CONSERVATION OF TWO ENDANGERED CONIFERS IN EASTERN MEXICO

F I N A L R E P O R T

CONSERVATION LEADERSHIP PROGRAMME | pro natura

CONSERVATION OF TWO ENDANGERED CONIFERS IN EASTERN MEXICO

Project ID 02325917

HOST COUNTRY AND SITE LOCATION
Cofre de Perote Mountain, Veracruz, México
(Latin America and Caribbean)

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SUMMARY OF THE PROJECT

Abies hickelii (Pinaceae) and *Taxus globosa* (Taxaceae) are two endemic conifers from Mexico and Central America. Both are considered as endangered species by the IUCN Red List and are protected by the Mexican laws. Their main threats are the destruction of their habitat and the fragmentation of their populations.

The present project impacted in the conservation of these two species in the Cofre de Perote Mountain, Veracruz State, México. The project's purpose was that the populations of both species were well identified, legally protected and in growth. To achieve this purpose, three main objectives were established and developed: 1) Identify *Abies hickelii* and *Taxus globosa* populations in the Cofre de Perote Mtn. and generate distribution maps; 2) Legally protect 50 hectares of these species habitat; and 3) Produce 5,000 plants of *Abies hickelii* and *Taxus globosa* and establish it in protected areas.

After the project implementation, we achieved to fulfill all the programmed activities and exceeded the proposed goals of each of the three objectives:

- We **discovered nine unknown** stands of *A. hickelii* and *T. globosa* and elaborated **four maps** of the distribution and potential distribution of both species;

- We achieved to **legally protect 1,071 hectares** of the habitat of *A. hickelii* and *T. globosa* as voluntary protected areas.

- We **produce 5,500 plants** in a tree nursery and half were established within protected areas.

Besides, we succesfully raise awareness in the conservation of both species in local communities, landowners and local and federal mexican authorities.

INTRODUCTION

Conifers are a group of trees and shrubs that grow in cooler areas of the world. They have fruit called cones, and very thin leaves called needles which they do not normally lose in winter. This group of plants was the first to produce seeds several millions of years ago. It is estimated that there are 615 living species of conifers, members of seven families and 65 genera.

Although the total number of species is relatively small, conifers are ecologically important. They are the dominant plants over large areas of land, mainly where cool climates exist. The world's tallest, thickest, largest, and oldest living trees are all conifers.

Also, conifers are of great economic value. Their softwood provide about 45% of the world's annual lumber production. Other uses of the timber include the production of paper and plastic from chemically treated wood pulp. Some conifers also provide foods such as pine nuts and Juniper berries, the latter used to flavor gin.

Of the world's 615 conifer species, 211 or 34% are listed by the International Union for Conservation of Nature (IUCN) as being threatened. Important actions for their conservation are needed.

Project species. Two of these 615 threatened conifers are *Abies hickelii* and *Taxus globosa,* which are considered as endangered species by the IUCN Red List. Both are distributed in Mexico and Central America and it's known that their populations are severely fragmented, especially because the two species occur in disjunct and limited areas outside of legally protected areas.

Identify and characterize their populations, create new legally protected areas and produce plants in nursery to enhance their populations, are actions required to protect them from decline and local extinction.

Project area. Cofre de Perote Mtn. is located in the Central Western part of Veracruz State, in Eastern Mexico. It's considered as an area of high diversity, endemisms and as a priority area for conservation by the Mexican Government. It has been included in the Mesoamerican hotspot and the Veracruz-Puebla AZE Site (Appendice 3).

Deforestation in the mountain is an ongoing process, which affects both project species as a late-successional trees. Also, the governmental reforestation actions with 2-3 species of trees (Pinus), are changing the quality of their habitat from a high diversity forest to a low diversity plantation.

PROJECT MEMBERS

Jerónimo Vázquez-Ramírez. Botanic and M. Sc. in Forest Ecology by the University of Veracruz. His academic and professional life has been linked to the Cofre de Perote Mtn. for more than 10 years. He has published numerous works on the forests and plants of this mountain. He is currently the Conservation Director of Pronatura Veracruz A.C.

Fernando Mota-Román. Agricultural Sciences Engineer by the University of Veracruz. Specializations in wildlife management and plant nurseries.He installed and managed the plant nursery “M.Chazaro” located in Cofre de Perote Mtn. where more 100,000 trees, shrubs and herbs (including *Abies hickelii* and *Taxus globosa*) has been produced. He is currently Field Technician at Pronatura Veracruz A.C.

José Isidro Marín Mendoza. Degree in Geography by the University of Veracruz. Specialty in Automated Cartography, Remote Sensing and Geographic Information Systems by the University of the State of Mexico. Geographic information services assistant at Pronatura Veracruz, performing activities related to the use, generation, collection and representation of cartographic information.

We are especially grateful to all Pronatura Veracruz team and volunteers who made possible the successfull implementation of the project. We also thank the support of our scientific advisors: Miguel Cházaro Basañez and Héctor Narave Flores.

PROJECT PARTNERS AND COLLABORATORS

Pronatura Mexico. Is the largest Mexican environmental conservation group. Founded in 1981, the organization covers the 32 Mexican states, being now composed of six regional representations, between which are Pronatura México A.C. and Pronatura Veracruz A.C. who collaborated actively in the project: Pronatura México A.C. received and managed the funds provided by CLP and Pronatura Veracruz A.C. facilitated the work in the field by providing vehicles and allowed us to use their facilities as office and native plant nursery in the Cofre de Perote Mtn. These non government, non profit organizations, share the mission of the conservation of the flora, fauna and priority ecosystems of Mexico, promoting society's development in harmony with nature.

Secretary of Veracruz State for Environment. Regulates all activities affecting the protection, conservation, improvement and restoration of Veracruz State environment. Strategic partners in the legal protection of the habitat of the project species. They issued the decrees of new Voluntary Protected Areas.

Instituto de Ecología A.C. and University of Veracruz. We use the XAL and XALU herbariums to identify known populations of the project species. At the end of the project more than 30 herbarium specimens with records of new locations were donated to both herbaria.

Local comunities and Landowners. Without the mountain communities, none of the goals achieved would have been possible. Local brigades carried out activities with us such as field explorations, seed collection, production and plant establishment. In addition, private owners, communities and ejidos volunteered their lands for the decree of new protected areas.

Special thanks to the communities of: El Llanillo (Las Vigas), Tonalaco (Xico), Carabinas (Xico), Rusia (Xico), Ingenio del Rosario (Xico), Tierra Prieta (Acajete), El Saucal (Acajete). Also a special acknowledgment to Mr. Arturo Orozco and Mr. Jesús Rebolledo who actively participated in the project activities.

AIM AND OBJETIVES

The project purpose was: populations of *Abies hickelii* and *Taxus globosa* of the Cofre de Perote Mountain are well identified, legally protected and in growth. In order to reach the purpose, three objetives were established:

1. Identify *Abies hickelii* and *Taxus globosa* populations in the Cofre de Perote Mtn.
2. Legally protect 50 hectares of *Abies hickelii* and *Taxus globosa* habitat,
3. Produce and establish 5,000 plants of *Abies hickelii* and *Taxus globosa* in protected areas

CHANGES TO THE ORIGINAL PLAN

The main activities of the project have been developed without problems. However, because the rainy season was delayed in the project region, we decided that the establishment of the 2,500 plants of *Abies hickelii* in the field (Activity 3.3) would be carried out at the end of September 2018 (postponing the project's completion date by two months). With this decision we tried to increase the survival rate of the plants and therefore the success of this relevant activity for the conservation of this endangered conifers.

Also, *Taxus globosa* did not produce many seeds during the year of project implementation and those produced had a very low viability. We decided to produce this species in a vegetative way (cuttings) and the produced plants will remain in the nursery until it had an adequate size to survive in the field.

METHODOLOGY

1. **Identify *Abies hickelii* and *Taxus globosa* populations in the Cofre de Perote Mountain.** To identify the populations of both conifers in the Cofre de Perote mountain and to be able to generate current and potential distribution maps, the following steps were followed:

   1.1 Elaboration of a database. To register known locations, the databases of the Mexican Biodiversity Information Network (REMIB) and the EncicloVida platform that integrates information from the National Commission for the Knowledge and Use of Biodiversity (CONABIO) were consulted. In addition, specimens from the herbariums XAL (Institute of Ecology A.C) and MEXU (Institute of Biology, National Autonomous University of Mexico) were consulted.

   With obtained records, a database was built where the location, date, type of vegetation, collector, among other data were recorded. Subsequently, the duplicate records, those whose taxonomic identity was incorrect, the poorly georeferenced and those that were outside the study area (Cofre de Perote volcano, Veracruz) were eliminated. In addition, botanists and local communities were interviewed to identify potential new distribution sites.

   1.2 Field explorations. With the company of local people and scientific advisors of the project, field campaigns were conducted to visit all the sites in the database and those identified in the interviews. During field trips and when an individual or stand of *Abies hickelii* or *Taxus globosa* was found, the record was added to the database and botanical specimens were collected using the methodology of Bridson and Forman (1992).

   1.3 Distribution maps. With all the records of presence obtained, current and potential distribution maps were prepared through the following steps:

   a) Geographical information was obtained from the National Institute of Statistics and Geography (municipal limits, localities, roads, protected areas, types of vegetation and digital elevation model, among others),

   b) Using ArcGis, we visualized the records of presence of *A. hickelii* and *T. globosa* were imported from the database previously made,

   c) The analysis of potential distribution was made with the maximum entropy algorithm MaxEnt (Phillips *et al* 2006) version 3.4.1. and

   d) Using ArcGis we made the graphic edition of the maps.

   1.4 Characterization of populations. Additionally, with the objective of determining the population status of both species, three circular sites of 2,000 m2 and 15 sub sites of 400 m2 were established in each stand, where the habitat, the diversity of species and the population structure were characterized. At these sites, parameters such as diameter, height and regeneration were measured.

2. Legally protect 50 hectares of *Abies hickelii* and *Taxus globosa* habitat. In order to legally protect the habitat of both species the following steps were followed:

2.1 Using the distribution maps made in the previous objetive, sites with prescence, potential presence and with adequate habitat for *A. hickelii* and *T. globosa* were identified.

2.2. Identifying sites. Once the sites were identified, explorations were made in the field. We contact local communities and landowners. During this first approach they were informed of the project, the species and the need to legally protect their habitat through the creation of voluntary protected areas. When the people showed interest, more visitats and detailed discussion occur.

2.3. Integration files. Once the people were convinced, a file was integrated by community or landowner. The files includes: Veracruz State official forms, official identification of the owner, papers that prove ownership of the land, geographic information of the site (coordinates, map and polygon in .shp format) and document with the description and zoning of the area.

2.4. Delivered of files. Once the file was integrated, it was delivered to the correspondent office of the Ministry of Environment of the State of Veracruz for review and subsequent issuance of a certificate as “Private Conservation Area”

2.5. Follow-up and attention was given to the observations of the Ministry of the Environment on the files.

2.6. Celebrating. Once the certificate of “Private Conservation Area” was issued, a meeting was held with the owners where their certificate was delivered to them and plants of the project’s target species were given to them to be established symbolically in the new protected area.

3. Produce and establish 5,000 plants of *A. hickelii* and *T. globosa* in protected areas.
To produce 5,000 plants of the target species, the following activities were carried out:

3.1 Seed collection. Prior to the beginning of the project, and as for the team *A. hickelii* and *T. globosa* are priority species for their conservation, a phenological monitoring was established in which 10 individuals of each species were identified and their phenofase was observed monthly. When it was identified that mature seeds were present, they were collected directly from the trees and moved to the nursery in blanket bags for processing.

3.2 Germination and viability tests of the collected seed were carried out. With this information, the necessary seed was germinated in seedbeds to meet the goal of 5,000 plants. After germination, the plants were watered and fertilized until they reached the minimum size to be established in the field.

3.3. Establishment. With the help of local communities, landowners and volunteers, half of the plants were established within protected areas. The establishment was directed to sites with the ideal conditions for the plant establishment.

3.4. Evaluation. The other half of the plants will remain growing in the nursery to be established in a later phase of the project. Thus we can compare the survival and growth between these two treatments

RESULTS & OUTPUTS

Below is a table with a summary of the objectives, activities, expected outputs and products of the project. In later pages, the analysis of the results by objectives and by activities is deepened according to the structure presented in the methodology.

Table 1. Summary of the objectives, activities, expected outputs and products of the project

Activities	**Expected Output**	**Output (compliance percentage)**
Objective 1. Identify and generate maps of the distribution of the populations of *Abies hickelii* and *Taxus globosa* in the Cofre de Perote Mountain.		
1.1 Identification of known localities in herbarium, databases, field botanists and local people.	1 database	1 database (100%)
1.2 Explorations in the field, georeferencing of new localities found and recollection of specimens	30 iNaturalist observations	36 iNaturalist observations (120%)
1.3 Data processing, database development and processing of herbarium specimens	30 herbarium specimens	31 herbarium specimens (103%)
1.4 Development of maps of known distribution, potential distribution and protected areas.	4 maps	4 maps (100%)
Objective 2. Legally protect 50 ha of *Abies hickelii* and *Taxus globosa* habitat		
2.1 Managing with landowners their incorporation into the state or national system of private conservation areas	50 hectares managed	1,071 hectares managed (2,000%)
2.2 Collect stakeholders' files	Files collected	7 files collected (100%)
2.3 Deliver files to corresponding offices and initiate certification process	50 hectares certificated as protected area	1,071 hectares certificated as protected area (2,000%)
Objective 3. Produce and establish 5,000 plants of *Abies hickelii* and *Taxus globosa* in protected areas.		
3.1 Recollect and process seeds of both species	10,000 seeds	20,000 seeds (200%)
3.2 Germinate seeds and grow plants in the native plant nursery.	5,000 plants	7,500 plants (150%)
3.3 Establish half of the plants in collaboration with local communities, land owners and stakeholders.	Establish 2,500 plants 1 draft of divulagation paper	Establish 2,500 plants (100%) 1 draft of divulagation paper (100%)
3.4 Evaluate and analyse the seed germination and grow of the plants.	2 technical sheet 1 draft of scientific paper	2 technical sheet (100%) 1 draft of scientific paper (100%)

OBJECTIVE 1

Database, Herbarium & Naturalist records. A database was created with the historical records and those generated from the project for the target species. During field explorations we registered sixteen stands that were unkown for the project species (13 of *Taxus globosa* and 4 *Abies hickelii)*. This discovering expand both species altitudinal and latitudinal known distribution in the project area. Before the project, in the XAL hebario (second most important in the country), there were 11 herbarium numbers of *Abies hickelii* and 3 of *Taxus globosa* for the project region. Thanks to our efforts in the field, there are now 36 of *Abies hickelii* (15 more) and 19 of *Taxus globosa* (16 more). These records allow a better understanding of the distribution and conservation status of local populations of these endangered species (Appendice 2).

Also, a profile was created on the Naturalist web site to upload at least 30 observations of both species in the study area. You can visit the project profile in the following link: https://www.naturalista.mx/observations?place_id=any&user_id=pronaturaveracruz_zonastempladas&verifiable=any

Maps. Once the base was prepared with the historical records and those created with the project, the information was used to draw up four maps of its current distribution and potential distribution. These maps will guide many conservation actions of these species in the Cofre de Perote mountain (see Appendice 3).

OBJECTIVE 2

Derived from the results of Objective 1, and having identified the sites with the presence of both species (real or potential) we conducted 10 field campaigns to present ourselves with local authorities and landowners of the region. During our meeting with them, we talked about the project, the importance of the species and how they can protect their forests through the creation of a “Private Conservation Area” which is supported by the Government of the Veracruz State.

Thanks to the collaboration with communities and landowners, we successfully increase the habitat of *Abies hickelii* and *Taxus globosa* that is legally protected in the Cofre de Perote mountain. **Seven new voluntary protected areas** were created, representing **1,071 hectares** (Table 2 and Appendice 6). Now a higher percentage of habitat and populations are protected by both species.

Table 2. Created protected Areas, Surface, protected species and landowners

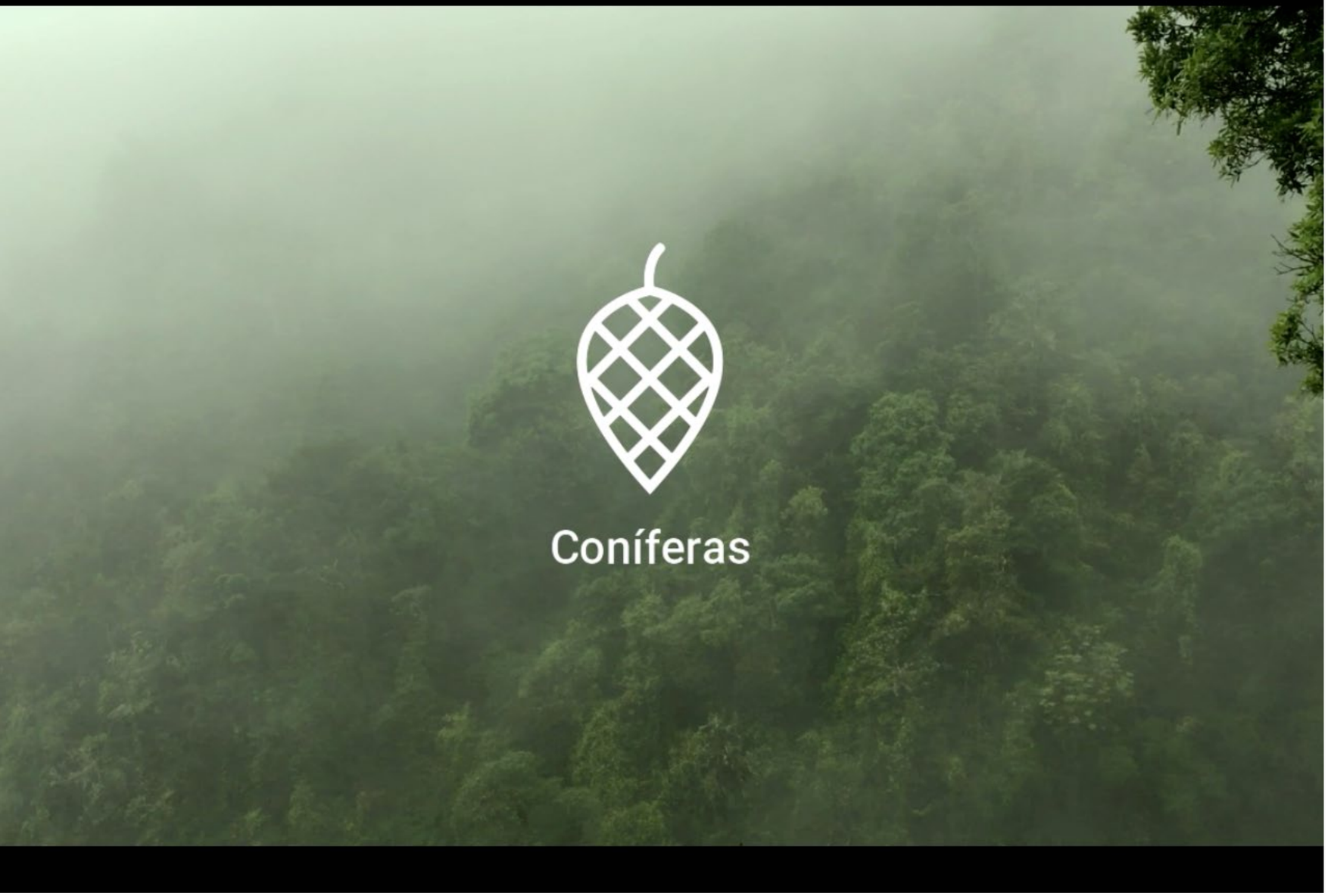
Name of the New Voluntary Protected Area	Area (hectares)	Protected Species	Landowner
Acueducto 1	28.3	*Abies hickelii*	Arturo Orozco Marthen
Acueducto 2	5.7	*Abies hickelii*	Arturo Orozco Marthen
Las Carabinas	144.3	*Abies hickelii & Taxus globosa*	Ejido Las Carabinas
Tonalaco	881.8	*Abies hickelii & Taxus globosa*	Ejido Tonalaco
Ingenio del Rosario	1.0	*Abies hickelii*	Aurelio Morales Bonfil
La Posilla	1.0	*Abies hickelii*	Félix Águilar Morales
Las Palomas	9.3	*Abies hickelii*	Hermelinda Martinez Alarcón
Total	**1,071.4 hectares**		

OBJECTIVE 3

Abies hickelii and *Taxus globosa* seeds were collected. In total, more than 10,000 seeds of both species were collected. In the field, the fruits were collected directly from the tree and transferred to the nursery in blanket bags. Later they benefited and were tested for viability. They germinated in peat moss and the time it took to germinate was measured. The palntulas were passed to the bag and watered and fertilized until they had an adequate size to go to the field. In total 5,500 plants were produced.

Using the maps prepared in objective 1, suitable areas were selected to establish 2,500 plants in the rainy season of 2018. Legally protected sites were prioritized (national coffer de perote park or private conservation areas created by the project). Once the sites were selected, we trained the local communities that carried out the field work. In total, 2,550 Abies hickelii plants were established (appendix 5). A year later, a sample was made to measure the survival of the plants.

As an additional activity, we were able to donate a batch of seeds Abies hickelii the National Germplasm Bank of Mexico for conservation under controlled conditions long term.



COMMUNICATION

We have followed two strategies to communicate the activities and results of the project:

1) **Recording, editing and dissemination of two videos**. Two short videos of the project species were recorded, adited and disseminated. Our goal with this strategy was to communicate the project activities and raise the awareness of an audience between 10-99 years who lives in cities near the Cofre de Perote Mountain. You can watch the videos here:

Abies hickelii video: https://drive.google.com/file/d/15qFJJs7-A4BEjc_FCYoWbRPouxEZxaJd/view?usp=sharing

Taxus globosa video: https://drive.google.com/file/d/15qFJJs7-A4BEjc_FCYoWbRPouxEZxaJd/view?usp=sharing

2) **Visits to schools and reforestation event in the project region**. Five schools were visited where a 25-minute talk about the forests of the Cofre de Perote Mountain and the project species was given to 150 kids between 10-11 years old.

In addition, a reforestation event was held, in the recently created voluntary protected area “Acueducto”, where the local communities, the Cofre de Perote National Park staff, the head of the environmental secretariat of the state of Veracruz, Pronatura’s team and other project partners participated. We established 500 plants of Abies hickelii.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MONITORING AND EVALUATION

Seed quality. Of each lot of collected seeds, we randomly select a samle (90% confidence and 10% sampling error) and evalate the quality of the seeds by the next tests: germination, tetrazolium and cut test (except for Taxus globosa were a small quantity of seed were collected and the only realized test was germination). The results are shown in Table 3.

Table 3.

ID	Species	Sample (N)	Test (% of viability)			Average (% of viability)
			Germination	Cut	Tetrazolium	
1	*Abies hickelii*	100	35	31	29	31
2	*Abies hickelii*	100	30	25	25	27
3	*Abies hickelii*	100	29	31	30	30
4	*Taxus globosa*	10	10	-	-	10
5	*Abies hickelii*	100	50	48	49	49

Plant survival. In addition, the survival of the plant s was evaluated one year after its establishment. For this purpose we follow the next steps: 1) we randomly chose a site where reforestation activities were develop, 2) in the field, we select a sample (90% confidence and 10 sampling error) and visit the plants, 3) we recorded if the plant was alive or dead, its height and vigor. As result of this evaluation we can conclude that 70% od the established plant is alive and growing, we attribute the death of the plant to snowfall recorded during the winter of 2018.

ACHIEVEMENTS AND IMPACTS

Below are the five project's most significant achievements and the significance of each one in relation to the overall objective and objectives of the project:

1. **Sixteen unregistered stands of both species were discovered.** During field explorations we registered unkown stands for the project species (13 of *Taxus globosa* and 4 *Abies hickelii)*. This discovering expand both species altitudinal and latitudinal known distribution in the project area.
2. **Thirdty herbarium specimens.** Before the project, in the XAL hebario (second most important in the country), there were 11 herbarium numbers of *Abies hickelii* and 3 of *Taxus globosa* for the project region. Thanks to our efforts in the field, there are now 36 of *Abies hickelii* (15 more) and 19 of *Taxus globosa* (16 more). These records allow a better understanding of the distribution and conservation status of local populations of these endangered species.
3. **10,000 collected seeds and a lot donated to Mexico National Bank**. We managed to collect enough seeds to produce the compromised plant, study its viability and donate a lot to Mexico National Germplasm Bank for its conservation under controlled conditions in the long term.
4. **2,500 plants established.** Using the records created by the project and climate change scenarios, we selected the sites to establish 2,500 plants (with 70% survival).
5. **1,071 hectares of new protected areas.** Thanks to the collaboration with communities, landowners and the state government, we managed to increase the legally protected area on the mountain by 1,071 hectares. This is of great relevance and now a higher percentage of habitat and populations both species are protected.

CAPACITY DEVELOPMENT

Through the application of what we learned in the leadership workshop, we understand what kind of leaders we were and this strengthened our work team. We also put in practice good practices which allow us to fundraise more economic resourses for the project region.

In addition, by executing the project we were able to increase our skills in the field: species identification, approach and collaboration with local communities, problem-solving, vegetation ecologic meassures. and in the office (development of potential distribution maps, data analysis, database development).

Finally, during the time that the project was active, a person who was volunteering at Pronatura, asked us for the opportunity to do his master's thesis with a project species. This increased our skills and abilities to lead a student's research work..

CONCLUSION

At the end of the project execution, we can conclude that we have successfully achieved the aim, objectives, and activities of the project: the populations of Abies hickelii and Taxus globosa del Cofre de Perote are well identified, legally protected and growing.

Sixteen unregistered stands of both species were discovered; new records that allow a better understanding of the distribution and conservation status of local populations of these endangered species; 2,500 plants established (with 70% survival) and 1,071 hectares of new protected areas.

Besides, awareness of the conservation of species in local actors such as communities, landowners and state and federal government has been achieved.

It is vital to continue strengthening the conservation initiative of these species and monitor during the next years how effective the actions carried out are (such as the creation of protected areas or reforestation).

LEASON LEARNT

What activities and results of the project went well and why? Field explorations and the decree of voluntarily protected areas were the most successful activities of the project, thanks to the support of local communities, landowners and our scientific advisors.

What activities and results of the project have been problematic and in what way, and how has it been overcome? The most problematic activity was the propagation and production of a Taxus globosa plant. We knew of the little success that other projects and research had had when germinating the seeds, so we decided to propagate it vegetatively (cutting) in order to meet the goal.

Briefly evaluate the specific methodologies of the project and the conservation tools used. In general, the methods and tools used were the most appropriate to meet the objectives of the project, although if we had to improve something it would be the method used to model the potential distribution of the species.

Indicate the important lessons learned throughout the project and recommendations for future improvements or modifications to the activities and results of the project. Although conservation projects have a very important research component, the information generated will be of little use if local communities or owners of natural resources are not involved from the start. It is also very important to be able to make alliances between actors from different sectors of society such as government, social, business and academic.

IN THE FUTURE

The species object of the project are a Pronatura's priority in the Cofre de Perote Mountain, so there will be continuous work for long-term preservation. The 2,500 plants of Abies hickelii that remain in the nursery, will be watered and fertilized. Then, they will be established in the rainy season of 2019. Subsequently, the survival of both reforestations (2018 and 2019) will be monitored in 2020 and the results will be compared.

CLP training has allowed us to fundraise economic resources for the project region. Today, we have grants from the Rainforest Trust and the Mexico National Commission of Protected Areas. The objective is to increase the protected area in Cofre de Peroe Mountain and strengthen those already protected through the creation of a regional management program, community surveillance and monitoring actions.

There is also another project in Pronatura that is implemented together with the National University of Mexico and the Royal Botanic Gardens of Kew. The purpose is to generate knowledge of useful tree species of Veracruz State and both, Taxus globosa and Abies hickelii, are a priority for the project.

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FINANCIAL REPORT

Itemized expenses	Total CLP Requested (USD)*	Total CLP Spent (USD)	% Difference	Details & Justification (Justification must be provided if figure in column D is +/- 25%)	Proposed Spending (Preliminary Report Only)
PHASE I - PROJECT PREPARATION					
Communications (telephone/internet/postage)					
Field guide books, maps, journal articles and other printed materials	300.00	300.00	0%		
Insurance					
Visas and permits					
Team training					
Reconnaissance					
Other (Phase 1)					
EQUIPMENT					
Scientific/field equipment and supplies	3,000.00	3040.11	1%		
Photographic equipment	500.00	558.71	12%		
Camping equipment					
Boat/engine/truck (including car hire)					
Other (Equipment)	1,100.00	999.95	-9%		
PHASE II - IMPLEMENTATION					
Accommodation for team members and local guides					
Food for team members and local guides	900.00	922.80	3%		
Travel and local transportation (including fuel)	2,000.00	1967.04	-2%		
Customs and/or port duties					
Workshops					
Outreach/Education activities and materials (brochures, posters, video, t-shirts, etc.)	1,700.00	1500.33	-12%		
Other (Phase 2)	1,000.00	1238.24	24%		
PHASE III - POST-PROJECT EXPENSES					
Administration	1,000.00	1000.00	0%		
Report production and results dissemination	900.00	852.94	-5%		
Other (Phase 3)					
Total	**12,400.00**	**12,380.12**			

APPENDICES

1. CLP Form

Output	Number	Additional Information
Number of CLP Partner Staff involved in mentoring the Project	0	
Number of species assessments contributed to (E.g. IUCN assessments)	0	
Number of site assessments contributed to (E.g. IBA assessments)	0	
Number of NGOs established	0	
Amount of extra funding leveraged ($)	USD $60,000	Rainforest Trust & National Commission of Protected Areas (Mexico)
Number of species discovered/rediscovered	0	
Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation)	0	
Number of species/sites legally protected for biodiversity	5	Five new Voluntary Protected Areas which represents 1,040 hectares
Number of stakeholders actively engaged in species/site conservation management	4	
Number of species/site management plans/strategies developed	0	
Number of stakeholders reached	200	Local communities, local, state and federal authorities & other NGO's
Examples of stakeholder behaviour change brought about by the project.		
Examples of policy change brought about by the project	N/A	
Number of jobs created	3 daily wages * 3 months	
Number of academic papers published	1	Sent to journal
Number of conferences where project results have been presented	1	

2. Letter issued by XALHerbarium about the 31 herbarium numbers donated by the project

INECOL
INSTITUTO DE ECOLOGÍA, A.C.

CONACYT

A QUIEN CORRESPONDA:

Por este medio me permito hacer constar que el M. en C. Jerónimo Vázquez Ramírez depositó en el Herbario XAL de este Instituto, ejemplares botánicos con sus respectivas etiquetas y duplicados de las especies *Taxus globosa* (16) y *Abies hickelii* (15), como respaldo del proyecto "Conservation of two endangered conifers in Eastern Mexico" apoyado por Conservation Leadership Programme. Sin duda alguna este material además de enriquecer nuestra colección será de gran importancia para los usuarios de este acervo.

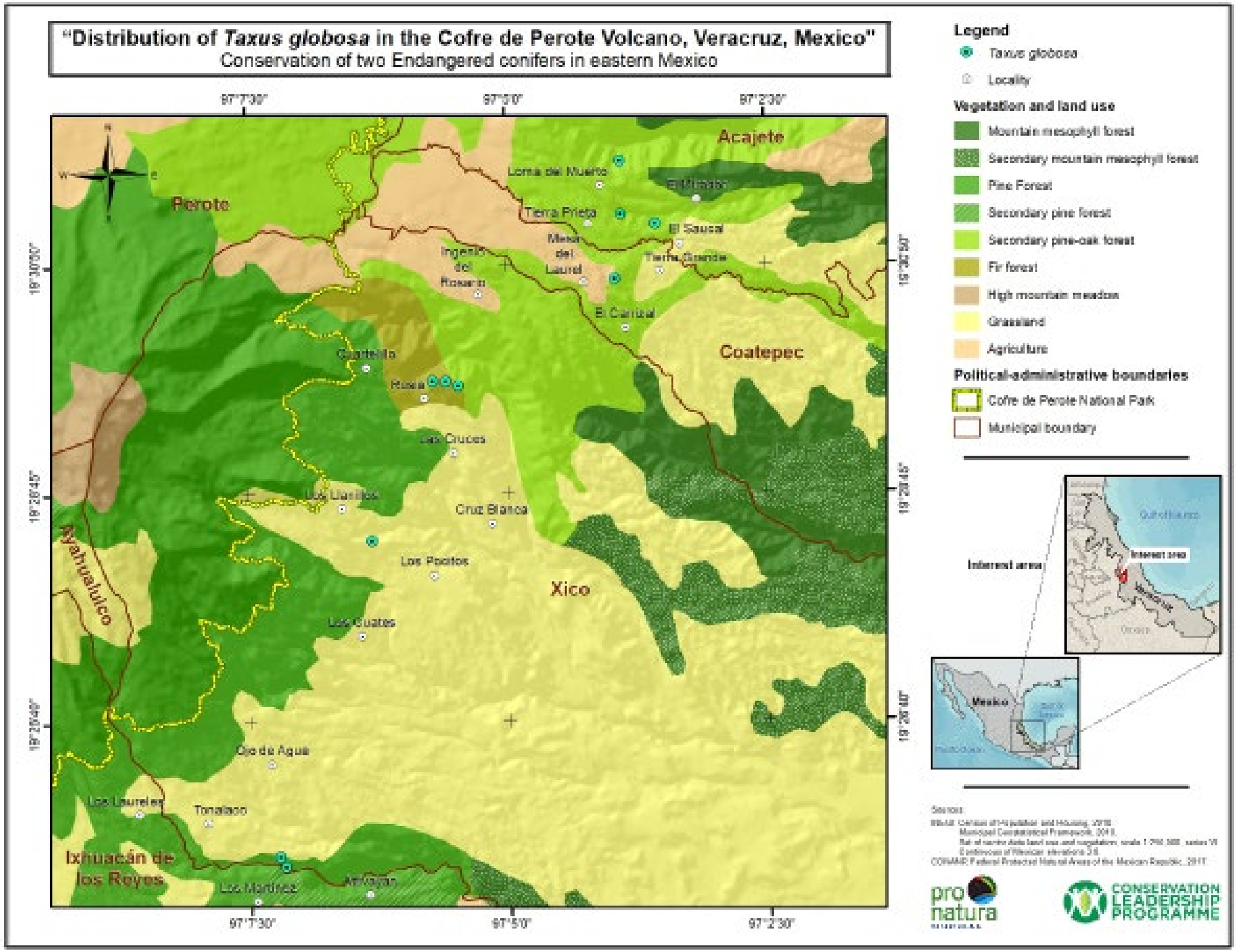
Se extiende la presente a los diez días del mes de julio de 2018.

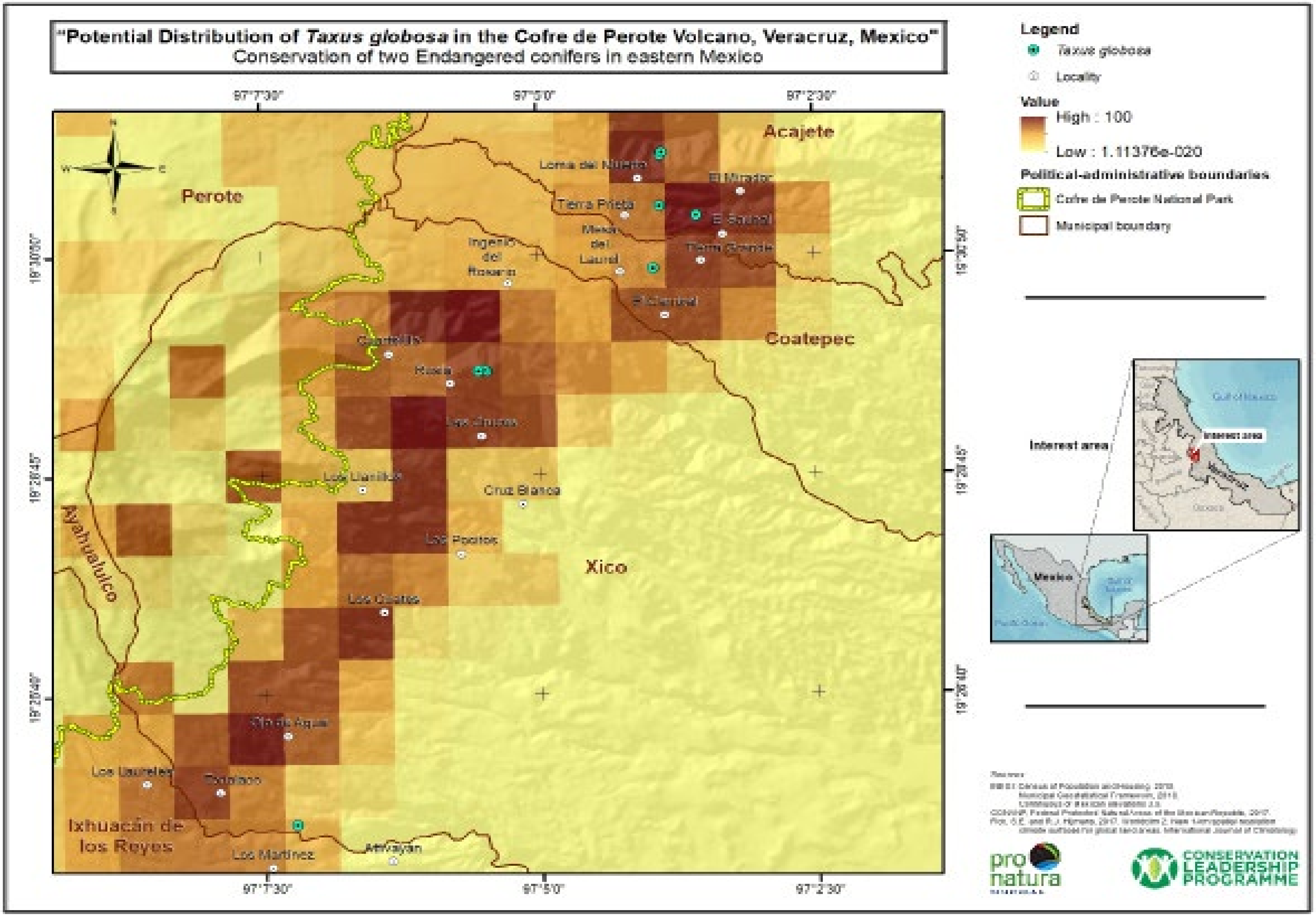
Atentamente,

Dr. Sergio Avendaño Reyes
Curador, Herbario XAL

HERBARIO XAL
Correo electrónico: sergio.avendano@inecol.mx, teléfono (228) 842-1800 Ext. 3112
Carretera antigua a Coatepec 351, El Haya, 91070 Xalapa, Veracruz, México

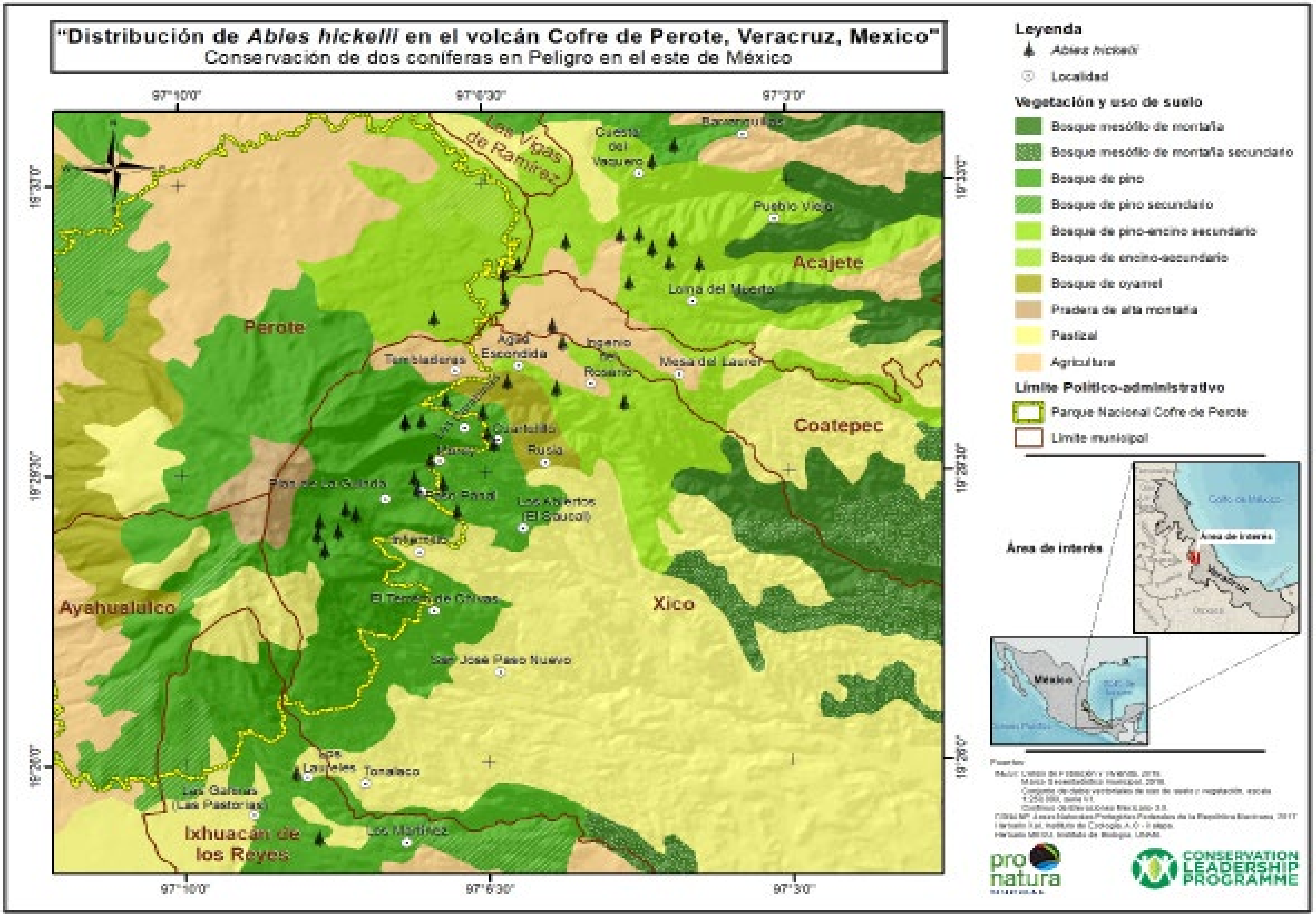
3. Maps of distribution and potential distribution of Abies hickelii and Taxus globosa in the Cofre de Perote Mountain, México.



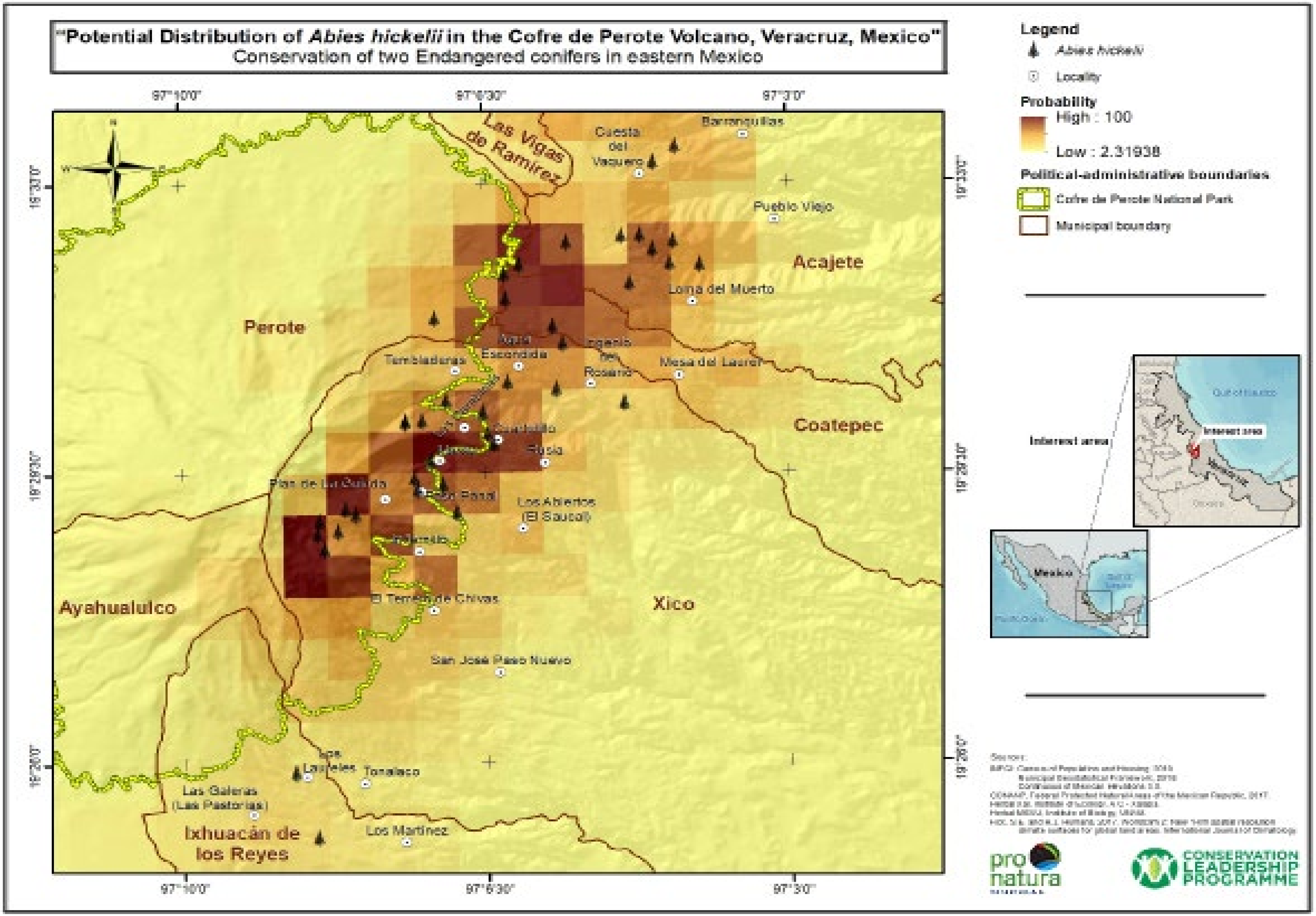

"Potential Distribution of *Taxus globosa* in the Cofre de Perote Volcano, Veracruz, Mexico"
Conservation of two Endangered conifers in eastern Mexico
Legend
Taxus globosa
Locality
Value
High : 100
Low : 1.11376e-020
Political-administrative boundaries
Cofre de Perote National Park
Municipal boundary
97°7'30"
97°5'0"
97°2'30"
19°30'50"
19°28'45"
19°28'40"
Perote
Acajete
Coatepec
Xico
Ayahualulco
Ixhuacán de los Reyes
Loma del Muerto
El Mirador
Tierra Prieta
El Sauzal
Mesa del Laurel
Tierra Grande
Ingenio del Rosario
El Central
Cruz Blanca
Los Pocitos
Los Cuates
Los Llanillos
Las Cruces
Los Laureles
Los Martínez
Interest area
Mexico
Gulf of Mexico
Veracruz
pro natura
CONSERVATION LEADERSHIP PROGRAMME

"Distribución de *Abies hickelii* en el volcán Cofre de Perote, Veracruz, Mexico"

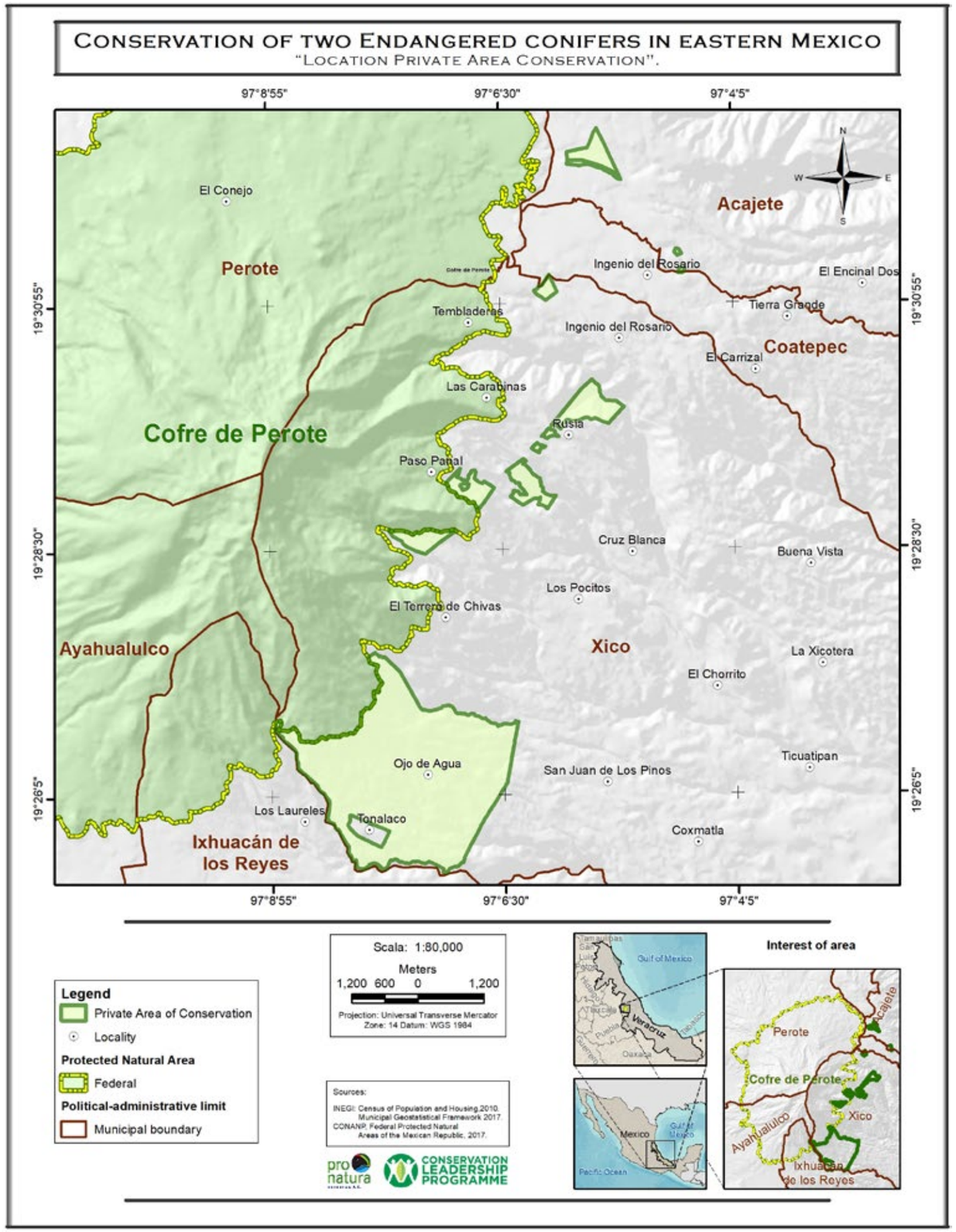
Conservación de dos coníferas en Peligro en el este de México



Leyenda
Abies hickelii
Localidad
Vegetación y uso de suelo
Bosque mesófilo de montaña
Bosque mesófilo de montaña secundario
Bosque de pino
Bosque de pino secundario
Bosque de pino-encino secundario
Bosque de encino-secundario
Bosque de oyamel
Pradera de alta montaña
Pastizal
Agricultura
Límite Político-administrativo
Parque Nacional Cofre de Perote
Límite municipal
Área de interés
Golfo de México
Veracruz
México
97°10'0"
97°6'30"
97°3'0"
19°33'0"
19°29'30"
19°26'0"
Las Vigas de Ramírez
Cuesta del Vaquero
Barrenquillas
Pueblo Viejo
Acajete
Loma del Muerto
Perote
Agua Escondida
Tembladeras
Ingenio del Rosario
Mesa del Laurel
Coatepec
Cuartelillo
Rusia
Plan de La Galera
Los Abiertos (El Saucal)
Infiernillo
El Terreno de Chivas
Ayahualulco
Xico
San José Paso Nuevo
Los Laureles
Tonalaco
Las Gallinas (Las Pastorías)
Ixhuacán de los Reyes
Los Martínez
Fuentes:
pro natura
CONSERVATION LEADERSHIP PROGRAMME


"Potential Distribution of Abies hickelii in the Cofre de Perote Volcano, Veracruz, Mexico"
Conservation of two Endangered conifers in eastern Mexico
Legend
Abies hickelii
Locality
Probability
High : 100
Low : 2.31938
Political-administrative boundaries
Cofre de Perote National Park
Municipal boundary
Interest area
Mexico
97°10'0"
97°6'30"
97°3'0"
19°33'0"
19°29'30"
19°26'0"
Las Vigas de Ramírez
Cuesta del Vaquero
Barranquillas
Pueblo Viejo
Acajete
Loma del Muerto
Perote
Agua Escondida
Ingenio del Rosario
Mesa del Laurel
Tembladeras
Coatepec
Rusia
Plan de La Guinda
Los Abiertos (El Saucal)
El Terrero de Chivas
Ayahualulco
Xico
San José Paso Nuevo
Los Laureles
Tonalaco
Las Galeras (Las Pastorías)
Ixhuacán de los Reyes
Los Martínez
Sources:
pro natura
CONSERVATION LEADERSHIP PROGRAMME

4. Location of the created voluntary Protected Areas



5. Informative signs placed in the new Protected Areas

6. Certificates of Private Protected Area issued by the Ministry of Environment of the State of Veracruz

SEDEMA
ESTADO DE VERACRUZ

El Gobierno del Estado de Veracruz de Ignacio de la Llave a través de la Secretaría de Medio Ambiente, con fundamento en lo dispuesto por los artículos 73 al 76 y 78 de la Ley Nº 62 Estatal de Protección Ambiental, tiene a bien emitir el presente:

CERTIFICADO

Número: SEDEMA/DGGARN-APC/271/2018

Al C. Aurelio Morales Monfil, por constituir voluntariamente **1-00-00 has.**, de su propiedad como **Área Privada de Conservación** en la categoría de **Reserva Privada de Conservación** denominada **"Ingenio del Rosario"**, con una vigencia de **Veinte años**, siempre y cuando se dé cumplimiento a los lineamientos de conservación que forman parte integral del presente y con el objetivo de implementar acciones de protección, conservación y desarrollo sustentable; este predio se localiza en el municipio de Coatepec, Ver., el cual presenta Ubicación en el municipio de Coatepec, Veracruz, el cual no presenta colindancias, por ser **Tierras de Uso Común** ; denominándose en lo sucesivo:

RESERVA PRIVADA DE CONSERVACIÓN

"INGENIO DEL ROSARIO"

El presente certificado no prejuzga en relación a los derechos de propiedad o posesión del predio ni sus medidas y colindancias y no podrá ser empleado para acreditar derechos patrimoniales.

MTRA. MARIANA AGUILAR LOPEZ
SECRETARIA DE MEDIO AMBIENTE

Xalapa, Ver., a 19 de febrero de 2018

SEDEMA
ESTADO DE VERACRUZ

El Gobierno del Estado de Veracruz de Ignacio de la Llave a través de la Secretaría de Medio Ambiente, con fundamento en lo dispuesto por los artículos 73 al 76 y 78 de la Ley Nº 62 Estatal de Protección Ambiental, tiene a bien emitir el presente:

CERTIFICADO

Número: SEDEMA/DGGARN-APC/362/2018

A los Propietarios del Ejido "Tonalaco" Representados Legalmente por el C. Catarino Ruiz Cortez, por constituir voluntariamente **1,005-84-939 has.**, como **Área Privada de Conservación** en la categoría de **Reserva Privada de Conservación** denominada: **"Ejido Tonalaco"**, con una vigencia de **Diez años**, siempre y cuando se dé cumplimiento a los lineamientos de conservación que forman parte integral del presente y con el objetivo de implementar acciones de protección, conservación y desarrollo sustentable; este predio se localiza en el municipio de Xico, Ver., con las siguientes colindancias y delimitaciones: al Norte con el Cofre de Perote; al Este con ejido "Tlacuilolan"; al Sur con el municipio de Ixhuacán de los Reyes ; al Oeste con el ejido "San José de los Laureles" municipio Ixhuacán de los Reyes ; denominándose en lo sucesivo:

RESERVA PRIVADA DE CONSERVACIÓN

"EJIDO TONALACO"

El presente certificado no prejuzga en relación a los derechos de propiedad o posesión del predio ni sus medidas y colindancias y no podrá ser empleado para acreditar derechos patrimoniales.

MTRA. MARIANA AGUILAR LOPEZ
SECRETARIA DE MEDIO AMBIENTE

Xalapa, Ver., a 30 de octubre de 2018

SEDEMA
ESTADO DE VERACRUZ

El Gobierno del Estado de Veracruz de Ignacio de la Llave a través de la Secretaría de Medio Ambiente, con fundamento en lo dispuesto por los artículos 73 al 76 y 78 de la Ley Nº 62 Estatal de Protección Ambiental, tiene a bien emitir el presente:

CERTIFICADO

Número: SEDEMA/DGGARN-APC/272/2018

Al C. Félix Aguilar Morales, por constituir voluntariamente **1-00-00 has.**, de su propiedad como **Área Privada de Conservación** en la categoría de **Reserva Privada de Conservación** denominada **"La Posilla"**, con una vigencia de **Veinte años**, siempre y cuando se dé cumplimiento a los lineamientos de conservación que forman parte integral del presente y con el objetivo de implementar acciones de protección, conservación y desarrollo sustentable; este predio se localiza en el municipio de Coatepec, Ver., el cual presenta Ubicación en el municipio de Coatepec, Veracruz, el cual no presenta colindancias, por ser **Tierras de Uso Común** ; denominándose en lo sucesivo:

RESERVA PRIVADA DE CONSERVACIÓN

"LA POSILLA"

El presente certificado no prejuzga en relación a los derechos de propiedad o posesión del predio ni sus medidas y colindancias y no podrá ser empleado para acreditar derechos patrimoniales.

MTRA. MARIANA AGUILAR LÓPEZ
SECRETARIA DE MEDIO AMBIENTE

Xalapa, Ver., a 19 de febrero de 2018

SEDEMA
ESTADO DE VERACRUZ

El Gobierno del Estado de Veracruz de Ignacio de la Llave a través de la Secretaría de Medio Ambiente, con fundamento en lo dispuesto por los artículos 73 al 76 y 78 de la Ley Nº 62 Estatal de Protección Ambiental, tiene a bien emitir el presente:

CERTIFICADO

Número: SEDEMA/DGGARN-APC/358/2018

A los C. Arturo Orozco Marthen y el C. Luis Bello Estrada, por constituir voluntariamente **28-25-95 ha**, de su propiedad como **Área Privada de Conservación** en la categoría de **Reserva Privada de Conservación** denominada **"Acueducto 1"**, con una vigencia de Noventa y nueve años, siempre y cuando se dé cumplimiento a los lineamientos de conservación que forman parte integral del presente y con el objetivo de implementar acciones de protección, conservación y desarrollo sustentable; este predio se localiza en el municipio de Acajete, Ver., con las siguientes Colindancias: al Norte con la propiedad de Martín Carmona; al Sur con la propiedad de Raúl González Náñez; al Oeste con la propiedad de Genero Carmona; al Este con la propiedad de Blas Martínez y Herón Morales; denominándose en lo sucesivo:

RESERVA PRIVADA DE CONSERVACIÓN

"ACUEDUCTO 1"

El presente certificado no prejuzga en relación a los derechos de propiedad o posesión del predio ni sus medidas y colindancias y no podrá ser empleado para acreditar derechos patrimoniales.

MTRA. MARIANA AGUILAR LÓPEZ
SECRETARIA DE MEDIO AMBIENTE

Xalapa, Ver., a 13 de julio de 2018

SEDEMA
ESTADO DE VERACRUZ

El Gobierno del Estado de Veracruz de Ignacio de la Llave a través de la Secretaría de Medio Ambiente, con fundamento en lo dispuesto por los artículos 73 al 76 y 78 de la Ley Nº 62 Estatal de Protección Ambiental, tiene a bien emitir el presente:

CERTIFICADO

Número: SEDEMA/DGGARN-APC/359/2018

A los C. Arturo Orozco Marthen y el C. Luis Bello Estrada, por constituir voluntariamente **5-78-6-6373 ha**, de su propiedad como **Área Privada de Conservación** en la categoría de **Reserva Privada de Conservación** denominada **"Acueducto 2"**, con una vigencia de Noventa y nueve años, siempre y cuando se dé cumplimiento a los lineamientos de conservación que forman parte integral del presente y con el objetivo de implementar acciones de protección, conservación y desarrollo sustentable; este predio se localiza en el municipio de Acajete, Ver., con las siguientes Colindancias: al Norte con la propiedad de Arturo Orozco; al Sur con el camino a Las Vigas; al Este con la propiedad de Arturo Orozco; al Oeste con el mismo predio; denominándose en lo sucesivo:

RESERVA PRIVADA DE CONSERVACIÓN

"ACUEDUCTO 2"

El presente certificado no prejuzga en relación a los derechos de propiedad o posesión del predio ni sus medidas y colindancias y no podrá ser empleado para acreditar derechos patrimoniales.

MTRA. MARIANA AGUILAR LÓPEZ
SECRETARIA DE MEDIO AMBIENTE

Xalapa, Ver., a 13 de julio de 2018

SEDEMA
ESTADO DE VERACRUZ

El Gobierno del Estado de Veracruz de Ignacio de la Llave a través de la Secretaría de Medio Ambiente, con fundamento en lo dispuesto por los artículos 73 al 76 y 78 de la Ley Nº 62 Estatal de Protección Ambiental, tiene a bien emitir el presente:

CERTIFICADO

Número: SEDEMA/DGGARN-APC/266/2018

A la C. Hermelinda Martínez Alarcón, por constituir voluntariamente **9-30-33.36 has.**, de su propiedad como **Área Privada de Conservación** en la categoría de **Reserva Privada de Conservación** denominada **"Las Palomas II"**, con una vigencia de **Veinte años**, siempre y cuando se dé cumplimiento a los lineamientos de conservación que forman parte integral del presente y con el objetivo de implementar acciones de protección, conservación y desarrollo sustentable; este predio se localiza en el municipio de Coatepec, Ver., con las siguientes colindancias: Al **Noreste** con tierras de uso común zona 1 ; al **Sureste** con tierras de uso común zona 1; al **Suroeste** con tierras de uso común zona 1; al **Noroeste** con Parcela 8 y tierras de uso común zona 1; denominándose en lo sucesivo:

RESERVA PRIVADA DE CONSERVACIÓN

"LAS PALOMAS II"

El presente certificado no prejuzga en relación a los derechos de propiedad o posesión del predio ni sus medidas y colindancias y no podrá ser empleado para acreditar derechos patrimoniales.

MTRA. MARIANA AGUILAR LÓPEZ
SECRETARIA DE MEDIO AMBIENTE

Xalapa, Ver., a 14 de febrero de 2018