportunity to think about them in much depth. This process in turn would ensure that the end results would be better appropriated by island stakeholders.

Because it has been conceived and developed within senior government levels, the current Vision 2020 process risks losing any traction it may have gained over the past 1-2 years after national elections in October 2006. Under these circumstances, the mission team strongly recommends that the Vision 2020 process be adapted to ensure a structured, yet full and transparent participation of Galapagos stakeholders.

Galapagos based institutions, namely the GNPS and the CDF, have repeatedly demonstrated a great capacity to manage large scale and complicated public information and participation processes in Galapagos. The Vision 2020 process should consider engaging them to help “socialize” the process in Galapagos and also to offer more stability for the process to compensate for potential fluctuation in national level commitments to it over time. UNESCO and IUCN have offered their services in this regards (see Mission Mandate, page 3 of this report) and welcome the opportunity to discuss it further with the national authorities.

## PART V: OVERALL ECONOMIC DEVELOPMENT MODEL

This report has demonstrated how population growth in Galapagos, particularly from immigration, is driven by growing economic opportunities in the islands. Fishing and tourism were both fairly equally driving immigration in the 1960's and 1970's, but tourism as since far surpassed any other activity in this regard. Measures destined to strictly control migration have yet to show much effectiveness since they were established in 1998.

The report has also made clear links between population growth, and the risk of introducing alien species to the islands – the biggest single threat to the OUV of Galapagos. Despite major efforts on the part of the authorities, and on the part of bi/multilateral and NGO support, this risk is greater than ever – with the threat of the West Nile Virus looming large.



Local hotels are investing in expansion and renovation.

Further economic growth driven by the cruise ship industry is theoretically limited by government restrictions on new cruise ship permits (limiting the total number of berths). It is critical to maintain this limit. However, increasing expectations in regards to land based tourism has the potential to represent a new wave of economic development that would once again drive illegal immigration from the continent, and further exacerbate the introduced species problem. As global demand for a “Galapagos Experience” grows, and should cruise ship capacity limits be strictly maintained, the incentive to develop new tourism products will be greater than ever. The mission team noted a great deal of evidence that this process is already well under way:

- Population growth rate of up to 6.9% (half of which is driven by illegal immigration)
- Up to 20% residents are illegal migrants
- 500 passenger cruise ships now sailing in the islands on short visits (previous 90 passenger limit)
- International cruise ship companies now operating subsidiaries in Galapagos
- Hotel construction, expansion
- Internet sales for building lots in Galapagos directed at international markets<sup>18</sup>
- Galapagos declared “International Sports Fishing Capital of the World” and actively promoted as such by local municipalities, despite on-going legal ban on sports fishing.
- Internet sports fishing packages overtly offered for Galapagos.<sup>19</sup>
- Tourist numbers growing by 12% per year
- 33 commercial flights a week

<sup>18</sup> [www.santacruzgarden.com](http://www.santacruzgarden.com)

<sup>19</sup> [www.fishgalapagos.com](http://www.fishgalapagos.com), [www.galapagosfishing.com](http://www.galapagosfishing.com)

- Construction of modern airport terminal in one town, even though no commercial flights currently authorized to fly there.
- Speculation driving coastal property prices up.
- New tourist products being aggressively marketed, involving speedboats carrying hotel-based tourists from port to port, further driving land based investment.
- Ease of access to global seafood markets resulting in the rapid commercial exhaustion of high value species, legal and illegal.

Galapagos is shifting into an economic development model that is fundamentally at odds with long term conservation and sustainable development interests. Galapagos is becoming an attractive destination for an increasing number of economic migrants, further driving population growth. This growth is actively encouraged by government subsidized fuel, electricity and transportation of people and goods from the continent. As has been demonstrated in all island ecosystems, if human presence and activities cannot be successfully decoupled from the process of introduction of alien species, the end result is a massive loss of native and endemic biodiversity.

Firm action must be taken now to establish the limits within which the nature and extent of future growth is to take place, with a particular focus on improving local capacity to participate in a strictly limited and highly controlled tourism industry dedicated to low impact activities, leading to an increase in the overall standard of living for Galapagos residents. Economic development policies could also be directed towards supporting private sector involvement in conservation work. Under these circumstances, the current focus on land based tourism represents a potentially large threat.

Based on these observations, it is fair to conclude that unless the economic model for Galapagos is fundamentally restructured, any efforts at managing the principal threats to the islands are likely to fail, especially in an environment of chronically weak governance. Under these circumstances, the chances of conserving this WH site's OUV in the medium to long term are slim.

It is not difficult to imagine a Galapagos, where a combination of i) a well conserved natural environment; ii) strictly limited tourism and iii) continued growing international demand combine to lead to the rapid development of sustainable, very high quality tourism products commanding high prices, and resulting in very important economic benefits for Ecuador in general and Galapagos residents in particular, including fishermen looking for alternatives. At the same time, this tourism could play a fundamental role in financing the management and research costs of maintaining the ecological integrity of the islands. To achieve this goal, the government of Ecuador would need to keep on taking bold measures, as it has repeatedly done in the past, focusing on establishing and respecting strict limits, managing migration, supporting targeted capacity building for residents, assuring the robustness of its agencies in the islands, and building a state-of-the-art inspection and quarantine system.

## PART VI: RECOMMENDATIONS

Based on the information obtained during the mission and on further discussions with IUCN and UNESCO WH Centre and Science Sector staff, the following general recommendations are proposed. The mission team report, and these general recommendations, form the basis upon which the World Heritage Committee will make its decisions in regards to the Galapagos World Heritage property.

Issue	Recommended Outputs / Actions	Possible Indicators	Suggested Target Dates		
			July 2007	July 2008	2011
<b>Restoring the Ecological Barrier</b>	➤ Implement a firm ban on new commercial air and marine entry points in Galapagos.	➤ Legal instrument adopted at national level (e.g. Civil Aviation Authority, Merchant Marine Authority)	X		
	➤ Designate Guayaquil as the only point from which aircraft and commercial vessels may legally travel directly to Galapagos.	➤ See above.	X		
	➤ Develop and implement optimal internal transportation system within Galapagos to reduce risk of dispersal of species.	➤ System in place, in use.		X	
	➤ Replace or retrofit unsuitable cargo ships serving Galapagos to comply with strict phytosanitary standards.	➤ Cargo ships serving Galapagos meeting international phytosanitary and quarantine standards.			X
	➤ Ensure that a protocol for the systematic decontamination of all cargo ships and aircraft prior to arriving in Galapagos is developed and applied.	➤ Regular monitoring reveals full compliance.	X		
	➤ Develop and implement a system whereby passengers traveling to Galapagos complete a declaration on transport of organic materials and implement a system of fines to discourage illegal transport.	➤ System in place.	X		
	➤ Develop and begin implementing a strategy to reduce the number of air and marine entry points to Galapagos to one highly professionalized and technologically advanced centre.	➤ Strategy developed with formal support from INGALA, and under implementation.			X
	➤ Inter-island transportation of people and goods should also be subjected to systematic inspection.	➤ 100% of Inter-island traffic is subjected to the SESA-SICGAL inspection.		X	
	➤ The GoE should assume greater financial responsibility for SESA-SICGAL and not rely almost exclusively on the park entrance fee and inspection fees to finance it.	➤ All professional staff of SESA-SICGAL are employees of the ministry of agriculture.		X	
	➤ An in-depth review of the inspection fee system should be carried out with a view to having users of the inspection pay the full cost of its operation.	➤ The system is reviewed, and the fee is revised accordingly.	X		
	➤ SESA-SICGAL has the necessary complement of staff and equipment to effectively carry out its responsibilities.	➤ All entry points in Galapagos and all continental departure points are fully staffed and able to deal with the volumes of cargo and passenger traffic.		X	
	➤ Develop and implement measures that will reduce the risk of dispersing species between islands by cruise ships.	➤ Regular monitoring reveals full implementation of control measures.		X	

Issue	Recommended Outputs / Actions	Possible Indicators	Suggested Target Dates		
			July 2007	July 2008	2011
Shoring up the integrity of the Galapagos Marine Reserve	➤ A protocol for ship ballast waters should be developed and implemented, if deemed necessary.	➤ A needs assessment has been carried out and recommendations are implemented.		X	
	➤ Ensure that the GNPS is given all the necessary financial and human resources to make full use of its existing GMR patrolling infrastructure	➤ GNPS patrol vessels and observation posts are in full use.	X		
	➤ The government supports incentives to reduce the fishing capacity in Galapagos so that sustainable fisheries of high value species can be better assured.	➤ The number of registered fishermen has dropped by 200 and ships by 100.		X	
	➤ The government passes a nationally binding instrument that will restrict the reversal of any future reduction in fishing capacity for Galapagos.	➤ Instrument is passed.		X	
	➤ Implement modern ship tracking technologies in support of the monitoring of the GMR	➤ All registered fishing, tourism and commercial vessels participate in a satellite based tracking system that is monitored by the GNPS.			X
	➤ All laws and regulations of the GMR should be effectively and equitably enforced, with no reports of exceptions being made.	➤ Increase number of arrests and convictions.	X		
Guaranteeing sustainable tourism	➤ Set a strict, nationally binding limit on the number of people arriving as tourists to Galapagos to 2005 levels.	➤ Binding commitment is made.	X		
	➤ Indefinitely freeze the total number of authorized cruise ship berths at 2005 levels.	➤ Number of berths is restricted to 2005 levels.	X		
	➤ Establish a definite policy on sports fishing, and ensure that it is strictly implemented.	➤ Policy is adopted by INGALA and enforced by the GNPS, Naval forces.	X		
	➤ Ensure that Galapagos residents can access training, education and capacity building programmes to help them access the various employment opportunities within the tourism industry.	➤ Programmes designed and implemented		X	
➤ Proportion of non-residents occupying jobs in Galapagos reduced by 25%				X	

Issue	Recommended Outputs / Actions	Possible Indicators	Suggested Target Dates		
			July 2007	July 2008	2011
Strengthening governance and institutional capacity	➤ The government of Ecuador makes a clear national level commitment to upholding the SLG and the institutions responsible for implementing it.	➤ National level announcement is made.	X		
	➤ Establish and implement a systematic repatriation programme for illegal immigrants to Galapagos.	➤ 25% of identified illegal immigrants have left Galapagos.	X		
	➤ Senior positions in INGALA and SESA-SICGAL are selected using a transparent process, and their stability is enhanced.	➤ The process used to hire the GNPS director is replicated for INGALA and SESA-SICGAL.	X		
	➤ INGALA should assume its full role as the central regional planning agency and develop a Galapagos level planning framework, based on the precautionary principle outlined in the SLG, and under which municipal development plans must conform.	➤ All development related decisions proposed by municipal governments need INGALA approval before proceeding.	X		
Developing a common vision for Galapagos	➤ The government of Ecuador should seek greater participation from the various stakeholder groups in Galapagos, and from the international community, in developing its vision. It is encouraged to approach UNESCO-MAB for support in this process.	➤ A clear workplan with budget, outlining the necessary resources for carrying out an in-depth multi-stakeholder visioning process in Galapagos is developed and financed.	X		
		➤ The process is carried out.		X	
Consolidating the capacity to deal with introduced species threats	➤ Secure adequate sustainable financing for research and implementation of initiatives targeting the control and eradication of introduced invasive species.	➤ The UNDP-GEF trust fund for the control and eradication of invasive species is fully structured.	X		
		➤ The UNDP-GEF trust fund is capitalized to at least USD15M, preferable to USD30M.		X	
		➤ The basic operational costs of the Charles Darwin Foundation are endowed to assure their financing in perpetuity.		X	
	➤ Municipal governments, which received US\$1.5M in 2005 from the park entrance fee, should ensure that their CIMEIs are sufficiently resourced to deal with introduced species issues in urban areas.	➤ CIMEIs have full-time dedicated staff and an operational budget in all three municipalities.		X	
	➤ Ensure that idle agricultural lands do not become centres of propagation and dispersal of introduced species into active agricultural lands and into park lands.	➤ Landowners are actively engaged in carrying out land management practices that reduces the risk of propagation and dispersal of introduced species, either with the support of public programmes, and/or by the application of penalties for inaction.		X	

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**ANNEX 2:** List of key activities and meetings carried out during the mission

**Feb. 28** Quito

1. Ex-director, Charles Darwin Research Station

**March 1** Quito

1. Mtg with deputy Minister of the Environment and deputy minister of Tourism.
2. Donor's Roundtable (WB, UNDP, DGCS, AECI, JICA, Dutch Cooperation, USAID, KFW) with participation of the Ministry of the Environment, Ministry of Foreign Affairs and IUCN;
3. Mtg with National Committee of MAB Programme
4. Mtg with Conservation International
5. Mtg with ASOGAL (Association of Galapagos Tourism Businesses)
6. Mtg with Charles Darwin Foundation (HQ in Quito).

**March 2** Quito

1. Mtg with IUCN-SUR;
2. Mtg with Ministry of the Environment (presentation of the 2020 Initiative, update on the adoption and implementation of new management plan for GNP and issues associated to tourism development);
3. Mtg with Ministry of Foreign Affairs;
4. Mtg with CEDEMA (National Conservation NGO lobby group)

**March 3** Travel from Quito to Santa Cruz Island, Galapagos.

1. Meeting with representatives and experts of the Galapagos National Park (GNP) and the Charles Darwin Foundation (CDF).
2. Mtg with Conservation International, Galapagos coordinator
3. Mtg with Member of the National Assembly

**March 4** Santa Cruz Island, Galapagos

1. Mtg with SESA-SICGAL (Sta. Cruz Unit)
2. Mtg with INGALA's Technical Planning Unit;
3. Mtg with Mayor of Sta. Cruz municipality;
4. Mtg with Representatives of the local media;
5. Mtg with CAPTURGAL (Galapagos Chamber of Tourism)
6. Mtg with Fishermen Cooperative of Santa Cruz;
7. Mtg with Representative of Ministry of Education in Santa Cruz.

**March 5** Santa Cruz Island, Galapagos

1. Field visit to: (a) sanitary landfill; (b) small gravel pit concessions; (c) forest areas affected by invasive species; (d) new urban development areas; (d) recycling centre of Santa Cruz.

**March 6** Santa Cruz Island, Galapagos

1. Full day technical working session on: (a) new management plan and implementation strategy for GNP; and (b) new strategic plan of the CDF, with GNPS and CDF.

**March 7** Travel from Santa Cruz to Villamil, Isabela by boat.

1. Mtg with local management unit of GNPS and CDF;
2. Mtg with local authorities of INGALA;
3. Mtg with specialists of SESA-SICGAL;
4. Mtg with mayor of municipality of Villamil;

5. Mtg with fishermen Cooperative of Isabela.
6. Visit to new urban development areas in Isabela and to the expanded airport terminal under construction.

**March 8** Travel from Isabela Island to San Cristobal Island by boat.

1. Mtg with specialists of SESA-SICGAL;
2. Mtg with authorities and specialties of the Provincial Office of INGALA and representative of the ProIngala project
3. Mtg with mayor of municipality of Puerto Baquerizo Moreno;
4. Mtg with provincial prefect;
5. Mtg with fishermen Cooperative of San Cristobal.
6. Visit to construction works of the “Ecological Waterfront of San Cristobal”.

**March 9** Puerto Baquerizo Moreno, San Cristobal Island, return flight to Quito

1. Mtg with local management unit of GNPS and CDF;
2. Mtg with provincial Director of the Ministry of Education;
3. Debriefing session with Provincial Office of INGALA.
4. Informal interview with representatives of national and provincial press
5. Flight back to Quito
6. Mtg with ex-minister of the environment

**March 10**

1. Mtg with the Minister of the Environment, and deputy minister of Tourism.
2. Debriefing meeting with representatives of the Ministry of the Environment, the Ministry of Foreign Affairs, office of the President and representatives of UNDP and the Ecuadorian Parliament. End of the mission.

Annex 3: Sports fishing  
tournament advertisement



*Tenth Annual  
Father & Son Billfish Classic Tournament  
2006  
The Galapagos Islands, Ecuador*

THREE WEEKENDS  
AVAILABLE



June 3 – 5  
June 10 – 12  
June 17 – 19

*There will be prizes and awards!!*

ENTRY FEE: \$4,500 per Team includes:

- Ground transfers between all airports and hotels in Ecuador
- First night at the Four Points Sheraton Hotel in Guayaquil
- Roundtrip airfare between Guayaquil and San Cristobal Island, Galapagos
- 4 nights at Miconia Hotel
- 3 Full days of fishing aboard the tournament boats
- Beer, sodas and lunches on the boat
- A complimentary T-Shirt of your size
- Final night at the Four Points Sheraton Hotel in Guayaquil
- All hotel taxes included

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**40 marlin raised per  
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