

THE STATE
OF THE WORLD'S
FOREST GENETIC RESOURCES
COUNTRY REPORT
MEXICO

This country report is prepared as a contribution to the FAO publication, The Report on the State of the World's Forest Genetic Resources. The content and the structure are in accordance with the recommendations and guidelines given by FAO in the document Guidelines for Preparation of Country Reports for the State of the World's Forest Genetic Resources (2010). These guidelines set out recommendations for the objective, scope and structure of the country reports. Countries were requested to consider the current state of knowledge of forest genetic diversity, including:

- Between and within species diversity
- List of priority species; their roles and values and importance
- List of threatened/endangered species
- Threats, opportunities and challenges for the conservation, use and development of forest genetic resources

These reports were submitted to FAO as official government documents. The report is presented on www.fao.org/documents as supportive and contextual information to be used in conjunction with other documentation on world forest genetic resources.

The content and the views expressed in this report are the responsibility of the entity submitting the report to FAO. FAO may not be held responsible for the use which may be made of the information contained in this report.

Forest Genetic Resources Situation in Mexico

Final Report on Project TCP/MEX/3301/MEX (4)

Mexico 2012

Food and Agriculture Organization
of the United Nations



Mexico, January 2012

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views of FAO.

ISBN 978-92-5-107275-2

All rights reserved. FAO encourages reproduction and dissemination of material in this information product. Non-commercial uses will be authorized free of charge, upon request. Reproduction for resale or other commercial purposes, including educational purposes, may incur fees. Applications for permission to reproduce or disseminate FAO copyright materials, and all queries concerning rights and licences, should be addressed by e-mail to copyright@fao.org or to the Chief, Publishing Policy and Support Branch, Office of Knowledge Exchange, Research and Extension, FAO,

Viale delle Terme di Caracalla, 00153 Rome, Italy.

© FAO 2012

Inform elaborated by Comisión Nacional Forestal (CONAFOR) in collaboration with Organización de las Naciones Unidas para la Alimentación y la Agricultura (FAO).

Printing and graphic design: DANDA

Thanks

This inform of Forest Genetic Resources in Mexico, is an overall effort coordination result from CONAFOR personal and FAO technical consulting team, supported by FAO Representation in Mexico and FAO Headquarter Forestal departament in Rome. In particular participated in this work Juan Manuel Torres Rojo, Víctor Eduardo Sosa Cedillo, Luis Artemio Alonso Torres, Fernando Miranda Piedragil, Yanet Biviana García Cruz, Octavio Salvador Magaña Torres, José Armando Alanís de la Rosa, Alfredo Nolasco Morales, Eugenia María Barba Robert, Sofía Cortina Segovia, Aurelio M. Fierros González, Karina Lizette Pérez Villegas, Erika del Rocío López Rojas, Francisco Javier Nuñez Castañeda, Carlos E. González Domínguez, Germánico Galicia García, Salvador Anta Fonseca, José Carlos Fernández Ugalde, state managers and personal of germoplasma at national level, by CONAFOR, and Javier López Upton, Carlos Ramírez Herrera, Jesús Jasso Mata, Marcos Jiménez Casas, Manuel Aguilera Rodríguez, José Ricardo Sánchez Velázquez, Dante Arturo Rodríguez Trejo, by FAO.

We also thanks participation of other Institutions and Secretaries which participated, in particular to Mario Aguilar Hernández and José Angel López López from FIPRODEFO, Gustavo Alonso Cabrera Rodríguez from DG CORENA, Francisco Javier Franco Ávila from PROBOSQUE, Pedro Brajcich Gallegos and Juan Bautista Rentería Anima from INIFAP, M. in Enrique Kato Miranda from IE of Guanajuato, José Sarukhán Kermez and Yessica Montiel Almanza from CONABIO, Martín Vargas Prieto from SEMARNAT, C. Francisco Javier Medina González from CONANP and Nahum Sánchez Vargas from UMSNH.

The review and graphic edition was made by Ing. Jonathan Martínez Cortés and Lic. Astrid Álvarez Heredia, personal from FAO Representation in México.

Index

Table Index	IX
Figures Index	IX
Annex Index	XI
A. Executive summary.	XII
Chapter 1 Current State of Forest Genetic Resource diversity	1
1.1. Vegetation types in Mexico.	1
1.2. Genetic Diversity in forest species.	3
1.3. High priority forest species in Mexico	9
1.4. Benefits obtained from ecosystems and forest species.	12
1.5. Forest ecosystems and threatened species.	16
1.6. Risk analysis for loss of genetic resources due to catastrophes	18
1.7. Priorities to avoid the loss of genetic resources.	19
Chapter 2 In situ state of genetic conservation	21
2.1. Protected natural areas (PNA) in Mexico.	21
2.2. Forest areas with management plans.	23
2.3. Management units for wildlife conservation (WMU).	24
2.4. Conservation and promotion plans.	26
2.5. Strategies to maintain in situ collections.	27
Chapter 3 Ex situ state of genetic conservation.	31
3.1. Forest species included in ex situ conservation programmes	31
3.2. <i>Ex situ</i> conservation plantations established in the country.	32
3.3. <i>Ex situ</i> conservation infrastructure.	52
3.4. Arboretums and botanical gardens established in Mexico.	58
3.5. Use and transference of germplasm inside and outside the country.	60
3.6. Documentation and official characterisation of germplasm.	61
3.7. Measures used to maintain and promote ex situ conservation.	61
Chapter 4 State of the use and sustainable ordering of forest genetic resources.	65
4.1. Genetic improvement objectives.	65
4.2. Genetic improvement level.	65
4.3. Degree of use of reproduction materials in improved forests in the country.	68
4.4. Measures taken to promote the use of genetically improved material.	68
4.5. Programmes of participatory selection of forest trees in the country.	68
4.6. Information systems on forest genetic improvement.	69
4.7. Species in which germplasm exchange is possible.	70
4.8. Improved species from which germplasm can be produced on a commercial scale.	70

4.9. Classification of improved reproductive material being used in the country.	71
4.10. Varieties produced in the country.	72
4.11. Public presentation of improved genetic materials.	72
4.12. Priorities to improve ex situ conservation.	72
Chapter 5 State of programmes, research, education, training and legislation in the country.	75
5.1. Institutions participating in the protection and promotion of forest genetic resources.	75
5.2. National genetic resources programme.	77
5.3. Judicial framework for strategies, plans and programmes for forest genetic resources.	78
5.4. Support for the national forest genetic resources programme.	79
5.5. Education, research and training.	80
5.6. Opportunities for education and training in other countries.	85
5.7. Legislation pertinent to forest genetic resources.	85
5.8. Agreements and international covenants in which Mexico participates.	86
5.9. Obstacles in the development of relevant rules and laws for forest genetic resources.	88
5.10. Management of information systems in support of the sustainable use, development and conservation of forest genetic resources.	88
5.11. Sensibility towards the importance of forest genetic resources.	89
5.12. Challenges, needs and main priorities for the maintenance or fortification of a national programme for forest genetic resources in Mexico within the next 10 years.	91
Chapter 6 State of regional and international contribution.	93
6.1. Thematic networks on forest genetic resources.	93
6.2. Needs and priorities for creating or fortifying national and international networks for forest genetic resources.	94
6.3. Other organisations and main results in those programmes.	96
6.4. Mexican needs and priorities with regard to future international contribution.	99
Chapter 7 Forest genetic resources, access and benefits.	101
7.1. Access to forest genetic resources in Mexico.	101
7.2. Access to forest genetic resources situated outside the country.	103
7.3. Distribution of benefits derived from forest genetic resources.	105
7.4. Priorities for improving use and access for forest genetic resources .	106

Chapter 8 Contribution of forest genetic resources to food security, reduction of poverty, and sustainable development	109
8.1. National priorities and contribution to forest genetic resources in economic, social and environmental aspects	109
8.2. Contributions of the management of forest genetic resources to the Millenium Development Goals	111
8.3. Forest species of importance to food security and the reduction of poverty.	113
Bibliographic references.	115
Annexes	125

Index of Tables

Table 1.1 Estimated types of vegetation and forest area in Mexico between 2002 and 2007, and loss of coverage during this period (FAO, 2010).	2
Table 1.2 Native species that have been genetically characterised. (SEMARNAT, 2012).	4
Table 1.3 Genetic diversity (H_e = Expected heterozygosity) and coefficient of differentiation (GST) in native species using alloenzymes.	7
Table 1.4 Genetic diversity (H_{mt} and H_{cp}) and coefficient of differentiation (GST _{mt} and GST _{cp}) in native species using molecular markers in mtDNA and ctDNA.	7
Table 1.5 Genetic diversity and coefficient of differentiation (GST) in Mexican species using nuclear DNA.	8
Table 1.6 Genetic diversity (P = percentage of polymorphic loci) in native species using RAPD.	9
Table 1.7 Prioritised species typical of coniferous forests.	10
Table 1.8 Prioritised species native in oak forest, jungle, hydrophilic vegetation and xerophilic scrubland.	11
Table 1.9 Examples of forest species being effectively exploited.	12
Table 1.10 Volume of timber (thousands of m ³ r) exploited annually in the period 2000 to 2010 (SEMARNAT, 2012a).	13
Table 1.11 Volume of timber (thousands of m ³ r) destined for different products in the period 2000 to 2010 (SEMARNAT, 2012b).	14
Table 1.12 Quantity (tonnes) of non-timber products in the period 2000 to 2010 (SEMARNAT, 2012c).	14
Table 1.13 Surface area by type of vegetation supported by payments from the environmental services programme.	15
Table 1.14 Number of forest fires in the period 2001 to 2011.	17
Table 1.15 Average yearly surface area affected by plagues and diseases. (SEMARNAT, 2011).	18
Table 2.1 Category and surface area of federal PNA (CONANP, 2011).	21
Table 2.2 Number of PNA and surface area in the years 2001 and 2011.	22
Table 2.3 Type of vegetation in Protected Natural Areas (CONANP, 2011)	23
Table 2.4 Forest germplasm production units registered by CONAFOR.	27
Table 3.1 Forest species and varieties used in ex situ conservation.	31
Table 3.2 Ex situ plantations and conservation banks.	33
Table 3.3 Bodies participating in ex situ conservation projects.	49
Table 3.4 Infrastructure for the storage of forest seeds.	53
Table 3.5 Arboretums and botanical gardens by federal entity.	59
Table 3.6 Categories of support for the ProÁrbol 2012 programme, which allow the promotion of genetic forest resources.	62
Table 3.7 Selected species under the sub-category of support for the establishment of areas for the production of forest seeds (A4-G), by species group.	63
Table 4.1 Main uses of species subject to genetic improvement.	65
Table 4.2 Report of sexual reproduction in active seed orchards (HSS)	66
Table 4.3 Report of asexual reproduction in active seed orchards (HSA)	67
Table 4.4 Report of active clone banks (BC).	67
Table 4.5 Clasification of germplasm production units and forest germplasm considered in the "Mexican Standard" project on forest germplasm.	71

Table 5.1 Bodies participating in the protection and promotion of forest genetic resources.	75
Table 5.2 Conservation and promotion projects of FGR 2001-2011.	80
Table 5.3 Educational institutions providing professionals with knowledge of forest genetic resources.	81
Table 5.4 Needs for normative instruments in forest genetic resources in Mexico.	88
Table 5.5 Printed material and courses given in all entities.	90
Table 5.6 Needs for specific sensitisation towards forest genetic resources in Mexico.	91
Table 6.1 Summary of the main activities carried out through diverse species and their products.	95
Table 6.2 Needs for international collaboration on forest genetic resources.	100
Table 7.1 Exchange of germplasm carried out with other countries in the last ten years.	104
Table 8.1 Potential contribution of forest genetic resources to the Millenium Development Goals in Mexico.	112

Index of Figures

Figure 1.1 Percentage of forest surface loss by type of vegetation in Mexico during the period 2002 - 2007: (BC = Coniferous Forest; BE = Oak Forest; BMM = Cloud Forest; SP = Evergreen Forest; SSC = Seasonal semi-deciduous forest; SC = deciduous forest; SE = Thorny Jungle; VH = Hydrophilic Vegetation; OTV = other types of vegetation; MX = desert scrub; PA = grasslands; VI = induced vegetation) (FAO, 2010).	2
Figure 2.1 Most frequent forest species in federal PNA.	22
Figure 2.2 Surface area of WMU registered at national level (SEMARNAT, 2012c).	25
Figure 2.3 Localisation of management units for the conservation of wildlife. (SEMARNAT, 2012c).	25

Index of Annexes

Annex 1 Distribution of the variance in quantitative traits in several forest species in Mexico.	126
Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR.	127
Annex 3 Main forest species, scrubs and other plants that present forest environmental services or have social value. (CONABIO, 2011).	136
Annex 4 List of threatened forest species from a genetic viewpoint and type of threat.	139
Annex 5 Report of Protected Natural Areas at Federal Level.	140
Annex 6 Report of Protected Natural Areas at State Level.	165
Annex 7 Report of Protected Natural Areas at Municipal Level.	216
Annex 8 Report of Private Natural Protected Areas.	235
Annex 9 Forest Germplasm Production Units registered by CONAFOR.	237
Annex 10 Report of Botanical Gardens in the Mexican Republic.	258

Annex 11 Report of promotion and research on FGR projects during the period 2001-2011.	266
Annex 12 Report of Educational Institutions in Mexico that include subjects related to the management of forest genetic resources in their programmes. The degree and subjects offered are indicated.	275
Annex 13 National Directory of investigators who develop activities related to FGR.	278
Annex 14 Report of achievements obtained from Mexican participation in the work group on Forest Genetic resources from the North American Forest Commission (NAFC) and (FAO) (over the last 10 years).	283
Annex 15 Forest species important to food security and the reduction of poverty.	285

Acronyms

- PNA** Protected Natural Areas
FGB Forest Germplasm Bank
TGSC Temporary Germplasm Storage Centre
NAFC North American Forest Commission
COLPOS Graduate College
CONABIO Commission for the Knowledge and Use of Biodiversity
CONACYT National Science and Technology Council
CONAFOR National Forest Commission
CONANP National Protected Natural Areas Commission
FAO Food and Agriculture Organization Of the United Nations
INFyS National Forest and Land Inventory
INIFAP National Institute for Forest, Agriculture and Animal Husbandry Investigations
LGDFS General Law of Sustained Forest Development
LGEEPA General Law for Ecological Equilibrium and Environmental Protection
LGVS General Law of Wildlife
RAPD Random Amplified Polymorphic DNA
FGR Forest Genetic Resources
RNGF Forest Germplasm National Network
UPGF Forest Germplasm Production Units

Executive Summary.

The 19th meeting of FAO (Food and Agriculture Organization of the United Nations) took place in March 2009. At this meeting, FAO supported the recommendation of the Genetic Resources Commission for Food and Agriculture, and the panel of FAO experts on Forest Genetic Resources (FGR) to prepare a report on the state of genetic resources in the world, due 2013. This report was to be used as a reference for national, regional and global action. The Committee urged member countries to collaborate with FAO and related organisations to create this report.

In order to create national reports, responsible focal points were designated for each country. For Mexico, Reforestation Management for the National Forest Commission (CONAFOR) was designated. Furthermore, participating countries were advised to incorporate the state of forest genetic resources into the report; considering their functions and values, describing related aspects of biodiversity, products and services provide, and the role they play regarding sustainable forest management, food security and the reduction of poverty.

For this purpose, during the month of May 2011, CONAFOR signed a Specific Agreement of Collaboration with Chapingo University. Prior to the analysis and systematisation of this information, CONAFOR and the University convened major stakeholders in the conservation and enhancement of forest genetic resources in Mexico (federal and state agencies, research and educational institutions, plantation companies and independent researchers), to provide information and comments as to the functions and activities they carry out, generating a total of 200 queries.

The content of this report has been prepared in accordance with the guidelines established by FAO in the document entitled "Guidelines for the Preparation of Country Reports for the State of the World's Forest

Genetic Resources”, prepared in June 2010. Thus, this report includes 8 chapters describing the current status of FGR: biodiversity, conservation projects and *in situ* and *ex situ* breeding, the use and management of genetic resources, research programmes, education and training, scope of regional cooperation and international rules governing access to genetic resources, and benefits and contribution to food security and poverty reduction.

Each chapter includes problems or obstacles that exist in Mexico, as well as strategies and priorities in the short, medium and long term to overcome them and to ensure the conservation and sustainable use of FGR. The report includes a set of appendices containing specific information on: priority forest species for reforestation, threatened species, Protected Areas, Forest Seed Production Units, an account of botanical gardens, research projects promoting conservation, and diverse information on FGR in relation to Mexico. This will serve as an information source to feed a database of forest genetic resources in Mexico.

1

Current State of Forest Genetic Resource diversity.

1.1 Vegetation types in Mexico.

Mexico ranks 4th in the world for biodiversity and endemism (Mittermeier *et al.*, 1998). This diversity is distributed in thirteen major vegetation types (Table 1.1). The estimated forest area in Mexico was 146,118,323 ha in 2002 (FAO, 2010), whereas by 2007 it had changed to 144,529,211 ha (FAO, 2010). Desert scrub presented the greatest loss of surface area during the period 2002 - 2007 due to the surface area covered by this vegetation type in the country. Nevertheless, the loss was only 0.86% of the reported area of this vegetation type in 2002. Forests and grasslands registered the greatest relative decrease in surface area compared to the forest area of this vegetation type that existed in 2002.

Species of the *Pinus* genus, which represent 54 native species are the most frequent in coniferous forests in Mexico (Perry, 1991). Some examples of these species are *Pinus montezumae*, *Pinus pseudostrabus*, *Pinus durangensis*, *Pinus douglasiana*, *Pinus devoniana*, *Pinus patula*, *Pinus maximinoi*, *Pinus ayacahuite*, among many others. There are other genera growing in this type of forest as well, such as *Abies*, *Pseudotsuga*, *Picea*, *Cupressus* and *Juniperus*, which are represented by some of the following species: *Abies religiosa*, *Abies guatemalensis*, *Abies durangensis*, *Abies mexicana*, *Abies vejarii*, *Abies concolor*, *Pseudotsuga menziesii*, *Picea chihuahuana*, *Picea engelmannii* y *Picea martinezii*, *Cupressus lusitanica*, *Cupressus guadalupensis*, *Juniperus deppeana*, *Juniperus flaccida*, *Juniperus californica*, *Juniperus monosperma*, *Juniperus comitana* and *Juniperus gamboana* (Rzewdoski, 1978).

Table 1.1 Estimated types of vegetation and forest area in Mexico between 2002 and 2007, and loss of coverage during this period (FAO, 2010).

Vegetation type	Area (ha)		Loss†	
	2002	2007	(ha)	%
Coniferous forest	16,468,771	16,442,279	26,492	0.16
Oak forest	15,327,532	15,315,459	12,072	0.08
Cloud forest	1,711,615	1,702,639	8,976	0.52
‡Cultivated forest	0	33,014	-33,014	
Evergreen forest	9,205,957	8,968,428	237,529	2.58
Semi-evergreen seasonal forest	4,392,514	4,236,321	156,193	3.56
Evergreen seasonal forest	16,797,362	16,474,631	322,731	1.92
Deciduous lowland forest	1,714,370	1,663,434	50,937	2.97
Hydrophilic vegetation	2,585,109	2,577,038	8,070	0.31
Other vegetation types	491,956	491,036	920	0.19
Desert scrub	58,086,760	57,585,728	501,032	0.86
Grassland	12,379,553	12,068,385	311,168	2.51
Induced vegetation	6,956,825	6,970,818	-13,993	
Total	146,118,323	144,529,211	1,589,112	

†Negative values represent an increase in the surface area: ‡ No data was reported on 2002.

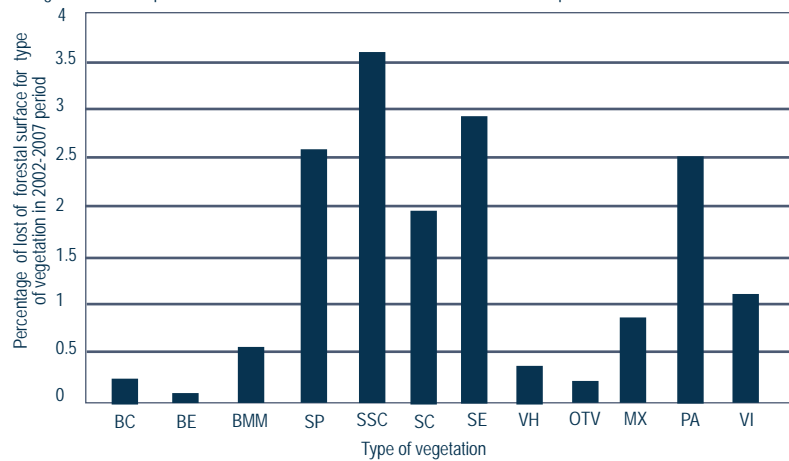


Figure 1.1. Percentage of forest surface loss by type of vegetation in Mexico during the period 2002 - 2007: (BC = Coniferous Forest; BE = Oak Forest; BMM = Cloud Forest; SP = Evergreen Forest; SSC = Semi-evergreen seasonal forest; SC = Deciduous Forest; SE = Thorny Jungle; VH = Hydrophilic Vegetation; OTV = Other Types of Vegetation; MX = Desert Scrub; PA = Grasslands; VI = Induced vegetation) (FAO, 2010).

In Mexican oak forests more than 200 species of the genus *Quercus* grow (Challenger and Soberon, 2008), among these species are *Quercus laurina*, *Quercus rugosa* and *Quercus macrophylla*. Species of this genus are of high value for furniture, charcoal and wood (Garcia-Molina, 2008).

There is a high richness of species in the jungles, of which very few are being exploited. *Cedrela odorata* and *Swietenia macrophylla* are among the tropical species that have been used the most for commercial purposes. However, there are other tree species used for the extraction of firewood and as hedges, such as *Gliricidia sepium*, which grows in evergreen forests, and semi-evergreen forests, and is also found in deciduous forests. *Prosopis juliflora* and *Acacia farnesiana*, among many other species, are representative of desert scrub. *Rhizophora mangle* and *Avicennia germinans* are part of the hydrophilic vegetation (Rzewdoski, 1978).

1.2 Genetic Diversity in Forest Species.

Mexico has no national policy to study or develop an inventory of genetic variation in tree and scrub species, and mechanisms for monitoring the genetic loss and vulnerability of the species have not been established. However, through institutions such as the National Council of Science and Technology (CONACYT) and the National Commission for Knowledge and Use of Biodiversity (CONABIO), which are federal agencies, some projects to determine the genetic diversity of forest species have been supported. These projects have been developed by educational and research institutions in the country. For example, CONABIO has funded 47 projects related to research studies on floristic inventories, analysis of species with economic potential, and useful species for reforestation (CONABIO, 2012). Existing pieces of work are mainly on forest species, which are categorised as at risk, and those with a restricted distribution. Genetic diversity of a few species of economic importance and wide distribution has been quantified, such as *religious Abies*, *Pinus patula*, *Pinus oocarpa*, *Pinus greggii*, *Pinus pinceana*, *leiophylla Pinus*, *Pseudotsuga menziesii* and *Cedrela odorata* (Aguirre-Plater et al., 2000, Dvorak et al., 2009; Gugger et al., 2011, Jaramillo-Correa et al., 2006, Ledig et al., 2001; Freaner Molina et al., 2001, Navarro et al., 2005 ; Parraguirre-Lezama et al., 2002, Ramirez-Herrera, 2007, Ramirez-Herrera et al., 2011, Rodríguez-Banderas et al., 2009).

Furthermore, some international institutions, such as CAM-CORE (International Programme for the Breeding and Conservation of Forest Species, formerly known as the Central American and Mexican Coniferous Resource Cooperative) and the Forest Service of the United States of America (USDA-FS), have published studies on interspecific variation in Mexican species (Ledig et al., 2001, Dvorak et al., 2009).

Regarding methods for estimating genetic diversity (which is inferred by calculating expected heterozygosity, observed heterozygosity, number of alleles per locus and percentage of polymorphic loci), molecular markers have been the most popular for tree species in the last ten years (Table 1.2). In the period 2001 to 2011, 41 studies describing the genetic diversity of 29 tree species, of which most belong to the genus *Pinus* followed by some species of the genus *Abies*, were published in indexed journals. In studies where allozyme genetic diversity (expected heterozygosity) was used, the average result was 0.19, and ranged from 0.07 in *Abies guatemalensis* to 0.39 in *Pinus lagunae* (Aguirre-Plater et al., 2000; Freaner Molina et al., 2001) (Table 1.3). Genetic diversity through isozymes found in Mexican species was similar to the genetic diversity (0.17) reported for most gymnosperms (Hamrick et al., 1992).

Table 1.2. Native species that have been genetically characterised. (SEMARNAT, 2012).

Species	Native (N) o Exotic (E)	Characteri- zation			Reference
		Morfologic	Adaptative	Molecular	
<i>Cedrela odorata</i>	N		X	X	Navarro <i>et al.</i> , 2005,
			X		Sánchez-Monsalvo <i>et al.</i> , 2003
<i>Pinus oocarpa</i>	N		X		Viveros-Viveros <i>et al.</i> , 2005
				X	Sáenz-Romero y Tapia-Olivares, 2003
				X	Dvorak <i>et al.</i> , 2009

Table 1.2. Native species that have been genetically characterised. (SEMARNAT, 2012). (CONT.)

Species	Native (N) o Exotic (E)	Characteri- zation			Reference
		Morfologic	Adaptative	Molecular	
<i>Pinus patula</i>	N		X		Sáenz-Romero <i>et al.</i> , 2011a
				X	Sáenz-Romero <i>et al.</i> , 2011b
					Dvorak <i>et al.</i> , 2009
<i>Pinus greggii</i>	N		X		López-Upton <i>et al.</i> , 2000
			X		López-Locía y Valencia-Manzo, 2001
				X	Parraguirre-Lezama <i>et al.</i> , 2002
				X	López-Upton, <i>et al.</i> , 2004
			X		Hernández-Pérez <i>et al.</i> , 2001
			X		Gómez-Jiménez <i>et al.</i> , 2010
<i>Pinus leiophylla</i>	N		X		Rodríguez-Banderas <i>et al.</i> , 2009
				X	Ramírez-Herrera <i>et al.</i> , 2011
<i>Pinus pinceana</i>			X	X	Ledig <i>et al.</i> , 2001
				X	Molina-Freaner <i>et al.</i> , 2001
				X	Favela-Lara, 2010
<i>Pinus culminicola</i>	N			X	Newton <i>et al.</i> , 2002
<i>Pinus chiapensis</i>	N			X	Rowden <i>et al.</i> , 2004
<i>Fagus grandifolia s.m.</i>	N			X	Montiel-Oscura, 2011
					Jaramillo-Correa <i>et al.</i> , 2008
<i>Abies flinckii</i>	N			X	Jaramillo-Correa <i>et al.</i> , 2008
<i>Abies guatemalensis</i>	N			X	Jaramillo-Correa <i>et al.</i> , 2008
<i>Abies hickelii</i>	N			X	Jaramillo-Correa <i>et al.</i> , 2008
<i>Abies religiosa</i>	N			X	Gugger <i>et al.</i> , 2011
<i>Pseudotsuga menziesii</i>	N			X	Wei <i>et al.</i> , 2011
				X	Mápula-Larreta <i>et al.</i> , 2008
		X			Jaramillo-Correa <i>et al.</i> , 2006
<i>Picea chihuahuana</i>	N			X	Cuenca <i>et al.</i> , 2003
<i>Pinus nelsonii</i>				X	Rodríguez-Banderas <i>et al.</i> , 2009
<i>Pinus chihuahuana</i>				X	Moreno- Letelier y Piñero, 2009
<i>Pinus strobiformis</i>				X	Moreno- Letelier y Piñero, 2009
<i>Pinus ayacahuite</i>				X	Delgado <i>et al.</i> , 2007
<i>Pinus montezumae</i>				X	

Table 1.2. Native species that have been genetically characterised. (SEMARNAT, 2012). (CONT.)

Species	Native (N) o Exotic (E)	Characteri- zation			Reference
		Morfologic	Adaptative	Molecular	
<i>Pinus pseudostrobus</i>				X	Delgado <i>et al.</i> , 2007
		X			Reyes-Hernández <i>et al.</i> , 2005
		X			Mápula-Larreta <i>et al.</i> , 2008
			X		Viveros-Viveros <i>et al.</i> , 2005
<i>Pinus tecunumanii</i>				X	Dvorak <i>et al.</i> , 2009
<i>Pinus radiata</i>				X	Karhu <i>et al.</i> , 2006
<i>Abies flinckii</i>				X	Aguirre-Plater <i>et al.</i> , 2000
<i>Abies guatemalensis</i>				X	Aguirre-Plater <i>et al.</i> , 2000
<i>Abies hickeli</i>				X	Aguirre-Plater <i>et al.</i> , 2000
<i>Abies religiosa</i>				X	Aguirre-Plater <i>et al.</i> , 2000
<i>Pinus coulteri</i>				X	Ledig, 2000
<i>Pinus lagunae</i>				X	Molina-Freaner <i>et al.</i> , 2001
<i>Pinus muricata</i>				X	Molina-Freaner <i>et al.</i> , 2001
<i>Pinus hartwegii</i>				X	Viveros-Viveros <i>et al.</i> , 2010
<i>Taxus globosa</i>		X			Ramírez-Sánchez <i>et al.</i> , 2011
<i>Picea mexicana</i>		X			Flores-López <i>et al.</i> , 2005



Table 1.3. Genetic diversity (H_e = Expected heterozygosity) and coefficient of differentiation (G_{ST}) in native species using alloenzymes.

Species	H_e	G_{ST}	Reference
<i>Abies flinckii</i>	0.11	0.27	Aguirre-Plater <i>et al.</i> , 2000
<i>Abies guatemalensis</i>	0.07	0.12	Aguirre-Plater <i>et al.</i> , 2000
<i>Abies hickelii</i>	0.10	0.07	Aguirre-Plater <i>et al.</i> , 2000
<i>Abies religiosa</i>	0.11	0.25	Aguirre-Plater <i>et al.</i> , 2000
<i>Pinus coulteri</i>	0.15	0.17	Ledig, 2000
<i>Pinus pinceana</i>	0.17	0.15	Ledig <i>et al.</i> , 2001
<i>Pinus pinceana</i>	0.37	0.25	Molina-Freaner <i>et al.</i> , 2001
<i>Pinus pinceana</i>	0.23	0.16	Ramírez-Herrera, 2007
<i>Pinus lagunae</i>	0.39	0.19	Molina-Freaner <i>et al.</i> , 2001
<i>Pinus muricata</i>	0.35	0.16	Molina-Freaner <i>et al.</i> , 2001
<i>Pinus oocarpa</i>	0.10	0.00	Sáenz-Romero, 2003
<i>Pinus hartwegii</i>	0.12	0.11	Viveros-Viveros <i>et al.</i> , 2010
<i>Pinus greggii</i>	0.12	0.38	Parraguirre Lezama <i>et al.</i> , 2002
<i>Fagus grandifolia</i> subsp. <i>mexicana</i>	0.21	0.05	Montiel-Oscura, 2011

The (H_{mt}) diversity estimated with DNA markers of mitochondria in *Abies flinckii*, *Abies guatemalensis*, *Abies hickelii*, *Abies religiosa* and *Picea chihuahuana* was very low, but not so in *Pseudotsuga menziesii* (Jaramillo-Correa *et al.*, 2008 and 2006; Gugger *et al.*, 2011) (Table 1.4). Most average diversity (89%) detected with molecular markers of mitochondrial DNA, was distributed among populations. The entire diversity in *Abies flinckii* and *Abies religiosa* through mitochondrial DNA is distributed among populations ($G_{STmt} = 1.0$) (Jaramillo-Correa *et al.*, 2008). The (H_{cp}) diversity average of Mexican species using DNA markers in chloroplast (cp) was 0.70, and ranged from 0.41 in *Pinus montezumae* to 0.94 in *Abies hickelii* (Delgado *et al.*, 2007, Jaramillo-Correa *et al.*, 2008.)

Table 1.4. Genetic diversity (H_{mt} and H_{cp}) and coefficient of differentiation (G_{STmt} and G_{STcp}) in native species using molecular markers in mtDNA and ctDNA.

Species	H_{mt}	H_{cp}	G_{STmt}	G_{STcp}	R_{ST}	Reference
<i>Abies flinckii</i>	0.00	0.80	1.00			Jaramillo-Correa <i>et al.</i> , 2008
<i>Abies guatemalensis</i>	0.04	0.93	0.81			Jaramillo-Correa <i>et al.</i> , 2008
<i>Abies hickelii</i>	0.05	0.94	0.78			Jaramillo-Correa <i>et al.</i> , 2008
<i>Abies religiosa</i>	0.00	0.91	1.00			Jaramillo-Correa <i>et al.</i> , 2008

Table 1.4. Genetic diversity (H_{mt} and H_{cp}) and coefficient of differentiation (G_{STmt} and G_{STcp}) in native species using molecular markers in mtDNA and ctDNA. (Cont.)

Species	H_{mt}	H_{cp}	G_{STmt}	G_{STcp}	R_{ST}	Reference
<i>Pseudotsuga menziesii</i>	0.59	0.79	0.77	0.56		Gugger <i>et al.</i> , 2011
<i>Pseudotsuga menziesii</i>	0.48	0.91	0.92	0.29		Wei <i>et al.</i> , 2011
<i>Picea chihuahuana</i>	0.00	0.42	1.00	0.36		Jaramillo-Correa <i>et al.</i> , 2006
<i>Pinus nelsonii</i>		0.73		0.13	0.5	Cuenca <i>et al.</i> , 2003
<i>Pinus leiophylla</i>		0.87		0.41		Rodríguez-Banderas <i>et al.</i> , 2009
<i>Pinus chihuahuana</i>		0.51		0.14		Rodríguez-Banderas <i>et al.</i> , 2009
<i>Pinus strobiformis</i>		0.86			0.27	Moreno- Letelier - Piñero, 2009
<i>Pinus ayacahuite</i>		0.56			0.10	Moreno- Letelier - Piñero, 2009
<i>Pinus montezumae</i>		0.41				Delgado <i>et al.</i> , 2007
<i>Pinus pseudostrobus</i>		0.42				Delgado <i>et al.</i> , 2007

The number of genetic diversity studies on Mexican species using microsatellites is very limited (Table 1.5). (H_E) Genetic diversity detected by microsatellites in four *Pinus* species in Mexico was high, and the majority was distributed within populations. Microsatellite markers are one of the molecular markers with the highest molecular polymorphism, however, their development is still expensive (White *et al.*, 2007).

Table 1.5. Genetic diversity and coefficient of differentiation (G_{ST}) in Mexican species using nuclear DNA.

Species	H_E	G_{ST}	Reference
<i>Pinus oocarpa</i>	0.71	0.13	Dvorak <i>et al.</i> , 2009
<i>Pinus tecunumanii</i>	0.65	0.08	Dvorak <i>et al.</i> , 2009
<i>Pinus patula</i>	0.59	0.08	Dvorak <i>et al.</i> , 2009
<i>Pinus radiata</i>	0.73	0.14	Karhu <i>et al.</i> , 2006

In four Mexican species, estimated (P) genetic diversity using RAPD (random amplified polymorphic DNA), was low, and the majority was distributed among populations (Table 1.6). RAPDs have the disadvantage of low reproducibility, presenting dominance, therefore, it is not possible to estimate some genetic parameters such as heterozygosity, (White *et al.*, 2007).

Table 1.6. Genetic diversity (P = percentage of polymorphic loci) in native species using RAPD.

Species	P	G _{ST}	Reference
<i>Pinus culminicola</i>	54	0.60	Favela-Lara, 2010
<i>Pinus chiapensis</i>	25	0.23	Newton <i>et al.</i> , 2002
<i>Cedrela odorata</i>		0.67	Navarro <i>et al.</i> , 2005
<i>Fagus grandifolia</i>	44	0.16	Rowden <i>et al.</i> , 2004

Studies that quantify genetic variation in quantitative traits in Mexican species, as well as studies of genetic diversity using molecular markers, are very few in relation to the number of plant species reported in the country. In Mexico, only 12 studies have been conducted for six species and three genera to estimate genetic variation in quantitative traits in forest trees during the period 2001 to 2011 (Annex 1). Furthermore, these studies considered other adaptive features such as survival, length between knots, resin composition and wax content of needles. In the characteristics which have been studied, most genetic variation was found between regions, which may reflect an adaptation to dissimilar environmental conditions.

It is worth mentioning that, although in some forest species genetic diversity has been estimated, it is not possible to know whether it has changed. This is because genetic diversity has not been evaluated for a second time, nor has the same methodology been used. This creates the need to increase the number of studies.

1.3 High priority forest species in Mexico.

CONABIO recognizes 240 species that have potential for ecological restoration and reforestation, of which 233 are native and 7 exotic (CONABIO, 2011). On the other hand, CONAFOR considers 85 species to be important, as defined by their economic, ecological and social, importance. Considering both lists yields a total of 294 forest species that can be considered as priorities for conservation, reforestation and restoration (Annex 2) (CONABIO, 2011; CONAFOR, 2011th).

However, in order to characterise genetic diversity and develop technological packages that allow the efficient use of these species, whilst influencing their conservation, it is important to focus efforts on a smaller

number of species for conservation, considering that they are widely distributed, representative of different ecosystems, and of high economic, social and ecological value in Mexico (Tables 1.7 and 1.8). It should be noted that efforts have been made to focus primarily on endangered species, which are included in NOM-059-Semanat-2010 (SEMARNAT, 2010). It may also be necessary to focus on species under exploitation, because they may be subject to genetic deterioration, which may in the future impact the acquirement of forest products.



Table 1.7. Prioritised species typical of coniferous forests.

Priority Species	Reasons for priority (Importance)	Vegetation
<i>Abies religiosa</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus ayacahuite</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus cembroides</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus chiapensis</i>	Economic, Social and Ecological	Conifers, oak, cloud forest
<i>Pinus devoniana</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus douglasiana</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus durangensis</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus engelmannii</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus greggii</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus maximinoi</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus montezumae</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus oaxacana</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus oocarpa</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus patula</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus pseudostrabus</i>	Economic, Social and Ecological	Conifers, oak
<i>Pinus teocote</i>	Economic, Social and Ecological	Conifers, oak
<i>Pseudotsuga menziesii</i>	Economic, Social and Ecological	Conifers, oak

Table 1.8. Prioritised species native in oak forest, jungle, hydrophilic vegetation and xerophilic scrubland.

Priority Species	Reasons for priority (Importance)	Vegetation type
<i>Avicennia germinans</i>	Economic, Social and Ecological	Hydrophilic vegetation
<i>Brosimum alicastrum</i>	Economic, Social and Ecological	Jungles: deciduous, semideciduous, evergreen, semievergreen and thorny
<i>Bursera simaruba</i>	Economic, Social and Ecological	Jungle: deciduous, semi-deciduous and evergreen; desert scrub; grasslands
<i>Cedrela odorata</i>	Economic, Social and Ecological	Jungle: evergreen semi-evergreen, semi-deciduous, deciduous; forest: cloud forest
<i>Ceiba pentandra</i>	Economic and Ecological	Jungle: deciduous, semi-deciduous, evergreen, semi-evergreen; forest: coniferous, oak
<i>Cordia dodecandra</i>	Economic, Social and Ecological	Jungle: deciduous, semi-deciduous
<i>Enterolobium cyclocarpum</i>	Economic, Social and Ecological	Jungle: deciduous, semi-deciduous, evergreen, semi-evergreen
<i>Gliricidia sepium</i>	Economic, Social and Ecological	Jungle: deciduous, semi-deciduous, evergreen, semi-evergreen
<i>Leucaena leucocephala</i>	Economic, Social and Ecological	Jungle: deciduous, semi-deciduous, evergreen, semi-evergreen
<i>Manilkara zapota</i>	Economic, Social and Ecological	Jungle: deciduous, semi-deciduous, evergreen, semi-evergreen forest: pine, oak
<i>Prosopis juliflora</i>	Economic, Social and Ecological	Jungle: thorny, deciduous, semi-deciduous; Mangrove; desert scrub
<i>Quercus laurina</i>	Ecological and Social	Forest: oak, cloud forest, coniferous
<i>Quercus macrophylla</i>	Economic, Social and Ecological	Forest: oak, coniferous, cloud forest; selva: semi-deciduous; grasslands
<i>Quercus rugosa</i>	Economic, Social and Ecological	Forest: oak, coniferous, cloud forest
<i>Quercus virginiana</i>	Economic, Social and Ecological	Forest: oak, coniferous; desert scrub; grassland
<i>Rhizophora mangle</i>	Economic, Social and Ecological	Hydrophilic vegetation
<i>Simarouba glauca</i>	Economic, Social and Ecological	Jungle: evergreen, semi-deciduous, deciduous
<i>Swietenia macrophylla</i>	Economic and Ecological	Jungle: evergreen, semi-evergreen, deciduous, semi-deciduous; Forest: oak
<i>Tabebuia rosea</i>	Economic and Ecological	Jungle: deciduous, semi-deciduous evergreen, semi-evergreen; grasslands
<i>Tabebuia donnell-smithii</i>	Economic, Social and Ecological	Jungle: deciduous, semi-deciduous, evergreen; Forest: oak

1.4 Benefits obtained from ecosystems and forest species.

There are approximately 13 million people living in 23,000 ejidos and indigenous communities located in the forest ecosystem areas of Mexico (CONAFOR, 2009). Some of these have created community companies and use their natural resources in traditional ways. It is worth mentioning that logging is a major source of employment for the inhabitants of forest areas, and firewood is the main source of energy for cooking and heating their homes. It is also noteworthy that there is a record of 420 timber forest species and 188 non-timber forest species under exploitation, most of these species are native, of which those in Table 1.9 are examples.



Table 1.9. Examples of forest species being effectively exploited.

Forests	Jungless	Desert Scrub
<i>Pinus montezumae</i>	<i>Cedrela odorata</i>	<i>Prosopis juliflora</i>
<i>Pinus pseudostrobus</i>	<i>Swietenia macrophylla</i>	<i>Prosopis laevigata</i>
<i>Pinus durangensis</i>	<i>Tabebuia rosea</i>	<i>Euphorbia antisiphilitica</i>
<i>Pinus ayacahuite</i>	<i>Ceiba pentandra</i>	<i>Agave lechuguilla</i>
<i>Pinus patula</i>	<i>Cordia alliodora</i>	
<i>Pinus douglasiana</i>	<i>Bursera simaruba</i>	
<i>Pinus leiophylla</i>	<i>Brosimum alicastrum</i>	
<i>Pinus maximinoi</i>		
<i>Abies religiosa</i>		
<i>Quercus laurina</i>		

1 Information given by SEMARNAT.

The genus *Pinus* contributed 77.8% of the average production of timber during the period 2000 to 2010 (Table 1.10). The genus *Quercus* followed in importance with 10.2% of timber production. The beautiful tropical species accounted for 0.4% of production, while 5.8% were common tropical species. The main products derived from timber harvesting during the period mentioned above were lumber, pulp, veneer and plywood, poles, piles, fuel and ties. The highest proportion was allocated to the production of lumber with an average rate of 68.2% (Table 1.11), and 10.7% of timber production went to cellulose, while 9.6% was for fuel production. From the above, it should be noted that timber production in Mexico registered a decrease of 35% in the period between 2000 and 2010.

Table 1.10. Volume of timber (thousands of m³r) exploited annually in the period 2000 to 2010 (SEMARNAT, 2012a).

Year	Genera		Other conifers	Genera <i>Quercus</i>	Other hardwood	Precious	Tropical Common	Total
	<i>Pinus</i>	<i>Abies</i>						
2000	7,507	412	37	919	188	45	323	9,430
2001	6,552	302	36	785	189	22	239	8,125
2002	5,305	219	34	659	170	23	255	6,665
2003	5,485	204	66	761	139	21	320	6,996
2004	5,110	206	48	623	331	34	366	6,719
2005	4,870	152	42	731	157	29	444	6,424
2006	4,923	112	74	777	100	38	457	6,481
2007	5,656	117	36	561	153	21	444	6,988
2008	4,811	128	40	501	70	18	601	6,168
2009	4,407	139	45	673	164	23	357	5,808
2010	4,564	164	48	715	152	28	446	6,117

Table 1.11. Volume of timber (thousands of m³r) destined for different products in the period 2000 to 2010 (SEMARNAT, 2012b).

Year	Sawmill	Cellulose	Veneer and Plywood	Poles and Piles	Fuel	Sleepers	Total
2001	5,556	1,028	518	216	704	102	8,125
2002	4,378	801	355	231	611	289	6,665
2003	4,552	845	449	180	717	253	6,996
2004	4,737	711	328	243	574	127	6,719
2005	4,637	428	309	259	670	122	6,424
2006	4,430	660	309	253	690	139	6,481
2007	4,549	882	534	213	690	121	6,988
2008	4,348	547	424	202	546	101	6,168
2009	3,936	628	247	203	682	112	5,808
2010	4,442	450	299	185	722	19	6,117

On the other hand, production of non-timber goods showed a high level of fluctuation (Table 1.12). For example, production increased by 115% in 2007 compared to 2001, while it decreased in 2008 and 2009. In 2010 the production increased compared to 2009. The main products obtained from non-timber forest areas were resin, rhizomes, fibers, waxes, gums and other (seeds, stalks, leaves and stems). Seeds, stalks, leaves and stems, among other products, accounted for an 87% of the average, while resin represented approximately 12% of production.

Table 1.12. Quantity (tonnes) of non-timber products in the period 2000 to 2010 (SEMARNAT, 2012c).

Year	Resins	Rhizomes	Fibres	Waxes	Gums	Others	Total
2001	35,012	0	840	50	7	240,383	276,292
2002	35,781	281	1,135	392	11	105,908	143,509
2003	33,769	2	1,448	476	8	223,674	259,377
2004	24,107	10	2,332	780	122	405,746	433,097
2005	14,365	17	3,299	2,894	120	338,651	359,347
2006	14,303	1	1,324	364	122	150,248	166,363
2007	17,020	1	5,299	724	10	571,222	594,275
2008	17,272	0	2,457	236	45	59,949	79,959
2009	19,429	0	3,786	1,071	13	35,257	59,556
2010	18,805	1,559	4,079	2,083	115	41,554	68,195

From a global, system-wide perspective, forest ecosystems provide a large number of environmental services, which include the protection of biodiversity, scenic beauty, cushioning the impact of hurricanes on the coast, stability in hydrological and chemical cycles and habitat, amongst others (Hunter, 2002). Despite the importance of environmental services, a calculation of their benefits has not been performed in Mexico, but it is emphasised that CONABIO (2011th) collected information on the contribution of environmental services to 67 species (native and exotic) growing in different ecosystems (Annex 3).

In addition, since 2007, CONAFOR has initiated a programme of support through payment for environmental services based on vegetation types (Table 1.13). Even when in terms of annual incorporated area it decreased by 42% during the period 2007-2011, the total area under this scheme exceeded 2.5 million hectares. Vegetation types with the greatest support, in descending order, are: coniferous forest (29.8%), deciduous forest (18.0%), desert scrub (17.2%), oak forest (13.7%), evergreen forest (8.9%) and cloud forest (4.3%).

Table 1.13. Surface area by type of vegetation supported by payments from the environmental services programme.

Type of Vegetation	Surface area (ha) [†]					Total
	2007	2008	2009	2010	2011	
Coniferous forest	181,430	117,883	163,224	101,177	105,839	669,553
Oak forest	101,432	64,715	79,036	75,558	48,787	369,528
Cloud Forest	63,176	26,416	36,093	18,668	15,295	159,648
Evergreen Forest	125,151	89,475	83,494	104,409	31,475	434,004
Deciduous Forest	86,704	89,590	79,087	101,812	64,033	421,226
Hydrophilic Vegetation	58	26,388	17,568	26,598	6,313	76,925
Bodies of Water	100	27,219	269	491	101	28,180
Desert Scrub	9,217	17,544	30,917	62,631	61,072	181,381
Grasslands	2,299	3,292	3,432	8,291	5,242	22,556
Induced Vegetation	8,496	6,088	7,267	6,066	4,575	32,492
Agriculture	33,037	16,248	13,618	25,672	11,457	100,032
Urban Area	382	1,144	1,936	1,815	718	5,995
Other types of vegetaci3n	0	86	501	728	13	1328
Total	611,482	486,089	516,440	533,914	354,919	2,502,844

[†] Statistics provided by the Management of Forest Ecosystem Services

Additionally, forests, jungles and thickets in Mexico provide habitats for a diversity of wildlife and plant species that have nutritious and medicinal properties. In turn, they constitute a useful source of biodiversity for the development of new markets as well as mitigating global climate change. They act as traps for CO₂, one of the gases held responsible for the greenhouse effect (CONAFOR, 2010).

1.5 Forest ecosystems and threatened species.

Ecosystems located in the alpine and subalpine (in higher elevation mountains in Mexico) can be considered vulnerable (species such as *Pinus hartwegii* and *Pinus rudis*) to the effects of global climate change, illegal exploitation and human pressure on tree communities.

The cloud forest and high and medium evergreen forests are other ecosystems threatened by disturbances associated with productive activities, because of an estimated loss of surface area of about 50% since the sixties (Challenger and Soberón, 2008). With regard to coastal wetlands, they have been heavily disturbed by tourism development and activities associated with oil production, while the desert scrub and grasslands are threatened by unplanned grazing.

In Mexico, 987 species of plants are included in NOM-059-SEMARNAT-2010 in any category of risk (SEMARNAT, 2010). Among these, 117 species include trees and scrubs and are of forest interest (Annex 4). Some examples of species included in this rule that have isolated populations, consisting of a small number of individuals are: *Taxus globosa*, *Fagus grandifolia* subsp. *mexican*, *Picea engelmannii*, *Picea martinezii*, *chihuahuana Picea*, *Pinus pinceana*, *culminicola Pinus*, *Pinus nelsoni* *Pinus maximartinezii* and *Pseudotsuga menziesii*, *Acer negundo* and *Cedrela odorata*. Additionally, there are small populations of species such as *Pinus hartwegii* and *Pinus greggii*, which may be in jeopardy due to the effects of inbreeding.

Changing land use is the primary agent of disturbance of FGR. The area of forests and woodlands declined at a rate of 155,000 hectares per year between 2005 and 2010 (FAO, 2010). Temperate forest accounted for about 6% of that loss, and the rest is presented in jungles. Similarly, areas of desert scrub and other vegetation (grass, tule, halophytic vegeta-

tion, etc.) were replaced by other land uses at a rate of 84,000 and 92,000 ha / year respectively, during the same period. Despite the observed deforestation in the indicated period, it is worth noting that the rate of deforestation has decreased significantly compared to previous periods.

Fire is another threat to FGR. During the period 2001 to 2011 there were 3,009,694 fires affecting 90,996 ha. The average annual area affected by fire was 273,609 ha in the mentioned period. Ecosystems dominated by desert scrub and grassland were the most affected, with average areas of 128,651 and 109,282 ha, respectively. The average forest area affected by fire was 26,278 ha and 11,485 ha for adult and young trees respectively (Table 1.14). It is noted that most of these fires were superficial.

Table 1.14. Number of forest fires in the period 2001 to 2011.

Year	Number of Fires	Affected Surface Area (ha) [†]					Total	Surface area/ Fires
		Wooded		Desert Scrub	Grassland			
		Adult	Young					
2001	6,340	18,809		53,440	64,630	136,879	21.59	
2002	8,256	31,988		88,507	87,802	208,297	25.23	
2003	8,211	66,676	21,586	130,287	103,900	322,448	39.27	
2004	6,300	5,357	5,157	32,861	37,947	81,322	12.91	
2005	9,709	17,324	15,376	117,848	125,540	276,089	28.44	
2006	8,745	33,077	9,045	116,578	85,182	243,882	27.89	
2007	5,893	7,214	7,935	69,332	57,180	141,660	24.04	
2008	9,735	16,206	10,381	104,205	100,854	231,645	23.80	
2009	9,569	34,883	7,892	130,274	123,295	296,344	30.97	
2010	6,125	6,372	5,882	50,957	51,513	114,723	18.73	
2011	12,113	51,155	20,112	520,874	364,264	956,405	78.95	

[†] Data provided by the Fire Management of CONAFOR.

Another threat to forest genetic resources is the presence of pests and diseases. The average annual area affected by pests and diseases was 52,112 ha during the period 2001 to 2008 (Table 1.15). Bark beetles, defoliators and mistletoe contributed most to attacks on forest vegetation (SEMARNAT, 2011).

Table 1.15. Average yearly surface area affected by plagues and diseases. (SEMARNAT, 2011).

Year	B	D	DE	M	Others	V	By the root	Cones	Total
2001	1,801	452	10,011	1,896	1,059	ND	ND	ND	15,219
2002	750	733	5,060	312	119	ND	ND	ND	6,974
2003	4,455	2,223	27,172	10,246	3,686	1,996	0	1,028	50,806
2004	9,957	12,573	15,225	24,673	2,697	1,784	0	913	67,822
2005	5,123	20,665	22,184	17,042	4,814	0	1,533	1,683	73,044
2006	3,761	10,175	31,710	21,968	4,550	3,063	192	1,295	76,714
2007	4,035	11,831	15,588	23,269	0	3,523	275	656	59,177
2008	4,397	15,806	15,215	27,183	ND	2,223	1,902	413	67,139

B=Borers; D=Defoliators; DE=Debarker, M=Mistletoe; V=Vascular.

It should be noted that Mexico has not established a system of information on threatened species and the trends of these threats. However, the documentation of major threats to the species considered at risk in the NOM-059-SEMARNAT-2010 has been fostered through the funding of research projects. Also included in the list are specific guidelines for adding or removing a species from the list. Since 2012 CONAFOR has developed a methodology for understanding the effects of climate change on the potential distribution of forest species in order to understand the trends of threats from this effect on FGR, and thus propose a mitigation strategy (Garcia-Cruz and Sierra-Villagrana, 2012).

1.6 Risk analysis for loss of genetic resources due to catastrophes.

Mexico does not perform risk analysis as a state policy to determine the loss of FGR caused by natural disasters. However, when such phenomena occur, rehabilitation of forest resources is carried out with input from various federal programmes (ProÁrbol, Natural Disaster Fund, Temporary Employment Programme), in coordination with State Governments.

To implement mechanisms in response to events which cause loss of FGR, some of the following are required:

- Allocate specific resources to the attention of the affected FGR;
- Personnel trained in the management of these resources;
- Identify areas at greatest risk of catastrophe; and
- Collect and conserve vulnerable or difficult to harvest germ-plasm of tree species in the at risk category, to ensure its reproduction and establishment.

1.7 Priorities to avoid the loss of genetic resources.

- The following are priority actions to prevent loss of FGR:
 - Taxonomically identify priority species as a basis for taking action for their conservation;
 - Integrate a list of publications to identify uses and services; Assess and record biodiversity in forest ecosystems; Determine the (continuous or discontinuous) distribution of forest species to target resources to be allocated for their conservation; Quantify the genetic diversity of species using both molecular methods and morphological adaptability studies (studies of common environment);
 - Determine the number of populations of priority species and their level of isolation; and
- In the definition of conservation of genetic resources, policies for technical criteria should be favoured.

2

In situ state of genetic conservation.

2.1 Protected Natural Areas in Mexico (PNA).

Among other purposes, PNA are intended to conserve habitats with minimal or no human intervention, and to promote the evolution of species within ecosystems.

In Mexico, the National Commission of Protected Natural Areas (CONANP) is the responsible body for the management of federally owned PNA. Currently, 174 PNA have been enacted, covering a sum area of 25,386,748 ha, of which 20,775,926 ha are land and 4,610,822 ha are sea (Table 2.1)

Table 2.1. Category and surface area of federal PNA (CONANP, 2011).

Category	Surface area (ha)		
	Land	Sea	Total
Biosphere Reserve	9,077,760	3,577,030	12,654,790
National Parks	744,286	738,132	1,482,419
National Monument	16,268	0	16,268
Areas of Natural Resources Protection	4,440,077	0	4,440,077
Areas of Flora and Fauna Protection	6,351,970	294,972	6,646,941
Sanctuaries	145,565	688	146,252
Total	20,775,926	4,610,822	25,386,748

Over the last 10 years, 47 PNA were decreed. This represents an increase of 10,191,790 ha to the area of PNA existing in 2001. This increase mainly occurred in Biosphere Reserves and Areas of Flora and Fauna Protection (Table 2.2).

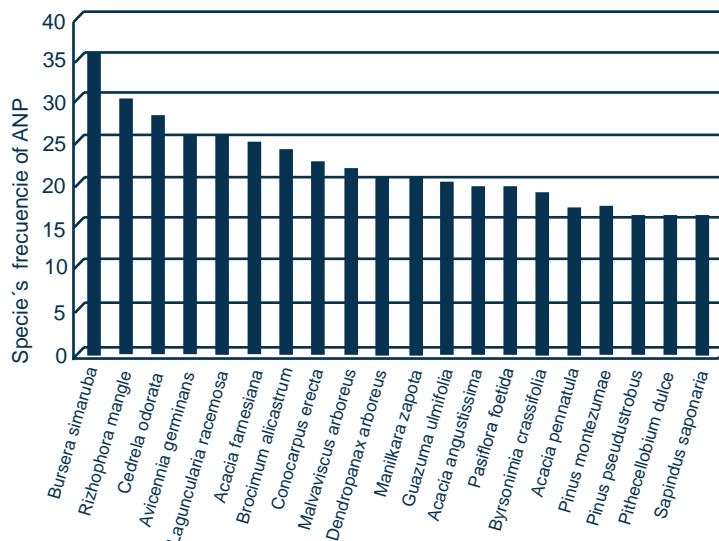
Table 2.2. Number of PNA and surface area in the years 2001 and 2011.

Category	Surface area (ha)			
	No.	2001	No.	2011
Biosphere Reserve	28	9,363,131	42	12,654,790
National Parks	57	618,020	67	1,482,419
National Monument	5	14,093	6	16,268
Areas of Natural Resources Protection	2	255,117	7	4,440,077
Areas of Flora and Fauna Protection	19	4,943,994	34	6,646,941
Sanctuaries	16	604	18	146,252
Total	127	15,194,958	174	25,386,748

As a result of the review of 70 PNA management plans, and information available on the websites of 41 PNA, 2,406 additional tree and scrub species of forest interest, which represent 56.5% of the 4,257 forest species estimated to exist in Mexico (CONABIO, 2011), were registered. In addition, 241 species were also identified in the list of 294 priority forest species recognized by CONABIO and CONAFOR (Annex 2).

It is also reported in this review that the species: *Bursera simaruba*, *Rhizophora mangle*, *Avicennia germinans* and *Cedrela odorata* were present in a greater number of PNA (Figure 2.1). With regard to conifers, *Pinus montezumae* and *Pinus pseudostrobus* recorded the highest frequency (Figure 2.1).

Figure 2.1. Most frequent forest species in federal PNA.



In most of the PNA, more than one type of vegetation can be found. The vegetation of wetlands is found in 95 PNA, tropical deciduous forest and desert scrub vegetation was found in 79 and 75 PNA, respectively. Coniferous forest, which contributes to the increased production of wood products, grows in 46 PNA, while oak forest was found in 47 PNA. Cloud forest, despite occupying 1% of forest area, is protected in 19 PNA. Tropical rain forest is considered the richest ecosystem biologically and is represented in 37 PNA (Table 2.3).

2 *Oficio* CN/0193/2011

Table 2.3. Type of vegetation in Protected Natural Areas (CONANP, 2011)

Type of Vegetation	Number of Protected Natural Areas						Total
	RB†	PN	MN	APRN	APFF‡	S	
Coniferous Forest	14	29	0	8	13	0	64
Oak Forest	11	17	1	6	12	0	47
Cloud Forest	9	4	0	3	3	0	19
Tropical Evergreen Forest	12	7	2	1	11	1	34
Tropical Deciduous Forest	29	14	1	4	19	12	79
Desert Scrub	26	13	3	7	19	7	75
Grasslands	11	9	0	5	11	1	37
Wetlands	35	22	2	1	24	11	95
Induced Forest	11	15	0	7	19	0	52

† ANRP= Areas of Natural Resources Protection; RB=Biosphere Reserve, NP= National Park, AAFP= Areas of Flora and Fauna Protection; NM= Natural Monument; S= Sanctuaries

There are federal PNA located throughout the country. The state of Quintana Roo has the highest number, followed Baja California and Baja California Sur (Annex 5). In addition to the federal PNA in Mexico there are 209 state PNA (Annex 6), 75 municipal PNA (Annex 7) and 12 individual PNA (Annex 8).

2.2 Forest areas with management plans.

Based on forest management plan outlines, the use of wood products and timber is authorised in order to prevent deterioration and ensure the sustainability of ecosystems under management. The use of authorised

products allows the owners and holders to earn income to meet their basic needs under the forest management plan, so that they become protectors and keepers of their own resources and also seek to improve the current conditions of their forest masses.

In 2009, 24.2% of forest and scrub areas were under a forest management plan (SEMARNAT, 2009). The number of authorisations for the use of timber products in the period 2001 to 2008 was 21,200, and 2,227 during the period 2001 to 2007 for non-timber products (SEMARNAT, 2009). The total number of permits issued is based on a forest management plan designed to ensure sustainability on that basis during the period 2001 to 2009, 599,481 hectares under forest management were certified, primarily in temperate forests (CONAFOR, 2011b).

2.3 Management units for wildlife conservation (WMU).

Through the Department of Wildlife, SEMARNAT promotes the conservation of vegetation through the establishment of Wildlife Management Units (WMU). These units are properties that the owners or holders operate in accordance with an approved management plan, which constantly monitors populations or individuals that are distributed there. The overall goal is the conservation of natural habitat, wild populations and wildlife specimens. The specific objectives of the WMU may be one or more of the following: restoration, protection, maintenance, retrieval, reproduction, repopulation, reintroduction, research, rescue, shelter, rehabilitation, exhibition, recreation, environmental education and sustainable use.

WMU generate jobs and foreign exchange through binomial "conservation-use". Each unit generates an average of 25 (direct and indirect) jobs that contribute to the continuity of the evolutionary processes of wild species and the generation of environmental services. They also contribute to the abolition of trafficking and the illegal capture of wild specimens.

Within the environmental services generated by WMU are benefits of social interest derived from wildlife and their habitat, such as climate

regulation, maintenance of hydrological cycles, nitrogen fixation, soil formation, carbon sequestration, erosion control, plant pollination, biological pest control or degradation of organic wastes.

As of December 2011 10,855 WMU have been registered in an area of 36.14 million hectares, equivalent to 18.39% of the country (Figure 2.2). The location of these areas in the territory is included in Figure 2.3.

Figure 2.2 Surface area of WMU registered at national level (SEMARNAT, 2012c).

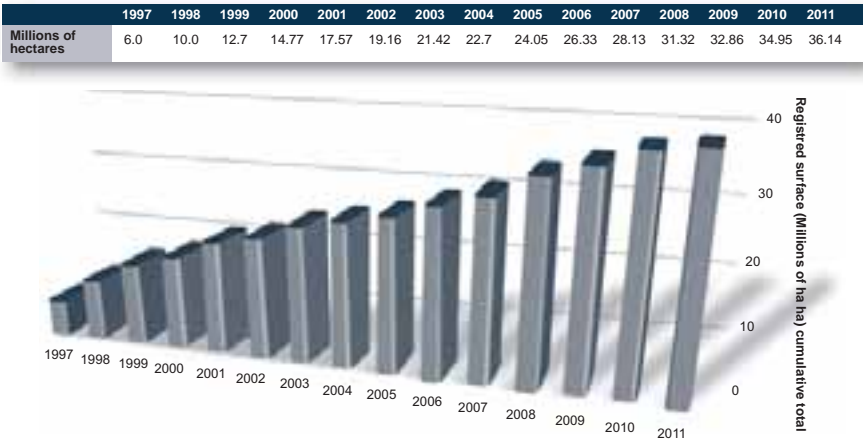
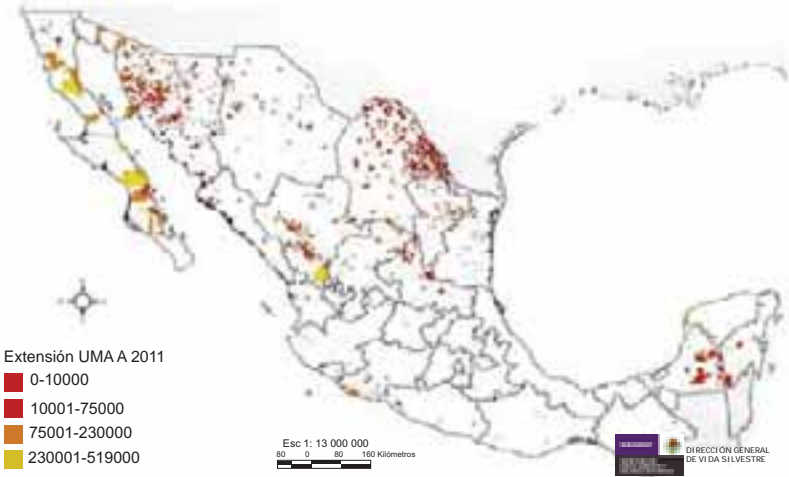


Figure 2.3. Localisation of management units for the conservation of wildlife. (SEMARNAT, 2012c).



2.4 Conservation and promotion plans.

Payment for environmental services.

The federal government and some state governments promote the conservation of vegetation through payment support programmes for environmental services. In these programmes, the owners and holders receive financial compensation in exchange for avoiding logging and conserving their resources. Starting in 2010, support is also provided for this type of land use under a certificate of good forest management. Within this programme CONAFOR has supported 2,502,845 ha in the period 2007 to 2011. Such programmes are a good conservation strategy, where the owners and holders of forest resources are involved in conservation efforts.

Forest germplasm production units.

CONAFOR has promoted the establishment of germplasm production units (seed area, seed stands and stands with species in the at risk category) in each state of the country. Currently there is a record of 210 germplasm production units in an area of 6,275 ha. (Table 2.4 and Annex 9). In 28 seed stands there are species in the at risk category in NOM-059-SEMARNAT-2010. Note that phenotypically superior individuals in these units are kept for quality germplasm, which is useful in planting programmes.

Table 2.4. Forest germplasm production units registered by CONAFOR.

Entity	Surface area (ha)	Category		
		Seed Area	Seed stand	Stand with species in risk category
Baja California	191.9		3	4
Baja California Sur	15	0	4	1
Campeche	862.379	0	4	3
Chiapas	438.5	0	19	6
Chihuahua	62	3	1	1
Colima	80.7	0	5	0
Distrito Federal	339	0	10	0

Table 2.4. Forest germplasm production units registered by CONAFOR. (Cont.)

Entity	Surface area (ha)	Category		
		Seed Area	Seed stand	Stand with species in risk category
Durango	118	0	1	0
Guanajuato	636.5	2	12	2
Guerrero	339.73	0	14	0
Hidalgo	17	3	4	0
Michoacán	134	0	10	0
Morelos	45.4	0	6	0
Nayarit	63.3	0	9	0
Nuevo León	35.05	0	4	0
Oaxaca	9	1	8	2
Puebla	54.9	0	3	2
Querétaro	24.43	0	3	0
Quintana Roo	299	0	6	0
San Luis Potosí	960	0	6	3
Sonora	220	0	9	0
Tabasco	59	0	7	0
Tamaulipas	117	0	5	2
Tlaxcala	128.09	0	8	1
Veracruz	242.94	0	5	4
Yucatán	593	0	8	1
Zacatecas	381.152	11	5	4
Total	6,275.07		171	28

2.5 Strategies to maintain *in situ* collections.

In order to increase efficiency in the protection of ecosystems in the federal PNA, CONANP grouped these areas into nine regions: 1) Yucatan Peninsula and Mexican Caribbean, 2) South Border, Isthmus and South Pacific, 3) North and Sierra Madre Oriental, 4) Northeast and Sierra Madre Oriental, 5) Western and Central Pacific, 6) Neovolcanic Center, 7) Gulf of Mexico Coastal Plain, 8) California Peninsula and North Pacific and 9) Northeast and Upper Gulf of California (CONANP, 2011).

To monitor and evaluate the status of the populations of some species of wildlife in the PNA, biological monitoring of flagship species was initiated (CONANP, 2007). In early 2001 there were only two spe-

cies monitored in the same number of PNA, but in 2006 the number increased to 30 species in as many areas. Efforts have been focused on awareness of the biodiversity within PNA, having an inventory and forest genetic studies within these measures has not been considered.

To promote sustainable development and reduce environmental degradation, the federal government established Conservation for Sustainable Development (PROCOCODES) as an important strategy for conservation in the PNA. Additionally, it supports the Temporary Employment Programme (PET), through which it provides employment for the population of the PNA.

In order to increase the income of the owners and holders of land in PNA, and thereby raise the interest of communities in the protection of vegetation, and reduce the destruction of protected ecosystem through illegal logging, grazing and forest fires, the payment for environmental services to the owners of forest land within the limits of the PNA has been implemented. Additionally, in some PNA, Seed Production Forest Units (plus trees, seed stands and seed areas) have been established. For example, there is a record of 7 seed areas and 196 seed stands, from which 35 have species listed in NOM-059-SEMARNAT-2010.

To carry out studies as a basis for making decisions, collaboration with educational and research institutions has been sought, which also promotes a culture of conservation, education and social participation.

The limitations and priorities identified by CONANP to improve *in situ* conservation of PNA identified in the National Programme of Protected Natural Areas (CONANP, 2011) are:

Limitations:

- The allocated budget and staff are still inadequate in relation to the protection and promotional needs that the PNA demand.
- The growth of communities located within and close to PNA, and the scarce employment alternatives available, generate negative pressures on the natural resources thereof through the performance of harmful practices. These practices include il-

legal logging of timber and non-timber, changing usage of soil, overgrazing and burning of grassland, and forest soil extraction.

Priorities:

- Consolidate the current PNA, and create others to increase the representation of ecosystem types protected in the PNA;
- Increase institutional linkage for the management and conservation of forest genetic resources.
- In the restoration of disturbed areas, favour natural regeneration over artificial regeneration (planting) to ensure recovery of native species (or disturbed sites adjacent to them) through the exclusion of livestock, floor surface scarification, establishment of herbaceous species to serve as nurse to the branch of tree species on sites with sparse vegetation, and the removal and relocation of seedlings (transplant to “root ball”).
- Establish more commercial plantations with native species in the areas outlying the PNA, through the conversion of land for agricultural use (including areas larger than 0.5 ha) with support schemes for the maintenance and payment of environmental services, during at least the first 10 years;
- Provide technical assistance to communities living in areas close to the PNA in order to facilitate the restoration of established plantations to productive plantations. The purpose of this is to enable communities to legally seize plantations to satisfy their needs for firewood, timber for construction and housing, and the marketing of forest products.
- Increase ecotourism projects in the PNA with the participation of communities, as a tool for sustainable development, cultural awareness, and conservation;
- Maintain and improve ongoing training programmes for personnel assigned to PNA.

- Increase the management of alternative sources of funding nationally and internationally, to develop productive projects for communities, conservation and research of the PNA's FGR.
- Strengthen the following areas in research projects: size of genetically viable populations, ecosystem biodiversity, patterns of genetic variation within and between populations of representative species, breeding phenology of tree species, natural regeneration practices, production and germplasm management, trends in changes of species and ecosystems as a result of climate change, genetic diversity of protected species, effect of alien species present in the areas and levels of isolation in species populations.

3

Ex situ* state of genetic conservation.*3.1. Forest species included in *ex situ* conservation programmes.**

Information collected from 21 government bodies, NGOs, and the research and education of plantation companies shows that our country is currently working with 74 taxa (Table 3.1), from which 56 are native and 18 exotic. Of these 74 taxa, 44 are conifers (37 native and 7 exotic), and 30 are hardwoods (19 native and 11 exotic)

Table 3.1. Forest species and varieties used in *ex situ* conservation.

Scientific name	Origin ¹	Scientific name	Origin ¹	Scientific name	Origin ¹
<i>Abies religiosa</i>	N	<i>Jatropha platyphylla</i>	N	<i>Pinus leiophylla</i>	N
<i>Abies vejarii</i> var. <i>macrocarpa</i>	N	<i>Khaya nyasica</i>	E	<i>Pinus maximartinezii</i>	N
<i>Amphiptergium adstringens</i>	N	<i>Khaya senegalensis</i>	E	<i>Pinus maximinoi</i>	N
<i>Astronium graveolens</i>	N	<i>Liquidambar styraciflua</i>	N	<i>Pinus montezumae</i>	N
<i>Bursera bipinnata</i>	N	<i>Moringa oleorifera</i>	E	<i>Pinus nelsonii</i>	
<i>Bursera glabrifolia</i>	N	<i>Pinus arizonica</i>	N	<i>Pinus oaxacana</i>	N
<i>Bursera linanoe</i>	N	<i>Pinus arizonica</i> var. <i>stormiae</i>	N	<i>Pinus oocarpa</i>	N
<i>Callophyllum brasiliensis</i>	N	<i>Pinus ayacahuite</i>	N	<i>Pinus patula</i> var. <i>patula</i>	N
<i>Cedrela odorata</i>	N	<i>Pinus ayacahuite</i> var. <i>veitchii</i>	N	<i>Pinus patula</i> var. <i>longipedunculata</i>	N
<i>Cordia alliodora</i>	N	<i>Pinus caribaea</i>	E	<i>Pinus pinceana</i>	N
<i>Cunninghamia lanceolata</i>	E	<i>Pinus caribaea</i> var. <i>hondurensis</i>	N	<i>Pinus pinea</i>	N
<i>Cupressus guadalupensis</i>	N	<i>Pinus cembroides</i>	N	<i>Pinus pringlei</i>	E

¹ N: Nativa; E: Exótica

Table 3.1. Forest species and varieties used in ex situ conservation. (CONT.)

Scientific name	Origin ¹	Scientific name	Origin ¹	Scientific name	Origin ¹
<i>Cupressus lusitanica</i>	N	<i>Pinus cembroides</i> var. <i>orizabensis</i>	N	<i>Pinus radiata</i> var. <i>binata</i>	N
<i>Dalbergia congestiflora</i>	N	<i>Pinus cooperi</i>	N	<i>Pinus teocote</i>	N
<i>Dendropanax arboreus</i>	N	<i>Pinus devoniana</i>	N	<i>Platymiscum lasiocarpum</i>	N
<i>Enterolobium cyclocarpum</i>	N	<i>Pinus devoniana</i> var. <i>cornuta</i>	N	<i>Pseudotsuga menziesii</i>	N
<i>Eucalyptus camaldulensis</i>	E	<i>Pinus douglasiana</i>	N		N
<i>Eucalyptus grandis</i>	E	<i>Pinus durangensis</i>	N	<i>Sequoia gigantea</i>	E
<i>Eucalyptus grandis</i> x <i>urophylla</i>	E	<i>Pinus eldarica</i>	E	<i>Sequoia sempervirens</i>	E
<i>Eucalyptus urophylla</i>	E	<i>Pinus engelmannii</i>	N	<i>Swietenia humilis</i>	N
<i>Evenopsis caesalinioides</i>	N	<i>Pinus greggii</i> var. <i>australis</i>	N	<i>Swietenia macrophylla</i>	N
<i>Gliricidia sepium</i>	N	<i>Pinus greggii</i> var. <i>greggii</i>	N	<i>Taxus globosa</i>	N
<i>Gmelina arborea</i>	E	<i>Pinus halepensis</i>	E	<i>Tectona grandis</i>	E
<i>Guaiacum coulteri</i>	N	<i>Pinus hartwegii</i>	N	<i>Toona ciliata</i>	E
<i>Hevea brasiliensis</i>	E	<i>Pinus johannis</i>	N		

¹ N: Nativa; E: Exótica

3.2 *Ex situ* conservation plantations established in the country.

The 21 agencies that develop projects for conservation and *ex situ* breeding have 180 tests together with, 21 sexual seed orchards (HSS), 5 asexual seed orchards (HSA), 5 clone banks (BC) and 4 seed areas, as described in Tables 3.2 and 3.3.



Table 3.2. Ex situ plantations and conservation banks.

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchards, seed areas	No. of clones/family	No. of stored accessions			
<i>Abies religiosa</i>	N					4 from 1 sources	2		
<i>Abies vejarii</i> var. <i>macrocarpa</i>	N	1	3 sources				4		
<i>Amphipterigium adstringens</i>	N	1	3 sources			170 from 3 sources	12		
<i>Astronium graveolens</i>	N	2	187 individuals				7		
<i>Bursera bipinnata</i>	N					2*	13		
<i>Bursera glabrifolia</i>	N					1*	13		
<i>Bursera linaloe</i>	N	2	2 sources			54 from 2 sources	12		
<i>Callophyllum brasiliensis</i>	N	2	297 individuals				7		
<i>Cedrela odorata</i>	N	2	25 sources	1 HSA	118 clones		8		
<i>Cedrela odorata</i>	N			1 BC	40 clones with 15 replicas each		9		

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Scientific name	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchardas, seed areas	No. of clones/family	No. of stored accessions		
<i>Cedrela odorata</i>	N	1	141 progenies from 6 sources					10	
<i>Cedrela odorata</i>	N	1	73 progenies from 5 sources from other countries					10	
<i>Cedrela odorata</i>	N	1	36 progenies from 3 sources					10	
<i>Cedrela odorata</i>	N					2*		13	
<i>Cedrela odorata</i>	N	2	20 progenies from 3 sources			21 from 1 source		15	
<i>Cedrela odorata</i>	N	1	3 sources					15	
<i>Cedrela odorata</i>	N	1	22 progenies					15	
<i>Cordia alliodora</i>	N	1	30 sources					8	
<i>Cunninghamia lanceolata</i>	N	1	30 progenies					15	
<i>Cupressus guadalupensis</i>	N					100 from isla Guadalupe		2	

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboreums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchards, seed areas	No. of clones/family	No. of stored accessions			
<i>Cupressus guadalupensis</i>	N	1	20 clones						15
<i>Cupressus guadalupensis</i>	N	1	974 individuals from 40 families						18
<i>Cupressus lusitanica</i>	N					79 from 1 source			6
<i>Cupressus lusitanica</i>	N			1 HSA	65 individuals from 28 families				18
<i>Dalbergia congestiflora</i>	N	2	133 individuals						7
<i>Dendropanax arboreus</i>	N	1	30 sources						8
<i>Ebenopsis caesalpinoides</i>	N	1	4 sources						1
<i>Dendropanax arboreus</i>	N	1	30 sources			54 from 1 source			8
<i>Ebenopsis caesalpinoides</i>	N	1	4 sources			54 from 1 source			1

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchardas, seed areas	No. of clones/family	No. of stored accessions			
<i>Enterolobium cyclocarpum</i>	N	2	10 sources			10 sources (bulk) and from 23 families	21		
<i>Eucalyptus camaldulensis</i>	E			1 BC	10 clones	153 from plantations	2		
<i>Eucalyptus grandis</i>	E	1	2 parcels				7		
<i>Eucalyptus grandis</i>	E	1	36 families (Brazilian source / 3 Mexican source); 13 families (Argentina source)				17		
<i>Eucalyptus grandis</i>	E	2		2 ASP	600 y 1000 individuals		17		
<i>Eucalyptus grandis</i>	E	3	129 Selected trees				17		
<i>Eucalyptus grandis</i>	E	3	60 plus trees				17		
<i>Eucalyptus urograndis</i>	E	1	1 sexual parcel and 1 asexual				7		

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchards, seed areas	No. of clones/family	No. of stored accessions			
<i>Eucalyptus urophylla</i>	E	1	4 clones				7		
<i>Eucalyptus urophylla</i>	E	1	420 individuals from 7 clones				7		
<i>Eucalyptus urophylla</i>	E	1	235 individuals from 7 clones				7		
<i>Eucalyptus urophylla</i>	E	1	36 families from (initial source, Brazil)/3 sources from Mexico				17		
<i>Eucalyptus urophylla</i>	E			2ASP	700 y 1000 individuals		17		
<i>Eucalyptus urophylla</i>	E	3	255 selected trees				17		
<i>Eucalyptus urophylla</i>	E	3	60 plus trees				17		
<i>Gmelina arborea</i>	E						13		
<i>Gliricidia sepium</i>	N	1	10 sources				2	125 from 10 sources	

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands					Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchards, seed areas	No. of clones/family	No. of stored accessions				
<i>Gmelina arborea</i>	E			1HSS	105 individuals			8		
<i>Gmelina arborea</i>	E	1	12 sources					10		
<i>Gmelina arborea</i>	E	1	3 sources				Bulk	19		
<i>Guaiacum coulteri</i>	N	2	346 individuals					7		
<i>Hevea brasiliensis</i>	E			1BC	200 clones			8		
<i>Jatropha platyphylla</i>	N	1	5 sources	1BC	20 clones		30 from 5 sources	1		
<i>Khaya nyasica</i>	E	1	18 progenies					15		
<i>Khaya senegalensis</i>	E	1	2 sources					16		
<i>Liquidambar</i>	N	1	78 progenies from 10					15		
<i>Moringa oleifera</i>	E						1*	13		
<i>Pinus arizonica</i>	N						1*	13		
<i>Pinus arizonica</i> var. <i>stormiae</i>	N	1	1 source					4		

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchardas, seed areas	No. of clones/family	No. of stored accessions			
<i>Pinus ayacahuite</i>	N	1	20 clones			44 from 3 sources	15		
<i>Pinus ayacahuite</i>	N	1	1 source				4		
<i>Pinus ayacahuite</i> var. <i>veitchii</i>	N	1	15 progenies				15		
<i>Pinus caribaea</i>	E	1	Mixed: <i>P. caribaea</i> , <i>P. caribaea hondurensis</i> y <i>P. oocarpa</i> .				7		
<i>Pinus caribaea</i> var. <i>hondurensis</i>	E	1	26 progenies from 5 sources			19 from 1 source	15		
<i>Pinus cembroides</i>	N	2	2 sources				4		
<i>Pinus cembroides</i> var. <i>Orizabensis</i>	N	2	14 progenies				15		
<i>Pinus cooperi</i>	N	1	3 sources				11		
<i>Pinus devoniana</i>	N					5 from 1 source	2		

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands			Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchardas, seed areas	No. of clones/family	No. of stored accessions		
<i>Pinus devoniana</i>	N	1	5 sources				85 from 19 sources	5
<i>Pinus devoniana</i>	N						3 from 1 source (superior trees)	14
<i>Pinus devoniana</i> var. <i>cornuta</i>	N						30 from 1 source	2
<i>Pinus douglasiana</i>	N	2	51 families	1 HSA; 1 BC	90 families			7
<i>Pinus douglasiana</i>	N	24	Variables in number of individuals					7
<i>Pinus durangensis</i>	N	1	1 source					11
<i>Pinus durangensis</i>	N						1*	13
<i>Pinus eldarica</i>	E	1	1 source					4

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Especie	Colecciones, ensayos de procedencias, progenies, arboreta o rodales de conservación				Bancos clonales (BC), áreas semilleras en plantaciones (ASP), huertos semilleros sexuales (HSS) y asexuales (HSA)			Banco de semillas	Instancia responsable
	Nombre científico	Origen(1)	Rodales o ensayos	No. de muestras específicas extralidas (acciones o árboles selectos, superiores o plus)	No. de bancos, huertos, áreas semilleras	No. de clones/familia	No. de accesiones almacenadas		
<i>Pinus eldarica</i>	E	1	Masal					15	
<i>Pinus engelmannii</i>	N	1	4 procedencias					11	
<i>Pinus greggii</i>	N	2	18 procedencias					6	
<i>Pinus greggii</i>	N	1	1 procedencia					11	
<i>Pinus greggii</i>	N	4	21 progenies de 3 procedencias			10 de 1 procedencia		15	
<i>Pinus greggii</i>	N			1 HSS	20 Familias de una procedencia			18	
<i>Pinus greggii</i>	N			1 HSS	424 individuos de 3 procedencias			18	
<i>Pinus greggii</i>	N			1 HSS	120 individuos de 6 procedencias			18	
<i>Pinus greggii</i>	N			1 HSS 2ª Generación	266 individuos de 5 procedencias			18	
<i>Pinus greggii</i>	N	2	Mixto: 13 procedencias de <i>P.greggii</i> var. <i>greggii</i> y <i>australis</i>					21	

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Scientific name	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchards, seed areas	No. of clones/family	No. of stored accessions		
<i>Pinus greggii</i> var. <i>australis</i>	N	4	20 sources				267 from 11 sources	2	
<i>Pinus greggii</i> var <i>greggii</i>	N	9	120 progenies				170 from 13 sources	2	
<i>Pinus greggii</i> var <i>greggii</i>	N	1	1 source					4	
<i>Pinus greggii</i> var <i>greggii</i>	N	1	3 sources					4	
<i>Pinus greggii</i> var <i>greggii</i>	N	1	22 progenies					4	
<i>Pinus greggii</i> var <i>greggii</i>	N	1	19 progenies					4	
<i>Pinus halepensis</i>	E	1	1 source					4	
<i>Pinus hartwegii</i>	N	1	1 source					4	
<i>Pinus hartwegii</i>	N						79 from 12 sources	5	
<i>Pinus hartwegii</i>	N						23 from 2 sources	15	
<i>Pinus johannis</i>	N	1	3 sources				92 from 3 sources	4	

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchards, seed areas	No. of clones/family	No. of stored accessions			
<i>Pinus leiophylla</i>	N			1 HSS	40 families from 6 sources	300 from 16 sources	2		
<i>Pinus leiophylla</i>	N	1	4 sources			25 from 4 sources	5		
<i>Pinus leiophylla</i>	N					1*	13		
<i>Pinus maximartinezii</i>	N	1	1 source			31 from 1 source	4		
<i>Pinus maximinoi</i>	N	2	36 progenies from 8 sources				15		
<i>Pinus montezumae</i>	N					133 from 7 sources	2		
<i>Pinus montezumae</i>	N	1	1 source				4		
<i>Pinus montezumae</i>	N					3 from 1 source (superior trees)	14		
<i>Pinus nelsonii</i>	N	1	1 source				4		
<i>Pinus oaxacana</i>	N					30 from 3 sources	15		
<i>Pinus oocarpa</i>	N	1	6 sources			15 from 1 source	2		

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Scientific name	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchardas, seed areas	No. of clones/family	No. of stored accessions		
<i>Pinus oocarpa</i>	N	2	4 sources						3
<i>Pinus oocarpa</i>	N				1 HSS	15 families			5
<i>Pinus patula</i>	N	3	10 sources		1 HSA	94 clones	420 from 11 sources		2
<i>Pinus patula</i>	N	11	150 progenies						2
<i>Pinus patula</i>	N				4 HSS 2 nd gen.	39 families	87 from 1 source		15
<i>Pinus patula</i>	N				5 HSS 3 rd gen.	23 families			15
<i>Pinus patula</i>	N				1 HSS 4 th gen.	31 families	10 from 1 source		15
<i>Pinus patula</i>	N	1	12 progenies				Bulk, from 2 sources		15
<i>Pinus patula</i>	N						70 from 3 sources		15
<i>Pinus patula</i> var. <i>longipedunculata</i>	N						72 from 3 sources		2
<i>Pinus pinceana</i>	N	1	1 source						4
<i>Pinus pinea</i>	E	1	1 source						4
<i>Pinus pringlei</i>	N	1	40 progenies				16 from 2 sources		2

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Scientific name	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchardas, seed areas	No. of clones/family	No. of stored accessions		
<i>Pinus pringlei</i>	N	2	1 source						3
<i>Pinus pseudostrobus</i>	N						147 from 7 sources		2
<i>Pinus pseudostrobus</i>	N	1	4 sources		1 HSS	8 families.	89 from 12 sources		5
<i>Pinus pseudostrobus</i>	N	1	29 progenies				38 from 9 sources superior trees)		14
<i>Pinus pseudostrobus</i>	N	2	35 progenies (1 source)				42 from 1 source superior trees)		14
<i>Pinus pseudostrobus</i>	N						25 from 1 source (seed area)		14
<i>Pinus pseudostrobus</i>	N						15 from 1 source		15
<i>Pinus pseudostrobus</i>	N				1 HSA	60 clones			18
<i>Pinus pseudostrobus</i>	N				1 HSS	5 sources			19

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Especie	Colecciones, ensayos de procedencias, progenies, arboreta o rodales de conservación				Bancos clonales (BC), áreas semilleras en plantaciones (ASP), huertos semilleros sexuales (HSS) y asexuales (HSA)			Banco de semillas	Instancia responsable
	Nombre científico	Origen(1)	Rodales o ensayos	No. de muestras específicas extraídas (acciones o árboles selectos, superiores o plus)	No. de bancos, huertos, áreas semilleras	No. de clones/familia	No. de accesiones almacenadas		
<i>Pinus radiata</i> var <i>binata</i>	N						78 de Isla Guadalupe, y 86 de Isla Cedros		2
<i>Pinus teocote</i>	N						54 de 2 procedencias		2
<i>Pinus teocote</i>	N	3	34 progenies de 3 procedencias						15
<i>Platymiscium lasiocarpum</i>	N	2	361 individuos						7
<i>Pseudotsuga menziesii</i>	N	3	10 procedencias				160 de 24 procedencias		2
<i>Pseudotsuga menziesii</i>	N	1	3 procedencias						4
<i>Pseudotsuga menziesii</i>	N						2*		13
<i>Pseudotsuga menziesii</i>	N	1	18 progenies de 3 procedencias						15
<i>Sequoia gigantea</i>	E						1*		13
<i>Sequoia sempervirens</i>	E						1*		13

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands				Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Scientific name	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchardas, seed areas	No. of clones/family	No. of stored accessions		
<i>Sequoia gigantea</i>	E						1*	13	
<i>Sequoia sempervirens</i>	E						1*	13	
<i>Swietenia humilis</i>	N						1*	13	
<i>Swietenia humilis</i>	N	1	40 individuals					21	
<i>Swietenia macrophylla</i>	N	1	30 sources					8	
<i>Swietenia macrophylla</i>	N				1 BC	30 clones with 15 replicas each		9	
<i>Swietenia macrophylla</i>	N	1	58 progenies from 5 sourceias					10	
<i>Swietenia macrophylla</i>	N	1	36 progenies from 3 sources					10	
<i>Swietenia macrophylla</i>							1*	13	
<i>Taxus globosa</i>	N				1HSS	40 families	100 in 10 bulk lots 6 sources	2	
<i>Tectona grandis</i>	E						1*	13	
<i>Tectona grandis</i>	E	1	2 sources					16	
<i>Tectona grandis</i>	E	1	2 sources				Masal	19	
<i>Tectona grandis</i>	E	1	2 sources					20	

Table 3.2. Ex situ plantations and conservation banks. (CONT.)

Species	Collections, provenance trials, progenies, arboretrums or conservation stands			Clonal banks (BC), Plantation Seed Areas (ASP), Sexual (HSS) and Asexual Seed Orchards (HSA)			Seed Bank	Responsible Body
	Scientific name	Origin(1)	Stads or trials	No. of extracted specific trials, (accessions or selected trees, superior or plus)	No. of banks, orchardas, seed areas	No. of clones/family		
<i>Tectona grandis</i>	E	1	40 individuals					21
<i>Toona ciliata</i>	E	1	2 sources					20
	115 N; 36 E	180		5 BC; 21 HSS;	5 HSA; 4 ASP		3,665 Accessions	21

Table 3.3. Bodies participating in ex situ conservation projects.

Participating body	Location	Technical Contact	Code of the body
Centro de Investigación en Alimentación y Desarrollo, A.C. Unidad Culliacán (CIAD), Sinaloa	Carretera a El Dorado Km 5.5, Campo El Diez, Culliacán, Sinaloa, C.P. 80110.	Dr. Miguel Ángel Angulo Escalante mangulo@ciad.edu.mx	1
Colegio de Postgraduados	Km. 36.5, Carr. México-Texcoco, Montecillo, Texcoco, Edo. de México.	Dr. Javier López Upton uptonj@colpos.mx Dr. Jesús Jasso Mata jejama@colpos.mx	2
Comisión Forestal de Michoacán	Bosque Cuauhtémoc, Justo Mendoza, Lote 11, Cuauhtémoc, C.P. 58020, Morelia, Mich.	Ing. Alejandro Reyes Ramos reyescraft@gmail.com	3
Departamento de Bosques de la Universidad Autónoma Agraria Antonio Narro	Calzada Antonio Narro 1923, Col. Buena Vista, CP 25315, Saltillo, Coah.	M.C. Celestino Flores López cele64@prodigy.net.mx	4
Departamento de Botánica del IIAF. Universidad Michoacana de San Nicolás de Hidalgo	Av. San Juanito Itzicuaró, S/N, Col. San Juanito Itzicuaró, Morelia, Mich.	Dr. Cuauhtémoc Sáenz Romero csaenz@umich.mx; csaenzromero@gmail.com	5
Facultad de Biología de la Universidad Michoacana de San Nicolás de Hidalgo	Km. 9.5, Carr. Morelia-Zinapécuaro, Tarímbaro, Mich. Uruapan, Mich.	M.C. Carlos Ramírez mandujanocramirez@umich.mx; carmcarm@prodigy.net.mx	6
Fideicomiso para la Administración del Programa de Desarrollo Forestal del Estado de Jalisco (FIPRODEFO)	Calle Bruselas 626, PA Col. Moderna, CP 44190. Guadalajara, Jal.	M.C. José Ángel López López angel.lopez@fiprodefo.org.mx Ing. Mario Aguilar Hernández mario.aguilar@jalisco.gob.mx	7

Table 3.3. Bodies participating in ex situ conservation projects. (CONT.)

Participating body	Location	Technical Contact	Code of the body
INIFAP	Campo Experimental El Palmar. Km. 18, Carr. Tezonapa- El Palmar, Veracruz, Ver.	M.C. Vicente Sánchez Monsalvo sanchez.vicente@inifap.gob.mx	8
INIFAP	Campo Experimental "San Felipe Bacalar", Km. 3.5, Carr. Chetumal-Bacalar, Chetumal, Q.R.	Dr. José Vidal Cob josevidalc@yahoo.es	9
INIFAP	Campo Experimental Edzna Km. 15 de la Carr. Campeche-Pocyaxum, Chiná, Camp.	Dr. Joaquín Gómez Tejero gomez.joaquin@inifap.gob.mx	10
INIFAP	Campo Experimental Valle de Guadiana. Km. 5, Carr. Durango-El Mezquital, Durango, Dur.	Dr. José Ángel Prieto Ruíz jprietoviv@yahoo.com.mx	11
INIFAP	Campo Experimental Zacatepec Km. 0.5, Carr. Zacatepec-Galeana, Col. Galeana, Zacatepec, Mor.	M.C. Fortunato Solares Arenas solares2001@yahoo.com.mx	12
INIFAP	Centro Nacional de Recursos Genéticos, Boulevard de la Biodiversidad 400, Tepatitlán, Jalisco.	Dr. José Fernando De la Torre Sánchez delatorre.fernando@inifap.gob.mx	13
Instituto de Investigaciones Agropecuarias y Forestales de la Universidad Michoacana de San Nicolás de Hidalgo	Av. San Juanito Itzicuaro, S/N, Col. San Juanito Itzicuaro, Morelia, Mich.	Dr. Nahum M. Sánchez Vargas nsanchezv@yahoo.com.mx	14

Table 3.3. Bodies participating in ex situ conservation projects. (CONT.)

Participating body	Location	Technical Contact	Code of the body
Instituto de Investigaciones Forestales de la Universidad Veracruzana	Parque Ecológico "El Haya", Jalapa, Ver.	Dr. Juan Alba Landa jalba@uv.mx Dr. Héctor Viveros Viveros hevviveros@uv.mx	15
MADPREVER, S.A. de C.V. (Empresa privada)	Avenida 20 de noviembre # 1110, Colonia La Sabana; C.P. 96980, Las Choapas, Ver. Tel.: (923) 237199	Ing. Javier Arcos Roa	16
PLANTEH S.A. DE C.V. (Empresa privada)	Km. 116, Carr. Tuxtepec-Palomares, Lombardo de Caso, Oax.	Dr. Jesús Jasso Mata jejama@colpos.mx	17
Protectora de Bosques del Estado de México (PROBOSQUE)	Rancho Guadalupe S/N, Conjunto SEDAGRO, C.P. 52141, Metepec, Edo. de México.	Ing. José Antonio Soto jash_610211@yahoo.com.mx	18
RCH S.P.R. de R.L. de C.V. (Empresa privada)	Jalapa, Ver.		19
REFORESTA MEXICANA, S.A. de C.V. (Empresa privada)	Avenida 20 de Noviembre # 1110, Colonia La Sabana, Las Choapas, Ver. C.P. 96980 Teléfono: 01 (923) 2371999	M.C. Jaime A. Cruz Román reforesta@prodigy.net.mx	20
Universidad del Mar.	Puerto Escondido Mixtepec, Juquila, Oax.	M.C. Mario Valerio Velasco taxodium01@hotmail.com mvvelascog@yahoo.com.mx	21

3.3 *Ex situ* conservation infrastructure.

Currently, there are 37 forest gene banks (FGB) for medium-term storage and 17 centres for temporary forest germplasm storage (CAT-GF), which have a combined storage capacity of 235 tonnes. These facilities have trained technical personnel, and the necessary equipment and instruments for conservation and physical and physiological seed evaluation.

Banks and centres in educational and research institutions, which are mostly owned by public bodies, are intended to save seeds which supply plant nurseries for government reforestation programmes. Small batches are kept in these banks for projects on the conservation of genetic resources and breeding, as set out in Table 3.4.

Table 3.4 Infrastructure for the storage of forest seeds.

Entity	Denomination*	Capacity (Tonne)	Holder (body, individuals or legal entities)	Species or group of species in storage
B.C.	B.G.F. El Cachanilla	4	Gerencia Estatal Baja California Norte CONAFOR.	Conifers and species of arid areas
B.C.S.	C.A.T.G.F. Vivero Forestal San José Viejo	5	Gerencia Estatal Baja California Sur CONAFOR.	Broadleaved in arid areas.
Camp.	C.A.T.G.F. Castamay	1	Gerencia Estatal Campeche CONAFOR.	Broadleaved in tropical areas.
Chih.	B.G.F. Las Virgenes	2.5	Gerencia Estatal Chihuahua CONAFOR.	Conifers in arid areas.
Chis.	C.A.T.G.F. Rancho Nuevo	1.2	Gerencia Estatal Chiapas CONAFOR.	Conifers and species of temperate and tropical weathers.
Chis.	B.G.F. Rancho Nuevo	2	Instituto de Reconversión Productiva y Bioenergéticos de la Secretaría del Medio Ambiente e Historia Natural de Chiapas.	Conifers and species of temperate and tropical weathers.
Chis.	B.G.F. Santa Ana	2	Instituto de Reconversión Productiva y Bioenergéticos de la Secretaría del Medio Ambiente e Historia Natural de Chiapas.	Broadleaved in tropical areas.
Coah.	B.G.F. Sattillo	10	Gobierno del Estado de Coahuila.	Conifers and species in arid areas.
Coah.	B.G.F. Facultad de Ciencias Forestales	2	Universidad Autónoma Agraria Antonio Narro, Sattillo, Coah.	Conifers in temperate weather.
Col.	C.A.T.G.F. El Esfuerzo	2	Gerencia Estatal Colima CONAFOR.	Broadleaved in tropical areas.
D.F.	B.G.F. CENID-COMEF	0.5	Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias	Conifers and legumed.
D.F.	B.G.F. Vivero San Luis Tlaxiatalmalco	20	Dirección General de la Comisión de Recursos Naturales de la Secretaría del Medio Ambiente del D. F. (CORENA).	Conifers and species in temperate weather.

Table 3.4 Infrastructure for the storage of forest seeds. (CONT.)

Entity	Denomination*	Capacity (Tonne)	Holder (body, individuals or legal entities)	Species or group of species in storage
Dgo.	B.G.F. Guadiana	3	Gerencia Estatal Durango CONAFOR.	Conifers and species in arid areas.
Edo. de Mex.	B.G.F. Montecillo	3	Colegio de Postgraduados, Campus Montecillo, Edo. de México.	Conifers and species in temperate weather.
Edo. de Mex.	B.G.F. PROBOSQUE	5	Protectora de Bosques del Estado de México (PROBOSQUE).	Conifers and species in temperate weather.
Edo. de Mex.	B.G.F. Jilotepec	12	Gerencia Estatal del Edo. de México CONAFOR.	Conifers and species in temperate weather.
Gro.	C.A.T.G.F. Chilpancingo	3	Gerencia Estatal Guerrero CONAFOR.	Conifers and tropical species.
Gro.	B. G.F. Vicente Guerrero	3.87	Secretaría de Medio Ambiente y Recursos Naturales del Estado de Guerrero.	Conifers and tropical species.
Gto.	C.A.T.G.F. Irapuato	0.45	Gerencia Estatal Guanajuato CONAFOR.	Conifers and tropical species.
Hgo.	C.A.T.G.F. Pachuca	1.9	Gerencia Estatal Hidalgo CONAFOR.	Conifers and species in temperate weather.
Jal.	B.G.F. El Centinela	3	Gerencia Estatal de Jalisco de la CONAFOR.	Conifers and tropical species.
Mich.	B.G.F. Morelia	7	Comisión Forestal del Estado de Michoacán.	Conifers and species in temperate weather.
Mich.	B.G.F. Patzcuaro	1	Gerencia Estatal Michoacán CONAFOR y Comisión Forestal del Estado de Michoacán.	Conifers and species in temperate weather.
Mich.	B.G.F. Facultad de Agrobiología de la UMSNH	0.1	Facultad de Agrobiología de la Universidad Michoacana de San Nicolás de Hidalgo, Uruapan, Mich.	Conifers and species in temperate weather.

Table 3.4 Infrastructure for the storage of forest seeds. (CONT.)

Entity	Denomination*	Capacity (Tonne)	Holder (body, individuals or legal entities)	Species or group of species in storage
Mich.	B.G.F. IIAF de la UMSNH	0.1	Instituto de Investigaciones Agropecuarias y Forestales (IIAF) de la UMSNH.	Conifers and species in temperate weather.
Mich.	B.G.F. Botánica de la UMSNH	0.1	Departamento de Botánica del IIAF de la Universidad Michoacana de San Nicolás de Hidalgo.	Conifers and species in temperate weather.
Mor.	C.A.T.G.F. Vivero Forestal Chapultepec	0.2	Gerencia Estatal Morelos CONAFOR.	Conifers and tropical species.
Mor.	C.A.T.G.F. Campo Experimental Zacatepec	0.05	Campo Experimental Zacatepec, Mor., INIFAP.	Latifoliadas de zonas tropicales.
Mor.	B.G.F. "Téteia del Volcán"	2.5	Comisión Estatal del Agua y Medio Ambiente, del estado de Morelos.	Latifoliadas de zonas tropicales.
N.L.	BGF, Facultad de Ciencias Forestales	2	Universidad Autónoma de Nuevo León	Conifers and species of scrub.
N.L.	B.G.F. Santiago	5	Gerencia Estatal Nuevo León CONAFOR.	Broadleaved in tropical areas.
Nay.	B.G.F. Camichín de Jauja	3	Gerencia Estatal Nayarit CONAFOR.	Conifers and tropical species.
Oax.	B.G.F. Santa María Atzompa	10	Gerencia Estatal Oaxaca CONAFOR.	Conifers and tropical species.
Oax.	B.G.F. Universidad del Mar	0.05	Universidad del Mar, Puerto Escondido, Oax.	Conifers and tropical species.
Oax.	B.G.F. El Tequio	40	Secretaría de Desarrollo Agropecuario, forestal y Pesca de Oaxaca.	Conifers and tropical species.

Table 3.4 Infrastructure for the storage of forest seeds. (CONT.)

Entity	Denomination*	Capacity (Tonne)	Holder (body, individuals or legal entities)	Species or group of species in storage
Oax.	B.G.F. Estatal	20	Secretaría de Desarrollo Agropecuario, forestal y Pesca de Oaxaca.	Conifers and tropical species.
Oax.	C.A.T.G.F. Región Sierra Norte	1	Secretaría de Desarrollo Agropecuario, forestal y Pesca de Oaxaca.	Conifers and species in temperate weather.
Oax.	C.A.T.G.F. Región Cañada Alta	1	Secretaría de Desarrollo Agropecuario, forestal y Pesca de Oaxaca.	Conifers and species in temperate weather.
Oax.	C.A.T.G.F. Región Mixteca Alta	1	Secretaría de Desarrollo Agropecuario, forestal y Pesca de Oaxaca.	Conifers and species in temperate weather.
Oax.	C.A.T.G.F. Región Bajo Mixe	1	Secretaría de Desarrollo Agropecuario, forestal y Pesca de Oaxaca.	Broadleaved in tropical areas.
Pue.	B.G.F. El Vergel	4	Gerencia Estatal Puebla CONAFOR.	Conifers and species in temperate weather.
Pue.	B.G.F. Peñuelas Pueblo Nuevo	5	Ejido Peñuelas Pueblo Nuevo y Gobierno del Estado de Puebla.	Conifers and species in temperate weather.
Q. Roo.	C.A.T.G.F. "Ya'Axche"	0.5	Gerencia Estatal Quintana Roo CONAFOR.	Broadleaved in tropical areas.
Qro.	B.G.F. Ignacio Pérez.	4	Gerencia Estatal Querétaro CONAFOR.	Conifers and species in arid areas.
S.L.P.	C.A.T.G.F. Tangamanga	0.18	Gerencia Estatal San Luis Potosí CONAFOR.	Conifers and species in arid areas.
Sin.	B.G.F. CIAD	0.05	"Centro de Investigación en Alimentación y Desarrollo, A.C. Unidad Culiacán (CIAD),	Broadleaved in tropical areas.
Son.	B.G.F. Hermosillo	3	Sinaloa. Gerencia Estatal Sonora CONAFOR.	Conifers and species in arid areas.

Table 3.4 Infrastructure for the storage of forest seeds. (CONT.)

Entity	Denomination*	Capacity (Tonne)	Holder (body, individuals or legal entities)	Species or group of species in storage
Tab.	B.G.F. COMESFOR	4	Comisión Forestal del Estado de Tabasco	Broadleaved in tropical areas.
Tab.	B.G.F. El Guayacán	5	Gerencia Estatal Tabasco CONAFOR	Broadleaved in tropical areas.
Tamps.	B.G.F. Forestal Rio Bravo.	7	Gerencia Estatal Tamaulipas CONAFOR.	Conifers and species in arid areas.
Tlax.	B.G.F. Xocoyucan	2	Gerencia Estatal Tlaxcala CONAFOR.	Conifers and species in temperate weather.
Ver.	B.G.F. Ing. José Ángel Navar Hernández	7.5	Gerencia Estatal Veracruz CONAFOR.	Conifers and species in temperate weather.
Ver.	B.G.F. IIF de la Univ. Veracruzana	0.1	Universidad Veracruzana, Jalapa, Ver.	Conifers and tropical species.
Ver.	C.A. T.G.F. RCH	0.1	RCH S.P.R. DE R.L. DE C.V., Jalapa, Ver.	Broadleaved in tropical areas.
Yuc.	B.G.F. San José Tecoh	6	Gerencia Estatal Yucatán CONAFOR.	Broadleaved in tropical areas.
Zac.	C.A. T.G.F. Enrique Estrada	1.5	Gerencia Estatal Zacatecas CONAFOR.	Conifers and species in arid areas.
54		235		



Development for the conservation of germplasm in the form of pollen or tissue is incipient, even if the existing banks have facilities and conditions that allow the incorporation of computers to store this type of genetic material.

In addition to the banks, infrastructure and storage facilities for seeds previously described, the National Centre for Genetic Resources (CNRG), which began operation in 2010 is also in use. This centre is located in the municipality of Tepatitlán, State of Jalisco, which is in charge of INIFAP. The facilities contain advanced technology and equipment for long term storage of genetic material of the following types; aquaculture, agriculture, forest, microbial and livestock.

Specifically, the forest subsystem has the capacity to safeguard 3,500 in vitro accessions (ten test tubes by accession), 40,000 cryo-vials, each cryo-vial can store up to 10 meristems or “tripe” in liquid nitrogen tanks, and 93,300 accessions in 1 kg bags inside refrigeration rooms at -18°C , which sum a total capacity of 136,600 accessions in use. It also has space to triple the current capacity, giving a final capacity of 415,800 accessions, only for the forest subsystem.

3.4 Arboretums and botanical gardens established in Mexico.

There are 57 arboretums and botanical gardens registered in 27 of the 32 Mexican states (Table 3.5). These arboretums and gardens include collections of plants and other native species of scientific, nutritional, medicinal and ornamental interest, as well as those categorised as at risk.



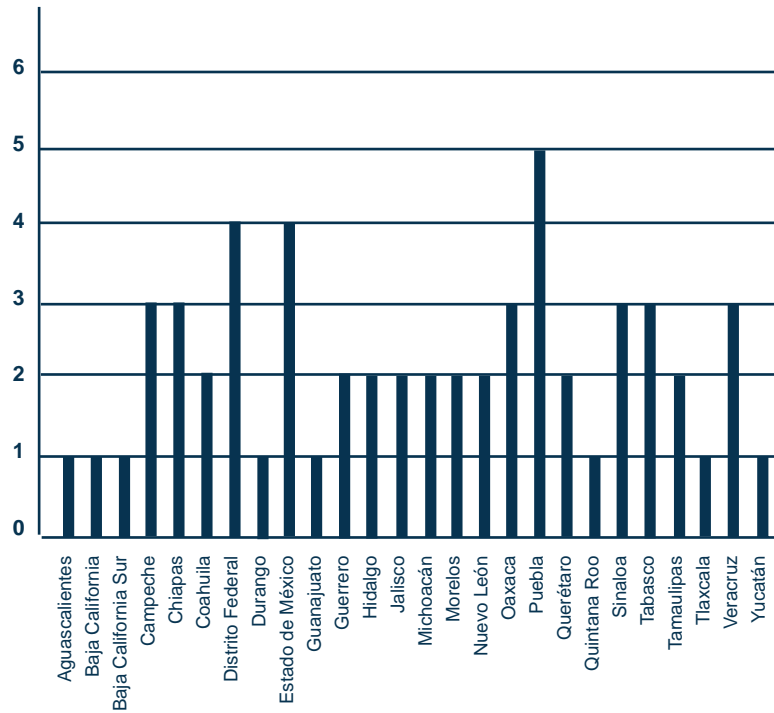
Table 3.5. Arboretums and botanical gardens by federal entity.

Entidad	No.
Aguascalientes	1
Baja California	1
Baja California Sur	1
Campeche	3
Chiapas	3
Coahuila	2
Distrito Federal	4
Durango	1
Estado de México	4
Guanajuato	1
Guerrero	2
Hidalgo	2
Jalisco	2
Michoacán	2
Morelos	2
Nuevo León	2
Oaxaca	3
Puebla	5
Querétaro	2
Quintana Roo	1
Sinaloa	3
Tabasco	3
Tamaulipas	2
Tlaxcala	1
Veracruz	3
Yucatán	1
Total	57

In most of these areas public service is provided, in addition to the research, propagation and conservation taking place.

There are ongoing exchanges of experiences, information, specimens, training and dissemination through a nonprofit association called "Mexican Association of Botanic Gardens, AC", of which most of the owners of the Gardens are members. The particular information for arboretums and botanical gardens is included in Annex 10.

Table 3.5. Arboretums and botanical gardens by federal entity. (CONT.)



3.5 Use and transference of germplasm inside and outside the country.

In Mexico, there are no laws to prevent or restrict the use of germplasm in different regions or areas that belong to the farms where it is collected.

In terms of imports and exports, an important prerequisite is established in the Regulation of the General Law on Sustainable Forest Development, to have a phytosanitary certificate issued by the country of origin of products and forest products (including forest germplasm). In terms of exportation of germplasm from Mexico to other countries, SEMARNAT is the federal executive body responsible for issuing phytosanitary certificates for conducting inspections and respective checks.

Currently, CONAFOR has a project to create a Mexican Standard (NMX-Voluntary application) to encourage the production of forest germplasm with superior genetic quality of natural populations or unmanaged plantations, it is scheduled to sanction and approve during 2012.

With this standard, the classification and identification of the source of germplasm for physiographic subprovinces will be possible (INEGI, 2001). This is to ensure that future reforestation efforts for conservation and restoration are made with plants produced from germplasm derived from production units that are located in the same subprovinces as the lands to be reforested.

3.6 Documentation and official characterisation of germplasm.

Based on the provisions of the General Law on Sustainable Forest Development and Regulation, the transportation of forest germplasm production units (orchards, testing, plantations, natural stands and seed areas) to storage centres and from these to the nursery or elsewhere, should be authorised under forest transport documents issued by SEMARNAT and/or tax receipts issued by the owners of the properties.

This documentation includes, among other things, the name of the property and its owner, the date of transport, the volume and/or weight of fruit and seeds per species, identification codes for the collection permit (or approval of the respective forest management programme), and destination.

Forest legislation in force does not include provisions for characterisation in terms of origin, phenotypic quality and/or genotypic germplasm.

3.7 Measures used to maintain and promote *ex situ* conservation.

Most conservation and breeding projects developed in the country have been funded by the federal and state government, through six-year

programmes that their respective administrations have implemented.

Over the past 10 years, the federal government has channeled funds for the protection and promotion of forest resources, increasing the amounts invested in previous decades through CONAFOR. In the current administration a programme called "ProÁrbol" operates through the federal government which is integrated into a single scheme to grant subsidies to owners of forest land with forest potential. The purpose is to develop measures that protect, conserve, restore and sustainably exploit the resources in the forests, jungles and arid zones of Mexico, and for the establishment, cultivation and harvesting of commercial forest plantations.

CONAFOR is the institution responsible for carrying out this programme. It operates by rules of operation. There is an annual call to establish the requirements, deadlines and procedures for the allocation and delivery of resources to beneficiaries.

In 2012 the operating rules include several categories of support related to the conservation, utilisation and genetic improvement of forest resources (Tables 3.6 and 3.7).

Table 3.6 Categories of support for the ProÁrbol 2012 programme, which allow the promotion of forest genetic resources.

Category of Support

A. Forest development

A1. Forest Studies

A1.1 Particular or regional manifestation of environmental impact

A1.3 Technical studies on the use of non-timber resources and forest germplasm collection

A2. Forestry

A4. Commercial forest plantations

A4-G Areas for the production of forest seed (with phenotypic and/or genotypic selection)

B. Conservation and restoration

B1. Reforestation and soil

B1.1 Reforestation

B1.2 Maintenance of reforested areas

B1.3 Protection of reforested areas

B2. Environmental Services

B2.2 Biodiversity

Table 3.7 Selected species under the sub-category of support for the establishment of areas for the production of forest seeds (A4-G), by species group.

Conifers	Native Broadleaf	Introduced Broadleaf	Eucalyptus
<i>Pinus arizonica</i>	<i>Amphiteringium adstringens</i>	<i>Tectona grandis</i>	<i>Eucalyptus camaldulensis</i>
<i>Pinus ayacahuite</i>	<i>Brosimum alicastrum</i>	<i>Gmelina arborea</i>	<i>Eucalyptus dunnii</i>
<i>Pinus chiapensis</i>	<i>Bursera aloexylon</i>		<i>Eucalyptus globulus</i>
<i>Pinus caribaea</i>	<i>Cedrela odorata</i>		<i>Eucalyptus grandis</i>
<i>Pinus devoniana</i>	<i>Ceiba pentandra</i>		<i>Eucalyptus nitens</i>
<i>Pinus douglasiana</i>	<i>Cordia alliodora</i>		<i>Eucalyptus saligna</i>
<i>Pinus durangensis</i>	<i>Cordia dodecandra</i>		<i>Eucalyptus urophylla</i>
<i>Pinus engelmannii</i>	<i>Cybistax donelli-smithii</i>		
<i>Pinus gregii</i>	<i>Prosopis glandulosa</i>		
<i>Pinus montezumae</i>	<i>Prosopis laevigata</i>		
<i>Pinus patula</i>	<i>Prosopis velutina</i>		
<i>Pinus pseudostrobus</i>	<i>Phitecellobium ebano</i>		
<i>Pinus oaxacana</i>	<i>Swietenia macrophylla</i>		
<i>Pinus rudis</i>	<i>Tabebuia rosea</i>		
<i>Pinus teocote</i>			
<i>Juniperus flaccida</i>			

Like CONAFOR, governments in states with the largest wooded areas, or with potential for commercial forest plantation establishments, develop their own programmes of forest protection and development, including grants for similar projects supported by the federation.

In addition, CONAFOR encouraged each state to develop its own strategic forest programme, as a result, they now have such programmes, which will help to promote sustainable forest development.

Of particular note is the National Centre for Genetic Resources above, which has the following objectives for the forest subsystem:

- Help preserve and improve the FGR important to Mexico;
- Contribute to, and promote the sustainable use of FGR;
- Support collection actions, characterisation, enhancement, use and preservation; and

- Value the conservation of FGR in the scientific community and the general population.

Currently this research center is developing long-term conservation of recalcitrant seeds from tropical tree species through *in vitro* research protocols, minimal growth and cryopreservation, parting from somatic tissues. Protocols for storage of orthodox seeds from tropical species are also generated and validated in refrigeration rooms.

Internationally, Mexico continues to maintain its share in the North American Forest Commission (NAFC) since 1970, which has achieved significant benefits in training and exchange of experiences through the Work Group on FGR.



4

State of the use and sustainable ordering of forest genetic resources.

4.1 Genetic improvement objectives.

Most of the species subject to genetic improvement are mainly used for lumber production, (39 of 69 taxa of the genus *Pinus* found in Mexico) (Table 4.1). This is mainly due to the importance of this genus in economics and natural range in Mexico.

Table 4.1. Main uses of species subject to genetic improvement.

Main use	%
Saw timber	59
Pulp wood	9
Food crops	9
Essential oils	4
Human Consumption	2
Forage	2
Conservation and restoration	4
Gums and resins	6
Christmas trees	3
Medicinal	2

4.2 Genetic improvement level.

Ex situ breeding programmes are emerging in Mexico, all of which are small in size and fall within the category named “first generation”.

Of the 21 programmes that run breeding projects, there are 21 sexual seed orchards (HSS), 5 asexual seed orchards (HSA) and 5 clonal banks (BC) as described in Tables 4.2, 4.3 and 4.4.

Table 4.2. Report of sexual reproduction in active seed orchards (HSS).

Scientific name	Origin ⁵	No. Seed orchards (HSS)	No. of individuals, families and/or sources	Responsible body*
<i>Gmelina arborea</i>	E	1	105 individuals	8
<i>Pinus douglasiana</i>	N	1	90 families	7
<i>Pinus greggii</i>	N	1	424 individuals from 3 sources	18
<i>Pinus greggii</i>	N	1	120 individuals from 6 sources	18
<i>Pinus greggii</i>	N	1	20 families from 1 source	18
<i>Pinus greggii</i>	N	1 de 2 ^a gen.	266 individuals from 5 sources	18
<i>Pinus leiophylla</i>	N	1	40 families from 6 sources	2
<i>Pinus oocarpa</i>	N	1	15 families	5
<i>Pinus patula</i>	N	4 de 2 ^a gen.	39 families	15
<i>Pinus patula</i>	N	5 de 3 ^a gen.	23 families	15
<i>Pinus patula</i>	N	1 de 4 ^a gen.	31 families	15
<i>Pinus pseudostrobus</i>	N	1	8 families	5
<i>Pinus pseudostrobus</i>	N	1	5 sources	19
<i>Taxus globosa</i>	N	1	40 families	2
TOTAL	13 N; 1 E	21 HSS		

*N: Native; E: Exotic *See Table 3.3.



Table 4.3. Report of asexual reproduction in active seed orchards (HSA).

Scientific name	Origin ¹	No. of Clonal Banks (BC)	No. of clones	Responsible Body*
<i>Cedrela odorata</i>	N	1	118 clones	8
<i>Cupressus lusitanica</i>	N	1	65 individuals from 28 families	18
<i>Pinus patula</i>	N	1	94 clones	2
<i>Pinus patula</i>	N	1	64 families from 3 sources	18
<i>Pinus pseudostrobus</i>	N	1	60 clones	18
TOTAL	5 N	5 HSA		

See Table 3.3.

Table 4.4. Report of active clone banks (BC).

Scientific name	Origin ¹	No. of Clonal Banks (BC)	No. of clones	Responsible Body*
<i>Cedrela odorata</i>	N	1	40 clones from 15 replicas each	9
<i>Eucalyptus camaldulensis</i>	E	1	10 clones	2
<i>Hevea brasiliensis</i>	E	1	200 clones	8
<i>Jatropha platyphylla</i>	N	1	20 clones	1
<i>Swietenia macrophylla</i>	N	1	30 clones from 15 replicas each	9
TOTAL	5 N	5 BC		

See Table 3.3.

Most of these orchards and banks are based in research. Their current conditions mean they are still unable to intensively produce genetically improved seed for use in commercial forest plantations. It should be noted that in these orchards there is no available information on controlled crosses.

4.3 Degree of use of reproduction materials in improved forests in the country.

Trials and established orchards with breeding purposes have been created recently and most remain in an experimental stage. Recently, firms with greater economic capacity have started to use improved germplasm on their own.

4.4 Measures taken to promote the use of genetically improved material.

There are currently no policies or guidelines that require the use of genetically improved material in plant production for reforestation with commercial purposes, forest cultivation, conservation, or restoration.

As a first step to promote the production of improved genetic material, starting in 2011 CONAFOR granted subsidies to ejidos in forest lands with ongoing and historical sustainable management of their resources. These subsidies were granted across 5 different states for the establishment of 8 asexual seed orchards in order to graft trees from the following species: *Pinus oaxacana*, *Pinus chiapensis*, *Pinus patula*, *Pinus engelmannii*, *Pinus durangensis* and *Pinus cooperi*.

Additional to this support, the Mexican Standards proposal for nurseries and forest germplasm is expected to 100% ensure plant production quality standards. This includes used germplasm, which must come from production units with phenotypic and/or genotypic selection, to improve survival and productivity of future plantings carried out in the country.

4.5 Programmes of participatory selection of forest trees in the country.

In relation to the conservation and breeding of forest trees, the General Law on Sustainable Forest Development expects that CONAFOR, in coordination with the agencies of the federal public administration, will coordinate and promote the development of a National System of

Genetically Improvement Forest. This will be possible with the evaluation and registration of parents, creation of areas, seed orchards and seed banks and additionally, through sponsoring the operation together with state and local governments (with the participation of owners of forest land or holders of authorisations for forest resource use, timber and non-timber forest, afforestation and commercial forest plantations).

Without creating special programmes as stated by law, both the federal government through CONAFOR, and state governments, annually channel resources to organised producers in order to support the establishment of *in situ* and *ex situ* production units, storage facilities and gene banks. In recent years, this has included projects in the states of Chiapas, Durango, Guerrero, Jalisco, Mexico, Michoacan, Oaxaca, Puebla and Veracruz.

As a complement, some research and service educational institutions have been working on such projects in collaboration with forest producers. The work of INIFAP, the Graduate College, Universidad Autonoma Agraria Antonio Narro, the Universidad Michoacana de San Nicolas de Hidalgo and Universidad Veracruzana (Table 3.2) should be highlighted.

In particular CONAFOR aims, to increase the establishment of asexual seed orchards in most of the entities over the next few years.

4.6 Information systems on forest genetic improvement.

During the period 1997 to 2001, the then Ministry of Environment, Natural Resources and Fisheries (SEMARNAP), operated a project called "Mexican Red Forest Germplasm" through the National Reforestation Programmes (PRONARE). This was in order to promote increased genetic quality of germplasm used in the propagation of plants for reforestation, and thus assist in the conservation of the forest resources of the country (SEMARNAP, 1998).

During its term, this network had the assistance of the most experienced research and training bodies in forest genetic improvement, CATIE and the Forest Service of the United States of America. As a means of communication and dissemination, a publication was issued and distributed in all states every three months. Its average circulation reached one thousand copies.

For the present year (2012), CONAFOR is promoting the creation of foundations for National Forest Genetic Resources. The purpose of these foundations will be to integrate and promote all of the production and genetic improvement carried out in the country. In addition, they will serve as a medium for dissemination and promotion to producers, researchers, public agencies, and research and educational institutions, both nationally and internationally.

4.7 Species in which germplasm exchange is possible.

Species considered in *ex situ* conservation projects, as well as species used in commercial reforestation and restoration seeds and vegetative parts are performed and can be arranged between institutions and producers through collaborative agreements, which specify the terms of trade.

4.8 Improved species from which germplasm can be produced on a commercial scale.

Plantations intended for breeding are relatively recent and their areas of experimentation are small. For this reason, it is not yet possible to acquire germplasm on a commercial scale. However, it is possible to make agreements with the holders for the acquisition of small quantities of materials used for testing and the establishment of orchards.

4.9 Classification of improved reproductive material being used in the country.

Currently, there is no official classification for selected or genetically improved forest germplasm. To address this situation, the Mexican Standard project that CONAFOR aims to put into operation, once approved, is a classification for Forest Seed Production Units (UPGF), and for the germplasm obtained from each of them, including the nine categories in Table 4.5.



Table 4.5. Classification of germplasm production units and forest germplasm considered in the “Mexican Standard” project on forest germplasm.

Group	Category	Code	Germplasm code
Identified Units	Seed Stand	UPGF-I-RS	GF-I-RS
	Stand with species in the at risk category	UPGF-I-RECR	GF-I-RECR
Selected Units	Seed Area	UPGF-S-AS	GF-S-AS
	Sexual Seed Orchard	UPGF-S-HSS	GF-S-HSS
	Asexual Seed Orchard	UPGF-S-HSA	GF-S-HSA
	Clonal Bank	UPGF-S-BC	GF-S-BC
Elite Units	Sexual seed orchard, Genetically proofed	UPGF-E-HSSCG	GF-E-HSSCG
	Asexual seed orchard, Genetically proofed	UPGF-E-HSACG	GF-E-HSACG
	Clonal Bank, Genetically proofed	UPGF-E-BCCG	GF-E-BCCG

4.10 Varieties produced in the country.

To date there are no known records of forest tree varieties that have been developed in our country.

4.11 Public presentation of improved genetic materials.

There are no legal provisions regarding forest legislation. However, the proposed forest germplasm Mexican Standard provides that forest germplasm should leave storage centres properly packaged and accompanied by a sheet, when dispatched to nurseries or other sites. The sheets should include, amongst other information, the location of the property where the germplasm was collected and the physiographic province to which it belongs, the category and nomenclature of the production unit, germplasm physical characteristics (weight, purity and number of seeds or propagules) and physiological characteristics (germination percentage and/or feasibility) of germplasm.

4.12 Priorities to improve *ex situ* conservation.

- Promote the basis for the creation of National Forest Genetic Resources, in order to nationally integrate and promote breeding stock, and to increase the exchange of genetic material and experience with networks or systems in other countries.
- Establish policies to ensure that the annually hired facility that supplies governmental reforestation programmes produces while observing the provisions for the collection, transportation and storage of forest germplasm, provided by forest legislation. This is to ensure the accuracy of quality and origin, and that the material deposited in banks and storage facilities complies with these regulations.
- Manage the authorisation of the Mexican Standard for the production of certified forest germplasm. Once it is approved

and operating, increasing the quality and productivity of future plantations will be promoted.

Establish differential pay for plants produced with certified forest germplasm, depending on their level of selection or breeding, according to the International Standard for the production of certified forest germplasm.

- In the concepts of support that the federal government grants in the form of subsidies, include support for the maintenance and management of *ex situ* and *in situ* production units, banks and germplasm storage centres.
- Promote coordination of the various levels of government in the country to unify and link efforts for conservation and enhancement of forest genetic resources.
- Increase the delivery of training workshops for producers and technicians in each state, to induce the establishment and certification of production units and storage facilities in accordance with the proposed Mexican Standard of germplasm.



5

State of programmes, research, education, training, and legislation in the country.

5.1 Institutions participating in the protection and promotion of forest genetic resources.

Activities for the protection and promotion of FGR in Mexico are mainly carried out by public entities of the federation, and state governments. To a lesser extent are the research institutions like INIFAP and universities that offer postgraduate courses related to forest resources, as described in Table 5.1

Table 5.1. Bodies participating in the protection and promotion of forest genetic resources.

Body	Main activities	Level of participation
Secretaría del Medio Ambiente y Recursos Naturales (SEMARNAT)	Regulate and coordinate the national policy for protection, conservation and promotion activities in relation to forest resources.	Federal
Procuraduría Federal de Protección al Ambiente (PROFEPA)	Control and monitoring for the sustainable use of forest resources.	Federal
Comisión Nacional Forestal (CONAFOR)	Coordinates conservation, protection and promotional activities in relation to forest ecosystems.	Federal
Comisión Nacional de Áreas Naturales Protegidas (CONANP)	Administration, protection and promotion of natural areas at a federal level.	Federal

Table 5.1. Bodies participating in the protection and promotion of forest genetic resources. (CONT.)

Body	Main activities	Level of participation
Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO)	Promote and coordinate activities for the knowledge and conservation of biological diversity. Operate the National Information System on Biodiversity (SNIB).	Federal
Instituto Nacional de Ecología (INE)	Generate and disseminate knowledge and information to support the formulation of environmental policies that promote sustainable development.	Federal
Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP)	Develop conservation, research and forestry training projects.	Federal
Gobiernos de las 32 entidades federativas	Administration, protection and promotion of Protected Natural Areas in the state.	State
Gobiernos de los estados de Chiapas, Durango, Guerrero, Jalisco, México, Michoacán, Morelos, Oaxaca, Puebla y Veracruz	Development of projects for the conservation, production and genetic improvement of forest germplasm.	State
Centro de Investigación en Alimentación y Desarrollo, A.C. Unidad Culiacán (CIAD), Sinaloa	Research and service activities related to forest resources.	State
Colegio de Postgraduados	Teaching, research and service activities in relation to forest resources.	Regional
Universidad Autónoma Agraria Antonio Narro	Teaching, research and service activities relation to forest resources.	Regional

Table 5.1. Bodies participating in the protection and promotion of forest genetic resources. (CONT.)

Body	Main activities	Level of participation
Universidad Autónoma Chapingo	Teaching, research and service activities relation to forest resources.	State
Universidad Autónoma de Chihuahua	Teaching, research and service activities relation to forest resources.	State
Universidad Autónoma de Nuevo León	Teaching, research and service activities relation to forest resources.	State
Universidad del Mar del Estado de Oaxaca	Teaching, research and service activities relation to forest resources.	State
Universidad Juárez del Estado de Durango	Teaching, research and service activities relation to forest resources.	State
Universidad Michoacana de San Nicolás de Hidalgo	Teaching, research and service activities relation to forest resources.	State
Universidad Nacional Autónoma de México	Teaching, research and service activities relation to forest resources.]	Regional
Universidad Veracruzana	Teaching, research and service activities relation to forest resources.	State

5.2 National genetic resources programme.

To date, a specific national programme for FGR does not exist in Mexico. However, it is worth mentioning that in 2004 the National Programme for the Management of Forest Genetic Resources (PNMRGF) was developed by different parties involved in the management and conservation of forest genetic resources (government, educational and research agencies, among others). This programme identified four lines of action in the short and medium term: Conservation of Forest Genetic Resources, Forest Ecosystem Restoration, Research, Technological Development and Innovation, and Education and Training.

Despite being a well-structured and basic document for the conservation and enhancement of forest genetic resources, it was not pursued nor did it receive a budget on which to operate. It is absolutely necessary (in addition to generating a programme like this) to establish a National Forest Genetic Resources System to be responsible for monitoring and operating the lines of action in the short, medium and long term.

For the current year, 2012, CONAFOR intends to promote the creation of the basis for the National Forest Genetic Resources System in order to promote, integrate and disseminate conservation actions and promotion of FGR carried out in the country. This can serve as liaison between the public authorities, responsible forest producers, growers, germplasm marketers and researchers.

5.3 Judicial framework for strategies, plans and programmes for forest genetic resources.

Mexico has a legal framework that allows the development of plans and programmes to promote permanent FGR established in the forest legislation.

For this purpose the General Law on Sustainable Forest Development provides in Article 132 that *"... the National Forest Commission (CONAFOR) in coordination with the agencies of the federal public administration, will coordinate and promote the development of a system of forest genetic improvement with the evaluation and registration of parents; creating areas and seed orchards, forest nurseries and non-timber species, and gene banks; sponsoring its operation through the governments of the states and municipalities; as well as the managers and owners of forest land who hold authorizations for the use of resources and non-timber forest, afforestation and commercial plantations."*

To complement this, the Regulations of the Act provided in Articles 168 and 169, state that... *"CONAFOR will coordinate and promote the following activities with the social, private and public sectors: the necessary technical assistance activities for the establishment and operation of a system for forest genetic improvement; the evaluation and registration of parents; the creation of seed orchards and areas, timber and non-timber species nurseries, and gene banks; and that the SEMARNAT will issue the official Mexican Standards to establish gene banks"*

for afforestation and reforestation purposes, as well as protection and conservation of forest genetic resources, promoting quality improvement by establishing production units of the resource, with the participation of stakeholders“.

Meanwhile, the General Wildlife Law is to establish the concurrence of the federal, state and municipality governments, within their respective powers, on the conservation and sustainable use of wildlife and its habitats. This excludes timber and non-timber resources, which are regulated by LGDFS, except when dealing with species or populations at risk.

Although there is an appropriate legal framework, and federal and state contributions to the development of FGR have considerably increased, a plan or programme for these resources has not yet been finalised with national and permanent character.

5.4 Support for the national forest genetic resources programme.

For the period 2001-2011, there was an investment of 230.023 million pesos in projects and actions for the promotion of FGR. This investment is significantly higher than in past decades, with federal and state governments being the provider of the major entities (Table 5.2). Specific information on projects is included in Annex 11.

Most of the resources provided by CONAFOR and state governments have been earmarked for the infrastructure development of banks and germplasm storage centers, the establishment of production units, and training for technicians and producers.



Table 5.2. Conservation and promotion projects of FGR 2001-2011.

Funding Body	No. of projects	Total (\$) ⁴⁶
Colegio de Postgraduados	3	839,500
Comisión Forestal de Michoacán	5	8,791,610
CONABIO	47	18,275,370
CONAFOR	10	114,310,210
CONAFOR-CONACYT	31	12,209,700
Fundación Produce, A.C.	1	1,477,700
IFS (International Foundation for Science)	1	106,676
INIFAP	33	30,232,791
Secretaría de Desarrollo Agropecuario del Estado de México	6	2,092,250
Secretaría de Desarrollo Rural del Estado de Jalisco	4	217,500
Secretaría de Medio Ambiente y Recursos Naturales de Guerrero	2	12,000,000
Secretaría de Sustentabilidad Ambiental y Ordenamiento Territorial de Puebla	6	6,054,240
Secretaría del Medio Ambiente e Historia Natural de Chiapas	6	15,822,370
Universidad Agraria Autónoma Antonio Narro	7	243,630
Universidad Autónoma de Nuevo León	6	7,350,000
TOTAL	168	230,023,547

In the case of resources belonging to INIFAP, CONABIO, CONAFOR-CONACYT, universities and others, investments have mainly been for research projects, establishment of orchards and tests.

5.5 Education, research and training.

A. Education.

In Mexico, there are 17 public education and research institutions that offer undergraduate and postgraduate courses that include courses or subjects related to forest genetic resources (Table 5.2).

Table 5.3. Educational institutions providing professionals with knowledge of forest genetic resources.

Institution	Specialisation level
Colegio de Postgraduados (Texcoco, Edo. de Méx.)	MA and Phd in Forest Sciences
Colegio de la Frontera Sur (San Cristóbal, Chis.)	MA in Conservation of Natural Resources.
Instituto Tecnológico de El Salto (Pueblo Nuevo, Dgo.)	BA in Forest Engineering MA in Sustainable Forest Development
Instituto Tecnológico de Perote (Perote, Ver.)	BA in Forest Engineering
Instituto Tecnológico Valle de Morelia (Morelia, Mich.)	BA in forest Engineering
Instituto Tecnológico Superior de Irapuato (Irapuato, Gto.)	BA in Forest Engineering
Universidad Autónoma Agraria Antonio Narro (Saltillo, Coah.)	BA and MA in Forest Engineering BA in Forest Seed Technology
Universidad Autónoma Chapingo (Texcoco, Edo. de Méx.)	BA in Forest Engineering BA in Forest Restoration Engineering MA in Forest Sciences
Universidad Autónoma de Chihuahua (Chihuahua, Chih.)	BA in Forest Engineering MA in Sustainable Forest Development Sciences
Universidad Autónoma de Nuevo León (Linares, N.L.)	BA in Forest Engineering MA and PhD in Natural Resources
Universidad Autónoma del Estado de Hidalgo (Tulancingo, Hgo.)	BA in Forest Engineering
Universidad Autónoma Indígena de México (El Fuerte, Sin.)	BA in Biotechnologic Forest Engineering BA in community Forest Engineering
Universidad de Guadalajara (Zapopan, Jal.)	BA in Natural and Agricultural Resources BA in Biology BA in Forest Engineering MA in Ecophysiology and Genetic Resources

Table 5.3. Educational institutions providing professionals with knowledge of forest genetic resources.

Institution	Specialisation level
Universidad Juárez del Estado de Durango (Durango, Dgo.)	Forest Science Engineering Environment Management and Natural Resources Engineering MA in Natural Sciences
Universidad Nacional Autónoma de México (México, D.F.)	BA, MA and Phd in Biology and Ecology
Universidad Michoacana de San Nicolás de Hidalgo (Morelia, Mich.)	BA in Biology Postgraduate degree in Natural Resources
Universidad Veracruzana (Xalapa, Ver.)	BA in Biology MA in Forest ecology sciences.

While there are several institutions training professionals with knowledge of FGR, the courses are scarce or very general (Annex 12). In some institutions these courses are offered as optional and not yet considered a priority in the curriculum. Sometimes there are courses on the collection of germplasm, seedling production and reforestation or biotechnology or genetic markers, without giving the appropriate approach for the conservation and breeding of FGR.

Graduate level students have a moderate interest in issues related to FGR, particularly when it comes to linking them to production aspects, such as forest genetic improvement. There is an estimated average of only three graduates annually with a curriculum on FGR.

The subjects taught in graduate programmes are mainly orientated to biotechnology or conservation issues. For example, there is training offered for biotechnological aspects as cultivation of tissue. However, this is without the study of subjects related to breeding in order to understand the role of the first as a tool in the propagation of selected genotypes. Molecular markers are taught without linking their application to productive use.

At a national policy level, a national strategy that meets the needs of education and training on FGR has not yet been established. To date, the strategy has been solely at the level of each institution or body, guided mainly by a few professionals and researchers who have knowledge in the subject.

The demand for trained professionals in FGR is moderate, and can be extended if plantation companies and federal and state governments establish advanced breeding programmes, considering the recruitment of specialists in the field, to help conserve and improve the genetic composition of FGR.

B. Investigation:

From the above institutions, the following are highlighted for their participation in applied research projects: the Graduate College (*Co-legio de Postgraduados*), Universidad Autonoma Agraria Antonio Narro, Universidad Michoacana de San Nicolas de Hidalgo, the National Autonomous University of Mexico (*UNAM*) and Universidad Veracruzana (Table 3.3).

INIFAP has the largest nationwide participation in the research and breeding of FGR. Meanwhile, CONABIO, CONAFOR and CONACYT participate increasingly by financing studies and research projects (Table 5.1).

Apart from the researchers who work in government bodies and universities, there are some researchers who work in companies, producer organisations and NGOs, as well as service providers or professionals who perform research projects related to conservation and genetic improvement. There is a directory of these researchers that might be considered in the National Forest Genetic Resources that CONAFOR has scheduled to promote in 2012 (Annex 13).

C. Training:

The state of FGR training is incipient. Technical personnel responsible for conducting management programmes and projects of plant production and reforestation, do not have appropriate training to perform advanced breeding projects, and conservation of FGR.

Regulatory requirements for management programmes for forest resources have not been established to identify and conserve superior individuals, nor to establish production units with genetic selection or

breeding to regenerate harvested areas, and use the germplasm for the establishment of *ex situ* production units and commercial plantations.

During the last 10 years, CONAFOR has provided or funded training courses for technicians and producers on activities such as: collection; storage, benefit and seed analysis; management centres and forest germplasm banks. Few courses in genetic improvement of forest trees have been taught. Like CONAFOR, some state governments have also participated in the training of technicians and producers, among which are the states of Durango, Chiapas, Guerrero, Jalisco, Mexico, Michoacan, Puebla, Oaxaca and Veracruz.

In order to contribute to the training of technicians responsible for the management of forest resources and reforestation projects, it is necessary to include complementary subjects in the training workshops, such as: Basic knowledge of tree improvement, Conservation of genetic resources, Genetic diversity, Establishment of production units, Germplasm management, Storage management and banking centres, Identification and selection of superior trees and Asexual propagation techniques of superior individuals.

Finally, to contribute to the sustainable use, conservation and enhancement of FGR in Mexico, the following education and training are necessary *inter alia*:

Strengthen teacher training to a higher education level and update knowledge in aspects of FGR continuously.

Generate new curricula and strengthen existing ones, incorporating basic issues such as: Basic knowledge of genetics, Genetics in Conservation, Conservation of Forest Genetic Resources, Population and Quantitative Genetics, Production and Management of Germplasm Units, Asexual Propagation Techniques, Forest Breeding, Biotechnology, Studies on Molecular Markers and their relation to Population Genetics and Genealogy.

In parallel, the number of FGR specialist teaching staff should be increased, as well as the infrastructure of laboratories, greenhouses and equipment for research and the training of students.

Promote the exchange of experience and use of facilities, including educational institutions, to streamline available resources.

5.6 Opportunities for education and training in other countries.

There are no legal restrictions in Mexico for students or professionals to be trained, or undertake postgraduate studies in FGR in other countries.

The Mexican government offers scholarships for postgraduate studies at prestigious institutions, and short stays (3 to 6 months) abroad, for students and professionals, mainly in developed countries. To complement this, the NAFC has supported Mexican students with courses and stays in Canada and the United States through research projects.

Although there are programmes of financial-aid for specialising abroad, the main constraints in increasing the number of specialists in FGR remain; low level in the language of the country, and an inadequate academic foundation in forest resources.

5.7 Legislation pertinent to forest genetic resources.

During the last decade there have been no special circumstances which hinder the issuing of laws and regulations relevant to FGR in Mexico.

While there are no specific legal provisions for FGR, laws and regulations applicable to forest and environment, in relation to the conservation and promotion of these resources are:

General Law of Ecological Balance and Environmental Protection (1988). Establishes the requirements and measures that should be observed in order to prevent and mitigate the negative environmental impacts that may result from the use of forest resources.

General Wildlife Act (2000). Establishes the requirements for the protection, restoration and sustainable use of species considered to be in the at risk category, according to NOM-059-SEMARNAT-2010.

General Law on Sustainable Forest Development (2003). Establishes requirements for access, use, and germplasm collection in natural forests and plantations for commercial, scientific, and restoration means.

NOM-007-SEMARNAT-1997 (Revised 2003). Establishes procedures and specifications for sustainable harvesting, transportation and storage of fruits, seeds and vegetative parts.

NOM-059-SEMARNAT (2010). Defines the flora and fauna listed in four risk categories: "endangered", "threatened", "subject to special protection" and "probably extinct in the wild".

5.8 Agreements and international covenants in which Mexico participates.

To contribute to the conservation and promotion of natural resources, including forest genetics, our country has signed the following agreements and international conventions:

Convention on Biological Diversity-CBD (ratified by Mexico in 1993). The CBD has three main objectives: 1) the conservation of biological diversity, 2) the use of its components, and 3) the fair and equitable sharing of benefits arising from the use of genetic resources;

Cartagena Protocol on Biosafety to the Convention for Biological Diversity (adopted in Montreal on 29th January, 2000 and published in the Official Journal of the Federation on 28th October, 2003). This protocol is one of the CBD supplementary agreements aimed to ensure an adequate level of protection in the field of safe transfer, handling and use of living modified organisms resulting from modern biotechnology, that may have adverse effects on the conservation and sustainable use of biological diversity. It also takes into account risks to human health, specifically focusing on transboundary movements;

Convention on International Trade in Endangered Species of Fauna and Flora (CITES). CITES is an international agreement between governments that was ratified by Mexico in 1991. Its mission is to establish regulations governing international trade in threatened and endangered species of flora and fauna, which, starting 2004, led Mexico

to make various amendments to the Appendices in order to ensure better protection of FGR affected by international trade;

Convention on Wetlands of International Importance Especially as Waterfowl Habitat – Ramsar. Promotes the conservation of wetlands and waterfowl by establishing natural reserves on them, taking appropriate measures for safekeeping based on its international terms of ecology, botany, zoology, limnology or hydrology;

Convention for the Protection of Flora, Fauna and Natural Scenic Beauty of the Western Hemisphere. Its purpose is the protection of endangered species and wild species of America, while preserving spectacular geological formations and places of extraordinary or aesthetic beauty, and historical or scientific value;

International Convention for the Protection of New Varieties of Plants - UPOV - Minutes 78 and 91. Requires parties to recognize and guarantee a right to the breeder of a new plant variety, or assignee, under the conditions laid down in the agreement;

Convention on the Protection of World Cultural and Natural Heritage. Establishes an effective system of protection to all that have outstanding, universal value from a scientific, conservation or natural beauty standpoint;

International Plant Protection Convention. Sets the sanitary and phytosanitary measures that govern all the parties;

Kyoto Protocol (in force since 2005). Derived from the United Nations Framework Convention on Climate Change (UNFCCC). It includes among other commitments, actions of afforestation and reforestation, to reverse deforestation and disturbance of FGR;

The Nagoya Protocol. Derived from the Convention on Biological Diversity and adopted in 2010. It ensures the fair and equitable sharing of benefits and access to genetic resources (Art. 5 and 6) and the access to traditional knowledge associated with genetic resources, which benefits indigenous and local communities by using their own knowledge (Art. 7).

5.9 Obstacles in the development of relevant rules and laws for genetic forest resources.

In the last decade there have been no special circumstances that hinder the development of laws or regulations relevant to FGR.

Based on responses collected from the researchers and bodies convened to prepare this report, the following needs are considered in the short-term, according to Table 5.2.

Table 5.4. Needs for normative instruments in forest genetic resources in Mexico.

Necessities	Priority Level			
	Not Applicable	Low	Moderate	High
Improve the current FGR legislation (facilitate scientific collections)			X	
Improve the report presentation requirements		X		
Consider the possibility of penalties due to breaches	X			
Create specific regulations for FGR		X		
Improve the effectiveness of regulations for FGR		X		
Increase cooperation among national authorities in respect of FGR				X
Create a National FGR System				X

5.10 Management of information systems in support of the sustainable use, development and conservation of forest genetic resources.

Federal and state agencies in Mexico that are involved in the conservation and promotion of FGR projects have files or databases on projects that they perform or support. A system to integrate information at national level that is available to the general population is still missing.

Of the federal agencies that have more information about FGR, we can highlight the following: CONAFOR, which has information on most of the *in situ* production units, storage centres and germplasm banks; CONANP that has information on handling programmes, and protection and promotion activities carried out in the federal protected areas; and CONABIO, that has the most comprehensive databases on biogeographic species of flora and fauna at a national level, and particularly about strategic forest species for our country, that are integrated into the National Information System on Biodiversity in Mexico (CONABIO, 2102nd). These include information on products obtained from them for industrial purposes, food, medicine, fodder, honey, craft, home construction, tool handles and wood for fuel. Research and educational instances, INIFAP, the Graduate College, the University of San Nicolas de Hidalgo, the Universidad Veracruzana and the Autonomous University Antonio Narro are more instances that have files that perform research on FGR.

Promotion carried out by CONAFOR to form the basis of the system of National Forest Genetic Resources, will contribute significantly to the national integration of databases and archives of the species, studies, and projects related to FGR, to promote sustainable use, conservation and development.

5.11 Sensibility towards the importance forest genetic resources.

There are no specific awareness programmes in Mexico for the conservation and promotion of FGR. The federal and state governments include some dissemination activities to improve awareness of the importance of forest resources amongst the population of forests in their protection and development programmes.

Dissemination activities are primarily focused on informing people about the multiple benefits of the forests and jungles, as well as damage caused by forest fires, illegal logging, pests and changes in land use.

To contribute to the environmental awareness of the Mexican population Tree Day (third Thursday in July) and the World Environment Day (5th June) are annually celebrated. During these events reforestation

and dissemination are undertaken in all states, with federal, state and municipal participation.

CONAFOR organises a relevant event called Expo-Forest, which is a national event that involves producers, processors, input suppliers, service providers, research and educational institutions, federal and state agencies, and other special guest countries. These events are widely promoted in host cities, obtaining the meaningful assistance of local people, and also from the rest of the states.

Specifically for training and sensitisation of farmers and technicians during the period 2007 – 2011, CONAFOR has taught various training courses and distributed basic technical FGR manuals (Table 5.3).

Table 5.5. Printed material and courses given in all entities.

Title	Presentation
Handbook of Ecological Zoning of Forest Species and Application of Simulation Models of the Effect of Climate Change.	Technical manual
Manual for Identification and Establishment of Forest Seed Production Units. ⁴	Technical manual
Use and Conservation of Forest Genetic Resources.	book
Management of Forest Genetic Resources.	book
Forest Germplasm Video	1 CD
Forest Genetic Resources Management. ¹	1 Course
Forest Germplasm Banks Management.	1 Course
Forest Genetic Improvement	1 Course
Seed Quality Analysis	4 Courses
Seed Collection 'Recolección de Germoplasma'.	4 Courses
Ecological Zoning of Forest Species and Priority Forest Seed Production Units (UPGF)	6 Courses-Workshop
Forest Germplasm Management (Climate Semi-arid, temperate and tropical)	3 Courses
National Meeting of Experts on the Management and Conservation of Forest Genetic Resources	1 Meeting

Based on the responses from the researchers and bodies consulted for this report, we have identified and integrated short-term awareness needs (Table 5.4).

Table 5.6. Needs for specific sensitisation towards forest genetic resources in Mexico.

Necessities	Priority Level			
	Not applicable	Low	Moderate	High
Prepare the information directed to forest genetic resources				X
Prepare communication strategies focused on forest genetic resources			X	
Improve the Access to information on forest genetic resources				X
Improve the training and education on forest genetic resources				X
Improve comprehension of benefits and values of FGR				X
Others: Establish strategies that ensure or increase the awareness of the importance of forest genetic resources*				X
Others: Involve more administrative units in the development of activities for forest culture				X
Others: Develop and implement a system to monitor and evaluate social impact			X	

* Ensuring a strategy for comprehension and acceptance of the importance of FGR would improve the value of the benefits that they bring to the population.

5.12 Challenges, needs and main priorities for the maintenance or fortification of a national programme for forest genetic resources in Mexico within the next 10 years.

- a) Promote and operate National Forest Genetic Resources, with subsystems or operational networks for education and training, research, production units, storage centers and gene banks.
- b) The promotion and signing of agreements for state promotion and development of FGR.
- c) Promote the issuance of regulatory guidelines and policies to identify and conserve superior forest individuals with forest management programmes to improve the quality

of new natural populations and to exploit the germplasm of these individuals for the establishment of *ex situ* testing and orchards.

- d) Establish policies to support conservation projects, and research to consider the following priorities:
1. Assessment of genetic structure and diversity in priority forest species.
 2. Genetic improvement of forest species: genotype tests, selection and management of outstanding genotypes. Genetic engineering to incorporate desirable features.
 3. Genecological zoning approach to Germplasm Production Units (UPG), considering climate change.
 4. Vulnerability and adaptation to environmental change.
 5. Basic issues such as reproductive biology, phenology, asexual propagation methods, including protocols considering tissue culture for mass propagation and conservation of endangered species, or those with problems in seed production.
 6. Expand the research agenda for the species in which their value lies in obtaining non-timber products such as resins, oils, fibers, fruits, food, medicine and fitness of the species for restoration of disturbed land, landfills and deposits mine waste.
 7. Sensitivity and adaptation of forest species to attack by exotic pests.



6

State of regional and international contribution.

6.1 Thematic networks on forest genetic resources.

During the last 10 years, Mexico has participated in thematic networks on FGR. The most common examples are the following networks: North American Commission (NAFC FAO), Forest Genetic Resources Network for Latin America (LAFORGEN), Forest Genetic Resources Network-FAO (REGENFOR) and BIOVERSITY. The benefits obtained from these networks have essentially been related to technical training at a higher level, although in some cases there are research collaborations on peripheral or research projects. To mention one example, the Work Group of the North American Commission (NAFC) on Forest Genetic Resources has developed technical manuals. These manuals include: the use and conservation of forest genetic resources and the management of forest genetic resources, which describes basic aspects of genetic resource conservation, management, evaluation and use of germplasm. It also includes the analysis of genetic structure in populations of forest trees, the zoning and transfer of germplasm, genetic designs and statistical methods for evaluation of tests, and the application of in vitro reproduction.

On behalf of the government, the Mexican Network of Forest Germplasm (REMGEFOR) was founded in 1997. It aimed to encourage the improvement of the genetic quality of germplasm to be used in plant propagation for reforestation, and assist in the conservation of the country's forest resources. The main function of this network was the coordination of activities with public, private and social bodies who collected, produced, stored, used and traded forest germplasm for propagation purposes. It also served as a link to information for all

members affiliated to REMGEFOR. Subsequently, the network stopped operating as it was. Currently CONAFOR, has a Forest Germplasm Bank Network (SINBAG) which includes 18 banks and a Network of Forest Seed Production Units evaluated and found by CONAFOR (210).

6.2 Needs and priorities for creating or fortifying national and international networks for forest genetic resources.

- Know and systematise the joint effort of research groups and define lines of action.
- Create and strengthen national networks in the regions of North and Central America, and at other international levels.
- Find funding for the operation of FGR networks.
- Strengthen involvement with NAFC, LAFORGEN, IUFRO (Latin American section) and universities in the southern United States and Canada, but especially with Latin America to promote the conservation of priority tropical species. In particular it is recommended for the Mexican delegation, which is comprised of three researchers, to participate in all meetings, both nationally and internationally. Strengthen the relationship with CAMCORE in order to obtain improved germplasm from Mexican species for the purpose of establishing progeny trials and seed orchards.

The Work Group on Forest Genetic Resources of the North American Commission (NAFC) has been the most successful in the conservation of FGR throughout the region. It collaborates with the U.S., Mexico and Canada, and has established training in both human resources and consulting for generated research projects and publications (Annex 14). It also collaborates in the exchange of experience between the three countries. The CAMCORE cooperative has supported some research projects, primarily on Mexican pines (Table 6.1) and human resource training, even though the benefit has been greater for this cooperative. Currently INIFAP is a member of CAMCORE. Specifically, there have been collaborations with the Tropical Agriculture (CATIE) in exchange of seeds of tropical species, especially in *Cedrela odorata*, *Swietenia macrophylla*, *Tectona grandis* and *Gmelina arborea*.

Table 6.1. Summary of the main activities carried out through diverse species and their products.

Name of the Network	Activities	Species involved
COFAN	1, 2, 3, 4, 7	<i>Picea chihuahuana</i>
COFAN	1, 2, 3, 4, 7	<i>Picea engelmannii</i>
COFAN	1, 2, 3, 4, 7	<i>Picea martinezii</i>
COFAN	1, 2, 3, 4, 7	<i>Pinus pseudostrobus</i>
COFAN	1, 2, 3, 4, 7	<i>Pseudotsuga menziesii</i>
COFAN	1, 2, 3, 4, 7	<i>Pinus patula</i>
COFAN	1, 2, 3, 4, 7	<i>Pinus oocarpa</i>
COFAN-U de California	1, 2, 3, 4, 7	<i>Pinus coulteri</i>
LAFORGEN	1, 2, 3, 4, MAPFORGEN	<i>Pinus rzedowski</i>
USDA Forest Service	1, 2, 3, 6	<i>Pinus pseudostrobus</i>
UC MEXUS	1, 2, 3, 4	<i>Pinus radiata</i> var. <i>binata</i>
UC MEXUS	1, 2, 3, 4	<i>Cupressus guadalupensis</i>
UC MEXUS	1, 2, 3, 4	<i>Quercus tomentella</i>
CAMCORE	1, 5	<i>Pinus patula</i>
CAMCORE	1, 5	<i>Pinus greggii</i> var. <i>australis</i> y <i>greggii</i>
CAMCORE	1, 5	<i>Pinus herrerae</i>
CAMCORE	1, 5	<i>Pinus pringlei</i>
CAMCORE	1, 5	<i>Pinus tecunumanii</i>
CAMCORE	1, 5	<i>Pinus jaliscana</i>
CAMCORE	1, 5	<i>Pinus maximartinezii</i>
CAMCORE	1, 5	<i>Pinus caribaea</i>
DANIDA	2, 5	<i>Pinus chiapensis</i>
DANIDA	2, 5	<i>Tectona grandis</i>
Instituto Forestal de Oxford	5	<i>Gmelina arborea</i> <i>Gliricidia sepium</i>
CAMCORE	1, 5	<i>Pinus maximinoi</i>
CAMCORE	1, 2, 5, 7	<i>Eucalyptus urophylla</i>
CATIE	1, 5	<i>Cedrela odorata</i>
CATIE	5	<i>Swietenia macrophylla</i>
CATIE	5	<i>Gmelina arborea</i>
CATIE	5	<i>Tectona grandis</i>
CSIRO-Australia	1, 5, 4, 6	<i>Pinus radiata</i>
Red Alfa (Europa-México)	1, 2, 6, 7	<i>Pinus patula</i>

* Examples of activities: 1 Information exchange | 2 Development of technical guidelines | 3 Development of shared databases | 4 Establishment of strategies for genetic conservation | 5 Germplasm exchange | 6 Creation, presentation and execution of joint research projects | 7 Formation of human resources.

LAFORGEN was created as part of the collaboration between “International Bioversity” and the Forest Research Centre in the National Institute of Spain for Agriculture and Food Technology (CIFOR-INIA).

It was also supported by funds from INIA. The purpose of LAFORGEN is to link experts from different research institutes in Latin America working in the field of genetic resources, including forests. Mexico has participated as a member of the Coordinating Committee. MAPFORGEN was established as a project of the Network and MAPFORGEN is a database which can be accessed from "Google Earth" to locate 100 of the main tree species used in Latin America (for now), anyone can join network, providing information and obtaining location data and genetic information.

Funds to support short-term projects that enable collaboration between members of the Network have been obtained through LAFROGEN. This network has been active in developing guidelines for the Global Report on Forest Genetic Resources prepared by FAO. Mexico was present in at least three meetings (Costa Rica, Ecuador and Colombia), the first two meetings were for the Network and the third was a course on Focal Points in different countries.

6.3 Needs and priorities for creating or fortifying national and international networks for forest genetic resources.

The «Mesoamerican Biological Corridor-Mexico,» runs through the south of the country. It began in 2002 as a project with international funding (GEF-WB). It is linked to an effort to unite natural ecosystems through a "Mesoamerican Biological Corridor", while preserving between 10% and 15% of known plant and animal species, and leading to better opportunities and quality of life for the residents in 7 Central American countries.

Financing was completed in 2009 but the decision was made to keep it in CONABIO within the federal budget. This was considered to be a useful public policy to encourage the alignment of investments in various sectors in the territory, for the maintenance of biodiversity, promotion of best resource management practices and local communities, in order to adapt to the negative impacts of climate change. This project is developed through four strategic areas:

- Land management policies;
- Use, management and restoration of biodiversity;
- Monitoring and evaluation;
- Institutional strengthening.

Biological corridors are in the states of Campeche, Chiapas, Yucatan, Quintana Roo, Tabasco, and connect a total of 26 federal, state and private PNA.

Other collaboration examples:

- Through a cooperative programme between Canada and Mexico to implement and disseminate practices for sustainable forest management, two “Model Forests” have been established in Mexico. The selected study area belongs to one of the two sites, which constitute the “Model Forest Network”. These sites are located in the states of Chihuahua (Chihuahua Model Forest), and Campeche (Campeche Model Forest). There is also a similar bilateral cooperation programme between the US and Mexico, where a selection of Forest Service specialists from both countries have set goals for maintaining genetic diversity in sustainable forest management. However, there has been no appropriate genetic analysis to demonstrate the sustainability of such management.
- CAMCORE has partially collaborated on research with partners INIFAP, the Government of Veracruz, and two private companies (FOMEX and Sta. Genoveva). The latter organization in particular has carried out extensive collections of germplasm of various tree species, mostly *Pinus*. CAMCORE has been involved by advising on the establishment of test species, provenance and progeny, particularly with the Universidad Veracruzana, and improved testing material of *Pinus patula* and *Pinus maximinoi* with the Graduate College.
- CP-European Union Collaboration. Alfa Red performed a teacher training on wood characteristics of selected *Pinus patula* trees.
- Specific collaborations between institutions with projects in California, USA, such as the University of California (UC MEXUS),

and various research institutions in Mexico, worked on conservation aspects of *Pinus radiata* var. *binata*, *Cupressus guadalupensis* and *Quercus tomentella*, endemic taxa from Guadalupe Island, and studies on genetic variation in pine from Baja California.

- There is the Placerville agreement (Dr. Thomas Ledig), with UAAAN and COLPOS, on projects for collections and studies of genetic variability in three Mexican species of *Picea*, all of which are in danger of extinction, and currently in *Pinus coulteri*. Also several Mexican researchers have been trained under this relationship, particularly in genetic diversity studies.
- Through NAFC there have been several instances of training at a technical and higher education level. Professors and researchers have come from the United States on several occasions to give conferences at symposiums, congresses or specific events over one or two days, as well as carrying out field trips to exchange ideas on FGR conservation. When the meetings of the genetic resource workgroup have happened in Mexico, CONAFOR technicians have participated, incentivising work on FGR in Mexico, with the particular participation of Dr. Judy Loo and Dr. Tannis Beardmore in refresher courses, postgraduate and training, and human resources training.
- Because of these meetings, there are manuals or memories of the events that have been held (listed above), with chapters that range from germplasm collection, to conservation strategies of genetic resources. This work group has jointly conducted research on aspects of species conservation in species such as: *Picea chihuahuana*, *Picea engelmannii* var. *Mexican martinezii* *Picea*, *Pinus pinceana*, *Pinus coulteri*, *Pinus pseudostrobus*, *Pinus oocarpa* and *Pseudotsuga menziesii*, and made proposals on assisted migration of tree species due to climate change. In particular, these have been made with Jerry Rehfeldt from the USDA Forest Service.
- Thanks to the Seed Physiology and Technology section of IUFRO, support was obtained for participation at an international gathering of seeds held in Taiwan in 2010. At this gathering, the presentation of a report on biodiversity and advances in the conservation of

genetic resources and characteristics of certain Mexican species, germination and storage problems, took place.

- In the context of the forest genetic resources programme of FAO, there are some activities that include our country, such as the evaluation of field trials in arid and semi-arid on species of the genera *Acacia* and *Prosopis*, and the proposal for creating a network of mahogany genetic resources in the Neotropics, which is based on a report by F. Patiño in 1997. However, neither of these activities is recent.

6.4 Mexican needs and priorities with regard to future international contribution.

Needs

- Establish a national system that is functional for FGR.
- Establish and/or strengthen links with international networks.
- Obtain funding from international sources to strengthen and promote conservation activities and forest genetic improvement.
- Training at all levels (specifying topics and areas) indicating the basic required aspects, such as molecular markers, barcode for classification of species (cited in other RG). The purposes of which are standardization and definition of species, which is important for the work of collection and storage of accessions to the Forest Subsystem at the National Germplasm Centre.

Priorities

- Develop databases on FGR.
- Develop human resources (training and development in the subject).
- Establish a work group that defines strategies for short, medium and long term material, financial and human resources that meet

the points mentioned above. It is recommended that this work group should settle on the basis of meeting attendees for the FAO report and a group of researchers willing to collaborate. (Annex 10).

- Review, update and implement the Forest Genetic Resources Programme (CONAFOR, 2004) by all parties involved in the management and conservation of FGR.

Table 6.2. Needs for international collaboration on forest genetic resources.

Necessities	Priority Level			
	Not	Low	Moderate	High
Understand the state of genetic diversity				X
Strengthen <i>in-situ</i> conservation projects		X		
Strengthen <i>ex-situ</i> conservation projects				X
Strengthen the use of forest genetic resources			X	
Strengthen research				X
Strengthen education and training				X
Strengthen legislation			X	
Strengthen the management of information and early alert systems for forest genetic resources.			X	
Strengthen public awareness			X	
Strengthen research on the impact of climate change in FGR				X

7

Forest genetic resources, access and benefits.

7.1 Access to forest genetic resources in Mexico.

FGR have great potential to generate economic, environmental and social benefits through their sustainable use and conservation. These benefits have not been as strongly recognised as those obtained from other forest products. However, they have helped to motivate the authorities of our country to promote the broadcast of legal and policy instruments, and to sign international agreements for the regulation of access and the promotion of forest genetic resources. These regulations recognise the property of FGR owners at all times and in doing so prevent biopiracy of FGR.

As a result of the above, 10 international agreements have been signed. These agreements are described in paragraph 5.9 of this report, while nationally, 3 laws and 2 official Mexican Standards have been issued to regulate the access and the benefits of using FGR, as described in subsection 5.8 of this Report.

Specifically, the General Law of Sustainable Forest Development promotes the sustainable use of forest resources, so that the economic and social benefits derived from their use and development are framed in the long-term and guaranteed for future generations.

The law also provides for the issuance of official Mexican Standards, which set out the requirements and specifications for the use of forest resources, considering the welfare of the population, conservation, protection, production, and development or restoration of these and

their ecosystems. It also considers the issue of distribution of profits in the sections of the standard that involve aspects of community forestry.

Under this regulatory framework, collection and storage of forest reproductive material must be undertaken in accordance with authorisations issued by SEMARNAT. Forest reproductive material is transported through forest documentation issued by SEMARNAT, and/or invoices and referrals issued by the harvester.

Authorisations for the use of forest reproductive material are granted to holders of the premises, or to third parties, with a prior consent written by the owners or possessors, which includes; the purpose of collection, and recognition (where appropriate) of the rights of indigenous communities, their property, knowledge and use of local varieties.

As a complement to the aforementioned legal instruments, in 2005 the Senate passed an Initiative of Access and Use of Genetic Resources, which was subsequently sent to the House of Representatives for discussion and approval (if applicable). It was turned over to the Committees on Health and Environment, and is still pending. This law aims to improve access, use, development, conservation and protection of genetic resources, and an equitable sharing of benefits arising from commercialisation. It also sets out the terms to provide the minimum benefits that these activities must contribute to the nation, and indigenous and local communities.

It is also worth mentioning that SEMARNAT has been working on the identification, analysis and development of legislation to implement and fully exploit the provisions of the Nagoya and other international agreements.

Thus, and arising from this report, it is suggested that more specific regulations for access to genetic resources and the benefit sharing that arises from their use should be contemplated. Fundamental aspects such as the safeguarding of genetic resources *per se*, and genetic resources related to traditional knowledge should also be considered.

7.2 Access to forest genetic resources situated outside the country.

The exchange or acquisition of forest germplasm with other countries is not restricted in our country, provided the provisions of forest laws, environmental and health regulations are followed. The exchanges recorded to date have been conducted primarily by training and research institutions and private companies in order to establish trials and commercial plantations with genetically superior quality germplasm (Table 7.1).



Table 7.1. Exchange of germplasm carried out with other countries in the last ten years.

International Bodies	Local bodies
Central American and Mexico Coniferous Resources Cooperative (CAMCORE)	<p>Universidad Veracruzana; State of Veracruz Government; Forest Programme in the Graduate College (CP); National Institute for Forest, Agriculture and Livestock Research, 'Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias' (INIFAP)</p> <p>Main exchanged species: <i>Pinus chiapensis</i>, <i>Pinus oocarpa</i>, <i>Pinus maximinoii</i>, <i>Pinus tecunumanii</i>, <i>Pinus patula</i>, <i>Pinus greggii</i>, <i>Pinus caribaea</i> y <i>Pinus oocarpa</i>.</p>
Tropical Agronomic Centre for Research and Education. 'Centro Agronómico Tropical de Investigación y Enseñanza' (CATIE)	<p>National Forest Commission 'Comisión Nacional Forestal' (CONAFOR)</p> <p>National Institute for Forest, Agriculture and Livestock Research. Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP)</p> <p>Acquisition of germplasm to support beneficiaries of projects of commercial forest plantations: <i>Cedrela odorata</i>, <i>Swietenia macrophylla</i>, <i>Tectona grandis</i> y <i>Gmelina arborea</i>.</p>
Private Businesses	<p>Businesses that carry out commercial tropical plantations:</p> <p>Acquired species: <i>Swietenia macrophylla</i>, <i>Tectona grandis</i>, <i>Gmelina arborea</i>, <i>Eucalyptus urophylla</i>, <i>Eucalyptus grandis</i>, <i>Eucalyptus globulus</i>, <i>Toona ciliata</i>, <i>Khaya senegalensis</i>, <i>Acacia mangium</i>, <i>Azadirachta indica</i>.</p>
University of California (UC MEXUS) Department of Science Industry and Resources in Australia. University of California Programme for the Conservation of Genetic Resources. Commonwealth Scientific and Industrial Organisation (CSIRO)	<p><i>Secretaría de Medio Ambiente y Recursos Naturales (SEMARNAT)</i>,</p> <p><i>Comisión Nacional de Áreas Naturales Protegidas (CONANP)</i></p> <p><i>Instituto Nacional de Ecología (INE)</i></p> <p><i>Colegio de Postgraduados (CP)</i></p> <p><i>Exchange of seeds of Pinus radiata.</i></p>

Despite the mentioned exchange of germplasm, Mexico has not yet established a national policy or project that integrates and promotes the exchange of germplasm and experiences. Therefore, there is no national registry of the number of accessions that have been exchanged with other countries, and the only control is for the import authorisations, mainly from Argentina, Australia, Belize, Brazil, Colombia, Chile, Costa Rica, Haiti, Central African Republic and South Africa, according to the records of permits to import and export germplasm available to the SEMARNAT.

It should be noted that another goal of the CNRG is the establishment of treaties and agreements with other national and international centres, educational and research institutions who have similar objectives for the exchange of genetic resources. This will improve control and access to the register of exchange of accessions in and out of the country.

7.3 Distribution of benefits derived from forest genetic resources.

The current General law of Sustainable Forest Development does not create any obstacles to achieving a fair distribution of the use of forest germplasm in favour of the owners of forest land, and of land with commercial or restoration plantations. This due to the fact that landowners are granted authorisations for collections of germplasm by this law.

Additionally, the law foresees that the departments and public organisms who are in charge of enforcing the law (SEMARNAT), and promoting forest activity (CONAFOR), support economic resources via subsidies and technical assistance to forest producers. in coordination with local governments (state and municipality), and other federal departments related to the forest sector. This is for the establishment of production units and genetic improvement, among other activities, and alongside the installation and operation of banks and forest germplasm storage centres.

Mexico currently lacks statistical information about revenues generated from the use of forest germplasm. The following example allows

us to estimate the annual income generated by germplasm collected through the federal government from plant production for conservation and restoration purposes: in 2011 there were 230 million plants that were used for an average of 23 tonnes of seeds, considering an average cost of \$ 1,000 per kilogram of seed, the result a spill economy of \$23 million, only in this example. It should be noted that a great part of the cost of seed is invested in the payment of wages used in the collection and processing of germplasm. Therefore, it also promotes an alternative source of employment in addition to those generated by traditional forest use.

Finally, it should be noted that during the last 10 years the federal government, through CONAFOR and some state governments, has channeled financial support and technical assistance in the growing forest sector. They have particularly supported projects such as: the collection of germplasm, FGPU establishment, installation and operation of gene banks and collection centers. However, it is still necessary to work on many issues related to improving the distribution of benefits from the use of FGR whilst simultaneously encouraging conservation.

Priorities for improving use and access for forest genetic resources.

- Below is a list of priorities to improve access and increase the benefits obtained by the use of FGR:
- Promote the creation of the National Forest Genetic Resources System, in order to integrate and promote breeding stock nationally and provide a link to the exchange between domestic producers and networks in other countries.
- Establish mechanisms to ensure that the facility that is contracted annually to supply government reforestation programmes, produces in accordance with the provisions on collection, transportation and storage of forest reproductive material under forest law, so as to ensure the accuracy of the source thereof.

- Manage the authorisation of the Standard for the establishment of production units and management of forest germplasm in order to improve quality and productivity of future plantations.
- Establish differential pay for plants produced with certified forest germplasm, according to their level of selection and breeding.
- Increase financial support to producers for the establishment, registration and management of forest germplasm production units.
- Advocate the benefits obtained from the use and exploitation of forest reproductive material among technical advisors and resource owners.
- With respect to the purchase of germplasm, give priority to forest producers who are governed by the existing legislation and have banks or storage centers, thus promoting the development of the forest germplasm market with genotypic and/or phenotypic selection.
- Ratify the Nagoya protocol while generating laws and regulations under which which the protocol can be implemented.



8

Contribution of forest genetic resources to food security, reduction of poverty, and sustainable development.

8.1 National priorities and contribution to forest genetic resources in economic, social and environmental aspects.

Extreme poverty, environmental degradation and loss of natural resources are highlighted among priorities that require immediate attention in our country. To the extent that these priorities are addressed and resolved, the preservation and sustainable use of natural resources, based on forestry, favourable changes in equity issues, and insecurity will be promoted.

According to the Forest Strategic Programme for Mexico 2025 (PEF 2025), the management and sustainable use of forest resources plays an important role in reducing poverty and the degradation of natural resources. In the case of rural populations (the sector most affected by poverty), these resources have potential and growing development in activities other than agriculture, such as the collection and trade of germplasm, production and sale of handicrafts, and the extraction of materials of medicinal importance, which directly benefit the owners of these resources with food and employment.

In a case study of rural populations in the Sierra Tarahumara (Azarcaya-Gonzalez, 2009), it was estimated that about 370,000 people depend on forest resources. They prefer to manage the forest for a range of purposes in addition to and aside from timber, due to the degree of

degradation that this activity presents. Degraded areas should be recovered through the collection of germplasm in the region, to be used in conservation and reforestation efforts. Therefore, one can conclude that the benefits obtained from FGR are part of the livelihood strategy in these communities.

Other studies (Bray *et al.*, 2007) indicate that, when the forest did not show significant levels of disturbance, indigenous people had no need to migrate to other regions due to the availability of trees alongside food security, activities such as hunting, collecting firewood, medicines, leaves, fruits, seeds, mushrooms, medicinal roots and food, and the use of materials for making handicrafts. Products that met their basic needs were obtained and were also consistent with their cultural needs.

In the federal programme ProÁrbol, run by CONAFOR, the following activities are included among others: support to promote forest development, community forestry, community-based conservation of biodiversity, conservation and restoration of forest ecosystems, and commercial forest plantation development. The programme has an estimated budget of over 2,000 million pesos, allowing the generation of jobs (increasing the income of the population), conservation, restoration and utilisation of forest resources, thus providing a better organisational structure and consolidating more than 200 local, regional and national organizations.

The PEF 2025, includes the management of FGR to significantly support:

- The preservation of genetic resources and biodiversity.
- The provision of material with desired characteristics in the support of reforestation and commercial plantations.
- The increase in revenues to domestic producers from the sale of germplasm with high genetic value.
- The provision of genetic material for the development of investment in new medical and industrial products, which represent a potential for the development of industries with revenues of billions of dollars.

- The promotion, development and use of the most appropriate species and ecotypes for each forest region, and even by specific purpose, as it is a precondition for a successful reforestation programme.

8.2 Contributions of the management of forest genetic resources to the Millennium Development Goals.

The benefits offered by FGR products are important and have indirect implications on revenue and sources of employment, ranging from the generation of food, medicine, handicrafts, etc., to products for rural consumption in different regions (PEF 2025). However, knowledge and potential use of many species is still deficient. The suburbs are more focused on the harvesting of timber, and most markets are not developed. In general, the use and development of FGR has not received the same attention as timber harvesting. Furthermore, the increase of research, training and dissemination of the benefits for the use and development of FGR should be emphasised in addition to the development and implementation of techniques for collecting, processing, and market research to develop such products.

Although the precise value of the benefits of FGR is unknown, its usable potential is known in jungles, forests, and arid zones (Toledo and Argueta, 1989). As it was considered that the benefits obtained from the use of FGR could contribute some of the Millennium Development Goals (Table 8.1).

Table 8.1. Potential contribution of forest genetic resources to the Millenium Development Goals in Mexico.

Objectives	Potential Contribution of FGR
1. Eradicate extreme poverty and hunger	Germplasm sell contributes to increase the earnings of owners and possessors of the forest resource.
2. Acheive universal primary training	There are no direct implications for the use and development of FGR
3. Promote equality and autonomy of women	There are no direct implications for the use and development of FGR
4: Reduce child mortality	There are no direct implications for the use and development of FGR
5. Improve maternal health	There are no direct implications for the use and development of FGR
6. Fight VIH/AIDS and other illness	There are no direct implications for the use and development of FGR
7. Guarantee sustainability of the environment	By promoting the benefits that the development of FGR brings, communities are motivated and encouraged to conserve and use their resources sustainably. Simultaneously, they conserve forest areas and reduce deforestation rates.
8. Promote a global association for development	There are no direct implications for the use and development of FGR

8.3 Forest species of importance to food security and the reduction of poverty.

Mexico has a large number of arboreal species, scrubs and other plants (succulents, vines, etc.), which are endemic in many cases. These species are considered important for food security or poverty reduction (Annex 15). Nevertheless, the importance of many other species remains unknown, so it is necessary to promote studies of their use and potential, taking into account indigenous knowledge.

There are more tree species that have medicinal, ornamental, and food potential to be studied in order to promote their use and marketing. As well as the development of markets, this could impact positively on reducing poverty and food security as well.



Bibliographic References.

- Aguirre-Plater E., G. R. Furnier y L. E. Eguiarte. 2000.** Low levels of genetic variation within and high levels of genetic differentiation among populations of species of *Abies* from southern Mexico and Guatemala. *American Journal of Botany* 87: 362-371.
- Azarcoya-González B. 2009.** La Sierra Tarahumara, el bosque y los pueblos originarios: estudio de caso de Chihuahua, México. *Forest tenure in Latin America*. Forestal. FAO. <http://www.fao.org/forestry/54367/es/mex/>
- Bray, D., Merino, L. y Barry, D. 2007.** Los bosques comunitarios de México. Manejo sustentable de paisajes forestales. México, Secretaría de Medio Ambiente, Instituto Nacional de Ecología, Instituto de Geografía de la Universidad Nacional Autónoma de México, Consejo Civil Mexicano para la Silvicultura Sostenible, Florida International University.
- CDB. 2011.** Primera reunión del comité intergubernamental especial de composición abierta para el protocolo de Nagoya sobre acceso a los recursos genéticos y participación justa y equitativa en los beneficios que deriven de su utilización. Montreal, Canadá 5- 10 de junio de 2011. Documento de delegación-México.
- Challenger, A. y J. Soberón. 2008.** Los ecosistemas terrestres. En *Capital Natural de México*, vol. I: Conocimiento Actual de la Biodiversidad. CONABIO, México, pp.: 87-108.
- CONABIO. 2011.** Índice de especies. Disponible en: http://www.conabio.gob.mx/conocimiento/info_especies/arboles/doctos/indice_especies.html. Consultado 28 de noviembre de 2011.
- CONABIO. 2012.** Proyectos financiados. Disponible en: http://www.conabio.gob.mx/web/proyectos/proyectos_financiados.html. Consultado 26 de enero de 2012.
- CONABIO. 2012a.** Sistema Nacional de Información sobre Biodiversidad de México. Disponible en: <http://www.conabio.gob.mx/>

institucion/snib/doctos/acerca.html. Consultado 26 de enero de 2012.

CONAFOR. 2004. Programa Nacional para el Manejo de los Recursos Genéticos Forestales. Primera Edición. Zapopan, Jalisco, México. 35 p.

CONAFOR. 2007. Anuario estadístico de la producción forestal. Disponible en: http://148.223.105.188:2222/gif/snif_portal/administrator/sistemas/archivoslasdemas/1295030069_ANUARIO_2007.pdf. Consultado el 29-09-2011.

CONAFOR, 2009. Inventario Nacional Forestal y de Suelos de México 2004-2009: Una herramienta de certeza a la planeación, evaluación y desarrollo forestal de México.

CONAFOR. 2010. Visión de México sobre REDD+ hacia una estrategia nacional. Disponible en: http://www.conafor.gob.mx:8080/documentos/docs/7/1393Visi%C3%B3n%20de%20M%C3%A9xico%20sobre%20REDD_.pdf. Consultado el 21 de enero de 2012.

CONAFOR. 2011. Zonificación forestal. Disponible en: http://148.223.105.188:2222/gif/snifportal/index.php?option=com_content&task=view&id=14&Itemid=11 (Consultado el 28 de septiembre 2011).

CONAFOR. 2011a. Reforestación - Fichas Técnicas. <http://www.conafor.gob.mx/portal/index.php/temas-forestales/reforestacion/fichas-tecnicas>. Consultada del 1 al 15 de diciembre 2011.

CONAFOR. 2011b. Certificados de manejo forestal 2011. Disponible en: <http://www.conafor.gob.mx:8080/documentos/docs/5/1775Padr%C3%B3n%20de%20predios%20con%20certificado%20de%20Buen%20Manejo%20Forestal.pdf>. Consultado el 14 de enero de 2012.

CONANP. 2007. Programa Nacional de Áreas Naturales Protegidas 2007-2011. SEMARNAT. Distrito Federal. Disponible en: http://www.conanp.gob.mx/quienes_somos/pdf/programa_07012.pdf.

CONANP. 2011. Áreas Naturales Protegidas. Disponible en: <http://www.conanp.gob.mx/contenido/pdf/Convencion%20>

para%20la%20Proteccion%20de%20la%20Flora,%20de%20la%20Fauna%20y%20de.pdf) p://conanp.gob.mx. Consultado, 01 al 31-08-2011.

Convención para la Protección de la Flora, de la Fauna y de las Bellezas Escénicas Naturales de los Países de América.

Disponible en: (<http://www.conanp.gob.mx/contenido/pdf/Convencion%20para%20la%20Proteccion%20de%20la%20Flora,%20de%20la%20Fauna%20y%20de.pdf>)

Convención relativa a los Humedales de Importancia Internacional especialmente como hábitat de Aves Acuáticas – RAMSAR. Disponible en: (<http://www2.medioambiente.gov.ar/acuerdos/convenciones/ramsar/ramsarplan.htm>)

Convención sobre la Protección del Patrimonio Mundial, Cultural y Natural (<http://www.pgjdf.gob.mx/temas/4-6-1/fuentes/19-A-2.pdf>)

Convenio Internacional de Protección Fitosanitaria. Disponible en: http://www.tribunalesagrarios.gob.mx/images/stories/LegislacionAgraria/tratados-internacionales-pdfs/15_convencion_internacional_proteccion_fitosanitaria.pdf.

Convenio Internacional para la protección de las obtenciones vegetales UPOV – Acta 78 y 91. Disponible en: http://www.alessandri.cl/legislacion/Obten_Veg.pdf

Convenio sobre el Comercio Internacional de Especies de Fauna y Flora Silvestres (CITES). Disponible en: <http://www.cites.org/esp/disc/what.shtml>.

Cuenca A., A. E. Escalante y D. Piñero. 2003. Long-distance colonization, isolation by distance, and historical demography in a relictual Mexican pinyon pine (*Pinus nelsonii* Shaw) as revealed by paternally inherited genetic markers (cpSSRs). *Molecular Ecology* 12: 2087–2097

Delgado, P., R. Salas-Lizana, A. Vázquez-Lobo, A. Wegier, M. Anzidei, E. R. Alvarez-Buylla, G. G. Vendramin, y D. Piñero. 2007. Introgressive hybridization in *Pinus montezumae* Lamb. and *Pinus pseudostrabus* Lindl. (Pinaceae): morphological and molecular (cpSSR) evidence. *International Journal of Plant Sciences* 168: 861–875.

- Dvorak W.S., K. M. Potter, V.D. Hipkins y G.R. Hodge. 2009.** Genetic diversity and gene exchange in *Pinus oocarpa*, a Mesoamerican pine with resistance to Pitch canker fungus (*Fusarium circinatum*). International Journal of Plant Sciences 170: 609-626.
- FAO. 2010.** Evaluación de los recursos forestales mundiales 2010: informe nacional México. Departamento Forestal-FAO. Roma, Italia. Disponible en <http://www.fao.org/docrep/013/al567S/al567S.pdf>.
- Favela-Lara S. 2010.** Population variation in the endemic *Pinus culminicola* detected by RAPD. Polibotánica 30: 55-67.
- Flores-López C., J. López-Upton, y J.J. Hernández V. 2005.** Indicadores reproductivos en poblaciones naturales de *Picea mexicana* Martínez. Agrociencia 39: 117-126.
- García-Cruz Y. B. y A. E. Sierra-Villagrana. 2012.** Manual de zonificación ecológica de especies forestales y aplicación de modelos de simulación del efecto del cambio climático. CONAFOR. Zapopan, Jalisco. 103 p.
- García-Molina, J. C. 2008.** Carbón de encino: fuente de calor y energía. Biodiversita 77: 7-9
- Gómez-Jiménez, D.M., C. Ramírez-Herrera, J. Jasso-Mata y J. López-Upton. 2010.** Variación en características reproductivas y germinación de semilla de *Pinus leiophylla* Schiede ex Schltdl. & Cham. Revista Fitotecnia Mexicana 23: 297-304.
- Gugger P.F., A. González-Rodríguez, H. Hernández-Correa, S. Sugita y J Cavender-Bares. 2011.** Southward Pleistocene migration of Douglas-fir into Mexico: phylogeography, ecological niche modeling, and conservation of 'rear edge' populations. New Phytologist 189: 1185-1199.
- Hamrick J. L., M. J. M. Godt y S. L. Sherman-Broyles. 1992.** Factors influencing levels of genetic diversity in woody plant species. New Forest 6: 95-124.
- Hernández-Pérez, C., J.J. Vargas-Hernández, C. Ramírez-Herrera y A. Muñoz-Orozco. 2001.** Variación geográfica en respuesta

a la sequía de plántulas de *Pinus greggii* Engelm. Revista Ciencia Forestal en México 26: 61-79.

Hunter, JR. M. L. 2002. Fundamentals of Conservation Biology. Black-Well Science, Inc. Massachusetts USA. 547 p

INEGI. 2001. Instituto Nacional de Estadística y Geografía. Provincias y subprovincias fisiográficas. Serie 1. <http://mapserver.inegi.org.mx/geografia/espanol/estados/definiciones/definicion.cfm?c=444&e=15>.

Jaramillo-Correa, J.P., J. Beaulieu, F.T. Ledig and J. Bousquet. 2006. Decoupled mitochondrial and chloroplast DNA population structure reveals Holocene collapse and population isolation in a threatened Mexican-endemic conifer. Molecular Ecology 15: 2787-2800.

Jaramillo-Correa, J.P., E. Aguirre-Planter, D.P. Khasa, L.E. Eguiarte, D. Piñero, G.R. Furnier and J. Bousquet. 2008. Ancestry and divergence of subtropical mountain forests isolated: molecular biography of genus *Abies* (Pinaceae) in southern Mexico and Guatemala. Molecular Ecology 17: 2476-2490.

Karhu A., C. Vogl, G.F. Moran, J.C. Bell and O. Savolainen. 2006. Analysis of microsatellite variation in *Pinus radiata* reveals effects of genetic drift but no recent bottlenecks. Journal of Evol. Biol. 19: 167-175.

Ledig, F.T. 2000. Founder effects and the genetic structure of Coulter pine. The Journal of Heredity 91: 307-315.

Ledig F. T., M. Capó-Arteaga, P. D. Hodgskiss, H. Sbay, C. Flores-López, M. T. Conkle, and B. Bermejo-Velázquez. 2001. Genetic diversity and mating system of a rare Mexican piñon, *Pinus pinceana*, and a comparison with *Pinus maximartinezii* (Pinaceae). American Journal of Botany 88: 1977-1987.

Ley General de Desarrollo Forestal Sustentable (LGDFS). Disponible en: (<http://www.diputados.gob.mx/LeyesBiblio/pdf/259.pdf>)

Ley General del Equilibrio Ecológico y la Protección al Ambiente (LGEEPA). Disponible en: http://www.diputados.gob.mx/LeyesBiblio/regley/Reg_LGEEPA_MPCCA.pdf

- Ley General de Vida Silvestre (LGVS).** Disponible en: <http://www.diputados.gob.mx/LeyesBiblio/pdf/146.pdf>
- López-Locía, M. y S. Valencia-Manzo. 2001.** Variación de la densidad relativa de la madera de *Pinus greggii* Engelm. del norte de México. Maderas y Bosques 7:37-47.
- López-Upton, J., A.J. Mendoza-Herrera, J. Jasso-Mata, J.J. Vargas-Hernández y A. Gómez-Guerrero. 2000.** Variación morfológica de plántulas e influencia del pH del agua de riego en doce poblaciones de *Pinus greggii* Engelm. Maderas y Bosques 6: 81-94
- López-Upton, J., C. Ramírez-Herrera, O. Plascencia-Escalante y J. Jasso-Mata. 2004.** Variación en crecimiento de diferentes poblaciones de las dos variedades de *Pinus greggii*. Agrociencia 38: 457-464.
- Mápula-Larreta, M., J. López-Upton, J.J. Vargas-Hernández y A. Hernández-Livera. 2008.** Germinación y vigor de la semilla de *Pseudotsuga menziesii* de México. Ra Ximhai 4: 119-134
- Meza-Sánchez, R. y E. Osuna-Leal. 2003.** Estudios dasométrico del mezquite en la zona de las Positas B.C.S. INIFAP. Folleto Científico No. 3. 52 p.
- Mittermeir, R.A., N. Myers, J. B. Thomsen and G.A.B. Fonseca. 1998.** Biodiversity hot spots and major tropical wilderness areas: approaches to setting conservation priorities. Conservation Biology 12: 516-520.
- Molina-Freaner F., P. Delgado, D. Piñero, N. Perez-Nasser y E. Alvarez-Buylla. 2001.** Do rare pines need different conservation strategies? Evidence from three Mexican species. Canadian Journal of Botany 79: 131-138.
- Montiel-Oscuro, D. 2011.** Estructura poblacional y genética de *Fagus grandifolia* subsp *mexicana*. Tesis de Maestría. Colegio de Postgraduados, Montecillo, Texcoco Edo de México. 46 p.
- Moreno-Letelier A. y D. Piñero. 2009.** Phylogeographic structure of *Pinus strobiformis* Engelm. across the Chihuahuan Desert filter-barrier. Journal of Biogeography 36: 121-131.

- Nava-Cruz, Y., F.J. Espinosa-García y G. R. Furnier-Whitelaw. 2006.** Niveles y patrones de variación química en resina de las hojas del género *Abies* del norte de México. *Agrociencia* 40: 229-238.
- Navarro, C., S. Cavers, A. Pappinen, P. Tigerstedt, A. Lowe and J. Merilä. 2005.** Contrasting quantitative traits and neutral genetic markers for genetic resource assessment of mesoamerican *Cedrela odorata*. *Silvae Genetica* 54: 281-292.
- Newton A. C., T. R. Allnut, W. S. Dvorak, R. F. del Castillo y R. A. Ennos. 2002.** Patterns of genetic variation in *Pinus chiapensis* a threatened Mexican pine, detected by RAPD and mitochondrial DNA AFLP markers. *Heredity* 89: 191-198.
- NOM-007-SEMARNAT-1997.** Disponible en: (<http://www.profepa.gob.mx/innovaportal/file/3306/1/nom-007-semarnat-1997.pdf>).
- Parraguirre-Lezama, C., J.J. Vargas-Hernández, P. Ramírez-Vallejo, H.S. Azpiros-Rivero y J. Jasso-Mata. 2002.** Estructura de la diversidad genética en poblaciones naturales de *Pinus greggii* Engelm. *Revista Fitotecnia Mexicana* 25: 279-279
- Perry Jr J. P. 1991,** *The Pines of Mexico and Central America.* Timber Press, Oregon, USA. 231 p.
- Plan estratégico forestal para México 2010 – 2025.**
- Protocolo de Cartagena sobre Seguridad de la Biotecnología del Convenio sobre Seguridad Biológica** (<http://www.cbd.int/doc/legal/cartagena-protocol-es.pdf>).
- Protocolo de Kyoto.** Disponible en: unfccc.int/resource/docs/convkp/kpspan.pdf.
- Protocolo de Nagoya.** Disponible en: <http://www.cbd.int/abs/doc/protocol/nagoya-protocol-es.pdf>.
- Ramirez-Herrera, C. 2007.** Quantitative trait variation and alloenzyme diversity of *Pinus pincheana*. PhD Thesis. University of New Brunswick. New Brunswick Canada. 198 p.

- Ramírez-Herrera C., K.E. Percy, J.A. Loo, L. D. Yeates y J.J. Vargas-Hernández. 2011.** Genetic variation in needle epicuticular wax characteristics in *Pinus pinceana* seedlings. *Silvae Genetica* 60, 210-215.
- Ramírez-Herrera, C. 2007.** Quantitative trait variation and alloenzyme diversity of *Pinus pinceana*. PhD Thesis. University of New Brunswick. New Brunswick Canada. 198 p.
- Ramírez-Sánchez S., G. García de los Santos, J.J. Vargas-Hernández, A. Hernández-Livera y O.J. Ayala-Garay. 2011.** Variación morfológica de semilla de *Taxus globosa* Schltdl. provenientes de dos regiones geográficas de México. *Revista Fitotecnia Mexicana* 34: 93-99.
- Reyes-Hernández, V.J., J.J. Vargas-Hernández, J. López-Upton, H. Vaquera-Huerta. 2005.** Similitud fenotípica de poblaciones mexicanas de *Pseudotsuga* Carr. *Agrociencia* 40: 545-556.
- Rodríguez-Banderas, A., C.F. Vargas-Mendoza, A. Buonamici and G.G. Vendramin. 2009.** Genetic diversity and phylogeographic analysis of *Pinus leiophylla*: a post-glacial range expansion. *Journal of biogeography* 36: 1807-1820.
- Rowden, A., A. Robertson, T. Allnutt, S. Heredia, G. Williams-Linera and A.C. Newton. 2004.** Conservation genetics of Mexican beech, *Fagus grandifolia* var. *mexicana*. *Conservation Genetics* 5: 475-484.
- Rzewdoski, J. 1978.** Vegetación de México. 1er edición digital. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad, México, 504 p.
- Sáenz-Romero, C, L.F. Ruiz-Talonia1, J. Beaulieu, N.M. Sánchez-Vargas and G.E. Rehfeldt. 2011b.** Variación genética entre poblaciones de *Pinus patula* en un gradiente altitudinal. Ensayo de vivero en dos ambientes. *Revista Fitotecnia Mexicana* 34: 19-25.
- Sáenz-Romero, C. y B.L. Tapia-Olivares. 2003.** *Pinus oocarpa* isoenzymatic variation along an altitudinal gradient in Michoacán, México. *Silvae Genetica* 52: 237-240.

Sáenz-Romero, C., J. Beaulieu and G.E. Rehfeldt. 2011a. Variación genética altitudinal entre poblaciones de *Pinus patula*. *Agrocienia* 45: 399-411.

Sánchez-Monsalvo, V., J.G. Salazar-García, J.J. Vargas-Hernández, J. López-Upton y J. Jasso-Mata. 2003. Parámetros genéticos y respuestas a la selección en características del crecimiento de *Cedrela odorata* L. *Revista Fitotecnia Mexicana* 26: 19-27.

SEMARNAP. 1998. Red Mexicana de Germoplasma Forestal. Gaceta de la Red N° 1. 78 p.

SEMARNAT. 2009. Base de datos estadísticos, modulo de consulta temática: dimensión ambiental, recursos forestales. Subsecretaría de Gestión para la Protección Ambiental, DGGFS. Disponible en: http://dgeiawf.semarnat.gob.mx:8080/approot/dgeia_mce/html/mce_index.html#. Consultado el 14 de enero 2012.

SEMARNAT. 2010. NORMA Oficial Mexicana NOM-059-SEMARNAT-2010, Protección ambiental-Especies nativas de México de flora y fauna silvestres-Categorías de riesgo y especificaciones para su inclusión, exclusión o cambio-Lista de especies en riesgo. Diario Oficial de los Estados Unidos Mexicanos. Secretaria del Medio Ambiente y Recursos naturales. Jueves, 30 de diciembre de 2010.

SEMARNAT. 2011. Superficie forestal afectada por plagas y enfermedades forestales (hectáreas). Comisión Nacional Forestal, Gerencia de Sanidad Forestal. Disponible en: http://dgeiawf.semarnat.gob.mx:8080/ibi_apps/WFServlet?IBIF_ex=D3_RFORESTA06_01&IBIC_user=dgeia_mce&IBIC_pass=dgeia_mce. Consultado el 23 de enero 2012.

SEMARNAT. 2012a. Base de datos estadísticos, módulo de consulta temática: dimensión ambiental, recursos forestales. Subsecretaría de Gestión para la Protección Ambiental, DGGFS. En http://dgeiawf.semarnat.gob.mx:8080/approot/dgeia_mce/html/mce_index.html#. Consultado el 14 de enero 2012.

SEMARNAT. 2012b. Superficie de UMA registradas hasta el 30 de noviembre de 2011. Subsecretaria de Gestión y Protección Ambiental. Dirección de Vida Silvestre. Disponible en: <http://www.semarnat.gob.mx/temas/gestionambiental/vidasilvestre/>

Documents/UMAS/Graf_SUP_301111.pdf. Consultada el 27 de enero de 2012.

SEMARNAT. 2012c. Mapa de las UMA registradas hasta el 30 de noviembre de 2011. Subsecretaría de Gestión y Protección Ambiental. Dirección de Vida Silvestre. Disponible en: http://www.semarnat.gob.mx/temas/gestionambiental/vidasilvestre/Documents/UMAS/Mapa_301111.pdf. Consultada el 27 de enero de 2012.

Toledo, V.M. y A. Argueta. 1989. La tradición contemporánea: transformaciones ecológico-agrarias en México, *México Indígena* 27: 3-9.

Tratado Internacional sobre los Recursos Fitogenéticos para la Alimentación y la Agricultura. Disponible en: <http://www.fao.org/ag//CGRFA/Spanish/itpgr.htm>.

Viveros-Viveros, H., B.I. Tapia-Olivares, C. Sáenz-Romero, J.J. Vargas-Hernández, J. López-Upton, A. Santacruz Varela y G. Ramírez-Valverde. 2010. Variación isoenzimática de *Pinus hartwegii* Lindl. en un gradiente altitudinal en Michoacán México. *Agrociencia* 44: 723-733

Viveros-Viveros, H., C. Sáenz-Romero, J. López-Upton y J.J. Vargas-Hernández. 2005. Variación genética altitudinal en el crecimiento de plántulas de *Pinus pseudostrabus* Lindl. en campo. *Agrociencia* 39: 575-587.

Wei, X., J. Beaulieu, D.P. Khasa, J. Vargas-Hernández, J. López-Upton, B. Jaquish and J. Bousquet. 2011. Range-wide chloroplast and mitochondrial DNA imprints reveal multiple lineages and complex biogeographic history for Douglas-Fir. *Tree Genetics & Genomes* 7: 1025-1040.

White, T. L., W.T. Adams and D. B. Neale. 2007. *Forests Genetics*. CABI Publishing, Cambridge, MA. 682 p.

Annexes

Forest Genetic Resources Situation in Mexico

Country Report

Annex 1. Distribution of the variance in quantitative traits in several forest species in Mexico.

Genera/Species	Characteristics	σ^2_R	σ^2_P	σ^2_{WP}	Q_{STR}	Q_{ST}	Reference
<i>Abies</i>	Chemical composition of resin in leaves	1.7†	39.4	58.1	-	-	Nava cruz et al., 2006
<i>Cedrela odorata</i>	Height (62 days)	-	42.3	13.4	-	0.28	Navarro-Pereira et al., 2005
	Height (252 days)	-	57.6	16.6	-	0.3	
	Base diameter	-	53.3	13.3	-	0.32	
	Length between knots	-	63.5	6.8	-	0.54	
	Height (5 years)	-	-	21.5	-	-	Sánchez-Monsalvo et al., 2003
<i>Pinus oocarpa</i>	Diameter (5 years)	-	-	12.6	-	-	
	Height (180 days)	-	-	9	-	-	Viveros-Viveros et al., 2005
<i>Pinus patula</i>	Diameter (150 days)	-	-	7	-	-	
	Height (8 months)	-	-	4.3	-	-	Sáenz-Romero et al., 2011a
	Aerial dry weight (8 months)	-	-	5	-	-	
<i>Pinus greggii</i>	Height (6 months)	-	5.76	-	-	-	Sáenz-Romero et al., 2011b
	Height (8 months)	-	35.5	7.7	-	-	López-Upton et al., 2000
	Height (16 months)	-	-	58	8	-	
	Wood density	-	13	24	-	-	López-Locía y Valencia-Manzo, 2001
	Survival	15.2	0	2.2	-	-	López-Upton et al., 2004
	Height	87.8	0.7	0.2	-	-	
	Diameter	84.1	0.6	0.2	-	-	
	Volume	76	0.8	0.4	-	-	
	Height	81.2	11.2	-	-	-	Hernández-Pérez et al., 2001
	Dry root weight (PSR)	72.7	8.3	-	-	-	
	Aerial dry weight (PSA)	37.9	26.2	-	-	-	
	PSR/PSA ratio	75.4	6.5	-	-	-	
<i>Pinus leiophylla</i>	Germination capacity	-	-	41.3	-	-	Gómez-Jiménez et al., 2010
	Peak value	-	-	29.3	-	-	
	Germination value	-	-	36.9	-	-	
<i>Pinus pinceana</i>	Wax content	38.2	10.5	3.4	0.57	0.38	Ramírez-Herrera et al., 2011

Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR.

Priority Species	Tree (A), other ligneous (O) or Agave (AV)	Species: native (N); exotic (E)	Reasons for Prioritisation (Importance)
<i>Abies religiosa</i>	O	N	Ecological and Economic
<i>Acacia berlandieri</i>	O	N	Ecological and social
<i>Acacia cornigera</i>	O	N	Ecological and social
<i>Acacia dolichostachya</i>	O	N	Ecological and social
<i>Acacia farnesiana</i>	O	N	Ecological and social
<i>Acacia mangium</i>	O	N	Ecological and social
<i>Acacia retinodes</i>	O	N	Ecological and social
<i>Acer negundo</i>	A	N	Ecological and social
<i>Acrocarpus fraxinifolius</i>	A	N	Economic and social
<i>Adelia barbinervis</i>	A	N	Ecological and social
<i>Agave angustifolia</i>	AV	N	Ecological, Economic and Social
<i>Agave atrovirens</i>	AV	N	Ecological, Economic and Social
<i>Agave lechuguilla</i>	AV	N	Ecological, Economic and Social
<i>Albizia lebeck</i>	A	E	Ecological and social
<i>Alchornea latifolia</i>	A	N	Economic
<i>Alibertia edulis</i>	O	N	Ecological and social
<i>Alnus acuminata</i>	A	N	Ecological and economic
<i>Alnus jorullensis</i>	A	N	Ecological and social
<i>Alseis yucatanensis</i>	A	N	Ecological and social
<i>Ampelocera hottlei</i>	A	N	Ecological and social
<i>Amphipterygium adstringens</i>	A	N	Ecological and social
<i>Anacardium occidentale</i>	A	N	Economic and social
<i>Andira galeottiana</i>	A	N	Ecological and social
<i>Andira inermis</i>	A	N	Ecological and social
<i>Annona cherimola</i>	A	N	Ecological and social
<i>Annona muricata</i>	A	N	Ecological and social
<i>Annona reticulata</i>	A	N	Ecological and social
<i>Annona squamosa</i>	A	N	Ecological and social
<i>Apeiba tibourbou</i>	A	N	Ecological and social
<i>Arbutus glandulosa</i>	O	N	Ecological and social
<i>Arbutus xalapensis</i>	O	N	Ecological and social
<i>Astianthus viminalis</i>	A	N	Ecological and social
<i>Astronium graveolens</i>	A	N	Ecological and social
<i>Atriplex canescens</i>	O	N	Ecological and social

Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR. (Cont.)

Priority Species	Tree (A), other ligneous (O) or Agave (AV)	Species: native (N); exotic (E)	Reasons for Prioritisation (Importance)
<i>Azadirachta indica</i>	A	E	Ecological and social
<i>Avicennia germinans</i>	A	E	Ecological, economic and social
<i>Bauhinia divaricata</i>	O	N	Ecological and social
<i>Bernoullia flammea</i>	A	N	Ecological and social
<i>Bixa orellana</i>	O	N	Ecological and social
<i>Blepharidium mexicanum</i>	A	N	Ecological and social
<i>Bocconia arborea</i>	A	N	Ecological and social
<i>Brosimum alicastrum</i>	A	N	Ecological, economic and social
<i>Bucida buceras</i>	A	N	Ecological and social
<i>Bucida macrostachya</i>	A	N	Ecological and social
<i>Buddleia cordata</i>	O	N	Ecological and social
<i>Bursera aloexylon</i>	A	N	Ecological and social
<i>Bursera excelsa</i>	A	N	Ecological and social
<i>Bursera simaruba</i>	A	N	Ecological and social
<i>Byrsonima crassifolia</i>	O	N	Ecological, economic and social
<i>Caesalpinia coriaria</i>	A	N	Ecological and social
<i>Caesalpinia gaumeri</i>	A	N	Ecological and social
<i>Caesalpinia velutina</i>	A	N	Ecological and social
<i>Calliandra calothyrsus</i>	A	N	Ecological, economic and social
<i>Calliandra eriophylla</i>	O	N	Ecological and social
<i>Calliandra grandiflora</i>	O	N	Ecological and social
<i>Calophyllum brasiliense</i>	A	N	Ecological and social
<i>Calycophyllum candidissimum</i>	A	N	Ecological and social
<i>Carica papaya</i>	A	N	Ecological and social
<i>Carpinus tropicalis</i>	A	N	Ecological and social
<i>Carya illinoensis</i>	A	N	Ecological and social
<i>Casearia nitida</i>	A	N	Ecological and social
<i>Casimiroa edulis</i>	A	N	Ecological and social
<i>Castilla elastica</i>	A	N	Ecological, economic and social
<i>Casuarina equisetifolia</i>	A	E	Ecological and social
<i>Cecropia obtusifolia</i>	A	N	Ecological, economic and social
<i>Cecropia peltata</i>	A	N	Ecological and social
<i>Cedrela odorata</i>	A	N	Economic and social
<i>Ceiba acuminata</i>	A	N	Ecological and social

Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR. (Cont.)

Priority Species	Tree (A), other ligneous (O) or Agave (AV)	Species: native (N); exotic (E)	Reasons for Prioritisation (Importance)
<i>Ceiba aesculifolia</i>	A	N	Ecological and social
<i>Ceiba parvifolia</i>	A	N	Ecological and social
<i>Ceiba pentandra</i>	A	N	Ecological and economic
<i>Cercidium microphyllum</i>	A	N	Ecological and social
<i>Cercidium praecox</i>	A	N	Ecological and social
<i>Chamaedorea elegans</i>	A	N	Ecological, economic and social
<i>Chrysobalanus icaco</i>	O	N	Ecological and social
<i>Chrysophyllum mexicanum</i>	A	N	Ecological and social
<i>Cnidocolus multilobus</i>	O	N	Ecological and social
<i>Coccoloba barbadensis</i>	A	N	Ecological and social
<i>Coccoloba uvifera</i>	A	N	Ecological, economic and social
<i>Cochlospermum vitifolium</i>	A	N	Ecological, economic and social
<i>Cojoba arborea</i>	A	N	Ecological and social
<i>Conocarpus erecta</i>	A	N	Ecological and social
<i>Cordia alliodora</i>	A	N	Ecological, economic and social
<i>Cordia dodecandra</i>	A	N	Ecological, economic and social
<i>Cordia eleagnoides</i>	A	N	Ecological and social
<i>Cornus disciflora</i>	A	N	Ecological and social
<i>Crataegus mexicana</i>	A	N	Ecological, economic and social
<i>Crescentia alata</i>	A	N	Ecological and social
<i>Croton niveus</i>	A	N	Ecological and social
<i>Cupressus guadalupensis</i>	A	N	Ecological
<i>Cupressus lusitanica</i>	A	N	Ecological and social
<i>Dalbergia granadillo</i>	A	N	Ecological and social
<i>Dendropanax arboreus</i>	A	N	Ecological and social
<i>Dialium guianense</i>	A	N	Ecological, economic and social
<i>Diospyros digyna</i>	A	N	Ecological and social
<i>Dioscorea composita</i>	O	N	Ecological, economic and social
<i>Engelhardtia mexicana</i>	A	N	Ecological and social
<i>Enterolobium cyclocarpum</i>	A	N	Ecological, economic and social
<i>Eriogonum fasciculatum</i>	O	N	Ecological and social
<i>Erythrina coralloides</i>	A	N	Ecological and social
<i>Eucalyptus grandis</i>	A	E	Economic
<i>Eucalyptus urophylla</i>	A	E	Economic

Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR. (Cont.)

Priority Species	Tree (A), other ligneous (O) or Agave (AV)	Species: native (N); exotic (E)	Reasons for Prioritisation (Importance)
<i>Eugenia capuli</i>	A	N	Ecological and social
<i>Euphorbia antisiphilitica</i>	O	N	Ecological and social
<i>Eysenhardtia polystachya</i>	O	N	Ecological
<i>Fagus mexicana</i>	A	N	Ecological and social
<i>Ficus carica</i>	A	E	Social
<i>Ficus cotinifolia</i>	A	N	Ecological and social
<i>Ficus tecolutensis</i>	A	N	Ecological and social
<i>Flourensia cernua</i>	O	N	Ecological and social
<i>Fraxinus uhdei</i>	A	N	Ecological, economic and social
<i>Gaultheria acuminata</i>	A	N	Ecological and social
<i>Genipa americana</i>	A	N	Ecological, economic and social
<i>Gliricidia sepium</i>	A	N	Ecological, economic and social
<i>Gmelina arborea</i>	A	E	Economic
<i>Guaiacum coulteri</i>	O	N	Ecological and social
<i>Guatteria amplifolia</i>	A	N	Ecological and social
<i>Guatteria anomala</i>	A	N	Ecological and social
<i>Guazuma ulmifolia</i>	A	N	Ecological, economic and social
<i>Haematoxylum brasiletto</i>	A	N	Ecological and social
<i>Haematoxylum campechianum</i>	A	N	Ecological and social
<i>Heliocarpus donnell-smithii</i>	A	N	Ecological and social
<i>Hevea brasiliensis</i>	A	E	Economic
<i>Hura polyandra</i>	A	N	Ecological and social
<i>Hymenaea courbaril</i>	A	N	Ecological and social
<i>Inga jinicuil</i>	A	N	Ecological, economic and social
<i>Inga paterno</i>	A	N	Ecological and social
<i>Inga vera</i>	A	N	Ecological, economic and social
<i>Jacaratia mexicana</i>	A	N	Ecological and social
<i>Juglans mollis</i>	A	N	Ecological and social
<i>Juglans regia</i>	A	E	Economic
<i>Juniperus deppeana</i>	A	N	Ecological and social
<i>Juniperus flaccida</i>	A	N	Ecological and social
<i>Juniperus horizontalis</i>	A	N	Ecological and social
<i>Juniperus monosperma</i>	A	N	Ecological and social
<i>Laguncularia racemosa</i>	A	N	Ecological and social

Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR. (Cont.)

Priority Species	Tree (A), other ligneous (O) or Agave (AV)	Species: native (N); exotic (E)	Reasons for Prioritisation (Importance)
<i>Larrea tridentata</i>	O	N	Ecological, economic and social
<i>Leucaena esculenta</i>	A	N	Ecological and social
<i>Leucaena leucocephala</i>	A	N	Ecological, economic and social
<i>Licania arborea</i>	A	N	Ecological and social
<i>Licania platypus</i>	A	N	Ecological and social
<i>Licaria capitata</i>	A	N	Ecological and social
<i>Lippia graveolens</i>	O	N	Ecological and social
<i>Liquidambar styraciflua</i>	A	N	Ecological, economic and social
<i>Lonchocarpus eriocarinalis</i>	A	N	Ecological and social
<i>Lonchocarpus rugosus</i>	A	N	Ecological and social
<i>Luehea speciosa</i>	A	N	Ecological and social
<i>Lycium fremontii</i>	O	N	Ecological and social
<i>Lysiloma acapulcensis</i>	A	N	Ecological and social
<i>Lysiloma divaricata</i>	A	N	Ecological and social
<i>Maclura tinctoria</i>	A	N	Ecological and social
<i>Magnolia schiedeana</i>	A	N	Ecological and social
<i>Malpighia glabra</i>	O	N	Ecological and social
<i>Manilkara zapota</i>	A	N	Ecological, economic and social
<i>Metopium brownei</i>	A	N	Ecological, economic and social
<i>Mimosa tenuiflora</i>	A	N	Ecological and social
<i>Morus celtidifolia</i>	A	N	Ecological and social
<i>Muntingia calabura</i>	A	N	Ecological, economic and social
<i>Myroxylon balsamum</i>	A	E	Economic
<i>Nectandra ambigens</i>	A	N	Ecological and social
<i>Ochroma pyramidale</i>	A	N	Ecological, economic and social
<i>Oecopetalum mexicanum</i>	A	N	Ecological and social
<i>Oreopanax xalapensis</i>	A	N	Ecological and social
<i>Pachira aquatica</i>	A	N	Ecological and social
<i>Parthenium argentatum</i>	O	N	Ecological and economic
<i>Picea chihuahuana</i>	A	N	Ecological
<i>Picea engelmannii</i>	A	N	Ecological
<i>Picea martinezii</i>	A	N	Ecological
<i>Pimenta dioica</i>	A	N	Ecological, economic and social
<i>Pinus arizonica</i>	A	N	Ecological, economic and social

Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR. (Cont.)

Priority Species	Tree (A), other ligneous (O) or Agave (AV)	Species: native (N); exotic (E)	Reasons for Prioritisation (Importance)
<i>Pinus ayacahuite</i>	A	N	Ecological and social
<i>Pinus caribaea</i>	A	E	Ecological and economic
<i>Pinus cembroides</i>	A	N	Ecological, Economic and Social
<i>Pinus chiapensis</i>	A	N	Ecological, Economic and Social
<i>Pinus devoniana</i>	A	N	Ecological, Economic and Social
<i>Pinus douglasiana</i>	A	N	Ecological, Economic and Social
<i>Pinus durangensis</i>	A	N	Ecological, Economic and Social
<i>Pinus engelmannii</i>	A	N	Ecological, Economic and Social
<i>Pinus greggii</i>	A	N	Ecological, Economic and Social
<i>Pinus halepensis</i>	A	E	Social
<i>Pinus herrerae</i>	A	N	Ecological, Economic and Social
<i>Pinus jeffreyi</i>	A	N	Ecological, Economic and Social
<i>Pinus lambertiana</i>	A	N	Ecological, Economic and Social
<i>Pinus lawsoni</i>	A	N	Ecological and social
<i>Pinus leiophylla</i>	A	N	Ecological and social
<i>Pinus lumholtzii</i>	A	N	Ecological, Economic and Social
<i>Pinus maximartinezii</i>	A	N	Ecological and social
<i>Pinus maximinoi</i>	A	N	Ecological and social
<i>Pinus montezumae</i>	A	N	Ecological and social
<i>Pinus nelsoni</i>	A	N	Ecological and social
<i>Pinus oaxacana</i>	A	N	Ecological, Economic and Social
<i>Pinus oocarpa</i>	A	N	Ecological and social
<i>Pinus patula</i>	A	N	Ecological, Economic and Social
<i>Pinus pinceana</i>	A	N	Ecological and social
<i>Pinus ponderosa</i>	A	N	Ecological, Economic and Social
<i>Pinus pringlei</i>	A	N	Ecological, Economic and Social
<i>Pinus pseudostrobus</i>	A	N	Ecological, Economic and Social
<i>Pinus teocote</i>	A	N	Ecological and social
<i>Piscidia grandifolia</i>	A	N	Ecological and social
<i>Piscidia piscipula</i>	A	N	Ecological and social
<i>Pithecellobium dulce</i>	A	N	Social
<i>Platanus mexicana</i>	A	N	Ecological, Economic and Social
<i>Platymiscium dimorphandrum</i>	A	N	Ecological and social
<i>Platymiscium yucatanum</i>	A	N	Ecological and social

Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR. (Cont.)

Priority Species	Tree (A), other ligneous (O) or Agave (AV)	Species: native (N); exotic (E)	Reasons for Prioritisation (Importance)
<i>Plumeria rubra</i>	A	N	Ecological and social
<i>Podocarpus matudae</i>	A	N	Ecological and social
<i>Podocarpus reichei</i>	A	N	Ecological and social
<i>Poeppigia procera</i>	A	N	Ecological and social
<i>Populus mexicana</i>	A	N	Ecological and social
<i>Poulsenia armata</i>	A	N	Ecological and social
<i>Pouteria campechiana</i>	A	N	Ecological and social
<i>Pouteria sapota</i>	A	N	Ecological and social
<i>Prosopis juliflora</i>	A	N	Ecological, economic and social
<i>Prosopis laevigata</i>	A	N	Ecological and social
<i>Prosopis velutina</i>	A	N	Ecological and social
<i>Protium copal</i>	A	N	Ecological and social
<i>Prunus capuli</i>	A	N	Ecological and social
<i>Prunus mexicana</i>	A	N	Ecological and social
<i>Prunus serotina</i>	A	N	Ecological, economic and social
<i>Pseudobombax ellipticum</i>	A	N	Ecological and social
<i>Pseudotsuga menziesii</i>	A	N	Ecological, economic and social
<i>Psidium guajava</i>	A	N	Ecological, economic and social
<i>Psidium sartorianum</i>	A	N	Ecological and social
<i>Pterocarpus acapulcensis</i>	A	N	Ecological and social
<i>Quararibea funebris</i>	A	N	Ecological and social
<i>Quercus candicans</i>	A	N	Ecological and social
<i>Quercus castanea</i>	A	N	Ecological, economic and social
<i>Quercus crassifolia</i>	A	N	Ecological and social
<i>Quercus crassipes</i>	A	N	Ecological and social
<i>Quercus gentryi</i>	A	N	Ecological and social
<i>Quercus glaucescens</i>	A	N	Ecological and social
<i>Quercus laeta</i>	A	N	Ecological and social
<i>Quercus laurina</i>	A	N	Ecological and social
<i>Quercus macrophylla</i>	A	N	Ecological and social
<i>Quercus magnoliifolia</i>	A	N	Ecological and social
<i>Quercus rugosa</i>	A	N	Ecological, economic and social
<i>Quercus virginiana</i>	A	N	Ecological, economic and social
<i>Rheedia edulis</i>	A	N	Ecological and social

Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR. (Cont.)

Priority Species	Tree (A), other ligneous (O) or Agave (AV)	Species: native (N); exotic (E)	Reasons for Prioritisation (Importance)
<i>Rhizophora mangle</i>	A	N	Ecological, Economic and Social
<i>Robinsonella mirandae</i>	A	N	Ecological and social
<i>Salix bonplandiana</i>	A	N	Ecological and social
<i>Salix humboldtiana</i>	A	N	Ecological, economic and social
<i>Sambucus mexicana</i>	O	N	Ecological and social
<i>Sapindus saponaria</i>	A	N	Ecological and social
<i>Schinus molle</i>	A	E	Ecological
<i>Schizolobium parahyba</i>	A	N	Economic and social
<i>Schizolobium parahybum</i>	A	N	Ecological and social
<i>Sebastiana longicuspis</i>	A	N	Ecological and social
<i>Senna spectabilis</i>	A	N	Ecological and social
<i>Sideroxylon laetevirens</i>	A	N	Ecological and social
<i>Sideroxylon persimile</i>	A	N	Ecological and social
<i>Simarouba glauca</i>	A	N	Ecological, economic and social
<i>Simira salvadorensis</i>	A	N	Ecological and social
<i>Simmondsia chinensis</i>	A	N	Ecological and economic
<i>Spondias mombin</i>	A	N	Ecological and social
<i>Spondias purpurea</i>	A	N	Ecological and social
<i>Sterculia apetala</i>	A	N	Ecological, economic and social
<i>Styrax ramirezii</i>	A	N	Ecological and social
<i>Swartzia cubensis</i>	A	N	Ecological and social
<i>Swartzia guatemalensis</i>	A	N	Ecological and social
<i>Swietenia humilis</i>	A	N	Ecological and social
<i>Swietenia macrophylla</i>	A	N	Ecological and economic
<i>Tabebuia chrysantha</i>	A	N	Ecological and social
<i>Tabebuia donnell-smithii</i>	A	N	Ecological and social
<i>Tabebuia guayacan</i>	A	N	Ecological and social
<i>Tabebuia impetiginosa</i>	A	N	Ecological and social
<i>Tabebuia rosea</i>	A	N	Ecological and social
<i>Talauma mexicana</i>	A	N	Ecological and social
<i>Tamarindus indica</i>	A	E	Social
<i>Tamarix parviflora</i>	A	E	Social
<i>Taxodium mucronatum</i>	A	N	Ecological and social
<i>Tecoma stans</i>	A	N	Ecological and social

Annex 2 Priority species of trees, bushes and agaves for reforestation in Mexico defined by CONABIO and CONAFOR. (Cont.)

Priority Species	Tree (A), other ligneous (O) or Agave (AV)	Species: native (N); exotic (E)	Reasons for Prioritisation (Importance)
<i>Tectona grandis</i>	A	E	Ecological and social
<i>Terminalia amazonia</i>	A	N	Ecological and social
<i>Terminalia catappa</i>	A	N	Ecological and social
<i>Theobroma cacao</i>	A	N	Ecological and social
<i>Tilia americana</i>	A	N	Ecological and social
<i>Trema micrantha</i>	A	N	Ecological, economic and social
<i>Trichospermum mexicanum</i>	A	N	Ecological and social
<i>Trophis racemosa</i>	A	N	Ecological and social
<i>Ulmus mexicana</i>	A	N	Ecological and social
<i>Vatairea lundellii</i>	A	N	Ecological and social
<i>Virola guatemalensis</i>	A	N	Ecological and social
<i>Vitex mollis</i>	A	N	Ecological and social
<i>Vochysia hondurensis</i>	A	N	Ecological and social
<i>Xylosma flexuosum</i>	A	N	Ecological and social
<i>Yucca elephantipes</i>	O	N	Ecological and social
<i>Yucca filifera</i>	O	N	Ecological and social
<i>Zanthoxylum kellermanii</i>	A	N	Ecological and social
<i>Zinowiewia concinna</i>	A	N	Ecological and social
<i>Ziziphus amole</i>	A	N	Ecological and social
<i>Zuelania guidonia</i>	A	N	Ecological and social

Annex 3. Main forest species, scrubs and other plants that present forest environmental services or have social value. (CONABIO, 2011).

Species	Native (N); Exotic(E)	Environmental services or social value (code)*	Vegetation**
<i>Acacia farnesiana</i>	N	1; 2; 5; 7; 8; 10; 11; 12	MX, SE, SC, SP, SSC, P
<i>Albizia lebeck</i>	E	1; 2; 7; 8	MX, SE, SC, SP, SSC, P
<i>Alchornea latifolia</i>	N	8; 11	BC, BE, BMM, SC, SSC, SP
<i>Alnus acuminata</i>	N	1; 2; 7; 8; 9	BC, BE, BMM, SC, SSP
<i>Anacardium occidentale</i>	N	1; 2; 8	MX, SE, SC, SP, SSC
<i>Annona muricata</i>	N	7; 8; 9	MX, SE, SC, SP, SSC
<i>Bixa orellana</i>	N	5; 8; 11; 5	MX, SE, SC, SP, SSC
<i>Brosimum alicastrum</i>	N	1; 3; 8; 10; 11; 12	SC, SSC, SP, SSP, SE
<i>Bursera simaruba</i>	N	1	SC, SSB, SP, MX, P
<i>Byrsonima crassifolia</i>	N	5; 7; 10; 11	BC, BE, BMM, SC, SSC, SP, SSP, MX, P
<i>Calliandra calothyrsus</i>	N	1; 2; 7; 8; 11; 12	SC, BE, BC
<i>Calophyllum brasiliense</i>	N	5; 8; 11; 12	BC, BE, SC, SSB, SP
<i>Carica papaya</i>	N	5; 8	SC, SSC
<i>Cecropia obtusifolia</i>	N	8; 11	SC, SSB, SP, SSP, MX, BC, BMM
<i>Cedrela odorata</i>	N	1,	SP, SC, SSC, SSP, BMM, BE, BC
<i>Ceiba pentandra</i>	N	1; 2; 5; 7; 8; 10; 11; 12	BC, BE, BMM, SC, SSP
<i>Coccoloba uvifera</i>	N	2; 3; 5; 10; 11; 12	SC
<i>Cochlospermum vitifolium</i>	N	5; 8; 10	SC, SSC, SSP
<i>Cordia alliodora</i>	N	1; 2; 5; 7; 10; 11; 12	SC, SSB, SSP
<i>Crataegus pubescens</i>	N	1; 5; 11	BC, BE, BMM, SC
<i>Crescentia alata</i>	N	5; 10; 11	BC, SC, SE, SSP, SSC, P
<i>Cupressus lusitanica</i>	N	1; 5; 11; 12	BC, BE, BMM, SC
<i>Dendropanax arboreus</i>	N	8	SC, SSC, SSP, BE, BC, BMM

*1=Soil and water preservation including catchment areas; 2=Soil protection; 3=Biodiversity preservation; 4=Cultural values; 5=Aesthetic values; 6=Religious values; 7=Fertility enhancement; 8=Soil recovery; 9=Dune fixation; 10 = Live barriers; 11 = Shadow; 12 = Wind barrier

**BC=Coniferous forest, BE= Oak forest, BMM= Mountain mesophyll, SC= Deciduous jungle, SSC= Semi-deciduous jungle, SP= Evergreen jungle, SSP= Semi-evergreen jungle, SE= Thorny jungle, MX= Desert scrub, VH= Hydrophilic vegetation P= Grassland

Annex 3. Main forest species, scrubs and other plants that present forest environmental services or have social value. (CONABIO, 2011). (Cont.)

Species	Native (N); Exotic(E)	Environmental services or social value (code)*	Vegetation**
<i>Dialium guianense</i>	N	1; 2; 12	SP
<i>Enterolobium cyclocarpum</i>	N	1; 2; 5; 7; 8; 10; 12	SC, SP, SSC
<i>Eysenhardtia polystachya</i>	N	8	BC, BE, BMM, SC, SSC, SP, MX
<i>Ficus carica</i>	E	1; 2; 3; 5; 8;	MX, BC
<i>Fraxinus uhdei</i>	N	5; 8; 11	BC, BE, BMM, VH
<i>Genipa americana</i>	N	1; 2; 5; 10; 11	SC, SSC, SP, SSP, SE, BE BMM
<i>Gliricidia sepium</i>	N	1; 2; 5; 7; 8; 10; 11; 12	SC, SSC, SP
<i>Guazuma ulmifolia</i>	N	1; 2; 3; 5; 7; 10; 11; 12	SC, SSB, SP, SE, BMM, VH
<i>Hymenaea courbaril</i>	N	1; 5; 11	SC, SSB, SP, BMM, BE, VH
<i>Inga jinicuil</i>	N	1; 2; 5; 7; 11; 12	SC, SP, BMM
<i>Inga vera</i>	N	1; 5; 7; 10; 11	SC, SP, SSC, BE, MX
<i>Juniperus deppeana</i>	N	1; 5; 8; 10; 11	BC, BE, P, SC
<i>Larrea tridentata</i>	N	1; 10	MX, SC, SE
<i>Leucaena leucocephala</i>	N	1; 2; 5; 7; 8; 11; 12	SC, SP, SSC
<i>Liquidambar styraciflua</i>	N	2; 5; 8; 11	BC, BE, BMM, SC
<i>Manilkara zapota</i>	N	5; 8; 11	SC, SSC, SSP, SP, BC, BE
<i>Metopium brownei</i>	N	8	SC, SP, SSC, SSP, VH
<i>Muntingia calabura</i>	N	2; 5; 11	SE, SC, SP, SSP
<i>Myroxylon balsamum</i>	E	7; 11	BE, SC, SSP, SP
<i>Ochroma pyramidale</i>	N	1; 5; 8; 11; 12	SP
<i>Parthenium argentatum</i>	N	1; 7	MX,P
<i>Pimenta dioica</i>	N	8; 10; 11; 12	SP, SSP, SSC
<i>Pinus caribaea</i>	E	1; 2; 5; 8; 10; 11	SP, SSP, SSC, SC

*1=Soil and water preservation including catchment areas; 2=Soil protection; 3=Biodiversity preservation; 4=Cultural values; 5=Aesthetic values; 6=Religious values; 7=Fertility enhancement; 8=Soil recovery; 9=Dune fixation; 10 = Live barriers; 11 = Shadow; 12 = Wind barrier

**BC=Coniferous forest, BE= Oak forest, BMM= Mountain mesophyll, SC= Deciduous jungle, SSC= Semi-deciduous jungle, SP= Evergreen jungle, SSP= Semi-evergreen jungle, SE= Thorny jungle, MX= Desert scrub, VH= Hydrophilic vegetation P= Grassland

Annex 3. Main forest species, scrubs and other plants that present forest environmental services or have social value. (CONABIO, 2011). (Cont.)

Species	Native (N); Exotic(E)	Environmental services or social value (code)*	Vegetation**
<i>Pinus cembroides</i>	N	1; 5; 12	BC, BE
<i>Pithecellobium dulce</i>	N	1; 2; 5; 7; 8; 10; 11	MX, BE, SC, SSC, SSP VH
<i>Platanus mexicana</i>	N	5; 11	BMM, SC, SSC, SSP
<i>Plumeria rubra</i>	N	5; 10	SC, SSC, SSP
<i>Prosopis juliflora</i>	N	1; 2; 7; 8; 12	SE, SC, SP; MX
<i>Prunus serotina</i>	N	1; 3; 5; 8; 10; 11; 12	BC, BE, BMM
<i>Psidium guajava</i>	N	1; 2; 5; 7; 8; 11; 12	SC, SSP, BE, BMM
<i>Quercus rugosa</i>	N	1; 2; 3; 5; 11	BE, BC, BMM, MX
<i>Rhizophora mangle</i>	N	1; 2; 3; 5; 8; 11; 12	VH
<i>Salix bonplandiana</i>	N	1; 5; 10; 12	VH, SC, BE, BC
<i>Salix humboldtiana</i>	N	1; 3; 5; 11	VH, SC, SSP, BE, BC, BMM
<i>Schinus molle</i>	E	1; 7; 8	SC, MX, P, BE, BC, BMM
<i>Schizolobium parahyba</i>	E	5	BC, SP, P
<i>Simarouba glauca</i>	N	3; 5; 7; 10; 11	SP, SBC, SC
<i>Simmondsia chinensis</i>	N	1; 7; 8; 9	MX
<i>Sterculia apetala</i>	N	1; 5; 10; 11; 12	VH, SC, SSC, SP, SSP
<i>Swietenia macrophylla</i>	N	1; 2; 5; 7; 8; 10; 11; 12	SP, SSP, SC, SSC, BE
<i>Tabebuia rosea</i>	N	1; 2; 5; 10; 12	BE, BMM, SC, SSC, SSP, SP
<i>Tamarindus indica</i>	E	2; 5; 11; 12	SC, SSC
<i>Trema micrantha</i>	N	3; 11	SC, SSP, SP, SSP, BC, BE, BMM

*1=Soil and water preservation including catchment areas; 2=Soil protection; 3=Biodiversity preservation; 4=Cultural values; 5=Aesthetic values; 6=Religious values; 7=Fertility enhancement; 8=Soil recovery; 9=Dune fixation; 10 = Live barriers; 11 = Shadow; 12 = Wind barrier

**BC=Coniferous forest, BE= Oak forest, BMM= Mountain mesophyll, SC= Deciduous jungle, SSC= Semi-deciduous jungle, SP= Evergreen jungle, SSP= Semi-evergreen jungle, SE= Thorny jungle, MX= Desert scrub, VH= Hydrophilic vegetation P= Grassland

Annex 4. List of threatened forest species from a genetic viewpoint and type of threat.

Species	Surface Area (ha)	Trees (ha)	Coverage percentage in the country	Distribution	Type of threat*
<i>Acer negundo</i>	IND‡	IND	IND	Wide	7
<i>Agave lechuguilla</i>	IND	IND	IND	Wide	1; 4; 13
<i>Avicennia germinans</i>	IND	IND	IND	Wide	6; 7; 10
<i>Cedrela odorata</i>	IND	IND	IND	Wide	3; 4; 7; 11
<i>Conocarpus erecta</i>	IND	IND	IND	Wide	3; 6; 7; 10
<i>Cupressus guadalupensis</i>	IND	IND	IND	Restricted	1; 7; 8; 12
<i>Cupressus lusitanica</i>	IND	IND	IND	Wide	1; 5; 7; 11; 13
<i>Dalbergia granadillo</i>	IND	IND	IND		
<i>Erythrina coralloides</i>	IND	IND	IND		
<i>Fagus grandifolia</i>	IND	IND	IND	Restricted	5; 7;
<i>Guaiaacum coulteri</i>	IND	IND	IND	Wide	5:00
<i>Laguncularia racemosa</i>	IND	IND	IND	Wide	5; 7; 13
<i>Licania arborea</i>	IND	IND	IND		
<i>Picea chihuahuana</i>	IND	IND	IND	Restricted	7; 11; 12; 13
<i>Picea engelmannii</i>	IND	IND	IND	Restricted	7; 11; 12; 13
<i>Picea martinezii</i>	IND	IND	IND	Restricted	7; 11; 12; 13
<i>Pinus strobus</i>	IND	IND	IND	Wide	1; 5; 7; 12
<i>Pinus caribaea</i>	IND	IND	IND	Restricted	7; 12;
<i>Pinus jeffreyi</i>	IND	IND	IND	Restricted	7
<i>Pinus lambertiana</i>	IND	IND	IND	Restricted	7
<i>Pinus maximartinezii</i>	IND	IND	IND	Restricted	1; 7
<i>Pinus nelsoni</i>	IND	IND	IND	Restricted	7
<i>Pinus pinceana</i>	IND	IND	IND	Restricted	7
<i>Podocarpus matudai</i>	IND	IND	IND		
<i>Pseudotsuga menziesii</i>	IND	IND	IND	Wide	1; 5; 7; 11; 12; 13
<i>Rhizophora mangle</i>	IND	IND	IND	Wide	6; 7; 10
<i>Tabebuia chrysantha</i>	IND	IND	IND	Wide	1; 7
<i>Taxus globosa</i>	IND	IND	IND	Wide	1; 7; 12; 13
<i>Vatairea lundelii</i>	IND	IND	IND		
<i>Zinowiewia concinna</i>	IND	IND	IND		

†1=Degradation and reduction of the forest cover; 2=Degradation and reduction in forest ecosystem; 3=Unsustainable logging; 4=Vehicle increase; 5=Competition for land use; 6=Urbanisation; 7=Habitat fragmentation; 8=Exotic species introduction; 9=Soil and water acidification; 10=Polluting emissions; 11=Plagues and disease; 12=Forest fires; 13=Drought and desertification; 14=Increase in sea level; 15=Other; ‡ INA = No data available

Annex 5. Report of Protected Natural Areas at Federal Level.

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Constitución de 1857	National Park	27-04-62	Baja California	Ensenada.	Pine Oak forest and bushes.
Sierra de San Pedro Mártir	National Park	26-04-47	Baja California	Ensenada.	Pines, Abies Libocedrus Pseudotsuga bushes.
Archipiélago de San Lorenzo	National Park	25-04-05	Baja California	Frente a las costas de Ensenada (Golfo de California)	
Valle de los Cirios	Flora and Fauna Protection Areas	02-06-80	Baja California	Ensenada	Microphytic desert scrub, pine forest, halophytic vegetation of coastal dunes and mangrove.
Isla Guadalupe	Biosphere Reserve	14-04-05	Baja California		
Bahía de los Angeles, Canales de Ballenas y Salsipuedes	Biosphere Reserve	05-05-07	Baja California	Ensenada	
El Vizcaino	Biosphere Reserve	30-11-88	Baja California Sur	Mulegé	Microphytic desert scrub, pine forest, halophytic vegetation of coastal dunes and mangrove.
Complejo Lagunar Ojo de Liebre	Biosphere Reserve	14-01-72	Baja California Sur	Mulegé	
Sierra La Laguna	Biosphere Reserve	06-06-94	Baja California Sur	La paz y Los Cabos.	Coniferous forest, rainforest, palms, scrubland and pine-oak forest.
Bahía de Loreto	National Park	19-07-96	Baja California Sur	Loreto.	Associations of mangroves and thorn scrub, coastal dunes, desert scrub.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Cabo Pulmo	National Park	06-06-95	Baja California Sur	Frente Municipio Los Cabos.	Coral reef.
Archipiélago Espíritu Santo	National Park	10-05-07	Baja California Sur	La Paz	
Cabo San Lucas	Flora and Fauna Protection Areas	29-11-73	Baja California Sur		
Alto Golfo de California y Delta del Río Colorado	Biosphere Reserve	10-06-93	Baja California y Sonora	Baja California. Mexicali. Sonora: Puerto Peñasco y San Luis Río Colorado.	Desert scrub, coastal dunes vegetation, marine and estuarine ecosystem.
Islas del Golfo de California	Flora and Fauna Protection Areas	02-08-78	Baja California, Baja California Sur, Sonora y Sinaloa		Desert scrub and sarcocosaicale sarcocuale, thorny deciduous forest
Calakmul	Biosphere Reserve	23-05-89	Campeche	Calakmul y Hopelchen (antes Champotón y Hopelchen)	High forest, medium and low evergreen, hydrophilic vegetation.
Los Petenes	Biosphere Reserve	24-05-99	Campeche	Calkini, Hecelchakan, Tenabo y Campeche.	Mangrove, arid scrub, evergreen rainforest, sub humid deciduous forest.
Laguna de Términos	Flora and Fauna Protection Areas	06-06-94	Campeche	Carmen, Palizada y Champotón.	Submerged sea grass, mangrove forest, schoenoplectus acutus, riparian vegetation.
Selva El Ocotle	Biosphere Reserve	27-11-00	Chiapas	Ocozacoautla de Espinosa, Cintalapa de Figueroa, Tecpatán de Mezalapa y Jiquipilas.	Evergreen forest, evergreen tropical forest, deciduous forest and pine oak forest.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
La Encrucijada	Biosphere Reserve	06-06-95	Chiapas	Mazatlan, Huixtla, Villa Comaltitlán, Acapetagua, Mapastepec y Pijijapan.	Mangrove, zapotomales lowland floodplain, tule-popals, lagoon systems and pockets of medium and low evergreen forest.
Lacan-tun	Biosphere Reserve	21-08-92	Chiapas	Ocosingo.	Evergreen forest.
MontesAzules	Biosphere Reserve	12-01-78	Chiapas	Ocosingo y Las Margaritas.	Evergreen and deciduous forest, pine oak forest, riparian gallery forest, bamboo thicket and savannah.
La Sepultura	Biosphere Reserve	06-06-95	Chiapas	Villacorzo, Villaflores, Jiquipilas, Cintalapa, Arriaga y Tonala.	Mountain rainforest, deciduous forest and fog creosote bush.
El Triunfo	Biosphere Reserve	13-03-90	Chiapas	Acacoyagua, Angel Albino Corzo, La Concordia, Mapastepec, Villa Corzo, Pijijapan y Siltepec.	Cloud forest, coniferous forest, tropical rain forest
Volcán Tacaná	Biosphere Reserve	28-01-03	Chiapas	Tapachula, Cacahoatan y Unión Juárez	Cloud forest, moorland and scytalopus parkeri.
Cañón del Sumidero	National Park	08-12-80	Chiapas	Tuxtla Gutiérrez, Soyaló, Osumacinta, San Fernando y Chiapa de Corzo.	Deciduous forest, oak, grassland.
Lagunas de Montebello	National Park	16-12-59	Chiapas	La Trinitaria y La Independencia	Pine, oak and mountain mesophile forest.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Palenque	National Park	20-07-81	Chiapas	Palenque.	Evergreen forest and induced grassland.
Bonampak		21-08-92	Chiapas	Ocosingo	Evergreen forest
Yaxchilan		21-08-92	Chiapas	Ocosingo	Evergreen forest
Cascada de AguaAzul	Flora and Fauna Protection Areas	29-04-80	Chiapas	Tumbala.	Evergreen forest
Chan-Kin	Flora and Fauna Protection Areas	21-08-92	Chiapas	Ocosingo.	Evergreen forest
Metzabok	Flora and Fauna Protection Areas	23-09-98	Chiapas	Ocosingo Y Palenque.	Evergreen forest, mesophile mountain forest
Naha	Flora and Fauna Protection Areas	23-09-98	Chiapas	Ocosingo.	Evergreen forest, mesophile mountain forest
Playa de PuertoArista	Sanctuary	29-10-86	Chiapas	Tonalá	Coastal dunes

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Janos	Biosphere Reserve	08-12-09	Chihuahua	Janos	Includes different types of vegetation: natural grassland, pine and oak forests, halophytic and riparian vegetation. The zone characterises itself by presenting a high degree of endemism and wild fauna and flora diversity. Because of its physical and biological characteristics, it presents gradual changes in the ecosystems that make up the zone, as is the case with forests and grasslands. This gives a wider diversity of species in this area given that the same species do not exist in adjacent ecosystems. It also has a vast extension of grasslands in great preservation conditions.
Cascada de Bassaseachic	National Park	02-02-81	Chihuahua	Ocampo.	Pine and oak forest, oak, desert scrub and grassland.
Cumbres de Majalca	National Park	01-09-39	Chihuahua	Chihuahua.	Pine forest, oak, pine-oak, grassland and desert scrub.
Médanos de Samalayuca	Flora and Fauna Protection Areas	05-06-09	Chihuahua	Juárez y Guadalupe	sandbanks, relictual single complex system composed of sand dunes and silt dioxide.
Cañón de Santa Elena	Flora and Fauna Protection Areas	07-11-94	Chihuahua	Manuel Benavides y Ojinaga.	Microphyll desert scrub, grassland, pine oak forest.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Tutuaca	Flora and Fauna Protection Areas	06-07-37	Chihuahua	Temosachic	
Campo Verde	Flora and Fauna Protection Areas	03-01-38	Chihuahua	Madera, Casas Grandes	
Papigochic	Flora and Fauna Protection Areas	11-03-39	Chihuahua	Carichi, Bocoyna, Guerrero, Ocampo.	
Rio Bravo del Norte	Flora and Fauna Protection Areas	21-10-09	Chihuahua y Coahuila	Ojinaga y Manuel Benavides; Ocampo y Acuña, respectivamente	It does not have a wide variety of ecosystems, but it does have different plant associations: rosette desert scrub, microphyll desert scrub, submontane scrub, oak, pine, oak-pine and pine-oak forest
Los Novillos	National Park	18-06-40	Coahuila	Acuña.	walnut, willow and alamo.
Cuenca alimentadora del Distrito Nacional de Riego 04 Don Martín, en lo respectivo a las Subcuencas de los Ríos Sabinas, Alamós, Salado y Mimbres	Flora and Fauna Protection Areas	08/06/1949 07/11/2002	Coahuila		
Cuatrociénegas	Flora and Fauna Protection Areas	07-11-94	Coahuila	Cuatrociénegas.	Desert scrub, submontane scrub, halophyte, cacti, grassland.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Maderas Del Carmen	Flora and Fauna Protection Areas	07-11-94	Coahuila	Muzquiz, Acuña Y Ocampo	Desert scrub, pine-oak forest, samandoca palm.
Cuenca alimentadora de los distritos nacionales de riego 026 Bajo Río San Juan y 031 Las Lajas, en lo respectivo a la Sierra de Arteaga	Natural Resources Protection Area	17-12-09	Coahuila y Nuevo León		The main vegetation types are: 1) Forest ayarín, 2) Oak forest, 3) Oak-pine forest, 4) Fir forest, 5) Pine, 6) Pine-oak, 7) Creosote bush, 8) Microphyll desert scrub, 9) Rosette desert scrub, 10) submontane scrub, 11) Agricultural, 12) Cattle, 13) Forestry, 14) Induced grassland.
Ocampo	Flora and Fauna Protection Areas	05-06-09	Coahuila	Ocampo	Scrub, microphyll and rosette scrub, plus patches representing the Chihuahuan Desert with zacatal, riparian vegetation.
Archipiélago de Revillagigedo	Biosphere Reserve	06-06-94	Colima		In the area of arid zone vegetation, halophytic, scrub, bush grassland, grassland.
Nevado de Colima	National Park	05-09-36	Colima	Cuauhtémoc y Comala.	Pine, fir and oak, alpine pasture and scrubland.
Las Huertas	Natural Resources Protection Area	23-06-88	Colima	Comala	
El Jabalí	Flora and Fauna Protection Areas	14-08-81	Colima	Comala	

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Cerro de la Estrella	National Park	24-08-38	Distrito Federal	Iztapalapa.	Artificial eucalyptus and cedar forest.
Cumbres de Ajusco	National Park	23-09-36	Distrito Federal	Tlalpan.	Pine, fir and high moor forest.
Desierto de los Leones	National Park	27-11-17	Distrito Federal	Cuajimalpa y Alvaro Obregón.	Fir, pine-oak and Garrya forest.
El Tepayac	National Park	18-02-37	Distrito Federal	Gustavo A. Madero.	Artificial eucalyptus and cedar forest..
Fuentes Brotantes de Tlalpan	National Park	28-09-36	Distrito Federal	Tlalpan.	Induced reforestation.
El Histórico Coyoacán	National Park	26-09-38	Distrito Federal	Coyoacán.	Eucalyptus, cedar and others reforestation.
Lomas de Padrierna	National Park	22-04-38	Distrito Federal	Magdalena Contreras y Alvaro Obregón.	Cedar reforestation.
La Michilía	Biosphere Reserve	18-07-79	Durango	Suchil y Mezquital.	Grassland, oak-pine forest, pine forest, manzanita scrub, marshes and riparian vegetation.
Mapimí	Biosphere Reserve	27-11-00	Durango, Chihuahua y Coahuila	Durango: Tlahualilo y Mapimí. Chihuahua: Jiménez. Coahuila: Sierra Mojada y Francisco I.Madero	Desert scrub, grasslands and halophytic vegetation.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Cuenca Alimentadora del Distrito de Riego 043 Estado de Nayarit, en lo respectivo a las Subcuencas de los Ríos Ameca, Atenguillo, Bolaños, Grande de Santiago Juchipila, Atengo y Tlaltenango	Natural Resources Protection Area	08/06/1949 07/11/2002	Durango, Jalisco, Nayarit, Agascalientes y Zacatecas		
Sierra Gorda de Guanajuato	Biosphere Reserve	02-02-07	Guanajuato	Atarje, San Luis de la Paz, Santa Catarina, Victoria, - Xichú	Tropical deciduous forest.
El Veladero	National Park	17-07-80	Guerrero	Acapulco de Juárez.	Pine-oak forest.
General Juan N. Alvarez	National Park	30-05-64	Guerrero	Chilapa de Álvarez.	Tropical deciduous forest.
Grutas de Cacahuamilpa	National Park	23-04-36	Guerrero	Picaya y Taxco de Alarcón.	
Playa de Tierra Colorada	Sanctuary	29-10-86	Guerrero		
Playa Piedra de Tlacoyunque	Sanctuary	29-10-86	Guerrero		

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Barranca de Metztitlán	Biosphere Reserve	27-11 -00	Hidalgo	Acatlán, Abtomónico El Grande, Eloxochilán, Huasca de Ocampo, Metztitlán, San Agustín Metzquitlán, Metepec, Zacualtipán de Angeles	Desert scrub, temperate forest, grassland, tropical rain forest.
El Chico	National Park	06-07-82	Hidalgo	Mineral Del Chico y Pachuca.	Fir and oak, pine-oak, cedar forest and grassland.
Los Mármoles (Comprende Barranca de San Vicente y Cerro de Cangando)	National Park	08-09-36	Hidalgo	Jacala de Ledezma, Zimapan y Nicolás Flores.	Pine-oak forest and desert scrub.
Tula	National Park	27-05-81	Hidalgo	Tula de Allende.	Desert scrub.
Chamela-Cuixmala	Biosphere Reserve	30-12-93	Jalisco	La Huerta.	Deciduous forest, medium semi-evergreen, mangroves, aquatic vegetation of lakes and streams, riparian vegetation, coastal dunes and desert scrub.
La Primavera	Flora and Fauna Protection Areas	06-03-80	Jalisco	Tala, Zapopan y Tlajomulco de Zúñiga	Pine-oak and tropical deciduous forest.
Sierra De Quila	Flora and Fauna Protection Areas	04-08-82	Jalisco	Tecolotlán, Tenamaxtlán, Cocula y San Martín Hidalgo.	Pine-oak forest and grassland.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Islas e Islotes de Bahía de Chamela (Islas La Pajarera, Cocinas, Mamut, Colorada, San Pedro, San Agustín, San Andrés y Negrita, y los Islotes Los Anegados, Novillas, Mosca y Submarino)	Sanctuary	13-06-02	Jalisco	La Huerta	
Playa Cuitzmala	Sanctuary	29-10-86	Jalisco	La Huerta	
Playa de Mismaloya	Sanctuary	29-10-86	Jalisco	Puerto Vallarta	
Playa el Tecuan	Sanctuary	29-10-86	Jalisco	La Huerta	
Playa Teopa	Sanctuary	29-10-86	Jalisco		
Sierra de Manantlán	Biosphere Reserve	23-03-87	Jalisco y Colima	Jalisco: Aulán de Navarro, Cuautlilan, Casimiro Castillo, Toliman y Tuxcacuesco. Colima: Minatitlan, Comala.	Pine-oak, fir, cloud forest, medium semi-deciduous forest, savannah vegetation, riparian forest, oak forest.
Zona de Protección Forestal "La Fraileskana"	Natural Resources Protection Area	27-03-07	La Concordia, Angel Albino Corzo, Y Illa Flores y Jiquipilas, Chiapas		

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Ventilas Hidrotermales de la Cuenca de Guaymas y de la Dorsal del Pacífico Oriental	Sanctuary	05-06-09	Localizadas en el Golfo de California y en el Pacífico Norte, respectivamente.		
Ciénegas Del Lerma	Flora and Fauna Protection Areas	27-11-02	Estado de México	Lerma, Santiago Tianguistenco, Almoloya del Río, Calpulhuac, San Mateo Atenco, Metepec y Texcalyacac	Wetlands.
Desierto del Carmen o Nixcongo	National Park	10-10-42	Estado de México	Tenancingo.	Pine, oak and cedar forest.
Los Remedios	National Park	15-04-38	Estado de México	Naucalpan de Juárez.	Artificial eucalyptus forest.
Molino de Flores Nezahualcóyotl	National Park	05-11-37	Estado de México	Texcoco.	Ahuehuetes and artificial eucalyptus, pepper tree, casahuate and ash forest.
Nevado de Toluca	National Park	25-01-36	Estado de México	Texcallitlán, Toluca, Zinacantepec, Almoloya de Juárez, Amanalco, Temascaltepec, Coatepec Harinas, Villa Guerrero, Calimaya, Tenango Del Valle y Villa Victoria.	Fir forest, pine, paramo high and zacatonal.
Sacromonte	National Park	29-08-39	Estado de México	Amecameca.	Artificial oak, eucalyptus, ash and cedar forest.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Valle de Bravo, Malacatepec, Tlaxiaco y Temascaltepec	Natural Resources Protection Area	21/10/1941 25/06/2005	Estado de México		
Insurgente Miguel Hidalgo y Costilla	National Park	18-Sep-36	México y Distrito Federal	México: Ocoyoacac y Huixquilucan. Distrito Federal: Cuajimalpa	Fir and pine forest.
Bosencheve	National Park	01-ago-40	México y Michoacán	México: Villa de Allende y Villa Victoria. Michoacán: Zitácuaro.	Fir and pine forest.
Iztaccihuatl - Popocatepetl	National Park	8-Nov-35	México, Puebla y Morelos	México: Chalco, Tlalmanalco, Amecameca, Allautla, Ixtapaluca, Texcoco y Ecatezingo. Puebla: Tlahuapan, Tianguismanalco, Calpan, Atlixco, Chiantzingo, Huejotzingo, San Felipe Teotlalcingo, San Salvador El verde, San Nicolás de los Ráncos y ochimilco. Morelos: Tetela del Volcán. Tlaxcala: Nanacamilpa de Mariano Arista y Calpulápan.	Pine forest and paramo high and zacatalal.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Zicuirán-Infiernillo	Biosphere Reserve	30-11-07	Michoacán	-	-
Barranca del Cupatitzio	National Park	02-11-38	Michoacán	Uruapan.	Pine, pine-oak forest
Cerro de Garnica	National Park	05-09-36	Michoacán	Hidalgo y Queréndaro.	Pine Forest and oyamel.
Insurgente José María Morelos	National Park	22-02-39	Michoacán	Charo y Tzitzio	Pine forest, scrubland and grassland
Lago de Camécuaro	National Park	08-03-41	Michoacán	Tangancicuaro.	Gallery forest, cypresses and willows.
Rayón	National Park	29-08-52	Michoacán	Tlapujahua.	Cedar and eucaliptus artificial forest.
Pico de Tancitaro	Flora and Fauna Protection Areas	19-08-09	Michoacán	Tancitaro, Peribán de Ramos, Nuevo Parangaricutiro y Uruapan	Temperate Ecosystems with Pinus Abies and Quercus, cloud forest, pasture and secondary forest, with areas in good condition that provide habitat for diverse species of endemic flora and fauna.
Playa de Maruata y Colola	Sanctuary	29-10-86	Michoacán		
Playa Mexiquillo	Sanctuary	29-10-86	Michoacán		

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Mariposa Monarca	Biosphere Reserve	10-11-00	Michoacán y México	Michoacán: Contepec, Senguio, Anganguao, Ocampo, Zitacuaro Y Aporo. Edo de México: Temascalcingo, San Felipe Del Progreso, Villa De Allende Y Donato Guerra.	Fir forest, pine-oak forest, grassland, juniper scrub.
Sierra de Huautla	Biosphere Reserve	08-09-99	Morelos	Anacuzac, Puente de Ixtla, Jojutla, Tlaquiltenango, y Tepalcingo.	Subhumid deciduous forest.
Corredor Biológico Chichinautzin	Flora and Fauna Protection Areas	30-11-88	Morelos, México y Distrito Federal	Huitzilac, Cuernavaca, Tepoztlán, Jiutepec, Tlanepantla, Yautepec, Tiayacapan y Totolapan.	Pine, fir, oak, pine-oak and oak crasicaule Rosette scrub, tropical lowland deciduous forest.
Lagunas de Zempoala	National Park	27-11-36	Morelos y México	Morelos: Huitzilac. México: Ocuilán	Fir forest, pine and oak.
El Tepozteco	National Park	22-01-37	Morelos, y D. F.	Morelos: Tepoztlán. Distrito Federal: Milpa Alta	Pine, fir, oak, tropical deciduous forest.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Benito Juárez	National Park	30-12-37	Oaxaca	Oaxaca de Juárez, San Andrés Huayapam, San Pablo Etla y San Agustín Etla.	Pine and oak forest, tropical lowland deciduous forest.
Lagunas de Chacahua	National Park	09-07-37	Oaxaca	San Pedro Tututepec.	Tropical evergreen and lowland deciduous forest, mangrove and coastal dune vegetation.
Yagul		24-05-99	Oaxaca	Tlacolula de Matamoros	Subhumid deciduous forest.
Boquerón de Tonalá	Flora and Fauna Protectio Areas	22-09-08	Oaxaca	Santo Domingo Tonalá	Topical lowland deciduous forest and oak forest.
Playa de Escobilla	Sanctuary	29-10-86	Oaxaca		
Playa de la Bahía de Chacahua	Sanctuary	29-10-86	Oaxaca		

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Tehuacán-Cuicatlán	Biosphere Reserve	18-09-98	Oaxaca y Puebla	Puebla: Ajalpan, Atecal, Callepec, Canada Morelos, Chapulco, Coyomeapan, Zinacatepec, Juan N. Mendez, Tollepec de Guerrero, Palmar de Bravo, Tecamachalco, Yehualtepec, Tlacollepec de Benito Juárez, Tepanco de López, Santiago Miahuatlán, Coxcatlan, San Gabriel Chilac, San José Miahuatlán, Tehuacan y Zapotitlán Oaxaca: Santiago Chazumba, San Pedro y San Pablo Tequixtepec del Distrito 2; Concepción Buena Vista, San Juan Bautista Coixtlahuaca, San Miguel Tequixtepec y Tepelmeme Villa De Morelos del Distrito 3; Teotitlán de Flores Magón,	Tropical deciduous forest, thorny forest, oak forest, grassland and desert scrub.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Tehuacán-Cuicatlán	Biosphere Reserve	18-09-98	Oaxaca y Puebla	San Juan de los Rios, San Martín Tuxtla, San Antonio Nahuatlán, Santa María Tecomaná, Santa María Ixcatlán y Mazatlán Villa de Flores del Distrito 4; San Pedro Jocotipac, Valerio Trujano, Santa María Texcatlán, San Juan Bautista Cuicatlán, Concepción Papalo, Santos Reyes Papalo, Santa María Papalo, Santiago Nacaltepec, San Pedro Jaltepetongo y San Juan	Tropical deciduous forest, thorny forest, oak forest, grassland and desert scrub.
Cuenca Hidrográfica del Río Necaxa	Natural Resources Protection Area	20-10-38	Puebla	Acoxochilán, Ahuazotepec, Choconcuautla, Cuauhtépec de Hinojosa, Huauchinango, Juan Galindo, Naupan, Tlaola, Xicotépec, Zacatlán, Zihuateutla.	

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Sierra Gorda	Biosphere Reserve	19-05-97	Querétaro	Arroyo Seco, Jalpan de Serra, Peñamiller, Pinal de Amoles y Landa De Matamoros.	Tropical deciduous forest, tropical deciduous forest, desert scrub, oak scrub, grassland, oak forest, coniferous forest, cloud forest, aquatic vegetation.
Cerro de Las Campanas	National Park	07-07-37	Querétaro	Querétaro.	Eucalyptus reforestation.
El Cimatario	National Park	27-07-82	Querétaro	Querétaro, Corregidora y Huimilpan.	Desert scrub.
Tiburón Ballena	Biosphere Reserve	05-06-09	Quintana Roo	Localizada frente a las costas del norte del Estado de Quintana Roo, y teniendo como zona de influencia los siguientes municipios Lázaro Cárdenas e Islas Mujeres.	Diverse ecosystems: freshwater, estuarine, marine and reef.
Arrecifes de Sian Ka'an	Biosphere Reserve	02-02-98	Quintana Roo	Frente a la costa de los Municipios de Solidaridad y Felipe Carrillo Puerto.	Coral reef.
Banco Chinchorro	Biosphere Reserve	19-07-96	Quintana Roo	Othon P. Blanco.	Coral reef.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Sian Ka'an	Biosphere Reserve	20-01-86	Quintana Roo	Cozumel y Felipe Carrillo Puerto.	Medium and lowland evergreen forest, deciduous forest, mangrove, logwood, marshes, hillocks, coastal dune vegetation and reefs.
Arrecifes de Cozumel	National Park	19-07-96	Quintana Roo	Cozumel.	Coral reef.
Arrecife de Puerto Morelos	National Park	02-02-98	Quintana Roo	Benito Juárez.	Coral reef.
Costa Occidental de Isla Mujeres, Punta Cancún y Punta Nizuc	National Park	19-07-96	Quintana Roo	Isla Mujeres y Benito Juárez.	Coral reef.
Isla Contoy	National Park	02-02-98	Quintana Roo	Isla Mujeres.	Mangroves, tropical deciduous forest, coastal, coastal and halophytic.
Tulum	National Park	23-04-81	Quintana Roo	Felipe Carrillo Puerto.	Tropical forest, mangrove and coastal dune vegetation.
Arrecifes de Xcalak	National Park	27-11-00	Quintana Roo	Othon P. Blanco	Coral reef.
Uaymil	Flora and Fauna Protection Areas	17-11-94	Quintana Roo	Felipe Carrillo Puerto y Othon P. Blanco.	Flooded lowland, tropical forest, mangrove.
Yum Balam	Flora and Fauna Protection Areas	06-06-94	Quintana Roo	Lázaro Cárdenas e Isla Mujeres.	Rainforest-low and low medium flood, forest or mangrove red and squat mangrove.
Bal'án Ka'ax	Flora and Fauna Protection Areas	03-05-05	Quintana Roo		

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Manglares de Nichupte	Flora and Fauna Protection Areas	26-02-08	Quintana Roo		
Playa de la Isla Contoy	Sanctuary	29-10-86	Quintana Roo		
Sierra de Abra Tanchipa	Biosphere Reserve	06-06-94	San Luis Potosí	Ciudad Valles y Tamuín.	Medium and low evergreen forest, deciduous forest, lowland deciduous thorn and oak forest.
Gogorrón	National Park	22-09-36	San Luis Potosí	Villa de Reyes.	Pine-oak forest, desert scrub.
El Potosí	National Park	15-09-36	San Luis Potosí	Río Verde.	Pine forest, oak and grassland.
Sierra la Mojonera	Flora and Fauna Protection Areas	13-08-81	San Luis Potosí	Vanegas	
Sierra de Álvarez	Flora and Fauna Protection Areas	07-04-81	San Luis Potosí	Armadillo de los Infantes y Zaragoza	
Meseta De Cacaxtla	Flora and Fauna Protection Areas	27-11-00	Sinaloa	San Ignacio y Mazatlán	Tropical deciduous forest, tropical lowland deciduous forest, medium semi-deciduous forest and desert scrub, marshes and lagoons.
Playa Ceuta	Sanctuary	29-10-86	Sinaloa		
Playa el Verde Camacho	Sanctuary	29-10-86	Sinaloa		CV

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
El Pinacate y Gran Desierto de Altar	Biosphere Reserve	10-06-93	Sonora	General Plutarco Elías Calles, Puerto Peñasco y San Luis Río Colorado.	Desert scrub.
Isla San Pedro Mártir	Biosphere Reserve	13-06-02	Sonora	Hermosillo	Aquatic; and in the land portion, scrubland.
Sierra de Álamos-Río Cuchujaqui	Flora and Fauna Protection Areas	19-07-96	Sonora	Álamos y Navojoa.	Deciduous forest, oak forest, pine-oak forest and thorny scrub
Pantanos de Centla	Biosphere Reserve	06-08-92	Tabasco	Centla, Jonuta y Macuspama.	Swamps and marshes, medium and low semi-evergreen forest and mangrove.
Cañón de Usumacinta	Flora and Fauna Protection Areas	22-09-08	Tabasco	Tenosique	High evergreen forest.
Laguna Madre y delta del Río Bravo	Flora and Fauna Protection Areas	14-04-05	Tamaulipas		
Playa de Rancho Nuevo	Sanctuary	29-10-86	Tamaulipas	Aldama	
Xicoténcatl	National Park	17-11-37	Tlaxcala	Tlaxcala.	Ornamental reforestation
Malinche o Matlacueyatl	National Park	06-10-38	Tlaxcala y Puebla	Tlaxcala: Ixtenco, Chiautempan, Huamantla, Teolochoico, Zitlaltepec de Trinidad Sánchez Santos, Tzompantepec, Mazatecochco de José María Morelos, Acuananala de Miguel Hidalgo, Contla de Juan Cumatzi, San Pablo Del Monte y Tlaxcala. Puebla: Amozoc, Puebla, Acajete y Tepatlaxco de Hidalgo .	Pine-oak forest, fir and zacatonal.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Malinche o Matlacueyatl	National Park	06-10-38	Tlaxcala y Puebla	Tlaxcala: Ixtenco, Chiautempan, Huamantla, Teolochoico, Zitlaltepec de Trinidad Sánchez Santos, Tzompantepec, Mazatecochco de José María Morelos, Acuananala de Miguel Hidalgo, Contla de Juan Cumatzi, San Pablo Del Monte y Tlaxcala. Puebla: Amozoc, Puebla, Acajete y Tepatlaxco de Hidalgo .	Pine-oak forest, fir and zacatonal.
Los Tuxtlas	Biosphere Reserve	23-11-98	Veracruz	Angel R. Cabada, Catemaco, Mecayapan, Pajapan, San Andrés Tuxtla, Santiago Tuxtla, Soledad y Tlahuicapan de Juárez.	Deciduous forest, evergreen tropical forest and cloud forest.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Cañon del Río Blanco	National Park	22-03-38	Veracruz	Orizaba, Chocaman, Fortín, Ixtaczoquillo, Alzacán, Nogales, Camerino Z. Mendoza, Maltrata, Aquila, Río Blanco, Rafael Delgado, Acultzingo, Soledad Atzompa, Naranjal y Huiloapan de Cuauhtémoc.	Evergreen tropical forest, pine forest and mountain cloud forest.
Cofre de Perote	National Park	04-05-37	Veracruz	Perote, Xico, Ayahualulco y Acajete.	Pine and fir forest.
Sistema Arrecifal el Cruzado	National Park	24-08-92	Veracruz	Frente A Veracruz, Boca Del Río y Alvarado.	Coral reef and halophytic vegetation.
Sistema Arrecifal Lobos-Tuxpan	Flora and Fauna Protection Areas	05-06-09	Veracruz	Tamiahua y Tuxpan	Coral Reef.
Pico de Orizaba	National Park	04-01-37	Veracruz y Puebla	Puebla: Tlachichuca, Chalchicomula de Sesma y Atlixintla. Veracruz: Calcahualco y La Perla.	Pine, fir, oak, alder forest.

Annex 5. Report of Protected Natural Areas at Federal Level. (Cont.)

Protected natural area	Type	Creation decree	Location	Municipalities	Ecosystems
Ría Lagartos	Biosphere Reserve	21-05-99	Yucatán	San Felipe, Río Lagartos y Tizimin.	Lowland deciduous forest, coastal dunes, mangrove.
Arrecife Alacranes	National Park	06-06-94	Yucatán	Frente Al Municipio de Progreso.	Coral reef.
Dzibilchantun	National Park	14-04-87	Yucatán	Merida.	Deciduous forest.
Playa Adyacente a la localidad denominada Río Lagartos	Sanctuary	29-10-86	Yucatán		
Ría Celestún	Biosphere Reserve	27-11-00	Yucatán y Campeche	Campeche: Calkini Yucatán: Celestun y Maxcanu.	Mangrove vegetation on coastal dunes, hillocks, savannah, cattail marshes, reedbeds, lowland flooding and tropical lowland deciduous forest with cacti.
Otoch Ma Ax Yetel Kooch	Flora and Fauna Protection Areas	05-06-02	Yucatán y Quintana Roo	Yucatán: Valladolid. Quintana Roo: Solidaridad.	Semi-evergreen forest, floodable lowland, savannah.
Sierra de Órganos	National Park	27-11-00	Zacatecas	Sombrerete	
Cuenca Alimentadora del Distrito Nacional de Riego 01 Pabellón	Natural Resources Protection Area	08/06/1949 07/11/2002	Zacatecas y Aguascalientes		

Annex 6. Report of Protected Natural Areas at State Level.

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerro del Muerto	28-05-08	Natural Monument	Aguascalientes	Aguascalientes, Jesus Maria	mezquite (Prosopis laevigata), huizache (Acacia spp.) and Nopals (punita spp.), Quercus eduardii Q. tolosina Q. laeta y Q. resinosa	Thorn scrub, subtropical scrub, grassland, oak forest.	Secretaría de Medio Ambiente del Estado de Aguascalientes
Sierra Fria	26-02-04	Zone is Subject to Ecological Conservation	Aguascalientes	San José de Gracia, Rincón de Romos, Pabellón de Arteaga, Jesús María y Calvillo	Pine (Pinus spp), Oak (Quercus spp), Cedar (Cupressus spp), Poplar (Populus spp), Arbutus (Arbutus spp), Juniper (Juniperus spp), Ash (raxinus spp), Palo Bobo (pomea spp), Palm (ucca spp), Nopal (punita spp), Mezquite (Prosopis spp), Manzanita (Arctostaphylos spp), Huizache (Acacia spp), Coreopsis mcvaughii rydb donotrichum amplum crawford iguiera rosei greenm	Coniferous Forest, Scrubland.	Secretaría de Medio Ambiente del Estado de Aguascalientes
Estero de San José del Cabo"	24-05-04	Zone is Subject to Ecological Protection	Baja California Sur	Los Cabos	Euphorbia leucophylla Abronia maritima Proboscidea albaefolia ouvea pilosa and Bouleoa barbata and enothera drumondii Acacia farnesiand Scirpus californicus Salix lasiolepis allisia glabra Prosopis sp Typha domingensis Lemna minor Ammannia coccinea Polygonum hydroperoides and yetrocotyle vulgaris	Dune vegetation, palm, guamuchil forest, mesquite, saltcedar, Aquatic vegetation: reeds and tular.	Secretaría de Planeacion Urbana, Infraestructura y Ecologia

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Balam-Kin	04-01-11	Zone is Subject to Ecological Conservation	Campeche	Champotón, Hopelchén, Escárcega	Guaiacum sanctum, Beaucarnea plicabilis, Chlophora tinctoria L. Gaud, Leucaena leucocephala Lam de it ybanitus sp. Phyllostylon brasiliense Cajan ex Brenthook, Malpighia lu. Aelli C. Morton, Acacia gaumeri S. Blake, Cedrela odorata L and icus obtusifolia unth Brosimum alicastrum, Bursera simaruba, Caesalpinia gaumeri, Caesalpinia mollis, Ceiba schottii G. sanctum, Gymnopodium floribundum, Lonchocarpus xudil Lonchocarpus yucatanenses, Lysiloma laitsii, um, Manilkara zapota, Maytenus schippii, Melopium brownei, Mimosa bahamensis, Piscidia piscipula, Platymiscium yucatanum, Pouteria campechiana, Pouteria reticulata, Pseudobombax ellipticus, Spondias mombin, Thouinia paucidentata aenatoxylon, campechianum, Bucida buceras, Acacia angustissima, Atelalea gumifera, Bravaisia berlandieriana, Bucida buceras, Byrsonima buccifera, Cameraria latifolia, Cocoloba cozumelensis, Cordia dodecandra, Croton icthe, Iospyros bumeloides, Erythroxylum rotundifolium, Eugenia winzerlingii, Eugenia spp, campechianum L. xudil, M. brownei and M. zapota	Wet semi-evergreen tropical forest, medium dry semi-deciduous jungle, low dry forests.	Secretaría de Medio Ambiente y Aprovechamiento Sustentable

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Balam-Ku	04-01-11	Zone is Subject to Ecological Conservation	Campeche	Escárcega, Candelaria,	Lonchocarpus castilloi (cascarrillo), Piscidia piscipula (ja'abin), Enterolobium cyclocarpum Brosimum alicastrum (ramón), Aspidosperma megalocarpum A cruentum, Mamikara zapota (chicle), Swietenia macrophylla Tabebuia chrysantha Bucida buceras (puclé), Calophyllum brasiliensis Lonchocarpus hondurensis, Pouteria amygdalina P. zapota Sideroxylon foetidissimum ribignya cohune Byrsonima bucidiaefolia aematoxylon campechianum (lino) Croton icche (cascarrillo de bajo), B. buceras Melopium brownii (chechen) y Cameraria latifoliada Iospyros bumeloides Clusia Lundelli Caesalpinia vesicaria Giliridia maculata campechianum (lino) B bucidaefolia Malpigia Lundelli yperbaena winzerlingii (naranjillo), iphysa paucifoliata Cameraria latifolia Sphinga playioba Gueltarda gaumeri Besucaren plabilis Guaiacum sanctum (guayacán), Astronium graveolens (jobillo), Gymnopodium floribundum (dziziche), Thouinia paucidentata (kanchunup), M. zapota B alicastrum Bursera simaruba (chaka?), Esenbeckia sp., Piscidia piscipula (ja'abin), Clusia sp., Lysiloma latsill uum (tsalam) y M brownii	High evergreen forest, flooded low forest, low forest deciduous, evergreen lowland forest.	Secretaría de Medio Ambiente y Aprovechamiento Sustentable

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Bosque de Coníferas Chanal	04-05-72	Natural Typical Area	Chiapas	Chanaly Las Margaritas	Pinus spp (Pines) and Quercus spp (Oaks)	Pine Forest, Pine-Oak Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
La Concordia Zaragoza	04-05-72	Natural Typical Area	Chiapas	La Concordia	Pinus spp (Pines) y Quercus spp (Oaks), Terminalia amazonia (Canshan) and Brosimum alicastrium (Ramón).	Tropical deciduous forest, tropical semi-evergreen Forest, Pine-Oak forest, Cloud forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Santa Felicitas	31-07-74	Natural Recreational Park	Chiapas	Ocosingo	Terminalia amazonia (Canshan), Brosimum alicastrium (Ramón) y Spondias mombin (Jobo).	Tropical evergreen forest, tropical semi-evergreen Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
El Zapotal	27-08-80	Ecological Recreation Center	Chiapas	Tuxtla Gutiérrez	Manikara zapota (Chicozapote), Cedrela odorata (Cedar), Acacia spp (Quebracho), Bursera excelsa (Copal) y B. siamruba (Muñato).	Semi-evergreen Rainforest, Tropical Deciduous Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Rancho Nuevo	28-03-90	Zone is Subject to Ecological Conservation	Chiapas	San Cristóbal de Las Casas	Pinus spp (Pines) and Quercus spp (Oaks)	Pine Forest, Pine-Oak Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Reserva Biótica Gertrude Duby	06-07-94	Zone is Subject to Ecological Conservation	Chiapas	San Cristóbal de Las Casas	Pinus spp (Pines), Quercus crassifolia Quercus spp (Oaks) and Clethra macrophylla	Pine Forest, Pine-Oak Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
El Canelar	02-08-95	Zone is Subject to Ecological Conservation	Chiapas	Acala	Calyptophyllum candidissimum (Canelo), Swietenia humilis (Caobilla), Alvaradoa amorphoides (Camarón), Cedrela odorata (Red Cedar), Platymiscium dimorphrandum (Hormiguillo) and Bursera simaruba (Palo Mulato).	Tropical deciduous forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
El Recreo	13-03-96	Zone is Subject to Ecological Conservation	Chiapas	Teopisca	Pinus oocarpa, Pseudotsuga (Pines), Quercus rugosa (Oaks), Arbutus sp (Madrones) and Juniperus sp (Red Cypress)	Pine Forest, Pinus-Quercus - uniperus forest	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Finca Santa Ana	19-06-96	Zone is Subject to Ecological Conservation	Chiapas	Pichucalco	Castilla elastica (Hule), Cedrela odorata (Cedar), endropandx arboreus (Lion's Paw), Mortoniodo Aron guatemalense (Cedrillo), Spondias mombin obo and Bravaisia integririma Gandco te	Tropical Evergreen Forest, Tropical Semi-evergreen Forest	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Laguna Bélgica	19-06-96	Zone is Subject to Ecological Conservation	Chiapas	Ocozacoautla de Espinosa	Quercus oleoides (Oaks), Terminalia amazonia (Canshán), Clethra suaveolens (Marquesotillo), Siparuna andina (Cojón de tigre) and Papirra mexicana (Duraznillo, Caobilla)	Tropical Semi-evergreen Forest, Quercus forest	Secretaría de Medio Ambiente e Historia Natural (SMAHN)

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerro Mactumatzá	16-07-97	Ecological Reserve	Chiapas	Tuxtla Gutiérrez	Acacia spp (Quebracho), Quercus acutifolia y Q. pedunculatis (Oaks), Bursera excelsa (Copal) y B siamaruba (Mulato).	Quercus forest Tropical deciduous forest, Tropical Semideciduous Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
El Cabilido Amatal	16-06-99	Zone is Subject to Ecological Conservation	Chiapas	Tapachula y Mazatán	Rhizophora mangle (Red Mangrove), Avicennia germinans (Madresal), Conocarpus erectus (Botoncillo) Sterculia apetala (brown), Pithecellobium dulce (Guamúchil), Sabal mexicana (Palm) and Tabebuia rosea (Matlisguate)	Thorny forest, tropical deciduous forest, mangrove and Palms.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
El Gancho Murtillo	16-06-99	Zone is Subject to Ecological Conservation	Chiapas	Tapachula y Suchiate	Rhizophora mangle (Red Mangrove), Avicennia germinans (Madresal), Conocarpus erectus (Botoncillo) Sterculia apetala (Castaño), Pithecellobium dulce (Guamúchil), Sabal mexicana (Palm) and Tabebuia rosea (Matlisguate)	Thorny forest, tropical deciduous forest, mangrove and Palms.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
La Lluvia	07-06-00	Ecological Reserve	Chiapas	Villaflores	Bursera simaruba (Mulato), Sabal mexicana (Palm), Lysiloma acapulcensis (Tepehuaje), Acacia spp (Quebrachos), Cordia sp And Quercus sp (Oak)	Tropical deciduous forest, Oak Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Volcán Tacaná	11-10-00	Zone is Subject to Ecological Conservation	Chiapas	Cacahoatán, Tapachula Y Unión Juárez	Bursera simaruba (Mulato), Sabal mexicana (Palm), Lysiloma acapulcensis (Tepehuaje), Acacia spp (Quebrachos), Cordia sp And Quercus sp (Oak)	Pine Forest, Pine-Oak Forest, deciduous tropical forest, cloud forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)- (CONANP)
Cordón Pico El Loro-Paxtal	22-11-00	Zone is Subject to Ecological Conservation	Chiapas	Escuintla, Siltepec, El Porvenir, Angel Albino Corzo, Motozintla, Acacoyagua, Monte Cristo de Guerrero y Mapastepec	Pinus spp (Pines) y Quercus spp (Oaks), Clethra spp Siparuna andina (Cojon of tiger), Trichospermum mexicanum (Colorado Cork)	Quercus Forest, Pinus Forest, Pinus-Quercus Forest, Cloud Forest, Tropical semi-Deciduous Forest (Cupressus Forest)	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
La Primavera	13-12-00	State Park	Chiapas	Comitán de Domínguez	Lysiloma acapulcensis (Tepehuaje), Bursera excelsa (Copal), Bursera simaruba (Mulato), iospyros digyna (Zapote negro), Acacia pennatula (Quebracho), Enterolobium cyclocarpum (Guandcastle) Cedrela odorata (Cedar) y Brosimum alicastrum (Ramon)	Tropical Deciduous Forest, Tropical Semi-deciduous Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Sistema Lagunar Catazajá	03-11-06	Zone is Subject to Ecological Conservation	Chiapas	Playas de Catazajá	Bursera simaruba Mulato Cordia bicolor endropandx arboreus (Mano de león), aematoxylum campechianum (Palo tinto) and Enterolobium cyclocarpum (Guandcastle).	Thorn forest, Tropical Deciduous Forest, Palms, Tropical Deciduous Forest secondary vegetation.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Humedales La Libertad	03-11-06	Zone is Subject to Ecological Conservation	Chiapas	La Libertad	Bursera simaruba Mulato Cordia bicolor endropandx arboreus (Mano de león), aematoxylum campechianum (Palo tinto) and Enterolobium cyclocarpum (Guandcastle).	Thorn forest, Tropical Deciduous Forest, Palms, Tropical Deciduous Forest secondary vegetation.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Tzama Cun Púmy	3-11-06	Zone is Subject to Ecological Conservation	Chiapas	Tapalapa	Abies guatemalensis, Clethra occidentalis endropandx arboreus (Mano de León) and Pinus oocarpa (Pine).	Pine forest, cloud forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Cerro Meyapac	15-11-06	Zone is Subject to Ecological Conservation	Chiapas	Ocozacoauilla de Espinosa	Acacia permatula (Quebracho), Cordia dodecandra (cupape), Protium copal (Copal), Quercus oleoides, Q. pedunculatis (Oaks), Swietenia humilis (Caobillo) and Imus mexicana (Palo baqueta)	Quercus Forest, Tropical Deciduous Forest, Tropical Semi-Deciduous Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
La Pera	15-11-06	Zone is Subject to Ecological Conservation	Chiapas	Berriozabal	Cupania dentata (Cola de pava), endropandx arboreus (Mano de leon), Guarea glabra Tapitira mexicand (Duraznillo, Caobillo) and Clusia spp (Memelitas).	Tropical Semi-Evergreen Forest, Tropical Evergreen Forest and Cloud Forest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Huitepec Los Alcantares	07-03-07	Zone is Subject to Ecological Conservation	Chiapas	San Cristóbal de Las Casas	reopandx xalapensis Quercus crassifolia Quercus laurina Quercus spp (Oaks) and Clethra macrophylla	Pine Forest, Oak Forest and CloudForest.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Humedales de Montaña María Eugenia	01-02-08	Zone is Subject to Ecological Conservation	Chiapas	San Cristóbal de Las Casas	Salix bomplandiana (sauce) and Taxodium mucronatum (Ahuehuate)	Aquatic and underwater vegetation.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Humedales de Montaña La Ksst	02-02-08	Zone is Subject to Ecological Conservation	Chiapas	San Cristóbal de Las Casas	Salix bomplandiana (sauce) and Taxodium mucronatum (Ahuehuate)	Aquatic and underwater vegetation.	Secretaría de Medio Ambiente e Historia Natural (SMAHN)
Zona de Restauración Zapalinamé	08-06-07	Restoration Area	Coahuila	Saltillo, Arteaga	Quercus satillensis Q greggii Agave lechugilla Agave striata asyjliron cedarsanum olina cespit fera ucca carnerosana Pinus cembroides	Pine-oak forest of xeric scrub, desert scrub, microphyte, Desert rosette.	Secretaría de Medio Ambiente de Coahuila

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Sierra de Zapalinamé	15-10-96	Zone is Subject to Ecological Conservation	Coahuila	Saltillo, Arteaga	Pseudotsuga sp., Quercus spp. Abies spp. and Pinus spp.	Mixed forests, coniferous, oak and desert and roselle scrub.	Profauna, A.C.
Ejidos de Xochimilco y San Gregorio Atlapulco	07-05-92	Zone is Subject to Ecological Conservation	Distrito Federal	Xochimilco	ahuejote (<i>Salix bonplandiana</i>), ahuehuele (<i>Taxodium mucronatum</i>) chapulixtle (<i>odonaea viscosa</i>), sauce lloron (<i>Salix babylonica</i>), trueno (<i>Ligustrum lucidum</i>), araucaria (<i>Araucaria heterophylla</i>), jacaranda (<i>acaranda mimosaefolia</i>), casuarina (<i>Casuarina e uiseltifolia</i>), eucalyptus (<i>Eucalyptus</i> spp.), ash (<i>raxinus uhdei</i>) and some palm species (<i>Phoenix candriensis</i> and <i>ashingtonia robusta</i>)	halophytic vegetation, aquatic and subaquatic vegetation (swamp) and terrestrial or riparian vegetation.	Secretaría de Medio Ambiente. Comisión de Recursos Naturales del Gobierno del Distrito Federal
Tercera Sección del Bosque de Chapultepec I	10-06-92	Zone is Subject to Ecological Conservation	Distrito Federal	Miguel Hidalgo	NA		Secretaría de Medio Ambiente. Comisión de Recursos Naturales del Gobierno del Distrito Federal
Tercera Sección del Bosque de Chapultepec II	10-06-92	Zone is Subject to Ecological Conservation	Distrito Federal	Miguel Hidalgo	NA	NA	Secretaría de Medio Ambiente. Comisión de Recursos Naturales del Gobierno del Distrito Federal

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Ecological Park de la Ciudad de México	28-06-89	Zone is Subject to Ecological Conservation	Distrito Federal	Tlalpan	Buddleia cordata tepozán Buddleia parviflora tepozancillo odomea viscosa chapulixtle Pittocaulon praecox Pittocaulon Quercus crassipes Q rugosa Q laurina and Pinus teocote	Desert scrub, oak-pine forest.	Secretaría de Medio Ambiente. Comisión de Recursos Naturales del Gobierno del Distrito Federal
Bosques de Las Lomas	08-10-94	Zone is Subject to Ecological Conservation	Distrito Federal	Miguel Hidalgo	NA	NA	Secretaría de Medio Ambiente. Comisión de Recursos Naturales del Gobierno del Distrito Federal
Sierra de Guadalupe	20-08-02	Zone is Subject to Ecological Conservation	Distrito Federal	Gustavo A. Madero	Eucalyptus sp eucalyptus Cupressus lusitanica white cedar Quercus spp Oak Casuarina e useifolia casuarina Eysenhardtia polystachya litorice Acacia schaffneri huizache Prosopis laevigata mezquite Mimosa aculeatcarpa var Blumifera yuca de galo ucca filifera yuca Bursera cuneata copal punta sireplacantha spot tuna and pomoea murucoides casahuate	Desert Scrub.	Secretaría de Medio Ambiente. Comisión de Recursos Naturales del Gobierno del Distrito Federal

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Sierra de Santa Catarina	03-11-94	Zone is Subject to Ecological Conservation	Distrito Federal	Iztapalapa, Tliahuc	liveforever (Sedum praealtum), nolina (olina parviflora), pittocaulon (Pittocaulon praecox), tepozán (Buddleia cordata y B. parviflora), nopal chamacuero (punta tomentosa) and huizache (Acacia farnesiana), pihu (Schinus molle), white cedar (Cupressus lusitanica), eucalyptus (Eucalyptus camaldulensis), jacaranda (acaranda mimosifolia), alle (Alnus sp.), Acacia (Acacia sp.), casahuate (Casuarina), e. uiseflora, Ash (raxinus uhdei), trueno (Ligustrum lucidum) and alamo (Populus sp.)	Desert Scrub.	Secretaría de Medio Ambiente, Comisión de Recursos Naturales del Gobierno del Distrito Federal
Bosque de Tlalpan	24-10-97	Urban Park	Distrito Federal	Tlalpan	Buddleia cordata tepozán Buddleia parviflora tepozancillo odonaea viscosa chapulixtle Pittocaulon praecox pittocaulon Quercus crassipes Q. rugosa Q. laurina	Desert Scrub, Pine-Oak Forest.	Secretaría de Medio Ambiente, Comisión de Recursos Naturales del Gobierno del Distrito Federal
La Armella	09-06-06	Zone is Subject to Ecological Conservation	Distrito Federal	Gustavo A. Madero	Buddleia cordata tepozán Buddleia parviflora tepozancillo odonaea viscosa chapulixtle Pittocaulon praecox pittocaulon Quercus crassipes Q. rugosa Q. laurina	Desert Scrub, Oak Forest.	Secretaría de Medio Ambiente, Comisión de Recursos Naturales del Gobierno del Distrito Federal

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Ecoguardas	29-11-06	Zone is Subject to Ecological Conservation	Distrito Federal	Tlalpan	Buddleia cordata tepozán Buddleia parviflora tepozancillo odonaea viscosa chapulixile Pittocaulon praecox pitocaulon Quercus crassipes Q. rugosa Q. laurina y Pinus teocote	Desert scrub, oak-pine forest.	Secretaría de Medio Ambiente. Comisión de Recursos Naturales del Gobierno del Distrito Federal
San Miguel Topilejo	26-06-07	Ecological Reserve Comunitaria	Distrito Federal	Tlalpan y Milpa Alta	NA	NA	Secretaría de Medio Ambiente. Comisión de Recursos Naturales del Gobierno del Distrito Federal
San Nicolás Totolapan	29-11-06	Ecological Reserve Comunitaria	Distrito Federal	Tlalpan y Magdalena Contreras	Oyamel (Abies religiosa), Pino (Pinus spp.)	Pine Oak Forest.	Secretaría de Medio Ambiente. Comisión de Recursos Naturales del Gobierno del Distrito Federal
El Tecuán	30-03-08	Ecological Park	Durango	Durango			Gobierno del Estado
Santa Bárbara	22-06-08	Natural Resources Protection Area	Durango	Pueblo Nuevo	Picea Chihuahuana Abies duranguensis Pseudotsuga menziesii are dominant	Pine-Oak forest, considered relicual, with species considered endemic to Mexico, riparian vegetation.	Gobierno del Estado

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Sierra de Lobos	04-11-97	Sustainable Use Area	Guanajuato	León, San Felipe y Ocampo	Madrones Arbutus glandulosa Arbutus xalapensis Cedar Juniperus flaccida Oaks Quercus castanea Quercus crassipes Quercus eduardii Quercus laeta Quercus laurina Quercus microphylla Quercus grisea Quercus potosina Ash raxinus uhdei Pine Pinus cembroides, Tejocote Crataegus mexicanand Capulin Prunus serotina Sauz Salix bonplandii Sabino Taxodium mucronatum Granjeno Celtis pallida	Oak Forest.	Instituto de Ecología del Estado de Guanajuato
Región Volcánica Siete Luminarias	21-11-97	Natural Monument	Guanajuato	Valle de Santiago	Tepame Acacia pennatula varaduz Eysenhardtia polystachya Tepehuaje Lysiloma microphylla Palo blanco Albizzia occidentalis Mezquite Prosopis laevigata Palo xixote Bursera fagaroides, palo dulce Eysenhardtia punctata.	Desert scrub.	Instituto de Ecología del Estado de Guanajuato
Presa de Silva y Áreas Aledañas	02-12-97	Ecological Restoration Area	Guanajuato	San Francisco del Rincón y Purísima del Rincón	Mezquite Prosopis laevigata Huizache Acacia farnesiana palo dulce Eysenhardtia punctata	Thorny forest.	Instituto de Ecología del Estado de Guanajuato

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Megaparque de la ciudad de Dolores Hidalgo	16-12-97	Ecological Park	Guanajuato	Dolores Hidalgo	Mezquite Prosopis laevigata Pirul mexicano Schinus molle, ulizache Acacia farnesiana Garambullo Myrtillocactus geometrizans	Thorny forest	Instituto de Ecología del Estado de Guanajuato
Cuenca de la Esperanza	06-03-98	Conservation Reserve	Guanajuato	Guanajuato	Madroños Arbutus glandulosa Oaks Quercus aff coccolobifolia Quercus castanea Quercus crassipes Quercus deserticola Quercus dysophylla Quercus fulva Quercus glabrescens Quercus laurina Quercus mexicanum Quercus microphylla Quercus reticulata Quercus rugosa Quercus sideroxyla sauz Salix bonplandiana tejocote Craetagus mexicanum Pines Pinus michoacana Pinus greggii	Quercus forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato
Las Fuentes	26-10-99	Ecological Park	Guanajuato	Santa Cruz de Juventino Rosas	Tepame Acacia pematula var arduz Eysenhardtia polystachya Tepehuaje Lysiloma microphylla Palo blanco Albizzia occidentalis Mezquite Prosopis laevigata Palo xixote Bursera lagaroides, palo dulce Eysenhardtia punctata, Palo Prieto Lysiloma divaricata	Tropical deciduous forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cuenca Alta del Río Temascalco	06-06-00	Sustainable Use Area	Guanajuato	Salamanca y Santa Cruz de Juventino Rosas	Madroños <i>Arbutus glandulosa</i> Oak <i>Quercus eduardi</i> , <i>Quercus resinosa</i> , <i>Quercus microphylla</i> <i>Quercus laurina</i> , <i>Quercus castanea</i> , <i>pirimo</i> , <i>erbesina</i> <i>pietatis</i> , palo cuchara <i>Bursera palmeri</i> , <i>pochote</i> <i>Celba aesculifolia</i> , palo amarillo <i>Euphorbia tulva</i> , <i>quebracho</i> <i>Lysiloma microphyllum</i> <i>huanimullo</i> <i>Lysiloma demostyachys</i> , <i>acebuche</i> <i>oresleira</i> <i>pilyreoides</i> , <i>sauz</i> <i>Salix bonplandiana</i>	Quercus forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato
Peña Alta	06-06-00	Sustainable Use Area	Guanajuato	San Diego de la Unión	Pine <i>Pinus cembroides</i> , <i>enico</i> <i>Quercus obtusata</i> , <i>Quercus resinosa</i> , <i>Quercus laurina</i> <i>Quercus grisea</i> , <i>Quercus microphylla</i> and <i>Quercus coccolobaefolia</i> , palo dulce <i>Eysenhardtia punctata</i> <i>cucharilla</i> , <i>asyllion acrotichum</i> <i>mezquite</i> <i>Prosopis laevigata</i> <i>tepozan</i> <i>Buddleja sessiliflora</i>	Conifer and Quercus forest, thorny forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato
Pinal del Zamorano	06-06-00	Conservation Reserve	Guanajuato	San José Iturbide y Tierra Blanca	<i>yamel</i> <i>Abies religiosa</i> , <i>alile</i> <i>Alnus</i> sp., Oak <i>Quercus rugosa</i> , <i>Quercus crassifolia</i> Red Madroños, <i>Arbutus</i> sp <i>Pinus</i> , <i>Pinus cembroides</i> <i>Pinus hartwegii</i> , <i>mezquite</i> <i>Prosopis laevigata</i>	Conifer and Quercus forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Parque Metropolitano	19-09-00	Ecological Park	Guanajuato	León	Mezquite Prosopis laevigata Tepame Acacia pennatula varaduz Eysenhardtia polystachya Tepehuaje Lysiloma microphylla	Desert scrub.	Instituto de Ecología del Estado de Guanajuato
Laguna de Yuriria y su Zona de Influencia	13-11-01	Ecological Restoration Area	Guanajuato	Yuriria y Valle de Santiago	Mezquite Prosopis laevigata palo dulce Eysenhardtia punctata, Palo blanco Albizia occidentalis	Desert scrub.	Instituto de Ecología del Estado de Guanajuato
Lago-Cráter La Joya	23-02-01	Ecological Park	Guanajuato	Yuriria	Tepame Acacia pennatula varaduz Eysenhardtia polystachya Tepehuaje Lysiloma microphylla Palo blanco Albizia occidentalis Mezquite Prosopis laevigata Palo xixote Bursera fagaroides, palo dulce Eysenhardtia punctata	Desert scrub.	Instituto de Ecología del Estado de Guanajuato
Las Musas	30-07-02	Sustainable Use Area	Guanajuato	Manuel Doblado	Sabino Taxodium mucronatum sauce lorón Salix bonplandiana varaduz Eysenhardtia polystachya mezquite Prosopis laevigata Tepehuaje Lysiloma microphylla Tepame Acacia pennatula	Quercus forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerros El Culliacán y La Gavia			Guanajuato	Municipios de Celaya, Cortazar, Jaral del Progreso y Salvatierra.	ak Quercus spp Tepame Acacia pennatula varaduz Eysenhardtia polystachya Tepehuaje Lysiloma microphylla Palo blanco Albizzia occidentalis	Quercus forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato
Sierra de Los Agustinos	30-07-02	Sustainable Use Area	Guanajuato	Acámbaro, Jerécuaro y Tarimoro	Pine Pinus monezumae Pinus pseudostrobus Pinus teocote tepezan Buddlejia cordata Oaks Quercus castanea Quercus crassifolia Quercus crassipes Quercus deserticola Quercus laeta Quercus laurina Quercus microphylla Quercus obtusata Quercus rugosa alie Alnus acuminata Alnus jorullensis tepecote Crataegus mexicana capulin Prunus serotina Timbe Acacia angustissima tepame Acacia pennatula palo blanco Albizzia occidentalis colorin cimarrón Erythrina americana, palo Erythrina herbacea varaduz Eyse Ahardia polystachya Tepehuaje Lysiloma microphylla palo xixote Busera fagaroides Ash raxinus uhdei acabuche oresiera phillyroides	Coniferous and Quercus forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato
Cerro del Cubilete	18-11-03	Ecological Restoration Area	Guanajuato	Silao y Guanajuato	aks Quercus rugosa Quercus laurina Quercus mexicana Tepame Acacia pennatula varaduz Eysenhardtia polystachya Mezquite Prosopis laevigata, Tepehuaje Lysiloma microphylla varaduz Eysenhardtia polystachya	Quercus forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerro de Los Amoles	07-05-04	Sustainable Use Area	Guanajuato	Moroleón y Yuriria	White Oak Quercus candicans Oak oak Quercus rugosa Oak laurelillo Quercus elliptica Oak colorado Quercus dysophila Madrones Arbutus laurina Capulín Prunus capuli Tejocote Crataegus mexicana Granjeno celtis pallida Palo dulce Eysenhardtia polystachia Papeillo Bursera adoraia Pochote Ceiba aesculifolia Palo blanco Albizzia occidentalis Palo Prieto Lysiloma divaricata	Quercus forest, desert scrub.	Instituto de Ecología del Estado de Guanajuato
Cerro de Arandas	25-11-05		Guanajuato	Irapuato	Mezquite Prosopis laevigata Palo xixole Bursera fagaroides Palo cuchara Bursera palmieri Palo amarillo Euphorbia fulva Palo fierro Senna polyantha Timbe Acacia angustissima Tepehuaje Lysiloma microphylla Nogal cimarrón Cedrela dugesii Crucillo Randia watsonii Primo amarillo erbesina pietalis Pochote Ceiba aesculifolia Palo santo iphysa suberosa uanimullo Lysiloma demostyachys Tepame Acacia pennatula Palo blanco Albizzia occidentalis Acebuche orestera pilyreoides	Desert scrub.	Instituto de Ecología del Estado de Guanajuato

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Presas La Purísima y su Zona de Influencia	25-11-05	Sustainable Use Area	Guajuato	Guajuato	Tepame Acacia pennatula varaduz Eysenhardtia polystachya Tepehuaje Lysiloma microphylla Palo blanco Albizzia occidentalis Mezquite Prosopis laevigata	Desert scrub.	Instituto de Ecología del Estado de Guajuato
Cuenca de la Soledad	18-08-06	Ecological Restoration Area	Guajuato	Guajuato	aks Quercus castanea Quercus glaucescens Quercus mexicana Quercus macrophylla Madrones Arbutus xalapensis Timbre Acacia angustissima Tepame Acacia pennatula Copal Bursera sp. Varaduz Eysenhardtia polystachya mezquite Prosopis laevigata pirul Schinus molle	Quercus forest, Desert scrub.	Instituto de Ecología del Estado de Guajuato
Presas de Neutla y su Zona de Influencia	15-09-06	Ecological Restoration Area	Guajuato	Guajuato	Mezquite Prosopis laevigata Huizache chino Acacia schaffneri Huizache Acacia farnesiana Tepame Acacia pennatula Pitayo Stemocereus uejelatensis Oaks Quercus eduardi Quercus resinosa Quercus potosina Nopal punta spp. Palo blanco Albizzia occidentalis Palo Prieto Lysiloma divaricata	Desert scrub.	Instituto de Ecología del Estado de Guajuato
Ecological Park Cubitos	30-12-02	State Park	Hidalgo	Pachuca		Desert scrub.	SEMARNATH

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Bosque El Hiloche	06-09-04	State Park	Hidalgo	Mineral del Monte		Oak forest.	Presidencia Municipal y SEMARNATH
Cerro El Tecajete	09-01-09	State Park	Hidalgo	Zempoala		Desert scrub.	Ejido y SEMARNATH
Finca Tegolome	20-09-04	Ecological State Reserve	Hidalgo	Tlanchinol		Cloud forest.	Propietario y SEMARNATH
El Zoológico	22-02-06	Ecological State Reserve	Hidalgo	Tepeji del Río		Desert scrub.	Colonos y SEMARNATH
Ceros La Paila-El Xihuingo	03-02-09	Ecological State Reserve	Hidalgo	Tepeapulco	Pinus spp	Pine forest and desert scrub.	Ejido y SEMARNATH
Cerro del Ángel	15-0711	Ecological State Reserve	Hidalgo	Mixquihuala de Juárez		Desert scrub	Ejido y SEMARNATH
Bosque Mesófilo Nevado de Colima	11-07-09	State Park	Jalisco	San Gabriel, Zapotlán de Vadillo, Tuxpan y Zapotlán el Grande.	Abies, Pinus, Quercus Rhamnus icus Tilia Terstroemia Alnus acuminata Subs Arguta Meliosma reopandx Carpinus Pinus hartwegii Cupressus lindley Polypodium sedum y Phoradencrom calyculatum Cupressus lindley Pinus Montezumae Camarostaphylis discolor, subsp. iscolor sitya virginianand Carpinus tropicales Tilia mexicanand Abies finckii Balmea stormae	Pine-Oak forest, Cloud forest, fir forest, Alle forest and Zacatonal forest.	Secretaría de Medio Ambiente para el Desarrollo Sustentable

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Sierra del Águila	16-02-10	Hydrological Protection State Area	Jalisco	Ameca, Ahualulco de Mercado, Etzatlán y San Juanito de Escobedo.		Oak forest, oak-pine forest, gallery forest, deciduous forest, thorny scrub, induced grassland, introduced aquatic vegetation.	Secretaría de Medio Ambiente para el Desarrollo Sustentable
Agua Caliente	12-01-04	Ecological Preservation Area	Michoacán	Marcos Castellanos	NA	Subtropical scrub.	Secretaría de Urbanismo y Medio Ambiente
Los Chorros del Varal	08-01-04	Ecological Preservation Area	Michoacán	Los Reyes	Bursera jorullensis, Celtis iguandea, Cyrtocarpa procer a, iphysa floribunda, ac uinia pungens, Malpighia mexicana, Plumeria rubra, Pseudobombax ellipticum, Crataeva palmeri, C. lania, Guazuma ulmifolia, Celtis iguandea, Cordia dentata, Bursera simaruba, Lysiloma divaricata, Phoebe tampicensis, Acacia coulteri, Beaucarnea inermis, Lysiloma acapulcensis, Cordia dodecandra, Crescentia cujete, Eriolobium cyclocarpum, Caesalpinia vesicaria, Calba aesculifolia, iospyrus cuneata, Guaiacum sanctum, ampea trilobata, Maclura tinctoria, Piscidia communis, Lysiloma demostachys, Bursera bipinnata, Bumelia celastrina	Tropical lowland deciduous forest, deciduous thorny forest.	Secretaría de Urbanismo y Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Manantiales de Parácuaro	14-01-04	Ecological Preservation Area	Michoacán	Parácuaro	Bravaisia integririma Candolleite, Palo blanco Bursera coyucensis Copal Pentocereus tepalcatepecanus	Tropical lowland deciduous forest, Tropical lowland deciduous thomy forest.	Secretaría de Urbanismo y Medio Ambiente
La Alberca de los Espinos	14-03-03	Ecological Preservation Area	Michoacán	Villa Jiménez	Quercus sp Salix humboldtiana Casimiroa edulis Prosopis laevigata Taxodium micronatum raxinus sp Acacia farnesiana	Tropical lowland deciduous forest.	Secretaría de Urbanismo y Medio Ambiente
La Eucalera de paso de Hidalgo	14-03-03	Urban Park	Michoacán	Brietas	Eucalyptus globules	NA	Secretaría de Urbanismo y Medio Ambiente
Mesa de Tzitzio	14-03-03	Ecological Preservation Area	Michoacán	Tzitzio	A	NA	Secretaría de Urbanismo y Medio Ambiente
La Chichihua	11-11-04	Ecological Preservation Area	Michoacán	Coalcomán	inowewia concinna Librillo Arbutus occidentalis var villosa Madrones Carpinus caroliniana Palo de Barranco Gentiland calyculata Edelweiss ncidium tigrinum Aligrado Tilia mexicana Cirimo Pinus rzedowski Pine de coalcomán	Secretaría de Urbanismo y Medio Ambiente	

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerro Punhuato	26-01-05	Ecological Preservation Area	Michoacán	Morelia	Quercus obtusata Q. castanea Q. deserticola Q. glaucoides raxinus uhdei punta spp Nopal Acacia pennatula lepame Acacia angustissima Acacia farnesiana Huizache Co. Aalia veluntia Granjeno Schinus molle Pituah Cupressus lindleyi White Cedar Casuarina e uiselfolia Casuarina	Subtropical scrub, pine oak forest, cloud forest.	Secretaría de Urbanismo y Medio Ambiente
Ex Escuela Agrícola Denominada la Huerta	31-01-05	Ecological Preservation Area	Michoacán	Morelia	Pinus	Subtropical scrub, pine oak forest, cloud forest.	Secretaría de Urbanismo y Medio Ambiente
Cerro Hueco y La Alberca	28-01-05	Ecological Preservation Area	Michoacán	Tacámbaro	Pinus	Pine forest, pine oak forest, deciduous forest.	Secretaría de Urbanismo y Medio Ambiente
Barrancón de las Guacamayas	26-12-05	Natural Park	Michoacán	Chinicuila	cedro Cedrela sp	Semi-evergreen forest.	Secretaría de Urbanismo y Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Manantial La Mintzita	13-01-05	Ecological Preservation Area	Michoacán	Morelia	iospyros xolocozii Zapote blanco Lilsea glaucescens Laurel Cedrela dugesii Nogalillo Acacia sp Huizache pomea sp Casahuate Ricinus sp Ash Higuera raxinus sp Sabino Salix sp Sauce	Subtropical Scrub, Pine Oak forest, Cloud Forest	Secretaría de Urbanismo y Medio Ambiente
Ecological Park Agua Tibia-Jeroche	25-01-05	Ecological Preservation Area	Michoacán	Puruándiro	Eysenhardtia polystachia Palo dulce Ceiba aesculifolia Pochote Bursera bipinata B cuneata B fagaroides B palmeri Copal Acacia sp Huizache Tecoma stans Retama pomea murucoides Casahuate punta sp (Nopal) Prosopis sp Mezquite Acacia sp Huizache Taxodium mucronatum Ahuehuele Salix sp Sauce raxinus uhdei Ash	Subtropical Scrub and Tropical Lowland Deciduous Forest, Gallery Forest	Secretaría de Urbanismo y Medio Ambiente
Bosque Cuautémoc y Parque Juárez	25-01-05	Urban Park	Michoacán	Jiquipán	acaranda mimosifolia Jacaranda raxinus ahdei Ash Casuarina e uiselfolia Casuarina	NA	Secretaría de Urbanismo y Medio Ambiente
Parque Lic. Salvador Bernal Murguía	15-06-06	Urban Park	Michoacán	Uruapan	Pinus sp Pine Quercus sp Cedar Cupressus sp White Cedar Symlocos Palo Avellano Arbutus sp Madrones Clethra Zapotillo reopandx Mazorco	Pine Oak forest, Oak forest and cloud forest	Secretaría de Urbanismo y Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Las Tinajas de Huandacareo	26-01-05	Ecological Preservation Area	Michoacán	Huandacareo	Pithecellobium flexicaule Phyllostylon brasiliense Acacia unijuga Bumelia laetevirens Bursera simaruba Esenbeckia berlandieri y icus spp.	Thorn scrub and tropical lowland deciduous forest.	Secretaría de Urbanismo y Medio Ambiente
Volcán El Jorullo	19-09-05	Heritage Reserve	Michoacán	La Huacana y Añío	Cordia sp Bursera sp uliano sp y aematoxylon sp. Sabal pumos	Deciduous forest, palms and secondary vegetation.	Secretaría de Urbanismo y Medio Ambiente
El Texcal	17-02-10	Park	Morelos	Jiutepec	Pithecellobium dulce Guamuchil Enterolobium cyclocarpum Parota icus sp Amate Bombacopsis uinata Pochote Prosopis sp Mezquite Swietenia humilis Caobilla Leucaena sp Guaje Bursera sp Rojo Lysiloma sp Tepemezquite	Deciduous forest, Cardon.	Secretaría de Gobierno del Estado. CEAMA
Sierra Monte Negro	10-06-98	Reserve	Morelos	Jiutepec, Emiliano Zapata, Yautepec y Tlaltzapán	Pithecellobium dulce Guamuchil Enterolobium cyclocarpum Parota icus sp Amate Bombacopsis uinata Pochote Prosopis sp Mezquite Swietenia humilis Caobilla Leucaena sp Guaje Bursera sp Rojo Lysiloma sp Tepemezquite	Tropical Lowland Deciduous Forest.	Gobierno del Estado. CEAMA

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Sierra de Huautla	31-03-93	Zone is Subject to Ecological Conservation	Morelos	Tlalquienango, Tepalcíngo	<i>Pithecellobium dulce</i> , <i>Guamuchil</i> , <i>Enterolobium cyclorarpum</i> , <i>Parota</i> , <i>Icus</i> sp, <i>Amate</i> , <i>Bombacopsis uinala</i> , <i>Pochote</i> , <i>Prosopis</i> sp, <i>Mezquite</i> , <i>Swietenia humilis</i> , <i>Caobilla</i> , <i>Leucaena</i> sp, <i>Guaje</i> , <i>Bursera</i> sp, <i>Rojo</i> , <i>Lysiloma</i> sp, <i>Tepemezquite</i>	Tropical Lowland Deciduous forest.	Gobierno del Estado. CEAMA
Los Sabinos, Santa Rosa y San Cristobal	31-03-93	Zone is Subject to Ecological Conservation	Morelos	Cuautla	<i>Pithecellobium dulce</i> , <i>Guamuchil</i> , <i>Icus</i> sp, <i>Amate</i> , <i>Leucaena</i> sp, <i>Guaje</i> , <i>Bursera</i> sp, <i>Rojo</i> , <i>Taxodium mucronatum</i> , <i>Ahuehuate</i>	Riparian and secondary vegetation.	Gobierno del Estado. CEAMA
Las Estacas	10-06-98	Reserve	Morelos	Tlaltizapán	<i>Pithecellobium dulce</i> , <i>Guamuchil</i> , <i>Enterolobium cyclorarpum</i> , <i>Parota</i> , <i>Icus</i> sp, <i>Amate</i> , <i>Bombacopsis uinala</i> , <i>Pochote</i> , <i>Prosopis</i> sp, <i>Mezquite</i> , <i>Swietenia humilis</i> , <i>Caobilla</i> , <i>Leucaena</i> sp, <i>Guaje</i> , <i>Bursera</i> sp, <i>Rojo</i> , <i>Lysiloma</i> sp, <i>Tepemezquite</i> , <i>Taxodium mucronatum</i> , <i>Ahuehuate</i> , <i>Cedrela odorata</i> , <i>Red Cedar</i> , <i>Cebapentandra</i> , <i>Ceiba</i> y <i>Eysenhardtia polystachya</i> , <i>Palo dulce</i>	Deciduous forest.	Gobierno del Estado. CEAMA
Sierra de San Juan	18-06-11	Biosphere Reserve	Nayarit	Tepec, Xalisco, San Blas	<i>Pinus</i> spp, <i>Quercus</i> spp.	Pine forest, Pine-Oak Forest, Oak forest, Oak-Pine forest, Cloud Forest.	Secretaría de Medio Ambiente de Nayarit

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Sierra de Vallejo	01-12-04	Biosphere Reserve	Nayarit	Compostela	<p>ribinya guacuyule</p> <p>Leguncularia racemosa</p> <p>Conocarpus erecta</p> <p>Rizophora mangle</p> <p>Avicenia germinans</p> <p>Bursera arb rea</p> <p>Tabebuia crisantha</p>	Deciduous Forest, disturbed pine forest deciduous forest, halophytic vegetation.	Secretaría de Medio Ambiente de Nayarit
Trinidad y Llano Salas	24-11-00	Ecological Conservation	Nuevo León	Aramberri	<p>oeberlinia esPinesa</p> <p>Cristo</p> <p>Altriplex canescens</p>	Desert scrub, halophyte vegetation,	Gobierno del Estado
La Trinidad	24-11-00	Ecological Conservation	Nuevo León	Aramberri	<p>ucca sp</p> <p>Larrea tridentata</p> <p>lorensia cernua</p>	Desert scrub, microphyte vegetation,	Gobierno del Estado
San Juan y Puentes	24-11-00	Ecological Conservation	Nuevo León	Aramberri	<p>uniperus sp</p>	Coniferous forest.	Gobierno del Estado
Sandía el Grande	24-11-00	Ecological Conservation	Nuevo León	Aramberri	<p>Agave lecheguilla</p> <p>Lechugilla</p> <p>Larrea tridentata</p> <p>gubernadora</p> <p>raxinus</p> <p>greggi</p> <p>Ash silvestre</p> <p>atrophia dioica</p> <p>sangre de drago</p> <p>Euphorbia antisifillica</p>	Rosette Desert Scrub.	Gobierno del Estado
Acuña	24-11-00	Ecological Conservation	Nuevo León	Doctor Arroyo	<p>Larrea tridentata</p> <p>Gobernadora</p> <p>lorensia</p> <p>cernua</p> <p>Hojasén</p> <p>Prosopis laevigata</p> <p>Prosopis</p>	Microphyte desert scrub.	Gobierno del Estado
El Refugio de Apanaco	24-11-00	Ecological Conservation	Nuevo León	Doctor Arroyo	<p>Prosopis laevigata</p>	Mesquite.	Gobierno del Estado

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerro del Peñón	24-11-00	Ecological Conservation	Nuevo León	Doctor González	Quercus spp	Oak forest.	Gobierno del Estado
Purísima (Bosque de enebro)	24-11-00	Ecological Conservation	Nuevo León	Iturbide	Cupressus spp	Coniferous forest.	Gobierno del Estado
Purísima (Bosque de oyamel)	24-11-00	Ecological Conservation	Nuevo León	Iturbide	Quercus spp Abies vejari	Oak forest, Coniferous forest.	Gobierno del Estado
Las Flores	24-11-00	Ecological Conservation	Nuevo León	Linares	Cellis pallida Pithecellobium dulce P. Pallens	Tropical Lowland Deciduous forest.	Gobierno del Estado
San Elias	24-11-00	Ecological Conservation	Nuevo León	Mier y Noriega	Larrea tridentata oerberlinia sPinesa ucca filifera	Microphyte desert scrub.	Gobierno del Estado
Cañon Pino del Campo	24-11-00	Ecological Conservation	Nuevo León	Mier y Noriega	Quercus emoryi Q yoxantha Pinus cembroides Agave lecheguilla Auphorbia ansisphylliflca	Creosote bush, Pine Oak forest.	Gobierno del Estado
Vaquerías	24-11-00	Ecological Conservation	Nuevo León	General Terán	Prosopis laevigata Bumelia celastrina Acacia rigidula Cordia bolsdieri	Tamaulipeco thorny scrub.	Gobierno del Estado
Santa Marta de Abajo	24-11-00	Ecological Conservation	Nuevo León	General Zaragoza	Quercus mexicanand Q. greggii Q. microphylla Arbutus xalapensis	Oak forest.	Gobierno del Estado
Cerro de Picachos*	24-11-00	Ecological Conservation	Nuevo León	Sabinas Hidalgo	Pinus pseudostrobus Quercus virginiana	Pine forest.	Gobierno del Estado

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerro El Potosí	24-11-00	Ecological Conservation	Nuevo León	Galeana	<i>Pinus culminicola</i> , <i>Abies vejarii</i> , <i>Pinus pseudostrabus</i> , <i>P. ayacahuite</i> , <i>P. hartwegii</i> , <i>Pseudotsuga flahaultii</i> , <i>Pseudotsuga macrolepis uniperus monticola</i>	Coniferous forest.	Gobierno del Estado
Sierra Corral de los Bandidos	24-11-00	Ecological Conservation	Nuevo León	García	<i>Asyrlirion texanum</i> , <i>Agave lecheguilla</i> , <i>echtia glomerata</i>	Rosette desert scrub.	Gobierno del Estado
Cerro La Mota	24-11-00	Ecological Conservation	Nuevo León	García	<i>Asyrlirion texanum</i> , <i>Agave lecheguilla</i> , <i>echtia glomerata</i> , <i>Cordia boissieri</i> , <i>Celtis pallida</i> , <i>Prosopis laevigata</i> , <i>Larrea tridentata</i> , <i>lourensia cernua</i>	Rosette desert scrub.	Gobierno del Estado
Sierra el Fraile y San Miguel	24-11-00	Ecological Conservation	Nuevo León	García, Abasolo, Hidalgo, General Escobedo, El Carmen, Miña	<i>Pinus spp</i> , <i>Quercus spp</i>	Rosette desert scrub, Submontane scrub, Oak forest, Oak-Pine forest, Pine-oak forest, Pine forest.	Gobierno del Estado
Sierra de las Mitras	24-11-00	Ecological Conservation	Nuevo León	Monterrey, Santa Catarina y García	<i>Asyrlirion texanum</i> , <i>Agave lecheguilla</i> , <i>echtia glomerata</i>	Rosette desert scrub, Submontane scrub, Creosote bush, Oak forest.	Gobierno del Estado

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerro del Topo	24-11-00	Ecological Conservation	Nuevo León	General Escobedo	<i>Cordia boissieri</i> , <i>Acacia rigidula</i> , <i>Agave lecheguilla</i> , <i>allyrium texanum</i>	submontane scrub.	Gobierno del Estado
Sierra Cerro de la Silla	24-11-00	Ecological Conservation	Nuevo León	Santiago, Allende y Cadereyta	<i>elietta parvifolia</i> , <i>cordia boissieri</i> , <i>raxinus greggi</i> , <i>Acacia berlandieri</i> , <i>Caesalpinia mexicana</i> , <i>iospyros texand</i> , <i>Leucaena pulverulenta</i> , <i>Pithecellobium pallens</i> , <i>P mahogany</i> , <i>Brahea berlandieri</i> , <i>Quercus sillae</i>	submontane scrub, semi-evergreen forest.	Gobierno del Estado
Baño de San Ignacio	24-11-00	Ecological Conservation	Nuevo León	Linares	<i>Celtis laevigata</i> , <i>Bumelia lanuginosa</i> , <i>Caesalpinia mexicana</i>	Tamaulpeco thorny scrub.	Gobierno del Estado
Llano de la Soledad (perrito llanero)	14-02-02	Ecological Conservation	Nuevo León	Galeana	Gobernadora (Larrea tridentata) and sometimes formig forests of palms or yucas (uca sp), species also presented: <i>Bouteloua chasei</i> , <i>Muhlenbergia villiflora</i> y <i>rankenia gypsophila</i>	Microphyte desert scrub and Gypsophyllic grassland.	Gobierno del Estado
La Trinidad (perrito llanero)	14-02-02	Ecological Conservation	Nuevo León	Galeana	Gobernadora (Larrea tridentata) and sometimes formig forests of palms or yucas (uca sp), species also presented: <i>Bouteloua chasei</i> , <i>Muhlenbergia villiflora</i> y <i>rankenia gypsophila</i>	Microphyte desert scrub and Gypsophyllic grassland.	Gobierno del Estado

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
La Hediondilla (perrito llanero)	14-ene-02	Ecological Conservation	Nuevo León	Galeana	Gobernadora (larrea tridentata), and sometimes forming forests or palms or yucas (Yucca sp.), species also present: Bouteloua chasei, Muhlenbergia villitora y Frankenia gypsophylla	Microphyte desert scrub and Gypsophyllif grassland.	Gobierno del Estado
El Obispado	13-Jun-05		Nuevo León				
Río Santa Catarina	11-Sep-08		Nuevo León				
La Pastora	27-Mar-09	Urban Park	Nuevo León	Guadalupe			
Cerro Ta Mee	27-Sep-97	State Park	Oaxaca	San Juan Bautista Cuicatlan	Amate Higo, GuaPinel, Aguacatillo, Oak, Cedar, Palmas, Ceibas, Biznagas y Casahuate	Desert scrub.	Gobierno del Estado. IEEDS
Hierve el Agua	06-dic-97	State Park	Oaxaca	San Lorenzo Albarradas	Pine, Ocole, Sabino and Palm	Tropical Lowland deciduous forest.	Gobierno del Estado. IEEDS
Ecological Park Regional del Istmo	17-Jun-00	Ecological Reserve	Oaxaca	Juchitán y El Espinal	Guiririna, Caoba, Guandacaste, Guayacán, Brasil, Oak, Ceiba y Granddillo	Tropical Lowland Deciduous forest and desert scrub.	Gobierno del Estado. IEEDS
Cerro del Fortín	30-Oct-04	State Park	Oaxaca	Oaxaca de Juárez	Quercus sp Oak Prosopis sp Mezquite Cordón, Copal, Ocotillo, Pochote, Jacaranda y Guaje	Oak forest, Desert and Tropical Lowland Deciduous Forest	Gobierno del Estado. IEEDS
La Sabana	14-abr-07	Ecological Reserve	Oaxaca	San Juan Cozocon, Mixe	Pinus spp Pine Cedrela odorata Cedar y Ceiba pentandra Ceiba	Evergreen forest.	Gobierno del Estado. Secretaría de Desarrollo Agropecuario, Forestal y Pesca

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerro del Fortín, Cruz Blanca y Cerro del Crestón	25-12-10	Ecological Reserve	Oaxaca	Oaxaca de Juárez	Quercus sp, Oak Prosopis sp Mezquite Cordon, Copal, Ocotillo, Pochote, Jacaranda y Guaje	Oak forest, desert and deciduous forest	Gobierno del Estado. IEEDS
State Park Lázaro Cárdenas "Flor del Bosque"	08-04-94	State Reserve	Puebla	Amozoc	Oak	Oak-Pine.	SSAOT
State Reserve "Sierra del Tentzo"	02-05-11	State Reserve	Puebla	Atoyatempan, molcaxac, Tzicallacoyan, Huatlillauca, Huehuetlan el Grande, Huaquechula, Atzompa, Tepeojuma, San Diego la Mesa Tochimilzingo, Atlixco, Teopanilan Ocoyucan	Cactus sp, oak, palms	Deciduous lowland forest	SSAOT
State Reserve Cerro de Amalucan	08-04-94	State Reserve	Puebla	Puebla	Pirul, eucalyptus		SSAOT
State Reserve Cerro Zapotecas	08-04-94	State Reserve	Puebla	San Pedro Cholula	Pine, Oak	Disturbed Pine-Oak secondary vegetation.	SSAOT
State Reserve Cerro MeNAocinas	08-04-94	State Reserve	Puebla	San Martín Texmelucan, Chautzingo	Pinus sp Quercus sp	Native shrubs.	SSAOT
State Reserve Cerro Tepeyac	08-04-94	State Reserve	Puebla	San Martín Texmelucan	Quercus sp	Disturbed Oak-Pine.	SSAOT

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Tángano II	22-05-09	Zona de Ecological Reserve	Querétaro	Huimilpan y El Marqués	180 species are listed	Tropical deciduous forest, crasicaule desert scrub.	Gobierno del Estado. Secretaría de Desarrollo Agropecuario
Peña de Bernal	05-06-09	Protected Landscape	Querétaro	Ezequiel Montes y Tolimán	puntilla sp Nopales Myrtillocactus sp Garambullo Prosopis sp Mezquite Acacia spp Huizaches	Crasicaule desert scrub.	Gobierno del Estado. Secretaría de Desarrollo Agropecuario
Laguna de Chankanaab	26-09-83	Natural Park	Quintana Roo	Cozumel	Red Mangrove Rhizophora mangle black mangrove Avicennia germinans white mangrove Laguncularia racemosa a plethora of palms, the outstanding one being Palma Chit Thrinax radiata and a plethora of orchids	Semideciduous forest, deciduous forest, coastal shrubs and mangroves.	Fundación de Parques y Museos de Cozumel (FPyMC)
Parque Kabah	08-11-95	Urban Park	Quintana Roo	Benito Juárez	A	Semideciduous forest, and eciduous forest.	Ayuntamiento de Benito Juárez, SEMA, Patronato del Parque Kabah, A.C.
Laguna Colombia	15-07-96	Ecological Park Estatal	Quintana Roo	Cozumel	Red Mangrove Rhizophora mangle black mangrove Avicennia germinans white mangrove Laguncularia racemosa a plethora of palms, the outstanding one being Palma Chit Thrinax radiata and a plethora of orchids	Semideciduous forest, deciduous forest, coastal shrubs and mangroves.	Fundación de Parques y Museos de Cozumel (FPyMC)

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Santuario del Manatí, Bahía de Chetumal	24-10-96	State Reserve	Quintana Roo	Othón P. Blanco	Red Mangrove Rhizophora mangle, black mangrove Avicennia germinans, white mangrove Laguncularia racemosa, a plethora of palms, the outstanding one being Palma Chitl, Thrinax radiata and a plethora of orchids	Semideciduous forest, deciduous forest, coastal shrubs and mangroves.	SEMA
Santuario de la Tortuga Marina, X'cabel-X'cabelito	02-02-98	Zone is Subject to Ecological Conservation	Quintana Roo	Tulum	Red Mangrove Rhizophora mangle, black mangrove Avicennia germinans, white mangrove Laguncularia racemosa, a plethora of palms, the outstanding one being Palma Chitl, Thrinax radiata and a plethora of orchids	Semideciduous forest, deciduous forest, coastal shrubs and mangroves.	SEMA
Sistema Lagunar Chacmochuch	09-08-99	Zone is Subject to Ecological Conservation	Quintana Roo	Isla Mujeres-Benito Juárez	Red Mangrove Rhizophora mangle, black mangrove Avicennia germinans, white mangrove Laguncularia racemosa, a plethora of palms, the outstanding one being Palma Chitl, Thrinax radiata and a plethora of orchids	Semideciduous forest, deciduous forest, coastal shrubs and mangroves.	SEMA
Laguna Manatí	09-08-99	Zone is Subject to Ecological Conservation	Quintana Roo	Benito Juárez	Red Mangrove Rhizophora mangle, black mangrove Avicennia germinans, white mangrove Laguncularia racemosa, a plethora of palms, the outstanding one being Palma Chitl, Thrinax radiata and a plethora of orchids	Semideciduous forest, deciduous forest, coastal shrubs and mangroves.	SEMA

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Sistema Lagunar Chichankanab	01-04-11	State Reserve	Quintana Roo	José María Morelos	A great variety of timber trees Caoba Swietenia macrophylla adamas Cedar Cedrela odorata apote Manilkara zapota a great number palms the outstanding one being Palma Chit Thrinax radiata and great number of orchids Red mangrove Rhizophora mangle black mangrove Avicennia germinans white mangrove Laguncularia racemosa	High semideciduous forest, semideciduous lowland forest, deciduous forest, coastal shrubs and mangroves.	SEMA
Selvas y Wetlands de Cozumel	01-04-11	State Reserve	Quintana Roo	Cozumel	Red mangrove Rhizophora mangle black mangrove Avicennia germinans white mangrove Laguncularia racemosa asides from diverse kinds of palms like Chit Thrinax radiata and rchids	Semideciduous forest, deciduous forest, coastal shrubs and mangroves.	SEMA
Parque Laguna de Bacalar	01-04-11	Ecological Park Estatal	Quintana Roo	Bacalar	Red Mangrove Rhizophora mangle, Black Mangrove Avicennia germinans, White Mangrove Laguncularia racemosa and Thrinax radiata	Semideciduous forest, deciduous forest, coastal shrubs and mangroves.	SEMA
Paseo de la Presa San José	05-06-96	Urban Park	San Luis Potosí	San Luis Potosí			
Ejido San Juan de Miguelito, Sierra San Miguelitp	05-06-96	Urban Park	San Luis Potosí	San Luis Potosí			

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Real de Guadalcazar	27-09-97	Special Reserve	San Luis Potosí	Guadalcazar			
Palma Larga	05-06-98	State Park	San Luis Potosí	Rioverde			
Mandntial Media Luna	07-06-03	State Park	San Luis Potosí	Rioverde			
Huircuta y la Ruta Histórico	27-10-00	Natural Sacred Place	San Luis Potosí	Villa de Ramos, Charcas y Aquismón			
Sótano de las Golondrinas	15-03-01	Natural Monument	San Luis Potosí	Aquismón			
Cuevas del Viento y de la Fertilidad	15-03-01	Natural Sacred Place	San Luis Potosí	Huehuetlán			
La Hoya de las Huahuas	15-03-01	Natural Monument	San Luis Potosí	Aquismón	NA	NA	NA
Parque Agua Blanca	19-12-87	State Park	Tabasco	Macuspana	NA	High and medium evergreen forest.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado
Yumka	05-06-1993 19-02-1987	Interpretation and Living with Nature Centre	Tabasco	Centro	NA	Evergreen forest.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado
Sierra de Tabasco	24-02-88	State Park	Tabasco	Teapa y Tacotalpa	NA	High evergreen forest.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Grutas de Coconá	24-02-88	Natural Monument	Tabasco	Teapa	NA	High and medium evergreen forest.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado
Laguna El Camarón	05-06-93	Ecological Reserve	Tabasco	Centro	NA	Hydrophilic vegetation.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado
Laguna de Las Ilusiones	8-02-95	Ecological Reserve	Tabasco	Centro	NA	Hydrophilic vegetation.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado
La Chontalpa	8-02-95	Ecological Reserve	Tabasco	Cárdenas	NA	Medium and high evergreen forest.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado
Laguna La Lima	8-02-95	Ecological Reserve	Tabasco	Nacajuca	NA	Hydrophilic vegetation.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado
Yu-Balcah	10-06-00	Ecological Reserve	Tabasco	Tacolalpa	Candcoite, Pio	Medium and high evergreen forest.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado
Cascadas de Reforma	23-11-02	Ecological Reserve	Tabasco	Balancán	Mangle, Chicozapote	Medium and high evergreen forest.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Río Playa	29-04-04	Ecological Reserve	Tabasco	Comalcalco	NA	High evergreen forest.	Secretaría de Recursos Naturales y Protección Ambiental. Gobierno del Estado
El Cielo	13-07-85	Biosphere Reserve	Tamaulipas	Gómez Farias, Llera, Ocampo y Jaumave	Pinus sp Quercus sp Li uidambar sp and Cedrela odorata	Deciduous forest, cloud forest, Pine Oak forest and desert scrub.	Gobierno del Estado
Altas Cumbres	19-11-97	Special Area Subject to Conservation	Tamaulipas	Jaumave y Victoria	Pinus sp., Quercus sp., Sabal sp., Brahea sp.	Bosque de Pino Encino, Bosque de Encino, Selva Baja Caducifolia y Bosque de Galería	Gobierno del Estado
Colonia Parras de la Fuente	08-07-82	Ecological Protected Area	Tamaulipas	Abasolo	Cordia sp., Prosopis sp., Acacia spp. and Pithecellobium dulce	Matorral espinoso y Selva Baja Caducifolia	Gobierno del Estado
Laguna La Escondida	31-04-97	Urban Park	Tamaulipas	Reynosa	Acacia spp. y punia spp.	Vegetación Secundaria	Gobierno del Estado
Bernal de Horcasitas	30-08-97	Natural Monument			Pithecellobium dulce Beucaearna sp and Bursera simaruba	Matorral espinoso y Selva Baja Caducifolia	Gobierno del Estado

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Arroyo Moreno	25-11-99	Ecological Conservation	Veracruz	Boca del Río	Red Mangrove (<i>Rhizophora mangle</i>), Black Mangrove (<i>Avicennia germinans</i>), Mangle botoncillo (<i>Conocarpus erecta</i>) and White mangrove (<i>Laguncularia racemosa</i> y <i>Avicennia nitida</i>), chiczapote (<i>Mantilaka zapota</i>), mango (<i>Mangifera</i> sp.), coco (<i>Cocos nucifera</i>), Mangrove fern (<i>Acrostichum aureum</i>), capulin (<i>Threma micrantha</i>), arbol de hule (<i>Castilla elastica</i>), mala palos (<i>icus insipida</i>), zapote oningo (<i>Mammea americana</i>) and guazimo (<i>Guazuma ulmifolia</i>)	Mangrove.	Secretaría de Medio Ambiente
Cerro de la Galaxia	12-02-91	Ecological Conservation	Veracruz	Banderilla	Pepinque (<i>Carpinus carolinense</i>) Oak (<i>Quercus xalapensis</i>), Liquidambar (<i>Liquidambar macrophylla</i>), Haya (<i>Platanus mexicana</i>), Marangola (<i>Clethra macrophylla</i>) and Jinicuil (<i>Inga jinicuil</i>)	Cloud forest.	Secretaría de Medio Ambiente
Cerro de las Culebras	05-05-92	Ecological Reserve	Veracruz	Coatepec	Jinicuil (<i>Inga jinicuil</i>), Chalahuile (<i>Inga spuria</i>), Oaks (<i>Quercus</i> sp.), Chinini (<i>Persea schiedeana</i>), Avocado (<i>Persea</i> sp.), Ixpepe (<i>Threma micrantha</i>), Jazmincillo (<i>dononema callystachium</i>), higuierilla (<i>Ricinus communis</i>), balsamina (<i>Impatiens balsamina</i>) y bromelia (<i>Tillandsia</i> sp.)	Cloud forest.	Secretaría de Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Ciénega del Fuerte	26-11-99	Ecological Conservation	Veracruz	Tecolutla	apampo (Pachira acutifolia), pochoia (Ceiba pentandra), capulin (Pithecellobium sp.), tronadora (Chiococa alba), Bay (eclandria sp.), hongos lignícolas (Cullybia sp.), Red Mangrove (Rhizophora mangle), Prieto Mangrove (Avicennia germinans), White mangrove (Avicennia nitida), mangle botoncillo (Conocarpus erecta), popal (Thalia geniculata), tule (Ponederia sagittata), lirio acuático (Eichornia crassipes), nenúfar (Nymphaea ampla), lechuga de agua (Pistia stratiotes), lenteja de agua (Lemna ae uinostialis).	Flooded jungle, deciduous forest, medium jungle, mangrove	Secretaría de Medio Ambiente
El Tejar Garrica	23-09-86	Ecological Protection Zone	Veracruz	Xalapa	zazamora (Mimosa albida), orozuz (Lantana camara), pesma (Pteridium a uilium) and cola de venado (Anaropogan bicornis), sangregado (Croton draco), palo gusano (Lippia myrocephala), jonole (eliocarpus appendiculatus), ixpepe (Trema micrantha), huizache (Acacia pennatula), higuierilla (Ricinus communis), cornizuelo (Acacia cornigera) and mala mujer (Cnidioscolus multilobus)	Cloud forest.	Secretaría de Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Francisco Javier Clavijero	27-12-75	Urban Park	Veracruz	Xalapa	Oak (<i>Quercus</i> sp.), jonote (<i>Eliocarpus domel</i>), haya (<i>Platanus mexicana</i>), Ash (<i>Raxinus undei</i>), liquidambar (<i>Liquidambar macrophilla</i>), palo gusano (<i>Lyppia myriocephala</i>), pepinque (<i>Carpinus carolinianus</i>), marangola (<i>Clethra mexicana</i>), siete hojas (<i>Reopanax xalapensis</i>), huizache (<i>Acacia pennatula</i>), gordolobo (<i>Bocconia frutescens</i>) y tree fern (<i>Ephelea mexicana</i>).	Cloud forest, riparian vegetation, fallow and grassland.	Secretaría de Medio Ambiente
Isla del Amor	04-Feb-97	Ecological Conservation y Valor Escénico	Veracruz	Alvarado	<i>Candivalia rosae</i> , rintonina <i>pomea stolonifera</i> y <i>pescaprae</i> , <i>Chamaecrista chamaecristoides</i> y <i>almond Terminalia catapa</i> . También se observan acacias and Relict of white mangrove <i>Laguncularia racemosa</i>	Successional vegetation.	Secretaría de Medio Ambiente
Medano del Perro	27-11-86	Ecological Park	Veracruz	Veracruz	Guinea grass (<i>Panicum maximum</i>) and uganda grass (<i>Pennisetum purpureum</i>)	Coastal dunes.	Secretaría de Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Molino de San Roque	23-09-86	Environmental Conservation and Improvement	Veracruz	Xalapa	encino (<i>Quercus xalapensis</i>);	Bosque Mesofilo de	Secretaría de Medio Ambiente
Pacho Nuevo	29-08-91	Ecological Reserve	Veracruz	Emiliano Zapata	chalahuite (<i>Inga spuria</i>), coffee (<i>Coffea arabica</i>), jinicuil (<i>Inga jinicuil</i>), banana tree (<i>Musa paradisiaca</i>), orange tree (<i>Citrus aurantium</i>), acuyo (<i>Piper auritum</i>), mala mujer (<i>Chidoscolus multibolus</i>), gordolobo (<i>Boconia frutescens</i>), guava (<i>Psidium guajava</i>), enramador (<i>Trichinia havanensis</i>), huizache (<i>Acacia farnesiana</i>) and gasparillo (<i>Erithrina americana</i>)	Cloud forest.	Secretaría de Medio Ambiente
Ecological Park Macuiltepetl	28-11-78	Ecological Recreation and Education	Veracruz	Xalapa	Oak (<i>Quercus xalapensis</i>), liquidambar (<i>Liquidambar styraciflua</i>), magnolia (<i>Magnolia shiedeana</i>), avocado (<i>Persea americana</i>), chirimoya (<i>Annona cherimola</i>), marangola (<i>Clethra macrophylla</i>), jacaranda (<i>Acacia mimosifolia</i>), ulmus (<i>Ulmus mexicanus</i>), pepinque (<i>Carpinus caroliniana</i>), croton (<i>Croton draco</i>) y ellocarpus (<i>Ellocarpus alatus</i>)	Cloud forest.	Secretaría de Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Predio Barragán	30-10-80	Ecological Education	Veracruz	Xalapa	Coffea arabica, chialhuiltes, nga spuarias, jinicuil, nga jinicuil, nisperos, Eroboria japonica, banana tree, Musa paradisíaca, orange tree, Citrus sp. lime tree, Citrus limonia, guava, Psidium guajaba, bamboo, Bambusa sp.) and berenjena, Cythomandra, betaceae creepers (Thunbergia alata, T. Fragrans), maguey (Agave applandia), chirimoya (Annona cherimola), anturio (Anthurium scandens), aristobolquía (Aristolochia penlandra), asclepias (Asclepias angustifolia), palo cuchara (e. Atriplex arborea), amargoso (Taraxacum mexicanum), mozoale (Melampodium divaricatum), sequilandi (Senecio barba-johannis), begonia (Begonia sp.), achiole (Bixa orellana), pepinque (Carpinus carolinense), tronadora (Tecoma stans), oak (Tabebuia rosea), apompo (Pachira a. uatica), bromelias (Aechmea nudicaulis y Tillandsia dasytrifolia), paxille (Tillandsia usneoides), palo mulato (Bursea simaruba), chachacalo (Canna l. Alca), mangroves Rhizophorae, mangle, Laguncularia racemosa), quebra pilatos (pomoea spp.), rionina (pomoea pascaprae e stromifera), Oaks (Quercus sp.), liquidambar (Liquidambar macrophylla), cedar (Cedrella odorata), orchids (Campylocentrum micranthum), Encyclia sp., Epidendrum sp., Laelia ibicinis, Oncidium sphacelatum, and Maxillaria densa, Pinus (Pinus sp.), passion fruit (Passiflora sp.), beech tree (Platanus mexicana), willow (Salix taxifolia), ulmus (Ulmus mexicana) and cecadas (Ceraozamia mexicana and antú amta (oddigest).	Cloud forest.	Secretaría de Medio Ambiente
Rio Filobobos y su Entorno	11-08-92	Ecological Reserve	Veracruz	Tlapacoyan y Atzacán		Tropical evergreen forest.	Secretaría de Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Rio Pancho Poza	23-01-92	Ecological Reserve	Veracruz	Altotonga	Red Pine (Pinus patula), ilite (Alnus jorullensis) and Oak (Quercus sp.)	Pine Oak forest.	Secretaría de Medio Ambiente
San Juan del Monte	30-10-80	Ecological Education	Veracruz	Las Vigas de Ramirez	Ocotle Pinus teocote Pinus pseudostrobus Red Pine Pinus patula chamaite pine Pinus montezumae Pine acalocote Pinus ayacahuite ilite Alnus jorullensis y Oak Quercus sp	Pine Oak forest.	Secretaría de Medio Ambiente
Sierra de Otontepec	02-03-05	Ecological Reserve	Veracruz	Ixcatepec, Tepetzintla, Chontla, Citlaltepetl, Tanitma, Tancoco, Cerro Azul y Chicontepec	Oak Quercus oleoides Q sororia Q glaucescens Q peduncularis and Q. Affinis ramon Brosimum alicastrum cedar Cedrela odorata chicozapote Manilkara zapota palo mulato Bursera simaruba fern ephelia mexicanand zapote iospyros riojae and palm Chamaedora elegans	Oak forest, semievergreen forest.	Secretaría de Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Tatocapan	11-06-91	Ecological Reserve	Veracruz	Santiago Tuxtla	apompo (<i>Pachira a uatica</i>), amate (<i>icus sp.</i>), palo mulato forest, o chaca (<i>Bursera simaruba</i>), cocuite (<i>Piscidia piscipula</i>), tamán (<i>Gossypium barbadense</i>), oak (<i>Tabebuia rosea</i>), balsamo (<i>Myroxylon balsamum</i>), ojoche (<i>Brosimum alicastrum</i>), nacastle (<i>Enterolobium cyclocarpum</i>), cucharo (<i>Pithecolobium torium</i>), zapote mamey (<i>Calocarpum sapota</i>), ilama (<i>Annona purpurea</i>), crucela (<i>Randia watsoni</i>), palma camedor (<i>Chamaedorea sp.</i>), telephone (<i>Ceropegia woodii</i>), guarumbo (<i>Cecropia obusifolia</i>), mafafa (<i>anthosoma robustum</i>), mango (<i>Mangifera sp.</i>) and banana tree (<i>Musa paradisica</i>).	Semievergreen forest	Secretaría de Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
El Palmar*	23-01-90	State Reserve	Yucatán	Celestún, Humucmá	<p>Suriana maritima, Tournefortia gnaphalodes, Ermodea littoralis and berlandierian, Scaevola plumieri, Bravaisia akilis, Coccotheca uvifera, uva de mar, Cordia sebestena, andcathulla, Sideroxylon americanum, ac. unila macrocarpa, Caesalpinia vesicaria, Melopium brownei, chechem, Pithecellobium keyense, Laniand involucrata, Erihalis fruticosa, Cossyrium hispidum, Agave angustifolia, Rhozophora mangle, Avicennia geminatis, Conocarpus erectus, Laguncularia racemosa, Mamikara zapota, Icus spp, Swietenia macrophylla, Tabebuia rosea, Sabal yapa, Bravaisia berlandierian, Melopium brownei, Bursera simaruba, Pisonia aculeata y Acrostichum aureum, Byrsionima buccidaefolia and Crescentia cujate, Acoelohaphe wrighii, aematoxylum campechianum, Cameraria latifolia, Melopium brownei, Manikara zapota, Bursera simaruba, Calba aesculifolia, Cochlospermum vitifolium, Conocarpus erecta, albergia glabra, ac. uinea macrocarpa, Bravaisia berlandierian, elcietis baruenensis, Malva viscus arboreus, Guaiacum sanctum, Caesalpinia gaudieri, Acacia pennatulula, Melopium brownei, Gymnopodium floribundum, avaridia albicans, atropia gaudieri, eomilis paugha emarginata, Alvaradoa amorphoides, Sideroxylon obtusifolium, Mimosa bahamensis, Bauhinia divaricata, Caesalpinia yucatanensis, Guazuma umifolia, Calba aesculifolia, nospyrus cuneata, ampea triflobata, Plumiera obtusa, Pithecellobium dulce, Baucamea pilabilis and Izyphus yucatanensis</p>	Coastal dune vegetation, mangrove, seagrass, groups of hydrophytes, hillocks, cenoles and rejolladas vegetation, Savannas, low inundated forest, dry deciduous forest.	Secretaría de Desarrollo Urbano y Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Dzilam	25-01-89	Reserva Estatal	Yucatán	Dzilam de Bravo	<p>Suriana maritima, Tournefortia gnaphalodes, Eriosea littoralis and Scaevola plumieri, Bravaisia berlandieriana, Thuus, Thevetia peruviana, akilis, Coccoloba uvifera uva de mar, Cordia alliodora, andcathula, Sideroxylon americanum, ac. uhinia macrocarpa, Caesalpinia vestitaria, Meliponum browniei chechem, Pithecolobium keyense, Lantana involucrata, Eriosea fruticosa, Gossypium hirsutum, Agave angustifolia, Rhizophora mangle, Avicennia germinans, Conocarpus erectus, Laguncularia racemosa, Manikara zapota, Ilex spp, Swietenia macrophylla, Tabebuia rosea, Sabal yapa, Bravaisia berlandieriana, Meliponum browniei, Bursera simaruba, Plinia aculeata and Acrostichum aureum, Bysonima bucidifolia and Crescentia cujete, Acaecidnaphe virgillii, aematoxylum campechianum, Cameraria latifolia, Meliponum browniei, Manikara zapota, Bursera simaruba, Ceiba aescullifolia, Cochlospermum vitifolium, Conocarpus erecta, albergia glabra ac. uinea macrocarpa, Bravaisia berlandieriana, elictis, bauhinensis, Malvaviscus arboreus, Guaiacum sanctum, Caesalpinia gaumeri, Acacia pennatula, Meliponum browniei, Gymnopodium floribundum, avadita albicans, atropia gaumeri, comilspaugha emarginata, Alvaradoa amoriphoides, Sideroxylon obtusifolium, Mimosa bahamensis, Bauhinia divaricata, Caesalpinia yucatanensis, Guazuma ulmifolia, Ceiba aescullifolia, isopyros, cuneata, ampa, trilobata, Plumeria obtusa, Pithecolobium dulce, Bucarnea pilatilis and tzyprus yucatanensis</p>	Coastal dune vegetation, mangrove, seagrass, groups of hydrophytes, hillocks, cenotes and rejolladas vegetation, savannas, low inundated forest, deciduous thorny forest, deciduous forest.	Secretaría de Desarrollo Urbano y Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Área natural protegida	Decreto de creación	Categoría	Entidad Federativa	Municipios	Especies forestales relevantes	Ecosistemas	Instancia responsable
Kabah	4-Jun-93	Parque Estatal	Yucatán	Santa Elena	Chacah (<i>Bursera simaruba</i>), Kanché (<i>Phyllostylon brasilienis</i>), Chulul (<i>Apoplanesia paniculata</i>) Xuul (<i>Lonchocarpus xuul</i>), Akits (<i>Thevetia gaumeri</i>) y Ja'abin (<i>Piscidia piscipula</i>), Bacalché (<i>Bourreria pulcra</i>), Tsisilche (<i>Gimnopodium floribundum</i>) Box catzih (<i>Acacia gaumeri</i>) y Catzih (<i>Mimosa bahamensis</i>)	Selva Mediana Caducifolia	Secretaría de Desarrollo Urbano y Medio Ambiente
Lagunas de Yalahau	5-Jun-94	Parque Estatal	Yucatán	Homún, Tekit, Sotuta, Huhí	<i>Caesalpinia gaumeri</i> , <i>Bursera simaruba</i> , <i>avardia albicans</i> <i>Senna villosa</i> , <i>Lysiloma latisiliu</i> , <i>Guettarda elliptica</i> , <i>Piscidia piscipula</i> <i>Ceiba aescuifolia</i> <i>Caesalpinia gaumeri</i> <i>Enterolobium cyclocarpum</i> <i>Ceiba aescuifolia</i> , <i>Plumeria obtusa</i> , <i>Coccoloba spicata</i> <i>Simaruba glauca</i> , <i>itex gaumeri</i> , <i>Caesalpinia violacea</i> , <i>Casimiroa tetrameria</i> , <i>aematoxylum campechianum</i> , <i>albergia glabra</i> , <i>Mimosa bahamensis</i> <i>Typha domingensis</i> , <i>Cladium jamaicense</i> , <i>Phragmites australis</i>	Agrupaciones de Hidrofitas, Vegetación de Cenotes y Rejolladas, Selva Baja Inundable, Selva Baja Caducifolia	Secretaría de Desarrollo Urbano y Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Kabah	04-06-93	State Park	Yucatán	Santa Elena	Chacah (Bursera simaruba), Kanché (Phyllostylon brasiliensis), Chulul (Apoplanesia paniculata) Xuul (Lonchocarpus xuul), Akits (Thevetia gaumeri) and Jarabin (Piscidia piscipula), Bacalché (Bourreria pulcra), Tsitsiche (Gimnopodium floribundum) Box catzín (Acacia gaumeri) and Caizín (Mimosa bahamensis)	Deciduous forest.	Secretaría de Desarrollo Urbano y Medio Ambiente
Lagunas de Yalahau	05-06-94	State Park	Yucatán	Homún, Tekit, Sotuta, Huhí	Caesalpinia gaumeri Bursera simaruba avaritia albicans Senna villosa Lysiloma latisili uum Gueltarda elliptica Piscidia piscipula Ceiba aesculifolia Caesalpinia gaumeri Enterolobium cyclocarpum Ceiba aesculifolia Plumeria obtusa Cocoloba spicata Simaruba glauca itex gaumeri Caesalpinia violacea Casimiroa tetrameria aematolylum campechianum albergia glabra Mimosa bahamensis Typha domingensis Cladium jamaicense Phragmites australis	Groups of hydrophytes, cenotes and rejjolladas vegetation, inundated forest, deciduous forest.	Secretaría de Desarrollo Urbano y Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
State Reserve Biocultural del Puuc	01-11-11	State Reserve	Yucatán	Muna, Santa Elena, Oxkutzcab, Tekax y Ticul	Ceiba pentandra (L.) Gaether Ehretia limifolia L. Cordia dodecandra A. DC. Bursera simaruba (L.) Sarg. isopyros dygna ac. Lonchocarpus yucatanensis Lysiloma latifolia uum (L.) Benth Pflger. Acacia gumert Blake. Piscidia piscipula (L.) Sarg Pithecellobium albicans (Benth) Benth. Brosimum alicastrum Swartz Cedrela odorata Sabal Yapa C right ex Beccarii. Gymnopodium floribundum Rolfe. Talisia olivaeformis H.B.& K) Radlk Cuazuma umifolia Lam. Caesalpinia gaumeri Lysiloma latifolia uum Enterolobium cyclocarpum Mimosa bahamensis Spondias mombin Guazuma umifolia Piscidia piscipula Pithecellobium dulce Acacia cornigera Bursera simaruba illex gaumeri Gymnopodium floribundum	Deciduous forest, semideciduous forest, medium semievergreen forest, medium deciduous forest, medium semideciduous forest, savannah and hydrophytic elements.	Secretaría de Desarrollo Urbano y Medio Ambiente
Reserva Cuxtal	04-10-04	Zone is Subject to Ecological Conservation	Yucatán	Merida	Ceiba pentandra L. Gaether Ehretia limifolia L. Cordia dodecandra A. DC. Bursera simaruba L. Sarg. isopyros dygna Jacq. Lonchocarpus yucatanensis Lysiloma latifolia uum L. Benth Pflger. Acacia gumert Blake. Piscidia piscipula L. Sarg Pithecellobium albicans (Benth) Benth. Bros num alicastrum Swartz Cedrela odorata L. Sabal yapa C right ex Beccarii. Gymnopodium floribundum Rolfe. Talisia olivaeformis (H.B.& K) Radlk Cuazuma umifolia Lam	Savannah and deciduous forest.	Secretaría de Desarrollo Urbano y Medio Ambiente

Annex 6. Report of Protected Natural Areas at State Level. (Cont.)

Protected Natural Area	Creation Decree	Category	Federal Entity	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Ciénegas y Manglares de la Costa Norte de Yucatán	19-03-10	State Park	Yucatán	Hunucmá, Ucú, Progreso, Ixil, Motul, Dzemul, Telchac Puerto, Sinanché, Yobain, Dzidzantún y Dzilam de Bravo	Rhizophora mangle, Avicennia germinans, Laguncularia racemosa, Conocarpus erectus, Byrsonna crassifolia, Crescentia cujete, Manilkara zapota, Brosimum alicastrum, Thevetia sp, Plumeria rubra, Crescentia cujete, Conocarpus erectus, Bravaisia tubiflora, Annona glabra, Bucida buceras, Calophyllum brasiliense, Melopium brownii, aematoxylum campechianum, Thrinax radiata, Typha dominguenis, ymphaea ampla, Plumeria obtusa, Proulum copal, Gordia dodecandra, Guaiacum sanctum, Beaucarnea plicabilis, Bursera simaruba, Acacia gaumeri, Mimosa bahamensis, Selenicereus lestrado, Brosimum alicastrum, Ceiba aesculifolia, Enterolobium cyclocarpum	Deciduous forest, mangrove, coastal dunes.	Secretaría de Desarrollo Urbano y Medio Ambiente
La Quemada	07-03-01	State Park	Zacatecas	Villanueva	White oak	Oak trees, crasicaule scrub, thorny scrub.	INAH
Ruta Huichola	05-12-09	State Park	Zacatecas	Sustitacán, Jeréz, Zacatecas y Guadalupe	NA	NA	IEMAZ

Annex 7. Report of Protected Natural Areas at Municipal Level.

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Ecological Conservation Area and de interés a la comunidad la área conocida como estero Balandra	10-abr-08	Ecological Conservation Area of community interest	Baja California	La Paz	Rhizophora mangle Laguncularia racemosa and Avicennia germinans	Mangrove	H. Ayuntamiento de La Paz
Ecological Reserve Sierra y Cañón de Jimulco	28-Jun-03	Natural Reserve	Coahuila	Torreón			Blodeset, A.C.
Cuenca de la Esperanza	6-Mar-98		Guanajuato	Guanajuato	Quercus spp	Oak Forest	
Pinal del Zamorano	6-Jun-00		Guanajuato	Tierra Blanca, San José Iturbide	Abies religiosa Pinus cembroides Quercus spp	Thorny scrub, Deciduous lowland forest, Oak forest, Stone Pine forest, Fir Forest	
Presa de Silva	02-dic-97		Guanajuato	Purísima del Rincón, San Francisco del Rincón		Desert scrub	

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Sierra de Lobos	4-Nov-07		Guanajuato	León, Ocampo y San Felipe		Oak Forest, Oak-Pine Forest, Creosote bush, Thornless and Thorny Scrub	
Peña Alta	02-dic-97		Guanajuato	San Diego de la Unión		Stone Pine Forest, Oak Forest, Pine, Thorny scrub and Crasicaule	
Cuanca Alta del Río Temascalillo	6-Jun-00		Guanajuato	Salamanca, Santa Cruz de Juventino Rosas		Oak Forest, Mezquital, Creosote bush, Scrub Subtropical and Crasicaule scrub where a type of barrel cactus is distributed and threatened.	
Mega Parque	16-dic-97		Guanajuato	Dolores Hidalgo	mezquite, huizache, nopal cardón, nopal cujo and garambullo	Thorny Scrub	
Las Fuentes	26-Oct-99		Guanajuato	Juventino Rosas			

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Parque Metropolitano	19-Sep-00		Guanajuato	Leon	Prosopis sp	Scrub, highlighting mezquite	
Siete Luminarias	21-Nov-97		Guanajuato	Valle de Santiago		Tropical Deciduous Forest	
Lago-Crater La Joya	23-Feb-01		Guanajuato	Yurira		Lakeside and Riparian Vegetation	
El Culiacan y La Gavia	30-Jul-02		Guanajuato	Celaya, Cortazar, Jaral del Progreso y Salvatierra		Oak Forest, Deciduous Lowland Forest and Crasicaule Bush	
Las Musas	30-Jul-02		Guanajuato	Manuel Doblado			
Sierra de los Agustinos	17-Sep-02		Guanajuato	Acambato, Jerecuaro, Tarimoro		Oak Forest Pine	
Laguna de Yuriria	19-Oct-01		Guanajuato	Yurira			
Cerro del Cubilete	18-Nov-03		Guanajuato	Silao, Guanajuato	Quercus rugosa Q obtusata Q mexicana Q Crassifolia Q castanea Q laurina Q grisea	Oak Forest	
Cerro de Los Amoles	7-May-04		Guanajuato	Yurira, Moreleón		Oak Forest	

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Presa La Purisima	25-Nov-05		Guanajuato	Guanajuato			
Cerro Los Arandas	25-Nov-05		Guanajuato	Irapuato	Copal	Tropical Deciduous Forest	
Presa de Neutra	15-Sep-06		Guanajuato	Comonfort		Lowland Thorny Scrub	
Cuenca de La Soledad Mixquiapan	18-ago-06		Guanajuato	Guanajuato		Oak Forest	
	31-Oct-03	Ecological Preservation Area	Hidalgo	Acatlán		Oak Forest	Ejido y SEMARNATH
La Lagunilla	12-abr-04	Ecological Preservation Area	Hidalgo	Singuilucan		Oak Forest	Ejido y SEMARNATH
El Campanario	26-abr-04	Ecological Preservation Area	Hidalgo	Cuatepec de Hinojosa	Pinus spp	Oak Forest and Pine Forest	Ejido y SEMARNATH
Cascada de Cuatenahuait	06-dic-04	Ecological Preservation Area	Hidalgo	Huautla		Rainforest	Ejido y SEMARNATH
Cerro El Aguacatillo	13-dic-04	Ecological Preservation Area	Hidalgo	Chapulhuacan	albergia paloescrito	Mesophyll Forest	Presidencia Municipal y SEMARNATH
Cerro La Paila-El Susto	31-ene-05	Ecological Preservation Area	Hidalgo	Singuilucan	Pinus spp.	Oak Forest and Pine Forest	Ejido y SEMARNATH

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Cerro La Paila-Matías Rodríguez	13-Jun-05	Ecological Preservation Area	Hidalgo	Singuilucan	Pinus spp.	Oak Forest and Pine Forest	Ejido y SEMARNATH
Cerro Nopala y La Estancia	05-dic-05	Ecological Preservation Area	Hidalgo	Nopala de Villagran		Oak Forest and Grassland	Ejido y SEMARNATH
Alcantarillas	05-ene-09	Ecological Preservation Area	Hidalgo	Apan	Pinus spp.	Oak Forest and Pine Forest	Ejido y SEMARNATH
Cocinillas	05-ene-09	Ecological Preservation Area	Hidalgo	Apan		Oak Forest and Juniper	Ejido y SEMARNATH
La Gloria	05-ene-09	Ecological Preservation Area	Hidalgo	Apan	Pinus spp.	Oak Forest and Pine Forest	Proprietarios y SEMARNATH
Tezoyo	05-ene-09	Ecological Preservation Area	Hidalgo	Apan		Oak Forest and Juniper	Ejido y SEMARNATH
Coatlaco	05-ene-09	Ecological Preservation Area	Hidalgo	Almoloya	Pinus spp.	Pine Forest and Oak Forest	Ejido y SEMARNATH
Rancho Nuevo	05-ene-09	Ecological Preservation Area	Hidalgo	Almoloya	Pinus spp.	Pine Forest and Oak Forest	Ejido y SEMARNATH
San Mateo Tlajomulco	05-ene-09	Ecological Preservation Area	Hidalgo	Singuilucan	Pinus spp.	Pine Forest and Oak Forest	Ejido y SEMARNATH

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Matías Rodríguez	05-ene-09	Ecological Preservation Area	Hidalgo	Tepeapulco	Pinus spp.	Oak Forest and Pine Forest	Ejido y SEMARNATH
Bondojito	05-ene-09	Ecological Preservation Area	Hidalgo	Huichapan		Desert scrub	Ejido y SEMARNATH
Dandhó	05-ene-09	Ecological Preservation Area	Hidalgo	Huichapan		Desert scrub	Ejido y SEMARNATH
Dothi	7-Jun-07	Ecological Preservation Area	Hidalgo	Huichapan		Desert scrub	Ejido y SEMARNATH
Mamithi	7-Jun-07	Ecological Preservation Area	Hidalgo	Huichapan		Desert scrub	Ejido y SEMARNATH
Zóthe	7-Jun-07	Ecological Preservation Area	Hidalgo	Huichapan		Desert scrub	Ejido y SEMARNATH
La Cañada Huixcazhdha	7-Jun-07	Ecological Preservation Area	Hidalgo	Huichapan		Desert scrub	Propietario y SEMARNATH
Rancho Huixcazhdha	7-Jun-07	Ecological Preservation Area	Hidalgo	Huichapan		Desert scrub	Propietario y SEMARNATH

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
La Laguna	7-Jun-07	Ecological Preservation Area	Hidalgo	Huichapan		Desert scrub	Propietario y SEMARNATH
Rancho Nāthu	7-Jun-07	Ecological Preservation Area	Hidalgo	Huichapan		Desert scrub	Propietario y SEMARNATH
Arroyo Nogales	13-Jun-08	Ecological Preservation Area	Hidalgo	Atotonilco El Grande		Desert scrub	Ejido y SEMARNATH
Cruz de Plata	13-Jun-08	Ecological Preservation Area	Hidalgo	Atotonilco El Grande		Desert scrub	Ejido y SEMARNATH
Plan Grande	15-Nov-08	Ecological Preservation Area	Hidalgo	Zacatlipan de Angeles	Pinus spp.	Mesophyll forest	Ejido y SEMARNATH
Zacatepec	04-dic-08	Ecological Preservation Area	Hidalgo	Calnali		Mesophyll forest	Ejido y SEMARNATH
Pirāmidēs de Ecuatitla	04-dic-08	Ecological Preservation Area	Hidalgo	Huejutla		Rainforest	Ejido y SEMARNATH
Asthar	08-ene-09	Ecological Preservation Area	Hidalgo	Chicuautila		Desert scrub	Propietarios y SEMARNATH

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Chicamole	1-Feb-09	Ecological Preservation Area	Hidalgo	San Bartolo Tutotepec	Pinus spp.	Mesophyll forest	Ejido y SEMARNATH
Rancho Golondrinas	1-Sep-09	Ecological Preservation Area	Hidalgo	Almoloya		Juniper forest	Propietario y SEMARNATH
El Sabino	8-Sep-11	Ecological Preservation Area	Hidalgo	Tepetitlan		Desert scrub	Ejido y SEMARNATH
Estero El Salado	27-Sep-00	Ecological Conservation Area	Jalisco	Puerto Vallarta	Gromphrena n tida Trianthema portulacastrum Asclepias curassavica Batis mar tima eliotropum curassavicum eliotropum indicum Bursera arb rea Crataevia lapia Laguncularia racemosa Melaluthera nivea Plucheasymphylifolia Pseudoconiza viscosa Merremia umbellata ydtrolea sPrinesa Acacia farnesiland	Medium semi-deciduous forest, Mangrove, Thorny Forest, Grassland, Aquatic and subaquatic vegetation	Municipio de Puerto Vallarta

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Estero El Salado	27-Sep-00	Ecological Conservation Area	Jalisco	Puerto Vallarta	<p>Acacia hindii Enterolobium cyclocarpum, Mimosa pigra, Pterocarpium lancoelatum, Prosopis julliflora, Acacia macrantha Pterocarpium dulce Sida rhombifolia Trichilia trifolia, icus citrifolia, icus insipida icus padifolia Ludwigia octavalis Portulaca oleracea Rhizophora mangle Salix humboldtland Solanum ferrugineum Solanum tampececense Solanum sp, Guazuma ulmifolia, ualtheria indica, Avicennia germinans, Lantand c. mara, Pistia stratiotes, Asclepias curassavica, Cyperus sp, Sporobolus splendens, Acrocomia mexicana, rbygnya guacuyule, Eichhornia crassipes, Typha domingensis</p>	Medium semi-deciduous forest, Mangrove, Thorny Forest, Grassland, Aquatic and subaquatic vegetation	Municipio de Puerto Vallarta

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Barranca del Río Santiago	7-Oct-04	Área Municipal de Protección Hidrológica	Jalisco	Zapopan	Cheilanthes aurantia Coreopsis cyclocarpa Cosmos landii Liabum angustissimum Trixis hyposericea Asplenium pringlei Cheilanthes palmeri Bidens cordylocarpa echita jaliscand echita pedicellata Pitcairnia karwinskand Crotalaria mexicand alea versicolor var nvoluta esmodium skinneri var curtum Cologania jaliscand Mimosa minutifolia Schrankia jaliscensis Cheilanthes pallens Cheilanthes grayi Cheilanthes longipila Agave guadalajarensis Guardiola mexicand Etocaulon jaliscanum Acacia	Tropical Deciduous Forest, Oak Forestand Rocky Vegetation	Municipio de Zapopan

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Barranca del Río Santiago	7-Oct-04	Área Municipal de Protección Hidrológica	Jalisco	Zapopan	<i>villaregalis abenaria trida Andropogon pringlei</i>	Tropical Deciduous Forest, Oak Forest and Rocky Vegetation	Municipio de Zapopan
Piedras Bolas	24-Feb-07	Formación Natural de Interés Municipal	Jalisco	Ahualulco del Mercado	ND	Thorny Forest, Tropical Deciduous Forest, Quercus Forest (Oaks and oak), mixed Quercus forest (pine or pitch pine) and Gallery Forest	Municipio de Ahualulco del Mercado
Bosque El Nixticuil-San Esteban-EI Diente	24-Feb-07	Área Municipal de Protección Hidrológica	Jalisco	Zapopan	<i>Taxodium mucronatum Pinus devoniana Pinus oocarpa Selaginella lepidophyll E. uisetum Iyemal Spondias purpurea Annona longiflora Tecoma stans Ceiba aescullifolia</i>	Tropical Deciduous Forest, Encinar, Oak Forest with Grassland, Pine Forest, Gallery Forest, Natural Induced Grassland and Secondary Vegetation	Municipio de Zapopan

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Bosque El Nixticuil-San Esteban-EI Diente	24-Feb-07	Área Municipal de Protección Hidrológica	Jalisco	Zapopan	Pseudobombax palmeri, Bursera copallifera, Bursera fagaroides, Euphorbia dioscorioides, Euphorbia graminea, Euphorbia heterophylla, Euphorbia ocymoidea, Quercus castanea, Quercus laela, Quercus magnoliifolia, Quercus resinosa, Acacia farnesiana, Acacia pennatula, Eysenhardtia polystachya, ndigofera densiflora, ndigofera jaliscensis, Leucaena macrophylla, Lysitoma acapulcense, Pithecellobium dulce, Prosopis laevigata, Salix bonplandiana, Salix taxifolia, Guazuma ulmifolia	Tropical Deciduous Forest, Encinar, Oak Forest with Grassland, Pine Forest, Gallery Forest, Natural Induced Grassland and Secondary Vegetation	Municipio de Zapopan

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Bosque Los Colomos	26-Jun-07	Área Municipal de Protección Hidrológica	Jalisco	Guadalajara	Begonia angustifolia Begonia tapata Bleia campanulata Bleia greenmaniana abenaria Aristolochia pringlei Aristolochia bracteosa Malaxis Spiranthes Stenorhynchos Taxodium mucronatum Tillandsia dasyphylla Liatris Moussonia elegans Lemna aff ae. uinocialis Bessera elegans Cyperus fibrata Clethra rosei Prosopis laevigata Bocconia	Pine Forest and Oak Forest, Thorny Forest, Gallery Forest, Tular, Floating Vegetation and Submerged Vegetation	Municipio de Guadalajara

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
La Calera	14-Sep-10	Ecological Preservation Area Municipal	Puebla	Puebla	Oak	Oak Forest	Secretaría del Medio Ambiente y Servicios Públicos del Municipio de Puebla
Parque del Centenario Laguna de Chapulco	14-Sep-10	Ecological Preservation Area Municipal	Puebla	Puebla	Silver Poplar, Willow, bald Cypress, Ash	Introduced, Aquatic vegetation	Secretaría del Medio Ambiente y Servicios Públicos del Municipio de Puebla
Barranca de Tiapacoyan	11-Nov-10		Puebla	Puebla	Acacia, Poplar	Native vegetation	Secretaría del Medio Ambiente y Servicios Públicos del Municipio de Puebla
Zona Occidental de Microcuencas	30-ago-06	Zone is Subject to Ecological Conservation	Querétaro	Querétaro	Conserved Oak Forest. 226 reported species of flora, 4 are included in NOM-059-SEMARNAT-2001	Tropical Deciduous Forest, Desert Scrub Srascaule, Oak Forest, Submontane Scrub	Mpto. de Querétaro

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Jurica Poniente	25-Sep-06	Ecological Preservation Area de Centros de Población con subcategoría de Parque Intraurbano	Querétaro	Querétaro	13 Flora species reported	Tropical Deciduous Forest, Desert Scrub Crasicaule	Mpio. de Querétaro
Cañada Juriquilla	19-May-09	Ecological Preservation Area de Centros de Población con subcategoría de Parque Intraurbano	Querétaro	Querétaro	22 species of flora have been reported from which 2 are at risk	Tropical Deciduous Forest	Mpio. de Querétaro
Laguna La Vega Escondida	12-Sep-03	Zona Especial sujeta a Ecológica Conservation	Tamaulipas	Tampico	Rhizophora mangle Typha sp ymphaea sp	Wetland	Municipio
Jardín Botánico Tizatlán	25-Mar-92	Area Subject to Ecological Reserve y UMA	Tlaxcala	Tlaxcala	Alnus cordata resnus uhdei	Galley Vegetation	Coordinación Estatal de Ecología
Ecological Park Público Diego Muñoz Camargo (La Cueva)"	5-Oct-98	Area Subject to Ecological Reserve	Tlaxcala	Apetatitlán	Alnus cordata resnus uhdei	Galley Vegetation	Coordinación Estatal de Ecología

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Teometitla	13-ago-97	Area Subject to Ecological Reserve	Tlaxcala	Terrenate	uniperus depeana	Juniper Forest	Coordinación Estatal de Ecología
Pitzocales	12-Nov-02	Area Subject to Ecological Reserve	Tlaxcala	Tella de Solidaridad	uniperus depeana	Juniper Forest	Coordinación Estatal de Ecología
Santuario del Loro Huasteco	17-Nov-99	Ecological Conservation	Veracruz	Pánuco	ramón (Brosimum alicastrum), amate or higuer (Ficus tecolutensis), guásima (Guasuma ulmifolia), palo mulato (Bursera simaruba), palma real (Scheelea liebmanni), mahogany (Phitecelobium arboreum), palma apache (Sabal mexicana), cornizuelo (Acacia cornijera), copite (Cordia dodecandra), jicaro (Crescentia cujete), chijol	Semi-Evergreen Forest	Municipio de Panuco

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Santuario del Loro Huasteco	17-Nov-99	Ecological Conservation	Veracruz	Pánuco	<p>Piscidia piscipula oak Tabebuia rosea agave Agave sp nopal opalea sp hule Castilla el stica ventosidad Croton nitens nogalillo uelania guidonia tule Typha domingensis guandacaste Enterobium ciciocarpum card n Bromelia sp palo gusano Lipia miriocephala rama linaja Trichilia havanesis matatena Thevetia thevetiodes guaje Leucaena glauca guava Psidium guajava uiebrahacha Acacia unijuga coculte Gliricidia septium</p>	Semi-Evergreen Forest	Municipio de Panuco

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Zone is Subject to Ecological Conservation "Reserva Cuxtal"	13-Jun-29	Zone is Subject to Ecological Conservation	Yucatán	Mérida	<p>Ceiba pentandra L Gaether Ehretia tinifolia L Cordia dodecandra A C Bursera simaruba L Sarg iospyros dygna ac Lonchocarpus yucatanensis Lysiloma latisili uum L BenthPitter Acacia gumeri Blake Piscidia piscipula L Sarg Pithecellobium albicans Benth Benth Bros mun alicastrum Swartz Cedrela odorata L Sabal yapa C right ex Beccarii Gymnopodium floribu - Aum Rolfe Talisia olivaeformis B Radlk Cuazuma ulmifolia Lam</p>	Savannah, and Deciduous Lowland Forest	

Annex 7. Report of Protected Natural Areas at Municipal Level. (Cont.)

Protected Natural Area	Creation Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
El Cedral	7-Mar-01	State Park	Zacatecas	Cd. Cuauhtémoc	Cedar	Quercus Forest, uniperus Forest, Thorny Scrub Grasslands	Municipio

Annex 8. Report of Private Protected Natural Areas.

Protected natural area	Establishment Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Área de Protección de Águila Real del Cerro de Juan el Grande	07-dic-06	Conservation area	Aguascalientes	El Llano	<i>Quercus potosina</i> , <i>Q. grisea</i> , <i>Prosopis laevigata</i> ; <i>Forestiera tomentosa</i> ; <i>Acacia farnesiana</i> ; <i>Schinus molle</i>	Oak, Thorny scrub	Private
La Ciénega	6-Jul-94	Area Subject to Ecological Reserve	Tlaxcala	Apizaco	<i>Salix babylonica</i>	Gallery Vegetation	Private
Santa Clara el Corte	ND	Area Subject to Ecological Reserve	Tlaxcala	Nanacamilpa de Mariano Arista	<i>Pinus pseudostrobus</i> , <i>Quercus rugosa</i>	Oak Pine Forest	Private
Santa Clara el Corte	ND	Area Subject to Ecological Reserve	Tlaxcala	Nanacamilpa de Mariano Arista	<i>Pinus pseudostrobus</i> , <i>Quercus rugosa</i>	Oak Pine Forest	Private
Santa Clara el Corte	ND	Area Subject to Ecological Reserve	Tlaxcala	Nanacamilpa de Mariano Arista	<i>Pinus pseudostrobus</i> , <i>Quercus rugosa</i>	Oak Pine Forest	Private
El Pilon	ND	Area Subject to Ecological Reserve	Tlaxcala	Tlaxco	<i>Pinus patula</i> , <i>Pinus ayacahuite</i>	Pine Forest	Private
Fracción II San Isidro Rancho Nuevo	ND	Area Subject to Ecological Reserve	Tlaxcala	Tlaxco	<i>Pinus patula</i> , <i>Pinus ayacahuite</i> , <i>Pinus rudis</i>	Pine Forest	Private
Fracción IV en que se dividió la Fracción I de la Hacienda Tlacotla, lote 4	ND	Area Subject to Ecological Reserve	Tlaxcala	Tlaxco	<i>Pinus patula</i> , <i>Pinus ayacahuite</i> , <i>Pinus rudis</i>	Pine Forest	Private

Annex 8. Report of Private Protected Natural Areas. (Cont.)

Protected natural area	Establishment Decree	Category	State	Municipalities	Relevant Forest Species	Ecosystems	Responsible Body
Fracción IV en que se dividió la Fracción I de la Hacienda Tlacotla, lote 6	ND	Area Subject to Ecological Reserve	Tlaxcala	Tlaxco	<i>Pinus patula</i> , <i>Pinus ayacahuite</i> , <i>Pinus rudis</i>	Pine Forest	Private
Fracción I de la Ex Hacienda Tlacotla "Rancho el Pardo"	ND	Area Subject to Ecological Reserve	Tlaxcala	Tlaxco	<i>Pinus patula</i> , <i>Pinus ayacahuite</i> , <i>Pinus rudis</i>	Pine Forest	Private
Segunda fracción del predio "Rancho Nuevo" y resto del predio "Tlacota II"	ND	Area Subject to Ecological Reserve	Tlaxcala	Tlaxco	<i>Pinus patula</i> , <i>Pinus ayacahuite</i> , <i>Pinus rudis</i>	Pine Forest	Private
Fracción I de San Jose "El Manantial"	ND	Area Subject to Ecological Reserve	Tlaxcala	Tlaxco	<i>Pinus patula</i>	Pine Forest	Private
Conjunto Predial el Tecajete, Las Águilas y Santo Tomás	ND	Area Subject to Ecological Reserve	Tlaxcala	Altzayanca	<i>Pinus pseudostrobus</i> , <i>Juniperus deppeana</i>	Pine Forest	Private

Annex 9. Forest Germplasm Production Units registered by CONAFOR.

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Impulsora Forestal Sta. Eduwiges S.P.R. de R.L.	Baja California	Prosopis glandulosa	N/A	Lote No. 4, Colonia Alvarado, Mexicali	15		1	
Ejido Sierra de Juárez. Presidente del Comisariado Ejidal	Baja California	Pinus jeffreyi	Predio Las Cuevitas,	Ejido Sierra de Juárez. Ensenada	15			1
Ejido Francisco R. Serrano. Presidente del Comisariado Ejidal	Baja California	Quercus schmidgera	Paraje La Canoa	Ejido Francisco R. Serrano (San Matías). Ensenada	15		1	
Ejido Eréndira. Presidente del Comisariado Ejidal	Baja California	Pinus muricata	Predio Las Pinhas	Ejido Eréndira. Ensenada	7		1	
C. Rogelio Parra Mora.	Baja California	Pinus uadrifolia	Potrero de Marcos, Rancho Parra,	Ejido Sierra de Juárez. Ensenada	100			1
Ejido. Heroes del Desierto. Presidente del Comisariado Ejidal	Baja California	Prosopis juliflora	Parcela Escolar	Ejido Heroes del Desierto, Poblado El Testarazo. Tecate	19.9		1	
Ejido Sierra de Juárez. Presidente del Comisariado Ejidal	Baja California	Calceotropis decurrens	Rancho El Alacrán	Ejido Sierra de Juárez. Ensenada	20			1
C. Ricardo Meza Duarte	Baja California Sur	Tecoma stans	San José del Rancho,	Delegación de San Antonio, Municipio de La Paz.	3		1	
C. Felix Avilés Domínguez	Baja California Sur	Lysiloma divaricata	NI	Santa Gertrudis, Delegación de Todos Santos, Municipio de La Paz	3		1	
C. Bernardino Mendoza Murillo	Baja California Sur	Ineya tesota	NI	San Francisco, Delegación de Los Dolores, Municipio de La Paz.	3			1
C. Enrique Martínez Hernández	Baja California Sur	Prosopis palmeri	NI	Domicilio conocido, María Auxiliadora, Municipio de Comondú	3		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
C. Isaac Ortega Geraldo	Baja California Sur	Cercidium floridum	NI	Ejido El Rosario, Delegación de San Antonio, Municipio de La Paz	3		1	
Ejido Matamoros. Presidente del Comisariado Ejidal	Campeche	Cedrela odorata	NI	Ejido Matamoros Escárcega	250			1
Ejido Nuevo Becal. Presidente del Comisariado Ejidal	Campeche	Swietenia macrophylla	NI	Ejido Nuevo Becal, Calakmul,	200		1	
Ejido 20 de Noviembre. Presidente del Comisariado Ejidal	Campeche	Swietenia macrophylla	NI	Ejido 20 De Noviembre, Calakmul,	200		1	
Ejido Miguel Colorado. Presidente del Comisariado Ejidal	Campeche	Cedrela odorata	NI	Ejido Miguel Colorado, Champotón,	200			1
Ejido Matamoros. Presidente del Comisariado Ejidal	Campeche	Acrocarpus fraxinifolius	NI	Frac. de Tierras de Uso Común, Ejido Matamoros, Escárcega,	1		1	
José del Carmen Chi Chan	Campeche	Swietenia macrophylla	NI	Predio San José Yohaltún, Hecelchakan,	0.529		1	
Martin Castillo López	Campeche	Gualiacum sanctum	NI	Ejido Pich, Campeche,	10.85			1
Ejido Mitziton. Presidente del Comisariado Ejidal	Chiapas	Pinus ayacahuite	NI	Mitzitón (Camino al Chivero). Domicilio Conocido. Ejido Mitziton, Ejido Mitziton del Municipio de San Cristobal de las Casas,	9		1	
Ejido Mitziton. Presidente del Comisariado Ejidal	Chiapas	Pinus oocarpa var ochoterenae y Pinus oaxacana	NI	Mitzitón (Camino al Cerezo). Domicilio Conocido. Ejido Mitziton del Municipio de San Cristobal de las Casas,	11		1	
Ejido Tres Picos. Presidente del Comisariado Ejidal	Chiapas	Pinus oocarpa	NI	Ejido Tres Picos. Domicilio Conocido. Ejido Tres Picos del Municipio de Villaflores,	5.5		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido Villahermosa. Presidente del Comisariado Ejidal	Chiapas	Pinus oocarpa	NI	Ejido Villahermosa. Domicilio Conocido, Ejido Villahermosa del	12		1	
Ejido Nueva Independencia. Presidente del Comisariado Ejidal	Chiapas	Pinus chiapensis	NI	Ejido Nueva Independencia. Domicilio Conocido, Ejido Nueva Independencia del Municipio de Villaflores.	3.8			1
Ejido Sierra Morena. Presidente del Comisariado Ejidal	Chiapas	Chamaedorea pinnatifrons	NI	Ejido Sierra Morena. Domicilio Conocido, Ejido Sierra Morena del Municipio de Villacorzo.	30			1
Ejido Capitán Luis A. Vidal. Presidente del Comisariado Ejidal	Chiapas	Chamaedorea uezalteca	NI	Ejido Capitán Luis A. Vidal. Domicilio Conocido, Ejido Capitán Luis A. Vidal del Municipio de Siltepec.	1.21			1
Ejido Coapilla. Presidente del Comisariado Ejidal	Chiapas	Pinus chiapensis	NI	Ejido Coapilla. Domicilio conocido Ejido Coapilla del Municipio de Coapilla.	1.55			1
Ejido Coapilla. Presidente del Comisariado Ejidal	Chiapas	Pinus maximinoi	NI	Ejido Coapilla. Domicilio conocido Ejido Coapilla del Municipio de Coapilla.	35.9		1	
Ranchería Plan de la Reyna, Propietario: Lorenzo Ruiz Ruiz	Chiapas	Swietenia macrophylla	NI	Plan de la Reyna. Domicilio conocido Ranchería Plan de la Reyna del Municipio de Ocozacoautla de Espinosa.	70		1	
Ranchería Guadalupe. Propietario: Sergio Gerardo Cerda Ocaranza	Chiapas	Tabebuia donnell-smithii	NI	Guadalupe. Domicilio conocido Ranchería Guadalupe del Municipio de Tapachula.	113		1	
Ejido El Rodeo. Presidente del Comisariado Ejidal	Chiapas	Abies guatemalensis	NI	Ejido El Rodeo. Domicilio conocido Ejido El Rodeo del Municipio de Siltepec.	8.92			1

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido Abelardo R. Rodríguez. Presidente del Comisariado Ejidal	Chiapas	Pinus oaxacana	NI	Municipio Comitán de Dominquez	8.8		1	
San Isidro. Efraín López Martínez	Chiapas	Swietenia macrophylla	NI	Municipio Marqués de Comillas	40.65		1	
La Corona. Soriano Gómez Ruiz	Chiapas	Swietenia macrophylla Brosimum alicastrum guyanense	NI	Municipio Marqués de Comillas	6.76		1	
Efraín A. Gutiérrez. Joseilmo Méndez Pérez	Chiapas	Pinus oaxacana	NI	Municipio Comitán de Dominquez	13.57		1	
Huehuetán. Daniel Alegría Arrazola	Chiapas	Tabebuia domnel-smithii	NI	Municipio de Huehuetán	25		1	
Ejido Motozintla. Presidente del Comisariado Ejidal	Chiapas	Pinus devoniana y P. oocarpa	NI	Municipio de Motozintla	5.11		1	
Ejido Manuel Velasco Suárez. Presidente del Comisariado Ejidal	Chiapas	Cedrela odorata	NI	Municipio de Ocozacoatlán	4.5		1	
Ejido Tapachulilla. Presidente del Comisariado Ejidal	Chiapas	Tabebuia rosea	NI	Municipio de Pijijiapan	3.2		1	
Finca Santa Ana. Secretaría de Medio Ambiente y Vivienda	Chiapas	Cedrela odorata	NI	Municipio de Pichucalco	1.11		1	
B.C. Rivera Elchachi. William Toledo Toala	Chiapas	Cedrela odorata	NI	Municipio de Venustiano Carranza	8.92		1	
Las Carolinas. Daniel Alegría Arrazola	Chiapas	Cedrela odorata	NI	Municipio de Tapachula	2.5		1	
Ejido Maha. Presidente del Comisariado Ejidal	Chiapas	Chamaedora ernestii-augustii	NI	Municipio de Ocosingo	2.6			1

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido Jitotol. Presidente del Comisariado Ejidal	Chiapas	Pinus tecumananii	NI	Municipio de Jitotol	13.9		1	
Ejido El Largo y Anexos. Presidente del Comisariado Ejidal	Chihuahua	Pinus engelmannii	NI	El Alto de Dolores, Domicilio Conocido, Ejido El Largo y Anexos, Madera,	16	1		
Ejido El Largo y Anexos. Presidente del Comisariado Ejidal	Chihuahua	Pinus arizonica	NI	El Cuatro, Domicilio Conocido, Ejido El Largo y Anexos, Madera,	12	1		
Ejido Madera. Presidente del Comisariado Ejidal	Chihuahua	Pinus arizonica	NI	Ing. Emilio Flores Calderon, Domicilio Conocido, Ejido Madera, Madera,	12	1		
Ejido Tutuaca. Presidente del Comisariado Ejidal	Chihuahua	Picea chihuahuana	NI	Chachamuris, Domicilio Conocido, Ejido Tutuaca, Paraje Piceas, Temosachic,	6			1
Ejido El Largo y Anexos. Presidente del Comisariado Ejidal	Chihuahua	Pinus arizonica	NI	El Carrizo, Domicilio Conocido, Ejido El Largo y Anexos, Madera,	16		1	
Lic. Yuliana Orta Verastegui	Coahuila	Picea mexicana	NI	PP Los Alpes, Arteaga,	6			1
Ejido Santa Rosa, Sr. Saturnino Campos, Presidente del Comisariado Ejidal	Coahuila	Pinus cembroides	NI	Ejido Santa Rosa, Saltillo,	10		1	
Ing. Angel R. Cepeda Dovala	Coahuila	Agave atrovirens	NI	PP El Refugio, Saltillo,	4.6		1	
C.P. Carlos Héctor Tovar Lopez	Coahuila	Prosopis glandulosa	NI	PP San Carlos, Cuatrociénegas,	2.4		1	
C. Gildardo Armando Gallardo Anguiano	Colima	Crescentia alata	NI	Lote 1 de la Sección 1, Ex hacienda, Comunidad Estapilla	29		1	
C. Léodan Enciso Figueroa	Colima	Guazuma ulmifolia	NI	Predio El Riego de la Comunidad el Arrayanal Mirafitlán,	10		1	
C. Magdalena Guizar Díaz	Colima	Gliciridia septum	NI	La Salada, Tecoman,	3		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
C. Ramón González Mungía	Colima	Caesalpinia platyloba	NI	La Tunita, Ejido Las Conchas, Ixtlahuacán	9.7		1	
C. Gildardo Armando Gallardo Anguiano	Colima	Caesalpinia coriaria	NI	Lote 1 de la Sección 1, Ex hacienda, Comunidad Estapilla	29		1	
Comunidad de Milpa Alta (nueve pueblos), Del. Milpa Alta, México, D.F. Presidente de Bienes Comunales	Distrito Federal	Abies religiosa Pinus hartwegii P montezumae Symphoricarpos microphyllus Quercus spp	NI	Delegación Milpa Alta	148		1	
Comunidad de Magdalena Atlictic, Delegación Magdalena Contreras, México, D.F. Presidente de Bienes Comunales	Distrito Federal	Abies religiosa Symphoricarpos microphyllus y Quercus spp	NI	Delegación Magdalena Contreras	14		1	
Comunidad de San Miguel y Santo Tomas Ajusco, Delegación Tlalpan, Presidente de Bienes Comunales	Distrito Federal	Abies religiosa Pinus hartwegii y Pinus montezumae	NI	Delegación Tlalpan	57		1	
Comunidad San Miguel Topilejo, Delegación Tlalpan, México, D.F. Presidente de Bienes Comunales	Distrito Federal	Pinus hartwegii P Montezumae y Symphoricarpos microphyllus	NI	Delegación Tlalpan	89		1	
Ejido San Andrés Mixquic, Delegación Tlahuac, México, D.F. Presidente del Comisariado Ejidal	Distrito Federal	Salix bonplandiana S. Babilonica	NI	Delegación Tlahuac	6		1	
Ejido San Nicolás Totolapan, México, D.F. Presidente del Comisariado Ejidal	Distrito Federal	Abies religiosa Pinus teocote Psimphoricarpos microphyllus Quercus spp	NI	Delegación Magdalena Contreras	17		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido Santiago Tulyehualco, Delegación Xochimilco, México, D.F. Presidente del Comisariado Ejidal	Distrito Federal	Salix bomplandiana S. Babingtonia y Alnus jorullensis	NI	Delegación Xochimilco	2		1	
Ejido San Francisco Tlatenco, Delegación Tlahuac, México D.F. Presidente del Comisariado Ejidal	Distrito Federal	Salix bomplandiana	NI	Delegación Tlahuac	2		1	
Ejido San Nicolás Tlatelco, Delegación Tlahuac, México, D.F. Presidente del Comisariado Ejidal	Distrito Federal	Quercus spp	NI	Delegación Tlahuac	2		1	
Ejido San Pedro Tlahuac, Delegación Tlahuac, México, D.F. Presidente del Comisariado Ejidal	Distrito Federal	Salix bomplandiana	NI	Delegación Tlahuac	2		1	
Ejido Pueblo Nuevo, Presidente del Comisariado Ejidal	Durango	Pinus durangensis	NI	Corralitos, Ejido Pueblo Nuevo, Mpio. Pueblo Nuevo,	9	1		
Ejido Chiqueros y Anexos", Presidente del Comisariado Ejidal	Durango	Pinus arizonica	NI	Chiqueros y Anexos, Ejido Chiqueros y Anexos, Mpio. Guanacevi,	100		1	
Alfonso Gerardo Fernández de Castro Toulet	Durango	Pinus cooperi	NI	Cielito Azul, P.P. Lote 4 del Fraccionamiento del Predio Rústico Las Veredas, Mpio. San Dimas,	9	1		
Ejido El Carricillo, Presidente del Comisariado Ejidal	Guanajuato	Pinus cembroides	NI	Area Natural Protegida, El Puerto, Ejido El Carricillo, Alarjea	9		1	
Ejido El Carricillo, Presidente del Comisariado Ejidal	Guanajuato	Pinus teocote	NI	Area Natural Protegida, El Pinal, Ejido El Carricillo, Alarjea	9		1	
Ejido El Carricillo, Presidente del Comisariado Ejidal	Guanajuato	Pinus devoniana	NI	Area Natural Protegida, El Pinal, Ejido El Carricillo, Alarjea	9		1	
Ing. J. Jesús Camargo Cintora	Guanajuato	Prosopis laevigata	NI	El Mezquitil Grande, San Pablo Casacuarán, Yuriria	7		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
C. Jorge Hernández Baeza	Guanajuato	Quercus rugosa	NI	El Rinconcillo, Comunidad El Rinconcillo, Juventino Rosas	50		1	
Ejido San Pedro Almoloyan. Presidente del Comisariado Ejidal	Guanajuato	Pinus cembroides	NI	Las Vacas, Ejido San Pedro Almoloyan, San Felipe	50		1	
Ejido San Luis de Los Agustinos. Presidente del Comisariado Ejidal	Guanajuato	Pinus pseudostrobus	NI	Sierra de Los Agustinos, Ejido San Luis de Los Agustinos, A cámbaro	50		1	
Ejido El Bravo. Presidente del Comisariado Ejidal	Guanajuato	Agave salmiana	NI	Cuartos del Bravo, Ejido El Bravo, San Felipe	40		1	
Ing. Marco Antonio González López	Guanajuato	Quercus laurina	NI	El Paisano, Comunidad Santa Rosa de Lima, Guanajuato	100		1	
C. J. Guadalupe Huerta Pérez	Guanajuato	Prosopis laevigata	NI	La Alameda, Ejido Tierra Blanca, San Miguel Allende	2.5		1	
Ejido San Pablo Casacuaran. Presidente del Comisariado Ejidal	Guanajuato	Albizia plurijuga	NI	Mogote Largo, Ejido San Pablo Casacuaran, Yuriria	100		1	
Ejido San Pablo Casacuaran. Presidente del Comisariado Ejidal	Guanajuato	Lysiloma divaricata	NI	Mogote Largo, Ejido San Pablo Casacuaran, Yuriria	100		1	
C. Ausencio Ledezma Becerra	Guanajuato	Pinus cembroides	NI	El Gato, Comunidad El Capullín, San José Ilurbide	100		1	
C. Toribio Viñez Félix	Guanajuato	Echinocactus platyacanthus	NI	Las Biznagas, Comunidad Arroyo seco, Tierra Blanca	10			1
C. Juan Pablo Rodríguez Acosta	Guerrero	Pinus devoniana	NI	Coapango, Mpio de Chilpancingo.	16		1	
Ejido Las Joyitas. Presidente del Comisariado Ejidal	Guerrero	Pinus maximilini	NI	Las Joyitas, Mpio de Leonardo Bravo.	16		1	
Ejido Los Bajitos. Presidente del Comisariado Ejidal	Guerrero	Pinus occarpa	NI	Los Bajitos, Mpio Tecpan de Galeana.	30		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with risk species
Ejido Los Bajitos. Presidente del Comisariado Ejidal	Guerrero	Pinus maximinoi	NI	Los Bajitos, Mpio. Tecpan de Galeana.	70		1	
Bienes Comunales de San Fco Oztulita. Presidente del Comisariado de Bienes Comunales	Guerrero	Bursera linaloe	NI	San Fco Oztulita Mpio de Copalillo.	9		1	
Bienes Comunales de Mezquitlán. Presidente del Comisariado de Bienes Comunales	Guerrero	Bursera linaloe	NI	Mezquitlán Mpio de Copalillo.	9		1	
Ejido Ahuacuozingo. Presidente del Comisariado Ejidal	Guerrero	Swietenia humilis	NI	Ahuacuozingo	60		1	
Bienes Comunales de Santiago Tiacotepec "Anexo Izotepec", (SEMAREN), Presidente del Comisariado de Bienes Comunales	Guerrero	Pinus pseudostrobus	NI	Santiago Tiacotepec, Anexo Izotepec, Mpio. General Heliodoro Castillo	10		1	
Bienes Comunales de Santiago Tiacotepec "Anexo Tiacotenco" (SEMAREN), Presidente del Comisariado de Bienes Comunales	Guerrero	Pinus devoniana	NI	Santiago Tiacotepec, Anexo Tiacotenco, Mpio. General Heliodoro Castillo	10		1	
Ejido San Miguel (SEMAREN), Mpio de Chilpancingo. Presidente del Comisariado Ejidal	Guerrero	Pinus maximinoi	NI	San Miguel, Mpio. de Chilpancingo	10		1	
Ejido Las Compuertas, (SEMAREN), Mpio de Coyuca de Benitez. Presidente del Comisariado Ejidal	Guerrero	Pinus maximinoi	NI	Las Compuertas, Mpio. Coyuca de Benitez	16	1		

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido Coapango (SEMAREN), Mpio de Chilpancingo. Presidente del Comisariado Ejidal	Guerrero	Pinus herreral Pinus ayacahuite Pinus michoacana cornuta y Pinus pseudostrobus	NI	Coapango Mpio de Chilpancingo	38		1	
Ejido Agua Hernández, (SEMAREN), Mpio de Chilpancingo. Gro. Presidente del Comisariado Ejidal	Guerrero	Pinus maximinoi Pinus oocarpa	NI	Agua Hernández, Mpio. de Chilpancingo	8.53		1	
Ejido Santa Rosa De Lima (SEMAREN), Mpio Coyoaca de Benitez. Presidente del Comisariado Ejidal	Guerrero	Pinus maximinoi	NI	Santa Rosa de Lima. Mpio. Coyoaca de Benitez	8.53		1	
Ejido San Cristóbal, (SEMAREN), Mpio de Chilpancingo. Presidente del Comisariado Ejidal	Guerrero	Pinus maximinoi	NI	San Cristobal, Mpio. de Chilpancingo	16	1		
Ejido Santa Barbara (SEMAREN), Mpio de Chilpancingo. Presidente del Comisariado Ejidal	Guerrero	Pinus maximinoi Pinus oocarpa	NI	Santa Barbara, Mpio. de Chilpancingo	12.67		1	
Ejido Fontezuelas. Presidente del Comisariado Ejidal	Hidalgo	Pinus greggii	NI	Plantación con fines de restauración, Municipio de Metziltlan	5		1	
Ejido Rancho Nuevo. Presidente del Comisariado Ejidal	Hidalgo	Pinus rudis	NI	Paraje Los Sedasos, Ejido Rancho Nuevo, Mpio. de Almoleya	4		1	
Ejido Rancho Nuevo. Presidente del Comisariado Ejidal	Hidalgo	Abies religiosa	NI	Paraje Piedra Ancha , Ejido Rancho Nuevo, Mpio. de Almoleya	4		1	
Bienes comunales La Encarnación. Presidente del Comisariado de Bienes Comunales	Hidalgo	Pinus cembroides	NI	Paraje en cerro colorado, Bienes comunales la Encarnación, municipio de Zirapán	4		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Hilda Gutierrez Estrada	Michoacán	Pinus pseudostrobus	NI	Predio los Robledos, Dos Aguas, Aguililla	9		1	
Hilda Gutierrez Estrada	Michoacán	Pinus michoacana var cornuta	NI	Predio los Robledos, Dos Aguas, Aguililla	9		1	
Propiedad Federal	Michoacán	Pinus douglasiana	NI	Predio Parque Nacional Barranca del Cupatitzio, Uruapan	9		1	
Ejido la Majada. Presidente del Comisariado Ejidal	Michoacán	Pinus rudis	NI	Ejido La Majada, Periban	9		1	
C.I. Patamban. Presidente del Comisariado de Bienes Comunales	Michoacán	Pinus montezumae	NI	Comunidad Indígena Palamban, Tangancicuaro	9		1	
Joaquin Arreola Estrada	Michoacán	Pinus pseudostrobus	NI	Predio las pilitas, Patzcuaro	9		1	
C.I. Nvo. San Juan Parangaricutiro Mich. Presidente del Comisariado de Bienes Comunales	Michoacán	Pinus pseudostrobus	NI	Condembaro. Comunidad Indígena Nvo. San Juan Parangaricutiro	9		1	
C.I. Nvo. San Juan Parangaricutiro Mich. Presidente del Comisariado de Bienes Comunales	Michoacán	Pinus montezumae	NI	Ziraspan. Comunidad Indígena Nvo. San Juan Parangaricutiro	9		1	
Canada de los Tejocotes. Ejido Felipe Tzin Tzün. Presidente del Comisariado Ejidal	Michoacán	Abies religiosa	NI	Municipio Salvador Escalante	12	1		
La Caja. El Madroño y el Té	Michoacán	Pinus montezumae	NI	Municipio de Zacapu	16	1		
Presa del Cachupín	Michoacán	Pinus pseudostrobus	NI	Municipio de Zinapecuaro	16	1		
Ejido Huecahuaxco. Presidente del Comisariado Ejidal	Morelos	Pinus pseudostrobus	NI	Huecahuaxco, Ocuilco	4.1		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido Buena Vista del Monte. Presidente del Comisariado Ejidal	Morelos	Quercus rugosa	NI	Buena Vista del Monte, Cuernavaca	3.2		1	
Ejido El Limón Cuauhuchichinola. Presidente del Comisariado Ejidal	Morelos	Lysiloma acapulcensis y Amphipterygium adstringens	NI	El Limón Cuauhuchichinola, Tepalcingo	5.1		1	
Ejido San Miguel Huajintlan. Presidente del Comisariado Ejidal	Morelos	Crescentia alata	NI	San Miguel Huajintlan, Amacuzac	8		1	
Ejido La Tigra. Presidente del Comisariado Ejidal	Morelos	Bursera linanoe	NI	La Tigra, Puente de Ixtla	10		1	
Ejido Ajuchitlan Santioopan. Presidente del Comisariado Ejidal	Morelos	Eysehordia polystachya	NI	Ajuchitlan Santioopan, Tlaquiltenango	15		1	
Productos Forestales del Ejido Vado del Cora. Presidente del Comisariado Ejidal	Nayarit	Gilicidia sepium	NI	Rancho Quemado, Santiago Ixcuintla	5		1	
C. I. San Diego del Marañjo. Presidente del Comisariado de Bienes Comunales	Nayarit	Gilicidia sepium	NI	COPLAMAR, Rosamorada	5.4		1	
Productos Forestales del Ejido Vado del Cora. Presidente del Comisariado Ejidal	Nayarit	Swietenia humilis	NI	Ejido Vado del Cora, Santiago Ixcuintla	2.6		1	
Ejido El Ahuacate. Presidente del Comisariado Ejidal	Nayarit	Eysehordia polystachya	NI	Ejido El Ahuacate, Ixtlán del Río	26		1	
Jalpa Grande, Anexo de la C. I. San Jeronimo Jomulco. Presidente del Comisariado de Bienes Comunales	Nayarit	Pinus devoniana	NI	Jalpa Grande, Jala	15.6		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido Marquezado. Presidente del Comisariado Ejidal	Nayarit	Eysenhardtia polystachya	NI	Ejido Marquezado, Ahuacatlán	2.7		1	
Productos Forestales del Ejido Vado del Cora. Presidente del Comisariado Ejidal	Nayarit	Tabebuia rosea	NI	Ejido Vado del Cora, Santiago Ixcuintla	2		1	
Productos Forestales del Ejido Vado del Cora. Presidente del Comisariado Ejidal	Nayarit	Enterobium cyclocarpum	NI	Ejido Vado del Cora, Santiago Ixcuintla	2		1	
Productos Forestales del Ejido Vado del Cora. Presidente del Comisariado Ejidal	Nayarit	ura polyandra	NI	Ejido Vado del Cora, Santiago Ixcuintla	2		1	
C. Luis Clemente Villarreal Cadena	Nuevo León	Myrospermum sousanum	NI	El Barretal, Bustamante	0.32		1	
Ejido Cañón de Vacas. Presidente del Comisariado Ejidal	Nuevo León	Pinus pseudostrabus	NI	Ejido Cañón de Vacas, Aramberri	14.38		1	
Ejido Cieneguillas y Crucitas. Presidente del Comisariado Ejidal	Nuevo León	Pinus cembroides	NI	Ejido Cieneguillas y Crucitas, Galeana	10.35		1	
Ejido La Encantada. Presidente del Comisariado Ejidal	Nuevo León	Pinus hartwegii	NI	Ejido La Encantada, Zaragoza	10		1	
Sociedad Manantial del Tigre (S.P.R)	Oaxaca	Cedrela odorata	NI	Paraje La Alicia, Ejido San Jacobo, Santiago Jocoatepec	1			1
Comunidad de Ixtlán de Juárez. Presidente del Comisariado de Bienes Comunales	Oaxaca	Pinus oaxacana	NI	Paraje Las Calaveras, Comunidad Ixtlán de Juárez	2		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
C. Rovello Cruz Rodriguez	Oaxaca	Prosopis laevigata	NI	Paraje El Arco, Comunidad de Tamazulapam del Progreso	1		1	
Comunidad de Teococuilco de Marcos Pérez. Presidente del Comisariado de Bienes Comunales	Oaxaca	Pinus pseudostrobus	NI	Paraje Rancho Obispo, Comunidad de Teococuilco de Marcos Pérez	3		1	
Comunidad de Ixtlán de Juárez. Presidente del Comisariado de Bienes Comunales	Oaxaca	Pinus patula Pinus oaxacana	NI	Ixtlán de Juárez	ND		1	
Comunidad de Concepción Pápalo. Presidente del Comisariado de Bienes Comunales	Oaxaca	Pinus patula Pinus oaxacana	NI	Concepción Pápalo	ND		1	
Comunidad San Juquila Vijanos, Villa Alta. Presidente del Comisariado de Bienes Comunales	Oaxaca	Pinus chapensis	NI	San Juquila Vijanos	ND			1
Comunidad de San Miguel El Grande. Presidente del Comisariado de Bienes Comunales	Oaxaca	Pinus oaxacana	NI	San Miguel El Grande	ND		1	
Comuneros H. Cd. de Tlaxiaco. Presidente del Comisariado de Bienes Comunales	Oaxaca	Pinus oaxacana	NI	Tlaxiaco	ND		1	
Anselmo Gutierrez Alpizar	Puebla	Pinus patula Abies religiosa	NI	Fracc. III Ex - Hacienda de Altamaxac, Chignahuapan	12		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido San Antonio Malahuacales. Presidente del Comisariado Ejidal	Puebla	Pinus patula Pinus ayacahuite	NI	Ejido San Antonio Malahuacales, Chignahuapan	6		1	
Ejido San Antonio Malahuacales. Presidente del Comisariado Ejidal	Puebla	Pinus pseudostrobus	NI	Arboles sobresalientes, Ejido San Antonio Malahuacales, Chignahuapan	11.9		1	
Antonio Macias Aburto	Puebla	Pseudotsuga menziesii	NI	Santa Fe, La Caldera, Ixtacamaxitlan	9			1
Ejido Xonacatla. Presidente del Comisariado Ejidal	Puebla	Pseudotsuga menziesii	NI	Ejido Xonacatla, Ixtacamaxitlan	15			1
Ejido Peñuelas, Pueblo Nuevo. Presidente del Comisariado Ejidal	Puebla	Pinus patula	NI	Municipio de Chignahuapan	1	1		
Comunidad Chavarrías. Presidente del Comisariado Ejidal	Querétaro	Abies religiosa	NI	Predio El Cajete, Municipio Cadereyta de Montes, Comunidad Chavarrías	7.93		1	
Comunidad Los Juárez. Presidente del Comisariado Ejidal	Querétaro	Pinus rudis	NI	Predio La Adarga, Municipio Cadereyta de Montes, Comunidad Los Juárez	12.28		1	
Ejido Jacal de la Piedad. Presidente del Comisariado Ejidal	Querétaro	Arbutus xalapensis	NI	Predio El Salto, Municipio Amealco de Bonfil, Ejido Jacal de La Piedad,	4.22		1	
Ejido Solferino. Presidente del Comisariado Ejidal	Quintana Roo	Swietenia macrophylla	NI	Área de Plantación COPLAMAR	61		1	
Ejido Ramonal Río Hondo Anexo Nachicocom. Presidente del Comisariado Ejidal	Quintana Roo	Swietenia macrophylla	NI	Área de Plantación COPLAMAR	29		1	
Ejido Tres Garantías. Presidente del Comisariado Ejidal	Quintana Roo	Swietenia macrophylla	NI	Rodal Natural	42		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido X-Hazil y Anexos. Presidente del Comisariado Ejidal	Quintana Roo	Swietenia macrophylla y Manilkara zapota	NI	Rodal Natural, Caoba	51		1	
Ejido Tres Garantías. Presidente del Comisariado Ejidal	Quintana Roo	Brosimum alicastrum	NI	Rodal Natural	25		1	
Ejido Caoba. Presidente del Comisariado Ejidal	Quintana Roo	Brosimum alicastrum	NI	Rodal Natural Chichan ha	91		1	
Ignacio Martínez Palomo	San Luis Potosí	Quercus rugosa	NI	Domicilio Conocido en NCP Papagayos, Cd. del Maiz	250		1	
Ignacio Martínez Palomo	San Luis Potosí	Abies religiosa	NI	Domicilio Conocido en NCP Papagayos, Cd. del Maiz	250		1	
Sabino Mayorga Catarina	San Luis Potosí	Cedrela odorata	NI	Iachiquil, Coxcalán	15			1
José Inés Gómez Jiménez	San Luis Potosí	Prosopis laevigata	NI	Comunidad Sta. María del Refugio, Calorce	9		1	
José Inés Gómez Jiménez	San Luis Potosí	erocactus pilosus	NI	Comunidad Sta. María del Refugio, Calorce	9			1
José Inés Gómez Jiménez	San Luis Potosí	ucca filifera	NI	Comunidad Sta. María del Refugio, Calorce	9		1	
Juan Acosta Guerrero	San Luis Potosí	Quercus rugosa	NI	Domicilio Conocido en NCP Papagayos, Cd. del Maiz	250		1	
Policarpio Nigoche Netro	San Luis Potosí	Tabebuia rosea	NI	Domicilio Conocido en Matlincs, El Naranjo	150		1	
Valentin Barrón Porto	San Luis Potosí	Cedrela odorata	NI	Domicilio Conocido en Minas Viejas, El Naranjo.	18			1
Ejido Bachoco El Alto. Presidente del Comisariado Ejidal	Sonora	Prosopis juliflora	NI	Bachoco el Alto, Eichojoa	31		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Margarito Neyroy Robles	Sonora	Prosopis juliflora	NI	El Polvorón, San Ignacio Río Muerto	2		1	
Ignacio Pesqueira Taylor	Sonora	Coursetia glandulosa pomoea arborescens	NI	Las Padecitas, Arizpe	71		1	
Ejidal El Guacho. Presidente del Comisariado Ejidal	Sonora	Pinus engelmannii	NI	El Guacho, Nacori Chico	14		1	
Ejido Mesa de Tres Rios. Presidente del Comisariado Ejidal	Sonora	Pinus durangensis	NI	Pico de la India, Nacori Chico	18		1	
Rancho San José del Real	Sonora	Prosopis velutina	NI	Las Piedras Bolas, Opodepe,	25		1	
Arturo Amavizca Herrera	Sonora	Agave angustifolia	NI	El Horror, Huasabas	30		1	
Ejido Forestal Yecora. Presidente del Comisariado Ejidal	Sonora	Pinus engelmannii	NI	Paraje La Joya, Yécora	9		1	
Cesar David Contreras Loustaunau	Sonora	Coursetia glandulosa	NI	El Salto, Rayón	20		1	
C. Manuel Ovando Hernández	Tabasco	Swietenia macrophylla	NI	Ejido Carrillo Puerto.Frontera	1		1	
C. Alvaro Napoleon Belliz Alvarez	Tabasco	Swietenia macrophylla	NI	Ejido Carrillo Puerto. Frontera	23		1	
C. Vicente Montejo de la Cruz	Tabasco	Swietenia macrophylla	NI	Ejido Luis Echeverría, Tenosique	1		1	
C. Porfirio Vázquez Jiménez	Tabasco	Cordia alliodora Tabebuia rosea Swietenia macrophylla	NI	Ejido La Pila. Tacotalpa	2		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
C. Luis Felipe Madrigal Hernández	Tabasco	Swietenia macrophylla Cordia alliodora Tabebuia rosea	NI	Ejido Maipaso, Huimanguillo	10		1	
C. Claudio Julian Ramirez	Tabasco	Brosimum alicastrum Swietenia macrophylla	NI	Ejido Cerro Blanco 5ta Seccion. Tacolalpa	2		1	
C. Ruben Amilcar Quetz Tzec	Tabasco	Brosimum alicastrum Pseudobombax ellipticum eclandia salicifolia itex gaumeri	NI	Ejido los Rieles de San Jose. Tenosique	20		1	
Ejido Las Antonias. Presidente del Comisariado Ejidal	Tamaulipas	Pinus nelsonii	NI	Ejido Las Antonias, Municipio de Bustamante.	20			1
Colonia Agrícola La Peña	Tamaulipas	Pinus cembroides	NI	Colonia Agrícola La Peña, Municipio de Miquihuana.	20		1	
Ejido Valle Hermoso. Presidente del Comisariado Ejidal	Tamaulipas	Pseudotsuga menziesii	NI	El Nacimiento, Ejido Valle Hermoso, Municipio de Miquihuana.	20			1
Ejido San José del Llano. Presidente del Comisariado Ejidal	Tamaulipas	ucca filifera	NI	La Pasta, Ejido San José del Llano, Municipio de Miquihuana.	16		1	
Ejido Felipe Angeles. Presidente del Comisariado Ejidal	Tamaulipas	Prosopis laevigata	NI	Felipe Angeles, Ejido Felipe Angeles, Municipio de Bustamante.	9		1	
Ejido Magdalena Aguilar. Presidente del Comisariado Ejidal	Tamaulipas	uniperus flaccida	NI	Magdalena Aguilar, Ejido Magdalena Aguilar, Municipio de Jaumave.	16		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Ejido Pobladores de México. Presidente del Comisariado Ejidal	Tamaulipas	Ebenopsis ebano	NI	Pobladores de México, Ejido Pobladores de México, Municipio de Soto La Marina.	16		1	
C. Benito Rodríguez Briones	Tlaxcala	Pseudotsuga menziesii	NI	Ejido San Jose Villarreal, Terrenate.	9			1
C. Carlos Osorno García	Tlaxcala	Abies religiosa	NI	Ejido Acopinhalco del Peñon, Tlaxco.	9		1	
C. Carlos Osorno García	Tlaxcala	Pinus ayacahuite	NI	Ejido Acopinhalco del Peñon, Tlaxco.	9		1	
C. Alejandro Gonzalez Garcia	Tlaxcala	Pinus pseudostrobus	NI	San Cristobal, Tlaxco.	1.17		1	
C. Álvaro Ramirez Luna	Tlaxcala	Pinus montezumae	NI	El Rosario, Tlaxco.	2.46		1	
C. Lino Castro Estulco	Tlaxcala	Pinus ayacahuite	NI	San Bartolomé del Monte, Calpulalpan.	2.46		1	
C. Isaias Cueto Aguilar	Tlaxcala	Pinus cembroides	NI	La Soledad, Tequexquilla.	6		1	
C. José Máximo Macías González	Tlaxcala	uniperus depeana	NI	San Pedro Ecatepec, Allangatepec.	80		1	
C. Juan Ramirez Jiménez	Tlaxcala	Amelanchier denticulata	NI	Santiago Tepetitpac, Totolac.	9		1	
Arturo Samuel Solís Vorrath	Veracruz	Abies religiosa	NI	Vivero El Paraiso, Las Vigas	36		1	
Gaudencio García Miranda	Veracruz	Pinus patula	NI	Ejido Ingenio El Rosario, Mpio. de Xico	3		1	
Yolanda Edelmira Bandala González	Veracruz	uglans pyramiformis	NI	Privada de La Cartuja # 21, Fracc. La Giraldá, Xalapa	30			1
Armando Peña Ventura	Veracruz	Pinus chiapensis	NI	Aldama S/N, Col. Miguel Hidalgo, C.P. 3650, Tlapacoyan	47			1

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
Fructoso García Carmona	Veracruz	Pinus ayacahuite	NI	Domicilio Conocido S/N, Comunidad Mesa de Laurel, Ingenio El Rosario, Mpio. de Coatepec	7.95		1	
Ricardo Romero González	Veracruz	uglans pyriformis	NI	Ancho Las Cañadas, Coxolo, Mpio. de Hualusco, C.P. 9410.	113.14			1
Adan Níeva Murillo	Veracruz	Cordia alliodora	NI	Domicilio Conocido Tepataxco	2		1	
Valerio Osorio Mota	Veracruz	Pinus chiapensis	NI	Domicilio Conocido, La Prensa, Mpio. Atzacan	1.85			1
Wenceslao Olvera	Veracruz	Pinus patula	NI	Domicilio Conocido Ejido Canalejas, Mpio. de Zucualpan	2		1	
C. Manuel Polanco Meneses	Yucatán	Platymiscium yucatanum	NI	Pocoboch, Calditmul	15		1	
C. Tiburcio Castro Castro	Yucatán	Cedrela odorata	NI	Cuncunul, Cuncunul	18			1
Ejido Tecoh. Presidente del Comisariado Ejidal	Yucatán	Piscidia piscipula	NI	Chechen, Tecoh	30		1	
Gobierno del Estado de Yucatán (Dr. Eduardo Baltori Sampietro) SEDUMA	Yucatán	Enterolobium cyclocarpum	NI	Area Natural Protegida, Hacienda Tabi, Ticul	100		1	
Ing. Victor Melo Granados Martínez	Yucatán	Platymiscium yucatanum	NI	Hacienda Chaua, Tunkas	200		1	
Prof. Jorge Lizama Góngora	Yucatán	Manilkara zapota	NI	Chunhuas, Tekax	100		1	
M.C. María Andrade Hernández	Yucatán	Acoelorrhaphe wrightii	NI	Reserva del Zapotal, Tizimin	50		1	
M.C. María Andrade Hernández	Yucatán	Brosimum alicastrum	NI	Reserva del Zapotal, Tizimin	30		1	

Annex 9. Forest Germplasm Production Units registered by CONAFOR. (Cont.)

Body, Institution, Individual or company owner in charge	Entity	Specie(s)	Name	Location	Surface area(ha)	Category		
						Seed Area	Seed stand	Stand with species in risk category
M.C. Maria Andrade Hernández	Yucatán	Manilkara zapota	NI	Reserva del Zapotal, Tizimin	50		1	
Otoniel Escareño Hernández	Zacatecas	Pinus cembroides	NI	Villanueva	50		1	
Ejido Reforma y Anexos. Presidente del Comisariado Ejidal	Zacatecas	Atriplex canescens	NI	Ejido Reforma y Anexos, Concepción del Oro	171.48		1	
Ejido Concepción del Oro. Presidente del Comisariado Ejidal	Zacatecas	Pinus johannis	NI	Ejido Concepción del Oro, Concepción del Oro	7			1
San Jose de Carbonerillas	Zacatecas	Pinus pinceaana	NI	San Jose de Carbonerillas, Mazapil	26.6			1
Pueblo Viejo	Zacatecas	Pinus maximartinezii	NI	Pueblo Viejo, Juchipila	50			1
Barranca de Guadalupe	Zacatecas	Pinus ayacahuite	NI	Barranca de Guadalupe, Valparaiso	5.62		1	
Barranca de Guadalupe	Zacatecas	Cupressus lusitanica	NI	Barranca de Guadalupe, Valparaiso	8.61			1
Banco de Los Arados	Zacatecas	Pinus leiophylla	NI	Banco de Los Arados, Valparaiso	31.422			
Ejido El Astillero. Presidente del Comisariado Ejidal	Zacatecas	Pinus devoniana	NI	Ejido El Astillero, Valparaiso	30.42		1	
				SUBTOTAL		11	183	36
				TOTAL			230	

Annex 10

Aguascalientes Jardín Botánico Rey Netzahualcóyotl Aguascalientes, Ags. Universidad Autónoma de Aguascalientes Gerardo García Regalado, Gerardo García Regalado 0.12 Campus Universitario 1989 Cacti, succulents and rosette, ornamentals, fruit, regional and medicinal use. Teaching, studying the local flora, conservation and propagation. <http://academia.uaa.mx/ccbas/biologia/pagina/jardinbot.htm>

Baja California Jardín Botánico Todos Santos Ensenada Jardín Botánico Todos Santos, A.C. Horacio de la Cueva Salcedo/ José Pedro Arce Serrano Calle Obregón # 370. Zona Centro Ensenada Baja California (oficina). Fraccionamiento la Escondida (Jardín).

Baja California Sur Jardín Botánico Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias/Rigoberto Meza Sánchez

Campeche Jardín Botánico Regional del Carmen Cd. del Carmen, Camp. Grupo Ariete Ecológico-Universidad Autónoma del Carmen 22.00 Colonia Renovación. Costa sur de la Isla del Carmen. 1993 Regional fruit, native plants, leguminous trees that are part of the arboretum, medicinal plants, palms and aquatic species, tropical succulents (pitayas and agaves) Environmental education conservation and promotion of native plants. NA

Campeche Arboretum Subprograma de Mejoramiento de Áreas Verdes Programa Ambiental Institucional Yum Kaax Campeche Centro de Estudios en Desarrollo Sustentable y Aprovechamiento de la Vida Silvestre Universidad Autónoma de Campeche Av. Agustín Melgar s/n Colonia Buenavista C.P. 24039 Campeche,

Campeche. Campeche Jardín Botánico de Hampolol, Campeche Universidad Autónoma de Campeche

Chiapas Jardín Botánico "Dr. Faustino Miranda" Tuxtla Gutiérrez, Chis. Secretaría de Medio Ambiente e Historia Natural. Teresa Cabrera Cachón / Tomasa Ortiz Suriano 4.40 Calzada de los Hombres Ilustres s/n. Oriente de la Ciudad. Zona Centro de Tuxtla Gutiérrez, a orillas del Río Sabinal 1949 Predominant vegetation in the central region of Chiapas, medicinal and ornamental naturalised exotic species. Important families: Sapotaceae, Moraceae, Bignoniaceae and Boraginaceae. Also contains threatened types such as Chamaedorea palms and cycads. It has more than 900 species. Knowledge of the flora of the state, conservation, management and spread of regional species and education and diffusion. www.amjb.org www.ihn.chiapas.gob.mx

Chiapas Jardín Botánico Regional El Soconusco Tapachula El Colegio de la Frontera Sur (ECOSUR) ECOSUR. Apdo. Postal #36 Carretera Antiguo Aeropuerto Km 2.5. C. P. 30700 Tapachula, Chiapas.

Chiapas Jardín Botánico de la Facultad de Ciencias Agronómicas Villaflores Facultad de Ciencias Agronómicas, Campus 5 Universidad Autónoma de Chiapas Carretera Ocozocoautla-Villaflores km 84.5. A.P. #78 C.P. 30470 Villaflores, Chiapas.

Coahuila Jardín Botánico "Gustavo Aguirre Benavides" Saltillo, Coah. Universidad Autónoma Agraria Antonio Narro 4.00 Km. 7 Carretera Saltillo-El Oro, Zacatecas. Sur de Saltillo 1968 Vegetation growing in this site, emphasising the family of Cactaceae in the state of Coahuila, which presents vulnerability to extinction. Its collections consist of about 300 species. Areas of rosetoflous scrub, desert microphyll halophilic,

submontane and Opuntia desert as well as zacatal areas, forest and mountain gypsofillic grassland. It has ridges for the exhibition of economic plants: cactus, fodder, medicinal and pinetum. Species conservation, research, environmental education and dissemination of knowledge about species and their ecology. NA

Coahuila Jardín Botánico “Jerzy Rzedowsky Rotter” Torreón, Coah. Universidad Autónoma de Coahuila 3.00 Campus Universitario, sobre el periférico o libramiento de Torreón y Santa Fé 1984 Microphyll scrub vegetation of *Larrea tridentata*, with approximately 60 trees of *Acacia farnesiand* and *Prosopis juliflora*. There are about 50 species in their collections. Basically dedicated to education and outreach, especially on living plants and herborised samples of native vegetation from the region of Laguna de Coahuila and Durango, as well as some examples of regional annual and perennial crops. NA

Distrito Federal Jardín Botánico de la Benemérita Escuela de Maestros México, D.F. Benemérita Escuela de Maestros. Academia de Ciencias Naturales 0.2 Calzada México-Tacuba 75, esquina con la av. Maestros, delegación Miguel Hidalgo, D. F., 11330 1985 Collection of 200 specimens representing 33 families and 84 genera, all arranged taxonomically in 7 areas: herbs, medicinal, ornamental, horticultural, cacti, fruit and Pinaceae. Awareness in students through the love of nature, applying strategies to form habits for conservation and the preservation of ecological balance. NA

Distrito Federal Jardín Botánico Medicinal “De la Cruz Badiano” México, D.F. Facultad de Estudios Superiores FES-Zaragoza, UNAM NA Av. Guelatao No. 66, Ejército de Oriente, Iztapalapa, 09230, México, D. F. 1987 Collection of medicinal plants represented largely by Asteraceae and Lamiaceae families in the Cuenca del Valle de Mexico. Develop conservation through a series of medicinal living plants in the Cuenca del de Mexico. Generate interest in the preservation of medical and botanical knowledge. Propagate threatened medicinal species in the region. NA Distrito Federal

Jardín Botánico del Instituto de Biología México, D.F. Instituto de Biología-UNAM, Cd. Universitaria 12.6 Ciudad Universitaria, México, D.F. 1959 National collections of agaváceas, crassulaceae and nolináceas. It also houses other taxonomic types of cactus, Opuntia, orchids, dahlias. Other issues, such as medicinal plants, ornamental rock-dwelling, water and a small arboretum. It has served in the cultivation of tissues of the cactus *Mammillaria san-angelensis* and the orchid *Bletia urban*, both native and endangered species. To investigate the diversity use, management and cultural significance of Mexican flora in general. In particular, some plant families (Agavaceae, Cactaceae, Crassulaceae, Orchidaceae and other related families). Also to promote the in situ and ex situ conservation of flora and to diffuse knowledge through the scientific community and society. www.ibiologia.unam.mx Distrito Federal

Jardín Botánico Centro de Información y Comunicación Ambiental de Norte América (CICEAND) México, D.F. Centro de Información y Comunicación Ambiental de Norte América, A. C. / Ma. Inés Delgado Rodríguez Av. Progreso #3, Planta baja. Col. Del Carmen, Coyoacán C.P. 04100. México, D. F.

Durango Botanical Garden Jardín Botánico “Escuela Superior de Biología” Gómez Palacio, Dgo Universidad Juárez del Estado de Durango / Luis Román Castañeda Viesca 0.07 Avenida Universidad s/n Fraccionamiento Filadelfia. Dentro de las Instalaciones de la Escuela Superior de Biología, al norte de la Ciudad de Gómez Palacio 1987 Native vegetation of the 16 municipalities that comprise the Comarca Lagunera Represent the most significant species of native vegetation of the 16 municipalities of the Laguna District, Coahuila and Durango, with a living collection and a herbarium. www.ujed.mx/portal/index.aspx

Estado de México Pinetum “Maximino Martínez” Texcoco, Edo. de México Universidad Autónoma Chapingo 3.50 Km. 4.7 Carretera Chapingo Tequexquahuac. 1985 Collection of Mexican conifers. Its main goals are to concentrate the greatest number of native Mexican species on a plantation to support teaching, university research and the forest culture of citizens, in addition to conserving threatened and endangered species, and the details of its origin. www.chapingo.mx/dicifo/pinetum

Estado de México Jardín Botánico de la Reserva Natural “Xochitla” Tepotzotlán, Edo. de México Fundación Xochitla 70.00 Autopista México-Querétaro, Salida a Tepotzotlán 1998 Fundamentally water plants and oaks. Its main objectives are: to ensure the permanence of a green area of 70 ha for man to reunite with nature, reforestation with native tree species in the valley of Mexico and the country, to form different arboretum and demonstration gardens, and generating an ecological recovery model based on its characteristics and local environmental issues. www.xochitla.org.mx

Estado de México Jardín Botánico ENEP-Iztacala (UNAM) Tlalnepantla. Edo. de México Universidad Nacional Autónoma de México. FES Iztacala 0.30 Av. De los Barrios N° 1, Los Reyes Iztacala, Tlalnepantla, Edo. De México. C.P. 54090 ND Collection of 900 different species including the families cactaceae, crasulaceae, agavaceae, liliaceae and zamiaceae the best represented vegetation of our country. Also has examples from other countries. Its objectives are primarily educational. Supports teaching and research at the Department of Botany, as well as local school groups. www.iztacala.unam.mx/

Estado de México Jardín Botánico de la Facultad de Estudios Superiores Cuautitlán Cuautitlán Izcalli Universidad Nacional Autónoma de México / Abel Bonfil Campos. María Elena Quintana Sierra Carretera Cuautitlán-Teoloyucan km 2.5, San Sebastián Xhala, C. P. 54714 Cuautitlán-Izcalli, Estado de México.

Guanajuato Jardín Botánico “El Charco del Ingenio” San Miguel de Allende, Gto. Cante, A.C. 67 Paloma s/n, Zona Centro San Miguel de Allende 1991 Collection of cacti with 500 species, one of crasulaceae with 153, one of agavaceae with 40 and represented in smaller amounts, nolinaceae, bomacaceae and cycadaceae. Plus a list of natural vegetation in the 67 has more than 600 species. Protect and preserve the natural heritage that “El Charco del Ingenio” represents. Develop a botanical garden dedicated to dry and semi dry areas in Mexico. www.elcharco.org.mx

Guerrero Jardín Botánico “Esther Pliego de Salinas” Acapulco, Gro Club de Jardinería de Acapulco 6.00 Costera Miguel Alemán y Av. Escénica, rumbo puerto Marqués 2002 Native flora introduced to the region of Acapulco. Promote environmental stewardship and preservation of flora and fauna, in addition to educating visitors on these issues and collaborate with civic, educational and cultural projects that spread these objectives. <http://www.loyola.edu.mx/nuestro-campus/jardin-botanico>

Guerrero Jardín Botánico de la Universidad Autónoma de Guerrero Chilpancingo, Gro. Universidad Autónoma de Guerrero 3 Av. Lázaro Cárdenas, rumbo a conjunto Jacarandas 1975 Best represented families are Lurseraceae, Leguminosae, Cactaceae and Compositae, with about 210 species. Seed germination of aloe (*Bursera aloexylon*) and the assisted regeneration of palo morado (*Peltogyne mexicana*). Has information on phenology. Instructional support to schools and colleges. ND

Hidalgo Jardín Botánico “Cubitos Ollintepetl” Pachuca, Hgo Consejo Estatal de Ecología del Gobierno del Estado 3.5 Cerros “Cubitos” y “Zopilote”, Zona conurbada de Pachuca y Mineral del Monte 1998 232,300 examples of 80 species from the Hidalguense Desert (Hidalgo and Querétaro). Cacti and includes trees in arid, mesquite and acacias zones. It also includes a collection of 1500 coniferous trees from 39 species

that form a small forest and one of pine (Pinetum), from the Pinetum "Maximino Martínez" Chapingo. It has a plantation of endemic Cypress *Cupressus guadalupensis* (Cedar Guadeloupe) Its main purposes are knowledge of arid areas, promotion of conservation, ecoproductive projects and education programmes. www.coede.hidalgo.gob.mx

Hidalgo Jardín Escolar "Maguey Azul" Tula de Allende Cruz Azul UNAM del Centro Educativo Cruz Azul / Edel HernáNaez Cid Calle Tula #104, Col. Poblado en Ciudad Cooperativa Cruz Azul. C.P. 42840 Municipio Tula de AlleNAe, Hidalgo.

Jalisco Jardín Botánico "Jorge Víctor Eller TownseNA" Zapopan, Jal. Universidad Autónoma de Guadalajara 3.00 Av. Patria 1201, Lomas del Valle, Zapopan, Jal. 45129. Villa Universitaria. 1968 550 species of semi-arid areas. They are represented by the Cactaceae, Orchidaceae, Bromeliaceae, Crassulaceae, Agavaceae and Euphorbiaceae families. Its objectives are to conduct studies on taxonomy and distribution of Mexican plants, supporting the teaching of botany in addition to cultivating and propagating threatened or endangered Mexican species. www.uag.mx/servicios/botanico.htm

Jalisco Jardín Botánico de Vallarta Cabo Corrientes, Jalisco Vallarta Botanical Gardens A.C./ Robert Price Mónica Lomeli Carretera Federal 200, tramo Vallarta a Barra Navidad km 24 Ejido de las Juntas y los Veranos Municipio Cabo Corrientes, Jalisco.

Michoacán Jardín Botánico del Centro de Investigación en Ecosistemas (CIECO) Morelia, Mich. Universidad Nacional Autónoma de México Campus Morelia / Santiago Arizaga y And Claudia Nepote Antigua Carretera a Pátzcuaro No. 8701 Col. Ex-Hacienda de San José de La Huerta C.P. 58190 Morelia, Michoacán.

Michoacán Jardín Botánico "Cerro Punhuato" Morelia, Mich. Secretaría de Urbanismo y Medio Ambiente de Michoacán Escarcha #272 Col. Prados del Campestre C.P. 58290 Morelia, Michoacán.

Morelos Jardín Etnobotánico del INAH-Morelos Cuernavaca, Mor. Instituto Nacional de Antropología e Historia 3.5 Matamoros No. 14 1979 The main collections contain cacti, orchids, medicinal, ornamental, food and condiment plants, plus an arboretum with low forest vegetation of the State of Morelos. Contribute to the recognition of ethno-botany (with an emphasis on Mexican herbalism) cultural heritage, through a representative exhibition of living medicinal plants with good presentation, and an extensive and innovative educational programme. www.inah.gob.mx

Morelos Jardín Botánico "San Isidro" Yecapixtla, Mor. Private NA Carretera Yecapixtla-Huesca. Segundo terreno con malla ciclónica 1996 Collection of medicinal plants, cacti, agaveae, crassulaceae and an arboretum in development. Best represented are Pinaceae and Labiatae. It also has zones of native vegetation. Preserving, through propagation, the spread of the culture of conservation to the general public. Developing botanical collections that support these ideas and science. ND

Nuevo León Jardín Botánico "La Yuca" Montemorelos, N.L. Bioparque "Estrella", AC 1.3 Carretera nacional del entronque a Rayones, a 9 km de Montemorelos 1998 About 2,400 examples of about 120 species of cacti and other succulents, including specimens of the Agavaceae, Crassulaceae and Nolinaceae families. It also has a small collection of medicinal plants and a regional nature interpretive trail with submontane scrub and gallery forest. The mission of this garden is principally the conservation of the biological diversity in its environment, including programmes for the evaluation and restoration of degraded ecosystems. For example, the preservation programme

of native flora which includes the protection of certain endangered species existing in submontane areas of scrub and desert scrub. It promotes the sustainable use of resources through the sale and propagation of native species and ecotourism. ND

Nuevo León Jardín Botánico “Efraim Hernández Xolocotzi” Linares, N.L. Universidad Autónoma de Nuevo León 4.7 Km 145 Carretera Linares. Cd. Victoria. 8 km al suroeste de Linares 1983 The best represented families are cacti, legumes, euphorbiaceae and agavaceae. It has approximately 182 species in his collection. Conduct floristic, ecological, systematic and horticultural studies. It has breeding programs for threatened or endangered species as well as education and dissemination among the local population to promote the idea of conservation and management of renewable natural resources. ND

Oaxaca Jardín Etnobotánico de Oaxaca Oaxaca, Oax Fundación Harp Elu Gobierno del Estado 2.00 Reforma s/n Zona Centro. Ex convento Dominico de Santo Domingo 1994 It has 560 species of agaves, cacti and burseras. Its objectives are diffusion, education and conservation through propagation. www.oaxaca-mio.com/atrac_turisticos/centro_cultural_stodomingo.htm

Oaxaca Jardín Botánico Regional “Cassiano Conzatti” Santa Cruz Xoxocotlán, Oax. Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional 3.00 Carretera a Zaachila, Cuilapan, Santa Cruz Xoxocotlán, desviarse al camino de Hornos por el fraccionamiento Villas Xoco 1992 Its main collections are represented by 150 species of cacti and other succulents, a section of useful plants and a pond with aquatic plants. The objectives are basically research, preservation and dissemination, keeping or maintaining collections of plants from different ecological and cultural resources for educational purposes, in addition to breeding programmes and ethno-botanical studies. www.cidroax.ipn.mx/

Oaxaca Jardín Botánico “La Ceiba” del Centro Educativo Cruz Azul Centro Educativo “Cruz Azul” Claudia de los Ángeles Morales Bolón Allende s/n Col. Progreso. Lagunas, Oaxaca.

Puebla Jardín Botánico “Luise Wardle de Camacho” Valsequillo, Pue Private 4.00 Carretera a Valsequillo, en la desviación al Oasis. A un costado de Áfricam Safari 1993 Plants native to desert scrub, cacti and the national collection of oaks also has about 500 species. Promote outreach, education, conservation and research on the native flora of the state of Puebla, and formation of the national collection of oaks. ND

Puebla Jardín Botánico “Helia Bravo Hollis” Zapotitlán Salinas, Pue. Comuneros de Zapotitlán Salinas 100.00 Km 26 Carretera Federal 125 Tehuacán - Huajuapán, 1986 Flora and fauna, propagation of cacti and other native species. The only forest of *Neobuxbaumia tetetzo*. Foster the appreciation of local flora and their traditional uses and potential, showing the botanical significance of the Tehuacan Valley to contribute to the conservation of threatened or endangered species. Apart from being a research centre for educational and recreational purposes. http://zapotitlanmagico.com/jardin_botanico.html

Puebla Jardín Etnobotánico “Francisco Peláez R.”, San Andrés Cholula San Andrés Cholula Empresa Rosmarinus (Particular) 0.55 Calle 2 Sur No. 1700, Barrio Santo Niño, a 7 cuadras del zócalo 1993 It houses the largest collection of Old World plants in Mexico. It has over 1,200 different herbs. Focused on promoting plant conservation through the transformation of the relationship between humans and plants, especially those considered useful for medicinal, culinary, aromatic, dye or other purposes It promotes in the audience a reminder of the pleasure of living with plants, and learning

to integrate into plants their daily lives before urbanisation and loss of contact with the world. www.jardinetnobotanico.org

Puebla Jardín Botánico de la Benemérita Universidad Autónoma de Puebla “Ignacio Rodríguez Alconedo” Valsequillo, Pue. Benemérita Universidad Autónoma de Puebla 3.00 Boulevard a Valsequillo. A la entrada del Campus Universitario, frente al área deportiva 1987 Different trees, especially oaks and plants of tempered regions. The best represented families are: Fagaceae, Leguminosae and Compositae. The main objectives of this garden are: education, research, diffusion and conservation. www.buap.mx

Puebla Jardín Etnobotánico “Quetzalcoatl” Cholula, Pue. Reserva Ecológica Zapotecas A.C / Margarita Tlapa Almonte 16 Poniente #309 Barrio de Santiago Mixquitla San Pedro Cholula, Puebla.

Querétaro Jardín Botánico Regional de Caderayta “Ing. Manuel González de Cosío” Cadereyta, Qro. Consejo de Ciencia y Tecnología del Estado de Querétaro 9.00 Ejido Fuentes y Pueblo Nuevo, al sur de Cadereyta de Montes 1988 Native species from the state of Querétaro, with a wide distribution on dry and semi-dry lands in the centre of the country; arboretum with native tree species and yucca growing. Spread ethno-botanical knowledge about the species on display, whose use is medicinal, food, industry, craft, forage, ornamental and common. www.redesc.ilce.edu.mx/redescolar/publicaciones/publi_prodigios/jardinb_cadereyta/galeria.htm

Querétaro Jardín Botánico de la Universidad Autónoma de Querétaro Querétaro, Qro. Universidad Autónoma de Querétaro ND Campus de la Universidad ND Cacti Teaching botanic and native flora. ND

Quintana Roo Botanical Garden Jardín Botánico “Dr. Alfredo Barrera Marín” Puerto Morelos, Q.R. Colegio de la Frontera Sur (ECOSUR) 65.00 Carretera Cancún-Tulum, a 1 km del cruce a Puerto Morelos 1983 Epiphytes (orchids and bromeliads), medicinal plants, ornamentals, cacti and agaváceas Has 2 ethnographic exhibits. The best represented families are orchids, legumes, euphorbia, cacti, aroids. There is a regional collection of medicinal plants and 31,317 plant species. Protection and propagation of regional species, to maintain documented scientific collections for research. Also promotes education and outreach on conservation and ethnography of Mayan culture, and the development of programmes and activities of education, recreation and ecotourism through workshops, conferences and event organisation. <http://w2.ecosur-qroo.mx/jardin.htm>

Sinaloa Botanical Garden Jardín Botánico “Benjamín F. Johnston” Los Mochis, Sin. Sociedad Jardín Botánico de Los Mochis, IAP 11.00 Blvd. Antonio Rosales. Col. Americand. Parque Sinaloa 1929 Exotic plants from Asia, Africa and Australia. Xerophytes in the region and state. Representatives of the Fabaceae, Rubiaceae, Moraceae, Arecaceae and Bigoniaceae families. Increase the collection and preservation of regional and exotic plants, as well as the protection of endangered species. Promote the study, preservation and dissemination of plant diversity through courses and guided tours, and to interact with national and international jb for the exchange of knowledge and experience. <http://amigosjardinbotanicolmm.blogspot.com>

Sinaloa Jardín Botánico de Sinaloa Culiacán, Sin. Sociedad Botánica y Zoológica de Sinaloa 10.00 Av. Américas 2134 Col. Villa Universidad 1980 Over 300 species of all types; exotic, native and traditional, with emphasis on ornamental species. Represents ecosystems such as tropical jungle, desert, artificial lake and tropical

deciduous forest. Has an oriental pavilion with old bonsais as well as bodies of water to show water plants. Education through spreading to create culture of conservation and preservation of nature, in addition to combining and reconciling nature with art. ND

Sinaloa Jardín Botánico del Acuario Mazatlán, Sin. Gobierno del Estado de Sinaloa NA Av. de los Deportes, a 100 m de Av. del Mar. Zona Costera 1980 61 species of Palmae, Leguminosae, Euphorbiaceae, Zamiaceae, Bignoniaceae and Apocynaceae families in the form of an arboretum. Education through recreation and protecting nature through living elements (existing flora and fauna) that help to create a recreational atmosphere and educate visitors. ND

Tabasco Tropical Agricultural Garden Jardín Agrícola Tropical “Puyacatengo” Teapa, Tab. Universidad Autónoma Chapingo. Centro Regional Universitario del Sureste. 16.00 San José Puyacatengo ND Vegetation in the area, especially fruit trees and collections of Poaceae. Training support on tropical agriculture for students at the Universidad Autónoma Chapingo. www.chapingo.mx

Tabasco Botanical Garden Jardín Botánico del Parque Ecológico de la Chontalpa Cárdenas, Tab. Colegio de Postgraduados 4.00 Campus Tabasco del Colegio de Postgraduados 1990 Regional species of orchids (93 species). Dedicated to environmental education, conservation and preservation of flora elements in Tabasco. www.colpos.mx

Tabasco Botanical Garden Jardín Botánico Universitario “José N. Rovirosa” Villahermosa, Tab Universidad Juárez Autónoma de Tabasco (UJAT) 10.00 Km. 0.5 Carretera 180 Villahermosa-Cárdenas. Dentro de las instalaciones de la División Académica de Ciencias Biológicas. 1993 Main collections of 267 species of aroids, palms, cycads, legumes, malvaceae, orchids, bromeliads, ferns and cacti, water and semi aquatic plants. There is a socioeconomic collection of forest, fruit and ethnobotanical interest. There is also, one hectare of *Haematoxylon campechianum* Environmental education, recreation and disclosure. Establishing ex situ and in situ programmes for the conservation of endangered flora in the state. www.ujat.mx

Tamaulipas Botanical Garden Jardín Botánico “Andcahuita” Ciudad Victoria, Tmps. Club de Jardinería, Ecología y Diseño Andcahuita A.C. Alma Rosa Guerra de Roché Dentro del Parque Recreativo Cultural Siglo XXI (Llera de Candles Ciudad Victoria y el Marge del Rio). Ciudad Victoria, Tamaulipas.

Tamaulipas Botanical Garden Jardín Botánico “Las Piedras” Ciudad Victoria, Tmps. Jardín de Piedra A.C. Sergio Guillermo Niebla Álvarez Carretera-Victoria-Montero Km. 12. Ejido Laborcitas “La Tequilera”. Victoria, Tamaulipas.

Tlaxcala Botanical Garden Jardín Botánico de Tizatlán, Tlaxcala Tlaxcala, Tlax Coordinación General de Ecología, Gobierno del Estado de Tlaxcala AntiguoCamino Real a Ixtulco s/n C.P. 90100 Tlaxcala, Tlax.

Veracruz Botanical Garden Jardín Botánico “Francisco Javier Clavijero” Xalapa, Ver. Instituto de Ecología, A.C. 7.50 Km. 2.5 carretera antigua Xalapa-Coatepec 1977 Owns 1,200 species and 2 national collections: cycads and bamboos. Also collections of fern and orchids. Regional medicinal plants, and propagation of threatened species in the mesophyll forest To maintain a documented collection of living plants that supports the scientific investigation, contributes to the knowledge and conservation of plant biodiversity and that is a resource for activities related to education, diffusion and sustainable development. www.inecol.edu.mx

Veracruz Ecologic Park Parque Ecológico “Paso Coyol”. Is not appropriately a botanical garden Córdoba, Ver. Patronato del Parque Calle 6 s/n, entre avenidas 15 y 21. Fraccionamiento Bella Vista 1995 Exotic and native species from the cacti, agavaceas zamiaceae and palm families. Conservation of plant species in the Veracruzana Córdoba region, environmental education as a tool for conservation, and planting native seeds for the live germplasm bank. ND

Veracruz Botanical garden of the Biology Station Jardín Botánico de la Estación de Biología de la UNAM “Los Tuxtlas” Catemaco, Ver. Universidad Nacional Autónoma de México NA Carretera de Catemaco a Montepío ND Tree and bush species in the tropical jungle. Conservation and teaching. www.ibiologia.unam.mx

Yucatán Regional Botanical Garden “Xítbal Neek” Ex Hacienda Xcumpich, norte de Mérida, antes de llegar a Dzibilchaltún. Centro de Investigación Científica de Yucatán (CICY) 3.00 Km 7 Carretera antigua a Progreso. 1983 Orchids, Bromeliads, Cacti, Palms and Beucarenas Agavaceas. Research is focused on the propagation and conservation of threatened and endangered species in the region. Establish scientific collections of native plant species of the peninsula with ecological, economic and biological interest, Encourage the use and conservation of plant species through environmental education programmes, research and the spread of obtained information. www.cicy.mx

Annex 11. Report of promotion and research on FGR projects during the period 2001-2011.

Financing Body	Project	Responsible Body	Total (Miles)
CONAFOR (2006-2011)	2 training courses on forest germplasm management	Gerencia de Educación y Capacitación	\$21.00
	2 training courses on forest germplasm management and plant production	Gerencia de Educación y Capacitación	\$70.00
	Equipment of FGB and UPGF	Gerencia de Reforestación	\$12,000.00
	Maintenance of FGB and UPGF	Gerencia de Reforestación	\$14,300.00
	Acquisition of Germplasm	Gerencia de Reforestación	\$32,200.00
	Establishment of seed orchards.	Gerencia de Reforestación	\$3,000.00
	54 courses and workshops given to technicians and producers during the period 2001-2011 (undetermined amount)	Gerencia de Reforestación	\$52,600.00
		Subtotal CONAFOR	\$114,310.21
CONAFOR-CONACYT 2003	Establishment of seed orchards with superior genetic material Pinus patula and Pinus greggii	Programa Forestal del Colegio de Postgraduados	\$880.00
CONAFOR-CONACYT 2004	Geographic variation of the content of taxa and propagation of selected material from the Mexican Yew (<i>Taxus globosa</i> Schlecht.)	Programa Forestal del Colegio de Postgraduados	\$3,475.40
CONAFOR-CONACYT 2003	Strategic conservation and genetic improvement of <i>Pseudotsuga</i> spp. Conifer in Tlaxcala and the central region of the country.	INIFAP - Colegio de Postgraduados-U. Tlaxcala, Dr.	\$3,670.80
CONAFOR-CONACYT	Development of technologies for the growth and micro propagation of medicinal species in temperate climates: <i>Tilia mexicana</i> (Cirimo), <i>Agastache mexicana</i> (Toronjil) and <i>Salureja macrostema</i> (Nurite).	INIFAP: Biol. Miguel Ángel Bello González	\$100.00
	Generation of technology for the in vitro production of asylirion cedarsanum	IIAEC, A.C. M.C. Maria Cristina Ruiz Moreno	\$100.00
	Manipulation techniques for ornamental, threatened or endangered cacti.	INIFAP: M. C. Edith Villavicencio Gutiérrez	\$17.20
	Germplasm Bank, Villa de los niños.	VILLA DE LOS NIÑOS A.C.; Dr. Raul López Velázquez	\$100.00
	Conservation of germplasm and definition of seed transference zones for <i>Pinus patula</i> Schl. Et Cham. in Veracruz.	INIFAP: M.C. Jesús Gustavo Salazar García	\$71.90

Annex 11. Report of promotion and research on FGR projects during the period 2001-2011. (Cont.)

Financing Body	Project	Responsible Body	Total (Miles)
CONAFOR-CONACYT	Determination of population attributes and productivity of <i>Pinus chiapensis</i> Mart. in its natural area of distribution in Veracruz and Puebla.	INIFAP; M.C. José Isidro Melchor Marroquín	\$233.20
	Effect of the level and type of competition for the stimulation of genetic parameters and the behavior of <i>Eucalyptus urophylla</i> clones S.T.Blake.	COLPOS; Dr. Jesús Vargas Hernández	\$144.00
	Validation of new rubber (<i>Hevea brasiliensis</i> Muell. Arg.) in the humid tropics of Mexico.	INIFAP; M.C. Elías Ortiz Cervantes	\$160.00
	Plant diagnostic of seed areas and natural stands in the "Región del Salto" of the Pueblo Nuevo, Durango municipality.	ITF; Lic. Santiago Solís Sánchez	\$96.00
	Management and conservation of the Natural Mezquite populations in Northern Nuevo Leon.	INIFAP; Jorge Cantú Vega	\$104.00
	Selection of Red cedar (<i>Cedrela odorata</i>) in two regions of the state of Veracruz and their response to growth promoting rhizobacteria.	Universidad Veracruzana; M.C. Andrés Rivera Fernández	\$16.20
	Determination of seed stands in tree species of the lowland in the Biosfera La Sepultura reserve, Chiapas, México.	UNICACH; M.C. Clara Luz Miceil Méndez	\$60.00
	Study of the phenology of forest species with potential interest for economic, ecologic and conservation uses.	ECOSUR; Dra. Susana Ochoa Gaona	\$80.00
	Development of techniques for the growth and use of medicinal species with the greatest demand in temperate forests of the Tlaxcala state.	UACH; Guillermo Mendoza Castelan	\$160.00
	Plantations of <i>Taxus globosa</i> in north-eastern Mexico.	UANL; Dr. Andrés Eduardo Estrada Castillón	\$260.00
	Establishment of seed areas for mahogany and cedar in the state of Yucatan.	FUEGO MAYA, A.C.; Fernando Palfino Valera	\$160.00
	Implementation of technology to produce <i>Pleurotus ostreatus</i> (oyster mushroom) in the indigenous community of Cucapa el Mayor, en Mexicali, B.C.	ICA de la UABC; Dr. Tomás Salvador Medina Cervantes	\$160.00
	Grafting protocol of <i>Pinus ayacahuite</i>	CUCBA U de G; Miana Munguia Salvador	\$400.00

Annex 11. Report of promotion and research on FGR projects during the period 2001-2011. (Cont.)

Financing Body	Project	Responsible Body	Total (Miles)	
CONAFOR-CONACYT	Conservation and use of the (<i>Beaucarnea recurvata</i> Lem.); non-tember economic forest species in the WMU "3 de mayo" of the community of Loma de Rigal, Emiliano Zapata, Veracruz.	Dr. Maria Luisa Osorio Rosales	\$60.00	
	Analysis of the accumulation of in vitro taxol in <i>Taxus globosa</i> under different conditions.	INIFAP; Dra. Teresita del Niño J. Marín Hernández	\$400.00	
	Characterisation of mezquite populations in North-Eastern Baja California.	UABC; Resp Admon. Edgar Cristhian Casillas Ibarra	\$208.00	
	In vitro conservation and Molecular Characterization of <i>Encyclia adenocaula</i> (La Llave and Lex) Schltr. (Orchidaceae) in the Municipality of Temascaltepec, México.	INIFAP; Dr. Teresita del Niño Jesus Marín Hernández	\$230.00	
	Identification and establishment of Community Forest Germplasm Production Units in the area of corridors from the Mesoamerican Biological corridor-Mexico, in Chiapas.	FUEGO MAYA, A. C. ; M.C. Patiño Valera Fernando	\$285.00	
	Biological bases for the management, propagation and conservation of mount oregano (<i>Lippia graveolens</i>): a species of high importance in Yucatán state.	CICY; Dra. Luz Maria Calvo Irbalien		
	Molecular characterisation of <i>Cryosporthe</i> from three experimental plantations of <i>Eucalyptus</i> spp.	INIFAP; M.C. Maria del Pilar de la Garza López de Lara	\$190.00	
	Genetic variability through molecular markers in native populations and spring commercial plantations. (<i>Tabebuia donnell-smithii</i> Rose) in the Soconusco, Chiapas.	INIFAP; Dra. Susana Azpíroz Rivero Hilda Susana	\$100.00	
	Techniques of vegetative propagation in oak species. (<i>Quercus</i> sp.)	U de G. M.C. Antonio Mora Santacruz	\$240.00	
		Subtotal CONAFOR-CONACYT	\$12,209.70	
	CONABIO	47 Projects of floristic inventories, computerisation of collections, analysis of species with economic potential, useful species for reforestation and publications.	CONABIO	\$18,275.37
			Subtotal CONABIO	\$18,275.37

Annex 11. Report of promotion and research on FGR projects during the period 2001-2011. (Cont.)

Financing Body	Project	Responsible Body	Total (Milles)
Colegio de Postgraduados	Establishment of seed orchards with superior genetic material in the region of Zacatlán-Chignahuapan, Puebla.	Programa Forestal del Colegio de Postgraduados	\$100.00
	Determination of forest diversity in the Valleys of Serdán and Libres in the state of Puebla.	Programa Forestal del Colegio de Postgraduados	\$450.00
	Genetic and morphological diversity and agronomic behaviour of the Lupinus genus in the region of Libres and los Llanos de Serdán, Puebla	Programa Forestal del Colegio de Postgraduados	\$289.50
	Subtotal COLEGIO DE POSTGRADUADOS		\$839.50
INIFAP	Techniques for the production of seedling of Euphorbia antisyphilitica. (Durango)	Villa Castorena Ma. Magdalena	\$350.00
	Introduction of sources for the restoration of forest in decline in the Federal District. Pinus hartwegii and Abies religiosa. (D.F.)	Benavides Meza Héctor Mario	\$950.00
	Predictive models of production of non-timber forest products. (D.F.)	Velasco Bautista Efraín	\$1,264.00
	Regional selection of genotypes of the main tropical forest species for the establishment of commercial plantations. (Veracruz)	Sanchez Monsalvo Vicente	\$3,579.00
	Productive potential of timber forest species validated by CONAFOR for the establishment of commercial plantations in Tamaulipas.	Sampayo Maldonado Salvador	\$1,417.00
	Technological package to asexually produce timber forest species of: Pinus arizonica Pinus durangensis y Pinus englemannii (Chihuahua)	Morales Nieto Carlos Raul	\$1,536.00
	Production and productivity in nurseries and forest plantations of the Sierra Madre Occidental. (Durango)	Prieto Ruiz José Ángel	\$4,000.00
	Generation, validation and/or development of technologies for the sustainable management of the productive chain of mezquite in central-northern Mexico. (Durango)	Ríos Saucedo Julio Cesar	\$1,520.00
	Development of a module for the transference of a technological package applying reforestation methodologies and producing plantlets under nursery conditions. (Durango)	Prieto Ruiz José Ángel	\$500.00

Annex 11. Report of promotion and research on FGR projects during the period 2001-2011. (Cont.)

Financing Body	Project	Responsible Body	Total (Miles)
INIFAP	Technology to improve priority forest species productivity in deciduous lowland forest. (Morelos)	Solares Arenas Fortunato	\$264.00
	Collection, multiplication and establishment of agaves for industrial purposes in Chihuahua.	Sierra Tristán J. Santos	\$96.00
	Integrated strategy for the sustainable management of forests of <i>Pseudotsuga menziesii</i> in the state of Puebla.	Guerra De La Cruz Vidal	\$1,175.93
	Collection, characterisation and production of ornamental cacti. (Coahuila)	Villavicencio Gutiérrez Eulalia	\$1,138.00
	Diagnostic and evaluation of the main non-timber species of economic importance in Tamaulipas.	Martínez Domínguez Perfecto Miguel	\$2,106.40
	Establishment of an investigation network for the sustainable Management of tropical jungles in Quintana Roo.	Alfaro Reyna Teresa	\$850.00
	Inventory of wild agave populations and commercial plantations in Sonora.	Cervantes Mendivil Teodoro	\$450.00
	Methodology for the establishment and management of forest germplasm producing units in Durango.	Prieto Ruiz José Ángel	\$1,404.50
	Technological transference in the multiplication of new clones of <i>avea brasiliensis</i> in the state of Tabasco.	Hernández Cruz José Miguel	\$250.00
	Transference of technology for plant production and restoration of forest areas in Tlaxcala.	Velásquez Valle Miguel Agustín	\$841.90
	Plant production with species in dry and semi-dry areas in the state of Chihuahua.	Tena Vega Melitón	\$126.00
	Identification of ornamental, native and introduced non-timber forest species with potential for production in the Huasteca Potosina. (S.L.P.)	Arredondo Gómez Alberto	\$276.00
	Validation of timber and non-timber forest species with potential in the state of San Luis Potosí.	Avila Ayala Rolando	\$120.00
Establishment and registry of germplasm production units in the state of Chiapas.	Gutiérrez Vázquez Benito Natalio	\$1,000.00	

Annex 11. Report of promotion and research on FGR projects during the period 2001-2011. (Cont.)

Financing Body	Project	Responsible Body	Total (Miles)
INIFAP	Population dynamics of sabino and ahuehuate (<i>Taxodium mucronatum</i> ten) in Cuenca del Río San Pedro Mezquitlan. (Durango)	Villanueva Diaz José	\$431.00
	Generation of cellular lines of <i>Swietenia macrophylla</i> resistant to Meliceae Boe (<i>ypsiophylla grandella</i>) through the integration of the gene BT (CRGF-JALSCO).	Cortes Cruz Moisés Alberto	\$405.67
	Patterns of distribution and indicators of productivity for the use and conservation of forest species in dry areas. (Chihuahua)	Martínez Salvador Martín	\$913.33
	Development of strategies and technologies for the sustainable use of timber and non-timber resources. (Durango)	García Rodríguez José Leonardo	\$686.20
	Characteristics and properties of <i>Bursera aloexylon</i> (linaloe) from the states of: Guerrero, Puebla, Oaxaca and Morelos. (Puebla)	Fuentes López Martha Elena	\$304.80
	Management agency for innovation in maguey mezcal production in the districts of: Ejutla, Miahuatlan, Ocotlán and Zimatlan in Oaxaca.	Gómez Cárdenas Martín	\$1,362.50
	Proposal of the methodology to formulate the national inventory of <i>Euphorbia antisiphilitica</i>	Zamora Martínez Marisela Cristina	\$240.00
	Analysis of the situation in plantations, tree species with status and the uses for charcoal in Campeche.	Maya Martínez Aixchel	\$442.07
	Production of linabe plants and design of the prototype for the distillation of essential oils. (Oaxaca)	Gómez Cárdenas Martín	\$125.50
	Technical and socioeconomical evaluation of the process of reforestation using natural regenerating Plantlets (Chihuahua).	Alarcón Bustamante Manuel	\$107.00
		Subtotal INIFAP	\$30,232.79

Annex 11. Report of promotion and research on FGR projects during the period 2001-2011. (Cont.)

Financing Body	Project	Responsible Body	Total (Miles)	
Secretaría del Medio Ambiente e Historia Natural de Chiapas	Creation of 9 studies for the Register of Germplasm Production Units.	Instituto de Reconversión Productiva y Bioenergéticos	\$1,355.09	
	Construction of the State Forest Germplasm Bank.	Instituto de Reconversión Productiva y Bioenergéticos	\$5,736.08	
	Creation of 15 studies for the Register of Germplasm Production Units.	Instituto de Reconversión Productiva y Bioenergéticos	\$2,520.00	
	Rehabilitation and operation of two forest germplasm banks and acquisition of native species of forest germplasm.	Instituto de Reconversión Productiva y Bioenergéticos	\$5,550.00	
	Fitogenetic diagnostics of priority watersheds.	Instituto de Reconversión Productiva y Bioenergéticos	\$417.60	
	Training technicians and producers on forest germplasm	Instituto de Reconversión Productiva y Bioenergéticos	\$243.60	
		Subtotal SRIA. DEL MEDIO AMBIENTE E HISTORIA NATURAL DE CHIAPAS		\$15,822.37
Comisión Forestal del Estado de Michoacán	Production and conservation of forest germplasm.	Comisión forestal del Estado de Michoacán	\$700.00	
	Management and operation of 3 seed areas.	Comisión forestal del Estado de Michoacán	\$1,000.00	
	Conservation of germplasm in priority species.	Comisión forestal del Estado de Michoacán	\$2,000.00	
	Awareness and conservation of priority forest species in Michoacán.	Comisión forestal del Estado de Michoacán	\$1,700.00	
	Forest genetic improvement (bank and production units).	Comisión forestal del Estado de Michoacán	\$3,391.61	
		Subtotal COMISIÓN FORESTAL DE MICHOACÁN		\$8,791.61

Annex 11. Report of promotion and research on FGR projects during the period 2001-2011. (Cont.)

Financing Body	Project	Responsible Body	Total (Miles)	
Secretaría de Medio Ambiente del Estado de México	Protocols for in vitro propagation of: <i>Fraxinus uhdei</i> and <i>Paulonia</i> sp. <i>Eucalyptus camaldulensis</i> y <i>Eucalyptus globulus</i>	Protección de Bosques del Estado de México	\$460.00	
	Techniques for producing layering in <i>Pinus greggii</i> and <i>Pinus patula</i> .	Protección de Bosques del Estado de México	\$200.00	
	Establishment of the second generation seed orchard of <i>Pinus greggii</i>	Protección de Bosques del Estado de México	\$350.00	
	Protocol for the in vitro propagation of <i>Pinus greggii</i>	Protección de Bosques del Estado de México	\$300.00	
	Techniques for the propagation of: <i>de Pinus hartwegii</i> and <i>Pseudotsuga</i> sp.	Protección de Bosques del Estado de México	\$555.00	
	Techniques for asexual propagation and tissue culture <i>Chiranthode Aron pentadactylon</i>	Protección de Bosques del Estado de México	\$227.25	
	Subtotal SRÍA. DE MEDIO AMBIENTE DEL EDO. DE MÉXICO			\$2,092.25
	Secretaría de Sustentabilidad Ambiental y Ordenamiento Territorial del Estado de Puebla	Equipment and operation of the germplasm bank.	Dirección de Desarrollo Forestal y de Suelo	\$575.00
		Lab equipment and operation of the germplasm bank.	Dirección de Desarrollo Forestal y de Suelo	\$796.95
		Facilities and equipment for drying and processing germplasm. Operation of the germplasm bank.	Dirección de Desarrollo Forestal y de Suelo	\$3,082.29
Drying oven and bank operation.		Dirección de Desarrollo Forestal y de Suelo	\$400.00	
Bank operation.		Dirección de Desarrollo Forestal y de Suelo	\$400.00	
Bank operation.		Dirección de Desarrollo Forestal y de Suelo	\$800.00	
Subtotal SRÍA. DE SUSTENT. AMB. Y ORD. TERRITORIAL DE PUEBLA			\$6,054.24	

Annex 11. Report of promotion and research on FGR projects during the period 2001-2011. (Cont.)

Financing Body	Project	Responsible Body	Total (Miles)
Secretaría de Desarrollo Rural del gobierno del estado de Jalisco	Demonstrative trial with: <i>Eucalyptus urophylla</i> <i>Pinus oocarpa</i> <i>Pinus caribaea caribaea</i> <i>Pinus caribaea hondurensis</i>	Fideicomiso para la Administración del Programa de Desarrollo Forestal (FIPRODEF0)	\$12.50
	Clonal trial of <i>Eucalyptus urophylla</i>	Fideicomiso para la Administración del Programa de Desarrollo Forestal (FIPRODEF0)	\$35.00
	Clonal trial of <i>Eucalyptus urophylla</i> <i>E ucalyptus grandis</i> y <i>E ucalyptus urograndis</i>	Fideicomiso para la Administración del Programa de Desarrollo Forestal (FIPRODEF0)	\$50.00
	15 tests in <i>Pinus douglasian</i>	Fideicomiso para la Administración del Programa de Desarrollo Forestal (FIPRODEF0)	\$120.00
	Subtotal SRIA, DE DESARROLLO RURAL DEL EDO. DE JALISCO		\$217.50
Secretaría de Medio Ambiente y Recursos Naturales de Guerrero	Training, equipment and collection to holders of 9 production units.	Dirección Forestal de la SEMAREN, Gro.	\$4,500.00
	Establishment of 9 production units and 1 germplasm bank.	Dirección Forestal de la SEMAREN, Gro.	\$7,500.00
	Subtotal SRIA, DE MEDIO AMBIENTE Y REC. NATURALES DE GUERRERO		\$12,000.00
Fundación PRODUCE, A.C.	Conservation and Genetic improvement of <i>Pinus greggii</i>	Programa Forestal del Colegio Postgraduados	\$1,477.70
		SUBTOTAL FUNDACIÓN PRODUCE, A.C.	\$1,477.70
IFS International Foundation for Science	Variation in morphological and adaptive traits and their relationship to the population size and density of <i>Pinus pinicea</i>	Programa Forestal del Colegio de Postgraduados	\$106.68
		Subtotal IFS INTERNATIONAL FOUNDATION FOR SCIENCE	\$106.68
Universidad Autónoma Agraria Antonio Narro		UNIVERSIDAD AUTÓNOMA AGRARIA ANTONIO NARRO	\$243.36
Universidad Autónoma de Nuevo León		Subtotal UNIVERSIDAD AUTONOMA DE NUEVO LEÓN	\$7,350.00
TOTAL			\$230,023.55

Annex 12. Report of Educational Institutions in Mexico that include subjects related to the management of forest genetic resources in their programmes. The degree and subjects offered are indicated.

Colegio de Postgraduados (Texcoco, Méx.)

Postgraduate degree in Forest Sciences

Germplasm Management
Forest Genetics
Forest Tree Genetic Improvement
Conservation Genetics

El Colegio de la Frontera Sur (San Cristóbal, Chis.)

Masters Degree in Conservation of Genetic Resources Management

Conservation Genetics
Evolution and systematic
Conservation biology

Universidad Autónoma Agraria Antonio Narro (Saltillo, Coah.)

Bachelors degree in Forest Engineering

Forest Genetic Improvement
Forest seed and nurseries

Bachelors degree in Seed Technology

Production of forest species

Universidad Autónoma Chapingo (Texcoco, Méx.)

Bachelors degree in Forest Engineering

Plant Physiology

Bachelors degree in Forest Restoration Engineering

Management and conservation of protected areas
Forest Biotechnology
Management and conservation of strange and endangered species

Masters degree in Forest Sciences

Forest Genetics
Forest Genetic Improvement
In vitro propagation of forest species

Universidad Autónoma de Nuevo León (Linares, N.L.)

Bachelors degree in Forest engineering

Conservation Biology
Forest Genetics
Forest Seeds and Nurseries

Masters degree in Natural Resources

Forest Genetic Improvement

Universidad Autónoma del Estado de Hidalgo (Pachuca, Hgo.)

Bachelors degree in Biology

Forest Genetics

Universidad Autónoma Indígena de México (El Fuerte, Sin.)**Bachelors degree in Biotechnological Forest Engineering**

Molecular Biology
 Tissue culture of forest species
 Forest Genetics
 Molecular Markers
 Forest tree Genetic Engineering

Genetic Improvement of Forest Trees

Population Genetics

Degree in Community Forest Engineering

Forest Genetics
 Forest Germplasm and Nurseries Management
 Plant physiology and Forest Genetic Improvement

Universidad de Guadalajara (Zapopan, Jal.)**Bachelors degree in agronomy**

Forest Genetic Improvement
 Quantitative Genetics
 Molecular Biology
 Genetic Engineering

Engineering degree in Agricultural and Natural Resources

Genetics and Evolution
 Bachelors degree in Biology
 Genetics

Population Ecology

Forest Genetic Improvement

Masters degree in Ecophysiology Sciences and Genetic Resources

Fitogenetic Resources
 Ecologic genetics

Bachelors degree in Forest Engineering

Genetics
 Forest Genetic Improvement Methods
 Select topics on Forest Seeds
 Select topics on Forest Genetics

Bachelors degree in Biology

Genetics
 Management and conservation of natural resources
 Plant Biotechnology
 Applied biotechnology

Universidad Juárez del Estado de Durango (Durango, Dgo.)**Bachelors degree in Forest science engineering**

Biotechnology

Engineering in Environment and Natural Resource Management**Forest Genetics**

Biotechnology
 Genetic Improvement topics
 Introduction to Quantitative Genetics

Masters degree in Natural Sciences

Forest Genetics

Forest Germplasm and Nurseries Management
Quantitative Genetics
Forest Genetic Improvement

Universidad Autónoma Nacional de México (México, D.F.)

Bachelors degree and Postgraduate degrees in Biology and ecology

Selected Genetics Subjects
Conservation Genetics
Population Genetics
Biotechnology
Genetics
Filogeography
Quantitative genetics and ecology
Filogenetic inference
Filogenetic reconstruction methods
Natural selection and adaptation
Filogenetic inference
Molecular Evolution

Universidad Michoacana de San Nicolás de Hidalgo (Morelia, Mich.)

Bachelors degree in Biology

Introduction to quantitative genetics
Genetic Improvement Topics

Postgraduate degree in Natural Resources

Forest Genetic Improvement
Quantitative Genetics
Forest Genetics

Universidad Veracruzana (Xalapa, Ver.)

Bachelors degree in Biology

Genetics

Instituto Tecnológico de El Salto (Pueblo Nuevo, Dgo.)

Bachelors degree in Forest Engineering

Forest Genetics
Masters degree of Forest Sustainable Development
Forest Genetic Improvement

Instituto Tecnológico Valle de Morelia (Morelia, Mich.)

Bachelors degree in Forest Engineering

Forest Genetics

Instituto Tecnológico de Perote (Perote, Ver.)

Bachelors degree in Forest Engineering

Forest Genetics

Instituto Tecnológico Superior de Irapuato (Irapuato, Gto.)

Bachelors degree in Forest Engineering

Forest Genetics

Annex 13. National Directory of investigators who develop activities related to FGR.

José Delgadillo Rodríguez Dr. Botany Faculty of Sciences U.A.B.C. Professor Coordinator of the BCMEX Herbarium Baja California (646) 1744560, 1745925, Ext. 120 jdelga.jose@gmail.com Calle 10 No. 456 Col. Azteca Ensenada B.C. Floristics and ecology of of the Northern Baja California coniferous forest, in San Pedro Mártir, Vegetación de Sierra de Juárez.

Selene Aguilar Aguilar Dr. In Agricultural Sciences Private research and consultancy Researcher Baja California (686) 8380105 y 1848948 selene_1aa@yahoo.com.mx Juventud Democrática 2000 No 1011 Mexicali, B.C., C.P. 21358 Genetic improvement, Ectomycorrhizal, Management of germplasm.

Joaquín Gómez Tejero Agronomist. Dr. Seed Forestry INIFAP Researcher Campeche 01(981)8139748 gomez.joaquin@inifap.gob.mx km.15 Carr. Campeche-Pocuyaxum, Campeche c.p. 24520, China, Campeche Management of germplasm, mahogany, cedar and gmelina.

Jorge Luis López Torres M.C. Forest Sciences Instituto Tecnológico de Chiná Researcher Campeche (981) 815 3817 Jlopetorre@yahoo.com Domicilio Conocido, Chiná, Campeche Demographic analysis and genetics of threatened plant species for conservation and resource management.

Neftalí Ramírez Marcial Dr. Botany Ecosur Investigator Chiapas nramirez@ecosur.mx Carretera Pandamericana y Periférico Sur s/n, Barrio María Auxiliadora, San Cristóbal de Las Casas, Chiapas CP 29290 Conservation and restoration of forests.

Jesús Miguel Olivas García Dr. Facultad de Ciencias Agrícolas y Forestales-UACH Researcher Chihuahua (639) 119064 4722351 jolivas@uach.mx Km. 2.5 carr. Delicias-Rosales, Cd. Delicias, Chih. Apartado Postal 33000 Testing of progeny, genetic improvement in forest species and provenance trials.

Martin Ricker Biologist and Doctor in Forest Sciences. Departamento de Botánica, UNAM Researcher Distrito Federal (55) 5622-9127 mricker@ibiologia.unam.mx martin_tuxtlas@yahoo.com.mx Instituto de Biología Apartado Postal 70-233 o Circuito Exterior s/n Cd. Universitaria, Del. Coyoacán México D.F. 04510 Diversity of tree species in Mexico, distribution of Leguminosae tree species.

Juan Pablo Jaramillo-Correa Biologist and Doctor in Forest Sciences. Instituto de Ecología – UNAM Professor Researcher Distrito Federal (55) 5622-9015 jaramillo@ecologia.unam.mx Circuito exterior s/n. AP 70-275. Ciudad Universitaria, UNAM 04510. México D.F. Molecular genetics of populations, phylogeography, conservation of genetic resources, conifers.

Luis Enrique Eguiarte Fruns Dr. Genetics Universidad Nacional Autónoma de México Professor Researcher Distrito Federal (555) 2 9006 Fax: (555) 662-8995 fruns@servidor.unam.mx Ciudad Universitaria, Coyoacán, México Distrito Federal C.P. 04510, México Quantitative genetics, genetics of populations and molecular genetics.

José Ángel Prieto Ruíz Agricultural engineer, specialising in forests. Dr. Nursery and plantation forests. INIFAP Researcher Durango (618) 826 0426; 0433; 0435

prieto.jose@inifap.gob.mx Km 4.5. Carr. Durango-El Mezquital. Durango, Dgo. Seed Management, plant production establishment of tests for species and/or precedences.

Santiago Barrios Matías M.C. Vegetable production U.A. Guerrero IICACN Professor Guerrero (747) 1155333 sbarrios2006@yahoo.com.mx Col. Tatagildo m21-L7, Calle Parotas, Chilpancingo, Gro. Linaloe seed production (Bursera linaleae) and production of ilama (*Annona diversifolia* Saff)

José González Ávalos Phd in Forest Science Instituto de Ciencias Agropecuarias, UAEH Professor Researcher Hidalgo (771) 71 72 000, Ext 4640 forestalngo@hotmail.com goavjo@hotmail.com Rancho Universitario, ExHacienda de Aquetzalpa. Av Universitaria #1. Tulancingo, Hgo. Forest seeds

José Ángel López López Biologist, M.C. FIPRODEFO Researcher Jalisco (333) 1620565, 1620566 angel.lopez@fiprodefo.org.mx Calle Bruselas No. 626, altos, Col. moderna, C.P. 44190 Seed orchard Management for *Pinus douglasiana* and clonal bank.

Javier López Upton Engineer Specialized in forests. Phd in Genetic Improvement Colegio de Postgraduados en Ciencias Agrícolas Professor Researcher México 01(595)95-202-00 Ext. 1463 uptojn@colpos.mx Km. 36.5 Car. Méx - Texcoco, Montecillo, Texcoco, Méx. CP 56230. Genetic improvement, quantitative genetics, conservation of genetic resources, and germplasm management.

Carlos Ramírez Herrera Forest engineer Phd in genetics Colegio de Postgraduados en Ciencias Agrícolas Professor Researcher México 01(595)95-202-00 Ext. 1463 kmcram@colpos.mx Km. 36.5 Car. Méx - Texcoco, Montecillo, Texcoco, Méx. C. P. 56230. Biologic conservation, population genetics, management of germplasm.

Jesús Jasso Mata Agriculture engineer specialized in forests PhD in genetics Colegio de Postgraduados en Ciencias Agrícolas Professor Researcher México 01(595)95-202-00 Ext. 1463 jejama@colpos.mx Km. 36.5 Car. Méx - Texcoco, Montecillo, Texcoco, Méx. C. P. 56230. Forest genetics, genetic improvement species phenology, seed orchard management.

Marcos Jiménez Casas Phd biologist in forest biotechnology Colegio de Postgraduados en Ciencias Agrícolas Professor Researcher México 01(595)95-202-00 Ext. 1463 marcosjc@colpos.mx marcosjc10@hotmail.com Km. 36.5 Car. Méx - Texcoco, Montecillo, Texcoco, Méx. C. P. 56230. Forest biotechnology

J. Jesús Vargas Hernández Phd in Forest Genetics Colegio de Postgraduados en Ciencias Agrícolas Professor Researcher México 01(595)95-202-00 Ext. 1463 vargashj@colpos.mx Km. 36.5 Car. Méx - Texcoco, Montecillo, Texcoco, Méx. C. P. 56230. Tree physiology and forest genetic resources. Genetic improvement.

Nidia Nasser Pérez Biologist Phd in genetics Universidad Autónoma Nacional de México Professor Researcher Michoacán (443) 322-2710 Fax: (443) 322-2719 nperez@oikos.unam.mx María de Guido Morelia, Michoacán, 58090, México Molecular Genetics, Ecologic Genetics Population genetics.

H. Jesús Muñoz Flores INIFAP Michoacán (452) 52 3 73 92 Ext. 106 muñoz.jesus@inifap.gob.mx Campo Experimental Uruapan, Av. Latinoamericand 1101, Col. Revolución, Apdo. Postal 128, C.P. 60150, Uruapan, Mich. Air seed, grafting, selection of superior trees, forest seed collection.

Antonio González Rodríguez Biologist, Dr. of ecology Centro de Investigaciones en Ecosistemas, UNAM Researcher Titular Michoacán (443) 322 3831 agrodri@oikos.unam.mx Antigua Carr. a Pátzcuaro 8701. Col. ExHacienda de San José de La Huerta, Morelia 58190, Michoacán Conservation genetics, filogeography, bioindicators, parasitic plants.

Cuauhtémoc Sáenz Romero Doctor of sciences Instituto de Investigaciones Agropecuarias y Forestales (IIAF), UMSNH Professor Researcher Michoacán (443) 334-0475, Ext. 118, Fax 200 csaenzromero@gmail.com Km 9.5 Carr. Morelia-Zinapécuaro TaríMAro Michoacán 58880 México Genetic resource Management, genetic variation, altitudinal genetics, zonation, adaptation to climate change.

Nahum Sánchez Vargas Doctor of sciences UMSNH Professor Researcher Michoacán (443) 3 34 04 75 Ext. 129 nsanchezv@yahoo.com Km. 9.5 Car. Morelia-Zinapécuaro, TaríMAro, Mich. Establishment of sexual and clonal conifer seed orchards and progeny and seed collection studies .

Alejandro Martínez Palacios Biologist, Dr. of sciences Instituto de Investigaciones Agropecuarias y Forestales (IIAF), UMSNH Michoacán (443) 334 0475 Ext. 119 apalacios56@gmail.com Km. 9.5 Carr. Morelia - Zinapécuaro, TaríMAro. Mich. C.P. 58880 México. Management and conservation of fitogenetic resources.

Roberto Lindig Cisneros Dr. of management of land resources Centro de Investigaciones en Ecosistemas-UNAM Professor Researcher Michoacán (443) 322 38 26 rlindig@oikos.unam.mx Antigua Carretera a Pátzcuaro No. 8701 Morelia, Michoacán, CP 58190 México Reestablishment of populations in ecologic restoration sites.

Ricardo López Aguillón Dr. of forest sciences Facultad de Ciencias Forestales. UANL Professor Researcher Nuevo León (821) 2143010 ext. 114 aguillon84@hotmail.com Carr. Nac. Km 145 67 700 Linares, N. L. Biologic conservation, population genetics, germplasm management.

Javier Jiménez Pérez Dr. of Forest Sciences forest Facultad de Ciencias Forestales UANL Professor Researcher Nuevo León (821) 2143010 ext. 115 jjimenez20@prodigy.net.mx Carr. Nac. Km 145 67 700 Linares, N. L. Mexico Biologic conservation, population genetics, germplasm management.

Enrique Jurado Ybarra Dr. of ecology Facultad de Ciencias Forestales UANL Professor Researcher Nuevo León (821) 2143010 ext. 137 enrique.jurado@hotmail.com Carr. Nac. Km 145 67700 Linares, N. L. Mexico Seed and plant biology.

Marco Aurelio González Tagle Dr. of Forest Sciences Facultad de Ciencia Forestales UANL Professor Researcher Nuevo León (821) 2143010 ext. 144 marco.tagle@gmail.com Carr. Nac. Km 145 67700 Linares, N. L. Mexico Biological conservation, population genetics, germplasm management.

Horacio Villalón Mendoza Dr. of Forest Sciences Facultad de Ciencia Forestales UANL Professor Researcher Nuevo León (821) 2143010 Ext. 124 horacio.villalon@gami.com. Carr. Nac. Km 145 67700 Linares, N. L. México Biological conservation, population genetics, germplasm management.

Fortunato Solares Arenas Msc in management and conservation of deciduous forest INIFAP, Campo Experimental Zacatepec, Researcher Morelos (734) 343 3820; Ext. 118 solares.fortunato@inifap.gob.mx Car. Galeand-Zacatepec; Km 0.5; Zacatepec, Mor. Germplasm management of priority species in the deciduous forest.

Mario Valerio Velasco Forest engineer U. del Mar Professor Oaxaca taxodium01@hotmail.com Ingeniería Forestal, Puerto Escondido, Puerto Escondido, Oax. Progeny trials.

Benito Gutiérrez Vázquez Forest engineer Msc Conservation of forest resources INIFAP Researcher Oaxaca (951)5215502 Ext. 131 gutierrez.benito@inifap.gob.mx Melchor Ocampo No. 7 Col. Agencia Municipal Santo Domingo Barrio Bajo, Ella, Oaxaca. CP 68200 In Situ and Ex Situ conservation, species characterisation and germplasm.

Rafael F. del Castillo Sánchez Dr of genetics and plant ecology IPN CIIDIR Professor Titular Oaxaca (951) 5170400 ext.- 82780 fsanchez@ipn.mx Hornos 1003 Nochebuena Santa Cruz Xoxocotlan Oaxaca 71230 Genetic ecology and population genetics. Ecology and forest conservation.

José Vidal Cob Uicab Forest engineer Dr. of forest biotechnology INIFAP Researcher Quintana Roo (983) 8320167, Cel. 9837333428 cob.jose@inifap.gob.mx Km. 3.5 Car. Chetumal-Bacalar. C.P. 77000 Chetumal, Quintana Roo Selection and improvement assisted by molecular markers. Ex situ and in situ conservation. In vitro propagation.

Xavier García Cuevas Forest technician, Forest engineer, M.C. Forest sciences INIFAP Researcher Quintana Roo (983) 1110373 xavier_garciacuevas@yahoo.com.mx Av. 7 No. 362 Entre Av. 4 y Av. 6. Col. Sor Juana Inés De La Cruz. Bacalar, Q. Roo. 77930 Management and establishment of progeny and source tests.

Miguel Ángel Angulo Escalante Dr. of pharmacology and toxicology Centro de investigación en alimentación y desarrollo, A.C.. Unidad Culiacán CIAD Researcher Sinaloa (667) 605536 mangulo@ciad.edu.mx 12 de octubre 3633 Col. Lomas del Sol, Culiacán, Sinaloa Inventory of plants with medical, food or bioenergetic purposes from the state of Sinaloa.

Luisa del C. Cámara Cabrales Agriculture engineer Dr. of Forest resource Management Dacbiol (Div. Acad. Ciencias Biológicas) UJAT Professor Researcher Tabasco 993- 3544308 Ext. 6407 lcámara@27hotmail.com División Académica de Ciencias Biológicas, UJAT. Km. 0.5 Carr. Villahermosa-Cárdenas. Entronque a Bosques de Saloya. C.P. 86039. Villahermosa, Tab. Management of seeds, conservation of genetic resources, stands and seed orchards. Seed and fruit production.

Vidal Guerra De la Cruz Biologist, Dr. of Forest ecosystem management Instituto Nacional de Investigaciones Forestales Agrícolas y Pecuarias Researcher Forestal

Tlaxcala (246) 464 6799 y 464 6871 guerra.vidal@inifap.gob.mx Km. 2.5 Car. Tlaxcala - Chiautempan, Col. INAustrial, Sta. And Chiautempan, Tlax. C. P. 90800. Basic sinvicultural studies with conservation and Management putposes. In situ conservation of forest genetic resources in températe weather.

Gema Lilia Galindo Flores Msc Plant Biology Universidad Autónoma de Tlaxcala Researcher Tlaxcala (248) 48 15482 gemagalindo@msn.com Km. 10.5 Autopista San Martín Texmelucan-Tlaxcala. S/N. Mpio. De San Felipe Ixtacuixtla. C.P. 90120 Propagation of species of forest interest. Production of bioinoculates (Ectomycorrhizal fungi).

Héctor Viveros Viveros Forest engineer Msc Forest Science, Dr. Forest Sciences Instituto de Investigaciones Forestales, Universidad Veracruzand Researcher Veracruz (228) 818 8907 ó bien (228)8421700 Ext. 13964 heviveros@hotmail.com Parque Ecológico "El Haya", Col. Benito Juárez, C.P. 91070, A.P. 551, Xalapa, Ver., Méx. Genetic conservation, pupulation genetics, germplasm management.

Virginia Rebolledo Camacho Biologist. Docotorate in science nand Biotechnology of Plantas Instituto de Investigaciones Forestales, Universidad Veracruzand Researcher Veracruz (228) 8 42 17 00 Ext. 13969 vrebolledo@uv.mx Parque Ecológico El Haya. Carretera Antigua A Coatepec S/N. CP 91070 Xalapa, Ver. Forest biotechnology, forest species genetic conservation.

Annex 14. Report of achievements obtained from Mexican participation in the work group on Forest Genetic resources from the North American Forest Commission (NAFC) and (FAO) (over the last 10 years).

Symposium in memory of Dr. Basilio Bermejo Velázquez on the “Use and Conservation of Forest Genetic Resources” in Jalapa, Veracruz, 5th November 2002.

On the 21st September 2003, an international symposium on “Forestry and the conservation of forest genetic resources for sustainable forest Management” as a parallel event to the XII world forestry congress.

On the 18th October 2004, a symposium on “Potential effects of global warming on forestry and genetic resources” at the Universidad de Michoacán, Morelia, México.

Training course in “Management and production of seeds and forest plants for conservation and genetic improvement” in the CEFOFOR-CONAFOR centre in Cd. Guzmán, Jalisco, México. 31 de Marzo de 2006.

Main Publications (2001-2010):

Ledig, F.T., M.A. Capo-A., P.D. Hodgskiss, H. Sbay, C. Flores-L., M.T. Conkle and B. Bermejo-V. 2001. Genetic diversity and the mating system of a rare Mexican Pine, *Pinus pinceand*, and a comparison with *Pinus maximartinezii* (Pinaceae). *American Journal of Botany* 88: 1877-1987. Available at: <http://treesearch.fs.fed.us/pubs/24297>

Ledig, F.T., P.D. Hodgskiss and V. Jacob-Cervantes. 2002. Genic diversity, mating system, and conservation of a Mexican subalpine relict, *Picea mexicana* Martínez. *Conservation Genetics* 3: 113-122. Available at: <http://treesearch.fs.fed.us/pubs/24299>

Sáenz-Romero, C., Snively, A. and LiNAig-Cisneros, R. 2003. Conservation and restoration of pine forest genetic resources in México. *Silvae Genetica* 52 (5-6):233-237. Available at: csaenz@umich.mx

Sáenz-Romero, C. and Tapia-Olivares, B. L. 2003. *Pinus oocarpa* isoenzymatic variation along an altitudinal gradient in Michoacan, Mexico. *Silvae Genetica* 52 (5-6): 237-240. Available at: csaenz@umich.mx

Ledig, F.T., P.D. Hodgskiss, K.V. Krutovskii, D.B. Neale and T. Eguiluz-Piedra. 2004. Relationships among the Spruces (*Picea*, Pinaceae) of Southwestern North America. *Syst. Bot.* 29(2): 275-295. Available at: <http://treesearch.fs.fed.us/pubs/24306>

Vargas H., J., B. Bermejo V., and F.T. Ledig (eds.) 2004. Management of Forest Genetic Resources. SecoNA Edition. Graduate College, Motecillo, Edo. de México, and the National Forest Commission, Zapopan, Jalisco, México. Available at: vargashj@colpos.mx

Viveros-Viveros, H., Sáenz-Romero, C., López-Upton, J. and Vargas-Hernández, J. J. 2005. Altitudinal genetic variation in plant growth of *Pinus pseudostrobus* LiNAI. in field testing. *Agrociencia* 39(5):575-587. Available at: csaenz@umich.mx

Sáenz-Romero, C., Guzmán-Reyna, R. and Rehfeldt, G.E. 2006. Altitudinal genetic variation among *Pinus oocarpa* populations in Michoacán, México; implications for seed zoning, conservation of forest genetic resources, tree breeding and global warming. *Forest Ecology and Management* 229:340-350. Available at: csaenz@umich.mx

Jaramillo-Correa, J.P., J. Beaulieu, F.T. Ledig, and J. Bousquet. 2006. Decoupled mitochondrial and chloroplast DNA population structure reveals Holocene collapse and population isolation in a threatened Mexican-*eNAemic* conifer. Available at: Jean.Beaulieu@NRCan.gc.ca

Sáenz-Romero C., G. E. Rehfeldt, N. L. Crookston, P. Duval, J. Beaulieu. 2009. Estimations of climate change in Michoacan: Implications for the agriculture and forestry sector and for the conservation of the Monarch Butterfly. *Journal of Popular Science and Technology of the State Council for Science and Technology of Michoacan C + Tec. Series 3, notebook numer 28.* Available at : csaenz@umich.mx

Sáenz-Romero C., G. E. Rehfeldt, N. L. Crookston, P. Duval, R. St-Amant, J. Beaulieu, B. A. Richardson. 2010. Spline models of contemporary, 2030, 2060 and 2090 climates for Mexico and their use in understanding climate-change impacts on the vegetation. *Climatic Change* 102:595–623. Available at: csaenz@umich.mx

Martiñón-Martínez, R.J., J.J. Vargas-Hernández, J. López-Upton, A-Gómez-Guerrero, H. Vaquera-Huerta. 2010. Response of *Pinus pinceand Gordon* to drought and high temperature stress. *Rev. Fitotec. Mex.* 33: 239-248. Available at: vargashj@colpos.mx

Ledig, F.T. G. E. Rehfeldt, C. Sáenz-Romero , and C. Flores-López. 2010. Projections of suitable habitat for rare species under global warming scenarios. *American Journal of Botany* 97:970-987.

Sáenz-Romero, C., Ruiz-Talonia, L.F., Beaulieu, J., Sánchez-Vargas, N.M. and Rehfeldt, G.E. 2011. Genetic variation among *Pinus patula* populations along an altitudinal gradient; Two environment nursery tests. *Revista Fitotecnia Mexicana* 34(1):19-25. Available at: csaenz@umich.mx

Wei, X.-X., Beaulieu, J., Khasa, D.P., Vargas-Hernández, J., López-Upton, J., Jaquish, B. and Bousquet, J. 2011. Range-wide chloroplast and mitochondrial DNA imprints reveal multiple lineages and complex biogeographic history for Douglas-fir. *Tree Genetics & Genomes* 7: 1025-1040. Available at: Jean.Beaulieu@NRCan.gc.ca

Sáenz-Romero, C., Beaulieu, J. and Rehfeldt, G.E. 2011. Altitudinal genetic variation among *Pinus patula* populations from Oaxaca, México, in growth chambers simulating global warming temperatures. *Agrociencia* 45: 399-411. Available at: csaenz@umich.mx

