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**United Nations Development Programme  
Country: Mexico  
PROJECT DOCUMENT<sup>1</sup>**

**Project Title: Enhancing National Capacities to Manage Invasive Alien Species (IAS) by Implementing the National Strategy on IAS**

**UNDAF Outcome(s):** Direct effect 6. Environmental sustainability and green economy. All three levels of government, the private sector, academia and civil society will have strengthened their capacities to reverse environmental deterioration, and to sustainably develop natural resources through mainstreaming environmental sustainability, low emissions development, and green economy in the legislative, programming and decision making processes

**UNDP Strategic Plan Environment and Sustainable Development Primary Outcome:** Growth is inclusive and sustainable, incorporating productive capacities that create livelihoods for the poor and excluded

**UNDP Strategic Plan Secondary Outcome:** (f) Countries are able to reduce and manage risks of conflict and natural disasters, including from climate change.

**Expected CP Outcome(s):**

*CDP (2014-2018) "Promoted risk disaster and low-emission, resilient and environmentally sustainable development strategies, with a gender and multicultural approach for poverty reduction and equity".*

**Executing Entity/Implementing Partner:** National Commission for Knowledge and Use of Biodiversity (CONABIO)

**Implementing Entity/Responsible Partners:** National Commission of Natural Protected Areas (CONANP) and Grupo de Ecología y Conservación de Islas, A.C. (GECI)

**Brief Description**

Mexico is one of 12 mega-diverse countries in the world, with high percentages of endemic species, ecosystem diversity, and genetic variability. In global terms, Mexico has the 2<sup>nd</sup> highest number of reptile species (804), 3<sup>rd</sup> highest number of mammals (535), 5<sup>th</sup> highest number of amphibians (361) and vascular plants (22,232), and the 8<sup>th</sup> highest number of birds (1,096). Mexico is also notable for its very high level of species endemism, with approximately 10,000 endemic species identified in the country. Mexico's National Biodiversity Strategy highlights IAS as a critical threat to biodiversity and proposes numerous actions to reduce IAS impacts. IAS are capable of displacing native species through competition, predation, habitat alteration, disease, etc., and can cause changes in ecosystems functions and conditions such as imbalances in food webs; and alteration, degradation and fragmentation of habitat. The effects of IAS are particularly devastating in insular environments; IAS are the leading cause of biodiversity loss on islands. The Government of Mexico (GoM) has made considerable baseline investments to address the threat of IAS, including a well-established system of inspection, quarantine and response to reduce the introduction and spread of IAS in the country. However, previous investments have focused overwhelmingly on productive sectors, in particular agriculture, livestock and forest products, as well as human health, and activities to address IAS that pose a threat to biodiversity and ecological functioning have been minimally funded. In response to this situation, the objective of the proposed project is to safeguard globally significant biodiversity in vulnerable ecosystems by building capacity to prevent, detect, control and manage IAS in Mexico. The project will take actions at two levels:

1. At the national level, the project will support the implementation of the National Strategy on Invasive Species (NSIS) and its objectives for strengthening national-level management effectiveness and orienting it more concretely towards biodiversity conservation. The project will develop improved information resources on IAS, establish priority setting and decision-making tools, strengthen capacity of key institutions, and integrate critical partners (targeted production sector stakeholders) into IAS prevention and control actions. The project also will address policies, regulations, capacities and tools to reduce or eliminate harmful practices in key productive sectors (aquaculture; aquarium trade, wildlife products and forest products) that are main IAS pathways for entry into Mexico and dispersion to high priority conservation areas.

<sup>1</sup> For UNDP supported GEF funded projects as this includes GEF-specific requirements

2. At the site level, the project will demonstrate effective IAS management in high priority conservation areas that harbor globally significant ecosystems. The primary emphasis at the site level will be on preventing the entry and spread of IAS into these areas through prevention and early detection and rapid response systems, in order to prevent IAS impacts at the source and thereby avoid costly control and eradication efforts. The project will promote integrated IAS planning and coordination at 9 mainland PA sites and 6 island sites, including the first biosecurity plans at these sites. The project also will work with local residents and producers to reduce the potential IAS impacts stemming from productive activities within and surrounding conservation areas (e.g. use of exotic species in forestry, gardens, agriculture, and aquaculture production activities). The project also will support measures to address IAS already present at some of these areas, specifically at sites where existing IAS are having a severe impact on biodiversity and/or ecosystem functions, and where control and eradication measures can be cost effectively implemented with a high likelihood of success.

Programme Period:	2014 - 2019
Atlas Award ID:	00062484
Project ID:	00079980
PIMS #	4714
Start date:	15/02/2014
End Date	31/12/2017
Management Arrangements	NIM Project
PAC Meeting Date	To be held in 2014

<b>Total resources required</b>	<b>31,488,305</b>
<b><i>Total allocated resources (grant):</i></b>	<b><i>25,237,088</i></b>
• GEF:	5,354,545
• CONABIO:	4,657,468
• CONAFOR:	10,000,000
• CONANP:	1,619,075
• GECI:	2,595,000
• INECC:	138,000
• SEMARNAT:	250,000
• UNDP:	600,000
• Various universities:	23,000
<b><i>Total In-kind contributions:</i></b>	<b><i>6,251,217</i></b>
• CESAEM:	83,000
• CONABIO:	616,153
• CONANP:	800,000
• FCEA:	75,000
• GECI:	180,000
• IMTA:	1,295,453
• INAPESCA:	833,333
• INECC:	9,000
• PROFEPA:	2,000,000
• SEMARNAT:	47,611
• Various universities:	311,667

Agreed by (Government):

\_\_\_\_\_  
Date/Month/Year

Agreed by (Executing Entity/Implementing Partner):

\_\_\_\_\_  
Date/Month/Year

Agreed by (UNDP):

\_\_\_\_\_  
Date/Month/Year

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## Acronyms

APR	Annual Progress Report
AWP	Annual Work Plan
CBD	Convention on Biological Diversity
CCF	Country Cooperation Framework (UNDP)
CESAEM	Morelos State Committee for Aquaculture Health
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CO	(UNDP) Country Office
COFEMER	Federal Regulatory Improvement Commission
COLPOS	Postgraduates College (Colegio de Posgraduados)
CONABIO	National Commission for the Knowledge and Use of Biodiversity
CONAFOR	National Forestry Commission
CONAGUA	National Water Commission
CONANP	National Commission of Natural Protected Areas
CONAPESCA	National Commission of Aquaculture and Fisheries
DEPC	Office of Conservation of Priority Species (CONANP)
DGGFyS	General Directorate of Forest & Soil Management (CONAFOR)
DGVS	Department of Wildlife (SEMARNAT)
ESSP	Environmental and Social Screening Procedure
FCEA	Fund for Communication and Environmental Education
GECI	Island Conservation and Ecology Group (Grupo de Ecología y Conservación de Islas)
GEF	Global Environment Facility
GIS	Geographic Information System
GISP	Global Invasive Species Programme
GoM	Government of Mexico
HDI	Human Development Index
IAS	Invasive Alien Species
IMTA	Mexican Institute of Water Technology
INAPESCA	National Fisheries Institute
INECC	National Institute of Ecology and Climate Change
IPCC	International Plant Protection Convention
LPAC	Local Project Appraisal Committee
M&E	Monitoring and Evaluation
METT	Management Effectiveness Tracking Tool
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NAPPO	North American Plant Protection Organization
NBSAP	National Biodiversity Strategy and Action Plan
NGO	Non-Governmental Organization
NIM	National Implementation Modality

NOM	Official Mexican Standard (regulation)
NPA	Natural Protected Area
NSIS	National Strategy on Invasive Species
PIMV	Wildlife Management Installations
PIR	Project Implementation Report
PPR	Portfolio Progress Report
PROCODES	Conservation Program for Sustainable Development
PROFEPA	Federal Attorney for Environmental Protection
PSC	Project Steering Committee
RCU	(UNDP) Regional Coordinating Unit
RTA	(UNDP) Regional Technical Adviser
SAGARPA	Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food
SBAA	Standard Basic Assistance Agreement
SCT	Ministry of Communications and Transport
SE	Ministry of Economy
SEMAR	Naval Secretariat
SEMARNAT	Ministry of Environment and Natural Resources
SENASICA	National Service of Agro-Alimentary Health, Safety and Quality
SENER	Ministry of Energy
SINAP	National System of Protected Natural Areas
SNFA	Sub-Secretary of Environmental Regulation (SEMARNAT)
TBW	Total Budget and Workplan
UAM	Metropolitan Autonomous University (Xochimilco)
UANL	Autonomous University of Nuevo León
UMA	Conservation and Management of Wildlife Units
UNAM	National Autonomous University of Mexico
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
WHS	World Heritage Site

## SECTION I: Elaboration of the Narrative

### PART I: Situation Analysis

#### CONTEXT AND GLOBAL SIGNIFICANCE

##### *Environmental Context*

##### *Environment & Biodiversity in Mexico*

1. Mexico is one of 17 mega-diverse countries in the world, with high percentages of endemic species, ecosystem diversity, and genetic variability in many taxonomic groups. In global terms, Mexico has the 2<sup>nd</sup> highest number of reptile species (804), 3<sup>rd</sup> highest number of mammals (535), 5<sup>th</sup> highest number of amphibians (361) and vascular plants (22,232), and the 8<sup>th</sup> highest number of birds (1,096). Mexico is also notable for its very high level of species endemism, with approximately 10,000 endemic species identified in the country, including 57% of flora, 11% of birds, 30% of mammals, 48% of amphibians and 45% of reptiles. With over 11,000 km of coastline and territorial waters of 231,813 km<sup>2</sup>, Mexico boasts high marine biodiversity and productivity; there are 1,616 coastal marine fish species, and levels of endemism are estimated at 20% for the Gulf of California and 15% for the Caribbean, Gulf of Tehuantepec and the north of the Gulf of Mexico. The country's 500 main islands and islets host 7% of all Mexican vertebrate and plant species, harbor over 200 endemic vertebrates and 110 endemic plants, provide reproduction sites for turtles, birds and marine mammals, and are situated in biologically productive waters of high economic and social value, particularly for local fishermen. Mexico is also a globally important center of domestication and diversification of crops. Cultivated species in Mexico have many wild relatives that can, or already do, amplify the high genetic diversity of cultivars of many species consumed worldwide, and therefore these species represent a resource of great importance in terms of global food security. Over 15% of plant species consumed worldwide as food have their origins in Mexico. Table 1 below has more details on plants used for food and other functions that originated or were domesticated in Mexico.

**Table 1: Selection of plants that originated or were domesticated in the Mexican territory<sup>2</sup>**

Main Use	Common Name	Species	Origin
Green Manure	Leadtrees	<i>Leucaena esculenta</i> , <i>L. leucocephala</i>	Mesoamerica
Food	Avocado	<i>Persea americana</i>	Mesoamerica
	Cacao	<i>Theobroma cacao</i>	Mesoamerica
	Pumpkin	<i>Cucurbita pepo</i> , <i>C. moschata</i>	Mesoamerica, Tropical America, North America
	Sapodilla	<i>Manilkara zapota</i>	Mesoamerica
	Bean	<i>Phaseolus vulgaris</i>	Mesoamerica
	Guava	<i>Psidium guajava</i>	Mesoamerica, Northern South America
	Jicama	<i>Pachyrhizus erosus</i>	Mesoamerica
	Tomato	<i>Lycopersicon esculentum</i>	Mesoamerica, Northern South

<sup>2</sup> Natural Capital of Mexico: Synopsis - Current knowledge, evaluation, and prospects for sustainability. CONABIO (p. 38)

	Maize Tejocote	Zea mays Crataegus mexicana, C. pubescens Physalis ixocarpa	America Mesoamerica Mesoamerica
	Tomatillo Prickly pear / Nopal	Opuntia albicarpa, O. ficus-indica, O. megacantha	Mesoamerica Mesoamerica
Drink	Magüey cenizo, magüey del cerro Magüey mezcalero, magüey espadín Magüey mezcalero, magüey tobalá Magüey pulquero, ixtle  Magüey tequilero, magüey azul, agave azul	Agave asperrima  Agave angustifolia  Agave potatorum  Agave salmiana  Agave tequilana	Mesoamerica  Mesoamerica, Northern Mexico Mesoamerica  Mesoamerica, Northern Mexico Mesoamerica
Condiment	Achiote Chili peppers Vanilla	Bixa orellana Capsicum annum Vanilla planifolia	Mesoamerica Mesoamerica Mesoamerica
Stimulant	Tobacco	Nicotiana rustica	Mesoamerica
Fiber	Cotton Henequen	Gossypium hirsutum Agave fourcroydes	Mesoamerica Mesoamerica
Rubber	Chicle, chicozapote	Manilkara zapota	Mesoamerica
Waxes	Candelilla	Euphorbia antisyphilitica	Northern Mexico, Southern USA
Ornamental	Cempasúchil, flower of the dead Poinsettia	Tagetes erecta  Euphorbia pulcherrima	Mesoamerica, North America, South America Mesoamerica
Dye	Indigo	Indigofera suffruticosa	Tropical America

### IAS in Mexico

2. Mexico has a long history of contact, colonisation and trade with the rest of the world. It has long land borders with three neighboring countries (USA, Guatemala and Belize), extensive coastlines (11,000 km) on two oceans, 90 ports (47 in the Pacific and 53 in the Gulf of Mexico and Caribbean) with over 6000 ship arrivals per year, and substantial regulated, unregulated (and sometimes illegal) interchange of people (over 300 million crossings per year) and goods at many points of entry. As a result, numerous exotic species have been introduced into Mexico. CONABIO has developed a national database of exotic species across various taxa known to be present in Mexico (Table 2); by 2012 CONABIO's database listed 1,272 exotic species, of which 570 were identified as IAS.

**Table 2: Non-native species recorded in CONABIO's information database (as of 2012)**

<b>Taxon</b>	<b>Invasive species</b>	<b>Exotic species either "not invasive" or "under review"</b>	<b>Total non-native species</b>
Microbes	1	2	3
Fungi	11	0	11
Algae	47	71	118
Plants	266	535	801
Molluscs	18	5	23
Crustacea	36	5	41
Insects	35	3	38
Other invertebrates	29	28	57
Fish	90	12	102



Amphibians	4	1	5
Reptiles	6	3	9
Birds	8	3	11
Mammals	19	2	21
<b>TOTAL</b>	<b>570</b>	<b>670</b>	<b>1240</b>

3. Invasive alien species (IAS) have the potential to alter the ecosystems they invade, cause severe environmental and economic damage, and negatively impact native species (they are one of the most important causes of biodiversity loss globally). The effects of invasive species on native species and ecosystems in Mexico are only minimally understood; a great deal of information collection and analysis remains to be done to assess their true impact. However, studies that have been completed to date indicate that the introduction of invasive alien species into Mexico has produced significant impacts on the natural landscapes, ecological functions, and biodiversity that were assessed. In northern Mexico, exotic grasses such as Buffelgrass (*Pennisetum ciliare*), introduced for use as livestock fodder, have dispersed rapidly across native ecosystems (incl. many protected areas), and have substantially replaced native vegetation cover and modified natural fire regimes. Introductions of exotic species for reforestation, soil conservation and windbreaks, such as giant cane (*Arundo donax*), Casuarina (*Casuarina equisetifolia*), and Salt cedar pine (*Tamarix* sp), have impoverished the diversity of native habitats and reduced the availability of water resources throughout Mexico. Mexico also faces the continuing threat of new introductions, such as the Cactus mealy bug (*Hypogeococcus festerianus*), which poses a major threat to several cactus and epiphyte species, and the cactus moth (*Cactoblastis cactorum*), which has the potential to extirpate dozens of species of Opuntia cactus that are the dominant elements of most of the semiarid zones in the Central Plateau of Mexico. The cactus moth was detected in 2006 on Isla Mujeres in Quintana Roo state, but thanks to the early action of Mexican government authorities, was eradicated in 2008.

4. Mexico's islands are particularly threatened by invasive mammals, including rats, dogs, cats, goats and mice, where they have led to the extinction numerous endemic species and continue to threaten remaining endemic species. Mainland protected areas, which harbor much of the globally important biodiversity in Mexico, are also threatened in numerous ways by a wide variety of terrestrial, aquatic and marine IAS (the Project Site information section below has more details on specific IAS threats to islands and mainland PAs). Similarly, freshwater ecosystems in Mexico such as lakes and rivers are particularly vulnerable to the introduction of alien species, and these ecosystems harbor a high number of endemic species. Mexican government regulations (NOM-059-SEMARNAT-2001) list 169 threatened native species in aquatic ecosystems, of which eight are considered extinct, 68 in danger of extinction, and 74 threatened; together these account for 31% of the native species of Mexico's freshwater ecosystems. Many of these species are threatened by the introduction and spread of exotic fish species through intentional and unintentional actions, as described below.

5. Certain productive sectors have been identified as critical pathways for the introduction of IAS into Mexico. Aquaculture has grown rapidly throughout the country and now exceeds the production capacity of both agriculture and livestock; the aquarium trade has expanded since 1993 into an industry with 250 farms in 20 states. Through both intentional introductions and accidental escapes, these sectors are responsible for the widespread transmission of parasites and diseases; hybridization; predation; competition for food and ecological niches; and habitat alteration in aquatic ecosystems, resulting in the localized extirpation of native species at over 100 sites in Mexico. In the wildlife sector, the import of exotic invasive species as pets frequently results in releases of these animals into natural ecosystems, where they compete with and prey on native species, alter food chains and change habitats. In the forestry sector, accidental imports of IAS in forestry products threaten native species and result in damage to forest ecosystems.

*Project Site Information*

6. During the project preparation phase, 9 mainland protected area sites and 6 island sites were selected as sites for implementing integrated IAS planning, coordination and management activities. An overview of these sites is provided in table 3 (additional details on each site are provided in Annex 3).

**Table 3: Overview of Project Sites for Implementation of IAS Management Actions**

Site	Status*	Area (ha.)	Biodiversity**	Invasive Alien Species / Local Pressures
<b>Island Sites</b>				
<b>Isla Guadalupe</b>	<b>Biosphere Reserve</b> (also AICA; AZE for the Guadalupe Petrel)	24,171	Center of terrestrial and marine bird endemism; 30 species of flora and fauna classified under NOM-059	54 species still present (feral cats among the most harmful, responsible for at least 6 extinctions).
<b>San Benito Archipiélago</b> (3 islands)	<b>Biosphere Reserve</b> (also AICA)	554	Most important seabird breeding site in western Pacific; 19 species of flora and fauna classified under NOM-059	14 species remaining (introduced rats are most harmful remaining species)
<b>Isla Espiritu Santo</b>	<b>Flora and Fauna Protected Area</b> - Islas del Golfo de California (also UNESCO World Heritage Site)	7,991	62 species and sub-species of flora and fauna classified under NOM-059	Goats and feral cats are the most harmful remaining species
<b>Isla Socorro</b>	<b>Biosphere Reserve</b> - Archipiélago de Revillagigedo (also AICA; AZE for Revillagigedo Shearwater)	13,033	Mexican island with greatest endemism & biodiversity; 17 species of flora and fauna classified under NOM-059	55 IAS remaining (feral cats are the most harmful remaining species)
<b>Arrecife Alacranes</b> (5 islands)	<b>National Park</b> (also Ramsar Site)	65	Largest coral reef in Gulf of Mexico; 13 species of flora and fauna classified under NOM-059	6 species remaining (but no mammals)
<b>Banco Chinchorro</b> (4 islands)	<b>Biosphere Reserve</b> (also Ramsar Site)	606	Key site for migratory birds; 27 species of flora and fauna classified under NOM-059	11 species remaining (feral cat and black rat are the most important harmful species on Cayo Centro)
<b>Total Area</b>		<b>46,420</b>		
<b>Mainland Protected Area Sites</b>				
<b>Sierra de Álamos - Río Cuchujaqui</b>	<b>Flora and Fauna Protected Area (APFF)</b>	92,890	Terrestrial (forest) ecosystems; 4 endemic species; 108 species of flora and fauna listed in the NOM-059	Spread of exotic grasses and Salt Cedar; aquaculture using non-native fish; cattle ranching
<b>Tutuaca</b>	<b>Flora and Fauna Protected Area (APFF)</b>	444,489	Terrestrial (forest) ecosystems; 29 endemic species; home to many species of migratory birds; 67 species listed under NOM-059	Feral cats; spread of exotic grasses; aquaculture using non-native species; reforestation with exotic tree species
<b>Valle de Bravo</b>	<b>Forested Protected Area (APRN)</b> (covering the watersheds of the Valle de Bravo, Malacatepec, Tilostoc and Temascaltepec rivers)	139,871	Terrestrial and aquatic ecosystems; 37 endemic species 80 species listed under NOM-059	Reforestation with exotic tree species; planting of exotic grasses; spread of reeds and water hyacinth; aquaculture using non-native species; feral dogs and cats; cattle ranching
<b>Cañón del Sumidero</b>	<b>National Park</b>	21,789	Terrestrial ecosystems; 12 endemic species; 76 species listed under NOM-059	Spread of white cedar; aquaculture using non-native species (fish and crocodiles); feral dogs and cats; cattle ranching

Site	Status*	Area (ha.)	Biodiversity**	Invasive Alien Species / Local Pressures
<b>Cumbres de Monterrey</b>	<b>National Park</b>	177,396	Terrestrial ecosystems (forests, desert, grasslands); 29 endemic species; 98 listed in the NOM-059	Spread of giant cane and glossy privet; aquaculture using non-native species; feral cats and dogs; cattle ranching
<b>El Vizcaíno</b>	<b>Biosphere Reserve</b> (also Ramsar site)	2,546,790	Terrestrial and aquatic ecosystems (desert, dunes, wetlands, estuaries); 23 endemic species; 78 species listed in NOM-059	Spread of salt cedar and vidrillo; spread of non-native frogs, tilapia and prawns; livestock ranching; feral cats; commercial oyster cultivation
<b>Los Tuxtlas</b>	<b>Biosphere Reserve</b> (also Ramsar site)	155,122	Terrestrial ecosystems (forests, savannah, coastal dunes); 48 endemic species; 289 species listed under NOM-059	Spread of invasive orchids, grasses, bamboo, and water hyacinth; spread of genetically modified plants; aquaculture using non-native species; spread of non-native geckos, herons and other bird species
<b>Marismas Nacionales</b>	<b>Biosphere Reserve</b> (also Ramsar site)	133,854	10-20% of the country's mangrove ecosystems, as well as other terrestrial and aquatic ecosystems; 9 endemic species in the reserve; 43 species listed under NOM-059	Spread of vines, giant cane, and buffelgrass; livestock ranching; spread of non-native crocodile
<b>Sian Ka'an</b>	<b>Biosphere Reserve</b> (also Ramsar site)	528,148	Terrestrial and marine ecosystems (including shallow ocean areas, coral reefs, marshes, forest, etc.); 144 species listed under NOM-059	Spread of Indian almond, coconut palms, casuarina, invasive red palm mite and black weevil; invasion of the lionfish; cattle ranching; aquaculture using non-native species
<b>Total</b>		<b>4,240,349</b>		

\* APFF = Área de Protección de Flora y Fauna (Flora and Fauna Protected Areas); APRN = Área Protegida de Recursos Naturales (Natural Resources Protected Area); AICA = (Área de Importancia para la Conservación de las Aves (Important Bird Area); AZE = Alliance for Zero Extinction

\*\* NOM-059 = Norma Oficial Mexicana – SEMARNAT - 2010, Environmental Protection. This is the official list of flora and fauna species native to Mexico that are considered at risk.

### Island Sites

#### *Overview of Mexican Island Biodiversity and Invasive Alien Species*

7. Mexico's 2,500 islands (i.e. islands, cays and reefs) contribute significantly to the biological richness of the country. Together, these islands cover an area of 5,127 km<sup>2</sup>. Although this is only a small fraction of Mexico's national territory of 1,959,248 km<sup>2</sup>, Mexico's islands harbor 8.3% of all the vascular plants and terrestrial vertebrates in the country. In addition, the islands are habitat for more than 350 endemic species and sub-species, representing 3.7% of the total number of endemic terrestrial vascular plants and vertebrates in the country. The islands of Mexico are critical feeding, reproductive and resting sites for a large number of bird populations; they are considered the third most important site globally for seabird diversity and endemism. Most of these bird species, which are important species for island ecosystems due to their guano production, nest exclusively on islands and are defenseless against predators. A total of 22 bird species that live in islands within the Mexican Territory have some kind of protection status based on IUCN classifications. The 6 islands / island groups targeted by the project are part of a large corridor, which connects North and South America; hence the protection of marine birds

nesting in these Mexican islands will have a significant impact on regional and worldwide ecosystem conservation efforts.

8. Invasive Alien Species have posed a significant threat to the native / endemic species on Mexico's islands for many years. 12% of the endemic birds and 20% of endemic mammals on Mexican islands have gone extinct due to IAS. In most cases, it has been invasive alien mammals (rats, mice, dogs, cats, sheep, rabbits, goats) that have been responsible for the extinction of endemic species (cats alone have caused the extinction of at least 10 endemic rodents on islands). On Socorro island, a population of Merino sheep introduced in the middle of the 19<sup>th</sup> century caused immense habitat destruction, feeding on endemic plants and removing vegetation that resulted in increased soil erosion and habitat loss for native plants, reptiles and endemic birds.

9. Fortunately, Mexico has made significant strides in reducing the impact of IAS present on its islands. In the past few decades, Mexico has successfully eradicated 54 populations of IAS (including 10 invasive mammals) on 35 islands (see map 1).

**Map 1: Eradications of Invasive Alien Species on Mexican Islands (Completed and Pending)**



#### *Targeted Island Sites and Site Selection Process*

10. The project has selected fifteen islands within six island groups totaling 46,420 hectares for site-level IAS management activities (all of these sites islands are federally owned and their environmental management is under the authority of CONANP). The six island groups are: Socorro, Espíritu Santo, Guadalupe, Banco Chinchorro, San Benito Oeste, and Arrecife Alacranes (see map 1 in Annex 3). The selection of pilot islands was based on analysis of priorities for the restoration of Mexico's Islands developed by Latofski Robles (2012). This analysis included a database with information on 29 islands / island groups distributed across all of the seas / oceans of the country and with the confirmed presence of invasive mammals (which are responsible for the great majority of extinctions of Mexico's insular native

species). The method used was a multi-criteria decision analysis that included spatial information, conservation priorities, and a combination of data and priorities based on "decision rules" selected by specialists in island restoration. For each island the following attributes were considered (in order of importance): Number of endemics; important reproduction and nesting habitat for seabirds and mammals (e.g. Areas of Importance for the Conservation of Birds, or sites of the Zero Extinction Alliance); number of species listed in any risk category in national legislation (the NOM-059-SEMARNAT of 2010); richness of flora and fauna species; low probability of reintroduction of IAS; feasibility and costs for implementing eradication. Based on this analysis, four groups of islands were established according to their priority rankings: (1) Socorro, Cozumel, María Cleofas, María Magdalena, Espíritu Santo; (2) María Madre, Guadalupe, Clarión, San José; (3) Ángel de la Guarda, Carmen, Cedros, Cerralvo, San Marcos, Santa Catalina, San Esteban, Cayo Centro, Saliaca, Coronado, San Benito Oeste, Santa Margarita; (4) Alcatraz, Natividad, San Diego, Magdalena, El Rancho, Mujeres, Mejía, Granito.

11. According to the analysis, the islands selected for this project, namely Socorro, Espíritu Santo, Guadalupe, Cayo Centro (Banco Chinchorro) and San Benito Oeste, were all among the islands that require priority attention. Of these, only Socorro and Espíritu Santo are within the group of highest priority islands, but the other islands were included based on the feasibility of implementing successful IAS management activities at those sites. On all of the selected islands, GEI has been conducting conservation and restoration activities for several years, and has established strong partnerships with local stakeholders and communities on those islands, including the local offices of SEMARNAT and CONANP, which can provide important logistical support to the IAS management activities. Furthermore, GEI has secured funding to work at each of these sites for at least the next 2-4 years, which will provide significant co-financing and value-added to the GEF investments on those islands, including the capacity to complement biosecurity activities (largely financed by the GEF project) with IAS control and eradication activities (largely financed with co-financing).

### Mainland PAs

#### *Overview of Mainland Protected Area Biodiversity and Invasive Alien Species*

12. During the past several decades, Mexico has established an extensive system of protected areas (174 PA units encompassing 25,384,818 hectares). Overall, PAs in Mexico in 2008 (federal, state and municipal) cover 9.85% of the territorial land area, 22.7% of territorial waters, 12% of the continental shelf and 1.5% of the exclusive economic zone. The National System of Protected Natural Areas (SINAP) brings together 57 of the 161 federal PAs, representing 60.5% of the total area of these areas, and one state PA. Some 65% of the area of federal PAs has international recognition under the World Heritage Site scheme or by inclusion as a biosphere reserve in the UNESCO Man and the Biosphere Program or the Ramsar Convention on Wetlands. Only 16.75% of the territory within SINAP is strictly considered as reserves (e.g. national parks), as the sustainable use of natural resources is permitted in the remaining 83.25%, (e.g. biosphere reserves).

13. Unfortunately, IAS continue to cause losses of biodiversity and reduced ecological productivity and services even within these protected sites. Degradation of forests and pastures within and around PAs from burning, overgrazing, and timber felling has allowed IAS to gain a foothold in many natural ecosystems. In fields surrounding many PAs, exotic agricultural varieties as well as pests have spread into PAs, with negative impacts for native flora and fauna. For example, the Red Palm Mite (*Raoiella indica*) has impacted numerous species of palm trees (including several endemics) in PAs; the import of exotic plants (the mite is associated with 55 agricultural and ornamental plants) is believed to be the mite's main pathway. The Cactus moth (*Cactoblastis cactorum*) damages various species of *Opuntia* cactus (many of them endemics concentrated in PAs); although eradicated in 2009, monitoring and prevention activities are necessary to prevent new infestations. Aquaculture operations using exotic fish

species are sites within or near to many PA sites; escapes of invasive fish species have led to declines in native fish species and changes to aquatic vegetation regimes at numerous PA sites.

#### *Targeted Mainland PA Sites and Site Selection Process*

14. The project has selected 9 mainland Protected Areas totaling 4,240,349 hectares and a wide variety of ecosystems for site-level IAS management activities. The selected sites are: two Flora and Fauna Protected Areas (Sierra de Álamos - Río Cuchujaqui and Tutuaca); one Forested Protected Area (Valle de Bravo); two National Parks (Cañón del Sumidero and Cumbres de Monterrey; and four Biosphere Reserves (El Vizcaíno, Los Tuxtlas, Marismas Nacionales, and Sian Ka'an) (see Map 2 in Annex 3). One of the criteria for selecting the 9 mainland PA sites, as well as selecting specific IAS interventions, was the presence of IAS that also pose a threat at many other sites within the national protected areas system. Thus, the selected PA sites and the specific activities were chosen in part based on their potential for replication. The full list of criteria used in selecting these sites was: 1) ecosystem representativity; 2) number of species listed under NOM-059 (native flora and fauna at risk); 3) number of IAS present; 4) overlap of specific IAS at multiple sites (as a measure of replication potential); 5) biological interactions between IAS and native species; 6) human use of IAS; 7) productive sectors active at each sites; and 8) potential IAS distribution in a projected 2050 climate change scenario. Working with CONANP, a team of experts used existing data sources to score each of the protected areas in SINAP based on these eight criteria. The team then carried out statistical analyses, based on weighted values for each of the criteria, to establish an overall score for each site. This process yielded a list of 18 priority PA sites across Mexico. Additional data was then collected for these 18 priority sites, and the analyses were then repeated with this more detailed information to yield new scores for each site, from which the final list of 9 sites was generated.

#### *Socio-Economic Context and Production Section Profiles*

15. Mexico's economy has grown steadily in the past several years, with annual GDP growth of 5.4% in 2010, 3.9% in 2011 and 4.3% in the first half of 2012. During this same period, unemployment has decreased each year. Nevertheless, development has been broadly uneven in the country, with particularly low indicators of development in rural where, where 65% of the population lives in poverty, 21% of adults have received no education, production is in decline due to low investments in equipment and infrastructure, and 80% of farmers have plots smaller than 5 hectares. In order to improve conditions in rural communities, Mexico has developed strategies to increase productivity, but some of these, such as use of modified seeds and promotion of exotic species for aquaculture and forestry, have contributed to the spread of IAS in the country.

16. One of the strategies that the Government of Mexico has adopted for economic development is the establishment of Units for Conservation and Management of Wildlife (Unidad de Manejo para la Conservacion de Vida Silvestre, or UMAs). UMAs are registered premises and facilities operating under an approved management plan within which conservation, sustainable use and recovery of (mostly native) species is performed. UMAs are commonly engaged in the breeding and sale of pets as well as plants for food, crafts, industrial and ornamental purposes. The main goal of these units is to preserve biodiversity while simultaneously creating "diversified" economic opportunities for the rural sector of society. UMAs can be either "intensive" (species confined) or "extensive" (species free); intensive UMAs must abide by requirements to confine the movement of exotic animals and plants within their boundaries, while extensive units can release exotic plants and animals freely within their boundaries. In 2009, there were 5,924 intensive UMAs in Mexico covering an area of 1,156,506 hectares, and 5,748 extensive UMAs covering an area of 23,639,143 hectares. The area of extensive UMAs accounts for 12.19% of Mexican territory, almost as large as the National System of Natural Protected Areas (SINAP), which covers 25,372,182 hectares. In addition to UMAs, Mexico also has a system of Wildlife Management

Installations (PIMVs) where species are confined in areas outside of their natural habitat for breeding and production purposes. PIMVs generally operate under more controlled conditions (e.g. zoos, botanical gardens, tree nurseries, circuses, etc.), but data on the use of exotic species at PIMVs is not currently available. In addition to the breeding of animals and plants at UMAs and PIMVs, many animal and plant species are imported for a variety of purposes. Such importations are regulated by SEMARNAT, which grants permits, and SAGARPA, which carries out sanitary inspections of imported species. A description of the importation and internal breeding and sale of plants and animals, including confirmed and potential IAS, in each of several key sectors is described below.

17. Although Mexico's General Law on Wildlife (LGVS) prohibits the introduction of exotic species into the wild and notes that a proactive attitude towards the reduction of free populations and their eradication if possible must be assumed, exotic species are increasingly being introduced in the country. Since 1995, PROFEPA inspected 398,897 importations of regulated wildlife. Imports of exotic animals are believed to be increasing due to the changing tastes of pet owners; in the past few years, authorities have received an increasing number of requests for import permits for exotic species, in particular reptiles such as chameleons and constrictor snakes. Other information also suggests a very large trade in wildlife (both legal and illegal) in Mexico, both using wild-caught and captive bred native species and using imported species. For example, a survey of 179 owners of primates in Mexico City alone showed that 3 native and 9 exotic primates were held as pets and mostly sourced in a large local pet market. In addition, close to 20% of all species currently bred in UMAs are designated species for sport hunting, and overall 660 UMAs in 16 Mexican states reported that they had exotic species in 2005. Forty-nine species belonging to 7 families of mammals and 5 families of birds have been introduced from UMAs into the broader environment, and 5 states also have reported feral populations of some of these exotics.

18. Timber production in Mexico has been declining over the past decade, from 6.7 million cubic meters in 2002 to 5.5 million cubic meters in 2011. During the same period, consumption of forest products has increased. As a result, imports of timber and other forest products have grown considerably in the past years, and today 60% of forest products in Mexico are imported (with a value of US\$1,264.4 million in 2011). Most forest products imports consist of lumber, plywood, fiberboard, beadings, and moldings; with most of the goods coming from the USA, India, Indonesia and China. This increase in the importation of forest products presents a significant source of potential invasive alien pests and diseases. Since 2006, PROFEPA has inspected 387,740 wood pallets and packaging, over 5 million Christmas trees, and over 1 million other forest products. Since 1995, PROFEPA has detected 6,719 exotic species in forest products, of which 1,665 were identified as quarantine pests that required the shipment of the infested good to be refused entry to Mexico. In 2010, PROFEPA performed 62,016 inspections of forest products at the border and detected 145 exotic species of which only 26 (18%) were considered a quarantine risk. Beetles form about 65% of the exotic species detected. The annual importation of over 1 million conifers (*Pseudotsuga*, *Pinus* and *Abies*) from Oregon and Canada since 2009 presents biosecurity risks. All containers with trees are inspected by PROFEPA's officers at the border and to date about 14 pest IAS with the potential to establish in Mexico have been detected. In 2012, about 0.2% of the million trees imported were sent back. At forest production sites within Mexico, sanitation notifications for forest pests and diseases on forested properties rose from 807 (affecting 32,042 ha.) in 2008 to 1,974 (affecting 349,384 ha.) in 2013.

19. Aquaculture production in Mexico, with the exception of shrimp aquaculture, has had only intermittent growth in the past five years, due in part to disease problems and in part to a lack of support and coordination between producers and institutions. At present, annual national fish production exceeds 1,681,000 tonnes, of which 85% is through capture and 15% from aquaculture; Mexico ranks 16<sup>th</sup> globally in fisheries production and 26<sup>th</sup> in aquaculture. Although aquaculture is still relatively small in volume as compared to fisheries production, it represents almost 40% of the value of total domestic production (approx. 18 billion pesos in 2012). Six "species" provide 69% of the total value of fish

production: shrimp, tilapia, tuna, octopus, sardines and trout. Because fishing and aquaculture contribute significantly to the development, welfare and food security of large segments of the population, Mexico has a well developed set of policies and strategies for the development of aquaculture and fisheries in Mexico, focused on: integrated planning, strengthened capitalization, compliance and regulatory enforcement, strategic development and promotion of consumption of fishery and aquaculture products.

20. A significant number of economically important aquaculture species are considered invasive alien species. Among these are the channel catfish (*Ictalurus punctatus*), the pacific white shrimp (*Litopenaeus vannamei*), different species of carp, tilapia and crayfish such as *Cherax quadricarinatus* and the giant river prawn (*Macrobrachium rosenbergi*). Initially some of these species were promoted by international organizations such as FAO, and were included in the strategies implemented by the government to increase food supplies and raw materials. Aquaculture operations frequently took place in natural water bodies, causing the establishment and propagation of invasive species and diseases, with the negative impacts on native species, deterioration of terrestrial and aquatic environments, and loss of ecosystem services and productivity.

21. Within the aquaculture industry, one significant component is the trade in ornamental freshwater fish, or the “aquarium trade”. The Mexican aquarium trade consists of local commercial breeders and those who catch wild Mexican species who supply the Mexican market, importers who bring in wild or captive bred animals from other countries, retailers who sell the fish, aficionados who trade or swap specimens among themselves, a large number of Mexicans who keep fish in home aquaria as pets or ornaments, and fewer large public aquaria where fish are kept for public display. This sector has grown in Mexico at an annual average rate of 8% during the past 20 years, and at present the production and commercialization of ornamental fish in Mexico generates significant economic and social benefits, including revenues of more than 1.65 billion pesos per year and more than 41,000 direct jobs. Approximately 43 million ornamental freshwater fish are sold annually, of which 52% are produced within Mexico in 20 different states (80% of the domestic production takes place at approximately 250 farms established in the state of Morelos). The remaining 48% is imported primarily from Asia, through the United States and South America; a large number of taxa (700 varieties of 117 families) are imported – a total of 18 million fish in 2006.

22. Ecological risks associated with the import and/or production of ornamental freshwater fish within Mexico include the spread of diseases, pests and invasive alien species into natural aquatic environments. A survey of 42 ornamental fish farms between 2005 and 2008 showed 50% used water from irrigation canals and most obtained their breeding stock from retailers or other farms. Farms changed between 5 – 10% of their water each day and presumably the discharged water went back into the source, along with any fish or their eggs that were not filtered out. At present, most ornamental fish production operations within the country lack trained personnel and appropriate techniques of production and marketing, which result in low profits, low quality fish, and inadequate or non-existent biosecurity measures. Globally, the list of known IAS associated with the aquarium trade is long (904 for freshwater fish alone, as well as many more invertebrates and plants. In the 1980s in Mexico 55 exotic fish species were registered as being in the aquarium trade, but by 2004 there were 118 registered species (Mendoza Alfaro et al. 2012). The 20 most common fish in the ornamental trade in Mexico are listed in Table 4.

**Table 4: Most common ornamental fish produced in the commercial trade in Mexico**

<b>Fish species</b>	<b>Known to also be in the wild in Mexico (c.f. Appendix 2)</b>	<b>Known to be invasive elsewhere and a risk in Mexico (c.f. Appendix 1)</b>
<i>Carassius auratus</i> (Goldfish)	Yes	
<i>Cyprinus carpio</i> (Common carp)	Yes	
<i>Poecilia reticulata</i> (Guppy)	Yes	



<i>Poecilia latipinna</i> (Common molly)	No	No
<i>Poecilia velifera</i> (Yucatan molly)	Yes	
<i>Pterophyllum scalare</i> (Angel fish)	No	Yes
<i>Trichogaster trichopterus</i> (Threespot Gourami)	No	Yes
<i>Xiphophorus maculatus</i> (Platy)	No	No
<i>Brachydanio rerio</i> (Zebra danio)	No	No
<i>Xiphophorus hellerii</i> (Green swordtail)	Yes	
<i>Gymnocorybus ternetzi</i> (Black tetra)	No	Yes
<i>Melanochromis johanni</i> (Bluegray mbuna)	No	Yes
<i>Hemigrammus caudovittatus</i> (Buenos Aires Tetra)	No	No
<i>Haplochromis fenestratus</i> (Fenestratus cichlid)	No	No
<i>Astronotus ocellatus</i> (Oscar)	No	Yes
<i>Capoeta (Puntius) titteya</i> (Cherry barb)	No	No
<i>Trichogaster (Colisa) lalia</i> (Dwarf gourami)	No	Yes
<i>Neolamprolagus leleupi</i> (Lemon cichlid)	No	No
<i>Hypostomus plecostomas</i> (Suckermouth catfish)	Yes	
<i>Betta splendens</i> (Siamese fighting fish)	No	Yes

23. In addition, 58 (16 exotic and 42 translocated natives) species of freshwater aquatic exotic plants are present in the wild in Mexico, of which eight have been sold in the aquarium trade (Table 5). Four species of freshwater molluscs are invasive in Mexico, of which three (a translocated native apple snail (*Pomacea flagellata*) and two exotic species (*Tarebia granifera* and *Melanoides tuberculata*) escaped from the aquarium trade and one (the clam *Corbicula fluminea*) was introduced as a food source. A few reptiles, such as the red-eared slider turtles (*Trachemys scripta elegans*), are also traded.

**Table 5: Species of aquatic plants known to be weeds offered for sale in the internet trade**

Species (* translocated native species)	Present in the wild in Mexico
Alligator weed ( <i>Althernanthera philoxeroides</i> )	Yes
Seaweed ( <i>Caulerpa taxifolia</i> )	Yes
Coontail ( <i>Ceratophyllum demersum</i> )*	Yes
Didymo ( <i>Didymospenia geminata</i> )	No
Water hyacinth ( <i>Eichhornia crassipes</i> )	Yes
Hydrilla ( <i>Hydrilla verticillata</i> )	Yes
Rice grass ( <i>Leersia hexandra</i> )	No
Parrot feather ( <i>Myriophyllum aquaticum</i> )	Yes
Watermilfoil ( <i>Myriophyllum spicatum</i> )	?
Reed ( <i>Phragmites australis</i> )*	Yes
Water lettuce ( <i>Pistia stratiodes</i> )*	Yes

### ***Policy, Institutional and Legal Context***

#### **Existing legislation/regulations relevant to IAS**

24. In general, Mexico has a well-established legal and technical framework to manage pests and quarantine procedures for plants and animals through phytosanitary and sanitary measures at the national level. The most relevant laws are the Animal Health Law (LFSA) and Plant Health Law (LFSV) which cover animal and plant health and apply broadly to sectors including livestock, agriculture, forestry, aquaculture and wildlife, including measures to reduce the risks of microbiological, physical, and chemical contamination in the production of crops, to take actions to promote and protect plant health,

and to implement sanitary provisions related to imports. Application of these and all other laws in Mexico is carried out through the development of official regulations and standards (Official Mexican Standards or NOMs).

25. With regard to inspections for IAS at points of entry into Mexico, there is a wide range of legal and regulatory instruments in force. The Customs Law (Ley Aduanera) authorizes the General Customs Administration to take charge of monitoring, controlling and auditing the entry and departure of goods. However, the LFSA grants the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) the specific authority to prevent the introduction of pests and diseases affecting animal health, while the LFSV authorizes SAGARPA to issue phytosanitary certificates for imports likely to host plant diseases or pests, and requires SAGARPA to develop phytosanitary requirement sheets which lay out specific requirements for imported plant products. In addition, the General Health Law assigns responsibility to the Mexican Secretariat of Health (SALUD) for issuing regulations related to human health, which can include food safety issues. With regard to the control of IAS within Mexico, the LFSV defines internal verification points on roads within the country where SENASICA checks phytosanitary certificates or other legally recognized documents for the transport of plants, plant products, materials, supplies, etc. PROFEPA also carries out inspections of forest products at some of these sites.

26. The Ministry of Environment and Natural Resources (SEMARNAT), through its agency the Federal Attorney for Environmental Protection (PROFEPA), also implements a number of IAS inspection activities at entry points based on various NOMs, focused primarily on forest products. NOM-013-SEMARNAT-2010 regulates the import of natural Christmas Trees into Mexico in order to prevent the introduction of possible pests; NOM-016-SEMARNAT-2016 regulates the import of new raw lumber/sawn wood; NOM-029-SEMARNAT-2004 establishes sanitary standards for specific species / products such as bamboo, wicker, reed, rattan, cane and raffia; and NOM-144-SEMARNAT-2012 establishes phytosanitary measures for unmanufactured solid wood products to ensure they are free from pests and diseases.

27. Several other laws govern the management of IAS within natural areas and in productive sector activities in Mexico. The National Law for Environmental Protection (LGEEPA) establishes legal provisions on environmental impacts and regulates the system of protected areas. The law was amended (Articles 79, 80 & 85) to make direct reference to IAS and to establish criteria for the preservation and sustainable use of wildlife, although it does not provide detailed guidelines or regulations. Similarly, both Article 46 and Article 52 were amended in 2013 to prohibit the introduction of IAS to Natural Protected Areas (NPAs) and Marine Protected Areas (MPAs) respectively. The General Law for Sustainable Forest Development (LGDFS) establishes provisions for forest health, requiring CONAFOR to establish a permanent system of early warning and assessment of forestland health (Article 119) and prioritizing the use of native species for the development of commercial plantations and reforestation if "technologically and economically feasible" (Article 86). However, the law also allows for commercial forest plantations with exotic species to replace native scrubland (Article 85) if such actions can be shown not to threaten biodiversity, or when specific studies show that native vegetation has little commercial or ecological value.

28. The General Law for Sustainable Fishery and Aquaculture (LGPAS) allows the introduction of non-native species into water bodies with an approved health certificate, however these certificates are issued without any formal risk analysis process (risk analysis is mentioned in the Law under Articles 29 and 114, but no provisions to implement such activities have taken place). The General Law on Wildlife (LGVS) addresses the management of exotic specimens and populations, as well as specimens and populations that have become harmful. The LGVS was amended in 2010 request the development and implementation of invasive species lists to support IAS management, control and eradication, but to date the list has not been finalized. Unlike most of laws relating to IAS in Mexico, the LGVS gives a role to

states governments that have signed coordination agreements with SEMARNAT (to date, the states of Baja California, Chihuahua, Coahuila, Nuevo Leon, Sonora and Tamaulipas have signed agreements) in which the partners are required to coordinate implementation of control and remediation measures for harmful IAS specimens or populations.

### **Policies relating to IAS management**

29. The proposed project is consistent with national priorities and plans and will advance Mexico's national targets and international commitments for biodiversity conservation. Mexico's National Biodiversity Strategy (NBS, 2000) highlights IAS as critical for biodiversity conservation, and proposes priority actions including: developing an IAS inventory; researching IAS pathways, early detection and monitoring methods, establishing a national strategy to control and eradicate the most noxious species, especially in sensitive areas such as islands and priority protected areas; and creating legal instruments to regulate entry and movement of IAS within the national territory and to promote the use, production and commerce of native species instead. Additionally, the NBS proposes the use of risk assessment protocols and impact assessment studies before authorizing the movement or entry of exotic species. Due to Mexico's biological and cultural diversity the implementation of the National Strategy has to be adapted to different scales and realities. Therefore in 2002 CONABIO, in collaboration with state governments and representatives of various sectors of society, initiated the development of State Biodiversity Strategies (<http://www.biodiversidad.gob.mx/region/EEB/mapa.html>). Twenty states are currently working on their biodiversity strategies, all of which identify IAS as a threat to biodiversity and include lists of the most important IAS.

30. SEMARNAT, through CONABIO (National Commission for Knowledge and Use of Biodiversity), published the National Strategy for Invasive Species (NSIS). Among its most important provisions, the NSIAS aims to establish a series of guidelines and agreements in order to channel individual institutional efforts and activities to better face the threat related to IAS. The strategy also promotes closer cooperation among and between the public and private sectors; agreements and integrated strategic planning to put existing resources to better use; and increased field level activities (Objective 2.2 calls for "control, management and eradication programs operating or completed for the areas and species identified as of greatest concern in the national diagnosis"). In the Mexican Development Plan (PND) 2013-2018, Strategy 4.4.1 to "implement a comprehensive development policy and strategy linking environmental sustainability with costs and benefits to society" and Strategy 4.4.4 to "protect the natural heritage" will help to make progress in the implementation of the NSIS. Targeted actions under these strategies include "update and align environmental legislation for effective regulation of the actions that contribute to the preservation and restoration of the environment and natural resources" and "guide and strengthen information systems to monitor and evaluate the performance of environmental policy"

31. The National Strategy for the Conservation and Sustainable Development of the Mexican Island Territory (2012) highlights the necessity to implement internal guidelines to develop prevention, control and eradication programs for exotic, invasive and feral species in National Protected Areas on islands created by CONANP, and establishes action plans that include efforts regarding invasive mammal eradication, plans for control and eradication of invasive plants and the implementation of pilot projects for the control and eradication of invasive invertebrates. The Mexican National Strategy for Plant Conservation (2012) recognizes invasive species as an important threat to plant diversity; 842 exotic species of terrestrial flora have been reported in Mexico as of 2012, of which at least 137 species have been prioritized for attention due to their invasive potential in natural habitats and because of the feasibility of their eradication. Action line 4.1 of the strategy, for the "prevention, control and eradication of invasive species", proposes to support local and regional implementation of the NSIS through a completed inventory of IAS and through state or regional action plans in accordance with the NSIS. Additionally, the plant conservation strategy mandates the creation of a plan to disseminate information

on widely used IAS in the country that responsible for the extinction of native plant diversity, and proposes that each Mexican state should carry out awareness campaigns focusing on those widely used IAS.

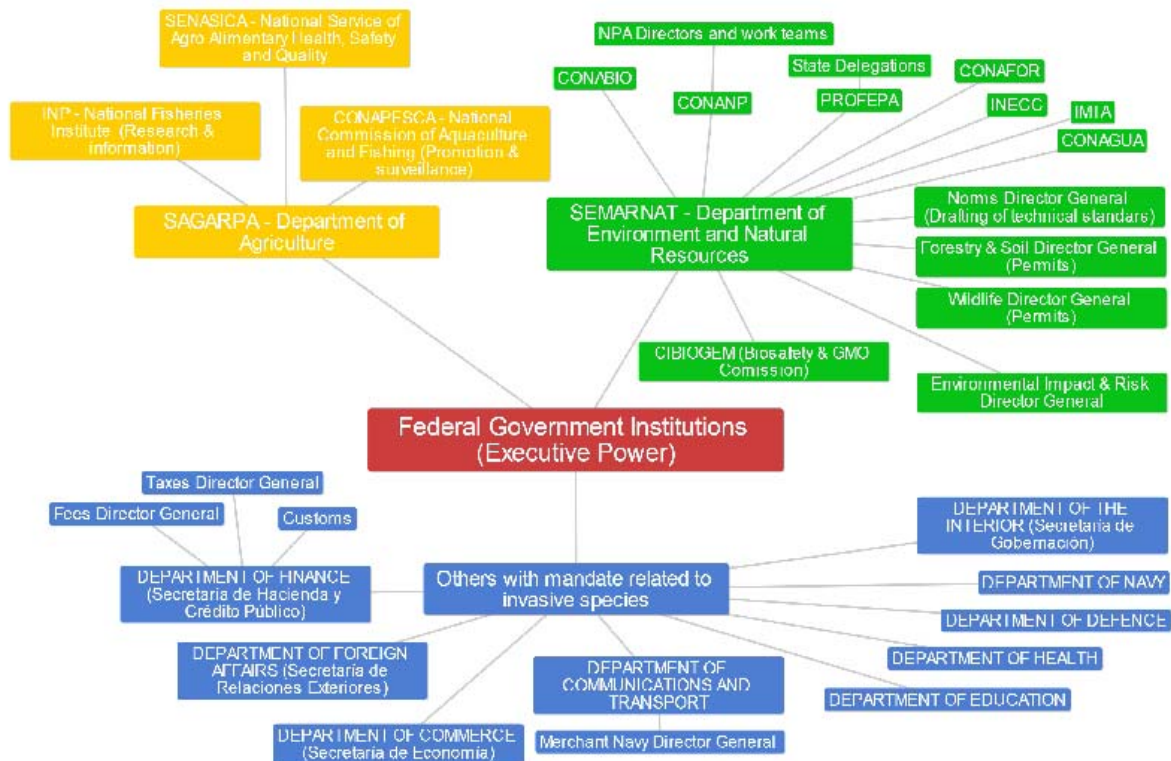
32. The Mexican Special Program on Climate Change (PECC) 2008-2012 addresses the problem of IAS and the possible aggravating effects of climate change of IAS impacts. The program includes objectives and specific targets to advance understanding of the effects of climate change on IAS dispersion and to promote control and eradication actions. A follow up Program (PECC 2) is now being drafted and includes an objective to “strengthen research on interactions and synergies of invasive species to climate change”. At the same time, several state-level climate change action plans are under way that take into account IAS as an interacting stressor with climate change. The National Strategy of Climate Change: Vision 10-20-40 (2013) addresses IAS in action lines A 3.9 (which refers to enhancing environmental resilience through the “increase of the area of ecosystems for forestation and restoration with native species suitable to regional climatic conditions”) and A 3.10 (“strengthening attention to problems exacerbated by climate change through integrated management of fire and combat pests and diseases”).

33. The draft National Strategic Forest Program for Mexico 2050 (under development) demands preventive actions for native and exotic pests and forest diseases based on risk profiles of their establishment, spread and extent of damage. The draft program identifies two priorities for IAS management: a) reduce the risk of damage to forest resources by the effect of pests and diseases and b) establish the capacity to meet timely and effective outbreaks of pests and both native and exotic diseases. The program also calls for studies analyzing the risk of exotic pests and creation of an information system in cooperation with other agencies at federal and state level, as well as research and education institutions. CONANP (National Commission for Natural Protected Areas) has established the program “Attention and management program of exotic invasive and feral species in natural protected areas of federal jurisdiction”, which identifies IAS as a priority issue for the federal protected area system.

### **Institutional Context**

34. There are a large number of institutions in the Federal Government of Mexico with responsibilities and functions related to invasive alien species. In general, these functions are split between those institutions that address IAS that impact productive sectors, economic activities and human health (and focus on pests, diseases and epidemics), and those that address IAS that impact ecological functions and biodiversity (and focus on invasive alien species, populations or individuals that become harmful). The large number of relevant institutions, and there different ways of viewing and addressing IAS-related issues, strongly supports the need for coordination and collaboration mechanisms that enable the implementation of the National Strategy on Invasive Species in Mexico.

**Figure 1:** Relationships between Mexican agencies involved with national biosecurity (after A. Ortiz 2013).



35. In the environmental sector, the National Commission for the Knowledge and Use of Biodiversity (CONABIO), an inter-Ministerial Commission, plays a leading role in coordinating inter-institutional information, planning, and programs for IAS-related issues in Mexico. In 2005, SEMARNAT designated CONABIO as the lead technical institution at the national level on invasive species in Mexico, with the mandate to function i) as a coordinating technical institution at national level and (ii) to provide national authorities involved in IAS prevention, control and management with the adequate scientific and technical guidance to conduct their work properly. Thus, while other institutions play a leading role in phytosanitary and zoosanitary measures (SENASICA) and regulation of IAS prevention and control measures (PROFEPA), CONABIO has a role to provide these agencies with necessary technical information and has an important coordinating function to ensure that they work together in a harmonized way on these issues. CONABIO is, in other words, in the position to facilitate that all relevant institutions in Mexico, both “environment focused” institutions and “non environment focused” agencies, work together in the most coherent and cost efficient manner. Since 2000, CONABIO has developed an extensive database on exotic, invasive and translocated species in the country. CONABIO also carries out training, workshops and outreach regarding IAS-related issues, and has played a key role establishing a common language among different institutions and in promoting coordination and collaboration between environmental and productive sector oriented institutions and stakeholders. This coordination and communication role was notably important as CONABIO helped to lead the effort to establish a National Strategy on Invasive Species (2010). Due to its status as an inter-ministerial commission, it has the legal authority to convene high-level representatives of other institutions and agencies, which is crucial in any efforts to achieve institutional cooperation at both the policy and operational levels.

36. The Ministry of Environment and Natural Resources (SEMARNAT) is responsible for formulating and conducting national policies and regulations on natural resources and the environment, including promoting the sustainable use of natural resources, and establishing and monitoring compliance with Mexican Official Norms (NOMs) related to natural resources, water, forests, flora and wildlife, terrestrial and aquatic wildlife, and fisheries. Within the ministry, the General Division for Wildlife (DGVS) oversees Unit for Conservation and Management of Wildlife (UMAs), some of which breed specimens or populations of exotic species, including approving UMA management plans and issuing permits for import, handling and control of specimens which may become harmful or are collected for scientific specimens. The General Division for Forest and Soil Management (DGGFS) is in charge of information regarding forest management, including exotic species, and also approves forest management plans, issues permits for imports and collections of forest flora and fauna, and carries out analysis of forest pest/disease samples collected by PROFEPA during inspections. Both DGGFS and DGVS have sanitary authority, however they have limited budgets and no field staff for these activities.

37. The mission of the National Commission of Natural Protected Areas (CONANP) is to preserve the natural heritage of Mexico through the establishment and management of Protected Areas and other conservation areas. To achieve this objective, CONANP considers, among other things, protection against various threats, including exotic and alien species, in order to ensure the continuity of evolutionary processes in Protected Areas and other conservation areas. Within CONANP, the Office of Conservation of Priority Species has responsibility for diagnosing IAS-related issues and coordinating all activities related to IAS management within the national PA system, while the subdivision of National Cooperation and Bilateral Issues is responsible for implementation of the Ramsar Convention and therefore for IAS in wetland areas. Since 2007, CONANP has included invasive species management in its National Program for Natural Protected Areas (NPAs), and has carried out diverse actions to collect information on exotic, feral and invasive species and their distribution in federal PAs in order to establish priorities for national action (this analysis was updated and expanded during the PPG phase).

38. The National Institute of Ecology and Climate Change (INECC) carries out scientific and technological research on climate change, environmental protection and preservation, and ecosystem restoration, and provides technical and scientific support to SEMARNAT to develop national policy on environmental protection and sustainable use of natural resources. INECC is responsible for estimating future costs associated with climate change, and for proposing strategies to address these costs. INECC was a key participant in the drafting of the National Strategy on Invasive Species, participates in control and eradication projects on islands, and carries out research relevant to IAS-related issues. With the addition of climate change to its portfolio (and name) in 2012, INECC's future participation in IAS-related issues is expected to focus on the relationship between climate change and IAS dispersion and impacts.

39. The Federal Attorney for Environmental Protection (PROFEPA) monitors compliance with environmental regulations through inspections, verification, and surveillance programs. Within PROFEPA, the General Division of Forest Inspection and Surveillance (DGIVF) carries out inspections at sites where sanitary notifications have been issued for potential exotic forest pests and diseases, to verify that phytosanitary treatments are carried out as required to prevent the dispersal and spread of exotic forest pests into stands of healthy trees. DGIVF also carries out sanitary inspections of storage and/or processing centers for forest raw materials (there are approximately 9,000 of these centers), as well as verifications at sales and distribution centers according to the special program of inspection and surveillance of Christmas trees. Another agency of PROFEPA, the Department for Wildlife and Phytosanitary Inspections and Surveillance of Ports, Airports and Borders (DGIAPAF), has 90 inspectors operating in 57 offices throughout Mexico to inspect and verify the flow of forest and wildlife products and species at ports, airports and borders, as well as selected strategic points in the country. In the case of detection of any pests in forest goods, samples are sent to laboratories at SEMARNAT for verification.

The main objectives of these inspections are to combat the illegal trade of internationally regulated wildlife species, to prevent the introduction of pests of quarantine importance into the country, to prevent the introduction of potentially invasive alien species, and finally to regulate the cross-border movements of genetically modified organisms.

40. The National Forestry Commission (CONAFOR) develops and promotes productive use, protection, conservation and restoration of forests and guides Mexico's national plans and policies for forests. CONAFOR also assists communities and small private owners in developing management plans, restoring degraded areas, creating plantations, using non-timber products, and protecting environmental services. CONAFOR is responsible for preventing and reducing the incidence of forest pests and diseases with economic, ecological and social impacts; is required by law to establish a permanent system of early warning and assessment of the health status of forestlands; and applies measures to maintain or restore the health forest ecosystems. The National Water Commission (CONAGUA) is responsible for managing and preserving national water resources; its activities regarding IAS management are focused on preventing the introduction and spread of aquatic weeds, such as *Tamarix* spp., *Arundo donax*, *Eichhornia crassipes*, *Tule*, and *Typha* spp., from impacting dams, irrigation systems, reservoirs, and natural rivers, streams, lakes, etc. CONAGUA develops and implements technical procedures for the control of aquatic weeds with support from states, municipalities and civil society organizations. The Mexican Institute of Water Technology (IMTA) is important for its function in research, education and training and for its power to propose guidelines and content for the National Water Policy and National Water Program, including IAS-related priorities and programs. IMTA's focus is mainly on biocontrol of aquatic weeds such as *Arundo donax* and *Eichhornia crassipes*. In addition, IMTA personnel provide training in biological control of weeds for persons involved in integrated pest management (IPM) to control invasive weeds in other sectors such as agriculture, forestry and conservation areas, including staff of the CONAGUA, SEMARNAT, the National Centre for Birds, Rodents and Weeds, the Directorate General of Plant Protection, and State Governments.

41. In the productive sector, the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) has the most direct and widespread responsibility for IAS-related issues. Within SAGARPA, the National Service of Agro Alimentary Health, Safety, and Quality (SENASICA) plays the leading role with regard to protecting agricultural resources, aquaculture and livestock from quarantined pests and diseases, and regulating and promoting risk reduction systems for food contamination and food quality. SENASICA also implements activities to prevent, diagnose, control and eradicate diseases and pests that can affect the production of fish, crustaceans and mollusks, and works with the Ministry of Health to develop and apply norms and protocols to fight pests related to human health. SENASICA carries out epidemiological surveillance of exotic diseases and pests with a diagnostic infrastructure located throughout the country, consisting of 7 regional laboratories for exotic diseases and 14 laboratories for molecular biology. At the state level, SENASICA is supported by State Plant Health Committees, which are producer organizations that participate in the development and operation of campaigns, programs and / or actions for plant health. The State Committee on Aquaculture Health of the State of Morelos (CESAEM) is mandated with supporting businesses and improving the quality and sustainability of aquaculture products in the State of Morelos, through analysis, detection, prevention and timely control of diseases that pose a risk to the quality of the various species produced. CESAEM is a state-level auxiliary body to SENASICA.

42. Other important agencies within SAGARPA include the General Livestock Coordination, the Department of Agriculture, the Department of Rural Development, and the National Institute for Forestry, Agriculture and Livestock (INIFAP), which has a comprehensive scientific research and technological development mandate. Also within SAGARPA, the National Commission of Aquaculture and Fishing (CONAPESCA) promotes the sustainable exploitation and conservation of marine and aquaculture resources, including elaborating and publishing Mexican Official Standards for the regulation of all

fisheries (marine and aquatic) and aquaculture operations. The National Fisheries Institute (INAPESCA) coordinates and conducts research on fisheries and aquaculture resources, focusing on sustainability criteria to guide management and conservation; these actions are carried out with the participation and financial support from the sectors involved.

43. Surveillance of animal diseases is done through the National Information System of Exotic and Emerging Diseases (SINEXE). The system relies on trained field staff and private veterinarians to detect possible new diseases in livestock and to send information to one of 21 laboratories in Mexico for a confirmed diagnosis. The time from field detection to diagnosis is recorded and the diagnoses are provided daily to SAGARPA for rapid response as required. This system allows some chance of early detection as farmers and their veterinary support report potential cases, and also ensures a rapid diagnosis and rapid response. Once a problem has been confirmed, the National Emergency Animal Health Provision (DINESA) is the mechanism in place to cope with disease outbreaks. SENASICA, which is responsible for issuing provisions of animal health and establishing measures for prevention, control and eradication of exotic and emerging animal diseases, is charged with ensuring that adequate financial and human resources and additional materials are in place for the implementation of anti - epidemic actions.

44. Surveillance of plant health is done through the Coordination System for the Management of Regulated Pest and Epidemiology (SCOPE), which is a platform for monitoring, tracking and forecasting of pests and diseases that affect or could affect the country, based on predictive models that take into account biological information, thermal conditions, and potential hosts for the development of the pest. Additionally there is a National Emergency Dispositive Against Regulated Pests in Mexico (NED), which defines technical procedures for the implementation of activities for the delimitation, containment and eradication of new pests and confirms post-eradication success. Another program relating to the links between IAS and productive sectors, in particular with regard to risk management, is the Epidemiological Plant Surveillance Program. In addition, two more information systems also will be of relevance to IAS management once they integrate IAS data: the National Forest Information System for information on native and exotic forest pests, and the National Information Subsystem on Wildlife.

45. A number of other institutions have varying responsibilities related to IAS management in the productive sector (and in some cases with environmental concerns). The Federal Commission for the Protection against Sanitary Risk (COFEPRIS) within the Department of Health is responsible for protecting the human health from sanitary risks through regulation, control and promotion. The inter-institutional Commission on Biosafety of Genetically Modified Organisms (CIBIOGEM) formulates and coordinates policies relative to the biosafety of Genetically Modified Organisms (GMOs), and has three auxiliary bodies: a Technical Committee, a Scientific Advisory Council and a Mixed Advisory Council. With Mexico's adherence to the International Convention for the Control and Management of Ships' Ballast Water, the Ministry of Communications and Transports (SCT) is in charge of undertaking measures for preventing, reducing, and eliminating the transference of harmful aquatic organisms and pathogens through the control and management of ballast water and ship sediments, and naval inspectors appointed to the diverse Port Authorities carry out inspections. The National Defense Secretariat and the Navy Secretariat (SEMAR) provide support to SENASICA, PROFEPA and others in IAS management at island sites in Mexico, including inspection and surveillance but also logistical support (mainly in the form of transport of goods and persons). The Ministry of Energy (SENER), particularly the Secretariat of Planning and Energy Transition, oversees biofuels including the potential impacts of IAS imported as biofuel crops. The Ministry of the Interior (SEGOB) issues permits necessary for control and eradication activities on islands. Finally, at the local level, municipal governments are responsible for overseeing natural resource management within their areas of jurisdiction and for ensuring that the needs of local stakeholders are taken into account in the definition of management strategies, including IAS management programs.



46. Although not a government institution, it is worth noting the role of the Grupo Ecológico de Conservación de Islas (GECI), which is a civil non-profit association that has played a critical role in IAS management on Mexico's islands. GECI's goal is the comprehensive restoration, conservation and sustainable development of islands of Mexico. To date, its activities include scientific research, prevention, control and eradication of introduced exotic mammals, environmental education, the development and implementation of methods and techniques for restoration, public policy, and management of legal protection schemes. Working with social and fisheries organizations as well as government agencies, GECI has achieved the removal of introduced mammals from 29 Mexican islands in the past decade. This represents approximately half of all Mexican islands with introduced species, and is an achievement that stands out internationally.

## **THREATS, ROOT CAUSES AND IMPACTS**

47. Globally significant biodiversity and ecosystems in Mexico are under serious threat from the introduction and spread of invasive alien species. Among the many negative impacts that IAS flora and fauna have on native species and natural ecosystems in Mexico are the following: direct predation of native species, competition for resources, inter-breeding / hybridization with native species, destruction and fragmentation of habitat, degradation of ecosystem services (i.e. food production; provision of sufficient and clean water resources; carbon sequestration and climate regulation, water and air purification), acceleration of the spread of other invasive species, and preventing the recovery of natural ecosystems. Many economic sectors are affected by the impacts of IAS, including agriculture, fisheries, forestry, energy, water, and tourism.

48. Numerous exotic species already have been introduced into Mexico, with significant impacts on natural landscapes. In northern Mexico, exotic grasses such as Buffelgrass (*Pennisetum ciliare*), introduced for use as livestock fodder, have dispersed rapidly across native ecosystems (incl. many protected areas), and have substantially replaced native vegetation cover and modified natural fire regimes. Mexico also faces the continuing threat of new introductions, such as the Cactus mealy bug (*Hypogeococcus festerianus*), which poses a major threat to several cactus and epiphyte species. Island ecosystems are perhaps the most affected of all ecosystems in Mexico by invasive alien species. Historical introductions of rats, cats, goats, sheep, pigs, rabbits and dogs have led to the extinction of 12% of the endemic birds and 20% of endemic mammals on Mexican islands; cats alone have caused the extinction of at least 10 endemic rodents on islands. On Socorro island, a population of Merino sheep introduced in the middle of the 19<sup>th</sup> century caused immense habitat destruction, feeding on endemic plants and removing vegetation that resulted in increased soil erosion and habitat loss for native plants, reptiles and endemic birds.

49. Even within Mexico's extensive system of protected areas, IAS have caused significant losses of biodiversity and reduced ecological productivity and services. Degradation of forests and pastures within and around PAs from burning, overgrazing, and timber felling has allowed IAS to gain a foothold in many natural ecosystems. In fields surrounding many PAs, exotic agricultural varieties as well as pests have spread into PAs, with negative impacts for native flora and fauna. The Red Palm Mite (*Raoiella indica*) has impacted numerous species of palm trees (including several endemics) in PAs (e.g. Sian Ka'an Biosphere Reserve); the import of exotic plants (the mite is associated with 55 agricultural and ornamental plants) is believed to be the mite's main pathway. The Cactus moth (*Cactoblastis cactorum*) damages various species of *Opuntia* cactus (many of them endemics concentrated in PAs); although eradicated in 2009, monitoring and prevention activities are necessary to prevent new infestations.

50. Changing climate patterns may exacerbate the threat of terrestrial and marine IAS, including the risk that exotic species that are not currently invasive may become so in the future. Rising temperatures, changes in humidity levels, and changes in the number of frosts, as well as and the increased incidence of

extreme weather events, may cause ongoing stresses to natural ecosystems, making them more vulnerable to IAS infestations. Increased drought may lead to an increased frequency and severity of fires that could, in turn, favor IAS invasion. Conversely, increased or more concentrated rainfall levels could create extensive flooding and disruption of ecological systems, providing opportunities for IAS to occupy new ecological niches. Rising seawater temperatures can cause coral bleaching which may create ecological gaps into which more adaptive IAS may establish, while rising sea levels and increased coastal flooding events may inundate wetland areas and could result in the establishment of IAS plants that are more salt tolerant.

51. Certain productive sectors have been identified as critical pathways for the introduction of IAS into Mexico, as described below.

#### IAS Threats from Wildlife Importation and Production

52. In the wildlife sector, the import of exotic invasive species frequently results in releases of these animals into natural ecosystems, where they compete with and prey on native species, alter food chains and change habitats. One example of the introduction of an exotic species in Mexico is the European wild boar (*Sus scrofa*). Until 1992, the wild boar was known to exist in the states of Chihuahua and Durango, but in 1995 a feral population was detected and reported for the first time in Mexico. Since then, 10 states have reported the species and feral populations are known to exist in at least 4 states (Chihuahua, Durango, Sonora, and Sinaloa). The boar was imported into Mexico for breeding at several different government-supported Conservation and Management of Wildlife Units (UMAs); unfortunately, escapes of animals are common as some UMAs exceed 50,000 ha. in area, so that releasing a wild boar pack almost ensures that the animals (or a sub-group of them) will become feral or wild in areas outside of the UMA. Other species that have been imported to UMAs only to escape into the general environment include red deer (*Cervus elaphus*), axis deer (*Axis axis*), Barbary sheep (*Ammotragus lervia*), among others.

53. In addition to animals imported for production purposes, many exotic species are imported into Mexico as pets. Among the most widespread and destructive of the IAS pets imported into Mexico are ornamental fish; these are described below. Other species include many species of birds, reptiles and amphibians. One 2007 study showed that to date exotic bird species had not easily established new populations in Mexico, despite the large potential source of such species in the wildlife and pet trade. This study showed that between 1995 and 2005, Mexicans imported 180 species of parrots mostly for commercial sale as pets (Table 6). To date, only one of these 10 species of parrot has apparently established a wild population – the monk parrot, which was illegally released in Baja California. While of the eight other introduced birds species present in Mexico, only the doves (*Streptopelia decaoata* and *S. chinensis*) and munia (*Lonchura malacca*) are likely to have established from cage-bird escapes or releases. Nevertheless, data on the spread of exotic birds and other pets is extremely scarce, and their distribution and impacts on biodiversity and ecosystems remains largely unknown.

**Table 6: Ten primary exotic parrot species imported into Mexico, 1995 – 2005**

Species	No. imported	Wild in other countries	Wild in Mexico
Peach-faced lovebird ( <i>Agapornis roseicollis</i> )	32 319	Yes	No
African ring-neck parakeet ( <i>Psittacula krameri</i> )	8 145	Yes	No
Yellow-collared lovebird ( <i>Agapornis personatus</i> )	5 754	Yes	No
Eastern rosella ( <i>Platycercus eximus</i> )	5 415	Yes	No
Senegal parrot ( <i>Poicephalus senegalus</i> )	4 860		No
Fischers lovebird ( <i>Agapornis fischeri</i> )	3 910		No
African grey parrot ( <i>Psittacus erithacus</i> )	3 782		No

Monk parrot ( <i>Myiopsitta monachus</i> )	2 931	Yes	Yes
Burrowing parrot ( <i>Cyanoliseus patagonus</i> )	2 820		No
Red rumped parrot ( <i>Psephotus haematonotus</i> )	1 864		No

54. Finally, feral dogs and cats already present in Mexico are also significant IAS threats; as noted above, feral cats are particularly dangerous as predators of native species (mammals, reptiles, amphibians, birds, insects) on islands. Within and around some protected areas, feral populations of both cats and dogs have increased greatly; these animals feed primarily on bird eggs, reptiles and rodents, and as they become more feral, also on deer, armadillos and hares, among others. Feral dogs and cats are also a source of disease transmission to native species. At some sites, packs of feral dogs pose a threat to PA visitors as well as the residents of local communities; and there have been outbreaks of rabies in urban areas bordering PAs, which increases the risk of zoonoses that could affect biodiversity within these PAs.

#### IAS Threats from Forest Products

55. In the forestry sector, introductions of exotic species for reforestation, soil conservation and windbreaks, such as giant cane (*Arundo donax*), Casuarina (*Casuarina equisetifolia*), and Salt cedar pine (*Tamarix sp*), have impoverished the diversity of native habitats and reduced the availability of water resources throughout Mexico. Although data differentiating between native and exotic forest pests and diseases is not available, together they have the third largest negative impact on timber production in Mexico after wildfire and land use change. Among the most widespread and damaging of these forest pests, which are frequently imported accidentally in imports of wood and other forest products, are the Eucalyptus Psyllid, Cochineal Rosada, the Rolla Teak, Termite Asian and cactus moth. In recent years, the states of Colima, Nayarit and Aguascalientes have had significant outbreaks of exotic forest pests, with widespread ecosystem impacts.

#### IAS Impacts of escapes from aquarium trade and aquaculture production sectors

56. Mexico has a great diversity of freshwater fish species because it is located in a transition zone between two major biogeographical regions, the neotropical and the neoarctic, and because of its enormous diversity of environments. The entry and spread of potentially invasive exotic fish represents a serious risk to the natural environment in general and in particular for native species. Through both intentional introductions and accidental escapes, the aquarium fish trade and the aquaculture production sector are responsible for the widespread transmission of parasites and diseases; hybridization; predation; competition for food and ecological niches; and habitat alteration in aquatic ecosystems, resulting in the localized extirpation of native species at over 100 sites in Mexico.

57. Information has been collected on existing and potential aquatic IAS in Mexico and organized into three categories: 1) species known to be invasive elsewhere in the world in similar habitats to those in Mexico, but not present in the aquaria or aquaculture trade or in the wild in Mexico; 2) species not present in the wild in Mexico, but held in aquaria or in captivity in aquaculture in Mexico; and 3) species known to be present in the wild in Mexico, or known in the wild in protected areas in Mexico. In the first category, 129 fish species known to have established populations outside their natural range have been deemed likely to be able to establish in Mexican waters should they be released. Most (75%) are freshwater species, only 9% are truly marine species, and the rest are species that spend part of their lives in both fresh and salt water. In the 2<sup>nd</sup> category, one report suggested that 293 species/taxa of fish are currently present in the aquarium trade in Mexico; 67 of these are known to exist in the wild, and over 200 species held in the ornamental aquarium trade are not yet in the wild in Mexico but have a high potential for introduction and spread in the absence of effective controls. Finally, in the 3<sup>rd</sup> category, 120 species of fish are known to be present in the wild in Mexico, of which 93 are non-native species and 27 are translocated Mexican species. 36 of these fish species are exotic incursions from the ornamental

trade, 34 are native translocations from the ornamental trade, 31 are deliberate releases of food or sport species, 2 were deliberate releases of exotic threatened species from the USA to extend their range (the tui and arroyo chubs), 7 were of exotic species invading Mexican waters (e.g. the lion fish), and 2 appear to have arrived with ballast water or as eggs on ships' hulls.

58. In the aquaculture production sector, the use of exotic species for production is common, and important aquatic IAS include tilapias, catfish, carps, the American Bullfrog, Australian lobsters, and shrimp species translocated from the Pacific to the Gulf of Mexico. Invasive aquatic species are known to have negatively impacted native fish species, aquatic habitat, and even hydrological and hydropower systems throughout the country. One example of this is the devil fish (*Loricaridae fam.*), which has managed to expand rapidly at many sites in Mexico since it was first reported in 1995. This species has a high rate of reproduction and few predators in Mexican waters, so that its population grows rapidly wherever it is introduced. The devil fish competes with many native fish species for feed, is known to incidentally ingest the eggs of other species, and is suspected of being a carrier of various diseases and parasites. In general, exotic animals and plants escaping from aquaculture production facilities may adversely affect both native plants and animals and commercial fisheries, frequently with multiplying and unanticipated impacts over time. For example, the El Infiernillo reservoir was formed in 1963 and had a fishery based on native fish species. The introduction of four tilapia species and four carp species largely replaced the native fish, but also allowed a thriving fishing industry that supported 119 communities and 45,000 people. Thus, the introduction of exotic species produced an economic benefit but an adverse outcome for the native fish. Later, the armored catfish (*Loricarida sp.*) was introduced into a dam upstream of the reservoir to control algae; eventually this species escaped downstream into the reservoir. After the arrival of this new invasive, the catch of tilapia declined by about threefold with severe consequences for the local economy. Similarly, the production and commercialization of ornamental fish in the aquarium trade has been recognized for some time now as a major pathway for the introduction of alien species in natural aquatic environments in Mexico. The introduction and spread of ornamental fish represents a serious risk for the extinction of native species of freshwater fish and the degradation of aquatic habitats. A long-term study in one river in central Mexico showed a decline in native species abundance of 11-30% per decade as exotic species increased by 9-20% per decade. *Xiphophorus variatus* (a translocated native platy common in the ornamental fish trade) and *Micropterus salmoides* (a translocated bass native to northern Mexico and the USA released as a game fish) were the most common exotic fish in the river.

## **LONG-TERM SOLUTION AND BARRIERS TO ACHIEVING THE SOLUTION**

### Long-Term Solution

59. Mexico achieved an important forward step in management of invasive alien species with the publication of the National Strategy on Invasive Species (NSIS) in 2010. Combined with significant investments in prevention, quarantine and response to prevent the introduction and spread of IAS into and within the country, the finalization of the NSIS demonstrates a significant national commitment to IAS management. However, the NSIS and baseline investments now need to be transformed into a comprehensive approach to control the introduction and spread of IAS that impact biodiversity through production sectors and other pathways, and to reduce the impacts of IAS in biodiversity-rich and vulnerable ecosystems. To achieve this, actions must be taken to strengthen decision-making tools and information resources; to enable institutional coordination; and to enhance financial and technical resources to better take into account the whole spectrum/range of intervention measures, that together will address the overall problem of IAS in the country, including IAS pathways in key productive sectors, and effective IAS management at sites of high biodiversity value. However, progress toward this long-term solution has been constrained so far by a number of barriers; which are described below.

## Barriers

60. The degree to which Mexico is unable to effectively manage and/or prevent the introduction, spread and impact of IAS into and within the country is due to a number of critical barriers. These barriers can be grouped into two broad categories, as detailed below.

### **Incomplete national management framework to support a cost efficient and coherent implementation of the National Strategy on Invasive Species (NSIS)**

61. The NSIS was developed in 2010 under the leadership of CONABIO and through a participatory process where all the key agencies involved in IAS control, prevention and management activities in Mexico worked together. It clearly recognizes that there is a need to consolidate and strengthen a national management framework to support a cost-efficient and coherent implementation of the NSIS. However, it also recognizes that existing legislation and regulation, as well as the institutional framework pertaining to IAS, is fragmented, and as a result the application and enforcement of regulations and programs for prevention, control, eradication and monitoring of IAS has been inconsistent. In some cases, laws, regulations and institutional priorities even contradict each other, as for example with exotic species used in aquaculture, where the introduction of such species contravenes laws of environmental protection and yet is promoted by some government agencies. In addition, sectorial regulations do not incorporate national and international protocols and agreements (WTO, Cartagena Protocol etc.) regarding management of exotic species. Institutional responsibility for IAS management is also spread widely, with numerous institutions engaged in control and quarantine activities at either entry points (border entries, airports and ports) or other distribution points (productive sector storage, distribution, processing facilities), with different institutions responsible for activities at different sites or relevant to different production sectors. In addition, protocols, risk assessments, and capacities vary significantly among different institutions and are applied differently to various productive sectors. Notably, there are few regulations to prohibit the spread of IAS to natural ecosystems; inspection and quarantine protocols do not cover IAS for their impact on biodiversity; and to date most resources have been focused on IAS with impacts on agriculture, livestock or commercial forest species, rather than IAS in natural ecosystems. In addition, while there are contingency plans that involve multiple institutions and clear response mechanisms for introductions of IAS that impact agriculture, livestock and commercial forests, no such plans or mechanisms exist for IAS that impact biodiversity. Thus, while the approval of the NSIS was a critical first step in consolidating legal and policy approaches to IAS, specific control instruments and protocols, as well as institutional mechanisms for their application, have yet to be developed, and additional budget resources will be needed to extend management actions to cover IAS that pose a risk to biodiversity and ecosystem services (most institutions have insufficient resources for attending existing IAS management priorities; e.g. PROFEPA, which is responsible for border inspections of exotic flora and fauna, is chronically under-funded as it does not keep funds generated from inspection fees and certificates). In addition, to date no formal inter-institutional coordination mechanisms exist for IAS management (the national assessment committee for IAS that led development of the NSIS continues to convene informally, but it has no formal mandate or authority to direct institutional actions), so that institutional programs remain isolated and largely reactive.

62. Furthermore, limited information on the invasion status, pathways, distribution, population size, ecology, and social / economic impacts of IAS has prevented an understanding of the impacts of IAS, or how to address them, with regard to preserving the country's biodiversity. This is both a reason and a consequence of the lack of attention paid to IAS in Mexico by decision makers, and represents a constraint to increased budgetary allocation. This also explains why participation in IAS decision-making by civil society and the private sector is very weak. For example, basic information is not available on the role of the aquarium trade and aquaculture sectors in IAS spread, including the location and operations of production units and application of biosecurity measures used to prevent escapes, all of

which hampers the ability to assess or control IAS pathways in key vulnerable ecosystems. In addition, standards and protocols do not exist for prevention and response for IAS species imported by these sectors. Another example relates to the trade in wildlife and forestry products where no tracking schemes exist for movements of products and spread into vulnerable ecosystems inside Mexico. Overall, the country lacks a “black list” detailing restrictions on the import of IAS for all of the major sectors through which IAS tend to enter and spread in Mexico, and inspectors do not have updated technical sheets with details on priority IAS in order to identify them. Producers, importers and retailers are unaware of the risks for biodiversity posed by IAS as they have not received training or information on biosecurity measures. A few agencies have established information systems for IAS, but data is mostly outdated, inadequate and dispersed, putting constraints on capacities to identify priorities and needs for IAS management. Information on the potential costs of different interventions is not available, presenting a severe limitation on priority setting for implementation of the NSIS. For example, economic data showing the cost-effective added value of improved prevention frameworks of IAS vs. more traditional approaches of control and eradication in vulnerable ecosystems would be highly important to generate in Mexico. Data on imports (purposes, frequency, seasonality and origin) is incomplete and mostly unavailable, but essential for a reliable, long-term evaluation of pathways and improved prevention across the sectors. There is no coordinated national system where data from all institutions /organizations converge in a standardized manner; nor any web-based tools where decision makers, resource managers, and other stakeholders can access and download information on IAS. Technical capacities to identify pathways, commodities and organisms that present an IAS risk, or to measure the threats and impacts of IAS, are still rudimentary. The effectiveness of past as well as current efforts to apply regulations, employ effective prevention and control techniques and technologies, and manage IAS impacts, is largely unknown and there is very little documentation of best practices.

### **Lack of demonstrated effective strategies and tools for managing IAS pathways in targeted production sectors and for IAS management in priority biodiversity areas**

63. With regard to IAS in areas of high biodiversity, programs for IAS management have taken place in Mexico (primarily on islands), but these have been implemented on an ad hoc basis and their results have not been systematized. Furthermore, there are no systems in place (or the information to support them) for priority setting for IAS management at high priority conservation sites such as mainland protected areas and islands; so that interventions are on an ad hoc basis and do not incorporate systemic considerations such as: impacts of IAS on the overall populations of globally significant biodiversity across different landscapes / sites; priority setting based on selection of viable and low cost IAS interventions (i.e. focusing on sites where biosecurity, control, eradication, and other activities can have the most likelihood to result in the protection of globally significant biodiversity and to incur the least costs); or sharing of lessons learned and development of replication strategies among sites. In addition, the range of invasive species, the population levels of some and the variety of ways they compete with native and endemic species make single approaches or isolated individual campaigns insufficient to hold back the growing threat posed to areas of high biodiversity. Integrated IAS systems that combine the prevention of new introductions, and spread within these areas, as well as the control of populations and the mitigation of the impact of existing ones, are required.

64. Essential information necessary to prioritize IAS management and focus scarce resources has not been collected, including studies to identify priority invasive species / ecosystems for IAS management and detailed criteria for risk assessments of pathways for IAS introductions (priority pathways have been identified for many islands, but not for mainland sites; the absence of this information constrains environmental education and outreach activities to raise awareness and minimize IAS introductions. Detection and delimiting surveys for IAS are conducted regularly in Mexico, but only at agricultural sites and commercial forestlands. In many cases, natural areas lack inspection regulations and associated protocols to control IAS introductions (e.g. IAS imported for productive activities; tourism activities;

accidental introductions from shipping), and local residents and tourists alike are largely unaware of the threats posed by IAS and do not know best practices to avoid introductions. Protected Areas have limited authority in managing IAS in surrounding productive landscapes, while agencies that do monitor/control IAS in those areas (such as SENASICA for agricultural pests) are not mandated to prevent IAS impacts on biodiversity or ecosystem functions in productive landscapes or in PAs. In many cases, the most cost effective approach to IAS is early detection and response; however, the necessary early response systems, technical capacities, and support and involvement of local communities are not yet in place to support such actions in high biodiversity areas.

## STAKEHOLDER ANALYSIS

65. The project will be executed by the National Commission for Knowledge and Use of Biodiversity (CONABIO) on behalf of the Government of Mexico. Other government institutions that will play a significant role in the project, particularly with regard to national and state level institutional and regulatory frameworks, including work targeting productive sectors, are the Ministry of Environment (SEMARNAT), the National Commission for Forestry (CONAFOR), the National Institute of Ecology and Climate Change (INECC), the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA), the Federal Attorney for Environmental Protection (PROFEPA), the Mexican Institute of Water Technology (IMTA), and the Morelos State Committee for Aquaculture Health (CESAEM). The National Commission for Natural Protected Areas (CONANP) will be the leading project partner implementing activities at 9 mainland protected areas (PA) sites, while the Island Conservation and Ecology Group (GECI) will play a similar role at 6 island sites. Productive sector companies and associations will be partners in project activities addressing the import and distribution of aquaculture, aquarium trade, forest and wildlife products into and within Mexico, and at production sites within and around the mainland PA and island sites selected by the project. Local communities and resource users as well as NGOs/CSOs active at those sites also will be key partners in prevention and biosecurity measures as well as education and outreach. Finally, several academic institutions, such as the Metropolitan Autonomous University - Xochimilco (UAM), the Autonomous University of Nuevo León (UANL), and the National Autonomous University of Mexico (UNAM), will play an important role.

66. During the project preparation stage, a stakeholder analysis was undertaken in order to identify key stakeholders and assess their roles and responsibilities in the context of the proposed project. The table below describes the major categories of stakeholders identified, the individual stakeholder institutions/organisations within each of these categories, and a brief summary of their specific roles and responsibilities in supporting or facilitating the implementation of project activities.

**Table 7: Stakeholder Participation in Project Implementation**

<b>Stakeholders</b>	<b>Anticipated Roles and Responsibilities in Project Implementation</b>
<b>National Government</b>	
National Commission for Knowledge and Use of Biodiversity (CONABIO)	CONABIO will act as the official Executing Agency of the project. In addition, CONABIO will take a leading role in coordinating many of the activities related to national level institutional and legal frameworks for IAS management. CONABIO will participate on the IAS High-Level Committee, Scientific Committee and lead the development of information sharing tools, including the National Invasive Alien Species Information System (NIASIS), the participatory networks for IAS management, and the IAS National Gateway. It will also facilitate institutional coordination through meetings with State Authorities to discuss including IAS issues into State Biodiversity Strategies; strengthening institutional structures for inter-institutional coordination on IAS prevention and management; and carrying out a study of existing spending on IAS management by different institutions. CONABIO will work with other institutions to develop new tools and processes for IAS management, including IAS risk analysis methodologies / protocols; detailed risk assessments for selected species; inspection / identification tools for IAS that threaten biodiversity; and strengthened

	capacity for Early Detection and Rapid Response (EDRR) systems for IAS at national level. Finally, CONABIO will participate in the development and implementation of education and awareness programs on IAS for policymakers, productive sectors, and the general public).
National Commission for Natural Protected Areas (CONANP)	CONANP's primary role in the project will be to oversee the implementation of IAS management activities at 9 mainland Protected Area sites. CONANP will work the numerous partners at the 9 sites, but will have overall responsibility for the program of implementation at each site, which will include strengthening IAS management capacities and processes; changing productive sector practices that contribute to IAS introduction and spread; raising community awareness and participation in IAS Management; implementing biosecurity programs; and undertaking selective IAS control, eradication and monitoring activities. CONANP also will participate on the IAS High-Level Committee and the Scientific Committee at the national level. In addition, CONANP will act as a partner to the project activities led by GEI at 6 island sites, including supporting the development of Island Biosecurity Programs, participating on the IAS committees for islands, and providing support to the targeted IAS control, eradication and monitoring efforts.
National Commission for Forestry (CONAFOR); General Directorate of Forest & Soil Management (DGGFyS)	CONAFOR will take the leading role within the project in strengthening IAS management for forest products and forest ecosystems. CONAFOR will be responsible for developing forest health indicators on IAS and integrating them into the National Forest and Soils Inventory; completing risk analyses for high priority exotic forest pests; improving the monitoring of national entry points (warehouses) to prevent the introduction of exotic forest pests; the design and testing of different approaches for using fire to control IAS pests and plants, and developing techniques for soil restoration and reforestation with native species as a tool to limit the establishment of IAS. CONAFOR also will participate on the IAS High-Level Committee and the Scientific Committee at the national level, and on the IAS Committees for selected mainland PA sites.
Ministry of Environment (SEMARNAT), particularly the Sub-Secretary of Environmental Regulation (SFNA)	As the institution with overall responsibility for environmental conservation in Mexico, SEMARNAT will be responsible for promoting an improved IAS management agenda among different sectors and incorporating lessons learned and key messages in relevant international processes related to IAS. SEMARNAT will play a key role in finalizing the National List of Invasive Species (including a regulatory impact assessment of the list), and together with SAGARPA, SEMARNAT will sign a formal agreement on prohibitions, restrictions and management plans to be applied to IAS listed in the NLIS. SEMARNAT also will direct the study and drafting of new/revised laws and regulations on IAS management, including changes to operationalize restrictions on imports and uses of exotic species in the aquarium trade, aquaculture, and wildlife and forest products sectors. SEMARNAT will guide the development and application of financial mechanisms to support IAS management. Finally, SEMARNAT will participate on the IAS High-Level Committee and the Scientific Committee at the national level.
Federal Attorney for Environmental Protection (PROFEPA)	PROFEPA will participate in the project as the key institution for prevention, inspection, quarantine and control of IAS that impact biodiversity (especially forest pests and wildlife), both for transboundary movements at harbors, airports and borders, and at centers of distribution, production and storage of products that may contribute to the introduction and spread of IAS into and within Mexico. PROFEPA also will undertake verification of the correct application of phytosanitary treatments to prevent dispersal and spread of IAS into stands of healthy trees. PROFEPA will participate on the IAS High-Level Committee and the Scientific Committee at the national level, and on the IAS Committees for selected mainland PA sites.
<b>Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA) / National Service of Agro-Alimentary Health, Safety and</b>	SAGARPA will participate in the publication and outreach programs for the new National List of Invasive Species (NLIS), and together with SEMARNAT, will sign a formal agreement on prohibitions, restrictions and management plans to be applied to IAS listed in the NLIS. SAGARPA also will participate in implementation of pilot Early Detection and Rapid Response (EDRR) systems for high priority IAS at the national level, and in the adoption of harmonized standards and training programs for IAS management across key institutions. At the site level, SAGARPA will play a role in promoting best practices in IAS management in targeted production sectors to reduce IAS spread in and around mainland Protected Areas. SAGARPA also will participate on the IAS High-Level Committee at the



Quality (SENASICA)	national level. Within SAGARPA, the National Service of Agro-Alimentary Health, Safety and Quality (SENASICA) will continue to collaborate with CONABIO and SEMARNAT on the standardization and digitization of information as part of the effort to establish the NIASIS in order to share information and make it accessible to other relevant actors in the country. SENASICA also will continue its programs to address the cactus moth ( <i>Cactoblastis cactorum</i> ), the red palm mite ( <i>Raoiella indica</i> ), and the pink mealybug ( <i>Maconellicoccus hirsutus</i> ), all of which are threats to agricultural production but also have significant impacts on biodiversity. Through the project, SENASICA will be provided with standardized protocols and mechanisms regarding the management of IAS that threaten biodiversity, including early warning, monitoring and blacklisting, as well as technical information sheets on IAS for use by personnel at borders and other entry points. At the site level, SENASICA will act as a partner with CONANP in introducing best practices in IAS management in targeted production sectors at mainland PA sites. Finally, SENASICA will participate on the IAS High-Level Committee and the Scientific Committee at the national level, and on the IAS Committees for selected mainland PA sites.
National Fisheries Institute (INAPESCA)	INAPESCA will play a leading role in project activities related to improved IAS management of the aquarium fish and aquaculture sectors. It will provide training and technical support for the production and marketing of ornamental freshwater fish, including improved biosecurity systems for production sites; studies of the potential to develop commercial products for fishmeal produced from priority IAS (lionfish and catfish); development of markets (livestock, fish and crustacean production facilities) in states most impacted by those species; and promotion of native aquatic species production in order to replace production with exotic species. INAPESCA will provide training on response procedures to exotic invasive species alerts for its own staff as well as personnel of the Regional Centre for Research and Innovation in Sustainable Fisheries and Aquaculture (CRIIPAS), and state-level Aquaculture Health Committees. Finally, INAPESCA will participate on the IAS High-Level Committee and the Scientific Committee at the national level.
Mexican Institute of Water Technology (IMTA)	IMTA will play a leading role in the project activities related to improved IAS management of aquatic invasive plants. It will carry out a number of activities to improve understanding of the impact of aquatic invasive plants in Mexico, including: mapping of aquatic invasive plants in the main water bodies of the country; development of content on aquatic invasive plant information (included in the NIASIS); analysis of regional hydrological information linked to changes that favor the dispersion of aquatic invasive plants;. In addition, IMTA will carry out capacity building on control of invasive aquatic plants, and will develop education and outreach materials for border personnel and the public in general on the impact of aquatic invasive plants on Mexican ecosystems. IMTA will participate on the Scientific Committee.
National Institute of Ecology and Climate Change (INECC)	INECC will validate existing models of actual and potential distribution under climate change for 60 high risk invasive alien species in Mexico, and propose changes to key policy instruments (National Strategy on Invasive Species, national protected areas system plans) based on projected changes in IAS spread and impacts under different climate change scenarios. INECC also will assist in the development of harmonized standards and training programs for IAS management across key institutions. Finally, INECC will participate on the IAS High-Level Committee and the Scientific Committee at the national level.
Morelos State Committee for Aquaculture Health (CESAEM)	CESAEM will oversee the implementation of a state-level pilot program for management of IAS in the aquaculture sector (Morelos is the main center of the aquarium fish industry in Mexico). CESAEM will characterize aquaculture production systems and their potential to disperse IAS; develop a technical proposal to minimize the risk of dispersion of IAS; and implement biosecurity measures at aquaculture production sites. In addition, CESAEM will carry out workshops to inform aquaculture producers, retailers and importers of changed regulations and protocols, and to provide them with capacity building in implementing the changes for improved biosecurity in the industry. Finally, CESAEM will develop and deliver a public awareness and outreach program on the risks associated with IAS in aquaculture.
<b>NGOs</b>	
Island Conservation and Ecology Group (GECI)	GECI, which has a long-standing record of IAS management activities at many Mexican islands, will have overall responsibility for the implementation of project activities at 6 island sites. Working with key partners at each site, GECI will oversee the development and

	implementation of Island Biosecurity Programs and the establishment of IAS Committees for each island. GECEI also will take the leading role in outreach and education on IAS issues, and in training of resource managers, other local authorities (e.g. the Mexican Navy), productive sector players (fishermen, tourism operators, etc.) and local residents in IAS management, with a focus on biosecurity. GECEI will coordinate the sharing of information among participants at the 6 island sites, and with stakeholders from other islands (at least 8) where IAS management actions are most likely to be replicated post-project. Finally, GECEI will be the lead technical implementer of IAS control, eradication and monitoring activities at all 6 island sites. GECEI will participate in Scientific Committee and in the development of the national status report on IAS.
Fund for Communication and Environmental Education (FCEA)	FCEA is expected to act as a partner on various education and outreach activities, including: outreach to schoolchildren, development of on-line educational content on aquatic IAS, and implementation of a pilot program on IAS issues for schools; workshops on invasive species for journalists; and development and dissemination of communication materials on IAS to legislators and other policy makers
<b>Private Sector / Local Stakeholders / User Groups</b>	
Representatives / Associations of key production sectors	Aquarium trade, aquaculture, wildlife and forest importers, producers and retailers will play an active role in the project at both the national and site levels. At the national level, these stakeholders will be invited to participate in the development of new industry codes of conduct and/or certification systems to reduce their contribution to the introduction and spread of IAS, in particular those IAS that impact biodiversity. They will also receive training, information and technical materials to assist them in establishing biosecurity systems for their operations, and in selecting practices that will reduce the threat of IAS in their operations (e.g. replacing the use of exotic species with native species). At the site level, similar activities will be implemented with selected productive sector operators, most notably with aquaculture, agriculture/livestock, and forest products producers at mainland PA sites, and with fishermen and tourism operators at island sites. These site-level productive stakeholders also will be sought out as partners in overall IAS management planning through participation on site-level IAS committees.
Local communities (Island and PA demonstration sites)	Local communities in and around the project's targeted sites will be encouraged to participate in a variety of IAS management measures. At the island sites, the project will provide training workshops in IAS monitoring for local communities (at the 4 islands with human populations), to enable their participation in EDRR activities. At the mainland PA sites, PA management staff (with guidance and monitoring from the IAS Management Committee at each site) will organize workshops and training for local residents and other stakeholders (PA staff, university researchers, NGO staff) in order to establish surveillance and reporting groups to enable early detection and reporting of IAS within and nearby the PAs. These local stakeholders will be provided with identification sheets and information on how to contact PA managers to report on IAS sightings. It is also expected that local residents at both island and mainland PA sites will be hired to participate in IAS control, eradication and monitoring activities.
<b>Academic Institutions</b>	
Autonomous Metropolitan University (UAM) Xochimilco	UAM will lead the development of a pilot project for the mapping of invasive flora in Queretaro State, with the goal of developing a model that can guide similar exercises throughout the country. UAM also will participate in the development of an adequate methodology for risk assessment of exotic flora and the implementation of risk analyses for high priority invasive flora. Finally, UAM will work with the Jardín Botánico de Queretaro to develop an exhibition on IAS. UAM will participate in the Scientific Committee.
Autonomous University of Nuevo León (UANL)	UANL will participate in the implementation of risk analyses for invasive fish species. In addition, UANL will participate in developing and implementing educational programs for aquarium and aquaculture stakeholders regarding the environmental risks of these sectors; training workshops on implementing processes to reduce the risk of IAS introduction / spread; and workshops to develop best practice manuals on IAS management (esp. biosecurity), including voluntary codes / certification systems for importers and producers of exotic fish and aquatic plants. UANL will participate in the Scientific Committee.

National Autonomous University of Mexico (UNAM)	UNAM will work in conjunction with UAM on the development and implementation of risk analyses for invasive flora and the pilot project to map invasive flora in Queretaro State. UNAM will be invited to participate in the Scientific Committee.
<b>Funders</b>	
United Nations Development Programme (UNDP Mexico)	UNDP Mexico is the official Implementing Agency of the project. UNDP Mexico will provide guidance, technical support, management tools, and theoretical and practical knowledge to project partners to support substantive project implementation.

## BASELINE ANALYSIS

67. In recent years, knowledge of and concern about IAS and their harmful impacts has increased in Mexico, sparking changes in the policy environment and new and increased baseline investments in IAS management. However, under the ‘business-as-usual’ scenario, at the national level, resources for IAS management will continue to focus overwhelmingly on IAS that impact agriculture and other productive activities, as well as human health. The significant capacities, personnel and resources of Mexican government institutions for IAS inspection, quarantine, and control will not be focused on or intentionally applied to IAS that impact biodiversity and ecosystem functioning. Furthermore, these institutions will continue to work largely independently of each other, with different information systems, risk analyses, protocols, etc., which will limit effectiveness and cost efficiencies. Government programs for IAS management will also continue to be primarily top-down, rather than working in tandem with stakeholders in key production and trade sectors who are responsible for much of the introduction and spread of IAS in the country. IAS management at mainland PA sites will be disconnected and ad-hoc, with no overall planning or priority setting at the site level and no coordination among sites or at the systemic level. Furthermore, most IAS management activities will continue to focus on control and eradication, with little emphasis on prevention or response approaches, and little activity to address the threat posed by IAS related to productive sectors, or IAS threats that emanate from outside of PA boundaries. IAS management at island sites will likely continue to be fairly well coordinated and prioritized, but will also likely to continue to emphasize control, eradication and restoration, with little capacity or resources for effective biosecurity measures (including prevention, inspection and early detection and rapid response). **The total baseline finance associated with the project represents \$1,835.1 million for the 4 years that the project is expected to last.** These investments in various IAS management programs and activities are described below:

### *Component 1) With respect to the strengthening of the National IAS Management Framework*

68. Overall planning, institutional and legal / regulatory frameworks for IAS management: The Ministry of Environment (SEMARNAT) led the development of the National Strategy on Invasive Species (NSIS, 2010) and has continued to work to integrate IAS management into laws and regulations. In 2010, amendments were made to the General Law of Ecological Equilibrium and Environmental Protection (LGEEPA, Articles 79, 80 & 85) and the General Law of Wildlife (LGVS, amended Article 3; new Article 27) to address IAS, including the first prohibitions on the liberation or introduction of invasive exotic species into natural ecosystems. In addition, CONABIO has taken an ongoing role in working with agencies responsible for sectoral regulations in developing Official Mexican Norms to support IAS management, including NOM 043 on invasive weeds, and Nom 013 on which regulates pests imported in the Christmas tree business and the use of exotic species for commercial forestry plantations, reforestation programs, and in the plant nursery industry. SEMARNAT and SAGARPA have agreed to actively pursue efforts to develop a more coherent and harmonized approach to IAS management under the overall framework established by the NSIS. These agencies, as well as others with mandates relevant

to IAS management, such as CONANP, PROFEPA, INECC, and IMTA, will continue to invest in IAS planning and institutional / legal frameworks for the foreseeable future. The baseline finance associated with planning, institutional and legal / regulatory frameworks is calculated at **\$0.5 million** for the duration of the project.

69. Information and decision-making tools to support IAS management: CONABIO, SEMARNAT and SENASICA (an agency within SAGARPA) have initiated collaboration on the standardization of information with regard to pests and sanitary threats, and all three agencies are working to digitize their data as part of the effort to establish a compatible database (the NIASIS) among key ministries (especially SEMARNAT and SAGARPA) in order to share information and make it accessible to other relevant actors in the country. SENASICA will continue to manage its information systems on pest and diseases, including the Coordinated System for the Management of Regulated Pest and Epidemiology (SCOPE) and the National Information System of Exotic and Emerging Diseases (SINEXE). In addition, two more information systems also will be of relevance to IAS management once they integrate IAS data: the National Forest Information System for information on native and exotic forest pests, and the National Information Subsystem on Wildlife. SEMARNAT also carries out taxonomic identification of exotic pests in forest products found at entry points in the country (submitted to them by PROFEPA and CONAFOR); the elaboration of phytosanitary certifications, and review of management plans and import authorizations for UMAs and PIMVs. CONABIO is also working closely with SAGARPA to represent Mexico in regional forums related to invasive species management, most notably within the North American Plant Protection Organization (NAPPO) and the North American Invasive Species Network (NAISN). The baseline finance associated with information and decision-making tools for IAS management is calculated at **\$5.0 million** for the duration of the project.

70. IAS prevention and response at points of entry into Mexico and key points of distribution within the country, including management of productive sectors such as agriculture, wildlife and forest products, aquaculture, etc.: Mexico has identified the introduction and spread of IAS as a significant threat to its biodiversity. Although Mexico has significant existing resources and mechanisms to prevent and control the introduction and spread of invasive species, these are oriented almost entirely to IAS that threaten agriculture and human health, and are not mandated by laws or regulations or used in practice to address IAS that might impact biodiversity. For this reason, to date very little attention has been paid to production and import sectors, such as the aquarium trade, aquaculture, and wildlife and forest products, which are responsible for IAS introductions into natural environments. Nevertheless, Mexico does have impressive resources for inspection, quarantine and response systems for IAS that impact agriculture and human health, and the possibility of reorienting these resources to include a focus on IAS that impact biodiversity gives Mexico a distinct advantage in trying to protect its biodiversity from invasive alien species. For example, at present PROFEPA has 90 full-time staff stationed at 57 offices to carry out phytosanitary inspections at airports, ports and border crossings, with a focus on imported wildlife (exotic fauna) and forest products (forest pests). PROFEPA has established a program for the "Verification and Inspection Program for the Importation of Christmas Trees" designed to prevent the entry and establishment of quarantine pests from Christmas tree imports. Mexico is considered as one of the major centres of diversity of pine species, and the introduction of pests through Christmas trees would have strong ecological and economic impacts. During the 2012 season, 1,084,521 Christmas trees were physically inspected, mainly *Abies procera* (52.3%), *Abies nordmanniana* (2%), *Abies grandis* (1.3%), *Abies fraseri* (0.15%) and *Pseudotsuga menziesii* (44.2%). Of these, 3,584 trees were rejected due to detection of forest pests of quarantine importance such as *Otiorhynchus rugosostriatus* and *Contarinia constricta*. PROFEPA's baseline spending on these and other activities related to IAS management, including salaries for headquarters staff, equipment and maintenance costs, and a special programme for import verification of Christmas trees, is approximately US\$10.1 million.

CONAFOR is also active in a number of activities related to IAS forest pests and diseases, including prevention and control of forest pests, risk analysis of exotic forest pests, a national forest inventory, and the integration of IAS considerations into its fire management and reforestation programs nationwide (see Output 2.2 for more details). During the 4 years of the proposed project, CONAFOR baseline spending on these activities will total approximately US\$54.0 million. INAPESCA implements baseline activities to control aquatic IAS, including projects to oversee ornamental fish production and to promote the use of native species in aquaculture, with total baseline spending of approximately US\$1.7 million. CONAGUA has implemented numerous activities for the control of aquatic weeds. For example, it has programs to clean the navigation channels of Lake Cuitzeo in Morelia by removing *Eichhornia crassipes* from 30 ha, and is working with the State Fisheries Commission (Compesca) to remove aquatic weeds from another 427 ha. It is currently carrying out a study for the removal of aquatic weeds from Lake Patzcuaro in the state of Michoacan. The largest component of spending on IAS management in Mexico is the funding provided through SAGARPA, which totals US\$433.3 million per year. The majority of this amount (US\$253.6 million per year) goes to SENASICA, which carries out inspections for IAS that pose a threat to agricultural production. A large part of these funds are spent on inspection, quarantine, response and control measures, as well as the operation of information management and tracking systems. One of these is the Coordinated System for Regulated Pest Management and Epidemiology (SCOPE), a platform for monitoring, tracking, modeling and forecasting pests and diseases that affect or could affect the country. Although the SCOPE is primarily used to monitor and prevent IAS impacts on rural production (i.e. agriculture), it does also collect information on ecological conditions and factors. The other system is the National Information System on Exotic and Emerging Diseases (SINEXE); a framework for reporting and surveillance of exotic diseases that might impact human or animal (livestock) health. SENASICA continues to expend significant resources in addressing several high risk IAS: the cactus moth (*Cactoblastis cactorum*), the red palm mite (*Raoiella indica*), and the pink mealybug (*Maconellicoccus hirsutus*), all of which are threats to agricultural production but are also of interest to the environmental sector for their impacts on biodiversity. In addition to the funding it provides to its agency SENASICA, the other component of the SAGARPA funding for IAS management (US\$179.7 million per year) provides funds to all of the state governments in Mexico for biosecurity to protect agriculture. The baseline finance associated with IAS prevention and response related to import and production sectors is estimated at **US\$1,805.1 million** for the duration of the project.

71. Of this 96% is related to SAGARPA but this focuses on IAS important to agriculture. Clearly this provides a robust foundation. Once the key elements for management IAS important for biodiversity conservation are put in place through this project, the SAGARPA baseline will also be an important vehicle for up scaling.

***Component 2) With respect to integrated IAS management to protect vulnerable globally significant ecosystems***

72. IAS management at mainland protected area sites: In recent years, CONANP and individual Natural Protected Areas (NPAs) have invested funds in IAS management at selected PA sites, primarily focused on control, eradication and restoration activities. CONANP also has supported the creation of IAS management plans at some sites, although typically these plans are not supported by funds for their implementation, and outreach and education on IAS to local communities at selected sites. In a few sites, CONANP has provided training in IAS management methods, and promoted the use of native species, to fisheries, aquaculture and livestock production units in areas within and surrounding mainland PA units, including: removing exotic rainbow trout (*Oncorhynchus mikiss*) and restoring native Trout (*Oncorhynchus chrysogaster*); launching a native fish species reproduction center; and establishing semi-

intensive grazing areas on PA boundaries. CONANP also worked with NOAA, REEF, ICRI, UNEP, the Caribbean Environment Programme, SPAW-RAC, and others to develop the manual on “Invasive Lionfish: A Guide to Control and Management” to assist coastal managers and field workers with local control and research efforts for invasive lion fish. CONANP will continue to strengthen its expenditures to safeguard biodiversity resources within PAs; this overall spending to improve minimum standards of park management will in turn have a positive effect in preventing and controlling IAS in and around mainland PA sites. The baseline finance associated with IAS management at all mainland PA sites is estimated at **\$16.2 million** for the duration of the project.

73. **IAS management on Mexican islands:** During the past decade, Mexican islands have been the focus of several IAS management programs. INECC has invested funds into research on the control and eradication of insular invasive species, while Mexican and U.S. government agencies, together with GECI and private donors, have invested in IAS control, eradication and restoration activities, resulting in the eradication of 54 distinct populations of 10 different species of exotic mammals on 35 islands; long-term control programs for exotic species such as feral cats and various invasive plants including salt cedar (*Tamarix aphylla*); as well as the restoration of ecosystems and the reintroduction of native species, including marine birds such as Heermann’s Gull (*Larus heermanni*) and the Elegant Tern (*Thalasseus elegans*). Mexico has made important progress in particular with regard to the eradication of invasive species on its islands. Rodent eradications using advanced techniques are contributing in a major way to the restoration of seabird populations and habitats at an eco-regional scale, and to date have allowed the recovery of a variety of species, in particular two local subspecies of Leach's Storm-petrel (*Oceanodroma leucorhoa cheimomnestes* and *O. l. socorroensis*), Xantus’s Murrelet (*Synthliboramphus hypoleucus*) and Cassin’s Auklet (*Ptychoramphus aleuticus*). On Isla Guadalupe, the Laysan Albatross (*Phoebastria immutabilis*) colony is now the largest in the Eastern Pacific. Eradication measures need to continue to be applied in island ecosystems in parallel with ongoing efforts to improve control and prevention measures. In addition, the National Strategy for the Conservation and Sustainable Development of the Mexican Island Territory recognizes the eradication of insular invasive species as a priority. To date, biosecurity systems (prevention; inspection; quarantine; early detection and rapid response) have not been implemented on Mexican islands. However, with the success of eradication strategies on numerous islands over the past twenty years, the National Advisory Committee on Mexican Island Territory 2012 has found it necessary to develop and implement biosecurity protocols to prevent the spread of IAS to other islands, or islands where they have been eradicated. The baseline finance associated with IAS management on Mexican islands is estimated at **\$7.3 million** for the duration of the project.

**Table 8: Baseline Finance Overview**

Component / Topic	US\$ Million
<b>Component 1</b>	
Overall planning, institutional and legal / regulatory frameworks for IAS management	0.5
Information and decision-making tools to support IAS management	5.0
IAS prevention and response at points of entry into Mexico and key points of distribution within the country	1,805.1
<b>Sub-Total</b>	<b>1,810.6</b>
<b>Component 2</b>	
IAS management at mainland protected area sites	16.2
IAS management on Mexican islands	7.3
<b>Sub-Total</b>	<b>23.5</b>
<b>TOTAL</b>	<b>1,834.1</b>

## PART II: Strategy

### PROJECT RATIONALE AND POLICY CONFORMITY

#### *Fit with the GEF Focal Area Strategy and Strategic Programme*

74. The project is aligned with GEF’s Strategic Objective (SO) 2: Mainstream Biodiversity Conservation and Sustainable Use into Production Landscapes, Seascapes and Sectors, and specifically with Outcome 2.3: Improved management frameworks to prevent, control and manage invasive alien species and *Indicator 2.3: IAS management framework operational score as recorded by the GEF tracking tool.*

75. The project will contribute to the achievement of GEF’s outcome indicators under the strategic programming area as follows:

**Table 9: GEF Focal Areas**

GEF V Biodiversity Focal Area Objectives	Expected Focal Area Outcomes	Expected Focal Area Outputs	Project contribution to indicators
BD-2	2.3: Improved management frameworks to prevent, control and manage invasive alien species	2.1. Policies and regulatory frameworks for production sectors: IAS management framework operational as recorded by GEF 5 TT	IAS Tracking Tool overall score will improve from 8 (28%) to 25 (86%)  Enhanced IAS surveillance and control strategies will contribute to biodiversity conservation on 15 islands (6 island groups) totaling 46,420 ha., and 9 mainland Protected Areas totaling 4,240,349 ha.

#### *Rationale and summary of GEF Alternative*

76. Biodiversity and ecosystems in Mexico are under serious threat from the introduction and spread of invasive alien species. Among the many negative impacts that IAS flora and fauna have on native species and natural ecosystems are the following: direct predation of native species, competition for resources, inter-breeding / hybridization with native species, destruction and fragmentation of habitat, degradation of ecosystem services (i.e. food production; provision of sufficient and clean water resources; carbon sequestration and climate regulation, water and air purification), acceleration of the spread of other invasive species, and preventing the recovery of natural ecosystems. Under the baseline situation, these threats are likely to continue, as Mexico has numerous constraints on its ability to prevent the introduction and spread of new IAS or to mitigate or eliminate the impact of IAS already in the country, including in areas of high priority for conservation.

77. The degree to which Mexico is unable to effectively manage and/or prevent the introduction, spread and impact of IAS into and within the country is due to a number of critical barriers: a lack of coordination among institutions responsible for IAS management, in particular between institutions responsible for IAS that impact agriculture and human health and institutions responsible for IAS that impact biodiversity and ecosystems, that prevents an effective and coherent national system of prevention, detection, and management; insufficient and disharmonized technical tools and information resources to support identification, inspection and response to IAS; a weak legal and regulatory system, particularly in the application of regulations to productive sectors that contribute to IAS introduction and spread; deficits in technical capacities and knowledge; insufficient awareness of IAS threats among the

public and productive sectors; and lack of experience in high priority conservation areas with integrated IAS management planning; with biosecurity approaches (including prevention, and early detection and rapid response), and with working with local productive sector stakeholders to reduce their contributions to IAS impacts.

78. To address these barriers, and to advance Mexico's national and international commitments to IAS management, the proposed project will support the implementation of the National Strategy on Invasive Species (NSIS) and its objectives for strengthening national-level management effectiveness and coordination and demonstrating effective site-based management of IAS in high priority conservation areas. Building on the momentum of the approval of the NSIS in 2010, the project will allow Mexico to bring together the resources of key stakeholders to implement coordinated policy, legal and institutional changes that will strengthen IAS management and orient it more concretely towards biodiversity conservation. At the systemic level, the project will strengthen national capacities to implement the NSIS through the development of improved information resources on IAS, priority setting and decision-making tools, strengthened capacity of key institutions, and the integration of critical partners (targeted production sector stakeholders) into IAS prevention and control actions. The project will devote special attention to integrating and harmonizing the activities of programs led by biodiversity and environment-focused agencies and the activities led by agencies in charge of import control and phytosanitary and zoosanitary measures. To enable better integration among these various agencies, the project will support the development and application of new inter-institutional and harmonized decision-making tools, information resources, budgetary coordination, and technical and financial capacities for IAS management, as well as new inter-institutional coordination structures.

79. The development of strengthened institutional coordination, technical and information tools, laws and regulations, etc. at the national level will enable Mexico to address the key issue of the introduction and spread of IAS into and within the country. Among the specific activities that the project will support in this regard are: development of a National List of Invasive Species (NLIS), as well as identification of high priority IAS on the NLIS; development of models to predict the potential impact of climate change on IAS dispersion; improved information systems for the tracking of IAS, including a National Invasive Alien Species Information System (NIASIS); improved and harmonized risk analysis, pre-screening, inspection, and quarantine procedures based on the NLIS as well as revised laws, regulations and protocols; testing of the first Early Detection and Rapid Response (EDRR) systems in Mexico for selected high risk IAS; and capacity building of key personnel to implement these procedures and protocols at points of entry into Mexico as well as points of distribution (e.g. aquaculture, wildlife and forest products production and storage facilities), including technical training and providing improved information (databases; technical information sheets) on high priority IAS. The project will specifically address policies, regulations and tools to reduce or eliminate harmful practices in key productive sectors (aquaculture; aquarium trade, wildlife products and forest products) that are main IAS pathways for entry into Mexico as well as dispersion to high priority conservation areas; these activities will be carried out with the participation of productive sector associations and companies.

80. At the site level, the project will work with key national actors and build upon existing programs to implement IAS prevention, response and control measures in vulnerable globally significant ecosystems. The primary emphasis of the GEF funding at the site level will be on preventing the entry and spread of IAS into high priority conservation areas through prevention and early detection and rapid response systems, in order to prevent IAS impacts at the source and thereby avoid costly control and eradication efforts. Because IAS management at conservation areas in Mexico has traditionally focused on control, eradication and monitoring, the project is working with its key partners in the islands (GECI) and the mainland PA sites (CONANP) to integrate and emphasize biosecurity approaches into their existing IAS management activities. The project will promote integrated IAS planning and coordination at all 9 mainland protected area sites and 6 island sites, including the first biosecurity plans at these sites to



improve IAS inspection, quarantine and response programs at entry points to islands and mainland PAs. EDRR systems will be developed and initiated to test strategies for reducing IAS establishment and spread, as well as long-term IAS management costs. The project also will work with local residents and producers to reduce the potential IAS impacts stemming from activities within and surrounding conservation areas. One approach will be to carry out education and outreach efforts to local inhabitants on the impacts of IAS on natural environments and human activities that contribute to these impacts, and to increase the participation of local inhabitants in IAS prevention and control measures. In addition, the project will work with specific production sector partners on: improved fish production, livestock grazing and forest management systems to reduce IAS spread and impacts on native species and ecosystem functions; replacement of exotic species with native species in forestry, gardens, agriculture, aquaculture and pasture management; and biosecurity measures at production facilities within selected sites and their surrounding landscapes.

81. Although the main focus of activities at the site level will be on preventing the introduction and spread of IAS into high priority conservation areas, the project also will support measures to address IAS already present at some of these areas, specifically at sites where existing IAS are having a severe impact on biodiversity and/or ecosystem functions, and where control and eradication measures can be cost effectively implemented with a high likelihood of success. In these instances, the project will implement control, eradication and monitoring measures for specific targeted invasive species (with significant co-financing; less than 13% of GEF project funds will support control and eradication activities). The project design recognizes that IAS control and eradication programs may have unintended negative consequences (e.g. removing one IAS may allow others to multiply in their place) and are not always cost-effective, as they deal with the effects rather than the causes of invasions, do nothing to prevent future invasions, and raise serious questions regarding long-term sustainability and financing. For this reason, control and eradication activities are being paired with the establishment of biosecurity systems, which will not only will protect biodiversity, but also ensure that investments in control and eradication have the highest rates of return on investment.

82. CONABIO will integrate the lessons learned from demonstrating IAS management in islands and mainland PAs (and surrounding productive landscapes) into its information management systems, and will share the results nationally to promote replication at other sites during and after the project, as well as with other countries (e.g. Cuba, Dominican Republic and Brazil). In addition, site-based activities to implement EDRR systems will serve as a model for the development of a national EDRR system. CONANP, through its Office of Conservation of Priority Species (DEPC), will consolidate lessons learned at the 9 mainland PA sites and disseminate that information throughout the national PA system; the Island Conservation and Ecology Group (GECI) will fulfill a similar function for IAS management at all Mexican islands. Thus, the implementation of field-based IAS activities will generate experiences to enhance IAS surveillance and control strategies in key vulnerable ecosystems, generating biodiversity conservation benefits and helping the country to develop cost coefficients to guide the priority setting process for future IAS field interventions at high priority conservation areas throughout Mexico.

83. It is also worth noting that the primary focus of most field-level activities in this project will be on terrestrial and aquatic invasive species, with less emphasis on marine invasive species. This focus is based primarily of the much higher level of known impacts on biodiversity and ecosystems from terrestrial and aquatic IAS; in many mainland PA sites and islands, these invasive species are considered the single most important threat to biodiversity. IAS in the marine environment, by contrast, are believed to have a lesser impact; just as importantly, efforts to manage marine IAS are typically tremendously expensive and difficult to achieve. The exception to the project's focus on terrestrial and aquatic species is the lionfish (*Pterois volitans*), which is an imminent and significant threat to marine biodiversity and habitat (coral reefs) in the Caribbean and Gulf of Mexico. The project partner INAPESCA will carry out studies of the potential to develop commercial products for fishmeal produced from high priority IAS

(lionfish and catfish), and the development of products and markets (livestock, fish and crustacean production facilities) in states most impacted by those species (Tabasco, Campeche, Chiapas, Michoacán, Quintana Roo, Veracruz, and Yucatan), so as to increase harvesting of these IAS. In addition, at the Sian Ka'an Biosphere Reserve, the project will support an existing program for control and commercialization of the lionfish, where PA authorities, municipalities, researchers, CSOs, schools, and universities are jointly participating in monitoring and capture of the lionfish; outreach campaigns to raise awareness of the threat and to promote the consumption of lionfish; and encouraging commercialization of the lionfish as a food product.

84. More details on GEF alternative, including specific activities to be undertaken at the national level and at island and mainland PA sites, is provided below.

## **PROJECT GOAL, OBJECTIVE, OUTCOMES AND OUTPUTS/ACTIVITIES**

85. **The project's goal is** globally significant biodiversity is protected from the impacts of invasive alien species in Mexico.

86. **The project objective is** to safeguard globally significant biodiversity in vulnerable ecosystems by building capacity to prevent, detect, control and manage IAS in Mexico

87. In order to achieve the above objective, and based on a barrier analysis (see Section I, Part I), which identified: (i) the problem being addressed by the project; (ii) its root causes; and (iii) the barriers that need to overcome to actually address the problem, the project's intervention has been organised in two components, which are in line with the concept presented at PIF stage. The following 'outcomes' are expected from the project:

Outcome 1: National IAS management framework

Outcome 2: Integrated IAS management to protect vulnerable globally significant ecosystem

### **Outcome 1: National IAS management framework**

#### **Output 1.1: Decision making tools aimed at informing cost effective management decisions to address IAS threats in key landscapes and key sectors (aquarium trade, aquaculture, trade of wildlife and forest products)**

88. The project will undertake a number of coordinated actions to improve the quality of and access to information on IAS, and to widen participation in information creation and sharing, as a means of improving IAS management in Mexico. The project will strengthen CONABIO's Invasive Species Information System to form a National Invasive Alien Species Information System (NIASIS), which will link different existing information sources, providing detailed information on species taxonomy and biology, places and pathways of introduction, IAS impacts on biodiversity and ecosystem functions, and data on dispersion under different climate change scenarios. The project also will establish an information management system to monitor the implementation of activities and the achievement of objectives described in the National Strategy on Invasive Species (NSIS), including information on IAS management (past, ongoing and future projects; partners; budgets; etc.) throughout Mexico. A national IAS Experts Network will be established to allow users to find contact information for experts in Mexico on specific IAS issues or species, thereby allowing resource managers and inspectors to quickly and efficiently access relevant experts and information for urgent biosecurity and EDRR actions, among others. The experts network will be linked to an IAS web portal that will provide easy access to and

dissemination of information on IAS, and will facilitate harmonized standards and training programs across key institutions. In addition to information management tools, the project also will help to develop targeted decision-making tools and processes for IAS and in particular for IAS that impact biodiversity. The National List of Invasive Species, including identification of high priority IAS, will be finalized, published and disseminated to all key agencies. Risk analyses applicable for all IAS taxonomic groups will be used to improve decision-making regarding imports of species by production sectors and to identify IAS that pose the greatest threat for high biodiversity sites. Standardized protocols and mechanisms regarding the management of IAS that threaten biodiversity, including early warning, monitoring and blacklisting, as well as technical information sheets on IAS for use by personnel at borders and other entry points, will be produced in coordination with SENASICA and PROFEPA and developed to improve the efficiency of prevention and control. Indicators for IAS that impact biodiversity will be developed and integrated into the National Forest and Soils Inventory, which will enable forest managers to plan for and address IAS issues. A validated model for mapping of IAS flora will be created and provided to resource managers, including protected area managers. In order to prepare for future interactions between climate change and IAS introduction and spread in Mexico, niche models will be developed for high risk IAS regarding current and future dispersion scenarios under expected climate change projections. Finally, to further guide decision-making on priority interventions and the allocation of resources, the project will produce cost coefficients for different IAS management strategies in Mexico (based in large part on project activities for productive sectors and for mainland PAs and islands), as well as economic models to estimate the costs to the Mexican economy of high-impact IAS.

**1.1.1 Strengthening of the National Invasive Alien Species Information System (NIASIS):** The project will strengthen the existing NIASIS, an information system managed by CONABIO that includes detailed information on invasive species taxonomy and biology; sites and pathways of introduction; and in the future will include potential dispersion and ecosystem impacts of IAS under current and future climate change scenarios. The NIASIS will be a managed information system, where all data is reviewed by CONABIO before being inputted into the system. The NIASIS will link different existing information sources, including national (SEMARNAT, IMTA, PROFEPA, INECC, CONANP) and international (GISIN, NAISN) IAS databases, building on collaboration that has already been initiated between CONABIO, SEMARNAT and SENASICA (SAGARPA) on the standardization of information with regards to pests and sanitary threats (see Baseline Analysis). To further strengthen the NIASIS, a review will be carried out of existing IAS-related data, as well as analysis of new data (e.g. from reports, published literature and projects) that should be incorporated into the NIASIS. In addition, the project will incorporate data from and coordinate with existing animal and plant health information systems managed by SEMARNAT and PROFEPA, which will help to identify species imported by productive sectors that pose a significant threat to biodiversity. The project also will carry out some data collection activities on the occurrence of and risk analysis for selected high priority IAS. In developing the NIASIS, the project will seek exchanges of information and collaboration with the North American Invasive Species Network (NAISN) and the Global Invasive Species Information Network (GISIN). IMTA will undertake additional activities to feed into the NIASIS, including the development of an aquatic invasive plant information system, based on mapping of aquatic invasive plants in the primary lakes and reservoirs of the country and including the integration of regional hydrological information linked to changes that favor the dispersion of aquatic invasive plants. By strengthening the NIASIS, the project will improve the availability, updating and exchange of information on IAS, allowing for a comprehensive diagnosis of IAS at the national level, projections of new or expanded invasions, improved priority setting for interventions, informed decision-making on sectorial policies and investments, and easy access to information for decision makers and other users.

**1.1.2 Establishment and operation of Information System to measure implementation of the National Strategy on Invasive Species:** The project will establish an information management system,

similar to that established by the PECC (Programa Especial de Cambio Climático), to monitor the implementation of activities and the achievement of objectives described in the National Strategy on Invasive Species (NSIS). This information system will focus on consolidating and making available information on IAS management (past, ongoing and future projects; partners; budgets; etc.) throughout Mexico. The information system will be an open system in which any institution / organization / university can both access and enter information. The system will allow Mexico to measure the success of its efforts in implementing the NSIS and in revising / updating the strategy based on changing conditions, as well as improving the availability, updating and exchange of information among key stakeholders on IAS management programs and projects nationally.

**1.1.3 Creation of Participatory Networks to support IAS management:** The project will develop several tools to support broader participation and cost-effective information sharing on the extent, location, and optimal management strategies for invasive alien species in Mexico. One tool will be an IAS Experts Network (modeled on the Delivering Alien Invasive Species Inventories for Europe or DAISIE system), which will allow users to find contact information for experts in Mexico on specific IAS issues or species. This will allow resource managers and inspectors to quickly and efficiently access relevant experts and knowledge products (which is important for biosecurity and EDRR purposes); it will also facilitate the sharing of information among experts within Mexico and with international partners. In addition, the project will support ongoing efforts by CONABIO to establish a mobile application and related online tool (based on the i-Naturalists system, a successful model of citizen science in the United States), where the general public can upload photos and data on suspected IAS sightings and ask other participants to identify the species; the project will help CONABIO to increase the capacity to collect and analyze the data that is generated and share it with relevant resource management agencies. Both of these tools, which will be linked to the IAS National Gateway (see 1.1.4), will facilitate timely and comprehensive information sharing among national IAS experts; easy access to relevant experts for institutional and sectorial stakeholders; and more efficient and cost effective approaches to IAS management

**1.1.4 Establishment and operation of an IAS National Gateway:** The current on-line, public system for accessing and sharing information on IAS in Mexico is a “wiki-style” page where requests for information are handled on a case-by-case basis and typically are not resolved quickly. CONABIO will convert this existing web portal into an interactive system that is directly linked to the NIASIS, so that information contained in the NIASIS database (lists of IAS; maps; risk analyses; etc.) is available and can be searched by the general public, experts and decision-makers. CONABIO will design, program and launch the IAS National Gateway and will carry out ongoing maintenance and updating, including translation of content, updating of data; etc. The National Gateway will provide rapid access and dissemination of information to enhance deployment of coordinated actions between institutional partners on IAS management.

**1.1.5 Publication and Outreach on the National List of Invasive Species (NLIS):** The Government of Mexico is in the process of developing a National List of Invasive Species. The list includes priority ranking of invasive species, utilizing a rapid assessment process (a hybrid between a basic screening and a full risk analysis). With the support of the proposed project, SEMARNAT, CONABIO and other institutions will: 1) carry out consultations to finalize the national list of invasive species (in 2014); 2) undertake a study of the impacts of listing of species (requested by the Comisión Federal de Mejora Regulatoria, the study is required to ensure that the benefits of listing any given species are greater than the costs and create the maximum benefit for society); 3) develop an official agreement (Acuerdo Secretarial) between SEMARNAT and SAGARPA regarding management of species on the national list (see activity 1.3.9); and 4) publish the official agreement and the national list. Once the list is finalized, the project will support outreach on the NLIS through workshops with relevant institutions and private organizations to clarify key questions, including: 1) review of which species are listed as high priority

species and what are the management measures that must be applied for such species; and 2) how risk analyses will be carried out for priority species (who does the risk analyses; who pays for them; when are they legally required; and can they be fast-tracked for emergency situations). Finalization and dissemination of the NLIS will allow the Government of Mexico to strengthen its capacity to identify, regulate and prevent the importation and movement of the highest risk IAS in Mexico, and to set national priorities for IAS management.

**1.1.6 Development and use of risk analysis methodologies for high risk species / pathways:** The project will assess existing methodologies for IAS risk analysis; and based on these, will design the most appropriate methodologies for IAS risk analysis in Mexico, in particular for IAS that may impact biodiversity. For invasive flora, CONABIO and several academic institutions will work jointly to develop risk analysis methodologies specific to Mexico, using both the Australian Weed Risk Assessment (AWRA) and the U.S. Department of Agriculture's PPG WRA, and once a nationally appropriate WRA is established (with supporting materials such as identification sheets and a risk analysis manual), the project will carry out a workshop to train Mexican stakeholders on its use. For invasive fauna, the project will develop appropriate methodologies and materials for Mexico and will then carry out a series of workshops to train institutional partners in the new methodologies. The risk analysis methodologies will be adapted as new information is available, for example new estimates of IAS dispersion based on the climate change models developed under 1.1.10. In addition to training stakeholders on the new risk analysis methodologies for invasive flora and fauna, the project also will develop related information materials and conduct outreach in order to ensure that all key institutions adopt the same methodologies. Once the new methodologies have been established, and staff have been trained in their use and provided with the necessary identification tools and guidelines, institutional stakeholders will implement risk analyses for all IAS flora and fauna that are categorized in the National List of Invasive Species as either "high priority" or "inconclusive" (based on the initial rapid assessments done during the creation of the NLIS). By creating robust risk analysis tools and materials tailored for Mexico, the project will strengthen the country's capacity to identify and manage highest risk pathways and species, including: 1) assigning robust risk scores to suspected high priority IAS; 2) establishing a national and inter-institutional standard for risk analysis of IAS; and 3) harmonizing the use of these standard risk analyses among different governmental institutions.

**1.1.7 Development and application of Inspection Tools for IAS that threaten biodiversity:** The project will develop and disseminate technical materials on priority invasive alien species that may impact biodiversity to key institutional partners responsible for preventing the introduction and spread of IAS in the country. These materials will include comprehensive technical fact sheets including identifying information and photos; information on introduction pathways and vectors; methods of identification; and procedures for quarantine/disposal. These inspection tools will be adapted as new information is available, for example new estimates of IAS dispersion based on the climate change models developed under 1.1.10. The tools will be shared with personnel of agencies such as SAGARPA and PROFEPA at ports, airports and border crossings. They will also be provided for agencies that carry out inspections at sites where continuous ecological monitoring takes place, such as forest inventory sites monitored by CONAFOR (see 1.2.2); at the approximately 9,400 Units for Conservation and Management of Wildlife (UMAs) in Mexico, which are government-supported wildlife and plant breeding facilities (e.g. germplasm production, nurseries, breeding of pets, ornamental plants, etc.) that focus mainly on native species but also produce exotic species; and at PIMVS, which are sites where exotic species are bred in more controlled conditions (e.g. zoos, botanical gardens, tree nurseries, circuses, etc.). The development and adoption of these tools by relevant agencies will greatly increase the capacity of national and state level authorities to prevent the entry and spread of IAS within Mexico.

**1.1.8 Development and testing of a model for mapping of IAS flora:** The project will support a pilot study for Mapping of Invasive Flora in Queretaro State, selecting a subset of the 615 species (from 355

genera in 87 families) known to have an exotic status in Mexico (Villaseñor & Espinosa, 2004) that have sufficient data to generate a useful map of potential distribution (and including at least one species for each of the 87 plant families when possible). This study will result in the creation of the Mexico Plant Invader Atlas - MEPIA (Atlas de Invasoras de Mexico - APIM), which will be validated in the pilot study, as well as booklet of the 50 most conspicuous invasive species in the state of Queretaro, manuals for field observations, and creation of data sheets. Activities will include a workshop to implement the MEPIA at a local scale in two Natural Protected Areas. One result of this work will be a validated standardized method for data collection procedures for atlases of invasive plant species, which then can be used by other states in Mexico. A second result will a grid system implemented in a GIS environment that will be able to identify individual squares of approximately 100 m x 100 m resolution code-linked to 1:250,000 scale topographical maps published by the National Institute of Geography and Statistics (INEGI). This will enable any area within Mexico to be placed in a square grid for sampling or monitoring. In carrying out this activity, the project will generate a tested model for the mapping of invasive flora with potential application throughout the country, including protected areas.

**1.1.9 Integrate information on IAS into the National Forest and Soils Inventory (INFyS):** Mexico completed five National Forest and Soils Inventories (INFyS) between 1961 and 2009. In these previous efforts, the INFyS collected information on soils and forest ecosystems through numerous variables that are used to generate indicators of forest health, including taxonomy, geographic location and population dynamics of species. However, these previous inventories did not record data specifically for invasive species. The Government of Mexico is currently implementing a new INFyS, and in order to incorporate IAS concerns into this process, CONAFOR will develop material and implement training programs for teams that perform data collection and measurements at the site level, so that the INFyS will include forest health indicators based on IAS risks and impacts, which will guide CONAFOR's forest management decision-making and allow CONAFOR to develop Early Detection and Rapid Response (EDRR) systems to limit the entry and spread of high priority IAS that impact forest ecosystems. CONAFOR's work on this issue will be complemented by the REDD+ project (co-financed by UNDP Mexico) to strengthen coordination between CONABIO and CONAFOR for monitoring of forest degradation. In collaboration with the proposed project, this forest monitoring will incorporate IAS indicators and data as part of the safeguards for REDD+, for example to determine if REDD+ programs contribute to the introduction or spread of IAS through conversion of natural forest, the displacement of human impacts to other sensitive areas (so called 'leakage'), or the planting of monocultures tree stands that might include potentially invasive alien species. In addition, the REDD+ program will generate data on forest overexploitation or unsustainable use, land use change, and impact of productive activities, which can feed into the INFyS and the NIASIS.

**1.1.10 Develop niche models for IAS dispersion related to climate change:** In partnership with the National Institute of Ecology and Climate Change (INECC), the project will develop niche models for high risk IAS regarding current and future dispersion scenarios under expected climate change projections. The project will focus on validating existing draft models (confirming occurrence records on original distribution and invasion sites; checking algorithms; consolidating various models to generate the best results) of actual and potential distribution of IAS in different climate change scenarios, and applying those models to 60 high risk IAS (as identified in the NLIS), using 3 Global Climate Models, 1 or 2 scenarios and 1 timeframe (2050). The models will include information on potential IAS dispersion, as well as analysis of how climate change may increase disturbances to ecosystem functioning (e.g. frequency/severity of fires, floods, etc.), and change local climatic regimes (e.g. changes in the frequency or duration of droughts; in the number of frosts; in humidity levels; etc.), thereby allowing IAS to become more easily established. The results of these analyses will include model outputs, interpretation of the data produced, and associated maps. The project will coordinate with the proposed UNDP-GEF project "Strengthening Management Effectiveness and Resilience of Protected Areas to Safeguard Biodiversity Threatened by Climate Change", which will be assessing climate change vulnerability and impacts at

numerous PA sites in Mexico, including several sites that are targeted by this project (Cañón del Sumidero, Vizcaíno, and the Archipiélago de Revillagigedo). The project also will benefit from data collected by Automatic Meteorological Stations that CONANP and SMN-CONAGUA have already established at 53 PA sites (with more expected in the next few years). Based on the models developed by the project, policy makers and resource planners will be able to develop and implement long-term IAS prevention measures at targeted sites, to revise and adapt the priorities of the National Strategy for Invasive Species (NSIS), and to carry out systemic planning for the national Protected Areas network in the face of projected climate change impacts.

**1.1.11 Establish cost coefficients for different IAS management strategies in Mexico:** The project will develop cost coefficients for different IAS management strategies (prevention, EDRR, control, eradication, etc.) under varying conditions (i.e. depending on species type; ecosystems; local pressures; etc.), focused on IAS that impact biodiversity. These cost coefficients will be developed based on a number of IAS management activities that will be implemented through the project, including: i) IAS management at selected island and mainland PA field sites (Outputs 2.1 and 2.2); ii) IAS management with selected productive sectors (Outputs 1.2 and 2.2.); and iii) the fire management and reforestation programs implemented by CONAFOR (Output 1.4). In addition, the cost coefficients will be based on assessments of activities carried out by various institutions once the national priority list of invasive species is finalized (see 1.2.4) and new activities are initiated to address IAS on that list. Once established, these cost estimates for different IAS management strategies under different conditions, they can be used to guide future policies and priority setting for the National Strategy on Invasive Species as well as individual programs and project.

**1.1.12 Develop economic models to estimate the costs to the Mexican economy of high-impact IAS:** The project will review existing methods (e.g. cost benefit analyses) for estimating economic costs of IAS that impact biodiversity. The project will then apply the selected economic methods (adapted as needed for national conditions) to 4-8 high-risk IAS, including estimates of both the direct costs created by damage to economic production, and the costs of IAS management (prevention, response, control, removal and restoration). The selected species will include IAS that impact BD, but also have impacts on human health, forest ecosystems, agricultural systems, and aquatic systems. At least some of the selected species will be IAS that were intentionally introduced into Mexico for economic production purposes, so as to show government and private stakeholders the actual costs that can result from such introductions. The results of these analyses will be widely shared with policy makers and resource managers in order to enable them to make more strategic decisions about the cost effectiveness of different policies, regulations, and management activities related to IAS. In addition, the project will establish cooperation with other countries on common research questions, methodologies and tools related to economic costs of IAS, including participation at international conferences and visiting relevant institutions abroad, in order to further strengthen understanding of the costs of IAS in Mexico.

## **Output 1.2: Sectorial guidance and regulations in place to strengthen the control of main pathways of IAS to vulnerable areas**

89. The aquaculture, aquarium fish trade, wildlife products and forest products sectors have been identified as key contributors to the introduction and spread of IAS in Mexico. The project will implement several activities specifically targeting the regulatory and institutional frameworks governing these sectors; it will draft regulations for control of IAS in productive sector operations, in particular the regulations or norms necessary to operationalize restrictions on the imports and uses of exotic species in the aquarium trade, aquaculture, and wildlife and forest products sectors. The project also will carry out outreach to State-level authorities and productive sector stakeholders on IAS threats, new IAS controls and regulations, and incorporating IAS management into institutional planning, including the integration of IAS management priorities into state-level Biodiversity Strategies, and the development of specific

recommendations and guidelines for changing regulations and institutional practices for IAS management of productive sectors. Capacity-building and awareness raising of government personnel will be undertaken on IAS regulations, risk analysis, control methods & techniques, and sanitary & phytosanitary standards, through workshops and on the job training, as well as careful monitoring of results and associated adaptive management. In addition to these cross-sectorial activities, the project will implement specific IAS management actions with the various targeted production sector stakeholders (importers/traders/producers/landowners and the government agencies that oversee them with regard to IAS issues) to educate them on IAS impacts, provide information on IAS regulations and restrictions (including new ones), to develop and implement new protocols and processes, etc. Risk analyses will be undertaken for each sector to identify the highest risk species and invasion pathways, and lists of prohibited or restricted invasive species will be continuously updated. The project will work with producer associations and government agencies to strengthen biosecurity protocols and processes, to monitor importation and production sites, and to implement rapid response protocols; it will also provide training programs & workshops to enable sector stakeholders to implement such actions. The table below provides a summary of some of the key changed practices that the project will implement for specific productive sectors:

<b>Changed Practices At National Level</b>		
<b>Productive sector</b>	<b>Current practice</b>	<b>Project Alternative</b>
Wildlife and forest products	<ul style="list-style-type: none"> <li>• Difficult to prohibit import of products in the absence of official lists of invasive species</li> <li>• Inspectors lack the necessary training and identification tools to detect IAS</li> <li>• Poor supervision by governmental institutions due to inadequate tracking schemes for movements of products inside the country</li> <li>• Government reforestation programs contribute to IAS dispersion into managed and natural forests</li> <li>• Importers are unaware of risks to biodiversity and ecosystem services</li> </ul>	<ul style="list-style-type: none"> <li>• Products for importation will be subject to inspection (or prohibition) based on the official national list of invasive species and other screening mechanisms (norms), which build on standardized pre-screening and risk analysis, in particular for identified high priority IAS</li> <li>• Inspectors utilizing technical information sheets on IAS related to wildlife and forestry products to carry out thorough inspections and identification at entry points</li> <li>• Monitoring system to track movements of high risk IAS inside the country (warehouses, distribution facilities, etc.)</li> <li>• Government reforestation programs utilizing native species and IAS indicators; forest fire management programs also being used for IAS control</li> <li>• Importers / producers have adopted biosecurity measures due to new protocols (e.g. New protocols for phyto-sanitary treatments at site-level forestry operations; storage and/or processing centers of forest raw materials and wood products; and sales and distribution centers for Christmas trees), and outreach and awareness efforts</li> </ul>
Aquarium trade / Aquaculture	<ul style="list-style-type: none"> <li>• Exotic species known as highly invasive are imported due to lack of official blacklist to prohibit imports</li> <li>• Imports of exotic species subjected to inconsistent or no risk assessments</li> <li>• Import, breeding and/or distribution of ornamental fish in the absence of biosecurity controls result in escapes into natural environments and spread of diseases to native species</li> </ul>	<ul style="list-style-type: none"> <li>• Finalization of official National List of Invasive Species allows for controls on the import of aquatic IAS</li> <li>• Risk assessments completed for high priority aquatic IAS (as identified on the NLIS)</li> <li>• Import, breeding and distribution more secure through better information systems / tracking of exotic species, application of biosecurity measures, capacity building of personnel, and participation in certification systems</li> <li>• Assessments completed on the location and characteristics of production facilities, including production capacity; species / varieties (imports and production) with potential impacts on biodiversity; and the origin and destination of products (produced, imported, commercialized).</li> <li>• Training provided to key agencies on inspections of exotic</li> </ul>



	<ul style="list-style-type: none"> <li>• Government institutions lack information regarding location and characteristics of production facilities: production capacity, species and varieties produced (imports and production), origin and destination of fish (produced, imported, commercialized)</li> </ul>	<p>aquaculture and aquarium trade products and response procedures to exotic invasive species alerts</p> <ul style="list-style-type: none"> <li>• Importers, producers and traders aware of risks regarding IAS due to outreach efforts, and involved in participatory systems of IAS management, including adoption of voluntary codes / voluntary certification systems and/or adoption of Hazard Analysis and Critical Control Points (HACCP) systems</li> <li>• Implementation of a pilot state-level program for IAS management in the aquaculture sector in Morelos state, which is the primary producer of ornamental fish species in all of Mexico</li> </ul>
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**1.2.1 Draft regulations for control of IAS in productive sector operations:** The project will undertake studies to determine the laws and regulations needed to operationalize restrictions on the imports and uses of exotic species in the aquarium trade, aquaculture, and wildlife and forest products sectors. Based on these studies, the project will draft new and/or revised regulations specifically relevant to IAS management in these sectors. Among the laws and regulations that will likely be revised and/or strengthened are: i) the General Wildlife Law (*Ley General de Vida Silvestre*); ii) regulations governing the National Service for Health, Food Safety and Quality (*El Sistema Nacional de Sanidad, Inocuidad y Calidad Agropecuaria y Alimentaria - SENASICA*); iii) the Federal Law of Rights (*Ley Federal de Derechos - LFD*); iv) the Organic Law of Federal Public Administration (*Ley Orgánica de la Administración Pública Federal - LOAPF*); and v) laws and regulations on wildlife, forestry and aquaculture products. Changes to these and other laws and regulations will reduce IAS impacts on biodiversity by informing decision-making among productive sectors and by requiring new protocols and implementing new restrictions on production activities that might contribute to the entry and/or spread of IAS in Mexico. The project also will work to establish regulations to prohibit the introduction of especially harmful exotic species at UMAs, and to require UMAs to implement monitoring programs for populations of exotic species and their translocation.

**1.2.2 Provide information, resources and training for improved IAS management to private-sector stakeholders and government agencies in the Wildlife and Forest sectors:** The project will carry out an overall assessment of high-risk species and pathways for IAS that impact biodiversity in the wildlife and forest sectors, as well as a detailed assessment of high-risk practices currently used by participants in these sectors. In addition, in cooperation with CONAFOR, the project will undertake a risk analysis for 4 exotic forest pests (*Sirex noctilio*, *Anoplophora glabripennis*, *Agilus planipennis* and *Phytophthora ramorum*) all of which are a significant cause of mortality in forests (commercial plantations and natural forests) in the United States and Canada, and all have a high potential for entry, establishment, and spread in Mexico. GEF funds will be used to develop risk analyses for these 4 high priority forest pests, while CONAFOR co-financing will fund monitoring and control activities based on the risk analyses to prevent the entry of these species into the country. The project will assist various Mexican government institutions in increasing their capacities for the inspection of exotic wildlife species and forestry products at entry points and at critical sites within Mexico, including a strengthened focus on IAS that impact biodiversity. Among other priorities, the project will develop / purchase materials and train staff from PROFEPA (responsible for the inspection of goods) and SEMARNAT (responsible for laboratory analysis of suspected goods) in the identification of IAS in wildlife and forest products. Several specific areas of high priority inspection and control also will be addressed. The project will work with PROFEPA to develop a program to move inspectors to points of entry at times and places of high risk (e.g. inspection of Christmas tree imports). Also, the project will support verifications of the correct application of phytosanitary treatments at site-level forestry operations to prevent the dispersal and spread of IAS into stands of healthy trees; the verification of sanitary standards at storage and/or processing centers of forest raw materials and wood products under NOM-144-SEMARNAT-2012; and the verification of sales and distribution centers according to the special program of inspection and

surveillance of Christmas trees. The project will work with CONAFOR and partners in the forest products industry on a variety of activities to reduce the entry, spread and impact of invasive forest pests in Mexico. The project will support the establishment of a system for the monitoring of national entry / distribution points (warehouses) to prevent the introduction of exotic forest pests; at present in Mexico there is no mechanism to know the taxonomy, status, origin, recurrence and quantitative data of insects that arrive still alive at ports of entry for international trade. CONAFOR will use GEF funds to establish the first monitoring system for exotic forest pests and points of entry into Mexico, with a pilot system at the most important harbors in Mexico, such as Veracruz, Altamira, Manzanillo; and Lazaro Cardenas, including signed MOUs with port administration authorities. CONAFOR will then provide co-financing for ongoing operation of these monitoring systems, as well as activities to control and combat exotic forest pests that are found at entry points or within the country (e.g. forest products distribution and storage centers). The project also will develop and disseminate educational materials to promote responsible activities for wildlife and forest products stakeholders, including awareness raising on the impacts of IAS on biodiversity, and explanations of the consequences of listing of any IAS on the NLIS and its associated risk assessments. This strengthened capacity to implement IAS prevention activities at borders and sites within Mexico, including restrictions and changed practices for the import and use of IAS in the forest and wildlife sectors, will reduce the risk of new introduction and further spread of IAS and avoid significant economic losses in productive sectors, as well as increasing support from policy makers, productive sectors, and the general public for management of IAS that impact biodiversity.

In addition to working on the prevention and spread of IAS through the production, transport and trade of wildlife and forest products, the project also will partner with CONAFOR and forest landowners / managers (of both natural and plantation forests) in field-level IAS management activities. One approach will be to develop and implement a program to use fire as a tool in the control of IAS, as part of CONAFOR's ongoing work to strengthen the participation of federal and state authorities and private landholders, as well as technical service providers and industry stakeholders, in the prevention, combat and control of forest pests and diseases. To date, CONAFOR has very little experience in the use of fire as a tool for controlling the spread of invasive species in the natural environment or in managed forests, and when Mexican authorities have used fire to control invasive pests and plants, they have typically burned over entire areas (and thereby released significant amounts of CO<sub>2</sub> into the atmosphere). However, experience in other countries has shown that controlled fires reaching temperatures as low as 60 celsius can succeed in killing pests without completely burning trunks, branches or roots, thereby reducing CO<sub>2</sub> emissions and allowing the remaining vegetation to decompose naturally in situ or to be harvested for firewood. Other examples exist where fire has been used in various countries as a highly effective tool in controlling IAS; for example, in the United States, fire has been used to control Salt Cedar (*Tamarix* sp.), whereas in Mexico chemical agents remain the only control mechanism. With support from the project, CONAFOR will design and test different approaches for using fire as a means of controlling IAS pests and plants during the first two years of the project. Based on the results of these tests, CONAFOR will then initiate a large-scale national program to implement fire-based IAS control approaches, which will help to control IAS impacts on biodiversity and ecosystem functioning, and reduce carbon emissions as well as the release of chemicals into forested areas.

Finally, the project will partner with CONAFOR on a program to develop and implement reforestation and soil restoration with native species. The restoration of degraded ecosystems is an important activity given the widespread historical ecosystem degradation in Mexico, which facilitates the establishment of invasive plants. Using GEF funds, CONAFOR will undertake a study to generate information on best practices on soil restoration and reforestation with native species as a tool to limit the establishment of invasives. In addition, GEF funding will be used to assess which soil restoration approaches favor or hinder the establishment of invasive flora and microbiota, so as to ensure that reforestation and associated soil restoration activities do not increase the entry and/or spread of these invasive species. The results of these studies will guide the implementation of the overall national program on reforestation and soil

restoration, which is already being implemented by CONAFOR in all 32 states of Mexico, ensuring that the program contributes to the restoration of native species by limiting the establishment of invasive species. As a related activity, the project also will support the work of IMTA to develop a methodology to determine the impact of *Arundo donax* infestations on natural fire regimes in riverine habitats.

**1.2.3 Provide information, resources and training for improved IAS management to private-sector stakeholders and government agencies in the Aquarium Trade and Aquaculture Sectors:** The project will assess high-risk species and pathways for IAS that impact biodiversity in the aquaculture and aquarium fish sectors, as well as a detailed assessment of high-risk practices currently practiced by participants in these sectors. Assessments will include information regarding location and characteristics of production facilities, including production capacity; species / varieties (imports and production) with potential impacts on biodiversity; and the origin and destination of products (produced, imported, commercialized). Based on these assessments, the project will assist provide training and materials for staff at PROFEPA (for inspection of trans-boundary movements at harbors, airports and borders) and CONANP (for inspection at facilities within or bordering protected areas) on inspections of exotic aquaculture and aquarium trade products, including a strengthened focus on IAS that impact biodiversity. These agencies, along with INAPESCA, SENASICA, the Regional Center for Research and Innovation in Sustainable Fisheries and Aquaculture (CRIIPAS), and state-level Aquaculture Health Committees, will also receive training on response procedures to exotic invasive species alerts. The project also will develop and implement educational programs for aquarium and aquaculture producers (including managers and site-level staff), traders and consumers to raise awareness regarding the environmental risks involved throughout the supply chain of these sectors, and regarding processes (e.g. HACCP) to make commerce and handling of exotic fish and crustaceans safer, including awareness raising on the impacts of IAS on biodiversity, and explanations of the consequences of listing of any IAS on the NLIS and its associated risk assessments. Building on this awareness raising effort, the project will work with productive sector associations and companies to establish participatory systems of IAS management, including workshops to develop best practice manuals on IAS management (esp. biosecurity) and to promote the adoption of voluntary codes and a voluntary certification system for producers, distributors and importers of aquaculture product, as well as the adoption of Hazard Analysis and Critical Control Points (HACCP) systems for aquaculture production / distribution facilities. In addition to these general approaches to working with the aquaculture and aquarium fish industries, INAPESCA will work with industry stakeholders on targeted strategies for reducing the threat posed by IAS in the aquaculture industry to biodiversity and ecosystem functioning. INAPESCA will provide training and technological support for the production and marketing of ornamental freshwater fish, which will include improved biosecurity systems for fish production sites. It will also carry out studies of the potential to develop commercial products for fishmeal produced from high priority IAS (lionfish and catfish), and the development of products and markets (livestock, fish and crustacean production facilities) in states most impacted by those species (Tabasco, Campeche, Chiapas, Michoacán, Quintana Roo, Veracruz, and Yucatan), so as to increase harvesting of these IAS. INAPESCA also will promote various production schemes for native aquatic species in order to replace production with invasive species, including American oysters in the Gulf of Mexico; native cichlids in Veracruz state; native trout (*Oncorhynchus mykiss nelson*) in Baja California; and native trout (*Oncorhynchus chrysogaster*) in Chihuahua state. Strengthened capacity to implement IAS prevention and response activities at borders and sites within Mexico for the aquaculture and aquarium fish sectors will reduce the risk of new introduction and further spread of IAS and avoid significant economic losses in productive sectors.

**1.2.4 Implement IAS biosecurity pilot activities with the Aquaculture Sector in the State of Morelos:** The project will work with key stakeholders in the State of Morelos, which is the primary producer of ornamental fish species in all of Mexico, to develop a pilot-state level program for IAS management in the aquaculture sector. The project will support the work of the Comité Estatal de Sanidad Acuícola del Estado de Morelos (CESAEM) to characterize aquaculture production and

marketing systems within the state, and assess their potential to disperse IAS. Aquaculture Production Units will be mapped, using a Geographic Information System to provide the information necessary to develop biosecurity recommendations. CESAEM, working with producers, retailers, and the Association of Ornamental Fish Producers (Asociación de Productores de Peces de Ornato del Estado de Morelos - APPOEM), will develop recommendations for modernizing the production and marketing systems of ornamental fish in the state of Morelos, including recommendations for the implementation of biosecurity measures in the design and operation of storage facilities and distribution and marketing centers of ornamental fish, and strategies for providing producers with basic equipment and materials to implement biosecurity measures. The project will promote the establishment of a permanent capacity building program, in partnership with local universities, aimed at producers and technical staff of aquaculture operations, with training in areas such as productivity improvement, IAS prevention, disease control and biosecurity measures, aligned with state policies regarding aquaculture and human health matters. Activities carried out in the State of Morelos will establish a model for IAS management partnerships among state-level government agencies and private businesses that can be applied to other productive sectors that contribute to IAS threats to biodiversity and in other states throughout the country.

**1.2.5 Outreach to State-level authorities and productive sector stakeholders on IAS threats, new IAS controls and regulations, and incorporating IAS management into institutional planning:** At present, State governments in Mexico are minimally involved in IAS-related management activities. However, 8 Mexican states are in the process of developing state-level Biodiversity Strategies, and several more are expected to begin this process in the next few years. The project will use this process as an opportunity to integrate IAS-related issues into the state biodiversity strategies, and thereby to establish a mandate for state-level institutions to focus on these issues. In addition, some states (e.g. Morelos) are taking steps to establish institutions at the state level to replicate the role of CONABIO at the national level, including implementation of the state biodiversity strategies. Therefore, the project will also work with these nascent state-level biodiversity institutions to prioritize and address IAS-related issues. CONABIO will conduct a series of workshops with representatives of state governments (as well as universities and NGOs) who are responsible for developing and implementing state biodiversity strategies in order to facilitate the inclusion of IAS management into those strategies, and to ensure that state-level strategies on IAS comply with and support the goals and targets of the National Strategy on Invasive Species (NSIS). In addition, CONABIO will select one state as a pilot where it will assist state authorities in implementing key actions in the Biodiversity Strategy, including those related to IAS management for productive sectors. To complement this policy and planning work, CONABIO and SEMARNAT will consolidate existing information on IAS impacts on human health in Mexico, as well as the information on IAS economic impacts (see 1.1.12), and use this information to develop specific recommendations and guidelines for changing regulations and institutional practices for IAS management of productive sectors. The project will disseminate and raise awareness on these issue through workshops and site visits for legislators to see first-hand the negative impacts of IAS on biodiversity and ecosystem functioning, as well as the options and best practices for IAS prevention and control. Awareness raising activities will also target productive sector stakeholders, including companies and individuals involved in the forest and wildlife products trade, aquaculture production, aquarium fish trade, and possibly others such as nurseries.

### **Output 1.3: Multi-sectorial institutional framework in place to implement National Strategy on Invasive Species (NSIS)**

90. IAS management at the national level will be addressed by the project through a variety of actions to strengthen regulations and coordination; to develop improved IAS prevention and response mechanisms; to generate new financing mechanisms and improve cost efficiencies; to harmonize capacity building approaches; and to increase awareness and understand of IAS threats and potential IAS management approaches. Existing laws and regulations for IAS will be reviewed to detect gaps and

inconsistencies and a proposal will be made for revised and harmonized laws and regulations, in particular for IAS with significant impacts on biodiversity. A multi-sectorial institutional framework will be established to implement the National Strategy on Invasive Species (NSIS), including formalizing the role of the existing IAS Experts Committee to function as an advisory body to the government and as the leading body for implementation of the NSIS. The project will develop and test an EDRR system at the national level for 2 selected high-priority IAS (e.g. *Cactoblastics cactorum* and *Dreissena polymorpha*), in order to determine the feasibility and cost of implementing such systems for other IAS that impact biodiversity. Recognizing the limited capacity of governmental agencies to monitor production sectors, enhanced regulations and protocols will be complemented by a proposal for a combination of fiscal and market-based instruments (e.g. retention of inspection fees; financial incentives for importers who implement certified biosecurity measures) to encourage public and private actors to shift towards low-risk practices and to substitute the use of exotics for native species. In addition, budgetary coordination between sectors / institutions will be promoted to ensure coherent and cost effective investments in IAS management. The project also will implement education and awareness campaigns on IAS for various stakeholder groups, including development and dissemination of materials and programs on IAS (threats/risks/impacts in Mexico; management activities/strategies; etc.); educational programs for legislators and journalists on IAS management options and the costs of IAS to Mexican society; and outreach programs at botanical gardens and other locations, among others

91. Within this overall suite of activities to strengthen the multi-sectorial institutional framework for IAS management, particular emphasis will be placed on integrating and harmonizing the activities of diverse institutions responsible for different aspects of IAS management in Mexico, most notably those institutions mandated to address the impacts of IAS on biodiversity and ecosystem functioning, and those responsible for implementing phytosanitary and zoosanitary measures to address IAS that impact productive activities (especially agriculture, livestock, aquaculture, and forestry), as well as human health.

92. At present, Mexico has a very strong phytosanitary inspection system, led by SENASICA, with a presence at all of the significant airports, ports and border points of entry into continental Mexico from other countries. In addition, Mexico has a robust system for inspection and prevention of IAS in forest and wildlife products, where PROFEPA is responsible for the inspection of goods at points of entry, SEMARNAT is responsible for the laboratory analysis of any suspected goods, and CONAFOR monitors for forest pests at field sites and at distribution and storage points. However, none of these existing programs includes mandates, protocols or practices for preventing / responding to IAS that do not specifically harm the relevant productive sectors; in other words, these institutional IAS programs do not address IAS that only impact biodiversity. Furthermore, these programs do not include prevention / control of IAS pathways within Mexico, so that there are no biosecurity programs to prevent the introduction and spread of IAS to Mexico's islands or internally between regions and high priority conservation areas.

93. Project proponents recognize that resolving years of fragmented interventions and institutional piecemeal approaches are complex issues to address and the ongoing efforts initiated by the GoM need to be pursued actively. Fortunately, with the publication of the NSIS in 2010, the Government of Mexico now fully recognizes the need for multi-sectorial and crosscutting approaches to IAS control, prevention and management, through an integrated and systematic approach involving both environmental stakeholders as well as actors representing productive sectors and phytosanitary authorities. Indeed, the fact that environmental-focused agencies are highly involved in ongoing IAS management efforts (see Baseline Analysis), and even have the mandate to lead the government effort to harmonize IAS management protocols and strategies (as with the National List on Invasive Species; the National Invasive Alien Species Information System, and the proposed high-level committee for IAS management), demonstrates the government's understanding of the need to find more efficient ways to control the impact of IAS not only in productive sectors but also in sensitive ecosystems of the country.

Furthermore, the ongoing effort to create a National List of Invasive Species has started the process of getting key institutions, including CONABIO, SEMARNAT, SENASICA, INAPESCA, PROFEPA, CONAFOR, CONANP, IMTA, and INECC, as well as NGOs and Universities, to work together on identifying high priority IAS; on developing harmonized pre-screening methodologies; on consolidating their individual institutional data on IAS; and on drafting the regulations that will be necessary to support the use of the final, approved list (i.e. clear rules regarding which species are not allowed into the country; request procedures for import permissions; etc.).

94. To support this approach, the project will develop a number of new information systems and harmonized and improved protocols and tools (as described under Output 1.1) in order to coordinate on different aspects of IAS management and to ensure the sharing of resources and information between institutions with a “traditional” IAS management orientation (e.g. SENASICA, CONAFOR, INAPESCA, etc.) and institutions with a stronger focus on IAS management for environmental protection (e.g. CONABIO, CONANP, PROFEPA, etc.). These new and jointly developed information resources, risk analyses, prevention and response protocols, identification materials, etc. will provide practical, day-to-day mechanisms to allow for increased coordination among these agencies. In addition, the new High Level Committee will be authorized to carry out inter-institutional coordination, including coordinating budgeting/spending on IAS management among different institutions and partners, and linking IAS management issues with health, economic, and climate change and biosecurity. The committee also will be supported by a Scientific Committee (to provide advisory services and to act as the leading national body for implementation of the NSIS) and a Technical Committee, which will be composed of at least one staff member from each relevant institution and will be charged with implementing the decisions made by the other committees and communicating and coordinating activities related to implementation of the NSIS among all relevant departments within each institution.

95. In order to further strengthen institutional coordination, the project will develop standardized protocols for: 1) communication procedures and protocols for responding to new IAS invasions and other time-sensitive IAS management issues; 2) delineation of institutional responsibilities and sharing of contact information for key persons in each institution; and 3) mechanisms for sharing information on current and potential new joint initiatives. In addition, once the National List of Invasive Species has been finalized, SEMARNAT and SAGARPA will sign a formal agreement (Acuerdo Secretarial) whereby they agree on the prohibitions, restrictions and management plans that must be applied to species on the list, including IAS that impact BD and IAS that may only impact economic activities, human health, and other factors. The project also will establish harmonized standards and training programs for IAS management across key institutions, including training on specific issues (i.e. risk analysis; biosecurity and EDRR systems; control, eradication, and monitoring techniques; economic analyses, etc.) so that the various institutions can share information and resource more effectively. This effort will support the strategy of the project to build on existing institutional capacities (e.g. the existing teams of inspectors at SENASICA, CONAFOR and PROFEPA, among others) and to integrate and include IAS that impact biodiversity into their mandates and programs, rather than to try to build a separate and costly parallel structure.

**1.3.1 Draft revised and harmonized existing laws / regulations related to IAS management:** The project will carry out a study (building on initial analyses completed during the PPG phase) of existing national IAS laws and policies, as well as international agreements regarding IAS to which Mexico is a signatory. The purpose of this study will be to identify gaps and inconsistencies in the regulatory framework for IAS, and based on that analysis, to propose revised and harmonized laws and regulations. One area of focus will be the development of the regulatory framework to allow PROFEPA to carry out inspection and quarantine activities for IAS that may impact biodiversity (at present, PROFEPA has the authority to carry out inspections at ports, airports, borders and selected sites within the country for phytosanitary reasons only), possibly through enhanced internal regulations within SEMARNAT. Once the

study is completed, the project will conduct a workshop with representatives of relevant governmental institutions and representatives of the parliament and experts to discuss and validate the proposal for changes to laws, regulations and policies, and then print the approved document. Based on the approved proposal, the project will write drafts of the most high priority laws / regulations / policies to strengthen IAS management, and hold a public presentation to promote public and policymaker interest in pushing forward these draft changes (post-project). By working to harmonize the legal framework for IAS management, and to strengthen the focus on IAS that impact biodiversity, the project will help to remove conflicting or uncertain laws and regulations, strengthen the control and enforcement capacity of relevant institutions, and clarify for all stakeholders the requirements and restrictions that apply to the import, trade and use of IAS in the country.

**1.3.2 Institutional structures strengthened / established to facilitate inter-institutional coordination for overall IAS management:** Policy and coordination on IAS-related issues in Mexico are informally overseen by the Experts Committee that was established to draft the NSIS. However, this committee has no formal authority to set policy or to compel coordinated activities among different institutions. Furthermore, the committee is dependent on informal contributions of technical and scientific information and data from various institutions and agencies to guide its work. In order to establish a more robust, coordinated, and participatory planning and oversight mechanism for IAS management in the country, the project will assist government institutions and other stakeholders in Mexico to establish three committees to oversee and coordinate IAS management activities, as follows:

- IAS High Level Committee (formally established and authorized) to carry out inter-institutional coordination for IAS, including coordinating budgeting/spending on IAS management among different institutions and partners, and linking IAS management issues with health, economic, and climate change and biosecurity. The committee is expected to be composed of all national institutions with responsibilities relevant to invasive species management (CONABIO, CONANP, SAGARPA, SENASICA, INAPESCA, CONAPESCA, CONAFOR, SCT, PROFEPA, INECC, SE, SENER, SEMARNAT).
- IAS Scientific Committee to provide advisory services to the High Level Committee and to act as the leading national body for implementation of the NSIS (this committee will be the new incarnation of the existing Experts Committee). This committee will be responsible for producing a Biennial Status Report on IAS in Mexico, which includes an update on the progress made in the implementation of the National Strategy on Invasive Species, including all stakeholder consultations and all outreach to disseminate the results of these reports.
- IAS Technical Committee of institutional staff (at least one from each relevant institution) to implement the decisions made by the High Level Committee and the Scientific Committee, to communicate and coordinate activities related to implementation of the NSIS among all relevant departments within each institution, and to report back to the other two committees on the results of implementation by various institutions.

**1.3.3. Institutional Coordination to prevent the entry and spread of IAS in Mexico:** At present, Mexico has no system for inter-institutional coordination in response to new invasions of IAS that impact biodiversity (although it does have such systems for agricultural pests and IAS that impact human health). As a first step in establishing effective and timely inter-institutional coordination for IAS management, the project will carry out workshops with representatives of government institutions concerned with IAS to define, decide on and develop standardized protocols for: 1) communication procedures and protocols for responding to new IAS invasions and other time-sensitive IAS management issues; 2) delineation of institutional responsibilities and sharing of contact information for key persons in each institution; and 3) mechanisms for sharing information on current and potential new joint initiatives. In addition, once the National List of Invasive Species (see 1.1.5) has been finalized, SEMARNAT and SAGARPA will sign a formal agreement (Acuerdo Secretarial) whereby they agree on the prohibitions, restrictions and management plans that must be applied to species that appear in any of the three NLIS categories: 1) IAS

not yet present in Mexico; 2) IAS already established in Mexico and/or species that are native to Mexico but are invasive in some regions of the country; and 3) IAS that are a threat for priority ecosystems (such as islands and mainland PAs). The agreement will cover all invasive species, including IAS that impact BD and IAS that may only impact economic activities, human health, and other factors. The agreed prohibitions, restrictions and management interventions will be based on relevant international conventions to which Mexico is a signatory, as well as national laws regarding invasive species. By enabling institutions to share information and coordinate response actions in a timely manner, these protocols will reduce the entry and spread of IAS in Mexico as well as improving the cost effectiveness of required responses.

**1.3.4. Strengthen capacity for Early Detection and Rapid Response (EDRR) systems for IAS at national level:** The project will seek to develop and test an EDRR system at the national level for 2 selected high-priority IAS (e.g. *Cactoblastics cactorum* and *Dreissena polymorpha*), in order to determine the feasibility and cost of implementing such systems for other IAS that impact biodiversity. The project will investigate the legal or policy changes required to give agencies the mandate and ability to check imported products or species of IAS that impact biodiversity once they have passed the border (e.g. to carry out additional inspections to see if they have missed IAS at the border; or to monitor the dispersion of species legally imported). The project will then establish an EDRR system for the two selected high-priority IAS, including the capacity to detect and report dispersed incursions post-border and to plan and to deliver effective responses. The proposed systems will take as examples the existing Sistema Nacional de Enfermedades Exóticas y Emergentes (SINEXE) and the National Emergency Dispositive (NED). To support implementation of the EDRR systems, the project will provide training to relevant institutions to implement the EDRR protocols; and will facilitate information sharing among agencies regarding any detections of IAS with potential impacts on biodiversity (the project may also support the establishment of an EDRR coordination team within SEMARNAT). Based on the results achieved with these two pilot EDRR systems, the project will develop a strategy for replicating EDRR systems at the national level for other high priority IAS in Mexico. This strategy also will use lessons learned and experience gained from the EDRR systems established at the selected field sites (islands and mainland PAs) to help guide the development of the national EDRR systems. Finally, as part of the upscaling and replication strategy, the project will engage in consultations with SAGARPA in the hope that they will modify the surveillance components of the existing SINEXE and NED systems so that they report on IAS that impact biodiversity, even if these IAS are not necessarily of interest as agents of disease or threats to production.

**1.3.5. Development and application of financial mechanisms to support IAS management:** The project will carry out a study regarding the feasibility of the development and introduction of financial instruments (e.g. cost recovery approaches such as taxes, fees, fines, or other charges) for IAS management, in particular to reduce the risk of intentional introductions of IAS that threaten biodiversity. Among other possibilities, the study will focus on the options for establishing a dedicated fund for IAS prevention activities based on fees and fines related to IAS management. Fees that might pay into the fund could include permit, registration and inspection fees; fees for quarantine / containment of suspected IAS; fees on disposal of vector material (e.g. contaminated soils); and fees for risk assessments. Alternatively, more general fees or levies might be established for IAS prevention costs based on the volume or risk level of imported goods. In addition, the study will assess the possibility of directing the monies collected from fines imposed by PROFEPA and other agencies for IAS infractions into the dedicated fund for IAS prevention (or even to establish separate designated funds for management of specific species, pathways, or production sectors). Once completed the study will be presented to the national congress and relevant institutions (e.g. Ministry of Economics, SEMARNAT) for their review, and then a conference will be convened with relevant industries, associations and other stakeholders to discuss the feasibility of the proposed financing mechanisms and to initiate on-going and continuous dialogue on funding and cooperation for IAS management. Among the specific outcomes of the study and subsequent dialogue will be the submission of a proposal for additional funding for IAS management



activities to the Secretaría de Hacienda y Crédito Público (SHCP). By establishing funding mechanisms for IAS management based on systems of fees and/or fines for IAS-related infractions, the project will facilitate increased and sustainable funding levels for IAS management in Mexico, while also incentivizing public and private actors to shift towards low-risk practices and to substitute the use of exotics for native species.

**1.3.6. Budgetary coordination between sectors to ensure coherent investments and actions to address threats cost efficiently:** The project will carry out a study of existing spending on IAS management (by type of intervention, such as prevention, response, control, eradication, etc.; by geographic location and ecosystem type; by type of invasive species and pathway/vector; etc.) among relevant institutions in Mexico. The results of this analysis will be compared with the cost coefficients for different IAS management strategies (see activity 1.1.11) and the estimates of the costs of high-impact IAS to the Mexican economy (see activity 1.1.12) in order to identify critical gaps where IAS management interventions are not being implemented for lack of funding (or possibly areas of duplicated funding), to select the most cost-effective approaches for addressing those gaps, and then to coordinate the spending and interventions of various institutions and partner organizations to implement those IAS management approaches. The “High-Level Committee” will oversee the process to use the results of this study (and those under 1.1.11 and 1.1.12) to redirect, coordinate and optimize Mexican government interventions for IAS management, in accordance with the goals and priorities of the National Invasive Species Strategy.

**1.3.7. Establish harmonized standards and training programs for IAS management across key institutions:** Using surveys, interviews and analyses of institutional responsibilities and roles, the project will assess the existing and projected necessary capacities and training needs of employees at key institutions (including PROFEPA, SAGARPA – SENASICA, CONANP, CONAFOR, etc.) for IAS management. Based on this analysis, the project will develop training standards for implementation at offices and field sites, including general training units using on-line tools, and training on specific issues (i.e. risk analysis; biosecurity and EDRR systems; control, eradication, and monitoring techniques; economic analyses, etc.) through workshops and on-the-job training. These training standards and strategies will help to guide the training of staff responsible for prevention and control of IAS as detailed under activities 1.1.6-1.1.7 and 1.2.2-1.2.5. In addition, IMTA will develop specific training standards and tools for the management of aquatic invasive plants, including capacity building of government staff in overall planning and priority setting, and capacity building of field staff on inspections and quarantine, as well as the biological control of invasive aquatic plants.

**1.3.8. Implement education and awareness campaigns on IAS for policymakers, private land owners, NGOs, volunteer groups and the general public:** The project will support the development and dissemination of materials on IAS (threats/risks/impacts in Mexico; management activities/strategies; etc.) for the general public, with a focus on 10 terrestrial and 10 aquatic invasive alien species identified using the rapid assessments (see activity 1.1.6). These general outreach materials will include flyers, field guides, posters, canvases, manuals, stickers/pins, etc., as well as the development and broadcasting of programs on the priority aquatic and terrestrial IAS for radio and television, possibly including a video series on the problem of IAS in general terms in Mexico, a radio series focusing on specific species / issues, and dissemination through various internet portals. The project will also target several specific stakeholder groups. The project will organize and implement at least one workshop on invasive species (three days and one day of field) for journalists, including both those familiar with IAS issues and others who could become advocates for IAS management to improve reporting on the issue. The project also will generate and disseminate communication materials among legislators on IAS, and will lead field trips each year for 15 legislators to study IAS issues. The project also will seek to influence legislators by producing and disseminating quick guides or syntheses of timely information (based on findings from activity 1.1.7), including relevant data and concrete suggestions for changing institutional guidelines and

rules for IAS management. To reach schoolchildren, the project will support the development of on-line educational content on IAS; and will implement a pilot program on IAS issues targeting 400 teachers and 4,000 children per year in Veracruz State. Finally, the project will support the development of exhibitions on IAS at specific locations in different states (zoos, museums, shopping malls), with a primary focus on a program on IAS issues, including displays of invasive plant species, for visitors to the Jardín Botánico de Queretaro (targeting 30,000 visitors over the 4 years of the project). Botanical gardens in Mexico are well organized and meet regularly, so the project will support this pilot exposition at the Queretaro garden, and will implement a survey of visitors to determine their preferences. The results of the survey, along with guidelines on the development of materials that can be adapted for each garden's locale, will then be made available on-line (on the CONABIO website) and through meetings for all botanical gardens in Mexico. Overall, these education and outreach activities for invasive alien species in Mexico will increase public awareness of, knowledge about, and support for IAS prevention, detection, control and eradication, which will enhance the effectiveness of and long-term support for IAS management programs.

## **Outcome 2: Integrated IAS management to protect vulnerable globally significant ecosystems**

### **Output 2.1: Strengthened prevention and control of key IAS populations in selected islands**

96. The project has selected fifteen islands within six island groups totaling 46,420 hectares for site-level IAS management activities (all of these sites islands are federally owned and their environmental management is under the authority of CONANP). The six island groups are: Socorro, Espíritu Santo, Guadalupe, Banco Chinchorro, San Benito Oeste, and Arrecife Alacranes. The project will undertake a number of coordinated actions to reduce the impact of IAS on biodiversity at the selected island sites. The project will support the development and implementation of an Island Biosecurity Plan (IBP) on each of the six selected islands / island groups. To guide the implementation of the IBPs, the project will help to establish an IAS Management Committee on each island. To generate understanding and support for IAS management interventions at the 6 selected island sites, the project will carry out environmental education activities for resource managers (government agencies and NGOs), local residents, visitors, and other current and potential users of the islands. In addition, in order to enable these stakeholders to participate more fully and effectively in IAS management activities, the project will implement capacity building in IAS management for managers and current and potential users of the selected islands / island groups. Capacity building will also be strengthened through the establishment of information sharing networks among the various institutions participating in the island-based activities of the project, in order to share lessons learned and best practices among different sites and stakeholders. The information sharing will include information dissemination to institutions responsible for islands that are NOT part of the project, in order to facilitate replication of IAS management practices at other Mexican islands over the long-term (post-project).

97. The project will undertake IAS control / eradication activities for IAS populations on selected islands that are creating significant negative impacts on native species, primarily to improve local coordination efforts related to control and eradication processes, and to fund control and eradication measures targeting IAS that threaten nesting birds and rare and globally valuable species. On islands, IAS pose a particular threat to endemic ground nesting birds, small mammals, reptiles and amphibians, and have been implicated in the extinctions of at least 17 endemic mammals and birds, plus several local extinctions or extirpations of seabirds. The project also will implement various monitoring activities to measure the success of IAS management activities and support the recovery of native species on the six selected islands / island groups. For those islands where eradications will take place, the project will

construct a baseline of both IAS populations and the native populations and then assess the recovery of the native populations after eradication. This information will help island resource managers to 1) confirm the absence of eradicated IAS in order to declare the island as free of that IAS; and 2) to assess the responses of native species and ecosystem functions after the eradication of IAS.

**2.1.1 Establish and maintain Island Biosecurity Programs:** The project will support the development and implementation of an Island Biosecurity Plan (IBP) on each of the six selected islands / island groups (a guide for developing IBPs was created during the project preparation phase). Island Biodiversity Plans will include three lines of defense: prevention and quarantine; detection and monitoring; and rapid response to invasions. Each IBP will include: 1) identification of major potential IAS; 2) identification of potential IAS introduction pathways; and 3) plans for the establishment of prevention and quarantine procedures, including biosecurity protocols at major ports and embarkation sites that serve the selected islands. This work will be done in close collaboration with local stakeholders, including the authorities responsible for managing, conserving and protecting the islands and their ecosystems (e.g. CONANP, SEMARNAT, PROFEPA); civil society organizations doing conservation projects (e.g. GECEI, Amigos de Sian Ka'an); and fishing cooperatives and tourism service providers that use the natural resources and the aesthetic beauty of the islands for their livelihood. These plans will be revised as new data and lessons learned are developed, including for example information on how different climate change scenarios (developed under Output 1.1) may increase disturbances to ecosystem functioning (e.g. frequency/severity of fires, floods, etc.), and change local climatic regimes (e.g. changes in the frequency or duration of droughts; in the number of frosts; in humidity levels; etc.), thereby allowing IAS to become more easily established. In addition, the IBPs will be evaluated and revised, based on results achieved, in the final year of the project. A key element of the IBPs will be the initiation of prevention (quarantine) measures for the inspection of goods and persons that arrive to the islands. However, given the limited human and logistical capacities, as well as the number of island visitors/users, it will not be feasible to inspect all goods and persons on all selected island sites. On the islands of Guadalupe, Socorro and Banco Chinchorro, 100% of goods and persons will be inspected. On San Benito and Espíritu Santo islands, which have a high number of users, 50% of goods and persons will be inspected; with a focus on increasing CONANP capacities to carry out inspections during high seasons (i.e. the lobster and abalone fishing seasons on San Benito, and the summer tourism months on Espíritu Santo). For Arrecife Alacranes, which has very high rates of tourism visitation, particularly for sport fishing, 25% of goods and persons will be inspected, with a focus on strengthening the capacity of CONANP and SEMAR for inspections (especially on Pérez Island). In addition to inspections of goods and persons arriving on the islands, some other specific biosecurity measures will include: 1) together with organized shipping (e.g. Navy vessels, ships servicing the government, NGOs, or the organized fishing communities), develop a set of agreed protocols or standard operating procedures (controls on the actions of individual boats of casual visitors will have to rely on more generic public awareness campaigns); 2) involve persons living on the islands in detection (and in some cases early response) activities, given that active surveillance cannot hope to meet all the 'early detection' needs over the long-term; 3) incorporate biosecurity into the Standard Operating Procedures in the chain of command at the 5 navy bases on the selected islands; and 4) work with the semi-permanent fishing communities (some of which are organized cooperatives) to conduct passive surveillance and report (or act) on any IAS they discover. To support all of this work, the project will help to establish an IAS Management Committee on each island. The committees will ensure the implementation and monitoring of the IBP, and allocate responsibilities and capabilities for biosecurity measures, including the effective implementation of an EDRR system. This will require investment in equipment / systems for prevention and early detection, as well as training of the members of the Committee in biosecurity activities.

**2.1.2 Implement education and training to support IAS management:** To generate understanding and support for IAS management interventions at the 6 selected island sites, the project will carry out environmental education activities for resource managers (government agencies and NGOs), local

residents, visitors, and other current and potential users of the islands. The thematic focus will be to provide users with information on the ecological value of the islands, the threats posed by IAS, and the details of the new Island Biosecurity Programs, whose success will depend highly on local stakeholder participation and support. The project will take advantage of publicly available platforms (e.g. websites, radio spots, newspaper and television media); will distribute printed information on IAS to all fishermen and other selected island users; and will install permanent media (e.g. posters and signs) on the importance of routine screening measures of persons and goods traveling to the islands. The project will also carry out workshops for awareness raising of personnel of management institutions (SEMAR, CONANP, SCT, etc.), local residents, and productive sector partners (tourism operators, fishermen, salt producers), including both those based on the islands and those based at points of embarkation (ports, airports) to the islands.

In addition, in order to enable these stakeholders to participate more fully and effectively in IAS management activities, the project will implement capacity building in IAS management for managers and current and potential users of the selected islands / island groups. The capacity building will focus on 3 thematic areas: 1) Preventive Actions (identifying pathways and transport mechanisms of IAS to the islands, with an emphasis on identifying introduction vectors, especially ships); 2) Control Actions (a detailed review of all landings, as well as detection monitoring on the islands); and 3) EDRR (elimination of newly introduced populations using monitoring and trapping practices). To enable these actions, the project will provide training workshops in IAS monitoring for local communities, to enable their participation in EDRR activities, as well as training of personnel of management institutions (SEMAR, CONANP, SCT, etc.) and productive sector partners (tourism operators, fishermen, salt producers) in biosecurity actions and in IAS monitoring and implementation of EDRR systems.

Capacity building will also be strengthened through the establishment of information sharing networks among the various institutions participating in the island-based activities of the project, in order to share lessons learned and best practices among different sites and stakeholders. GEI will be primarily responsible for ensuring that critical information is shared among island stakeholders. GEI already has strong collaboration networks with island partners, particularly CONANP and SEMAR, at all 6 island sites, and will develop a formal and practical system for ongoing sharing of information and lessons learned among the sites. In addition, the project will convene an annual meeting during each year of the project with stakeholders from the 6 selected island sites, and the project also will ensure information dissemination to institutions responsible for islands that are NOT part of the project, in order to facilitate replication of IAS management practices at other Mexican islands over the long-term (post-project). Stakeholders from the 8 island sites that have been identified as priorities for IAS management post-project will participate in the meetings with the 6 primary sites during years 2 and 4 of the project. These other 8 sites, which were selected using the same process as that used to select the 6 primary islands in this project (see above), are: Marías (3 islands), Coronado (3 islands and 1 islet), Cerralvo, Todos Santos (2 islands), San Pedro Mártir, Isabel, Marietas, Asunción and San Roque (part of the Vizcaíno Biosphere Reserve). The outcome of these consultations will be a replication strategy for IAS management on other Mexican islands, which will detail what kinds of IAS management interventions should be prioritized on various islands, which institutions should be involved, and what sources of funding might be available for these replication activities.

**2.1.3 Implement targeted high priority IAS Control & Eradication programs:** IAS control / eradication activities are specifically proposed for IAS populations on selected islands that are creating significant negative impacts on native species. In these situations, biosecurity activities are not sufficient to conserve globally significant biodiversity, and in fact biosecurity systems without complementary control / eradication activities may be considered doomed to failure as key species and ecosystem functions will continue to decline even in the absence of new introductions of IAS. On some islands, the project will undertake ongoing control of high-priority IAS, specifically feral cats which pose an extreme

threat to native seabirds on these islands. Populations of feral cats on these islands will be contained below thresholds where they can cause significant and ongoing depredations of native seabird populations, with the goal of keeping the feral cat populations on these islands below these thresholds until there is available funding to execute eradication campaigns. In other cases, the project will carry out eradication of selected high-priority IAS. It should be noted that in some cases, such as Socorro Island, the control measures themselves may in fact result in complete eradication. Eradication activities have been proposed only in cases where eradication is in fact the most cost effective manner of dealing with the threat posed by specific IAS, and where the threat posed by the IAS is significant for the island's biodiversity. Overall, 87% of the costs of these control and eradication activities will be paid for with co-financing, and the GEF funding of US\$312,500 represents only 5.84% of the overall GEF support for the project.

In selecting among different IAS management options for the different island sites, GEI utilized a decision support system that it has developed in order to prioritize activities and goals for island conservation throughout Mexico. Among other factors, this decision support system takes into account the issue of cost effectiveness of eradication vs. sustained control (where this is possible) vs. reinvasion risk in the long term. Eradication activities will be carried out through this project (mostly co-financed) in situations where eradication is the most technically feasible and cost effective option to sustainably protect island biodiversity from IAS threats. For example, on smaller and more remote islands, eradication of invasive mammals such as cats is not only feasible but also much less costly than ongoing control efforts, and provides immense benefits for island biodiversity over the long-term (particularly when it is combined with effective biosecurity measures). Furthermore, experience in Mexico and globally shows that the control of rodents is simply not feasible, while sustained control of feral cats is far more expensive than eradication. It is also worth noting that the average cost of removing IAS on Mexican islands (USD 90/ha) is considered a good return on investment for BD conservation compared to other experiences conducted elsewhere in the world; Mexico has invested significantly in control and eradication on islands over the past several decades and has developed effective techniques and capacities that have brought down the costs of these measures over time.

The specific IAS control and eradication actions that have been selected for the six island sites are: 1) control of feral cats (*Felis catus*) on Isla Guadalupe, which will greatly reduce predation on 4 seabird species and 3 micro-endemic and native terrestrial birds; 2) eradication of mice (*Peromyscus eremicus cedrosensi*) on San Benito Archipelago, which will benefit 3 endemic subspecies of terrestrial birds as well as a population of 2 million seabirds (12 species); 3) eradication of feral cats on Isla Espiritu Santo, which will reduce predation on 27 reptile species (3 endemics), 90 bird species and 6 endemic mammal species; 4) eradication of feral goats (*Capra hircus*) on Isla Espiritu Santo, which will protect 233 species of vascular plant (53 of which are insular / regional endemics); 5) control of feral cats on Isla Socorro, which will reduce predation on 9 endemic bird species and endemic reptiles; 6) removal of exotic plants such as casuarina, Burr Grass (*Cenchrus echinatus*), coconut and nopal on Arrecife Alacranes, which will reduce competition for 29 vascular plant species (2 endemics); and 7) eradication of rats (*Rattus rattus*) and cats on Banco Chinchorro, which will help to protect 72 tropical migrant bird species, 26 resident bird species, and 10 reptile species, and aid in the natural recovery of mangroves and tropical forests.

**2.1.4 Establish and maintain monitoring programs to ensure effectiveness of biosecurity and IAS control and eradication efforts:** The project will implement various monitoring activities to measure the success of IAS management activities and support the recovery of native species on the six selected islands / island groups. For those islands where eradications will take place, the project will construct a baseline of both IAS populations and the native populations and then assess the recovery of the native populations after eradication. This information will help island resource managers to 1) confirm the absence of eradicated IAS in order to declare the island as free of that IAS; and 2) to assess the responses of native species and ecosystem functions after the eradication of IAS. Monitoring programs will focus

on: recovery of populations of nesting seabirds on Isla Guadalupe and in the San Benito Archipelago; absence of feral sheep and recovery of native flora and fauna on Isla Socorro; absence of rodents and the recovery of invertebrates and terrestrial reptiles on Arrecife Alacranes; recovery of populations of masked boobies (*Sula dactyltra*) and Brown Noddy (*Anous stolidus*) on Arrecife Alacranes; and the absence of black rats and recovery of native species on Banco Chinchorro. 83% of the costs of these activities will be paid for with co-financing.

## **Output 2.2: Enhanced IAS surveillance and control strategies reduce introduction rates from productive landscapes and contain populations below thresholds that endanger endemic species and their habitats at 9 mainland Protected Areas**

98. The project has selected 9 mainland Protected Areas totaling 4,240,349 hectares and a wide variety of ecosystems for site-level IAS management activities. The selected sites are: two Flora and Fauna Protected Areas (Sierra de Álamos - Río Cuchujaqui and Tutuaca); one Forested Protected Area (Valle de Bravo); two National Parks (Cañón del Sumidero and Cumbres de Monterrey; and four Biosphere Reserves (El Vizcaíno, Los Tuxtlas, Marismas Nacionales, and Sian Ka'an). At these mainland PA sites, the focus of the project will be on the strengthening of IAS management to prevent introductions from productive sector (agriculture, forestry, aquaculture, plant nurseries) activities in the landscapes within and surrounding the PA units. To support this landscape level approach, the project will work with production sector companies and individuals (i.e. farmers and ranchers) to address their activities that may contribute to the impacts of IAS on biodiversity in these landscapes. At the same time, the project will work to identify invasive species and associated pathways at each PA site; to provide detailed information and reach out to other institutions responsible for managing activities of these sectors, such as CONAFOR and SENASICA; and to work with them to identify the optimal combination of prevention, control and response measures and risk reduction strategies. The project also will work to enhance the capacity and authority of PA managers to work with these other institutions to implement restrictions and EDRR activities in areas surrounding PA units. At present, CONANP has some powers to promote conservation in "zones of influence" around PA units, but its authority to exercise powers regarding invasive alien species in these areas is unclear, and its capacity to do so is limited by staff and resource constraints. Thus CONANP, with support from SEMARNAT, will seek opportunities to pilot institutional coordination on IAS management (focused on prevention, response, and productive sector activities) at the selected mainland PA sites.

99. The project will undertake a number of coordinated actions to reduce the impact of IAS on biodiversity at the selected mainland PA sites. The project will work to establish/strengthen IAS Committees at all selected Mainland PA sites, which will oversee planning and implementation of IAS related activities, as well as coordination among institutions, productive sector companies, and local communities to establish protocols for IAS prevention and management. To further strengthen and guide the management of IAS at the selected mainland PA sites, the project will support the development and implementation of IAS Prevention, Detection and Management Plans that incorporate planning and priority setting. To enable the effective implementation of the management plans, the project also will support efforts to extend the regulatory authority of PA managers over invasive alien species. As noted above, the project will implement a variety of programs to reduce the contribution of productive sector activities to the entry and spread of IAS within national protected areas, including programs to improve biosecurity systems and/or replace the use of exotic species with natives species, at aquaculture production facilities, farms and ranches, nurseries, and local communities. To raise awareness about IAS impacts and management options, the site-level IAS Committees, in partnership with local NGOs and others, will organize and deliver workshops on IAS-related issues for current and potential visitors / users of the PAs to raise awareness of IAS threats, to explain new biosecurity protocols and restrictions, and to share information on effective IAS management practices. In addition, the project will promote

community participation in IAS management in areas within and surrounding the selected PA sites. Site-level PA management staff (with guidance and monitoring from the IAS Management Committee at each site) will organize workshops and training for local residents and other stakeholders (PA staff, university researchers, NGO staff) in order to establish surveillance and reporting groups to enable early detection and reporting of IAS within and nearby the PAs.

100. Early Detection and Rapid Response (EDRR) systems will be implemented for selected IAS at 4 of the mainland PA sites. At each site, the project will help to build capacity among PA staff, as well as local residents and NGOs and researchers active in the areas, to participate in monitoring and alert systems for IAS. In addition, the project will track of lessons learned to establish cost coefficients and also to develop models that can guide replication at other sites and for other species, including efforts to establish EDRR for selected high priority IAS at the national level. CONANP, together with local partners, will implement a variety of control programs for specific IAS at 6 of the mainland PA sites; these control programs were selected based on the significant impact these IAS are having on biodiversity at these sites. The project will support IAS eradication at one site, where project funds will be used to develop an IAS eradication protocol for the PA site, including a prioritized list of IAS whose eradication will have significant benefits for native species and/or ecosystem functioning, a list of sites within the PA where IAS impacts are most harmful, and guidelines on the most cost effective eradication strategies for those species. The project also will implement monitoring of specific IAS at 4 sites in order to assess the effectiveness of previous IAS eradication efforts and to prevent the reintroduction of those IAS. CONANP will fund ecosystem restoration activities at two mainland PA sites in order to measure the most effective and cost efficient techniques for restoration after the removal of invasive alien species.

101. Finally, at the national level, the Office of Conservation of Priority Species (DEPC) within CONANP will support and coordinate the actions at the 9 mainland PA sites. The DEPC is responsible for providing training, information, financial resources management, and other services to individual PA units, as well as carrying out system-level assessments, project tracking and planning for the entire system of national protected areas. Under this project, the DEPC will be responsible for priority setting and overall systemic planning, as well as strategies and mechanisms to promote replication of the IAS management activities at other PA sites after the project had ended. It will also make sure that information sharing takes place among the 9 selected PA sites during the project; and that lessons learned are made available throughout the national PA system.

**2.2.1 Develop baseline information necessary for effective IAS management planning:** General diagnoses of IAS distribution and impacts at the 9 mainland PA sites were carried out during the project preparation phase, and along with the information in the IAS management programs already in place at 5 of the sites, have helped to guide the selection of project activities at these sites. For some sites, additional diagnoses will be carried out during the first year of the project, in order to expand on and confirm the baseline information, so that IAS interventions in and around the targeted PA sites address the most urgent instances of IAS that impact biodiversity and ecosystem functioning. At the sites APFF Sierra de Alamos-Río Cuchujaqui and the Biosphere Reserve Marismas Nacionales, the project will identify high priority species, including assessing the environmental factors that promote IAS presence and pathways; identifying areas where IAS are present; and analyzing the impacts of IAS on other species and/or ecosystems (in particular endemic species). In addition, at the Cumbres de Monterrey National Park, the project will carry out impact assessments and measure dispersion of Chinese Privet (*Ligustrum lucidum*), Wild Tobacco (*Nicotiana glauca*), and Giant Cane (*Arundo donax*).

**2.2.2 Strengthen IAS management capacities and processes for landscapes within and surrounding mainland Protected Areas:** The project will work to establish/strengthen IAS Committees at all selected Mainland PA sites. The IAS Committees will function as sub-committees of the Advisory Councils that exist already at 8 of the 9 sites (with the exception of the Marismas Nacionales Biosphere

Reserve). These Advisory Councils, which typically include staff from the PAs and other government agencies, representatives of civil society and local communities (mayors), business owners, and ejidos (communal farms) and other local landholders, advise and assist PA managers in planning, management, funding, promoting social participation, emergency response, research, and review of the success of PA management actions. Within this framework, the IAS Committees will oversee planning and implementation of IAS related activities, as well as coordination among institutions, productive sector companies, and local communities to establish protocols for IAS prevention and management. Membership in the IAS Committees will include PA managers, other relevant government offices at each site (e.g. PROFEPA, SENASICA, SAGARPA, etc.), community leaders, and the operators of local productive sector businesses (such as aquaculture operations; forestry companies; wildlife breeding facilities; etc.) as well as local associations representing productive sectors.

To further strengthen and guide the management of IAS at the selected mainland PA sites, the project will support the development and implementation of IAS Prevention, Detection and Management Plans. Some of the selected PA sites already have IAS programs and/or stand-alone projects focused on specific IAS, but none of them have integrated IAS management plans that incorporate planning and priority setting. The project will support PA managers in strengthening existing plans (at 5 sites) and creating plans (at 4 sites) for integrated IAS management, including providing training for PA managers in priority setting and management planning. IAS Management Plans will address short, medium and long-term strategies and goals, with details on technical, administrative, and financial components. In addition, these plans will encompass the larger landscape around each PA site, with detailed strategies for community involvement and coordination among all relevant agencies. The plans will include an analysis of the contributions of local communities and productive activities to IAS processes, and propose ideas to reduce significant human impacts, possibly including additional restrictions on productive operations and uses of IAS. The IAS Management Plans also will mandate a multi-species approach to IAS management by taking account of and addressing potential secondary impacts of management interventions. These plans will be revised as new data and lessons learned are developed, including for example information on how different climate change scenarios (developed under Output 1.1) may increase disturbances to ecosystem functioning (e.g. frequency/severity of fires, floods, etc.), and change local climatic regimes (e.g. changes in the frequency or duration of droughts; in the number of frosts; in humidity levels; etc.), thereby allowing IAS to become more easily established. The IAS Management Plans will be finalized in year 3 of the project, and will incorporate the lessons learned from the results of project activities, and will include a financing plan to address high priority and cost-effective activities over the long-term. The management plans will be integrated into the overall management plan for each PA site, so that IAS management activities become a standard part of the operating activities of each PA site going forward.

To enable the effective implementation of the management plans, the project also will support efforts to extend the regulatory authority of PA managers over invasive alien species. At present, PAs have the legal authority to restrict the entry of IAS within their boundaries: LGEEPA 49 §IV prohibits the introduction of all “exotic” species into the core areas of National Protected Areas; RLGVS 90 prohibits the introduction of “exotic” species into other “wild habitat” in Mexico (including PA buffer zones); and LGEEPA 46 and 51 state that any species classified as “invasive” cannot be introduced anywhere with the national protected area. However, at present, PA managers do not have any authority to prohibit the use of IAS that are already present within PA boundaries, such as exotic aquaculture species. Furthermore, most PA units do not have detailed lists of the high impact IAS within the PA boundaries or in neighboring areas, which reduces their ability to enforce the legal and regulatory tools listed above. The project will work to give PA managers additional regulatory authority over IAS already within their boundaries, to improve cooperation between PA managers and PROFEPA (which has the actual legal authority to enforce laws and regulations for infractions within the PA boundaries), and to develop better information on which high impact IAS are resident within or near to specific PA units. In addition, the project will work to develop new / strengthened regulations and protocols for productive landscapes



around PAs. CONANP itself does not have authority to enforce restrictions on productive activities outside of PA boundaries; instead, such authority is vested in SEMARNAT (for wildlife breeding); SAGARPA (for aquaculture); CONAFOR (for use of exotic forest species); etc. Therefore, at the targeted sites, the project will work (through the IAS Committees) to strengthen inter-institutional cooperation to enforce relevant laws and regulations to reduce the contribution of productive sector activities to the entry and spread of IAS that impact biodiversity into protected areas.

**2.2.3 Introduce best practices in IAS management in targeted production sectors to reduce IAS spread:** The project will implement a variety of programs to reduce the contribution of productive sector activities to the entry and spread of IAS within national protected areas. At the Tutuaca Flora and Fauna Protected Area, the project will establish an EDRR system for aquaculture ponds producing Mozambique Tilapia, and will implement a control program for exotic trout (*Oncorhynchus mykiss*) and work with producers to replace that species replacement with native trout. The project also will work with local farmers to end their planting of buffel grass (*Cenchrus ciliaris*) and pinkgrass (*Melinis repens*) within the PA boundaries; these species are used as feed for livestock, but they have displace native grasslands and species and increased the incidence and severity of fires within the PA. As part of its co-financing of the project, CONANP will finance eradication efforts directed at these species. At the APFF Sierra de Álamos-Río Cuchujaqui, the project also will work with local farmers to end their planting of pink grass (*Melinis repens*), which is used as fodder for cattle sold for meat and milk and cheese production. At the Marismas Nacionales Biosphere Reserve, livestock ranching has created significant negative impacts on mangrove forests due to the destruction of mangrove seedlings by foraging cattle, as well as pollution caused by livestock waste. For this reason, the project will work with local ranchers to convert from open-range to semi-established ranching, including demonstration plots of native forage species to support the new ranching techniques. At the APFF Vallee de Bravo, the project will work with local aquaculture producers to replace the use of exotic carp and trout with local fish species, and to implement biosecurity measures to prevent the reintroduction of exotic species. Activities at this site also will include working with local inhabitants to replace the use of exotic tree species such as cedro blanco (*Cupressus lindleyi*), eucalyptus (*Eucalyptus camaldulensis*) and casuarina (*Casuarina equisetifolia*) with native tree species for use in hedgerows and as boundaries. At the Cañón del Sumidero National Park, the project will work with local fishpond managers to improve biosecurity measures to prevent the spread of exotic fish species into local water bodies. Finally, at the Sian Ka'an Biosphere Reserve, the project will work with local aquaculture producers to replace the invasive species Mozambique Tilapia (*Oreochromis mossambicus*) with the native Tenguayaca (*Petenia splendida*). Activities at Sian Ka'an also will include working with local ranchers to remove cattle from the core area of the reserve, as these animals are preventing the regeneration of native vegetation.

**2.2.4 Increase community awareness and participation in IAS management in and around mainland PA sites:** The IAS Management Committees at each mainland PA site will coordinate and implement activities to raise awareness and facilitate participation of local stakeholders in IAS management. To raise awareness about IAS impacts and management options, the site-level IAS Committees, in partnership with local NGOs and others, will organize and deliver workshops on IAS-related issues for current and potential visitors / users of the PAs to raise awareness of IAS threats, to explain new biosecurity protocols and restrictions, and to share information on effective IAS management practices. The project also will develop and disseminate information materials on IAS to the general public and to schools, including printed information (posters, brochures, signs, leaflets and manuals) and media products (e.g. TV and radio announcements, videos, etc.) that explain IAS issues and emphasize biosecurity measures, such as the importance of routine screening measures for persons and baggage when entering PA sites. At the Cumbres de Monterrey National Park, the project will work in partnership with an existing education and awareness program on invasive species in cooperation with the Conservation Program for Sustainable Development (PROCOCODES) and Parks Canada. In addition, the project will promote community participation in IAS management in areas within and surrounding the

selected PA sites. Site-level PA management staff (with guidance and monitoring from the IAS Management Committee at each site) will organize workshops and training for local residents and other stakeholders (PA staff, university researchers, NGO staff) in order to establish surveillance and reporting groups to enable early detection and reporting of IAS within and nearby the PAs (these groups will be modeled on similar groups of farmers and veterinarians who find and report diseases and pests in productive sectors). These local stakeholders will be provided with identification sheets and information on how to contact PA managers to report on IAS sightings (including how to access and report to the participatory IAS tools established at the national level by CONABIO (see Output 1.1). As one example, at the Los Tuxtlas Biosphere Reserve, the project will train and equip the staff of community monitoring brigades and a local bird monitoring network to enable them to identify, monitor and control invasive birds, mammals and flora in the ANP. At three sites (Los Tuxtlas, Cumbres de Monterrey, and Cañón del Sumidero), project activities will be integrated with ongoing programs of PROCODES that focus entirely on community management of natural resources.

**2.2.5 Develop and implement Biosecurity Programs (Prevention; Early Detection and Rapid Response) at selected mainland PA sites:** Early Detection and Rapid Response (EDRR) systems will be implemented for selected IAS at 4 of the mainland PA sites, including for the Monk Parakeet (*Myiopsitta monachus*) at Vizcaino; for the Mozambique Tilapia (*Oreochromis mossambicus*) at Tutuaca; for cats, dogs, and the devil fish (*Loricaridae fam.*) at Cañón del Sumidero; and for giant cane (*Arundo donax*), vine (*Cassytha filiformis*) and palm weevil (*Rhynchophorus palmarum*) at Sian Ka'an. At each site, the project will help to build capacity among PA staff, as well as local residents and NGOs and researchers active in the areas, to participate in monitoring and alert systems for IAS. In addition, the project will track of lessons learned to establish cost coefficients and also to develop models that can guide replication at other sites and for other species, including efforts to establish EDRR for selected high priority IAS at the national level. For Cañón del Sumidero, dogs and cats were selected because of the intense impacts they are having on biodiversity at the sites (see activity 2.2.6 for details), while the devil fish was selected because this species has managed to expand rapidly at many sites in Mexico since it was first reported in 1995. The devil fish, which has a high rate of reproduction and has few predators in Mexican waters, competes with many native fish species for feed, is known to incidentally ingest the eggs of other species, and is suspected of being a carrier of various diseases and parasites. For Sian Ka'an, the project will focus on the giant cane (*Arundo donax*), which is an invasive that impacts vegetation in riparian zones and gallery forests, as well as water supply in riparian zones; the invasive creeper (*Cassytha filiformis*), which is a parasitic creeper that removes nutrients from host plants through their cell membranes and has the potential to degrade natural forests as well as become a pest of commercial importance by harming various species of fruit trees and ornamental plants; and the black palm weevil (*Rhynchophorus palmarum*), a species that attacks coconut and other palms, which are keystone species in much of the PA and also important for the tourism market as well as for construction.

**2.2.6 Implement targeted IAS Control, Eradication and Monitoring at selected mainland PA sites:** Overall, 66% of the costs of control and eradication activities at mainland PA sites will be paid for with co-financing, and the GEF funding of US\$381,017 represents only 7.12% of the overall GEF support for the project. These activities are described below.

IAS Control Programs: CONANP, together with local partners, will implement a variety of control programs for specific IAS at 6 of the mainland PA sites; these control programs were selected based on the significant impact these IAS are having on biodiversity at these sites. At the El Vizcaíno Biosphere Reserve, the project will map the distribution of Vidrillo (*Mesembryanthemum crystallinum*) and implement control actions and reforestation with native species. Vidrillo is cultivated by local residents for sale as an ornamental plant and has colonized large areas near human settlements where it outcompetes native wildflower species by increasing salinity and nitrates in the soil. The project will also address the problem of the Pacific Oyster (*Crassostrea gigas*), whose spread within the reserve is causing

diseases in seagrass beds that are important habitat for migratory birds. The cultivation of sterile specimens of this oyster species has been permitted in some areas within the reserve, but the oyster has spread to other parts of the reserve due to illegal operations and the use of non-sterile germplasm. The project will implement control measures to reduce the spread of the oyster and remove illegal operations, and will establish a system to ensure that sterile germplasm is used for all cultivated oysters. At the APFF Sierra de Álamos-Río Cuchujaqu, the project will implement a control program to reduce the population of black rats (*Rattus rattus*), which threaten native birds, amphibians, and other species. The project also will undertake control and management of salt cedar (*Tamarix ramosissima*), which has proliferated and is highly invasive at this site as it can displace native species because of its high consumption of water resources and its contribution to soil salinization. Control measures will include felling of trees, followed by treating stumps with herbicides, and will be implemented by PA staff together with residents of the Comunidad La Labor de Santa Lucía. At the Cumbres de Monterrey National Park, the project will implement a manual and chemical control program at 3 sites (total of 90 hectares) to control Giant Cane (*Arundo donax*), which is sold for ornamental purposes and is used in residential and tourist accommodations. This plant species is an invasive that impacts vegetation in riparian zones and gallery forests, as well as water supply in riparian zones, and has also invaded managed landscapes such as agricultural fields and backyards. The project also will undertake manual and chemical control, in collaboration with a local community, of 120 hectares of Chinese Privet (*Ligustrum lucidum*), which is sold for ornamental purposes and is used in residential and tourist accommodations. This plant species is an invasive that causes inhibits the growth of native vegetation in pine and oak forests. In addition to control activities, the project will support preventive work to avoid future invasions in natural ecosystems. At the Los Tuxtlas Biosphere Reserve, the project will carry out control of invasive grasses by installing hedgerows with native plants produced in a community nursery. At the Cañón del Sumidero National Park, the project will implement a program for control of feral dogs and cats, which are the most significant IAS problem at this site. Feral populations of both species have increased greatly in recent decades in areas within and surrounding the PA site; these animals feed primarily on bird eggs, reptiles and rodents, and as they become more feral, also on deer, armadillos and hares, among others. Feral dogs and cats are also a source of disease transmission to native species; packs of feral dogs pose a threat to visitors to the PA as well as the residents of local communities; and there have been outbreaks of rabies in urban areas bordering the PA, which increases the risk of zoonoses that could affect biodiversity within the PA, including the core zone. PA management initiated a program in 2009, in cooperation with UNDP and the Fundación Antonio Haghenbeck, to sterilize dogs and cats in local communities within and bordering the PA. This program also included education of local residents about the problem and enlisted their assistance in reporting sightings of feral dogs and cats. Local authorities have also begun construction of a wall along approximately 4 km. of the park boundary, which will help to prevent the entry of additional IAS. The project, in partnership with the Fundación Antonio Haghenbeck, will complement these ongoing efforts by assisting PA managers in monitoring and controlling (removing) feral dogs and cats within the PA boundaries for humane disposal, and in working with local communities to encourage sterilization of pets. In addition, in order to reduce one of the most negative impacts of these feral animals, the PA will place fencing around crocodile nests within the PA boundaries to reduce predation of crocodile eggs. Finally, at the Sian Ka'an Biosphere Reserve, the project will implement a program of control and commercialization of lionfish (*Pterois volitans*). The lionfish has generated a significant impact on the entire coastal area and islands of the state of Quintana Roo, where it inhabits coral reefs, seagrass beds and shallow coastal lagoons and feeds on small fish, crustaceans and molluscs. The lionfish is rapidly displacing native species because of its high reproductive rate and the absence of any natural predators for the species in the Caribbean, with significant negative impacts on marine biodiversity and ecosystem functioning as well as local fisheries. The PA authorities, together with municipalities, researchers, CSOs, schools, and universities, has initiated a monitoring program in 2010, as well as ongoing activities to capture lionfish and to increase general public awareness about the problem and to promote the consumption of lionfish (in partnership with the hotel and restaurant sector). The project will help PA authorities to expand participatory control

measures for the lionfish with local fishermen, and to encourage commercialization of the lionfish as a food product by assisting in the organization of fishing tournaments and promoting consumption of lionfish in local hotels and restaurants as well as among local residents. CONANP in close collaboration with UNEP, NOAA, REEF, ICRI, the Caribbean Environment Programme, SPAW-RAC, and others, recently released the manual “Invasive Lionfish: A Guide to Control and Management” to assist coastal managers and field workers with local control and research efforts for invasive lionfish.

**IAS Eradication Programs:** The project will support IAS eradication at one site (Marismas Nacionales). Project funds will be used to develop an IAS eradication protocol for the PA site, including a prioritized list of IAS whose eradication will have significant benefits for native species and/or ecosystem functioning, a list of sites within the PA where IAS impacts are most harmful, and guidelines on the most cost effective eradication strategies for those species. Using this protocol, CONANP will co-finance the eradication of selected IAS at selected sites within the PA, which will contribute to the development of cost coefficients for different IAS management options at the national level.

**IAS Monitoring Programs:** The project will implement monitoring of specific IAS at 4 sites in order to assess the effectiveness of previous IAS eradication efforts and to prevent the reintroduction of those IAS. At the Los Tuxtlas site, the project will monitoring, control and eradication of the plant *Sansevieria trifasciata* in the mangroves of the Laguna de Sontecomapan; and of various exotic fish species in the Laguna de Sontecomapan and the Laguna del Ostión. In addition, the project will establish a monitoring system for the presence and pathways of entry of the orchid (*Oeceoclades maculata*), which outcompetes and replaces native orchid species. At the Cumbres de Monterrey site, the project will implement a cooperative program with local farmers to monitor farms on the boundary of the PA sites for invasive species. At the Sian Ka'an site, the project will implement monitoring, control and eradication of the red palm mite (*Raoiella indica*) and the Australian pine (*Casuarina equisetifolia*). Finally, at the Cañón del Sumidero site, the project will help PA managers to establish an overall IAS monitoring program.

**2.2.7 Undertake Ecosystem Restoration in areas negatively impacted by IAS:** CONANP will fund ecosystem restoration activities at two mainland PA sites in order to measure the most effective and cost efficient techniques for restoration after the removal of invasive alien species. At the El Vizcaino Biosphere Reserve, CONANP will establish a native plant nursery and undertake re-vegetation activities with native species; it will also implement a program to restore the San Ignacio Oasis with native species after the eradication of the Bullfrog (*Rana catesbeiana*) and tilapia (*Oreochromis sp.*). At the Cañón del Sumidero National Park, CONANP will undertake habitat restoration in areas where invasive grasses such as Buffel Zacate (*Penisetum ciliare*) have been removed.

## INDICATORS AND RISKS

102. The project indicators are detailed in the Strategic Results Framework, which is attached in Section II of this Project Document.

103. Project risks and risk mitigation measures are described below.

**Table 10: Risk Matrix**

IDENTIFIED RISKS AND CATEGORY	IMPACT	LIKELIHOOD	RISK ASSESSMENT	MITIGATION MEASURES
Governmental agencies / private	Low	Moderately Likely	Low	Information and knowledge generation, management and dissemination are key components of this project, including: strengthening of the National Invasive Alien Species Information System (NIASIS); establishment and operation of Information

IDENTIFIED RISKS AND CATEGORY	IMPACT	LIKELIHOOD	RISK ASSESSMENT	MITIGATION MEASURES
companies unwilling to share information / data				System to measure implementation of the National Strategy on Invasive Species; the creation of participatory networks to support IAS management; and the establishment and operation of an IAS National Gateway. Open-access and the mutual benefits of information sharing will be explicitly included in all of these activities, and in any other agreements for databases, websites, etc. sponsored by the project. Furthermore, the project will raise awareness among government and private stakeholders on the extent of negative impacts of IAS and on the potential benefits to be accrued from working jointly to reduce IAS introduction and spread.
Government unwilling or unable to pass new IAS laws by the end of the project	Low	Very Likely	Medium	Authority to push through approval of new legislation is beyond the scope of the project partners. The project will mitigate the risk by completing drafts of new/amended laws and regulations at least one year before the end of the project, so that the relevant authorities within the Government of Mexico can begin the process of legislative approval while the project is still ongoing. In addition, the project intends to propose a range of new/revised protocols under existing laws and regulations that can be used to strengthen IAS control without requiring legislative approval, such as amendments to i) the General Wildlife Law; ii) amended regulations governing the National Service for Health, Food Safety and Quality (SENASICA); iii) the Federal Law of Rights; iv) the Organic Law of Federal Public Administration; and v) laws and regulations on wildlife, forestry and aquaculture products.
Conflicts of interest and different priorities of stakeholders constrain implementation of activities	Medium	Likely	Medium	Mexico's new NSIS prioritizes strengthening partnerships between government, private sector and civil society. In supporting the implementation of the NSIS through this project, the needs and priorities of stakeholders will be identified, and constructive dialogue, joint planning and problem solving will be promoted. A "High Level Committee" for IAS management will be formally established and authorized to carry out inter-institutional coordination for IAS for the first time in Mexico. This committee will be supported by both a "Scientific Committee" to monitor progress made in the implementation of the National Strategy on Invasive Species, and a "Technical Committee", composed of staff from relevant institutions who will be tasked with communicating and coordinating activities related to implementation of the NSIS among all relevant departments within each institution. The project also will foster interest among stakeholders by developing positive market and fiscal incentives and by making the economic and business case for IAS management based on the savings to be derived from reducing IAS impacts. At the national level, the project has secured the cooperation and participation of numerous government institutions and agencies with responsibilities for IAS management. At the state level, the project will work with state-level authorities in at least eight Mexican states to integrate IAS concerns into state-level Biodiversity Strategies, and to ensure that state-level strategies on IAS comply with and support the goals and targets of the National Strategy on Invasive Species (NSIS). In addition, the project will select one state as a pilot where it will assist state authorities in implementing key actions in the Biodiversity Strategy, including those related to IAS management for productive sectors, so as to provide a model for the participation of state authorities in IAS management throughout the country. The project also will develop and implement a pilot for biosecurity activities with the Aquaculture Sector in the State of Morelos, in order to demonstrate how cooperation among state authorities and productive sector companies and associations can be used to address IAS in productive sectors. At the site level, the project will work with local governments, ejidos, resource managers, and producers at 9 mainland PA sites and 6 island sites, where it will test different models for stakeholder participation in planning, prevention, response, control and eradication activities related to invasive species. Both GECI and CONANP have extensive experience in working with local stakeholders at island sites (and at some mainland PA sites) to develop programs of IAS control and eradication; through the proposed project, they will expand this collaboration to involve communities, natural resource

IDENTIFIED RISKS AND CATEGORY	IMPACT	LIKELIHOOD	RISK ASSESSMENT	MITIGATION MEASURES
				users, and production sectors in local IAS committees, in the creation of site-level IAS management plans, and in the design and implementation of site-level biosecurity systems.
Insufficient funding to continue necessary IAS management after the project ends	Medium	Moderately Likely	Low	Governmental support for biosecurity and IAS management has increased in recent years along with an increased awareness of the economic/environmental impacts of IAS. This dynamic is likely to continue. These issues are at the center of many key national development policy frameworks, and the project will take advantage of that to continue to raise awareness, and bring in further information to guide decision making on investments. The project will assist in the development and application of financial mechanisms to support IAS management, especially cost recovery approaches such as taxes, fees, fines, or other charges, in particular to reduce the risk of intentional introductions of IAS that threaten biodiversity. Fees might include permit, registration and inspection fees; fees for quarantine / containment of suspected IAS; fees on disposal of vector material (e.g. contaminated soils); and fees for risk assessments. Alternatively, more general fees or levies might be established for IAS prevention costs based on the volume or risk level of imported goods. In addition, the project will assess the possibility of directing the monies collected from fines imposed by PROFEPA and other agencies for IAS infractions, as well as the fees noted above, into a dedicated fund for IAS prevention (or even to establish separate designated funds for management of specific species, pathways, or production sectors). Also, the project will submit a proposal for additional funding for IAS management activities to the Secretaría de Hacienda y Crédito Público (SHCP). In addition to developing new financing mechanisms, the project will support budgetary coordination between sectors to ensure coherent investments and actions to address threats cost efficiently. The project will carry out a study of existing spending on IAS management (by type of intervention, such as prevention, response, control, eradication, etc.; by geographic location and ecosystem type; by type of invasive species and pathway/vector; etc.) among relevant institutions in Mexico. The results of this analysis will be compared with cost coefficients for different IAS management strategies and estimates of the costs of high-impact IAS to the Mexican economy in order to select the most cost-effective approaches for IAS management and to coordinate the spending and interventions of various institutions and partner organizations to implement those IAS management approaches.
Climate change may alter the threats and risks associated with IAS	Medium	Likely	Medium	Climate change may raise the threat of IAS by increasing the disturbances to ecosystem functioning (e.g. frequency/severity of fires, floods, etc.), as well as by changing local climatic regimes (e.g. changes in the frequency or duration of droughts; in the number of frosts; in humidity levels; etc.). Such changes have the potential to decrease ecosystem resilience and create conditions where invasive species can more easily become established. Climatic parameters have been included in the project's risk analysis activities, including the development of niche models to estimate the potential impacts of climate change on the dispersion of high priority IAS. Project partners will take an adaptive management approach, including integrating the results of climate modeling into the priority setting of the National Strategy on Invasive Species, and in revising IAS prevention and response protocols based on changes in the risk profiles of specific IAS in response to climate change, in order to reduce the risk of introduction and spread of new IAS into and within the country. Models for estimating IAS dispersion under different climate change scenarios also will be used to adapt island and mainland PA site-level IAS management plans.
Increased international trade may introduce unforeseen	Medium	Moderately Likely	Low	The project and its co-financing partners are investing heavily in strengthening the capacity of institutions such as PROFEPA, CONAFOR and SAGARPA (including both SENASICA and INAPESCA) to prevent and reduce the introduction and spread of IAS into and within Mexico. As part of this investment, resources will be directed towards training of inspection staff at these institutions, and providing these personnel

IDENTIFIED RISKS AND CATEGORY	IMPACT	LIKELIHOOD	RISK ASSESSMENT	MITIGATION MEASURES
IAS				with risk analysis tools, inspection protocols, identification materials, and other resources to identify not only known existing IAS threats, but also to improve the ability to plan for, identify, and control potential new threats. In addition, the project will take an adaptive management approach to the evolving threat of IAS introductions and spread due to trade and travel, including developing and using data mining and other predictive tools to continually revise phytosanitary and sanitary measures in response to changing conditions and trends. Risk assessments will be periodically updated to assure that new commodities, pathways and species are accounted for.

**Table 11: Risk Assessment Guiding Matrix**

Impact						
	CRITICAL	HIGH	MEDIUM	LOW	NEGLEGIBLE	
CERTAIN / IMMINENT	Critical	Critical	High	Medium	Low	
VERY LIKELY	Critical	High	High	Medium	Low	
LIKELY	High	High	Medium	Low	Negligible	
MODERATELY LIKELY	Medium	Medium	Low	Low	Negligible	
UNLIKELY	Low	Low	Negligible	Negligible		Considered to pose no determinable risk

## COST-EFFECTIVENESS

104. The proposed project strategy represents a cost-effective approach to reduce the impact of invasive alien species on biodiversity and ecosystems and thereby generate global environmental benefits. Mexico already has an effective regulatory and institutional framework and capacities for controlling IAS that pose a threat to economic production and human health, which constitutes a strong foundation on which the project can build. For example, at present Mexico has an extensive phytosanitary inspection system, led by SENASICA, with a presence at all of the significant airports, ports and border points of entry into continental Mexico from other countries. In addition, Mexico has a robust system for inspection and prevention of IAS in forest and wildlife products, where PROFEPA is responsible for the inspection of goods at points of entry, SEMARNAT is responsible for the laboratory analysis of any suspected goods, and CONAFOR monitors for forest pests at field sites and at distribution and storage points. Thus, rather than attempting to establish a wholly new set of institutions, personnel, facilities, etc. for managing IAS that impact biodiversity, the project will work with national partners to revise and adapt mandates, protocol, and capacities to enable the scope of the existing IAS management framework to expand to cover IAS that pose a threat to biodiversity.

105. In addition to building on existing structures and capacities, several elements of the project are designed to specifically address and promote cost effective and efficient approaches to IAS management. By harmonizing regulations and standardizing protocols and mechanisms among different institutions regarding the management of IAS that threaten biodiversity, including early warning, monitoring and blacklisting, the project will improve the efficiency of IAS prevention and control activities. In addition,



the project will develop several tools to support broader participation and cost-effective information sharing on the extent, location, and optimal management strategies for invasive alien species in Mexico, including an IAS Experts Network that will allow resource managers and inspectors to quickly and efficiently access relevant experts and knowledge products; and a mobile application and related online tool where the general public can upload photos and data on suspected IAS sightings, which will help CONABIO to increase the capacity to collect and analyze the data that is generated and share it with relevant resource management agencies. Both of these tools, which will be linked to an IAS National Gateway, will facilitate timely and comprehensive information sharing among national IAS experts, easy access to relevant experts for institutional and sectorial stakeholders, and more efficient and cost effective approaches to IAS management. The project will utilize risk analyses to identify IAS with the most environmental and economic impact, as well as establishing cost coefficients for different IAS management strategies (prevention, EDRR, control, eradication, etc.), based on field level activities developed and implemented through the project. These estimates of the most damaging IAS, and the most cost effective techniques for addressing them, will allow decision makers to identify and select the most cost effective IAS management strategies, which will help to guide future policies and priority setting for the National Strategy on Invasive Species, as well as the national protected areas system and the planning work of National Advisory Committee on Mexican Island Territory 2012.

106. The project also will establish and strengthen coordination mechanisms that will optimize the activities of existing institutions for IAS management, such as the proposed IAS High Level Committee. Among other activities, the committee will seek to integrate and harmonize the activities of those institutions mandated to address the impacts of IAS on biodiversity and ecosystem functioning, and those responsible for implementing phytosanitary and zoosanitary measures to address IAS that impact productive activities and human health, so that they are sharing information, coordinating inspection and quarantine activities, and avoiding overlaps in responsibilities. The committee also will work to establish budgetary coordination between sectors to ensure coherent investments and actions to address threats in a cost efficient manner, by identifying critical gaps where IAS management interventions are not being implemented for lack of funding (or possibly areas of duplicated funding), to select the most cost-effective approaches for addressing those gaps, and then to coordinate the spending and interventions of various institutions and partner organizations to implement those IAS management approaches.

107. At the site level, field-testing of IAS management strategies will take place at island and mainland PA sites where it can build on previous experience in IAS management and where institutional partners (CONANP and GECI) have on-the-ground resources and proven experience in IAS management. At these sites, the project will implement the first integrated systems for IAS management in high priority conservation areas, which will enable managers to select and deploy the most cost effective and relevant IAS actions over the long term based on improved knowledge and priority setting and planning activities. To date, site level IAS management in high priority conservation areas has been focused heavily on control, eradication and monitoring measures; these activities are typically costly, and in the absence of effective biosecurity measures, need to be carried on indefinitely (control) and/or repeated periodically (eradication). By contrast, the primary emphasis of the GEF funding at the site level will be on preventing the entry and spread of IAS into high priority conservation areas through prevention and early detection and rapid response systems, in order to prevent IAS impacts at the source and thereby avoid costly control and eradication efforts. In addition, the project will carry out education and outreach efforts to local inhabitants to raise awareness about IAS issues and to increase the participation of local inhabitants in IAS prevention and control measures, including working with local CSOs, communities and researchers to establish participatory voluntary monitoring brigades for high priority IAS. While there is some investment for control and eradication (<15% of GEF funds, almost all for control) at the project sites, these activities are being undertaken principally in situations where control and eradication can generate significant global biodiversity benefits for relatively low cost and with a high probability of success.



108. In selecting among different IAS management options for the different island sites, GEICI utilized a decision support system that it has developed in order to prioritize activities and goals for island conservation throughout Mexico. Among other factors, this decision support system takes into account the issue of cost effectiveness of eradication vs. sustained control (where this is possible) vs. reinvasion risk in the long term. Eradication activities will be carried out through this project in situations where eradication is the most technically feasible and cost effective option to sustainably protect island biodiversity from IAS threats. For example, on smaller and more remote islands, eradication of invasive mammals such as cats is not only feasible, but also much less costly than ongoing control efforts, and provides immense benefits for island biodiversity over the long-term (particularly when it is combined with effective biosecurity measures). Furthermore, experience in Mexico and globally shows that the control of rodents is simply not feasible, while sustained control of feral cats is far more expensive than eradication. It is also worth noting that the average cost of removing IAS on Mexican islands (USD 90/ha) is considered a good return on investment for BD conservation compared to other experiences conducted elsewhere in the world; Mexico has invested significantly in control and eradication on islands over the past several decades and has developed effective techniques and capacities that have brought down the costs of these measures over time. Nevertheless, the project design recognizes that IAS control and eradication programs are not always cost-effective, as they deal with the effects rather than the causes of invasions, do nothing to prevent future invasions, and raise questions regarding long-term sustainability and financing. For this reason, control and eradication activities are being paired with the establishment of biosecurity systems, which will not only will protect biodiversity, but also ensure that investments in control and eradication have the highest rates of return on investment.

## COUNTRY OWNERSHIP: COUNTRY ELIGIBILITY AND COUNTRY DRIVENNESS

109. According to the Instrument for the Establishment of the Restructured Global Environment Facility, Mexico qualifies for GEF financing on the following grounds:

- It ratified the UN Framework Convention on Biological Diversity on 13 June 1992; and
- It receives development assistance from UNDP's core resources

110. The proposed project will assist Mexico in making its contribution to the fulfilment of Aichi Targets at the national level in several ways, as follows:

**Table 12: Aichi Targets and Related Project Activities**

Aichi Targets	Activities of proposed project
<p><b>Target 4:</b> By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.</p>	<p>The project will work with a variety of government institutions and businesses (focused on the aquaculture, aquarium trade, forest and wildlife products sectors) to adopt new measures, protocols, practices and codes for management of invasive alien species that impact biodiversity, thereby reducing the impacts of IAS on native species and natural ecosystems</p>
<p><b>Target 6:</b> By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and</p>	<p>The project will address the production of aquatic fish species and aquatic plants, seeking to reduce the use of invasive aquatic fish and plant species and replace them with sustainably harvested native species, and to implement biosecurity measures to prevent the escape and spread of invasive aquatic fish and plant species, which have been demonstrated to impact native species and ecosystem functioning through direct predation, competition for food resources and ecological niches, and changes to vegetative communities and hydrological systems</p>

ecosystems are within safe ecological limits.	
<b>Target 7:</b> By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	The project will promote agriculture, livestock, aquaculture and forestry practices that reduce the use of invasive alien species that are known to negatively impact biodiversity, including: exotic grass species that outcompete native grasses; free-ranging livestock that degrade native ecosystems through overgrazing, erosion, etc. and outcompete native grazing animals; exotic aquatic fish species (e.g. tilapia, catfish, etc.) that escape and prey on and outcompete native fish species; the use of exotic tree species for reforestation or forest plantation production, which replace native tree species and eliminate natural ecosystems that support plant and animal diversity
<b>Target 9:</b> By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	The project is primarily focused on identifying and managing invasive species pathways to prevent their introduction and establishment, at entry points into Mexico, at distribution points within the country (i.e. production, storage, processing, distribution centres for aquaculture, aquarium fish, forest and wildlife products), and at high priority conservation areas within the country (i.e. mainland Protected Areas and Islands). The project is also undertaking activities at the high priority conservation areas for control, eradication and monitoring of priority IAS.
<b>Target 19:</b> By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	The project will substantially increase Mexico’s information base and ability to share and disseminate information on invasive alien species and on their impact on biodiversity. The project will strengthen the National Invasive Alien Species Information System (NIASIS); establish an Information System to measure implementation of the National Strategy on Invasive Species; create Participatory Networks to support IAS management; establish an IAS National Gateway for information sharing and dissemination; finalize and publish a National List of Invasive Species (NLIS); and develop niche models for IAS dispersion related to climate change. In addition, the project will improve technologies for IAS management, risk analysis methodologies for high risk species / pathways, inspection tools for IAS that threaten biodiversity, a model for mapping of IAS flora, and IAS indicators for forest management.

## PROJECT CONSISTENCY WITH NATIONAL PRIORITIES/PLANS

111. The proposed project is consistent with national priorities and plans and will advance Mexico’s national targets and international commitments for biodiversity conservation and the management of invasive alien species (IAS). Mexico’s National Biodiversity Strategy (NBS, 2000) highlights IAS as critical for biodiversity conservation, and proposes priority actions including: developing an IAS inventory; researching IAS pathways, early detection and monitoring methods; and creating legal instruments to regulate entry and movement of IAS. The National Strategy on Invasive Species (NSIS, 2010) provides the first official recognition in Mexico of the importance of minimizing the impact of IAS on the country’s biological diversity; promotes a common national vision for coordination and resource allocation regarding IAS management; and identifies institutional responsibilities that need to be strengthened. The NSIS recognizes three Objectives: 1) Prevent, detect and reduce the risk of introduction, establishment and dispersal of invasive species; 2) Establish control and eradication programs for invasive species populations, which minimize or eliminate their negative impacts and favor ecosystem restoration and conservation; 3) Inform the public in an appropriate and efficient way to achieve a broad civil support and participation within their reach in actions to prevent, control and eradicate invasive species. All three of these Objectives, as well as all 15 of the “2020 Goals” listed in

the document, are supported by the activities in the proposed GEF project. The Mexican National Development Plan (PND) 2013-2018 identifies the need to protect the country's natural patrimony (Strategy 4.4.4), including conservation of biodiversity while strengthening of management capacities and participation of ejidos (communal farms) and forest communities. The Mexican Special Program on Climate Change 2008-2012 addresses the problem of the possible aggravating effects of climate change on the spread and impacts of invasive species, and includes objectives and specific targets that are coherent with corresponding elements of the National Strategy on IAS related to advancing the understanding of climate change impacts on IAS and promoting control and eradication actions. Similarly, several climate change action plans are under way at the state level that identify and address IAS as an interacting stressor. The Strategic Forestry Program for Mexico 2025, as part of its specific strategies for the development of forest resources, gives priority to the issue of forest pests and diseases, for which it defines two objectives: i) to reduce the risk of damage to forest resources by the effect of pests and diseases, and ii) to create the capacity to address native and exotic pest and disease outbreaks both native and exotic in a timely and effectively manner. This program also identifies as a priority the implementation of a risk analysis program for exotic pests and the establishment of an information system together with other federal and state agencies for detection, diagnosis, evaluation, inspection and control of forest pests and diseases. The proposed project falls within Mexico's national priorities for GEF 5 projects, as confirmed in the 2010 National Portfolio Formulation Process, which identified IAS management as one of 8 priority themes in its biodiversity focal area.

112. The project is also consistent with Mexico's commitments to international conventions, most notably the Convention on Biological Diversity (CBD), which discusses the importance of IAS management activities such as the identification and monitoring of contamination pathways, early detection and response methods, implementation of management plans for the control of IAS, and importance of raising awareness among all relevant actors, and encourages all parties to the CBD to join forces in the prevention, control, or removal of IAS that threaten ecosystems, habitats, or native species (art. 8h). Other relevant conventions to which Mexico is a signatory include the Convention on International Trade in Endangered Species of Fauna and Flora (CITES); the Agreement on the Application of Sanitary and Phytosanitary Measures of the World Trade Organization; and the International Convention for the Control and Management of Ships' Ballast Water and Sediments. Mexico is also a participant to the FAO-sponsored Code of Conduct for Responsible Fisheries, which provides guidelines for IAS management in fisheries and aquaculture. At the regional level, Mexico is a participant in the following initiatives with relevance to invasive species management: The North American Plant Protection Organization (NAPPO), which establishes regional phytosanitary standards for the import and export of all types of plant materials and has an invasive species panel. NAPPO has collaborated on strategies for the eradication of species on the Mexico–U.S. border. The Commission for Environmental Cooperation (CEC) of North America, an side agreement of the North American Free Trade Agreement (NAFTA), has played an important role in promoting research, the development of IAS inventories, and in generating guidelines for risk analysis of aquatic invasive species. The Trilateral Committee for the Conservation and Management of Wildlife and Ecosystem is an interagency effort between wildlife and other government agencies in the U.S., Canada, and Mexico; in 2008, the Committee began for formally address invasive species issues.

## **SUSTAINABILITY AND REPLICABILITY**

113. The project has been carefully designed to maximize the potential for the long-term sustainability of the interventions in invasive species management. The project's emphasis on establishing a comprehensive IAS policy, legal and regulatory framework will contribute strongly to the sustainability of the project, in particular through the support of the implementation of the existing National Strategy on Invasive Species, which will guide Mexico's IAS management activities going forward. By emphasizing a systemic focus that strengthens coordination among government institutions, and greatly increase the

participation of productive sector stakeholders in IAS management actions, the project will promote long-term institutional sustainability and increased and diversified financial contributions / participation by numerous stakeholders. Institutional sustainability also will be enhanced through the establishment of information sharing systems such as the NIASIS, the Information System to measure implementation of the National Strategy on Invasive Species, participatory networks for IAS reporting, and the IAS National Gateway, all of which will enhance coordination and thus awareness of institutional roles and responsibilities and options for effective management. Financial sustainability will be further strengthened through the development and application of financial mechanisms to support IAS management (e.g. permit, registration and inspection fees; fees for quarantine / containment of suspected IAS; fees on disposal of vector material (e.g. contaminated soils); and fees for risk assessments; directing monies collected from fines imposed by PROFEPA and other agencies for IAS infractions into a dedicated fund for IAS prevention; submission of a proposal for additional funding for IAS management activities to the Secretaría de Hacienda y Crédito Público) and by facilitating budgetary coordination between sectors to ensure coherent investments and actions to address IAS threats cost efficiently (i.e. analysis of IAS management activities to select the most cost-effective approaches, and then to coordinate the spending and interventions of various institutions and partner organizations to implement those approaches). GEF funding can be viewed as “seed money” that will kick-start the implementation of the National Invasive Species Strategy and increase awareness among governmental institutions, decision makers, and private stakeholders as to the extent of IAS problem in Mexico; particularly potential future interactions with climate change. An understanding of the linkage between these threats will broaden the decision-making process beyond short-term benefits to take account of long-term, costly and potentially irreversible impacts to the environment and human health, and thereby ensure increased long-term funding for IAS management through government budget allocations and the consideration of fiscal and market-based instruments and incentives for invasive species control. Finally, across all of the project components, special attention will be placed on gender equity, and where possible specifically targeting women at all capacities (labor, technicians, scientists, managers) and youth as participants in IAS management actions.

## **Replicability**

114. The project has been designed to ensure that lessons learned and best practices will be applicable at many different levels (local, national and international) and in many different types of ecosystems (terrestrial and aquatic). The National Strategy on Invasive Species (NSIS), as well as other systemic planning and coordination mechanisms such as SINAP’s planning systems for protected areas, and the National Strategy for the Conservation and Sustainable Development of the Mexican Island Territory, provide effective tools for ensuring widespread replication. Similarly, sector specific strategies and management tools will serve to guide operational plans of sectors and institutions throughout the country. For example, CONAFOR will use the forest health indicators for IAS developed in the new National Forest and Soils Inventory to guide management of IAS in forests throughout the country; in addition, the approaches developed for using fire as an IAS management tool and for using IAS in reforestation programs are intended to be used by CONAFOR at numerous sites throughout the country. Specific IAS management tools, such as risk analyses for high priority species, and protocols for mapping IAS flora, will be developed as models that are intended to be replicated for other species and sites in the country. A strong focus on capacity building and the development of technical tools and information resources will ensure that national capacities exist to replicate the project successes in other areas of Mexico. Additionally, the project will actively identify lessons learned and knowledge generated at project sites through dissemination of materials via the UNDP system and via national channels. As this project overcomes barriers and expands IAS prevention, detection and management actions, the project will disseminate the experiences both within Mexico and to other countries in Latin America and beyond.

115. With regard to lessons developed at high priority conservation areas, the project design includes strategies to replicate these lessons at other sites. Eight island sites were identified during the project preparation as priorities for IAS management post-project (some islands for biosecurity; some for IAS control and eradication; and some for both types of activities). These eight sites, which were selected using the same process as that used to select the six primary islands in this project, are: Mariás (3 islands), Coronado (3 islands and 1 islet), Cerralvo, Todos Santos (2 islands), San Pedro Mártir, Isabel, Marietas, Asunción and San Roque (part of the Vizcaíno Biosphere Reserve). By the end of the project, a replication strategy for IAS management on other Mexican islands will be finalized, which will detail what kinds of IAS management interventions should be prioritized on various islands, which institutions should be involved, and what sources of funding might be available for these replication activities. Similarly, for the mainland PA sites, the Office of Conservation of Priority Species (DEPC) will be responsible for priority setting and overall systemic planning, as well as strategies and mechanisms to promote replication of the IAS management activities at other PA sites after the project had ended. It will also make sure that information sharing takes place among the 9 selected PA sites during the project; and that lessons learned are made available throughout the national PA system.

## **PART III: Management Arrangements**

### **Arrangements and responsibilities**

116. The project will be executed under National Implementation Modality (NIM), with execution by the National Commission for Knowledge and Use of Biodiversity (CONABIO), following UNDP's Programme and Operations Policies and Procedures, per its role as implementing agency. Execution of the project will be subject to oversight by a Project Steering Committee, detailed below. Day to day coordination will be carried out under the supervision of a Project Coordination Unit and corresponding staff, also detailed below. The executing agency will take responsibility for different outcomes/activities according to existing capacities and field realities, ensuring effective and efficient use of GEF resources.

117. The *National Commission for Knowledge and Use of Biodiversity (CONABIO)* is the official project Executing Agency, responsible for the fulfillment of the project's results. Its main responsibilities related to the project are to:

- Lead the project implementation with the support of the Project Coordination Unit (PCU);
- Participate together with UNDP, in selecting the Project Coordinator;
- Designate a representative to act as a permanent liaison between UNDP, the Ministry of Foreign Affairs and the Project Coordinator, and to participate in the Project Steering Committee meetings, and others as required, to ensure that the necessary inputs are available to execute the project;
- Prove the technical and administrative capacity to develop the project;
- Monitor the project's work plan and progress;
- Provide the name and describe the functions of the person or persons authorized to deal with UNDP concerning the project's matters;
- Approve ToR for technical personnel and consultancies for project implementation;
- Participate in the selection process of the consultants and approve all hiring and payment request;
- Provide the name and describe the functions of the person or persons authorized to sign the project's budget and/or substantive revisions of the project.
- Coordinating the activities of all other project partners, and providing overall technical oversight of programs and outputs of project contractors and short-term consultants (with the support of the PCU).

118. The *United Nations Development Programme (UNDP)* is the world development network established by the United Nations with a mandate to promote development in countries and to connect them to the knowledge, experience and resources needed to help people achieve a better life. Its main responsibilities related to the project are to:

- Designate a programme officer responsible for providing substantive and operational advice and to follow up and support the project's development activities;
- Advise the project on management decision making, as well as to guarantee quality assurance;
- Be part of the project's Steering Committee and other Committees or Groups considered part of the project structure;
- Administer the financial resources agreed in the budget / workplan and approved by the project's Steering Committee; monitor financial expenditures against project budgets / workplans; and oversee the provision of financial audits of the project;
- Oversee the recruitment and hiring of project staff, the selection and hiring of project contractors and consultants; and the appointment of independent financial auditors and evaluators;
- Co-organize and participate in the events carried out in the framework of the Project;
- Use national and international contact networks to assist the project's activities and establish synergies between projects in common areas and/or in other areas that would be of assistance when discussing and analyzing the project;
- Provide Support in the development and instrumentation of the project's gender strategy.
- Ensure that all project activities, including procurement and financial services, are carried out in strict compliance with the procedures of the UNDP / GEF.

119. The *Ministry of Foreign Affairs (SRE)*. The Government of the United Mexican States has designated the Technical and Scientific Cooperation Directorate of the SRE as the official counterpart of UNDP in Mexico. Its main responsibilities related to the project are:

- As the entity responsible for technical cooperation in Mexico, to act as the Mexican government's official counterpart to UNDP; specifically, and in accordance with the National Development Plan, to formalize approval of the project cooperation documents presented to UNDP by federal, state and private entities;
- If necessary, to make a written request to UNDP for reports on the project;
- To approve the annual audit plan for the project and, in accordance with UNDP standards and procedures, to convene an information and consultation meeting prior to the audit;
- If considered necessary, to attend at least one meeting a year of the project's Project Steering Committee;
- As required, to participate in tripartite meeting or in any follow-up or reorientation sessions.

120. Component 2 of the project is focused on IAS management interventions at 9 mainland protected area sites and 6 island sites. Implementation of the project at these sites will be led by CONANP (mainland PAs) and GECI (islands). CONANP will lead the implementation of activities at these sites with PA staff already in place at each site; their activities will be coordinated by a team of 3 persons in the Office of Conservation of Priority Species (DEPC) at CONANP's main offices in Mexico City. GECI, a licensed Mexican NGO, will lead implementation of the project activities at the 6 island sites. Details on the roles of CONANP and GECI as "responsible parties" to this project are provided below. Some details on the roles of other partners in the project is described in Part III below; these details will be further elucidated during the project inception phase, based on relevant activities established in the project work plan.

121. Project implementation will be carried out under the general guidance of a *Project Steering Committee (PSC)*, which will be responsible for making management decisions for the project by consensus, especially the operational plans, annual reports and budgets of the project. The PSC will be

co-chaired by UNDP and CONABIO and will meet at least twice per year to review project progress and approve upcoming work plans and corresponding budgets. Other members of the PSC will include CONANP and GEICI; representatives of other stakeholders may also be included in the PSC, as deemed appropriate and necessary (the membership of the PSC will be reviewed and recommended for approval at the project Inception Workshop). The PSC will be in charge of the overall supervision of the project, providing strategic guidance for its implementation, ensuring that this proceeds in accordance with a coordinated framework of government policies and programs, and in accordance with the agreed strategies and targets laid out in this Project Document. The PSC will also approve and supervise the hiring and work of staff under the Project Coordination Unit, detailed below. In order to ensure UNDP's ultimate accountability, the PSC decisions should be made in accordance with standards that ensure development results, cost-effectiveness, fairness, integrity, and transparency.

122. The responsibilities of the PSC shall include, but not be limited to: (1) Review, approve and amend this project document, including the Monitoring and Evaluation (M&E) framework, the budget, and the implementation plan; (2) Monitor compliance with the Project's objectives; (3) Discuss progress and identify solutions to problems facing any of the project's partners; (4) Review and approve the AWP and the consolidated financial and progress reports; (5) During the life of the project, review proposals for major budget re-allocation such as major savings or cost increases, or for use of funds for significantly different activities; (6) Review evaluation findings related to impact, effectiveness and the sustainability of the project; (7) Monitor both the budget and the prompt delivery of financial, human and technical inputs to comply with the work plan; (8) Ensure the participation and ownership of stakeholders in achieving the objectives of the project; (9) Ensure communication of the project and its objectives to stakeholders and the public; (10) Approve the project communication strategy and public information plans prepared by the PSC; (11) Facilitate linkages with high-level decision making; (12) Convene ordinary meetings to consider the Technical Committee's proposals and recommendations, as well as the progress made by the project; and (13) Convene, if necessary, extraordinary meetings.

123. Given the complex nature of this project, the *Scientific Committee* of the High Level Committee on Invasive Species, which will be established under Output 1.3 of this project, will provide scientific and technical backstopping to the project, as well as identify lessons learned that could be applicable to other projects within Mexico and around the world. Membership in the Scientific Committee will be determined by the existing Experts Committee during the project inception phase. Among its other duties, the Scientific Committee will meet once per year to discuss the project's progress and provide guidance to maximize the project's efforts.

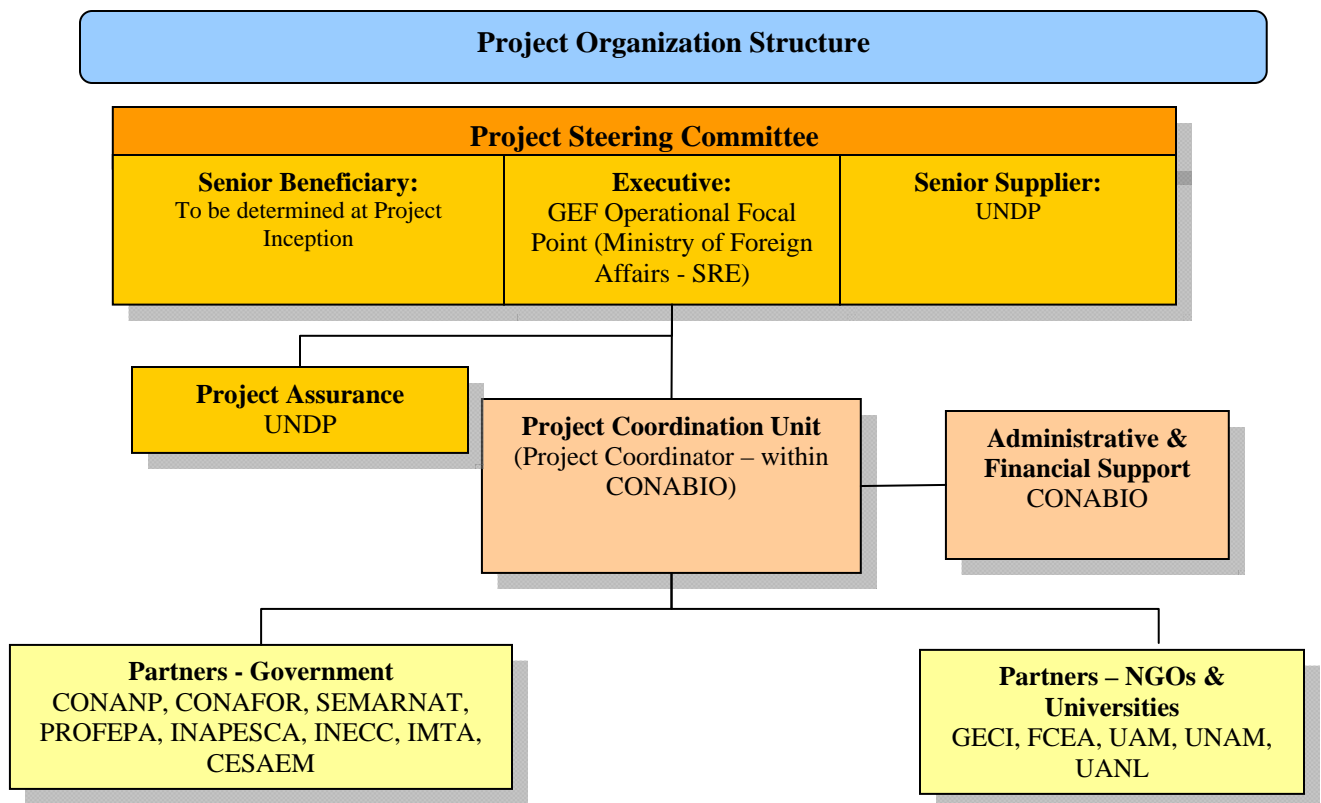
124. The *National Project Director* (NPD), a senior staff member of CONABIO, will be responsible for oversight of the Project and carries overall responsibility and accountability. The NPD will keep the PSC updated on project advances and challenges as needed, and will report to the PSC on progress made and issues to be resolved. The NPD will establish and provide overall guidance to the PCU, and is responsible for overseeing the work undertaken by the PCU team. The NPD will submit relevant documentation to the PSC for endorsement.

125. Day-to-day management and coordination of the project will be under the supervision of the *Project Coordination Unit* (PCU). The PCU will be responsible for the general management actions of the project, such as the preparation of consolidated annual work plans and technical and financial reports to be presented to the PSC, with the aim of ensuring that advances in relation to the goals and key milestones of the project are achieved as planned. The PCU will report to the NPD (Project Director). The PCU will be comprised of a Project Coordinator, an Assistant to the Project Coordinator, an Administrator / Accountant, and a Secretary, all of whom will be full-time staff (the first three will be paid with project funds, while the salary of the Secretary will be paid with CONABIO co-financing). The *Project Coordinator* will be responsible, under the supervision of the NPD, for the overall integration and

follow-up of studies, research and project technical activities. He/she will assist in the supervision of project implementation, liaising directly with the NPD, and will undertake quarterly operational planning and provide guidance on day-to-day implementation. The PCU will ensure institutional coordination among the many project partner institutions and organizations.

126. In addition to the staff of the PCU and the staff of various partner institutions who will participate in specific project activities, a series of short and medium-term consultancy contracts will be necessary in order to implement some of the technical aspects of the project. Contracted companies and consultants will carry out targeted project activities under the technical supervision of the PCU and CONABIO, and in coordination with relevant partners for different activities. Terms of reference will be developed jointly by the PCU and CONABIO and approved by the PSC in accordance with approved work plans.

127. The figure below presents the project organogram, showing the relationships between the main institutions to be involved with project implementation and the bodies to be established by the project.



128. The Project Steering Committee is responsible for making management decisions for a project in particular when guidance is required by the Project Coordinator. The PSC plays a critical role in project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual WorkPlan, the PSC can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans. In order to ensure UNDP’s ultimate accountability for the project results, PSC



decisions will be made in accordance to standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the PSC, the final decision shall rest with the UNDP Project Manager.

129. Potential members of the PSC are reviewed and recommended for approval during the PAC meeting. Representatives of other stakeholders can be included in the PSC as appropriate. The PSC contains three distinct roles, including:

- Executive (UNDP): individual representing the project ownership to chair the group.
- Senior Supplier (Ministry of Foreign Affairs): Individual or group representing the interests of the parties concerned that provide funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project.
- Senior Beneficiary (To be determined): individual or group of individuals representing the interests of those who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board is to ensure the realization of project results from the perspective of project beneficiaries.
- Project Assurance (UNDP): Supports the Project Board Executive by carrying out objective and independent project oversight and monitoring functions. The Project Manager and Project Assurance roles should never be held by the same individual for the same project. A UNDP Staff member typically holds the Project Assurance role.

#### *Responsible Party*

130. The project will be implemented under the NIM modality where the Implementing Partner is CONABIO with collaboration of CONANP and GECI A.C. as Responsible Parties, following the standards and regulations of the United Nations Development Programme (UNDP), the implementing agency of this project. Initial roles are indicted in Annex 5. The Implementing Partner is the entity responsible for the project outcomes, and who is accountable for its management, including monitoring and evaluation activities, the achievement of outputs and effective use of resources. A single Implementing Partner is designated to lead each project. This Partner may establish agreements with other organizations or entities in order to support the achievement of the outputs envisaged in the project, this/these other/s instance/s is/are called: Responsible Party (ies). The Responsible Party is designated by the Implementing Partner to support the implementation, planning and / or monitoring of certain activities / components within the project's framework, using their technical skills and management services to support the achievement of project objectives. Project partners will assume responsibility for the different outcomes and outputs expected from the project, carrying out activities related to their actual capabilities in the field, ensuring effectiveness and efficiency of GEF funding. An Implementation Agreement will be signed between the Implementing Partner and the Responsible Party during the project inception phase.

#### *Financial and other procedures*

131. The financial arrangements and procedures for the project are governed by the UNDP rules and regulations for National Implementation (NIM). Financial transactions will be based on direct requests to UNDP from the National Project Director and/ or Project Coordinator for specific activities (included in work plans and financial reports) and for advances for petty cash where necessary and considering the difficulties of implementation in many remote areas. The arrangements for financial reporting, requests for transfer of funds, and the advance and disbursement of funds will, in turn, be detailed in MOUs between CONABIO and its implementing partners. All procurement and financial transactions will be governed by national rules and regulations, and must be compatible with the UNDP rules and regulations.

132. Dollarization clause: "The value of any contribution received by the United Nations Development Programme as part of this Agreement, and which is made in a currency other than the U.S. Dollar, is determined by applying the operational rate of the United Nations prevailing on the date that such payment is made effective. If there is a change in the operational rate of the United Nations before UNDP uses the entire amount paid, the balance will be adjusted according to the value of the currency at that date."

133. If a loss is registered in the value of the fund balance, UNDP shall inform the Donor with a view to determining whether the donor has to provide more funding. Without having any such additional funding, UNDP may reduce, suspend or terminate assistance to the program / project. In the case where there is an increase in the value of this balance, this increase will go to the project to implement its activities, in agreement with the donor.

134. All accounts and all financial statements are expressed in U.S. dollars. The exchange rate used in each case shall be the monthly exchange rate set by the UN in Mexico. Notwithstanding the foregoing, payments to suppliers are made in local currency. In cases where the total contributions exceed the total reference amount, a budgetary review of the project will be carried out as per UNDP requirements.

#### *Direct Project Services*

135. In its role as GEF Implementing Agency (IA) for this project, UNDP shall provide project cycle management services as defined by the GEF Council (described in Annex 5). The Government of Mexico shall request UNDP to provide direct project services specific to project inputs according to its policies and convenience. These services –and the costs of such services - are specified in the Letter of Agreement in Annex 5. In accordance with GEF Council requirements, the costs of these services will be part of the executing entity's Project Management Cost allocation identified in the project budget. UNDP and the Government of Mexico acknowledge and agree that these services are not mandatory and will only be provided in full accordance with UNDP policies on recovery of direct costs.

#### *Audit Clause*

136. The Government of Mexico will provide the UNDP Resident Representative with certified periodic financial statements, and with an annual audit of the financial statements relating to UNDP (including GEF) funds according to the established procedures set out in the Programming and Finance manuals. The Audit will be conducted by the legally recognized auditor of the Government, or by a commercial auditor engaged by the Government. The firm will be selected through a bidding process and will be subjected to a rigorous evaluation within the principles of transparency, neutrality and cost benefit.

137. The project will be audited in accordance with the UNDP Financial Regulations and Rules and applicable audit policies. An audit to the Project is an integral part of UNDP financial and administrative management within the framework of UNDP's accountability, internally and with regards to the GEF. The project will be audited to ensure that resources are administered in accordance with the financial regulations of the project document, workplan and budget. The project's budget should contemplate the resources needed to carry out the audit. The firm selected by UNDP Mexico, through a bidding process and subjected to a rigorous evaluation within the principles of transparency, neutrality and cost benefit will take over this exercise in accountability.

#### *Communications and visibility requirements*

138. Full compliance is required with UNDP's Branding Guidelines. These can be accessed at <http://intra.undp.org/coa/branding.shtml>, and specific guidelines on UNDP logo use can be accessed at: <http://intra.undp.org/branding/useOfLogo.html>. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects need to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: [http://www.thegef.org/gef/GEF\\_logo](http://www.thegef.org/gef/GEF_logo). The UNDP logo can be accessed at <http://intra.undp.org/coa/branding.shtml>.

139. Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"). The GEF Guidelines can be accessed at: [http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08\\_Branding\\_the\\_GEF%20final\\_0.pdf](http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf). Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

140. Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

#### *Administrative arrangements*

141. The project will be financed by the GEF with a total amount of US\$5,354,545. The Government of Mexico has committed cash co-financing to the Project to an amount of US\$26,133,760. These resources will mainly be used for salaries, travel expenses, equipment, programs and subsidies, and basic operation and management expenses of the various project partner agencies that are implementing activities related to IAS management. To coordinate the spending of these resources with the GEF funds provided to the project, UNDP will make its installed capacity available to the Project, guaranteeing that their use is both transparent and prompt, with any services provided to the project by UNDP will be in accordance with its internal guidelines and regulations.

## **PART IV: Monitoring Framework and Evaluation**

### **MONITORING AND REPORTING**

142. Project monitoring and evaluation will be conducted in accordance with established UNDP and GEF procedures and will be provided by the project team and the UNDP Country Office (UNDP-CO) with support from UNDP/GEF. The Project logframe (Project Results Framework) in Section II, Part I provides *performance* and *impact* indicators for project implementation along with their corresponding *means of verification*. These will form the basis on which the project's Monitoring and Evaluation (M&E) system will be built. The following sections outline the principle components of the Monitoring and Evaluation Plan and indicative cost estimates related to M&E activities. The project's Monitoring and Evaluation Plan will be presented and finalized at the Project's Inception Report following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities.

143. The project will be monitored through the following M&E activities. The M&E budget is provided in the table below.

### **Project start-up**

144. A Project Inception Workshop will be held within the first 2 months of project start with those with assigned roles in the project organization structure, UNDP country office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

145. The Inception Workshop should address a number of key issues including:

- a) Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis à vis the project team. Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.
- b) Based on the project results framework and the relevant GEF Tracking Tool if appropriate, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- c) Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- d) Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- e) Plan and schedule Project Steering Committee meetings. Roles and responsibilities of all project organisation structures should be clarified and meetings planned. The first Project Steering Committee meeting should be held within the first 12 months following the inception workshop.

146. An Inception Workshop report is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

### **Quarterly**

147. Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform. Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high. Note that for UNDP GEF projects, all financial risks associated with financial instruments such as revolving funds, microfinance schemes, or capitalization of ESCOs are automatically classified as critical on the basis of their innovative nature (high impact and uncertainty due to no previous experience justifies classification as critical). Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot. Other ATLAS logs can be used to monitor issues, lessons learned etc. The use of these functions is a key indicator in the UNDP Executive Balanced Scorecard.

### **Annually**

148. Annual Project Review/Project Implementation Reports (APR/PIR): This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

149. The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).

- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools) are used by most focal areas on an annual basis as well.

### **Periodic Monitoring through site visits**

150. UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

### **Mid-term of project cycle**

151. The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (February 2016). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the [UNDP Evaluation Office Evaluation Resource Centre \(ERC\)](#). The relevant GEF Focal Area Tracking Tools will also be completed during the mid-term evaluation cycle.

### **End of Project**

152. An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF.

153. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response, which should be uploaded to PIMS and to the [UNDP Evaluation Office Evaluation Resource Centre \(ERC\)](#). The relevant GEF Focal Area Tracking Tools will also be completed during the final evaluation.

154. During the last three months, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out

recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

### Learning and knowledge sharing

155. Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyse, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

### M&E workplan and budget

**Table 13: M&E Activities, Responsibilities, Budget and Time Frame**

Type of M&E activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time frame
Inception Workshop and Report	<ul style="list-style-type: none"> <li>▪ Project Manager</li> <li>▪ UNDP CO, UNDP GEF</li> </ul>	Indicative cost: 8,363	Within first two months of project start up
Measurement of Means of Verification of project results.	<ul style="list-style-type: none"> <li>▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.</li> </ul>	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on <i>output and implementation</i>	<ul style="list-style-type: none"> <li>▪ Oversight by Project Manager</li> <li>▪ Project team</li> </ul>	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ UNDP RTA</li> <li>▪ UNDP EEG</li> </ul>	None	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> </ul>	None	Quarterly
Mid-term Evaluation	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ UNDP RCU</li> <li>▪ External Consultants (i.e. evaluation team)</li> </ul>	Indicative cost: 24,000	At the mid-point of project implementation.
Final Evaluation	<ul style="list-style-type: none"> <li>▪ Project manager and team,</li> <li>▪ UNDP CO</li> <li>▪ UNDP RCU</li> <li>▪ External Consultants (i.e. evaluation team)</li> </ul>	Indicative cost: 32,000	At least three months before the end of project implementation
Project Terminal Report	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ Local consultant</li> </ul>	0	At least three months before the end of the project
Audit	<ul style="list-style-type: none"> <li>▪ UNDP CO</li> <li>▪ Project manager and team</li> </ul>	Indicative cost: 12,000	Yearly

Type of M&E activity	Responsible Parties	Budget US\$ <i>Excluding project team staff time</i>	Time frame
Visits to field sites	<ul style="list-style-type: none"> <li>▪ UNDP CO</li> <li>▪ UNDP RCU (as appropriate)</li> <li>▪ Government representatives</li> </ul>	For GEF supported projects, paid from IA fees and operational budget	Yearly
Inception Workshop and Report	<ul style="list-style-type: none"> <li>▪ Project Manager</li> <li>▪ UNDP CO, UNDP GEF</li> </ul>	Indicative cost: printing costs only, if any.	Within first two months of project start up
Measurement of Means of Verification of project results.	<ul style="list-style-type: none"> <li>▪ UNDP GEF RTA/Project Manager will oversee the hiring of specific studies and institutions, and delegate responsibilities to relevant team members.</li> </ul>	To be finalized in Inception Phase and Workshop.	Start, mid and end of project (during evaluation cycle) and annually when required.
Measurement of Means of Verification for Project Progress on <i>output and implementation</i>	<ul style="list-style-type: none"> <li>▪ Oversight by Project Manager</li> <li>▪ Project team</li> </ul>	To be determined as part of the Annual Work Plan's preparation.	Annually prior to ARR/PIR and to the definition of annual work plans
ARR/PIR	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> <li>▪ UNDP CO</li> <li>▪ UNDP RTA</li> <li>▪ UNDP EEG</li> </ul>	None	Annually
Periodic status/ progress reports	<ul style="list-style-type: none"> <li>▪ Project manager and team</li> </ul>	None	Quarterly
TOTAL indicative COST <i>Excluding project team staff time and UNDP staff and travel expenses</i>		US\$76,363	

\*Note: Costs included in this table are part and parcel of the UNDP Total Budget and Workplan (TBW) in the PRODOC, and not additional to it.

## PART V: Legal Context

156. This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement between the Government of Mexico and the United Nations Development Program, signed by the parties on February 23rd, 1961. The host country implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government co-operating agency described in that Agreement.

157. The UNDP Resident Representative in Mexico City is authorized to effect in writing the following types of revision to this Project Document, provided that he/she has verified the agreement thereto by the UNDP-GEF Unit and is assured that the other signatories to the Project Document have no objection to the proposed changes: (i) Revision of, or addition to, any of the annexes to the Project Document; (ii) Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation; (iii) Mandatory annual revisions which re-phase the delivery of agreed project inputs or increased expert or other costs due to inflation or take into account agency expenditure flexibility, and; (iv) Inclusion of additional annexes and attachments only as set out here in this Project Document.

158. Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner. The implementing partner shall:

- a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

159. UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

160. The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via <http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm>. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.



## SECTION II: Strategic Results Framework (SRF) and GEF Increment

### PART I: Strategic Results Framework Analysis

<b>This project will contribute to achieving the following Country Programme Outcome as defined in CPAP:</b> Mainstreaming environment and energy
<b>Country Programme Outcome Indicators:</b> Promoted risk disaster and low-emission, resilient and environmentally sustainable development strategies, with a gender and multicultural approach for poverty reduction and equity
<b>Primary applicable Key Environment and Sustainable Development Key Result Area: 1. Mainstreaming environment and energy:</b> Technical and institutional capacities to promote environmental sustainability developed
<b>Applicable GEF Strategic Objective and Program:</b> SO 2 - Mainstream biodiversity conservation and sustainable use into production landscapes, seascapes and sectors
<b>Applicable GEF Expected Outcomes:</b> SP 3 - Improved management frameworks to prevent, control and manage invasive aliens
<b>Applicable GEF Outcome Indicators:</b> Policies and regulatory frameworks for production sectors: IAS management framework operational as recorded by GEF 5 TT

Project Strategy	Objectively verifiable indicators
Goal	<b>Globally significant biodiversity is protected from the impacts of invasive alien species in Mexico</b>

	Indicator	Baseline	Target	Means of Verification	Risks and Assumptions
<b>Project Objective:</b> To safeguard globally significant biodiversity in vulnerable ecosystems by building capacity to prevent, detect, control and manage IAS in Mexico	Strengthened national level invasive species management framework, measured by an increase in total score of the IAS TT:	Scores at Start of Project	Scores at End of Project:	GEF Tracking Tool applied at PPG, MTR and TE	<u>Risks:</u> - Extreme weather events and/or fires beyond predicted levels.  <u>Assumptions:</u> - Stability and commitment of governmental institutions throughout project implementation.  - Willingness within the GoM to commit funding /
	<b>Issue</b>	<b>Baseline Scores</b>	<b>Target Scores</b>		
	1) Is there a National Coordination Mechanism to assist with the design and implementation of a national IAS strategy?	1	3		
	2) Is there a National IAS strategy and is it being implemented?	2	3		
	3) Has the national IAS strategy led to the development and adoption of comprehensive framework of policies, legislation, and regulations across sectors	2	4		
	4) Have priority pathways for invasions been identified and actively managed and monitored?	1	2		
	5) Are detection, delimiting and monitoring surveys conducted on a regular basis?	1	5		
	6) Are best management practices being applied in project target areas?	1	8		
	<b>TOTAL SCORE</b>	<b>8</b>	<b>25</b>		
	<b>TOTAL POSSIBLE</b>	<b>29</b>	<b>29</b>		

	Indicator	Baseline	Target	Means of Verification	Risks and Assumptions
	<p>Strengthened national capacities for IAS management<sup>3</sup>, as measured by the UNDP Capacity Development Scorecard</p> <p>Supporting framework for implementation of the National Strategy for Invasive Species (NSIS), as measured by:</p> <ul style="list-style-type: none"> <li>National (federal and state level) and international institutions (government, NGOs &amp; Universities) involved in the implementation process of the NSIS</li> <li>Cost effectiveness of IAS management actions</li> </ul> <p>Entry and spread of IAS into 15 islands (6 island groups) reduced through biosecurity inspections of goods/persons who arrive at the islands by air/sea</p> <p>Populations of key IAS contained to below thresholds that endanger native species and their habitats, providing additional protection to at least<sup>4</sup>:</p> <ul style="list-style-type: none"> <li>155 endemic species, and 168 species of</li> </ul>	<p>Average score on Capacity Development Scorecard: 43</p> <ul style="list-style-type: none"> <li># of official institutional partners involved in IAS management in Mexico: 8 governmental institutions, 3 Universities, 2 NGOs, 1 State level organization</li> <li>No consolidated information on the costs of different IAS management strategies (prevention, response, control, etc.) in Mexico, or how costs differ in varying ecological / logistical conditions</li> </ul> <p>0% of goods and persons arriving at islands are subject to biosecurity inspections</p> <p>Populations of selected high impact IAS at sites (low, medium, high; estimates will be validated during year 1 of the project):</p> <ul style="list-style-type: none"> <li>Feral cats (<i>Felis gatus</i>) on Isla</li> </ul>	<p>Average score on Capacity Development Scorecard by end of project: 76</p> <ul style="list-style-type: none"> <li>1 additional institutional partner becomes involved in IAS management each year of the project</li> <li>Cost coefficients, based on IAS management activities carried out at selected project field sites, developed and guiding priority setting of NSIS goals / activities by end of project</li> </ul> <p>Goods and persons arriving at islands are subject to biosecurity inspections</p> <ul style="list-style-type: none"> <li>100%: Guadalupe, Socorro, Banco Chinchorro</li> <li>50%: San Benito, Espíritu Santo</li> <li>25%: Arrecife Alacranes</li> </ul> <p>Populations of selected high impact IAS at sites by end of project:</p>	<p>Scorecard applied at PPG, MTR and TE</p> <p>MoUs for participation in the NSIS</p> <p>Project report on cost coefficients</p> <p>Reports of inspection authorities</p>	<p>resources to the management of IAS that impact biodiversity National and international macroeconomic conditions remain stable.</p>

<sup>3</sup> Institutions / Organizations include: CONABIO, CONANP, CONAFOR, SENASICA, INAPESCA, SEMARNAT, INECC, IMTA, PROFEPA, as well as Universities, NGOs/CSOs, and Private Sector Associations

<sup>4</sup> Overall, 87% of the costs of these control and eradication activities will be paid for with co-financing, and the GEF funding of US\$312,500 represents only 5.84% of the overall GEF support for the project

	Indicator	Baseline	Target	Means of Verification	Risks and Assumptions
	<p>flora and fauna classified under NOM-059<sup>5</sup>, at 15 islands (6 island groups) totaling 46,420 hectares</p> <ul style="list-style-type: none"> <li>• 191 endemic species, and 983 species of flora and fauna classified under NOM-059, at 9 mainland protected areas totaling 4,240,349 hectares</li> </ul>	<p>Guadalupe, Isla Espiritu Santo, Isla Socorro and Banco Chinchorro - <u>Medium</u></p> <ul style="list-style-type: none"> <li>• Mice (<i>Peromyscus eremicus cedrosensi</i>) on San Benito Archipelago – <u>High</u></li> <li>• Feral goats (<i>Capra hircus</i>) on Isla Espiritu Santo - <u>Medium</u></li> <li>• Black rats (<i>Rattus rattus</i>) on Banco Chinchorro – <u>High</u></li> <li>• Vidrillo (<i>Mesembryanthemum crystallinum</i>) at El Vizcaíno Biosphere Reserve – <u>High</u></li> <li>• Pacific Oyster (<i>Crassostrea gigas</i>) at El Vizcaíno Biosphere Reserve - <u>Medium</u></li> <li>• Black rats (<i>Rattus rattus</i>) at the APFF Sierra de Álamos-Río Cuchujaqu – <u>High</u></li> <li>• Salt cedar (<i>Tamarix ramosissima</i>) at the APFF Sierra de Álamos-Río Cuchujaqu – <u>High</u></li> <li>• Giant Cane (<i>Arundo donax</i>) (90 hectares) and Chinese Privet (<i>Ligustrum lucidum</i>) (120 hectares) at the Cumbres de Monterrey National Park – <u>Medium</u></li> <li>• Feral dogs (<i>Canis lupus familiaris</i>) and feral cats (<i>Felis gatus</i>) at the Cañón del Sumidero National Park – <u>High</u></li> <li>• Lionfish (<i>Pterois volitans</i>) at the Sian Ka'an Biosphere Reserve - <u>Medium</u></li> </ul>	<ul style="list-style-type: none"> <li>• 0 on Isla Espiritu Santo and Banco Chinchorro; Low on Isla Guadalupe and Isla Socorro</li> <li>• 0</li> <li>• 0</li> <li>• 0</li> <li>• Medium</li> <li>• Low</li> <li>• Medium</li> <li>• Medium</li> <li>• Low</li> <li>• Low</li> <li>• Low</li> </ul>		
<b>Component 1: National IAS</b>	% of species being imported into Mexico for the first time that have a risk analyses (for potential impacts on biodiversity)	0%	100% of species are subject to risk analyses or at least rapid assessments for potential impacts on biodiversity	Risk analysis protocols and manuals	<u>Risks:</u> - State Authorities may not be willing

<sup>5</sup> NOM-059: Mexican Official Norm (SEMARNAT-2010, Environmental Protection; flora and fauna species native to Mexico; list of species at risk)

	Indicator	Baseline	Target	Means of Verification	Risks and Assumptions
<b>management framework</b>	<p>Effective biosecurity systems at productive sector facilities, including: nurseries, breeding ponds / farms, distribution centers, UMAs and PIMVS<sup>6</sup></p> <p>Regulations under existing legislation to strengthen management authority over IAS that impact biodiversity (laws / regulations that might need to be revised / strengthened include):</p> <ul style="list-style-type: none"> <li>• Ley General de Vida Silvestre</li> <li>• El Sistema Nacional de Sanidad, Inocuidad y Calidad Agropecuaria y Alimentaria (SINASICA)</li> <li>• Ley Federal de Derechos (LFD)</li> <li>• Leyes y reglamentos sobre vida silvestre, lo forestal y acuícola</li> <li>• Ley Orgánica de la Administración Pública Federal (LOAPF)</li> </ul> <p>% of inspectors at points of entry or other inspection sites within Mexico are trained in use of the National List of Invasive Species or in protocols to prevent the introduction/spread of IAS that impact BD</p> <p>Early Detection and Rapid Response (EDRR) systems for IAS that impact biodiversity</p>	<p>Productive sector companies and associations lack knowledge, experience and capacities for applying biosecurity protocols or technologies for IAS that impact biodiversity</p> <p>Laws and regulations for wildlife, forestry and fisheries are insufficient for prevention, early detection, rapid response, and control and eradication of IAS that impact biodiversity</p> <p>0%</p> <p>No EDRR systems exist in Mexico for IAS that impact biodiversity</p>	<p>10 productive sector facilities that deal in IAS with potential impacts on biodiversity applying Hazard Analysis and Critical Control Points (HACCP) systems and/or implementing improved IAS management technologies by the end of the project</p> <p>Regulations for management of IAS that impact biodiversity in wildlife, forestry and fisheries are drafted by the end of the project</p> <p>&gt; 90%</p> <p>EDRR systems have been developed and implemented nationally for at least 2 invasive species (e.g. <i>Cactoblastics cactorum</i> and <i>Dreissena polymorpha</i>) by the end of the project</p>	<p>HACCP reports, closed circuit technologies implemented</p> <p>Draft laws, regulations, and other legal instruments</p> <p>Training reports; statistics on # of inspections carried out</p> <p>Official reports of EDRR systems</p>	<p>to implement robust IAS management controls for productive sectors</p> <p>- Standards, codes of conduct and certification systems for productive sectors may not be ready for implementation by the end of the project</p> <p><u>Assumptions:</u></p> <p>- Institutional willingness to share information and adopt harmonized protocols on IAS</p> <p>- Productive sector players understand the role of IAS management in ensuring long-term viability of their operations</p> <p>- Political will exists to approve and implement strengthened IAS</p>

<sup>6</sup> UMA (Unidades de Manejo Ambiental) are government authorized centers to support natural resources related production; PIMVS (Predios o Instalaciones que Manejan Vida Silvestre) are facilities wildlife species are bred and managed in a controlled system outside of their natural habitat

	Indicator	Baseline	Target	Means of Verification	Risks and Assumptions
					laws and/or regulations  - Institutional willingness to integrate IAS management priorities into existing plans and functions
<b>Component 2: Integrated IAS management to protect vulnerable globally significant ecosystems</b>	<p>Financing for control and prevention activities</p> <p>Sustained control of feral cats (Guadalupe and Socorro)</p> <p>Removal of IAS from selected island sites</p>	<p>USD 0.8 million per year for activities related to IAS management at 6 selected island sites</p> <p>Feral cat populations on two islands having severe negative impact on native species through predation</p> <p>A total of 15 populations of invasive mammals (i.e. rodents, cats and ungulates) have already been removed from the selected island sites between 1998-2012</p>	<p>Average 25% increase of budget for IAS control and prevention in selected island sites by the end of the project</p> <p>Sustained control of feral cats (Guadalupe and Socorro) by end of project</p> <ul style="list-style-type: none"> <li>• End of year 1: Eradication of feral cats (Espiritu Santo); mice (San Benito Oeste); and 5 species of exotic vascular plants (Arrecife Alacranes)</li> <li>• End of year 2: Eradication of black rats and feral cats on Banco Chinchorro (Cayo Centro)</li> <li>• End of year 3: Eradication of feral goats on Isla Espiritu Santo</li> <li>• End of Project: Post-eradication monitoring completed for 9 IAS (eradicated in years 1-2)</li> </ul>	Detailed budget analysis using common methodologies across all sites will be done at beginning, midterm and end of project	<p><u>Risks:</u></p> <p>- Deterioration of security conditions could prevent implementation of field activities at some mainland PA sites</p> <p><u>Assumptions:</u></p> <p>- Acceptance among local stakeholders at island sites of IAS management restrictions</p> <p>- Willingness within CONANP to increase funding / resources for management of IAS that impact biodiversity</p> <p>- Acceptance among local stakeholders at</p>
	<p>Early Detection and Rapid Response (EDDR) systems to prevent the establishment and spread of specific high priority IAS applied at selected mainland PA sites:</p> <ul style="list-style-type: none"> <li>• Monk Parakeet (<i>Myiopsitta monachus</i>) at Vizcaino</li> <li>• Mozambique Tilapia (<i>Oreochromis</i></li> </ul>	<p>0 mainland PAs have systems for EDRR (baseline populations to be determined during year 1 of project)</p> <ul style="list-style-type: none"> <li>• Outcompetes native bird species for food sources</li> <li>• Outcompetes native fish species;</li> </ul>	<p>4 mainland PAs with operating participatory EDRR systems sites by end of the project, with the following results:</p> <ul style="list-style-type: none"> <li>• 80% reduction in successful escapes of monk parakeet</li> </ul>	Logs of documented EDRR activities	

	Indicator	Baseline	Target	Means of Verification	Risks and Assumptions
	<p><i>mossambicus</i>) at Tutuaca</p> <ul style="list-style-type: none"> <li>Feral cat, feral dogs, and the devil fish (<i>Loriicaridae fam.</i>) at Cañón del Sumidero</li> <li>Giant cane (<i>Arundo donax</i>), vine (<i>Cassytha filiformis</i>) and palm weevil (<i>Rhynchophorus palmarum</i>) at Sian Ka'an</li> </ul> <p>Best practices for IAS management among productive sector partners at 6 mainland PA sites reduce IAS populations as follows:</p> <ul style="list-style-type: none"> <li>Planting of buffel grass (<i>Cenchrus ciliaris</i>) and pinkgrass (<i>Melinis repens</i>) at Tutaca and pink grass (<i>Melinis repens</i>) at Sierra de Álamos</li> <li>Planting of exotic tree species such as cedro blanco (<i>Cupressus lindleyi</i>), eucalyptus (<i>Eucalyptus camaldulensis</i>) and casuarina (<i>Casuarina equisetifolia</i>) at Vallee de Bravo</li> <li>Extensive cattle ranching within PA boundaries at Marismas Nacionales and Sian Ka'an</li> <li>Aquaculture utilizing exotic trout (<i>Oncorhynchus mykiss</i>) at Tutuaca; exotic carp and trout at Vallee de Bravo; various exotic species at Cañón del Sumidero; and Mozambique Tilapia (<i>Oreochromis mossambicus</i>) at Sian Ka'an</li> </ul>	<p>changes aquatic environment</p> <ul style="list-style-type: none"> <li>Feral cats and dogs prey on native species and transmit diseases; devil fish competes with native fish species and transmits diseases</li> <li>Giant cane disrupts aquatic systems; vine kills native vegetation; weevil kills palms</li> </ul> <p>Current production sector practices result in the following IAS impacts:</p> <ul style="list-style-type: none"> <li>Exotic grasses displace native grassland species and increase the incidence and severity of fires within the PA</li> <li>Exotic tree species reduce habitat for native species and change hydrological conditions</li> <li>Destruction of mangrove seedlings by foraging cattle; pollution caused by livestock waste; negative impacts on re-vegetation</li> <li>Exotic fish species outcompete native fish species and produce changes in the aquatic environment</li> </ul>	<ul style="list-style-type: none"> <li>No increase in # of water bodies with presence of tilapia</li> <li>Reduced rate of spread of feral cats and dogs into PA; no increase in # of water bodies with devil fish</li> <li>No increase in area impacted by giant cane or vine; no increase in # of palms impacted by weevil</li> </ul> <p>Best practices instituted at 6 mainland PA sites by the end of project, with the following results:</p> <ul style="list-style-type: none"> <li>No more planting of buffel grass and pinkgrass</li> <li>Planting of exotic tree species ended, and replaced with native tree species</li> <li>Cattle ranching restricted in scope (e.g. no access to priority conservation areas such as mangroves)</li> <li>Replacement of exotic aquaculture species with native species; enhanced biosecurity systems for remaining exotic aquaculture operations</li> </ul>	<p>Annual reports of PA Advisory Councils and project monitoring reports</p>	<p>mainland PA sites of IAS management restrictions</p> <ul style="list-style-type: none"> <li>Local actors understand the role of IAS management in reducing social vulnerability.</li> <li>Productive sector players understand the role of IAS management in ensuring long-term viability of their operations</li> </ul>

## **PART II: Incremental Reasoning and Cost Analysis**

### **EXPECTED GLOBAL, NATIONAL AND LOCAL BENEFITS**

#### **Global Benefits**

Mexico represents an important global reservoir of biodiversity and its ecosystems provide a broad variety of goods and service to the global community (a large number of agricultural varieties have their origins in Mexico). Mexico is one of 12 mega-diverse countries in the world, with high percentages of endemic species, ecosystem diversity, and genetic variability in many taxonomic groups. The proportion of species endemic to Mexico is outstandingly high: 57% of flora, 11% of birds, 30% of mammals, 48% of amphibians and 45% of reptiles. Mexico boasts high marine biodiversity and productivity; there are 1,616 coastal marine fish species, and levels of endemism are estimated at 20% for the Gulf of California and 15% for the Caribbean, Gulf of Tehuantepec and the north of the Gulf of Mexico. In global terms, Mexico has the 2<sup>nd</sup> highest number of reptile species (804), 3<sup>rd</sup> highest number of mammals (535), 5<sup>th</sup> highest number of amphibians (361) and vascular plants (22,232), and the 8<sup>th</sup> highest number of birds (1,096) (Llorente-Bousquets y Ocegueda Cruz 2008). Mexico is also notable for its high level of species endemism, with approximately 10,000 endemic species identified in the country (Llorente-Bousquets y Ocegueda Cruz 2008). Mexico is an important center of domestication and diversification of many crops, some of them of global importance (see Environmental Context for a list of some of the most important species); it is estimated that over 15% of plant species consumed worldwide as food have their origins in Mexico. Cultivated species in Mexico have many wild relatives that can, or already do, amplify the high genetic diversity of cultivars of many species consumed worldwide, and therefore these species represent a resource of great importance in terms of global food security. By reducing the introduction and spread of IAS into and within Mexico through improved regulatory and institutional frameworks and capacities for IAS management, including working with stakeholders involved in the production and trade of exotic and potentially invasive species, the project will make a major contribution towards safeguarding globally important biodiversity.

Furthermore, by establishing IAS management systems for high priority conservation areas (Islands and mainland Protected Areas), including promoting integrated IAS management in landscapes surrounding mainland PAs in order to reduce threats from surrounding productive landscapes, the project will help to sustain the health and functioning of natural ecosystems that harbour globally significant biodiversity. Mexico's 2,500 islands (i.e. islands, cays and reefs) contribute significantly to the biological richness of the country. Together, these islands cover an area of 5,127 km<sup>2</sup> (Comité Asesor Nacional sobre el Territorio Insular Mexicano 2012). Although this is only a small fraction of Mexico's national territory of 1,959,248 km<sup>2</sup>, the islands harbor 8.3% of all the vascular plants and terrestrial vertebrates in the country. In addition, the islands are habitat for more than 350 endemic species and sub-species, representing 3.7% of the total number of endemic terrestrial vascular plants and vertebrates in the country. Mexico's islands are also considered the 3<sup>rd</sup> most important site globally for seabird diversity and endemism, and provide important reproduction sites for turtles, birds and marine mammals. The mainland Protected Area sites targeted by this project, which are found in 9 separate regions of Mexico and range from coastal-marine regions to desert, mountain, humid and dry forest regions, also harbour a great variety of ecosystems and high levels of biodiversity and endemism. Among the many ecosystems encompassed by these sites are: desert scrub, savannah, chaparral, submontane scrub, grasslands, microphyll forest, deciduous forest, pine-oak forest, thorn scrub and evergreen riparian vegetation, conifer-hardwood forest, pine-oak forest, gallery forest, deciduous scrub oak forest, cloud forest, high evergreen forest, medium evergreen forest, low evergreen flooded forest, coastal dunes, rocky reefs, wetlands, estuaries and coastal lagoons, mangroves (10-20% of the total in Mexico), shallow ocean areas and coral reefs. Among the 9 sites, there are over 900 species of flora and fauna classified under NOM-

059 (Official Mexican Norm for native flora and fauna at risk), including 211 endemic species. Over 600 of these species are also listed on the IUCN Red List of Threatened and Endangered Species. In addition to conserving globally significant biodiversity at these sites, the project's objective of reducing the impact of invasive species on ecosystems (e.g. preventing forest degradation and allowing natural reforestation to take place) will improve the resilience of these ecosystems with regard to climate change and add to global CO<sub>2</sub> sequestration capacity.

### **National & Local Benefits**

Mexican society depends heavily on the production of natural systems (20% of the population relies on subsistence production based on natural resources), many of which are threatened by the impacts of invasive alien species. Although studies of the economic and social impacts of IAS in Mexico are quite limited (the proposed project will carry out studies for selected high priority IAS), those analyses that have been carried out indicate the extent to which IAS can impact human wellbeing and health, and therefore the degree to which strengthened IAS management can provide significant national and local benefits. For example, aquatic ecosystems, though modest in size, are crucial for much of the economic activity of marginalized populations, and yet highly impacted by IAS; one study concluded that invasive catfish had supplanted native fish species that were the main source of income for 12,877 persons in the state of Tabasco (another 51,548 persons depended to some degree directly or indirectly on income from these native fish species). Invasive aquatic plant species, such as the Common water hyacinth (*Eichhornia crassipes*), hydrilla (*Hydrilla verticillata*), salvinia (*Salvinia spp*), saltcedar (*Tamarix ramosissima*) and giant reed (*Arundo donax*) have a significant negative impact on water supply and contribute to premature accumulation of sediments in reservoirs, restrictions on fishing and recreational activities, obstruction of water canals and water inlets in hydroelectric installations, and reduced efficiency of hydraulic installations. Aquatic weeds also have a direct effect on health by providing suitable habitat for the development of organisms that are vectors for serious and even mortal diseases such as dengue fever, helminthiasis, philiarasis, encephalitis, malaria and yellow fever, among others. The cactus moth poses a serious threat to *Opuntia* cacti, which are the main source of income for 25,000 Mexican households (in 2009, approximately 83,000 hectares were cultivated with *Opuntia*, producing revenues of US\$170 million). Mexico's ocean territories are biologically productive waters of high economic and social value, particularly for local fishermen. The invasive lionfish, however, poses a serious threat to coral reef ecosystems and fisheries in the Gulf of Mexico and Caribbean. Many islands and PAs have the potential to generate tourism revenues that can benefit conservation and local communities, but the attraction of tourists to these sites can be greatly diminished by IAS impacts. For example, the black palm weevil (*Rhynchophorus palmarum*) and red palm mite (*Raoiella indica*) attack coconut and other palms at the Sian Ka'an Biosphere Reserve; these palm species are important for the tourism market as well as for construction. At the Cañón del Sumidero National Park, packs of feral dogs residing within the park pose a threat to visitors to the PA as well as the residents of local communities, and there have been outbreaks of rabies in urban areas bordering the PA. IAS also impact human health by contributing to the spread of new diseases and parasites, as well as increasing exposure to higher and more frequent doses of pesticides and other chemicals that are needed to eradicate and control invasive species. By safeguarding biological diversity and ecosystems and their services from these and other IAS threats, the project will add considerably to local and national economic benefits.



## INCREMENTAL COSTS MATRIX

Benefits	Baseline (B)	Alternative (A)	Increment (A-B)
<b>Global benefits</b>	<p>Under the <b>business-as-usual scenario</b>, priority actions identified in the NSIS would likely remain unfulfilled, as gaps in institutional authority and coordination, and limited resources, would make implementation highly difficult. Institutional will, mechanisms and resources to effectively engage with productive sectors that are key IAS pathways would remain weak, and most IAS management would remain focused solely on protecting economic resources with little regard for biodiversity conservation.</p> <p>Understanding of the potential impacts of climate change on IAS dispersion will be absent, preventing decision makers from making effective long-term decisions on IAS prevention and control. In the islands, IAS management would continue on a case-by-case basis, without a setting of priorities or a systematic approach, and without consistent cooperation among stakeholders or mechanisms for sharing information nationally or internationally. Mainland Protected Areas would continue to lack technical expertise or models for IAS management. In the absence of this project, globally significant biodiversity in Mexico, including native / endemic species and natural ecosystems at vulnerable island and mainland PA sites, will continue to be</p>	<p>The project, which counts on financing from the GEF, government institutions (CONABIO, CONANP, PROFEPA, SEMARNAT, CONAFOR, INECC, IMTA, INAPESCA, CESAEM), NGOs (GECI, FCEA), Universities (UAM, UANL, UNAM) and UNDP will remove key barriers for the strengthening of the management of IAS that impact biodiversity at entry and distribution points as well as high priority conservation areas (islands, mainland PAs) within Mexico. The GEF project will replace the baseline piecemeal approach with a coordinated and effective IAS management framework for the country. As a complement to national baseline investments in IAS policy and legal development, inspection and quarantine functions, and site-level eradications, the GoM is seeking GEF support to develop improved IAS management systems that protect Mexico's globally significant biodiversity. In line with the GEF focal area strategy for IAS, the project will implement a systemic approach to IAS management while also addressing IAS in the aquarium trade, aquaculture, forest and wildlife products sectors and in targeted areas of high biodiversity value and significant IAS threat. Project activities will be oriented towards maximizing limited national resources to address the most important elements of the threat posed by IAS. As such, the project will place special emphasis on early detection and prevention systems, as well as the use of risk analyses to identify IAS with the most potential environmental and economic impact on Mexico, in order to establish clearly agreed priorities for IAS management interventions. This project represents critical support at a crucial time as Mexico endeavors to implement the new National Strategy on Invasive Species (NSIS), both for the resources and expertise it</p>	<p>The GEF increment will strengthen IAS management at entry and distribution points, and high priority conservation areas, throughout Mexico. This will produce benefits for globally significant species and ecosystems nationally, including: coastal and marine fish species (1,616), reptiles (804), mammals (535), amphibians (361), birds (1,096) and vascular plants (22,232), many of which are among the approximately 10,000 endemic species identified in the country. Mexico also harbours numerous crop cultivars that represent a resource of great importance in terms of global food security. At the site level, the GEF increment will help to conserve important biodiversity at mainland Protected Areas, including over 900 species of flora and fauna classified under NOM-059, including 211 endemic species. Over 600 of these species are also listed on the IUCN Red List of Threatened and Endangered Species. The project also will help to prevent forest degradation and allow natural reforestation to take place, thereby adding to global CO<sub>2</sub> sequestration capacity. At the island sites, the project will help to protect 350 endemic species and sub-species, representing 3.7% of the total number of endemic terrestrial vascular plants and vertebrates in the country. The project also will produce global benefits by helping Mexico to implement the National Biodiversity Strategy of Mexico and its different action plans, thereby fulfilling its obligations as a Party to the Convention on Biological Diversity, and by strengthening the national contribution to the global Aichi Targets, specifically Target 4 on sustainable production, Target 6 on marine and aquatic species, Target 7 on agriculture, aquaculture and forestry, Target 9 on invasive alien species, and Target 19 on</p>

Benefits	Baseline (B)	Alternative (A)	Increment (A-B)
	threatened by the introduction, establishment and spread of IAS.	will provide and for its catalytic effect in bringing other resources and increased attention to the issue of IAS.	knowledge, the science base and technologies relating to biodiversity.
<b>National and local benefits</b>	Under the ‘business-as-usual’ scenario, efforts to guide development of targeted production sectors (aquaculture, aquarium trade, forest and wildlife products) in the prevention, inspection, quarantine and response to IAS introduction and spread will be stymied by a lack of clear regulatory authority, insufficient technical tools and processes, poor understanding of the economic impacts of specific IAS and the costs for different IAS management options, and lack of partnerships between regulatory authorities and business associations and companies. As a result, the focus of governmental and private stakeholders will stay on short-term economic benefits, and import, production and distribution of IAS in these sectors will proceed without weighing the costs and benefits of various activities. In this scenario, economic development will frequently be unsustainable and incur significant opportunity costs for Mexico by damaging / destroying natural ecosystem functions and values. Over time, this will represent a loss to both the national economy and to local stakeholders.	The project will engage a variety of stakeholders in processes to plan for and implement IAS management. These stakeholders will include associations, companies and individual producers in the aquarium trade, aquaculture, forest and wildlife products sectors, including importers, traders, producers, and distributors, who will be engaged in developing improved prevention and control measures for IAS relevant to their productive activities. Other relevant stakeholders will be managers of operations in these sectors, as well as agriculture and livestock producers and other local residents at selected mainland PA sites, who will be provided with training and information on strategies (biosecurity measures; replacement of exotic species with native species) for improved IAS management in their operations and practices, as well as guidance on new regulations and restrictions relevant to their activities. Stakeholders at Island sites, including local residents as well as fishermen and tourism operators, will be integral to the development and implementation of Island Biosecurity Plans, as well as the implementation of various IAS control, eradication and monitoring programs. In all of these national and local level activities, relevant stakeholders will have the opportunity to participate in IAS planning, priority setting and management, so that IAS management actions balance the needs of these groups and the biodiversity conservation and ecosystem functioning objectives of the project.	The project is expected to yield national and local benefits by supporting the more effective IAS management of the aquarium trade, aquaculture, forest and wildlife products sectors, as well as strengthening IAS management for specific productive sector operations in and around high priority conservation areas (islands and mainland PAs), all of which are responsible for various pathways and processes that contribute to the introduction and spread of IAS into Mexico. By reducing the impact of these sectors, through improved biosecurity processes, strengthened regulations, substitution of exotic species with native species, etc., the project will reduce or eliminate IAS impacts that affect the social and economic well being of Mexico’s citizens. For example, aquatic ecosystems are highly impacted by IAS; invasive catfish have supplanted native fish species on which local communities depend; and invasive aquatic plant species have a negative impact on water supply, contribute to premature accumulation of sediments in reservoirs and obstruction of water canals and water inlets in hydroelectric installations, etc., while also providing suitable habitat for disease vectors such as dengue fever, helminthiasis, philliarasis, encephalitis, malaria and yellow fever. Other IAS, such as the cactus moth and the lionfish, pose a direct threat to the livelihoods of numerous farmers and fishermen respectively. By safeguarding biological diversity and ecosystems and their services from these and other IAS threats, the project will add considerably to local and national economic benefits.

## SECTION III: Total Budget and Workplan

<b>Atlas Award ID and Project ID:</b>	Atlas Award ID: 00062484 Project ID: 00079980	<b>Project Title:</b>	Enhancing National Capacities to manage Invasive Alien Species (IAS) by implementing the National Strategy on IAS
<b>PIMS N°:</b>	4714	<b>Implementing Partner (NIM agency)</b>	CONABIO
<b>Business Unit</b>	MEX10		

Project Outcome / Component	Impl. Agent	Fund ID	Donor Name	ATLAS Budget Code	Atlas Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	TOTAL	Notes
<b>1) National IAS Management Framework</b>	NIM	62000	GEF	71200	International Consultants	0	49,100	49,100	19,601	117,801	1
	NIM	62000	GEF	71300	Local Consultants	50,000	85,000	80,000	39,832	254,832	2
	NIM	62000	GEF	71400	Contractual Services - Individ	21,150	21,150	21,150	21,150	84,600	3
	NIM	62000	GEF	71600	Travel	35,000	45,000	30,000	14,666	124,666	4
	NIM	62000	GEF	72100	Contractual Services-Companies	250,000	400,000	400,000	167,500	1,217,500	5
	NIM	62000	GEF	72200	Equipment and Furniture	20,000	27,666	0	0	47,666	6
	NIM	62000	GEF	72300	Materials & Goods	25,000	31,580	0	0	56,580	7
	NIM	62000	GEF	72800	Information Technology Equipmt	8,333	0	0	0	8,333	8
	NIM	62000	GEF	73400	Rental & Maint. Of Other Equip.	10,793	10,793	0	0	21,586	9
	NIM	62000	GEF	74200	Audio Visual&Print Prod Costs	0	4,166	0	0	4,166	10
NIM	62000	GEF	75700	Training	145,000	300,000	300,000	90,831	835,831	11	
<b>TOTAL COMPONENT 1 GEF</b>						<b>565,276</b>	<b>974,455</b>	<b>880,250</b>	<b>353,580</b>	<b>2,773,561</b>	
<b>2) Integrated IAS management to protect vulnerable globally significant ecosystems</b>	NIM	62000	GEF	71300	Local Consultants	75,000	125,000	75,000	38,333	313,333	12
	NIM	62000	GEF	71400	Contractual Services - Individ	21,150	21,150	21,150	21,150	84,600	13
	NIM	62000	GEF	71600	Travel	25,000	25,000	25,000	10,000	85,000	14
	NIM	62000	GEF	72100	Contractual Services-Companies	288,540	275,940	275,940	260,440	1,100,860	15
	NIM	62000	GEF	72200	Equipment and Furniture	80,000	90,000	40,000	20,000	230,000	16
	NIM	62000	GEF	72300	Materials & Goods	50,000	90,000	60,000	21,017	221,017	17
	NIM	62000	GEF	72800	Information Technology Equipmt	10,000	15,000	0	0	25,000	18
	NIM	62000	GEF	73400	Rental & Maint. Of Other Equip.	10,000	12,500	12,500	0	35,000	19
	NIM	62000	GEF	74200	Audio Visual&Print Prod Costs	10,000	15,000	15,000	5,375	45,375	20
	NIM	62000	GEF	75700	Training	35,000	60,000	60,000	30,834	185,834	21
<b>TOTAL COMPONENT 2 GEF</b>						<b>604,690</b>	<b>729,590</b>	<b>584,590</b>	<b>407,149</b>	<b>2,326,019</b>	
<b>3) Project</b>	NIM	62000	GEF	71200	International Consultants	0	24,000	0	32,000	56,000	22

<b>Management</b>	NIM	62000	GEF	71400	Contractual Services - Individ	34,700	34,700	34,700	34,700	138,800	23
	NIM	62000	GEF	74100	Professional Services	3,000	3,000	3,000	3,000	12,000	24
	NIM	62000	GEF	74500	Miscellaneous Expenses	8,363	0	0	0	8,363	25
	NIM	62000	GEF	74599	Direct Project Costs	9,950	9,950	9,950	9,952	39,802	26
<b>TOTAL PROJECT MANAGEMENT GEF</b>						<b>56,013</b>	<b>71,650</b>	<b>47,650</b>	<b>79,652</b>	<b>254,965</b>	
<b>TOTAL PROJECT</b>						<b>1,225,979</b>	<b>1,775,695</b>	<b>1,512,490</b>	<b>840,381</b>	<b>5,354,545</b>	

## Budget Notes

#	Budget Note Details
1	Capacity building and oversight of Mexican academic, government and NGO experts in economic modeling of costs of high-impact IAS to the Mexican economy (59,000); Training to implement national-level EDRR protocols (58,801)
2	Risk assessments for high priority invasive alien species (10 species per year X 4 yr.) (120,000); economic expert to analyze inputs various project partners on IAS management costs and thereby develop cost coefficients (6,000); mapping of Invasive Flora (Queretaro State) (10,000); characterize aquaculture production systems and their potential to disperse IAS (4,166); develop technical proposal to minimize the risk of IAS dispersion between aquaculture producers (16,666); Training to implement national-level EDRR protocols (60,000); adaptation of EDRR maps for pilot sites (6,500); study on market based instruments for funding of IAS management (10,000)
3	45% time of Project Coordinator and Assistant to Project Coordinator to guide activities and provide technical inputs for strengthening of IAS management at national level (84,600)
4	Travel and per diem costs for staff of IMTA to carry out mapping of aquatic invasive plants to feed into the National Invasive Alien Species Information System (NIASIS) (41,666); mapping of Invasive Flora (Queretaro State) (32,500); meeting and travel costs to mount IAS exhibitions at the Jardín Botánico de Queretaro (8,000); travel costs to develop harmonized training tools for IAS management (2,500); travel costs for Project Coordinator and Assistant to Project Coordinator to guide activities and provide technical inputs for strengthening of IAS management at national level (40,000)
5	Contractor to establish and maintain an information management system to monitor the achievement of objectives in the National Strategy on Invasive Species (NSIS) (155,000); contractor to carry out Pilot Project for Mapping of Invasive Flora (Queretaro State) (45,000); contractor to validate existing models of actual and potential IAS distribution (30,000); contractor to work with CONAFOR to develop materials and provide training for teams integrating IAS into forest health indicators in the INFyS (83,333); contractor to work with CONAFOR to carry out risk analyses for 4 high priority invasive alien forest pests (4 risk analyses at 41,667 each = 166,667); contractor to work with CONAFOR to monitor national entry points (warehouses) to prevent the introduction of exotic forest pests (US\$166,667); contractor to work with CONAFOR to design and test different approaches for using fire to control IAS pests and plants (166,667); contractor to work with CONAFOR to study best practices for soil restoration and reforestation with native species as a tool to limit the establishment of invasives (250,000); contractor to characterize aquaculture production systems and their potential to disperse IAS (12,500); contractor to develop public awareness and outreach programme on the risks associated with IAS in aquaculture (16,666); contractor to provide training on design and construction of recirculation systems for low-cost production of ornamental and food fish (125,000)
6	Equipment for material collection and shipment of samples to the National Forest Reference Laboratory (6,000); biosecurity equipment at aquaculture production sites (41,666)
7	Satellite images and maps to enable IMTA to integrate and analyze hydrological information related to aquatic invasive plants to feed into the NIASIS (31,666); materials to implement training and oversee creation of economic modeling of costs of high-impact IAS to the Mexican economy (8,000); materials to inspect Christmas Trees imports (6,914); materials for training of border personnel on biological control of invasive aquatic plants (10,000)
8	Computer equipment and software for GIS information system for aquaculture production sites (8,333)
9	Rental of microscopes with integrated cameras; purchase of kits to process phytosanitary samples and for handling of wildlife species; etc. for inspection of forest and wildlife products (21,586)
10	Production of a CD with information on aquatic invasive plants for border personal (4,166)

11	Capacity building of PROFEPA inspectors (Dept. of Airports, Ports and Borders Posts) in the identification and management of IAS that impact BD, especially forest pests and wildlife (355,000); capacity building of PROFEPA inspectors (Dept. of Forests and Wildlife) to identify potential IAS, in particular forest pests (355,000); workshops to promote proposals with aquaculture producers (4,166); training courses for aquaculture producers, retailer and importers (4,166); capacity building on IAS management for technicians and professionals responsible for advising producers in the aquaculture sector (29,166); training on response procedures to invasive species alerts for key agencies (e.g. INAPESCA) (8,333); Training to implement national-level EDRR protocols, and information sharing among agencies regarding detections of IAS with impacts on biodiversity (80,000)
12	Assessment of high risk IAS and pathways at 3 mainland PA sites (58,333); development of IAS Prevention, Detection and Management Plan (strengthen existing plans at 5 sites and create plans at 4 sites) (50,000); advise on productive sector IAS management actions at 6 mainland PA sites (60,000); advise on IAS Monitoring Programs for specific high risk IAS at 4 sites (20,000); advise on IAS Control Programs for specific IAS at 6 mainland PA sites (100,000); advise on IAS eradication plan at 1 mainland PA site (25,000)
13	45% time of Project Coordinator and Assistant to Project Coordinator to guide activities and provide technical inputs for strengthening of IAS management at national level (84,600)
14	Travel costs for productive sector management consultants at mainland PA sites (20,000); travel costs for IAS monitoring programs at mainland PA sites (5,000); travel costs for IAS control programs at mainland PA sites (20,000); travel costs for Project Coordinator and Assistant to Project Coordinator to guide activities and provide technical inputs for strengthening of IAS management at mainland PA and island sites (40,000)
15	Contract with GECI (NGO) to implement all project activities under Output 2.1 at 6 island sites (1,100,860)
16	Equipment for IAS management activities focused on production sectors in and around mainland PA sites (85,000); equipment for community monitoring brigades and bird monitoring network at mainland PA site (20,000); equipment for Early Detection and Rapid Response (EDRR) systems at 4 mainland PA sites (25,000); equipment for IAS monitoring activities at 4 mainland PA sites (20,000); equipment for IAS control activities at 6 mainland PA sites (80,000)
17	Materials for productive sector IAS management actions at 6 mainland PA sites (45,000); materials for education and awareness activities at all 9 mainland PA sites (35,000); materials for Early Detection and Rapid Response (EDRR) systems at 4 mainland PA sites (30,000); materials for IAS monitoring activities at 4 mainland PA sites (27,917); materials for IAS control activities at 6 mainland PA sites (83,100)
18	Information technology equipment to support education and awareness activities at all 9 mainland PA sites (25,000)
19	Equipment for implementation of biosecurity and other IAS management measures with productive sector partners at 6 mainland PA sites (35,000)
20	Media equipment, materials and programs for education and awareness on IAS issues at all 9 mainland PA sites (45,375)
21	Training of PA staff and local stakeholders on site-level IAS Management Committees at all 9 mainland PA sites in planning, priority setting, budgeting and other issues related to IAS Management (119,167); training of local productive sector operators in biosecurity practices, replacement of exotic species with native species, etc. at 6 mainland PA sites (16,667); training of participants in community monitoring brigades and bird monitoring networks (13,333); training of PA staff and local partners at 4 mainland PA sites in EDRR systems (36,667)
22	International Consultants for Mid-Term Review (24,000) and Terminal Evaluation (32,000)
23	Salary for Project Administrator/Accountant (120,000); 10% of salaries (for general project management related tasks) of Project Coordinator and Assistant to Project Coordinator (18,800)
24	Financial audits (3,000/year for 4 years = 12,000)
25	Inception workshop costs (meeting facilities; preparation materials; travel and per diem) (8,363)
26	Estimated UNDP Direct Project Service/Cost recovery charges to UNDP for executing services. In accordance with GEF Council requirements, the costs of these services will be part of the executing entity's Project Management Cost allocation identified in the project budget. DPS costs would be charged at the end of each year based on the UNDP Universal Price List (UPL) or the actual corresponding service cost. The amounts here are estimations based on the services indicated, however as part of annual project operational planning the DPS to be requested during the calendar year would be defined and the amount included in the yearly project management budgets and would be charged based on actual services provided at the end of that year.

### Summary of Funds by Funding Source and Project Outcome

Source of Funds	Outcome 1	Outcome 2	Project Mngmt.	Total
Global Environment Facility	\$2,773,561	\$2,326,019	\$254,965	\$5,354,545
CONABIO	\$4,029,221	\$-	\$1,244,400	\$5,273,621
CONANP	\$-	\$2,419,075	\$-	\$2,419,075
PROFEPA	\$2,000,000	\$-	\$-	\$2,000,000
SEMARNAT	\$297,611	\$-	\$-	\$297,611
CONAFOR	\$10,000,000	\$-	\$-	\$10,000,000
INECC	\$147,000	\$-	\$-	\$147,000
IMTA	\$1,295,453	\$-	\$-	\$1,295,453
INAPESCA	\$833,333	\$-	\$-	\$833,333
CESAEM	\$83,000	\$-	\$-	\$83,000
GECI	\$-	\$2,775,000	\$-	\$2,775,000
UAM	\$151,667	\$-	\$-	\$151,667
UANL	\$3,000	\$-	\$-	\$3,000
UNAM	\$180,000	\$-	\$-	\$180,000
FCEA	\$75,000	\$-	\$-	\$75,000
UNDP	\$600,000	\$-	\$-	\$600,000
<b>Total</b>	<b>\$22,468,846</b>	<b>\$7,520,094</b>	<b>\$1,499,365</b>	<b>\$31,488,305</b>

## SECTION IV: Additional Information

### PART I: Letters of co-financing commitment

See separate file for letters

### PART II: Stakeholder Involvement Plan and Coordination with other Related Initiatives

#### *1. Information dissemination, consultation, and similar activities that took place during the PPG*

Project design was a highly participatory process, in line with UNDP's and GEF's requirements. During the project preparation stage, numerous meetings were held with stakeholders in order to assess their interests in the project and define their roles and responsibilities in project implementation (see the Stakeholder Analysis in Section I, Part I for a description of the primary stakeholders and their expected participation in / collaboration with the project). The thematic consultancies commissioned during the PPG were specifically designed to solicit stakeholder input from an array of sources regarding experience with IAS management, while seeking to propose innovative ways to remove barriers to strengthening IAS management at the national and site levels. Two workshops were held at the national level to present the primary activities of the project and to solicit stakeholder inputs and validation of the project design. For the mainland PA sites, multi-day meetings were held with stakeholders at 8 of the 9 sites (the 9<sup>th</sup> site was cancelled due to logistical problems) to present the project strategy, to assess current efforts and programs for IAS management, and to solicit input from local stakeholders on priority issues related to IAS management. Participants at these meetings included PA managers and technical staff, other federal and local government officials, CSOs, producer associations, and local residents. A similar process was undertaken for the 6 island sites, where GEI has long-standing ties to the relevant local stakeholders (fishermen, Naval personnel, CONANP staff, and local residents) and worked with them to design the proposed suite of project activities at each site.

#### *2. Stakeholder involvement plan*

The project will be implemented with the participation of a wide variety of formal and informal partners. The roles of the most important of these partners are described in the Stakeholder Analysis (Section I, Part I of the UNDP Prodoc). The project's design incorporates activities and mechanisms to ensure on-going and effective participation by these and other partners in the implementation of the project:

- Project inception workshop to enable stakeholder awareness of the start of project implementation: The project will be launched by a multi-stakeholder workshop, which will provide an opportunity to share updated information on the project with relevant stakeholders. The workshop will also be used to finalize selection of the Project Steering Committee (PSC); to review and make any necessary revisions to the project work plan and budget; and to establish linkages between the staff of the Project Coordinating Unit (PCU) and counterparts in relevant ministries and organizations.
- Project Steering Committee to ensure representation of stakeholder interests in project: A Project Steering Committee (PSC) will be constituted to ensure broad representation of all key interests throughout the project's implementation. The representation, and broad terms of reference, of the PSC are further described in Section I, Part III (Management Arrangements) of the Project Document.
- Project communications to facilitate on-going awareness of project: The project will develop,



implement and maintain a communications strategy to ensure that all stakeholders are informed on an on-going basis about the project's objectives and activities; overall project progress; and the opportunities for involvement in various aspects of the project's implementation.

- **Capacity building:** Project activities are focused on building the capacity – at the systemic, institutional and individual levels – of the institutions, NGOs, and other stakeholders to ensure the sustainability of initial project investments. Significant GEF resources are directed at building the capacities of MEE at the institutional level to lead ecosystem-level information management and planning for conservation and development, and of ICS and NGO managers of Outer Island protected areas at the institutional and site level to enable more effective PA management.

### 3. Coordination with other related initiatives

The project will be executed by CONABIO, with oversight and coordination functions carried out through a multi-stakeholder IAS High Level Committee, which will be established during the project inception phase. Steps will be taken by the PSC and CONABIO to ensure close coordination and communication with related projects to coordinate efforts and to promote information sharing. In particular, strategic coordination with the following projects will lead to improved IAS management and increased benefits for Mexican biodiversity.

In developing niche models of potential climate change impacts on the dispersion of IAS (activity 1.1.10), the project will coordinate with the proposed CONANP project “Strengthening Management Effectiveness and Resilience of Protected Areas to Safeguard Biodiversity Threatened by Climate Change”, which is being implemented with support from UNDP-GEF. The CONANP project will be assessing climate change vulnerability and impacts at numerous PA sites in Mexico, including several sites that are targeted by this project (Cañón del Sumidero, Vizcaíno, and the Archipiélago de Revillagigedo). The proposed project will coordinate with CONANP on climate change related activities at these sites, and will seek access to the data being provided to this project from Automatic Meteorological Stations that CONANP and SMN-CONAGUA have already established at 53 PA sites (with more expected in the next few years). In addition, CONABIO will ensure coordination with the REDD+ initiative “Measuring, Reporting and Verification - Activity Data (MRV-AD) Monitoring System within the Mexican REDD+ program”, which is designed to develop a national monitoring system to survey land use changes and biodiversity for REDD+ reporting. Monitoring of biodiversity will include collecting sightings of easy to identify invasive species at sites covered by the National Forest and Soil Inventory and at points within Natural Protected Areas NPA.

The proposed project “Strengthening Management of the PA System to Better Conserve Endangered Species and their Habitats”, currently being developed by CONANP with support from UNDP-GEF, will address conservation of two species that are impacted by invasive / feral species. The Cedros Island Mule Deer (*Odocoileus hemionus cerrosensis*), endemic to Cedros Island in Baja California, is considered in critical danger of extinction due to the presence of feral dogs in the island and the destruction of its habitat due to out of control forest fires. The proposed project will share lessons learned from the activities at 6 island sites, including information on strategies for control and eradication of feral mammal species. In addition, the Baja California Pronghorn or Peninsular Pronghorn (*Antilocapra americana peninsularis*) (IUCN Critically Endangered) has a population now estimated at only around 200 individuals, due to many factors, one of which is competition in its grazing areas from domestic livestock. The proposed project will share lessons learned from the activities at several mainland PA sites to reduce extensive cattle grazing in sensitive ecosystems.

The proposed project will seek to benefit from lessons learned on marine IAS, in particular strategies for control of the invasive Lionfish (*Pterois volitans*), developed by the regional project “Mitigating the Threats of Invasive Alien Species in the Insular Caribbean”, which is being implemented by CONANP



with support from UNEP-GEF. The project also will seek to share information on marine IAS issues in the Gulf of Mexico with the CONABIO project, supported by UNIDO-GEF, for “Integrated assessment and Management of the Gulf of Mexico Large Marine Ecosystem”. An overall strategy for the Gulf is expected to be finalized in May 2014 and should include analysis of marine IAS issues.

GECI will ensure coordination with IAS management activities that it is implementing with partners including CONANP, INECC, CONABIO, SEMARNAT, and SEMAR, at 33 island sites throughout Mexico. Among other activities, GECI and its partners are carrying out IAS education and outreach; seabird restoration through social attraction techniques; pre- and post-eradication monitoring of IAS and native species; control and eradication programs; scientific research; and inventorying of vertebrate populations on islands. The six island sites of the GEF Project will benefit from the outcomes of these projects on other islands / protected areas, and GECI will ensure information sharing and capacity building among GECI and CONANP staff at all of the islands (see Output 2.1). In addition, the Seabird Restoration Program in Baja California Pacific Islands, implemented by GECI, CONABIO and a number of other partners, includes activities on 11 islands in the Pacific Ocean off the coast of Baja California for the control of invasive plants, scientific research, habitat restoration, and building of local capacities and environmental education. Coordination with the GEF project will be important, particularly for issues such as capacity building and environmental education, with a focus on biosecurity. As well, the GEF project will benefit from experience learned on social attraction techniques for islands where IAS have been eradicated.

The project partner IMTA will provide lessons learned from its on-going biological control program for water hyacinth in the Rio Santiago; this species is one of the most important aquatic invasive species in Mexico, and IMTA intends to test four potential biological control agents (two weevils and two plant pathogens) for control of the water hyacinth (these measures have been approved by NAPPO and Mexican Plant Protection Service). Coordination also will be established with the continuous monitoring program for aquatic organisms in rivers on Mexico’s borders, a program of CONABIO and UANL that among other activities is carrying out a risk analysis of the zebra mussel in areas of high biodiversity importance in the Colorado River basin.

Finally, the project will benefit from Information sharing with various global and regional IAS information networks, including the Global Invasive Species Information Network (GISN); the IUCN Invasive Species Specialist Group; the North American Plant Protection Organization (NAPPO), and the North American Invasive Species Network (NAISN). NAPPO is responsible for the development of regional standards regarding invasive species, while NAISN is a consortium that aims to strengthen IAS capacities across North America and to unify and connect existing regional invasive species efforts into a single network to improve communication, collaboration, and overall coordination in support of invasive species management and prevention efforts across the continent. CONABIO, together with SAGARPA, participates fully in NAPPO and NAISN, and will ensure coordination between these networks and the proposed project, including drawing on information and experiences gathered by the invasive species panel of NAPPO regarding the establishment of guidelines for plant screening, risk analysis and pathway risk assessment.

### **PART III. Terms of References for key project staff**

As noted under the Management Arrangements, day-to-day management and coordination of the project will be under the supervision of the *Project Coordination Unit* (PCU). The PCU will be comprised of a Project Coordinator, an Assistant to the Project Coordinator, an Administrator / Accountant, and a Secretary, all of whom will be full-time staff (the first three will be paid with project funds, while the salary of the Secretary will be paid with CONABIO co-financing). Indicative Terms of Reference for the Project Coordinator are provided below; a final ToR for the Project Coordinator, and ToRs for the other PCU staff, will be created during the project inception phase.

#### **Terms of Reference for Project Coordinator**

CONABIO, in coordination with the UNDP CO, will select the PC to carry out the duties specified below, and to provide further technical assistance as required by the project team to fulfill the objectives of the project. He/she will be responsible for ensuring that the project meets its obligations to the GEF and the UNDP, with particular regard to the management aspects of the project, including supervision of staff, serving as stakeholder liaison, implementation of activities, and reporting. The PC will be responsible for the day-to-day management of project activities and the delivery of its outputs. The PC will support and coordinate the activities of all partners, staff, and consultants as they relate to the implementation of the project. The PC will report to the National Project Director (within CONABIO) and will be responsible for the following tasks:

<b>Tasks</b>	<b>Related Outputs</b>
Prepare detailed work plans under the guidance of the PSC	Detailed work plans indicating dates for deliverables
Prepare detailed budgets; as necessary, make recommendations for modifications to the project budget and, where relevant, submit proposals for budget revisions to the PSC, CONABIO, and UNDP	Detailed budgets; budget revisions as necessary
Facilitate project planning and decision-making sessions	N/A
Supervise and coordinate the work of the staff of the Project Coordination Unit	Annual performance reports for PCU staff
Organize the contracting of consultants and experts for the project, including preparing ToRs for all technical assistance required, preparation of an action plan for each consultant and expert, supervising their work, and reporting to the Project Director at CONANP and UNDP	ToRs, action plans, and monitoring reports for consultants and experts
Oversee coordination of the activities of the designated Responsible Parties (CONANP and GEICI) to the project	Part of general project reporting
Provide technical guidance and oversight for all project activities	N/A
Oversee the progress of the project components conducted by local and international experts, consultants, and cooperating partners	Part of general project reporting
Foster, establish, and maintain links with other related national and international programs and national projects, including information dissemination through media such as web page updates, etc.	Reporting on potential institutional links with other related national and international programs and national projects

Organize PSC meetings as well as annual and final review meetings as required by CONABIO and UNDP, and act as the secretary of the PSC	PSC Meeting Minutes and follow-up action plans
Coordinate and report the work of all stakeholders under the guidance of CONABIO	Part of general project reporting
Prepare PIRs/APRs in the language required by the GEF and the UNDP-CO and attend annual review meetings	Yearly PIRs/APRs
Prepare and submit quarterly progress and financial reports to CONABIO and UNDP in line with GEF requirements	Quarterly reports and financial reports on the consultant's activities, all stakeholders' work, and progress of the project to be presented to CONABIO and UNDP
Coordinate and participate in M&E exercises to appraise project success and make recommendations for modifications to the project	Minutes of meetings and/or consultation processes
Prepare and submit technical concepts and requirements about the project requested by CONABIO, UNDP, or other entities	Technical reports as required
Ensure the project utilizes best practices and experiences from similar projects	N/A
Ensure the project utilizes the available financial resources in an efficient and transparent manner	N/A
Visits to project field sites to provide technical support and monitoring	Trip reports
Ensure that all project activities are carried out on schedule and within budget to achieve the project outputs	Final report that summarizes the work carried out by consultants and stakeholders during the project, as well as the status of the project outputs at the end of the project

### Qualifications

- A graduate academic degree in areas relevant to the project (e.g., invasive species management / conservation / natural resource management);
- Minimum 10 years of experience in project management;
- Experience facilitating consultative processes, preferably in the field of natural resource management;
- Working knowledge of IAS-related issues and management;
- Proven ability to promote cooperation between and negotiate with a range of stakeholders, and to organize and coordinate multi-disciplinary teams;
- Strong leadership and team-building skills;
- Self-motivated and ability to work under the pressure;
- Demonstrable ability to organize, facilitate, and mediate technical teams to achieve stated project objectives;
- Familiarity with logical frameworks and strategic planning;
- Strong computer skills;
- Flexible and willing to travel as required;
- Excellent communication and writing skills in Spanish and English;
- Previous experience working with a GEF-supported project is considered an asset;

## Overview of Project Consultants

All TORs for project consultants will be fully developed and validated prior to the launching of recruitment processes.

### *Overview of Inputs from Technical Assistance Consultants financed with GEF funds*

<b>Natl. / Intl.</b>	<b>Purpose</b>	<b>Intensity of input</b>	<b>Indicative budget allocation (US\$)</b>	<b>Key Tasks and Responsibilities</b>
Intl.	Development of economic models for selected high priority IAS	4-day workshop followed by on-line guidance and technical support to national experts from home base over 12 months, followed by 2 <sup>nd</sup> workshop first (probably two consultants)	59,000	Capacity building and oversight of Mexican academic, government and NGO experts in economic modelling of costs of high-impact IAS to the Mexican economy
Intl.	EDRR systems at national level	Approximately 90 days of support from 1 or more consultants over a 3-year period	58,801	Training of Mexican institutions / experts to implement national-level EDNR protocols for selected high priority IAS
Intl.	External Mid-Term Evaluation of Project	Approximately 40 days of work over 2-3 months (by 1-2 consultants)	24,000	Produce formal Mid-Term Evaluation according to UNDP and GEF templates and requirements
Intl.	External Terminal Evaluation of Project	Approximately 53 days of work over 2-4 months (by 1-2 consultants)	32,000	Produce formal Terminal Evaluation according to UNDP and GEF templates and requirements
Natl.	IAS Risk Analysis	Multiple consultants doing risk analyses for 10 species per year times 4 years; approx. 10 days of work per species	120,000	Risk assessments for high priority invasive alien species
Natl.	Cost coefficients for IAS management	Approx. 20 days of work over 3-6 month period	6,000	Economic expert to analyse inputs various project partners on IAS management costs and thereby develop cost coefficients
Natl.	Invasive Flora Map	Approx. 30 days of work over 2-3 years	10,000	Mapping of Invasive Flora in Queretaro State (as a pilot) and development of process/model for replication in other Mexican states
Natl.	Analysis of IAS in aquaculture	Approx. 12 days of work over 2-3 months	4,166	Characterize aquaculture production systems and their potential to disperse IAS
Natl.	Biosecurity for IAS in aquaculture	Approx. 50 days of work over 6-12 months	16,666	Develop technical proposal to minimize the risk of IAS dispersion between aquaculture producers
Natl.	EDRR systems at national level	Approx. 200 days of work over 2-3 years (multiple consultants)	60,000	Provide support to relevant agencies for the implementation of national-level EDNR protocols
Natl.	EDRR maps	Approx. 20 days of work over 3-6 months	6,500	Adaptation of EDNR maps for pilot sites
Natl.	IAS financing instruments	Approx. 30 days of work over 4-8 months	10,000	Study on market based instruments for funding of IAS management
Natl.	Risk analyses for PA sites	Approx. 200 days of work over 2 years (multiple consultants)	58,333	Assessment of high risk IAS and pathways at 3 mainland PA sites
Natl.	IAS Management Plans for PA sites	Approx. 165 days of work over 1-2 years (multiple consultants)	50,000	Development of IAS Prevention, Detection and Management Plans (strengthen existing plans at 5 sites and create plans at 4 sites)
Natl.	IAS Management in Productive	Approx. 200 days of work over 1-2 years (multiple consultants)	60,000	Advise on implementation of productive sector IAS management actions at 6

	Sectors at PA sites			mainland PA sites
Natl.	IAS Monitoring at PA sites	Approx. 65 days of work over 2 years (multiple consultants)	20,000	Advise on IAS Monitoring Programs for specific high risk IAS at 4 sites
Natl.	IAS Control at PA sites	Approx. 330 days of work over 2-3 years (multiple consultants)	100,000	Advise on IAS Control Programs for specific IAS at 6 mainland PA sites
Natl.	IAS Eradication at PA sites	Approx. 80 days of work over 4-6 months	25,000	Advise on IAS eradication plan at 1 mainland PA site (25,000)

## Project Annexes

### Annex 1: GEF Tracking Tool & Capacity Scorecard

#### SUMMARY OF GEF TRACKING TOOL

*See Separate File for detailed information, including scores and comments from various stakeholders*

#### Summary Scores from PART VI of the GEF Tracking Tool for BD-2 Projects

Issue	Baseline Scores	Target Scores
1) Is there a National Coordination Mechanism to assist with the design and implementation of a national IAS strategy?	1	3
2) Is there a National IAS strategy and is it being implemented?	2	3
3) Has the national IAS strategy led to the development and adoption of comprehensive framework of policies, legislation, and regulations across sectors	2	4
4) Have priority pathways for invasions been identified and actively managed and monitored?	1	2
5) Are detection, delimiting and monitoring surveys conducted on a regular basis?	1	5
6) Are best management practices being applied in project target areas?	1	8
<b>TOTAL SCORE</b>	<b>8</b>	<b>25</b>
<b>TOTAL POSSIBLE</b>	<b>29</b>	<b>29</b>

Note: Part VI of the GEF Tracking Tool was filled out by representatives of the following institutions: CONABIO (National Commission for Knowledge and Use of Biodiversity); CONANP (National Commission for Natural Protected Areas); Ecological Group for Island Conservation (GECI); National Fisheries Institute (INAPESCA); Ministry of the Environment and Natural Resources (SEMARNAT); National Service for Health, Food Safety and Quality (SENASICA); Universidad Autónoma Metropolitana – Xochimilco (UAM); Universidad Autónoma de México (UNAM); and the PPG Legal and Policy Expert.

## Summary of Capacity Development Assessment Scorecard

See Separate File for detailed Capacity Development Assessment Scorecard information, including scores and comments from various stakeholders

Matrix of the Capacity Development Assessment Scorecard for Invasive Alien Species Projects (Summary)						
Strategic Areas of Support	Baseline Scores (Project Start)			Target Scores (Project End)		
	Project Scores	Total possible score	%	Project Scores	Total possible score	%
1. Capacity to conceptualize and formulate policies, legislations, strategies and programmes	5	9	56	8	9	89
2. Capacity to implement policies, legislation, strategies and programmes	20	39	51	34	39	87
3. Capacity to engage and build consensus among all stakeholders	8	15	53	13	15	87
4. Capacity to mobilize information and knowledge	4	9	44	8	9	89
5. Capacity to monitor, evaluate, report and learn	6	15	40	13	15	87
<b>TOTAL Score and average for %'s</b>	<b>43</b>	<b>87</b>	<b>49</b>	<b>76</b>	<b>87</b>	<b>87</b>

Note: The Capacity Scorecard was filled out by representatives of the following institutions: CONABIO (National Commission for Knowledge and Use of Biodiversity); CONANP (National Commission for Natural Protected Areas); Ecological Group for Island Conservation (GECI); National Commission of Aquaculture and Fishing (CONAPESCA); National Fisheries Institute (INAPESCA); Ministry of the Environment and Natural Resources (SEMARNAT); Federal Attorney of Environmental Protection (PROFEPA); National Service for Health, Food Safety and Quality (SENASICA); Universidad Autónoma Metropolitana – Xochimilco (UAM); and the PPG Legal and Policy Expert.

## Annex 2. Output (progress) Indicators and Indicative Activities

Indicator	Baseline	Target	Verification
<b>Output (progress) Indicators for Outcome 1</b>			
<b>Output 1.1: Decision making tools aimed at informing cost effective management decisions to address IAS threats in key landscapes and key sectors</b>			
<ul style="list-style-type: none"> <li>Management plans for invasive species that have been identified as high priority for impacts on BD</li> <li>Agreed upon common protocols for priority species adopted by IAS management institutions</li> <li>Extent of data in the National Invasive Alien Species Information System (NIASIS)</li> <li>Capacity to plan for IAS impacts in the fact of potential climate change</li> </ul>	<ul style="list-style-type: none"> <li>A National List of Invasive Species (NLIS) is in draft form</li> <li>There are no harmonized protocols among IAS management institutions for carrying out risk analyses to identify highest risk species / pathways, or collecting and exchanging information</li> <li>The NIASIS includes 50,000 records (covering 381 species), 415 rapid assessments, and 157 information sheets on IAS occurrence in Mexico</li> <li>Lack of information on possible impacts of climate change on dispersion of IAS prevents effective long-term planning and priority setting for IAS management</li> </ul>	<ul style="list-style-type: none"> <li>At least 15 management plans for high priority species identified in the approved NLIS developed and in operation, by the end of the project</li> <li>At least 3 institutions adopting the different protocols for risk analysis of priority species, taxonomic groups, pathways, or geographic areas</li> <li>By the end of the project, a 40% increase in the contents of data base (records, species, rapid assessments, and information sheets)</li> <li>Niche models developed on dispersion of 60 high risk IAS under climate change scenarios by end of year 2</li> </ul>	<p>Published NLIS; species mgmt. plans</p> <p>Official documents for import prohibitions</p> <p>NIASIS + related CONABIO webpages</p> <p>Approved niche models</p>
<b>Output 1.2: Sectorial guidance and regulations in place to strengthen the control of main pathways of IAS to vulnerable areas</b>			
<ul style="list-style-type: none"> <li>Improved management of IAS in productive sectors by state authorities in one Mexican state (pilot)</li> <li>Productive sector industry standards / codes for management of IAS that may impact biodiversity</li> <li>Include IAS in biodiversity strategies at state level</li> </ul>	<ul style="list-style-type: none"> <li>Existing IAS management framework has no incentives for productive sectors to prevent IAS escapes or to choose low risk species</li> <li>Productive sector associations / businesses do not have or use standards, codes of conduct or certification systems to govern their treatment of IAS that may impact biodiversity</li> <li>Only a few states have published their Strategy yet, and none so far have included actions / programs for IAS management</li> </ul>	<ul style="list-style-type: none"> <li>Authorities in Morelos State have developed and implemented strengthened IAS management controls for the ornamental fish, aquaculture and nursery plant sectors by the end of the project</li> <li>Standards, codes of conduct and certification systems are developed for productive sectors and under implementation by the end of the project</li> <li>All State-level Biodiversity Strategies include the subject of IAS and have at least one objective referring to the issue</li> </ul>	<p>Signed agreements</p> <p>Approved standards, codes and certification systems</p> <p>Approved BD strategies</p>



Indicator	Baseline	Target	Verification
<b>Output 1.3: Multi-sectorial institutional framework in place to implement National Strategy on Invasive Species (NSIS)</b>			
<ul style="list-style-type: none"> <li>• Oversight and coordination structures for implementation of the NSIS</li> <li>• Institutional protocols for the principle pathways for introduction and spread of IAS that impact biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• The Experts Committee that created the NSIS is still functional, but does not have any official authority related to the implementation of the NSIS</li> <li>• Systems to identify and control pathways for IAS introduction and spread are focused only on IAS with potential impacts on economic activities (agriculture, forest products, wildlife)</li> </ul>	<ul style="list-style-type: none"> <li>• 3 committees (High-Level; Scientific; Technical) are officially established to guide implementation of the NSIS, with operating guidelines and authority, by the end of year 1</li> <li>• By the end of the project, 5 protocols for taxonomic groups or pathways at strategic entry points have been developed and adopted by the environmental sector (CONAFOR, CONANP, SEMARNAT)</li> </ul>	<p>Official decisions and minutes of High-Level committee</p> <p>PROFEPA, CONAFOR, SEMARNAT, CONANP reports on protocols</p>
<b>Indicative Activities</b>			
<b>Output 1.1: Decision making tools aimed at informing cost effective management decisions to address IAS threats in key landscapes and key sectors (aquarium trade, aquaculture, trade of wildlife and forest products in particular)</b>			
<ul style="list-style-type: none"> <li>1.1.1 Strengthening of the National Invasive Alien Species Information System (NIASIS)</li> <li>1.1.2 Establishment and operation of Information System to measure implementation of the National Strategy on Invasive Species</li> <li>1.1.3 Creation of Participatory Networks to support IAS management</li> <li>1.1.4 Establishment and operation of an IAS National Gateway</li> <li>1.1.5 Publication and Outreach on the National List of Invasive Species (NLIS)</li> <li>1.1.6 Development and use of risk analysis methodologies for high risk species / pathways</li> <li>1.1.7 Development and application of Inspection Tools for IAS that threaten biodiversity</li> <li>1.1.8 Development and testing of a model for mapping of IAS flora</li> <li>1.1.9 Integrate information on IAS into the National Forest and Soils Inventory (INFyS)</li> <li>1.1.10 Develop niche models for IAS dispersion related to climate change</li> <li>1.1.11 Establish cost coefficients for different IAS management strategies in Mexico</li> <li>1.1.12 Develop economic models to estimate the costs to the Mexican economy of high-impact IAS</li> </ul>			
<b>Output 1.2: Sectorial guidance and regulations in place to strengthen the control of main pathways of IAS to vulnerable areas</b>			
<ul style="list-style-type: none"> <li>1.2.1 Draft regulations for control of IAS in productive sector operations</li> <li>1.2.2 Provide information, resources and training for improved IAS management to private-sector stakeholders and government agencies in the Wildlife and Forest sectors</li> <li>1.2.3 Provide information, resources and training for improved IAS management to private-sector stakeholders and government agencies in the Aquarium Trade and Aquaculture Sectors</li> <li>1.2.4 IAS biosecurity pilot activities in the Aquaculture Sector in the State of Morelos</li> <li>1.2.5 Increase state-level oversight and capacity for IAS management in import and production sectors</li> </ul>			
<b>Output 1.3: Multi-sectorial institutional framework in place to implement National Strategy on Invasive Species (NSIS)</b>			
<ul style="list-style-type: none"> <li>1.3.1 Draft revised and harmonized existing laws / regulations related to IAS management</li> <li>1.3.2 Institutional structures strengthened / established to facilitate inter-institutional coordination for overall IAS management</li> </ul>			

Indicator	Baseline	Target	Verification
1.3.3 Institutional Coordination to prevent the entry and spread of IAS in Mexico 1.3.4 Strengthen capacity for Early Detection and Rapid Response (EDRR) systems for IAS at national level 1.3.5 Development and application of financial mechanisms to support IAS management 1.3.6 Budgetary coordination between sectors to ensure coherent investments and actions to address threats cost efficiently 1.3.7 Establish harmonized standards and training programs for IAS management across key institutions 1.3.8 Implement education and awareness campaigns on IAS for policymakers, private land owners, NGOs, volunteer groups and the general public			
<b>Output (progress) Indicators for Outcome 2</b>			
<b>Output 2.1. Strengthened prevention and control of key IAS populations in selected islands</b>			
<ul style="list-style-type: none"> <li>• Capacity for coordinated management and planning for IAS management</li> <li>• Number of Island Biosecurity Plans (IBPs) supervised by island IAS management committees</li> <li>• EDDR systems developed by the project applied at pilot level</li> </ul>	<ul style="list-style-type: none"> <li>• Selected islands have no mechanisms for the coordinated management of IAS</li> <li>• Selected islands do not undertake planning to address biosecurity problems</li> <li>• Selected islands have no mechanisms or capacities to respond to the discovery of newly introduced IAS</li> </ul>	<ul style="list-style-type: none"> <li>• 6 Island IAS Management Committees operating by the end of year 1</li> <li>• 6 Island Biosecurity Plans (IBPs) developed and implemented by end of year 1</li> <li>• Early Detection and Rapid Response (EDRR) systems operational and preventing introduction / spread of IAS on 6 islands by end of year 2</li> </ul>	Meeting minutes of Committees  Published IBPs
<b>Output 2.2. Enhanced IAS surveillance and control strategies reduce introduction rates and contain populations</b>			
<ul style="list-style-type: none"> <li>• Capacity for coordinated management and planning for IAS management</li> <li>• IAS management plans for specific PA units</li> <li>• Capacity to identify and address IAS (and their pathways) with the most negative impacts on biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• 0 mainland PAs have management structures to facilitate cooperation on IAS management with residents and businesses within and outside of PAs</li> <li>• 5 PA units have IAS management plans, but none of these plans is being implemented in an integrated manner</li> <li>• 0 mainland PA sites have lists of priority IAS for their location</li> </ul>	<ul style="list-style-type: none"> <li>• 9 mainland PAs with participatory IAS management committees by the end of year 1</li> <li>• By end of year 2, 5 mainland PAs are implementing IAS management plans (including risk analyses, priority setting, capacity building strategies); by end of project, remaining 4 PA sites are also implementing plans</li> <li>• Lists of local high priority IAS (for PAs and surrounding landscapes) created for 9 sites by end of year 2; lists being used by management agencies (e.g. CONANP, PROFEPA) to restrict use of IAS within and surrounding 9 sites by end of year 3</li> </ul>	Committee documents; meeting minutes  Finalized IAS management plans, and progress reports  Lists of priority IAS

Indicator	Baseline	Target	Verification
<ul style="list-style-type: none"> <li>• EDDR systems developed by the project applied at pilot level</li> </ul>	<ul style="list-style-type: none"> <li>• 0 mainland PAs have systems for Early Detection and Rapid Response (EDRR) to prevent the establishment and spread of IAS</li> </ul>	<ul style="list-style-type: none"> <li>• 5 mainland PAs with operating participatory EDDR systems preventing introduction / spread of IAS at PA sites by end of the project</li> </ul>	Logs of documented EDDR activities
<p><b>Indicative Activities</b></p> <p><b>Output 2.1: Strengthened prevention and control of key IAS populations in selected islands</b></p> <ul style="list-style-type: none"> <li>2.1.1 Establish and maintain Island Biosecurity Programs</li> <li>2.1.2 Implement education and training to support IAS management</li> <li>2.1.3 Implement targeted high priority IAS Control &amp; Eradication programs</li> <li>2.1.4 Establish and maintain monitoring programs to ensure effectiveness of biosecurity and IAS control and eradication efforts</li> </ul> <p><b>Output 2.2: Enhanced IAS surveillance and control strategies reduce introduction rates and contain populations below thresholds that endanger endemic species and their habitats at selected mainland protected areas</b></p> <ul style="list-style-type: none"> <li>2.2.1: Baseline Information to Support IAS Management Planning</li> <li>2.2.2: Strengthened Management Capacities and Processes</li> <li>2.2.3: Changes in Productive Sector practices</li> <li>2.2.4: Community awareness and participation in IAS Management</li> <li>2.2.5 Biosecurity Programs (Prevention; Early Detection and Rapid Response) developed and implemented</li> <li>2.2.6: Integrated IAS Control, Eradication and Monitoring</li> <li>2.2.7: Ecosystem Restoration</li> </ul>			

### Annex 3. Description of Selected Project Sites

#### Acronyms for Project Sites

- APFF Area de Protegida de Flora y Fauna (Flora and Fauna Protected Areas); official category of protected area in Mexico
- APRN Area Protegida de Recursos Naturales (Natural Resources Protected Area); official category of protected area in Mexico
- AICA Área de Importancia para la Conservación de las Aves (Important Bird Area, according to Birdlife International)
- AZE Alliance for Zero Extinction conservation area (Alliance for Zero Extinction comprises 80 non-governmental biodiversity conservation organizations working to prevent species extinctions by identifying and safeguarding sites where species evaluated to be Endangered or Critically Endangered under International Union for Conservation of Nature (IUCN) criteria only exist at one location on earth)
- NOM-059 Norma Oficial Mexicana – SEMARNAT - 2010, Environmental Protection. NOM-059 lists flora and fauna species native to Mexico that are classified as being at risk.

### Island Sites

**Map 1: Island Restoration (IAS Management) Priorities** (Latofski-Robles et al. In publication. WNAN)



## **Isla Guadalupe Biosphere Reserve**

**Official Status:** (Biosphere Reserve; also an AICA, and an AZE for the Guadalupe Petrel)

**Area / Location:** 24,171 hectares; located in the Pacific Ocean 250 kilometers west of Baja California

**Biodiversity:** Center of terrestrial and marine bird endemism (9 species); 223 plants (34 endemic); 90 insects (14 endemics); 136 birds (22 nesting; also, there were 9 endemics but 6 are now extinct); 30 species of flora and fauna classified under NOM-059. Threatened endemic species include the Guadalupe Cypress (*Cupressus guadalupensis guadalupensis*), Guadalupe Pine (*Pinus radiata* var. *binata*) and Guadalupe Palm (*Brahea edulis*). The island is also important habitat for breeding colonies of three marine mammal species: Guadalupe Fur Seal (*Arctocephalus townsendi*), Northern Elephant Seal (*Mirounga angustirostris*) and California Sea Lion (*Zalophus californianus*).

**Invasive Alien Species:** Historically, 65 IAS have been registered on the island: 53 plants, 5 birds and 7 mammals. Of these, six plant species and five mammals (rabbit, donkey, horse, goat and dog) have been eradicated (the mammals all between 2002-2007), so that there are 54 species still present. Of the remaining IAS on the island, feral cats are the most harmful; they are considered to be responsible for at least 6 extinctions on the island.

**Threats / Pressures:** There are three settlements on the island (one research station; one fishing community and one navy station), with approximately 100 inhabitants in total. Due to the remoteness of the island from the mainland, and because access is restricted, Isla Guadalupe receives few visitors. Those that do visit regularly belong to the following groups: SEMARNAT and CONANP staff, abalone and lobster fishermen and their familie; and scientists and conservationists. Persons and goods arriving by boat and plane are inspected for security and drug trafficking reasons, but not for the purpose of preventing IAS introductions. In addition, there is one site in the northern part of the island where fishermen, researchers and tourism operators (looking for great white sharks), occasionally come ashore.

## **San Benito Archipiélago Biosphere Reserve**

**Official Status:** Biosphere Reserve; also an AICA

**Area / Location:** 554 hectares over three islands: San Benito Oeste – 364 hectares; San Benito Este – 146 hectares; San Benito Medio – 44 hectares, located in the Pacific Ocean 70 kilometers northwest of Baja California

**Biodiversity:** Most important seabird breeding site in western Pacific (2 million seabirds); 51 plants (3 endemic species, *Hemizonia streetsii*, *Mammillaria neopalmeri* and *Dudleya linearis*), 1 reptile, 75 birds (including 4 endemic sub-species of terrestrial birds; *Salpinctes obsoletus tenuirostris*, *Eremophila alpestris baileyi*, *Passerculus sandwichensis sanctorum* and *Carpodacus mexicanus mcgregori*). A total of 19 species of flora and fauna on the island are classified under NOM-059. There are 12 species of nesting seabirds on the island, including one of the most southern colonies of Cassin's Auklet (*Ptychoramphus aleuticus*), the most northern nesting site of the Guadalupe Murrelet (*Synthlyboramphus hypoleucus*), and one of only two nesting sites in the Pacific Ocean for the Heerman's Gull (*Larus heermanii*).

Invasive Alien Species: Historically, the island has had a total of 17 IAS: 9 plants, 4 birds and 4 mammals. Of these, 3 mammals (rabbit, goat and donkey) were eradicated in 1998-99 and 2005, so that 14 invasive species remain. Of these, introduced rats are the most harmful species.

Threats / Pressures: The only access to the islands is maritime. Generally, the route of entry is via Cedros Island, located 25 km to the southeast. The only productive activity that takes place nearby is fishing of benthic species of high commercial value such as abalone and lobster, conducted by the National Abalone Fishermen fishing cooperative (PNA), which has had a concession for more than 70 years. The PNA has its main facilities in Cedros Island, as well as a fishing camp with over 40 houses located in San Bonito West. Eight persons engaged in maintenance activities and monitoring inhabit San Benito West permanently. However, during the lobster and abalone seasons, about 100 people move from Cedros to a fishing camp on San Bonito West. Thus, the only route of IAS introduction to the island is related to the transport of people and goods from Cedros Island. The PNA has been receptive to suggestions made by GECI regarding the issue of IAS, and more generally, conservation of the archipelago, and it supported the work to eradicate introduced mice on the island.

### **Isla Espíritu Santo (Flora and Fauna Protected Area)**

Official Status: Part of the Islas del Golfo de California Flora and Fauna Protected Area; also a UNESCO World Heritage Site

Area / Location: 7,991 hectares, located in the Gulf of California 25 kilometers from southern Baja California.

Biodiversity: 233 plants, which represent more than 40% of all of the plant species registered in the islands of the Gulf of California. Of these, 54 are endemic species, including *Opuntia brevispina*, *Cryptantha grayi* var. *Nesiotica*, and *Acacia pacensis*. In terms of fauna, there are 6 mammals, of which 3 are endemic: ring-tailed cat (*Bassariscus astutus saxicola*), black jackrabbit (*Lepus insularis*) and the Antelope Squirrel (*Ammospermophilus insularis*). There are more than 90 bird species at the site, primarily marine birds, and including residents, migratories and occasional visitors. There are also 27 reptiles, of which three are endemic, and two species of amphibians. 62 species and sub-species of flora and fauna on the island are classified under NOM-059.

Invasive Alien Species: Historically, 7 IAS (5 vascular plants and 2 mammals) have been recorded on the island. There have been no eradications (goat eradication was suspended in 2005), but there has been control for 1 plant species (Pino Salado or Salt Ceder; *Tamarix ramosissima*) by CONANP in 2009 and 2011. Of the IAS on the island, goats and feral cats are the most harmful species.

Threats / Pressures: Espíritu Santo Island is located only 25 km from the city of La Paz in Baja California. There are two points of embarkation to the island; the docks and piers of La Paz, and the port of Pichilingue. The main productive activities around the island are nature tourism and artisanal and recreational fishing. Two types of fishermen operate around the sites: fishermen who make the trip daily from La Paz, and those who have established fishing camps on the island. It is estimated that about 120 fishermen use the marine area of the island throughout the year; about 90 camp on the island, for a period of three to six days a week for different fishing seasons. As for recreational fishing, there are between 25 and 30 vessels whose operators belong to at least four fishing cooperatives and two private companies; it is not believed that these fishing vessels make landings on the island. Ecotourism activities include snorkeling and scuba diving, kayaking, hiking, camping and wildlife viewing, with different activities taking place throughout the year.

## **Isla Socorro (Biosphere Reserve)**

**Official Status:** Part of the Archipiélago de Revillagigedo Biosphere Reserve; also classified as an AICA, and an AZE (for the Revillagigedo Shearwater)

**Area / Location:** 13,033 hectares, located approximately 500 kilometers from the Mexican mainland in the Pacific Ocean.

**Biodiversity:** Mexican island with greatest endemism & biodiversity, with 9 defined vegetation zones. There are 39 plants endemic to the archipelago, of which 30 are endemic to Isla Socorro. There are 103 bird species, of which 10 terrestrial bird species are endemic to the island, although two of these are now extinct. Important marine bird species include endemics such as Revillagigedo Shearwater (*Puffinus auricularis auricularis*) and the Yellow-Crowned Night Heron (*Nyctanassa violacea gravirostris*). ambas endémicas. The island also harbors 3 terrestrial reptile species, one of which is endemic, the Socorro Blue Lizard (*Urosaurus auriculatus*). There are 17 species of flora and fauna classified under NOM-059 on the island.

**Invasive Alien Species:** IAS registered on the island include 47 vascular plants, 5 birds, 1 reptile and 3 mammals. Of these, the feral sheep was eradicated in 2011. Of the 55 remaining invasive species, feral cats are the most harmful, posing a serious threat to native terrestrial and marine birds. Feral cats were primary contributors to the extinction on the island of the Socorro Dove (*Zenaida graysoni*), as well as several other species thought to now be extinct or severely endangered on the island, such as *Micrathene whitneyi graysoni*, *Mimodes graysoni*, and *Puffinus auricularis auricularis*. In addition, the domestic mouse (*Mus musculus*) is present on the island although its population appears to be restricted to the naval base.

**Threats / Pressures:** Because the island is located in an official naval sector, access is greatly limited and permission must be granted by both the Mexican Navy and CONANP. For this reason, and because of the remote location of the island, the threat of IAS introduction from fishermen or tourists is relatively low. Nevertheless, the approximately 100 inhabitants of the SEMAR naval base do pose an IAS-related threat in terms of their transport of goods and persons to and from the mainland. Fortunately, visitors to the island are subject to searches of goods and materials; although the inspections do not target IAS, the system in place provides a strong baseline on which to build a biosecurity system for the island.

## **Arrecife Alacranes National Park**

**Official Status:** National Park; also designated as a Ramsar Site

**Area / Location:** 65 hectares over 5 islands: Chica = 1.3 ha.; Pájaros = 2.86 ha.; Pérez = 17.63 ha.; Muertos = 14.46 ha.; Desterrada = 29.16 ha., located in the Gulf of Mexico 140 kilometers from the Yucatan Peninsula.

**Biodiversity:** The site hosts mangrove and coastal dune ecosystems, as well as the largest coral reef in the Gulf of Mexico. There are 24 native plants at the site, of which 2 are endemics (*Cakile edentulavar alacranensis* and *Cenchrus insularis*). The park also harbors 4 crab species and 4 reptiles, including two species of lizards: *Anolis sp.* and *Mabuya unimarginata*. The presence of marine turtle species including Green Turtles (*Chelonia mydas*), Loggerhead Turtles (*Caretta caretta*) and Hawksbill Turtles (*Eretmochelys imbricata*) was one of the key factors in establishing the national park. There are also 144

bird species representing 33 distinct families; overall, more than 300,000 marine birds visit the park throughout the year. 13 species of flora and fauna within the park are classified under NOM-059.

Invasive Alien Species: Historically, there were two invasive alien mammal species in the park; the black rat (*Rattus rattus*) and the domestic mouse (*M. musculus*). The rat was a significant threat to turtle and bird populations through predation of eggs. However, in 2011 the former was eradicated on Pérez island, and the latter on Muertos and Pájaros island, so that these species are now gone from the park. The only remaining IAS in the park are the Cattle egret (*Bubulcus ibis*), whose impact is still unknown, and 5 exotic plants, including Casuarina (*Casuarina equisetifolia*), Prickly Pear (*Opuntia dillenii*) and sandspour (*Cenchrus echinatus*); these plants compete for nutrients and displace native vegetation, including habitat for various bird species.

Threats / Pressures: The principal introduction pathway for IAS is on Isla Pérez, which is the only inhabited island in the park. The number of residents is approximately 15 SEMAR and CONANP personnel. Tourism (fishing, camping, diving) takes place within the national park, as does artisanal fishing for lobster and other species. The most significant risk comes from fishing tournaments held in and around the park several two to three times each year; participants commonly disembark on the islands.

## **Banco Chinchorro Biosphere Reserve**

Official Status: Biosphere Reserve; also designated as a Ramsar Site

Area / Location: 606 hectares over 4 islands: Cayo Centro = 560 ha.; Cayo Norte Mayor and Cayo Norte Menor = 26 ha.; Cayo Lobos = 20 ha., located in the Caribbean Sea 30 kilometers east of the coast of Quintana Roo.

Biodiversity: The reserve is a key site for over 150 species of birds, many of which are migratory. There are 4 species of mangroves, 6 reptiles, and 153 species of birds, including the Roadside Hawk (*Buteo magnirostris*), Wood Stork (*Mycteria americana*) and the Clapper Rail (*Rallus longirostris*). There are 27 species of flora and fauna classified under NOM-059 within the reserve. Three marine turtle species -- Green Turtles (*Chelonia mydas*), Loggerhead Turtles (*Caretta caretta*) and Hawksbill Turtles (*Eretmochelys imbricata*) -- use the reef as feeding grounds and the cays as nesting sites.

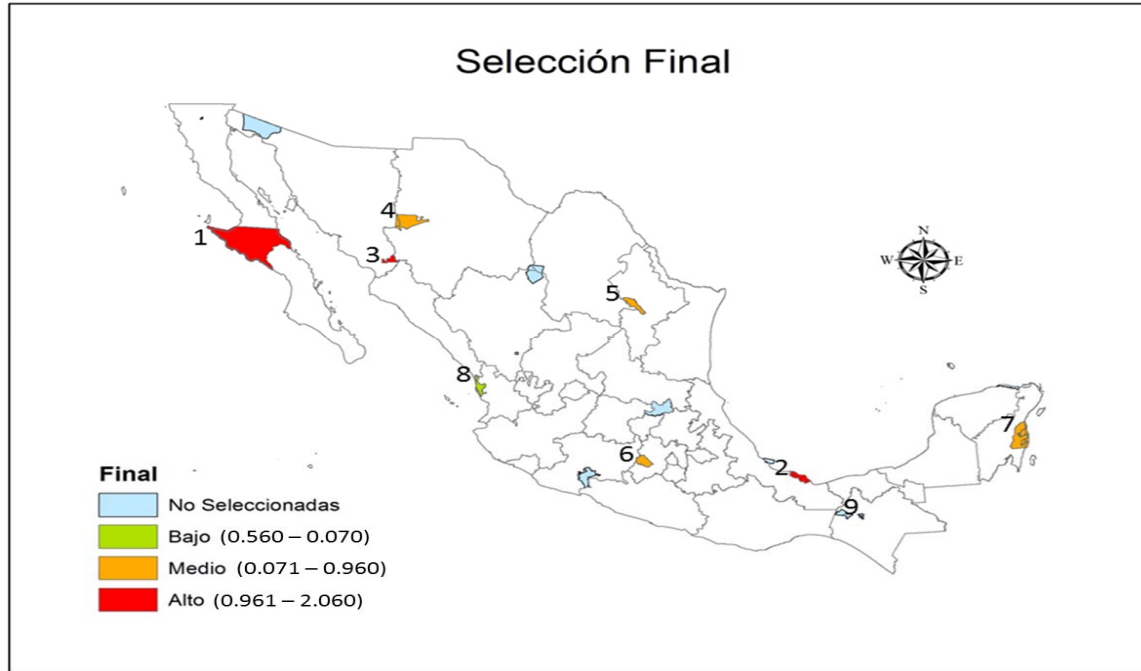
Invasive Alien Species: The black rat (*Rattus rattus*) was eradicated from Cayo Norte Mayor and Menor in 2012. Today, IAS in the reserve include 6 vascular plants, 2 birds, 1 reptile and 4 mammals. Of these, the feral cat is the most harmful species.

Threats / Pressures: SEMARNAT maintains a small staff on Cayo Norte Mayor, which usually consists of 12 persons, of whom three are replaced every 15 days. Cayo Centro has two settlements, one is inhabited by about 100 fishermen from three fishing cooperatives that using traditional methods to catch lobster and finfish, the other is a CONANP station. Tourists mostly come for snorkeling or fishing, and they do not land often on the islands, although some groups stay on Cayo Centro.



## Mainland Protected Area Sites

Map 2: Selected Mainland PA Project Sites



1. RB El Vizcaíno, 2. RB Los Tuxtlas, 3. APFF Sierra de Álamos -Río Cuchujaqui, 4. APFF Tutuaca, 5. PN Cumbres de Monterrey, 6. APRN Valle de Bravo, 7. RB Sian Ka'an, 8. RB Marismas Nacionales, y 9. PN Cañón del Sumidero

### Sierra de Álamos - Río Cuchujaqui Flora and Fauna Protected Area

Official Status: Flora and Fauna Protected Area

Area: 92,890 hectares

Biodiversity: This site has the greatest genetic diversity in the State of Sonora, encompassing ecosystems such as deciduous forest, forest pine-oak forest, thorn scrub and evergreen riparian vegetation. There are 4 endemic species in the area (*Anolis dunni*, *Anolis nebuloides*, *Bipes canaliculatus* and *Plestiodon parviauriculatus*). In total, there are approximately 1,200 plant species in 566 genera and 148 families, and approximately 557 vertebrate species, within the PA site. Of the above, 108 species of flora and fauna are listed in the NOM-059, including 9 Endangered, 41 Threatened, and 58 Special Protection, and 83 are on the IUCN Red List; 2 Endangered, 12 as Vulnerable, 10 Almost threatened, and 58 Least Concern and 1 in Low Risk.

Invasive Alien Species / Threats: IAS with major negative impacts on biodiversity include: Zacate rosado (pink grass); Zacate johnson (johnson grass) and Zacate buffel (buffel grass); Pino Salado (Salt Cedar, which uses high levels of water and causes soil salinization); exotic fish (which feed on the eggs of native amphibians and fish and displace native fish populations); and cattle breeding (SAGARPA continues to subsidize cattle production at this site)

## **Tutuaca Flora and Fauna Protected Area**

Official Status: Flora and Fauna Protected Area (APFF)

Area: 444,489 hectares

Biodiversity: The site includes pine forest, coniferous forest, oak forest and induced vegetation. The area has high biodiversity with 29 endemic species and notable endemic and/or emblematic species such as the golden trout (*Oncorhynchus chrysogaster*), the Yaqui catfish (*Ictalurus pricei*), golden eagle (*Aquila chrysaetos*), wild turkey (*Meleagris gallopavo*), black bear (*Ursus americanus*), cougar (*Puma concolor*), jaguar (*Panthera onca*), collared peccary (*pecarí tajacu*) and among the most important, the billed parrot (*Rhynchopsita pachyrhyncha*), which is considered emblematic of the area. This site is also home to many species of migratory birds. 67 species in the reserve are listed under NOM-059, including 7 Endangered, 44 Special Protection and 16 Threatened, as well as 55 species on the IUCN Red List, including 3 Endangered, 1 Vulnerable, 4 Near Threatened, and 40 Least Concern.

Invasive Alien Species / Threats: The most significant IAS impacts have come from feral cats (*Felis catus*), which have adversely impacted wild populations of amphibians and small reptiles. In addition, SAGARPA and municipal governments support the planting of IAS such as Zacate buffel and Zacate rosado (exotic grasses) to support livestock, and they also support aquaculture using tilapia, which displaces native species such as trout (*Onchorhynchus* sp.), and reforestation programs that involve the planting of exotic plant species in areas around the PNA.

## **Valle de Bravo Forested Protected Area**

Official Status: Forested Protected Area (APRN)

Area: 139,871 (covering the watersheds of the Valle de Bravo, Malacatepec, Tilostoc and Temascaltepec rivers)

Biodiversity: The site encompasses both terrestrial and aquatic ecosystems, including deciduous forest, middle- deciduous forest, deciduous scrub oak forest, pine-oak forest and cloud forest. There are 37 endemic species within the area, including 106 mammals, 187 birds, 33 reptiles, 27 amphibians, 21 fish, 78 fungi and 1,680 plants. 80 species in the reserve are listed under NOM-059, including 8 Endangered, 35 Special Protection and 37 Threatened, as well as 51 species on the IUCN Red List, including 4 Critically Endangered, 6 Endangered, 3 Vulnerable, 1 Near Threatened, and 37 Least Concern.

Invasive Alien Species / Threats: IAS with major negative impacts on biodiversity include: species used in reforestation projects, such as patula pine (*Pinus patula*), eucalyptus (*Eucalyptus* spp.) and casuarina (*Casuarina equisetifolia*), which degrade soils and prevent the regeneration of natural ecosystems, contributing to habitat loss and fragmentation of ecosystems and displacement of native species; the planting of exotic grass species such as the chayotillo (*Sicyos deppei*) that have replaced native grasses and contributed to increased fires; reeds (*Arundo donax*) and water hyacinth (*Eichhornia crassipes*) that have affected water quality and competed for light and nutrients with native vegetation; the use of exotic species as tilapia (*Oreochromis* sp.), Carp (*Cyprinus carpio*), largemouth bass (*Micropterus salmoides*), and especially rainbow trout (the Municipality of Amanalco within the ANP has 70 trout farms and is the leading producer of rainbow trout in Mexico) in aquaculture operations in both artificial and natural water bodies, which has led to the depletion of aquatic flora and fauna, competition for food and the transmission of diseases in humans and animals; feral dogs and cats which displace and prey on native

species; introduced cattle that are preventing natural forest regeneration; and genetically altered agricultural varieties

### **Cañón del Sumidero National Park**

Official Status: National Park

Area: 21,789 hectares

Biodiversity: This site harbors 12 endemic species. Overall, the park has 1,298 species of flora, equivalent to 15.7% of the total number of floral species in Chiapas State. In terms of fauna, the site has a total of 278 species, including 52 mammals, 23 reptiles, 7 amphibians, 8 fish, and 188 of birds. 76 species in the reserve are listed under NOM-059, including 7 Endangered, 40 Special Protection and 29 Threatened, as well as 48 species on the IUCN Red List, including 2 Endangered, 7 Vulnerable, 5 Near Threatened, and 34 Least Concern.

Invasive Alien Species / Threats: IAS with major negative impacts on biodiversity include: Cedra Blanco (white cedar), which affects the germination of other species leading to low diversity and low biomass of vascular plants; tilapia production (which has been promoted by SAGARPA for subsistence and commercial use) that impacts native fish; escaped farmed Morelet's crocodiles (*Crocodylus moreletii*) which have preyed on young individuals of the native American Crocodile (*Crocodylus acutus*); feral dogs and cats, which feed primarily on bird eggs, reptiles and rodents but also on deer, armadillo and hares, and transmit diseases to native species; and livestock production, which continues to be promoted by SAGARPA

### **Cumbres de Monterrey National Park**

Official Status: National Park

Area: 177,396 hectares

Biodiversity: This site is located within the subtropical high-pressure zone, with a climate influenced by masses of marine, continental and high altitude air circulation. This variable climatic system, combined with highly varied conditions of elevation, slope, and slope orientation, has given rise to high ecosystem diversity, including conifer-hardwood forests, pine-oak forests, chaparral, desert scrub, submontane scrub, gallery forests and grasslands. The park includes 29 endemic species, and in total is inhabited by at least 1,368 species of flora and fauna. Of these, 98 are included in the NOM-059, including 14 Endangered, 49 Special Protection, and 35 Endangered, and 71 are on the IUCN Red list, including 1 Critically Endangered, 5 Endangered, 4 Vulnerable, 4 Near Threatened, and 54 Least Concern.

Invasive Alien Species / Threats: IAS with major negative impacts on biodiversity include: giant cane (*Arundo donax*; 110 hectares within the NP) that displaces numerous native flora such as *Chilopsis linearis* and the genera *Platanus*, *Populus*, *Juglans*, *Salix* and *Carya* and reduces water availability; glossy privet (*Ligustrum lucidum*; 26 hectares within the NP), which also reduces water availability and impacts native species such as various pine and oak species; various aquatic fish species such as largemouth bass (*Micropterus salmoides*), tilapia (*Tilapia aurea*), southern platyfish (*Xiphophorus maculatus*) and variatus platyfish (*X. variatus*) that impact native aquatic species; feral cats and dogs; and cattle breeding (promoted by SAGARPA).

## **El Vizcaíno Biosphere Reserve**

Official Status: Biosphere Reserve (also designated Ramsar site)

Area: 2,546,790 hectares

Biodiversity: This site encompasses a variety of physical and climatic environments that have allowed the development of ecosystems such as desert scrub, microphyll forest, coastal dunes, rocky reefs, shorelines, wetlands, estuaries, and coastal lagoons. There are 23 endemic species in the reserve. In total, the reserve harbors 463 species of flora, grouped in 256 genera and 83 families; 308 species of terrestrial and marine vertebrates (excluding fish), 4 of which are amphibians; 43 reptiles, 192 birds and 69 mammals. Of the above, 78 species are listed in NOM-059, of which 11 are Endangered, 46 under Special Protection and 21 are Threatened. Similarly, 58 of these species appear on the IUCN Red List; 2 Critically Endangered, 5 Endangered, 4 Vulnerable, 3 Near Threatened, and 45 as Least Concern.

Invasive Alien Species / Threats: IAS with major negative impacts on biodiversity include: salt cedar, which outcompetes native species for water resources, creates saline conditions that prevent the germination and growth of native plant species, and contributes to the spread of wildfires; vidrillo (*Mesembryanthemum crystallinum*), which competes directly with native wildflower species for space and water; frogs, tilapia and prawns that have displaced endemic species of fish and turtles (e.g. *Trachemys scripta*) in the San Ignacio oasis; raven (*Corvus corax*), which consume the eggs of other bird species on islands of the Reserve; mountain goats that remove vegetative cover and spread diseases to wild bighorn sheep; raised sheep, cattle and donkeys (with support from SAGARPA) that displace native species like mule deer and the peninsular pronghorn (*Antilocapra americana peninsularis*); feral cats that have contributed to the decline in the population of Mexican Shearwater (*Puffinus opisthomelas*) on Natividad Island; and commercial oyster cultivation which causes diseases in seagrass beds that impact migratory birds in San Quentin.

## **Los Tuxtlas Biosphere Reserve**

Official Status: Biosphere Reserve (also designated Ramsar site)

Area: 155,122 hectares

Biodiversity: This site is of great biological and ecological importance due to its geographic position in the middle of the coastal plain near the sea, its wide altitudinal gradient, varied terrain and exposure to the humid winds of the Gulf of Mexico, all of which gives it a wide variety of soils and microclimates favorable to ecosystem diversity. Among the significant ecosystems within the reserve are highland, medium and lowland flooded evergreen forests, cloud forest, pine forest, oak forests, mangroves, savannah and coastal dunes. Thanks to its biogeography, the reserve has a high level of flora native to Central and South America, with over 2,697 species, subspecies and varieties recorded. There are 48 endemic species in the reserve, and Los Tuxtlas is one of the five regions with the most endemic tree species in Mexico (including 26 of the 41 tree species unique to the rain forests of the Gulf and Caribbean). Fauna include 565 species of birds, 139 species of mammals, 120 species and subspecies of reptiles, 46 species of amphibians, 861 species of butterflies, 133 species of dragonflies, 118 species of Cerambycidae beetles, 164 species of beetles and more than 50 species of aquatic insects. 289 species in the reserve are listed under NOM-059, including 57 Endangered, 136 Special Protection and 96 Threatened, as well as 194 species on the IUCN Red List, including 7 Critically Endangered, 13 Endangered, 9 Vulnerable, 22 Near Threatened, and 143 as Caution.

Invasive Alien Species / Threats: IAS with major negative impacts on biodiversity include: orchids (*Oeceoclades maculata*), which invades and displaces native species; invasive grasses (*Brachiaria brizantha*) that do not allow other vegetation to grow; Colombian Bamboo (*Guadua angustifolia*), which causes soil erosion; water hyacinth (*Eichhornia crassipes*), which contributes to eutrophication; spread of genetically modified plants, including hybrid corn varieties, that pollinate native varieties; largemouth bass, which feed on other fish, frogs, shrimp, crustaceans and insects; tilapia that alter and remove bottom sediment and compete with native species; two species of gecko (*Hemidactylus frenatus*; *Hemidactylus turcicus*), which have displaced native gecko species (*Sphaerodactylus glaucus*) and may transmit diseases to native herpetofauna; herons that outcompete native birds such as the Groove-billed Ani (*Crotophaga sulcirostris*) that feed on invertebrates; the Bronzed Cowbird (*Molothrus aeneus*) and various species of Magpie, which compete with native birds for space and nesting sites; and the house mouse and common rat, which can transmit a number of diseases.

### **Marismas Nacionales Biosphere Reserve**

Official Status: Biosphere Reserve (also designated Ramsar site)

Area: 133,854 hectares

Biodiversity: This site is an area of coastal wetlands of incalculable ecological value that harbors between 10-20% of the country's mangrove ecosystems, which consist of 82 species, 1 sub-species and three varieties of vascular plants, amount them 4 mangrove species: Red mangrove (*Rhizophora mangle*), black mangrove (*Avicennia germinans*), buttonwood mangrove (*Conocarpus erectus*) and white mangrove (*Laguncularia racemosa*). Other important features are highly productive coastal lagoons, bays and estuaries that form an important corridor for migratory birds and shelter endangered species, and include diverse ecosystems such as deciduous forest, thorn scrub, coastal dune vegetation, streams, ponds, and marshes. There are 9 endemic species in the reserve, and a total of 446 species of resident and migratory birds, 98 species of mammals, 79 species of reptiles, 28 species of amphibians and a total of 6-9,000 plant species. The reserve is home to 4.5% of all of the migratory birds that come to Mexico each winter. Notable fauna species include jaguar (*Panthera onca*), crocodile (*Crocodylus acutus*) and several species of migratory birds of great international interest. 43 species in the reserve are listed under NOM- 059, including 11 Endangered, 20 Special Protection and 12 Threatened, as well as 34 species on the IUCN Red List, including 2 Critically Endangered, 1 Endangered, 4 Vulnerable, 6 Near Threatened, and 12 Caution.

Invasive Alien Species / Threats: IAS with major negative impacts on biodiversity include: vines (*Cissus sicyoides*), which have direct negative impact on mangroves by restricting growth, reducing seed production and increasing susceptibility to insects and fungi; giant cane (*Arundo donax*), which has increased sedimentation and invaded riparian corridors where it consumes large quantities of water, causes flood control problems, and displaces plants and animals; buffelgrass (*Cenchrus ciliaris*), which is promoted by SAGARPA as livestock forage; livestock (also promoted by SAGARPA), which have reduced mangrove stocks and caused water pollution; and the Mexican crocodile (*Crocodylus moreletii*), which was introduced and has bred with the native *Crocodylus acutus*, producing highly aggressive hybrid offspring.

### **Sian Ka'an Biosphere Reserve**

Official Status: Biosphere Reserve (also designated Ramsar site)

Area: 528,148 hectares

Biodiversity: This site of 528,148 hectares includes 153,192 hectares of marine ecosystems, including shallow ocean areas and coral reefs, and 374,956 hectares of terrestrial ecosystems, dominated by a limestone plateau that gradually slopes towards the sea and forms a gradient from dry to flooded sites. Within this gradient are found midlevel and lowland flood forests, marshes, mangroves, fresh and brackish water bodies, cenotes, springs, small islands and hills. The reserve has a high diversity of native species among including palms (*Tabebuia chrysantha* and *Thrinax radiata*) and a yucca (*Pseudophoenix sargentii*) that are listed in the NOM-059. The site harbors 103 species of mammals, including species at risk such as jaguar (*Panthera onca*), ocelot (*Leopardus wiedii*), ocelot (*Leopardus pardalis*), jaguarundi (*Felis yaguaroundi*), tapir (*Tapirus bairdii*), manatee (*Trichechus manatus*), spider monkey (*Ateles geoffroyi*) and sarahuato (*Alouatta pigra*). Notable bird species include the jabiru (*Jabiru mycteria*), American Flamingo (*Phoenicopterus ruber*), the peak canoe Toucan (*Ramphastos sulfuratus*) and the green Toucan (*Aulacorhynchus prasinus*). 144 species in the reserve are listed under NOM-059, including 22 Endangered, 71 Special Protection and 50 Threatened, as well as 109 species on the IUCN Red List, including 6 Critically Endangered, 8 Endangered, 7 Vulnerable, 11 Near Threatened, and 76 Least Concern.

Invasive Alien Species / Threats: IAS with major negative impacts on biodiversity include: Indian almond (*Terminalia catappa*), which produces chemicals that inhibit the growth and germination of native species (particularly in fragile coastal dunes); coconut palms (*Cocos nucifera*), which grow higher and prevent sunlight from reaching native palm species (*Tabebuia chrysantha* and *Thrinax radiata*), and are the main host of the invasive red palm mite (*Raoiella indica*) and black weevil (*Rhynchophorus palmarum*); Casuarina, which is displacing native vegetation such as the creeping vine (*Erenodea littoralis*), sea grape (*Coccoloba uvifera*), thatch palm (*Thrinax radiata*) and 4 species of mangrove (*Rhizophora mangle*, *Laguncularia racemosa*, *Avicennia germinans* and *Conocarpus erecta*); the lionfish (*Pterois volitans*), which has generated a significant impact on the entire coastal area and islands of the state of Quintana Roo, where it consumes native fish, crustaceans and molluscs; cattle breeding (promoted by SAGARPA), which reduces the regeneration of vegetation; and production of tilapia (*Oreochromis niloticus*), also supported by SAGARPA.

## **Annex 4. UNDP Environmental and Social Screening Procedure**

*Applied in October 2013 (see separate file)*

## Workplan

Outputs & Activities	Year 1		Year 2		Year 3		Year 4		Leading Agencies / Principal Partners
	1-6	7-12	1-6	7-12	1-6	7-12	1-6	7-12	
<b>IAS management framework</b>									
<b>Tools aimed at informing cost effective management decisions to address IAS threats in key landscapes and key sectors (aquarium wildlife and forest products)</b>									
Development of National Invasive Alien Species Information System									CONABIO, with support from IMTA and other Govt. agencies
Development of Information System to measure Strategy on Invasive Species									CONABIO, with participation of Govt. agencies, Universities, NGOs
Development of Networks to support IAS management									CONABIO and Universities
Development of an IAS National Gateway									CONABIO
Development of the National List of Invasive Species (NLIS)									SEMARNAT, CONABIO, SAGARPA, COFEMER, National IAS Committee, Universities
Development of risk analysis methodologies for high risk species /									CONABIO, UAM, UNAM, UANL
Development of Inspection Tools for IAS that threaten									CONABIO, SEMARNAT
Development of a model for mapping of IAS flora									UAM, UNAM
Development of IAS into the National Forest and Soils Inventory									CONAFOR, COLPOS, CONABIO
Development of IAS dispersion related to climate change									INECC, CONANP
Development of tools for different IAS management strategies in									Technical experts; GECI, CONANP, CONAFOR
Development of models to estimate the costs to the Mexican economy of									Technical Experts; IMTA
<b>Policy and regulations in place to strengthen the control of main pathways of IAS to vulnerable areas</b>									
Development of control of IAS in productive sector operations									SEMARNAT, CONABIO
Development of resources and training for improved IAS management to government agencies in Wildlife and Forest sectors									PROFEPA, SEMARNAT, IMTA, CONAFOR, COLPOS, SAGARPA
Development of resources and training for improved IAS management to government agencies in the Aquarium Trade and									INAPESCA, CONABIO, SEMARNAT, CONANP, Comites Estatales de Sanidad Acuícola
Development of activities in the Aquaculture Sector in the State of									CESAEM, INAPESCA, Secretaría de Desarrollo Agropecuario (Morelos)



Outputs & Activities	Year 1		Year 2		Year 3		Year 4		Leading Agencies / Principal Partners
	1-6	7-12	1-6	7-12	1-6	7-12	1-6	7-12	
production sectors									
<b>Output 1.3: Multi-sectorial institutional framework in place to implement National Strategy on Invasive Species (NSIS)</b>									
1.3.1 Draft revised and harmonized existing laws / regulations related to IAS management									SEMARNAT, National experts
1.3.2 Institutional structures strengthened / established to facilitate inter-institutional coordination for overall IAS management									National consultants, IAS Committees
1.3.3 Institutional Coordination to prevent the entry and spread of IAS in Mexico									National IAS Committee, SEMARNAT, SAGARPA
1.3.4 Strengthen capacity for Early Detection and Rapid Response (EDRR) systems for IAS at national level									CONABIO, PROFEPA, SAGARPA, SEMARNAT
1.3.5 Development and application of financial mechanisms to support IAS management									SEMARNAT
1.3.6 Budgetary coordination between sectors to ensure coherent investments and actions to address threats cost efficiently									CONABIO, National experts
1.3.7 Establish harmonized standards and training programs for IAS management across key institutions									INECC, IMTA, CONANP, PROFEPA, CONABIO, SAGARPA-SENASICA
1.3.8 Implement education and awareness campaigns on IAS for policymakers, private land owners, NGOs, volunteer groups and the general public									FCEA, CONANP, CONABIO, IMTA, SEP, SEMARNAT, UAM, Jardín Botánico de Queretaro
<b>Component 2: Integrated IAS management to protect vulnerable globally significant ecosystems</b>									
<b>Output 2.1: Strengthened prevention and control of key IAS populations in selected Islands</b>									
2.1.1 Establish and maintain Island Biosecurity Programs									GECI, CONANP, SEMARNAT, CSOs/NGOs, local productive sectors
2.1.2 Implement education and training to support IAS management									GECI
2.1.3 Implement targeted high priority IAS Control & Eradication programs									GECI, CONANP
2.1.4 Establish and maintain monitoring programs to ensure effectiveness of biosecurity and IAS control and eradication efforts									GECI, CONANP
<b>Output 2.2: Enhanced IAS surveillance and control strategies reduce introduction rates from productive landscapes and contain populations below thresholds that endanger endemic species and their habitats at selected Mainland Protected Areas</b>									
2.2.1: Develop baseline information necessary for effective IAS management planning									CONANP
2.2.2: Strengthen IAS management capacities and processes for landscapes within and surrounding mainland Protected Areas									CONANP, PROFEPA, SENASICA, SAGARPA, community leaders, local productive sector businesses
2.2.3: Introduce best practices in IAS management in targeted production sectors to reduce IAS spread									CONANP, PROFEPA, SENASICA, SAGARPA, community leaders, local

Outputs & Activities	Year 1		Year 2		Year 3		Year 4		Leading Agencies / Principal Partners
	1-6	7-12	1-6	7-12	1-6	7-12	1-6	7-12	
									productive sector businesses
2.2.4: Increase community awareness and participation in IAS management in and around mainland PA sites									CONANP, CSOs / NGOs, local community leaders, ejidos
2.2.5 Develop and implement Biosecurity Programs (Prevention; Early Detection and Rapid Response) at selected mainland PA sites									CONANP, local residents
2.2.6: Implement targeted IAS Control, Eradication and Monitoring at selected mainland PA sites									CONANP, local residents, CSOs / NGOs
2.2.7: Undertake Ecosystem Restoration in areas negatively impacted by IAS									CONANP

## **Annex 6. UNDP Direct Project Services**

### **LETTER OF AGREEMENT**

#### **STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE CONABIO FOR THE PROVISION OF SUPPORT SERVICES**

**Dear Mr. Jose Sarukhan Kermez**

**Commissioner - National Commission for Knowledge and Use of Biodiversity (CONABIO)**

1. Reference is made to consultations between officials of the National Commission for Knowledge and Use of Biodiversity (hereinafter referred to as “the CONABIO”) and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the CONABIO hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.
2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the CONABIO-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.
3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:
  - (a) Identification and/or recruitment of project and programme personnel;
  - (b) Identification and facilitation of training activities;
  - (c) Procurement of goods and services;
4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the programme support document or project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a programme or project, the annex to the programme support document or project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.
5. The relevant provisions of the Standard Basic Assistance Agreement (SBAA) between the Government of Mexico and the United Nations Development Programme, signed by the parties on 23 February 1961, including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA and the project document.
7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.
8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.
9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.
10. If you are in agreement with the provisions set forth above, please sign and return to this office three signed copies of this letter. Upon your signature, this letter shall constitute an agreement between CONABIO and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

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Signed on behalf of UNDP  
Marcia de Castro  
Resident Representative

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For CONABIO  
Mr. Jose Sarukhan Kermez  
Commissioner  
National Commission for Knowledge and Use of Biodiversity  
[Date]

## DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between the National Commission for Knowledge and Use of Biodiversity (CONABIO), the institution designated by the Government of Mexico and representatives of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed programme or project **Enhancing National Capacities to manage Invasive Alien Species (IAS) by implementing the National Strategy on IAS** (PIMS 4771) “the Project”.
2. In accordance with the provisions of the letter of agreement signed on *Date of signature (LOA)* and the project document, the UNDP country office shall provide support services for the Project as described below.
3. Support services to be provided:

Support services* (insert description)	Schedule for the provision of the support services	Cost to UNDP of providing such support services (where appropriate)	Amount and method of reimbursement of UNDP (where appropriate)
1. Payments, disbursements and other financial transactions	During project implementation	Universal Price List	Support Services
2. Recruitment of staff, project personnel, and consultants	During project implementation	Universal Price List	Support Services
3. Procurement of services and equipment, and disposal/sale of equipment	During project implementation	Universal Price List	Support Services
4. Organization of training activities, conferences, and workshops, including fellowships	During project implementation	Universal Price List	Support Services
5. Travel authorizations, visa requests, ticketing, and travel arrangements	During project implementation	Universal Price List	Support Services
6. Shipment, custom clearance, vehicle registration, and accreditation	During project implementation	Universal Price List	Support Services

\* UNDP direct project support services will be defined yearly, and for those executed during the period, direct project costs will be charged at the end of each year based on the UNDP Universal Pricelist (UPL) or the actual corresponding service cost.

4. Description of functions and responsibilities of the parties involved:

As described in the Project Document (Management Arrangements), the project will be executed under national implementation modality (NIM), with execution by the National Commission for Knowledge and Use of Biodiversity (CONABIO) following UNDP’s Programme and Operations Policies and Procedures, per its role as implementing agency. Execution of the project will be subject to oversight by a Project Steering Committee (described in the Project Document). Day to day coordination will be carried out under the supervision of a Project Coordination Unit and corresponding staff. The CONABIO will take

responsibility for different outcomes/activities according to existing capacities and field realities, ensuring effective and efficient use of GEF resources.

As described in the Project Document, the functions of the Participants are the following:

**The Ministry of Foreign Affairs (SRE).** The Government of the United Mexican States has designated the Technical and Scientific Cooperation Directorate of the SRE as the official counterpart of UNDP in Mexico. Its main responsibilities are:

- As the entity responsible for technical cooperation in Mexico, to act as the Mexican government's official counterpart to UNDP; specifically, and in accordance with the National Development Plan, to formalize approval of the project cooperation documents presented to UNDP by federal, state and private entities.
- If necessary, to make a written request to UNDP for reports on the project.
- To approve the annual audit plan for the project and, in accordance with UNDP standards and procedures, to convene an information and consultation meeting prior to the audit.
- If considered necessary, to attend at least one meeting a year of the project's Project Steering Committee.
- As required, to participate in tripartite meeting or in any follow-up or reorientation sessions.

**The National Commission for Knowledge and Use of Biodiversity (CONABIO)** is responsible for the fulfillment of the project's results. Its main responsibilities are to:

- Lead the project implementation with the support of the PCU.
- Designate a representative to act as a permanent liaison between UNDP, the Ministry of Foreign Affairs and the Project Coordinator, and to participate in the Project Steering Committee meetings, and others as required, to ensure that the necessary inputs are available to execute the project.
- Prove the technical and administrative capacity to develop the project.
- Monitor the project's work plan and progress.
- Provide the name and describe the functions of the person or persons authorized to deal with UNDP concerning the project's matters.
- Approve Terms of Reference for technical personnel and consultancies for project implementation.
- Participate in the selection process of the consultants and approve all hiring and payment request.
- Provide the name and describe the functions of the person or persons authorized to sign the project's budget and/or substantive revisions of the project.

**United Nations Development Programme (UNDP)** has the responsibility to:

- Designate a programme officer responsible for providing substantive and operational advice and to follow up and support the project's development activities.
- Advise the project on management decision making, as well as to guarantee quality assurance.
- Be part of the project's Steering Committee and other Committees or Groups considered part of the project structure.
- Administer the financial resources agreed in the revised work plan and approved by the project's Steering Committee, and inform the National Implementing Partner of its origin and destination.
- Co-organize and participate in the events carried out in the framework of the Project.
- Use national and international contact networks to assist the project's activities and establish synergies between projects in common areas and/or in other areas that would be of assistance when discussing and analyzing the project.
- Provide Support in the development and instrumentation of the project's gender strategy