

# THE TOTAL CONTROL PLAN FOR INVASIVE SPECIES IN THE GALAPAGOS ARCHIPELAGO, ECUADOR

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## Contents

<b>1. BACKGROUND</b>	<b>2</b>
<b>2. THE TOTAL CONTROL OF INTRODUCED SPECIES</b>	<b>3</b>
2.1 Coordinating mechanisms	4
2.2 Strategic plans	5
<b>3. STRATEGY TO PREVENT THE ARRIVAL AND ESTABLISHMENT OF NEW EXOTIC SPECIES</b>	<b>5</b>
3.1 Strategic plans	6
<b>4. STRATEGY TO RESPOND TO THE PRESENCE OF ESTABLISHED EXOTIC SPECIES</b>	<b>7</b>
4.1 Strategic plans	7
<b>5. STRATEGY FOR THE STRENGTHENING OF REGIONAL CAPACITY TO MANAGE INTRODUCED SPECIES</b>	<b>8</b>
5.1 Strategic plans	8
<b>6. REGIONAL PLANNING AND FUNDING MECHANISMS FOR THE TOTAL CONTROL STRATEGY</b>	<b>8</b>
<b>7. WEAKNESSES AND LIMITATIONS</b>	<b>9</b>
<b>8. THE WAY FORWARD</b>	<b>9</b>



## 1. BACKGROUND

### Considering that:

- The Galapagos islands are internationally recognized as an area of importance for their contribution to global biodiversity; 95% of original biodiversity still exists;
- There is an exceptionally high level of endemism, and inter-island variability is also very high.
- In the 468 years since the arrival of man in Galapagos and its subsequent human colonization, it has been estimated that the arrival of organisms has accelerated enormously in comparison with natural levels;
- At present, there are more than 500 species of plants, almost 600 of invertebrates and 28 species of introduced vertebrates;
- There can be a considerable interval between the introduction of a new species and the appearance of invasive characteristics;
- The unique character of Galapagos ecosystems makes it difficult to predict the impact of exotic species;
- All introduced species must be considered potentially invasive, given the that there is a wide range of habitats and environments on the Galapagos which may favour a wide range of species, and their typically “disturbed” nature, ecologically;
- Invasive species do not recognize barriers or zones, and many species have a negative impact equally in the National Park as in the urban and agricultural zones;
- Agricultural production is limited by soil conditions, scarcity of water for irrigation and the presence of pests and diseases (exotic species);
- There is a high risk of the arrival of introduced species in the marine Reserve, through the vectors of ballast and bilge water, and hull fouling;
- Invasive species as a consequence of human activities have been identified as the main threat to the biodiversity and economy of the archipelago;
- The risk of the introduction of new species continues to be high;
- The Special Law for the Conservation and Sustainable Development in Galapagos Province (1998) provides the legal framework for addressing the problem of introduced species;
- The Regulation for the Total Control of Introduced Species in Galapagos Province (2003) is the principal legislation in the Province to regulate introduced species issues;
- Current attitudes towards conservation in the archipelago are not always positive, the local community has little or no contact with Galapagos outside the inhabited areas and therefore does not value its biodiversity;

The Galapagos Islands are internationally recognized for their biodiversity.

The unique character of Galapagos ecosystems makes it difficult to predict the impact o

The legal framework to manage exotic species exists.

The community must be educated to understand the consequences and costs of short, medium and long-term mitigation activities.

the Galapagos community must become partners in their own development and take responsibility for actions for sustainable development and conservation;

- The community needs to be educated to understand the consequences and costs of short, medium and long-term mitigation activities, and to make good decisions;
- Human population growth (by migration and birth) is very high.
- Governance in the province is poor.

The objective of total control is to: “provide a sustainable strategy in the long-term to reduce the impact of introduced species”

## 2. THE TOTAL CONTROL OF INTRODUCED SPECIES

- The Regulation of Total Control, 2003, has twelve objectives which together define the concept of total control of introduced species;

- The objective of total control of introduced species is to:

“Provide a sustainable strategy in the long-term to reduce the impact of introduced species in the Galapagos Islands”

- In order to achieve the total control of introduced species, three strategic directions are proposed:
  - Prevention of the arrival and establishment of new exotic species in the archipelago;
  - Reaction to the presence of existing exotic species;
  - Strengthening of regional capacity to manage the problems raised by introduced invasive species.
- Four activities are recognized as essential to the effective implementation of all three strategic directions:
  - Strengthening the mechanisms for collaboration and inter-institutional coordination;
  - Improved communication, both within Galapagos and outside the province;
  - Environmental education, specifically of the local community;
  - Facilitation of the acquisition of skills and improvements from outside the Galapagos. It is notable that high levels of expertise are available around the world, often free to prestige sites such as Galapagos, and these are currently largely unexploited.

Three strategic directions are proposed:

- Prevention,
- Reaction, &
- Strengthening of regional capacity.

The table below indicates the areas of consideration for each of the three strategies, which are covered in more details in the following sections.

Strategy	Areas of consideration	Responsible	Comments
PREVENTION	<ul style="list-style-type: none"> <li>• Border control – inspection &amp; quarantine</li> <li>• Detection – monitoring, surveillance &amp; early detection.</li> <li>• Early incursion response (risk assessments, contingency plans)</li> <li>• Containment of introduced species already present</li> </ul>	SESA-Galapagos CDF GNP	= SICGAL  Species and pathway oriented mitigation activities
REACTION	<ul style="list-style-type: none"> <li>• Prioritization of sites and/or target introduced species for action</li> <li>• Implementation of management plans</li> <li>• Instigation and implementation of eradication and control plans</li> </ul>	GNP DPA SESA Municipalities	Site oriented mitigation activities
STRENGTHENING OF REGIONAL CAPACITY	<ul style="list-style-type: none"> <li>• Local economic and technical management mechanisms</li> <li>• Sustainable (ecological and economic) development policies</li> <li>• Planning and optimization of resource use</li> <li>• Linkages to external support (technical, finance etc).</li> </ul>	INGALA	

## 2.1 Coordinating mechanisms.

The principal organizations involved in the issue of introduced species are: the Charles Darwin Foundation (CDF), the Galapagos National Park (GNP), the Ecuadorian Agricultural Health Service, Galapagos office (SESA Galapagos), the provincial Technical Office (DTA) of the Ministry of Agriculture, and the municipalities.

The planning and coordination body in the province is the Galapagos National Institute (INGALA).

Coordination mechanisms established by law are:

- The INGALA Council is defined in the Special Law for Galapagos, 1998, with the role of approving the regional policies for conservation and sustainable development in Galapagos, and approving the regional plan. The Council acts with the advise of the Technical Planning Committee. There are thirteen members:
  - Minister of the Environment, who presides
  - Minister of Finance and Public Credit
  - Minister of National Defense
  - Minister of Tourism
  - Minister of External Affairs, Industry and Fishing
  - Executive Director of INEFAN, or delegate
  - Provincial Prefect
  - Representative of the three municipalities
  - President of the Tourist Chamber of Galapagos, CAPTURGAL
  - Representative of the artesian fishermen of Galapagos
  - President of the Ecuadorian Committee for the Defense of Nature and Wildlife, CEDENMA

The coordinating mechanisms established by law are the INGALA Council and the Provincial Agricultural & Quarantine Health Committee.

- Representative of the agricultural sector
  - Provincial governor
- The CDF is also a member, but has no vote.

- The Provincial Agricultural Health and Quarantine Committee, the provincial authority designated under the Regulation for the Total Control, 2003, responsible for planning and regulating compliance of zoosanitary and phytosanitary activities, and to define the policies and strategies for the total control of introduced species. There are five members:
  - SESA Galapagos, which presides
  - Galapagos National Park
  - Representative of the three municipalities
  - Representative of the agricultural sector
  - Representative of the business sector

## 2.2 Strategic plans

Under the Regulation for Total Control the Provincial Agricultural Health and Quarantine Committee is responsible for producing five five-year strategic plans. At a workshop held in December 2003 by the Committee with invited representatives of other key organizations in Galapagos, a further five plans were defined, to give a total of 10 which together fulfill the definition of total control as given in the Regulation for Total Control 2003.

- The general objective is expressed as the future vision, the position desired in five years time;
- The plans serve to identify the priority activities which must be implemented, started or funded, those necessary in order to achieve the future vision defined in the general objective;
- The objective of the plans is also to identify the existing gaps and to provide a framework for quarantine related activities aimed at sustainable (ecological and economic) development in the province.

The plans serve to identify the activities necessary in order to achieve the vision of the future.

These 10 plans have been drafted, and are presented under the strategic direction to which they correspond in the following sections.

It is more cost-effective to prevent the arrival of a new species than manage it afterwards.

## 3. STRATEGY TO PREVENT THE ARRIVAL AND ESTABLISHMENT OF NEW EXOTIC SPECIES

Risk should be managed offshore as much as possible, and effective prevention of the arrival of new species by pathway and vector management is the key to achieving total control of introduced species at the regional level. It is more cost-effective to prevent the arrival on a new species than manage it afterwards. Three barriers exist.

- The first barrier is the inspection and quarantine system in the airports and ports on the continent and in Galapagos, using methods based on pest risk analysis of imported products and goods;
- No system can guarantee the complete prevention of introduction of new species, for logistic reasons and the fact that there are always people determined to smuggle in prohibited or infested products;

There are three barriers:

1. Inspection and quarantine,
2. Surveillance,
3. Rapid response.

- The second barrier is surveillance, the animal and plant health monitoring systems and early detection, designed to detect the arrival of new species which have slipped through the first barrier. This also detects changes in the distribution of introduced species already established;
- Risk analysis, and subsequent optimization of resources;
- The third barrier is a Rapid Response System (RRS), an immediate response to plant and animal health outbreaks, due to the incursion of undesirable organisms or of exotic species already established;
- It is recognized that the best opportunity to eradicate a new species exists in the early stages of establishment, and that lack of knowledge or confidence do not justify postponement of implementation of mitigation activities. Rapid access to outside expertise and technical support can be important, especially in the event of new types of invasive species
- The RRS comprises an inter-institutional rapid response team, the RRT, and pre-designed action plans which allow a rapid and efficient response;
- There is a close link between the vigilance system and that of rapid response to ensure a rapid reaction when a new exotic species or an outbreak is detected;
- In the Marine Reserve, due to lack of information on the status of marine species as native or introduced, the emphasis in the short-term is on the prevention of arrival of new species in ballast and bilge water, and via hull fouling;
- In the long-term, further inventory work is required to upgrade the capability of being able to identify new incursions.

In the Marine Reserve the short-term emphasis is on the prevention of arrival of new species.

### 3.1 Strategic plans

Six plans correspond to the prevention strategy.

Plan	General objective	No. activities
1. Sustainability of the Quarantine and Inspection Service for Galapagos, SICGAL.	SICGAL technically strengthened with a high level of professionalism by the quarantine officials, and with adequate and secure funding for compliance with its legal responsibilities. The organization responsible for its management, SESA Galapagos, strengthened as the decentralized operative institution.	58 47% funded at least partially
2. Zoosanitary and phytosanitary vigilance, and monitoring of introduced species.	Efficient and well managed permanent surveillance system in place, allowing the rapid identification of introduced species.	15 94% funded at least partially
3. Global response to Zoosanitary and phytosanitary emergencies.	Pests and diseases declared emergent controlled opportunely and efficiently.	28 68% funded at least partially
4. Training of associations involved in the transport and commercialization of	Raised level of awareness of exotic species issues (skills, practices and knowledge) of people involved in the transport and commercialization of goods and services, so that their introduction	16 31% funded at least partially

agricultural products and other inputs.	is avoided and mechanisms of regulation and control are strengthened.	
5. Information dissemination to the Galapagos community, working visitors and tourists	Knowledge raised and behaviour improved on the regulations and norms of SICGAL and the total control of introduced species.	18 72% funded at least partially
6. Management of invasive species in the marine reserve.	Reduced risk of arrival and dispersion of new marine invasive species.	16 31% funded at least partially

#### 4. STRATEGY TO RESPOND TO THE PRESENCE OF ESTABLISHED EXOTIC SPECIES

Activities in the strategy of reaction to the presence of established exotic species have the objective of ecosystem restoration and are guided by two principles:

- Maintain uninhabited islands as close as possible to the pristine state;
  - Maintain or improve the present condition of populated islands.
- Actions are principally those of eradication and control, based on scientific knowledge of target and non-target species, and the impact of methods used;
  - Research is a fundamental component for understanding the impact of invasive species, and planning how to go about controlling or eradicating them, partly because their ecology on the Galapagos is different compared to their place of origin
  - Research also evaluates the effect of mitigation activities on the beneficiaries: the native and endemic ecosystems, agro-ecological ecosystems and/or urban environment ecosystems;
  - Decision making for the selection of sites for mitigation activities should be based on a prioritization system;
  - Eradication should always be the first option wherever possible, eradication is always much more cost-effective than continuous control, and technology and expertise now available worldwide makes this increasingly viable.

Reaction activities are guided by two principles:

1. Maintain uninhabited islands as close as possible to the pristine state;
2. Maintain or improve the present condition of populated islands.

Decision-making for site selection is based on a prioritization system.

##### 4.1 Strategic plans

Plan	General objective	No. activities
7. Control and Eradication of introduced species.	The impact of introduced organisms mitigated, contributing to the conservation of biodiversity, the economic sustainability of agricultural activities and the maintenance of human health, through the prioritization of scientific, technical and financial resources.	30 73% funded at least partially
8. Promotion of agricultural production.	Existing pests and diseases managed, new introductions reduced and resources dedicated to optimal control, through the implementation of projects supporting local substitution of products which are currently being imported.	39 28% funded at least partially

## 5. STRATEGY FOR THE STRENGTHENING OF REGIONAL CAPACITY TO MANAGE INTRODUCED SPECIES

All the activities of prevention and reaction involve various local organizations working together, and it is necessary to strengthen the regional capacity so that they can each comply with their responsibilities.

- Strengthening of regional capacity includes:
  - Institutional strengthening;
  - Capture and management of funds:
    - For specific projects
    - For daily and continuous activities of inspection, animal and plant health activities, monitoring and the RRS
  - Optimization of resource use;
  - Planning and the planning process;
  - 
  - Establishment of good governance practices.
  
- Due to the important influence which migration exerts over the introduction of potentially invasive species, it is necessary to develop and apply policies and instruments to decrease the rate of population growth in the region;
  
- Many activities outlined in the plans of the three strategic directions depend on the development of a regional land-use planning system;
  
- Good decision-making is based on an analysis of the associated biological, social and political characteristics and is made via a prioritization system. A prioritization system specific to Galapagos is a fundamental tool for regional planning, and its development is included in the strategy.

It is necessary to strengthen regional capacity so that they can comply with their responsibilities.

Decision-making is based on a prioritization system.

### 5.1 Strategic plans

Plan	General objective	No. activities
9. Strengthening of the Provincial Agricultural Health and Quarantine Committee.	A strengthened committee, trained and financed, recognized as the technical provincial authority, and with a solid structure.	21 86% funded at least partially
10. Strengthening of regional capacity for the management of introduced species.	Galapagos province has organizations capable of regulating, planning and implementing mitigation activities for introduced species, working together, taking decisions based on biological, ecological, social and political criteria, and with a high level of community participation.	23 100% funded at least partially

## 6. REGIONAL PLANNING AND FUNDING MECHANISMS FOR THE TOTAL CONTROL STRATEGY

- The Regional Plan establishes the strategy to achieve sustainable development, and defines the needs and priorities for the province. The Plan includes guidelines for the implementation of, among other things, the total

The Regional Plan defines the direction of all development and conservation

control plan for introduced species<sup>1</sup>;

- Sectoral planning consists of the Galapagos National Park Management Plan and the Municipality Cantonal Plans, produced with extensive public consultation of stakeholders within the Province;

The total control strategy forms a horizontal axis in the regional planning process. It is illustrated in the following diagram, with the widest cover at the top and the narrowest at the bottom:



The total control plan is the mechanism to determine which activities are funded within the National Park Management Plan

- A trust fund is being created under the GEF project to fund activities associated with introduced species in the Galapagos National Park Management Plan. Which activities are funded will be determined by the total control plan.

## 7. WEAKNESSES AND LIMITATIONS

- The 10 plans do not actually cover the full range of activities which need to be included in a total control strategy. They have a more narrow focus, some very specific, and are also primarily geared to quarantine issues;
- A large proportion of the activities defined in the 10 plans are unfunded at present; this situation has compounding effects – funding some activities has a huge roll-on effect to others because of co-dependency linkages.
- The law demands actions from the coordinating mechanisms which:
  - They are technically unable to fulfill;
  - They are financially unable to fulfill.
- Some of the processes defined by the law are not yet implemented, for example the Technical Committee of INGALA has not yet met. This committee gives technical advise to the INGALA Council.

The 10 plans have a narrow focus, primarily geared to quarantine issues

A large proportion of the activities defined in the plans are unfunded

## 8. THE WAY FORWARD

These 10 plans represent the first step in the development of the total control plan for introduced species. Note that they do not themselves form the total

<sup>1</sup> Reglamento a Le Ley Especial para la Provincia de Galápagos, Decreto Ejecutivo No. 1657, 2000, Artículo 5.

control plan, they are merely the first step in its formulation being based on the existing legal requirements and mechanisms.

The next proposed steps are as follows:

- Socialize the plans in the local and wider community.
- Ensure that the activities defined are adopted as part of the annual operating plans of the organizations involved.
- Identify the priority activities which lack funding.
- Strengthen the coordination mechanisms.
- Carry out a gap analysis of the 10 plans and revise them accordingly – to work out systematically the cross dependencies of activities and the implications of various activities not being done or only being half done; and generate a series of scenarios which show the consequences of partial or no completion of various inter-related activities between the plans.
- Carry out an analysis of the main weaknesses in the implementation of the plan and develop a strategy to overcome them.
- Widen the remit of the plans as defined in the Regulation, with a biosecurity focus.
- Widen the remit of the Provincial Quarantine Committee, with a biosecurity focus.
- Revise the Regulation for Total Control of Introduced Species, to include the final set of plans.
- Define the functioning of the funding mechanism for activities included in the Galapagos National Park Management Plan.
- Define the funding mechanisms for activities not included in the Galapagos National Park Management Plan.
- Carry out an assessment of the various activities in the plans which could be supported by offshore assistance (not necessarily financial) and the implications to the 10 plans

The 10 plans represent the first step in the formulation of the total control plan

A wider focus is required – biosecurity, rather than just quarantine. Funding mechanisms need to be defined.

These steps will all be carried out in collaboration with the four key organizations: CDF, GNP, SESA-Galapagos and INGALA.

