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Supplementary Material

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Table S1. Endemic conifers of the *Sierra Madre Occidental*, Mexico, and their current conservation status.

Taxon	Threat category	
	IUCN	**NOM-059**
Cupressaceae		
Juniperus blancoi var. *huehuentensis* R. P. Adams, S. González & M. González	VU	--
J. blancoi var. *mucronata* (R. P. Adams) Farjon	VU	--
J. deppeana var. *robusta* Martínez	VU	--
J. durangensis var. *durangensis* Martínez	LC	--
J. durangensis var. *topiensis* R. P. Adams & S. González	--	--
J. poblana var. *decurrens* R. P. Adams	--	--
Pinaceae		
Abies durangensis Martínez	LC	--
A. neodurangensis Debreczy, I. Rácz & R. M. Salazar	--	--
Picea chihuahuana Martínez	EN	P

Pinus cooperi C. E. Blanco	VU	--
P. gordoniana var. *sinaloensis* (Debreczy & I. Rácz) Frankis	--	--
P. maximartinezii Rzed.	EN	P
P. yecorensis Debreczy & I. Rácz	--	--

IUCN = International Union for Conservation of Nature; NOM-059 = NOM-059-SEMARNAT-2010. VU = Vulnerable; LC = Least Concern; EN = Endangered. P = Endangered. -- = Taxon not included in the lists.

Table S2. Assessments of *Juniperus blancoi* var. *huehuentensis* R. P. Adams, S. González & M. González in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**EN B1+2ab(v);C2(ii);D1**
	NOM-059-SEMARNAT-2010	**P**
	IUCN Red List	
Criteria		**Assessment**
A. Population size reduction		
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.		
(a) Direct observation [except A3]		
(b) An index of abundance appropriate to the taxon		
(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality		
(d) Actual or potential levels of exploitation		
(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites		
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.		
>90 %=CR; >70 %=EN; >50 %=VU		
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).		
>80 %=CR; >50 %=EN; >30 %=VU		

A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible. >80 %=CR; >50 %=EN; >30 %=VU	
B. Geographical distribution	EN B1
B1. Extent of occurrence (*EOO*) <100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU	-2 233 km^2-
B2. Area of occupancy (*AOO*) <10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU	
And at least 2 of the following 3 conditions:	EN a -3 locs-b(v)
(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU	
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area, extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals	
(c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.	
C. Small population size and decline	EN
Number of mature individuals <250=CR; <2 500=EN; <10 000=VU	300 ind (Mastretta-Yanes et al., 2012)
And at least one of C1 or C2:	
C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future): 25 % in 3 years or 1 generation (whichever is longer)=CR 20 % in 5 years or 2 generations=EN 10 % in 10 years or 3 generations=VU	
C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions:	EN C2(ii)
(i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU	
(ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU	
(iii) Extreme fluctuations in the number of mature individuals	
D. Very small or restricted population	
D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU	EN D1
D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time. Typically: if *AOO*<20 km^2 or number of locations <5=VU	
E. Risk of extinction in wildlife	

If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR

If ≥20 % within 20 years or 5 generations=EN

≥10 % within 100 years=VU

Result	EN B1+2ab(v);C2(ii);D1
Notes	This taxon should be reclassified as EN

MERE of plants

A. Geographical distribution $\left(\frac{Total\ score}{11}\right)$	0.81
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present).	3
(a) The range is less than or equal to 1 km^2=4	
(b) The range covers more than 1 km^2 but less than 1 % of the country=3	
(c) The range covers >1-<5 % of the country=2	
(d) The range covers >5-<40 % of the country=1	
(e) The range covers >40 % of the country=0	
(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000).	3
(a) 1-3=3	
(b) 4-8=2	
(c) 9-25=1	
(d) Greater than or equal to 26=0	
(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México.	3
If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points.	
(a) 1=3	
(b) 2-3=2	

(c) 4-5=1

(d) Greater than or equal to 6

(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. (a) Peripheral or extralimital distribution=1 (b) Non-peripheral or extralimital distribution=0	0
B. Habitat	0.89

$$\left(\frac{Total\ score}{9}\right)$$

(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. (a) 1=3 (b) 2=2 (c) 3=1 (d) Greater than or equal to 4=0	3
(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). (a) Yes=1 (b) No=0	1

(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). (a) Yes=1 (b) No=0	1
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas. (a) Yes=1 (b) No=0	0
(5) Altitudinal range of the taxon. (a) Less than 200 m=3 (b) 200 m-<500 m=2 (c) 500 m-<1 000 m=1 (d) Greater than or equal to 1 000 m=0	3
C. Vulnerability $\left(\frac{Total\ score}{25}\right)$	0.35
C1. Demographics (If no information is available, assign a value of 0)	
(1) Total number of individuals (If no information is available, assign a value of 0) (a) Less than or equal to 500=3 (b) 501-5 000=2 (c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	3
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]).	0

(a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	0
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	1
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0
(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the	

variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]).

(a) Low (=10 %)=1

(b) High (>10 %)=0

(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1).

(a) Low (=20 %)=0

(b) High (>20 %)=1

(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. 1

(a) Low=1

(b) High=0

(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). 1

(a) Low=0

(b) High=1

C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).

(1) Does the taxon require a nurse for its establishment? 0

(a) No=0

(b) Yes=1

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and 0

Parmelia constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). (a) No=0 (b) Yes=1	
(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). (a) No=0 (b) Yes=1	0
(4) Does the taxon have a specific dispersal mechanism? (a) No=0 (b) Yes=1	0
(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). (a) No=0 (b) Yes=1	0
(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). (a) No=0 (b) Yes=1	1
(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? (a) No=0 (b) Yes=1	0
D. Impact of human activity $\left(\frac{Total\ score}{10}\right)$	0.2
(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. (a) The plant benefits from the disturbance=-1 (b) It does not affect the plant, or it is unknown=0 (c) The plant is affected by the disturbance=1	0
(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing,	1

or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight.

(a) The remaining habitat does not support the viability of existing populations=4

(b) The impact is significant and affects all populations=3

(c) The impact is severe in some, or moderate across all populations=2

(d) The impact is moderate and affects only a few populations=1

(e) There is no significant impact on any population=0

(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? 1

(a) No=0

(b) Yes=1

(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. 0

(a) The impact of its use involves the removal of populations=4

(b) The impact of its use is significant and affects all populations=3

(c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	2.25

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S3. Assessments of *Juniperus blancoi* var. *mucronata* (R. P. Adams) Farjon in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**VU B1+b(i,iii)**
	NOM-059-SEMARNAT-2010	**Pr**
	IUCN Red List Criteria	**Assessment**
A. Population size reduction		

Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.

(a) Direct observation [except A3]

(b) An index of abundance appropriate to the taxon

(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality

(d) Actual or potential levels of exploitation

(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.

>90 %=CR; >70 %=EN; >50 %=VU

A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.

>80 %=CR; >50 %=EN; >30 %=VU

A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).

>80 %=CR; >50 %=EN; >30 %=VU

A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.

>80 %=CR; >50 %=EN; >30 %=VU

B. Geographical distribution — VU B1

B1. Extent of occurrence (*EOO*) — -11 311 km^2-

<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU

B2. Area of occupancy (*AOO*)

<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU

And at least 2 of the following 3 conditions: — VU b(i,iii)

(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU

(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area, extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals

(c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.

C. Small population size and decline

Number of mature individuals

<250=CR; <2 500=EN; <10 000=VU

And at least one of C1 or C2:

C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future):

25 % in 3 years or 1 generation (whichever is longer)=CR

20 % in 5 years or 2 generations=EN

10 % in 10 years or 3 generations=VU

C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions:

(i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU

(ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU

(iii) Extreme fluctuations in the number of mature individuals

D. Very small or restricted population

D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU

D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.

Typically: if *AOO*<20 km^2 or number of locations <5=VU

E. Risk of extinction in wildlife

If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR

If ≥20 % within 20 years or 5 generations=EN

≥10 % within 100 years=VU

Result	VU B1b(i,iii)
Notes	The VU category remains in place, with additional criteria

MERE of plants

A. Geographical distribution $\left(\frac{Total\ score}{11}\right)$	0.64
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1 (e) The range covers >40 % of the country=0	3

(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). 1

(a) 1-3=3

(b) 4-8=2

(c) 9-25=1

(d) Greater than or equal to 26=0

(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. 3

If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points.

(a) 1=3

(b) 2-3=2

(c) 4-5=1

(d) Greater than or equal to 6

(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. 0

(a) Peripheral or extralimital distribution=1

(b) Non-peripheral or extralimital distribution=0

B. Habitat 0.66

$$\left(\frac{Total\ score}{9}\right)$$

(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. 3

(a) 1=3

(b) 2=2

(c) 3=1

(d) Greater than or equal to 4=0

(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003).	1
(a) Yes=1	
(b) No=0	
(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994).	1
(a) Yes=1	
(b) No=0	
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas.	0
(a) Yes=1	
(b) No=0	
(5) Altitudinal range of the taxon.	1
(a) Less than 200 m=3	
(b) 200 m-<500 m=2	
(c) 500 m-<1 000 m=1	
(d) Greater than or equal to 1 000m=0	
C. Vulnerability	0.13
$\left(\frac{Total\ score}{25}\right)$	
C1. Demographics (If no information is available, assign a value of 0)	0
(1) Total number of individuals (If no information is available, assign a value of 0)	
(a) Less than or equal to 500=3	

(b) 501-5 000=2 (c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	0
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	0
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	1
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0

(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]). (a) Low (=10 %)=1 (b) High (>10 %)=0	
(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1). (a) Low (=20 %)=0 (b) High (>20 %)=1	
(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. (a) Low=1 (b) High=0	0
(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). (a) Low=0 (b) High=1	0

C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).

(1) Does the taxon require a nurse for its establishment? 0

(a) No=0

(b) Yes=1

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). 0

(a) No=0

(b) Yes=1

(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). 0

(a) No=0

(b) Yes=1

(4) Does the taxon have a specific dispersal mechanism? 0

(a) No=0

(b) Yes=1

(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). 0

(a) No=0

(b) Yes=1

(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). 1

(a) No=0

(b) Yes=1

(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? 0

(a) No=0

(b) Yes=1

D. Impact of human activity 0.2

$$\left(\frac{Total\ score}{10}\right)$$

(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. 0

(a) The plant benefits from the disturbance=-1

(b) It does not affect the plant, or it is unknown=0

(c) The plant is affected by the disturbance=1

(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. 1

(a) The remaining habitat does not support the viability of existing populations=4

(b) The impact is significant and affects all populations=3

(c) The impact is severe in some, or moderate across all populations=2

(d) The impact is moderate and affects only a few populations=1

(e) There is no significant impact on any population=0

(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? 1

(a) No=0

(b) Yes=1

(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	0
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	1.63

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S4. Assessments of *Juniperus deppeana* var. *robusta* Martínez in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**VU B2b(iii)**
	NOM-059-SEMARNAT-2010	**--**
	IUCN Red List Criteria	**Assessment**
A. Population size reduction		
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.		
(a) Direct observation [except A3]		
(b) An index of abundance appropriate to the taxon		
(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality		
(d) Actual or potential levels of exploitation		
(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites		
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.		
>90 %=CR; >70 %=EN; >50 %=VU		
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).		
>80 %=CR; >50 %=EN; >30 %=VU		
A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
B. Geographical distribution		LC
B1. Extent of occurrence (*EOO*)		-119 442 km^2-
<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU		
B2. Area of occupancy (*AOO*)		
<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU		
And at least 2 of the following 3 conditions:		VU b(iii)
(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU		
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area,		

extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals (c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals. C. Small population size and decline Number of mature individuals <250=CR; <2 500=EN; <10 000=VU And at least one of C1 or C2: C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future): 25 % in 3 years or 1 generation (whichever is longer)=CR 20 % in 5 years or 2 generations=EN 10 % in 10 years or 3 generations=VU C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions: (i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU (ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU (iii) Extreme fluctuations in the number of mature individuals D. Very small or restricted population D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time. Typically: if *AOO*<20 km^2 or number of locations <5=VU E. Risk of extinction in wildlife If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR If ≥20 % within 20 years or 5 generations=EN ≥10 % within 100 years=VU	
Result	VU B2b(iii)
Notes	Although the *EOO* is too large for the VU category, it is recommended that it remain in that category, given the lack of demographic data to help assess its risk

MERE of plants

A. Geographical distribution	0.36

$\left(\frac{Total\ score}{11}\right)$	1
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1 (e) The range covers >40 % of the country=0	
(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). (a) 1-3=3 (b) 4-8=2 (c) 9-25=1 (d) Greater than or equal to 26=0	0
(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points. (a) 1=3 (b) 2-3=2 (c) 4-5=1 (d) Greater than or equal to 6	3
(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. (a) Peripheral or extralimital distribution=1 (b) Non-peripheral or extralimital distribution=0	0
B. Habitat	0.44

$$\left(\frac{Total\ score}{9}\right)$$

(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. (a) 1=3 (b) 2=2 (c) 3=1 (d) Greater than or equal to 4=0	3
(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). (a) Yes=1 (b) No=0	0
(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). (a) Yes=1 (b) No=0	1
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas.	0

(a) Yes=1
(b) No=0

(5) Altitudinal range of the taxon. 0
(a) Less than 200 m=3
(b) 200 m-<500 m=2
(c) 500 m-<1 000 m=1
(d) Greater than or equal to 1 000m=0

C. Vulnerability 0.17

$$\left(\frac{Total\ score}{25}\right)$$

C1. Demographics (If no information is available, assign a value of 0)

(1) Total number of individuals (If no information is available, assign a value of 0) 0
(a) Less than or equal to 500=3
(b) 501-5 000=2
(c) 5 001-50 000=1
(d) Greater than or equal to 50 001=0

(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). 0
(a) Recruitment observations have been made in all populations=0
(b) There are reports of recruitment in some populations=2
(c) There are reports of a lack of recruitment across all populations=4

(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. 0
Yes=1
No=0

(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	1
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	1
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0
(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]). (a) Low (=10 %)=1 (b) High (>10 %)=0	
(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related	

species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1). (a) Low (=20 %)=0 (b) High (>20 %)=1	
(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. (a) Low=1 (b) High=0	0
(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). (a) Low=0 (b) High=1	0
C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).	
(1) Does the taxon require a nurse for its establishment? (a) No=0 (b) Yes=1	0
(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). (a) No=0 (b) Yes=1	0

(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). (a) No=0 (b) Yes=1	0
(4) Does the taxon have a specific dispersal mechanism? (a) No=0 (b) Yes=1	0
(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). (a) No=0 (b) Yes=1	0
(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). (a) No=0 (b) Yes=1	1
(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? (a) No=0 (b) Yes=1	0
D. Impact of human activity $\left(\frac{Total\ score}{10}\right)$	0.2
(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. (a) The plant benefits from the disturbance=-1 (b) It does not affect the plant, or it is unknown=0 (c) The plant is affected by the disturbance=1	0
(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in	0

ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. (a) The remaining habitat does not support the viability of existing populations=4 (b) The impact is significant and affects all populations=3 (c) The impact is severe in some, or moderate across all populations=2 (d) The impact is moderate and affects only a few populations=1 (e) There is no significant impact on any population=0	
(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? (a) No=0 (b) Yes=1	1
(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	1

(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	1.17

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S5. Assessments of *Juniperus durangensis* var. *durangensis* Martínez in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**LC**
	NOM-059-SEMARNAT-2010	**--**
	IUCN Red List	
Criteria		**Assessment**
A. Population size reduction		

Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.

(a) Direct observation [except A3]

(b) An index of abundance appropriate to the taxon

(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality

(d) Actual or potential levels of exploitation

(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.

>90 %=CR; >70 %=EN; >50 %=VU

A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.

>80 %=CR; >50 %=EN; >30 %=VU

A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).

>80 %=CR; >50 %=EN; >30 %=VU

A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.

>80 %=CR; >50 %=EN; >30 %=VU

B. Geographical distribution — LC

B1. Extent of occurrence (*EOO*) — -148 348 km^2-

<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU

B2. Area of occupancy (*AOO*)

<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU

And at least 2 of the following 3 conditions:

(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU

(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area, extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals

(c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.

C. Small population size and decline

Number of mature individuals

<250=CR; <2 500=EN; <10 000=VU

And at least one of C1 or C2:

C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future):

25 % in 3 years or 1 generation (whichever is longer)=CR

20 % in 5 years or 2 generations=EN

10 % in 10 years or 3 generations=VU

C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions:

(i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU

(ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU

(iii) Extreme fluctuations in the number of mature individuals

D. Very small or restricted population

D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU

D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.

Typically: if *AOO*<20 km^2 or number of locations <5=VU

E. Risk of extinction in wildlife

If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR

If ≥20 % within 20 years or 5 generations=EN

≥10 % within 100 years=VU

Result	LC
Notes	It is recommended that it remain in the same category, as it is one of the most common and widely distributed endemic conifers

MERE of plants

A. Geographical distribution $\left(\frac{Total\ score}{11}\right)$	0.36
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1	1

(e) The range covers >40 % of the country=0

(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). 0

(a) 1-3=3

(b) 4-8=2

(c) 9-25=1

(d) Greater than or equal to 26=0

(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. 3

If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points.

(a) 1=3

(b) 2-3=2

(c) 4-5=1

(d) Greater than or equal to 6

(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. 0

(a) Peripheral or extralimital distribution=1

(b) Non-peripheral or extralimital distribution=0

B. Habitat 0.33

$$\left(\frac{Total\ score}{9}\right)$$

(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. 3

(a) 1=3

(b) 2=2

(c) 3=1

(d) Greater than or equal to 4=0

(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). 0

(a) Yes=1

(b) No=0

(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). 0

(a) Yes=1

(b) No=0

(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas. 0

(a) Yes=1

(b) No=0

(5) Altitudinal range of the taxon. 0

(a) Less than 200 m=3

(b) 200 m-<500 m=2

(c) 500 m-<1 000 m=1

(d) Greater than or equal to 1 000m=0

C. Vulnerability 0.17

$$\left(\frac{Total\ score}{25}\right)$$

C1. Demographics (If no information is available, assign a value of 0)

(1) Total number of individuals (If no information is available, assign a value of 0) 0

(a) Less than or equal to 500=3

(b) 501-5 000=2 (c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	0
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	1
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	1
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0

(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]). (a) Low (=10 %)=1 (b) High (>10 %)=0	
(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1). (a) Low (=20 %)=0 (b) High (>20 %)=1	
(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. (a) Low=1 (b) High=0	0
(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). (a) Low=0 (b) High=1	0

C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).

(1) Does the taxon require a nurse for its establishment? 0

(a) No=0

(b) Yes=1

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). 0

(a) No=0

(b) Yes=1

(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). 0

(a) No=0

(b) Yes=1

(4) Does the taxon have a specific dispersal mechanism? 0

(a) No=0

(b) Yes=1

(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). 0

(a) No=0

(b) Yes=1

(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). 1

(a) No=0

(b) Yes=1

(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? 0

(a) No=0

(b) Yes=1

D. Impact of human activity $\left(\frac{Total\ score}{10}\right)$	0.2
(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. (a) The plant benefits from the disturbance=-1 (b) It does not affect the plant, or it is unknown=0 (c) The plant is affected by the disturbance=1	0
(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. (a) The remaining habitat does not support the viability of existing populations=4 (b) The impact is significant and affects all populations=3 (c) The impact is severe in some, or moderate across all populations=2 (d) The impact is moderate and affects only a few populations=1 (e) There is no significant impact on any population=0	1
(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? (a) No=0 (b) Yes=1	0

(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	1
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	1.07

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S6. Assessments of *Juniperus durangensis* var. *topiensis* R. P. Adams & S. González in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**EN B1+2ab(iii);D1**
	NOM-059-SEMARNAT-2010	**A**
	IUCN Red List	
	Criteria	**Assessment**
A. Population size reduction		
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.		
(a) Direct observation [except A3]		
(b) An index of abundance appropriate to the taxon		
(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality		
(d) Actual or potential levels of exploitation		
(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites		
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.		
>90 %=CR; >70 %=EN; >50 %=VU		
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).		
>80 %=CR; >50 %=EN; >30 %=VU		
A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
B. Geographical distribution		EN B1
B1. Extent of occurrence (*EOO*)		-646 km^2-
<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU		
B2. Area of occupancy (*AOO*)		
<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU		
And at least 2 of the following 3 conditions:		EN
(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU		a-3 locs-b(iii)
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area,		

extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals (c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals. C. Small population size and decline Number of mature individuals <250=CR; <2 500=EN; <10 000=VU And at least one of C1 or C2: C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future): 25 % in 3 years or 1 generation (whichever is longer)=CR 20 % in 5 years or 2 generations=EN 10 % in 10 years or 3 generations=VU C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions: (i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU (ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU (iii) Extreme fluctuations in the number of mature individuals D. Very small or restricted population	
D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU	EN D1
D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time. Typically: if *AOO*<20 km^2 or number of locations <5=VU E. Risk of extinction in wildlife If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR If ≥20 % within 20 years or 5 generations=EN ≥10 % within 100 years=VU	
Result	EN B1+2ab(iii);D1
Notes	Its inclusion on the Red List should be a priority

MERE of plants

A. Geographical distribution	0.82
$\left(\frac{Total\ score}{11}\right)$	
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest	3

continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present).

(a) The range is less than or equal to 1 km^2=4

(b) The range covers more than 1 km^2 but less than 1 % of the country=3

(c) The range covers >1-<5 % of the country=2

(d) The range covers >5-<40 % of the country=1

(e) The range covers >40 % of the country=0

(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). 3

(a) 1-3=3

(b) 4-8=2

(c) 9-25=1

(d) Greater than or equal to 26=0

(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. 3

If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points.

(a) 1=3

(b) 2-3=2

(c) 4-5=1

(d) Greater than or equal to 6

(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. 0

(a) Peripheral or extralimital distribution=1

(b) Non-peripheral or extralimital distribution=0

B. Habitat 0.55

$$\left(\frac{Total\ score}{9}\right)$$

(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone 3

between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. (a) 1=3 (b) 2=2 (c) 3=1 (d) Greater than or equal to 4=0	
(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). (a) Yes=1 (b) No=0	0
(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). (a) Yes=1 (b) No=0	0
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas. (a) Yes=1 (b) No=0	0
(5) Altitudinal range of the taxon. (a) Less than 200 m=3 (b) 200 m-<500 m=2 (c) 500 m-<1 000 m=1 (d) Greater than or equal to 1 000m=0	2

C. Vulnerability $\left(\frac{Total\ score}{25}\right)$	0.26
C1. Demographics (If no information is available, assign a value of 0)	0
(1) Total number of individuals (If no information is available, assign a value of 0) (a) Less than or equal to 500=3 (b) 501-5 000=2 (c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	0
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	1
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0

(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	1
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0
(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]). (a) Low (=10 %)=1 (b) High (>10 %)=0	1
(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1). (a) Low (=20 %)=0 (b) High (>20 %)=1	1
(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. (a) Low=1 (b) High=0	

(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1).

(a) Low=0

(b) High=1

C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).

(1) Does the taxon require a nurse for its establishment? 0

(a) No=0

(b) Yes=1

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). 0

(a) No=0

(b) Yes=1

(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). 0

(a) No=0

(b) Yes=1

(4) Does the taxon have a specific dispersal mechanism? 0

(a) No=0

(b) Yes=1

(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). 0

(a) No=0

(b) Yes=1

(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). (a) No=0 (b) Yes=1	1
(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? (a) No=0 (b) Yes=1	0
D. Impact of human activity $\left(\frac{Total\ score}{10}\right)$	0.1
(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. (a) The plant benefits from the disturbance=-1 (b) It does not affect the plant, or it is unknown=0 (c) The plant is affected by the disturbance=1	0
(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. (a) The remaining habitat does not support the viability of existing populations=4 (b) The impact is significant and affects all populations=3	1

(c) The impact is severe in some, or moderate across all populations=2 (d) The impact is moderate and affects only a few populations=1 (e) There is no significant impact on any population=0	
(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? (a) No=0 (b) Yes=1	0
(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	0
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	1.73

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4

Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S7. Assessments of *Juniperus poblana* var. *decurrens* R. P. Adams in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**VU B1b(iii,iv,v)**
	NOM-059-SEMARNAT-2010	**Pr**
	IUCN Red List Criteria	**Assessment**
A. Population size reduction Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4. (a) Direct observation [except A3] (b) An index of abundance appropriate to the taxon (c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality (d) Actual or potential levels of exploitation (e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites		
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased. >90 %=CR; >70 %=EN; >50 %=VU		
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible. >80 %=CR; >50 %=EN; >30 %=VU		
A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years). >80 %=CR; >50 %=EN; >30 %=VU		
A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		

>80 %=CR; >50 %=EN; >30 %=VU

B. Geographical distribution	VU B1
B1. Extent of occurrence (*EOO*) <100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU	-11 424 km^2-
B2. Area of occupancy (*AOO*) <10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU	VU b(iii,iv,v)
And at least 2 of the following 3 conditions:	
(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU	
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area, extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals	
(c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.	
C. Small population size and decline	
Number of mature individuals <250=CR; <2 500=EN; <10 000=VU	
And at least one of C1 or C2:	
C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future): 25 % in 3 years or 1 generation (whichever is longer)=CR 20 % in 5 years or 2 generations=EN 10 % in 10 years or 3 generations=VU	
C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions:	
(i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU	
(ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU	
(iii) Extreme fluctuations in the number of mature individuals	
D. Very small or restricted population	
D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU	
D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time. Typically: if *AOO*<20 km^2 or number of locations <5=VU	
E. Risk of extinction in wildlife	

If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR

If ≥20 % within 20 years or 5 generations=EN

≥10 % within 100 years=VU

Result	VU B1b(iii,iv,v)
Notes	It is recommended that it be included on the Red List

MERE of plants

A. Geographical distribution $\left(\frac{Total\ score}{11}\right)$	0.64
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1 (e) The range covers >40 % of the country=0	3
(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). (a) 1-3=3 (b) 4-8=2 (c) 9-25=1 (d) Greater than or equal to 26=0	1
(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points. (a) 1=3 (b) 2-3=2	3

(c) 4-5=1

(d) Greater than or equal to 6

(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. 0

(a) Peripheral or extralimital distribution=1

(b) Non-peripheral or extralimital distribution=0

B. Habitat 0.55

$$\left(\frac{Total\ score}{9}\right)$$

(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. 3

(a) 1=3

(b) 2=2

(c) 3=1

(d) Greater than or equal to 4=0

(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). 0

(a) Yes=1

(b) No=0

(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). 1

(a) Yes=1

(b) No=0	
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas.	0
(a) Yes=1	
(b) No=0	
(5) Altitudinal range of the taxon.	1
(a) Less than 200 m=3	
(b) 200 m-<500 m=2	
(c) 500 m-<1 000 m=1	
(d) Greater than or equal to 1 000m=0	
C. Vulnerability $\left(\frac{Total\ score}{25}\right)$	0.22
C1. Demographics (If no information is available, assign a value of 0)	
(1) Total number of individuals (If no information is available, assign a value of 0)	0
(a) Less than or equal to 500=3	
(b) 501-5 000=2	
(c) 5 001-50 000=1	
(d) Greater than or equal to 50 001=0	
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]).	0
(a) Recruitment observations have been made in all populations=0	
(b) There are reports of recruitment in some populations=2	

(c) There are reports of a lack of recruitment across all populations=4	
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	0
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	1
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0
(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines	1

to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]). (a) Low (=10 %)=1 (b) High (>10 %)=0	
(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1). (a) Low (=20 %)=0 (b) High (>20 %)=1	1
(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. (a) Low=1 (b) High=0	
(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). (a) Low=0 (b) High=1	
C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).	
(1) Does the taxon require a nurse for its establishment? (a) No=0 (b) Yes=1	0

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). (a) No=0 (b) Yes=1	0
(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). (a) No=0 (b) Yes=1	0
(4) Does the taxon have a specific dispersal mechanism? (a) No=0 (b) Yes=1	0
(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). (a) No=0 (b) Yes=1	0
(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). (a) No=0 (b) Yes=1	1
(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? (a) No=0 (b) Yes=1	0
D. Impact of human activity $\left(\frac{Total\ score}{10}\right)$	0.2
(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by	0

human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. (a) The plant benefits from the disturbance=-1 (b) It does not affect the plant, or it is unknown=0 (c) The plant is affected by the disturbance=1	
(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. (a) The remaining habitat does not support the viability of existing populations=4 (b) The impact is significant and affects all populations=3 (c) The impact is severe in some, or moderate across all populations=2 (d) The impact is moderate and affects only a few populations=1 (e) There is no significant impact on any population=0	1
(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? (a) No=0 (b) Yes=1	0
(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the	1

method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	1.61

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S8. Assessments of *Abies durangensis* Martínez in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**LC**
	NOM-059-SEMARNAT-2010	**Pr**
	IUCN Red List Criteria	**Assessment**
A. Population size reduction Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4. (a) Direct observation [except A3] (b) An index of abundance appropriate to the taxon (c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality (d) Actual or potential levels of exploitation (e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased. >90 %=CR; >70 %=EN; >50 %=VU A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible. >80 %=CR; >50 %=EN; >30 %=VU A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years). >80 %=CR; >50 %=EN; >30 %=VU A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible. >80 %=CR; >50 %=EN; >30 %=VU		
B. Geographical distribution B1. Extent of occurrence (*EOO*) <100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU		LC -9 369 km^2-

B2. Area of occupancy (*AOO*) <10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU And at least 2 of the following 3 conditions: (a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU (b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area, extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals (c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.	
C. Small population size and decline Number of mature individuals <250=CR; <2 500=EN; <10 000=VU And at least one of C1 or C2: C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future): 25 % in 3 years or 1 generation (whichever is longer)=CR 20 % in 5 years or 2 generations=EN 10 % in 10 years or 3 generations=VU C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions: (i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU (ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU (iii) Extreme fluctuations in the number of mature individuals	
D. Very small or restricted population D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time. Typically: if *AOO*<20 km^2 or number of locations <5=VU	
E. Risk of extinction in wildlife If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR If ≥20 % within 20 years or 5 generations=EN ≥10 % within 100 years=VU	
Result	LC
Notes	Given the lack of ecological studies and/or future distribution models, and due to its wide

	distribution in the SMO, the LC category is maintained
***MERE* of plants**	
A. Geographical distribution $\left(\frac{Total\ score}{11}\right)$	0.45
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1 (e) The range covers >40 % of the country=0	2
(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). (a) 1-3=3 (b) 4-8=2 (c) 9-25=1 (d) Greater than or equal to 26=0	0
(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points. (a) 1=3 (b) 2-3=2 (c) 4-5=1 (d) Greater than or equal to 6	3
(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States,	0

while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital.

(a) Peripheral or extralimital distribution=1

(b) Non-peripheral or extralimital distribution=0

B. Habitat 0.55

$$\left(\frac{Total\ score}{9}\right)$$

(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. 3

(a) 1=3

(b) 2=2

(c) 3=1

(d) Greater than or equal to 4=0

(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). 1

(a) Yes=1

(b) No=0

(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). 1

(a) Yes=1

(b) No=0

(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low 0

recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas. (a) Yes=1 (b) No=0	
(5) Altitudinal range of the taxon. (a) Less than 200 m=3 (b) 200 m-<500 m=2 (c) 500 m-<1 000 m=1 (d) Greater than or equal to 1 000m=0	0
C. Vulnerability $\left(\frac{Total\ score}{25}\right)$	0.17
C1. Demographics (If no information is available, assign a value of 0)	
(1) Total number of individuals (If no information is available, assign a value of 0) (a) Less than or equal to 500=3 (b) 501-5 000=2 (c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	0
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	2
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0

(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	0
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	0
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0
(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]). (a) Low (=10 %)=1 (b) High (>10 %)=0	
(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help	

you decide and should not be considered universal values (if there is only one population, assign a value of 1). (a) Low (=20 %)=0 (b) High (>20 %)=1	
(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. (a) Low=1 (b) High=0	0
(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). (a) Low=0 (b) High=1	0
C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).	
(1) Does the taxon require a nurse for its establishment? (a) No=0 (b) Yes=1	0
(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). (a) No=0 (b) Yes=1	0
(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of	0

observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003).

(a) No=0

(b) Yes=1 0

(4) Does the taxon have a specific dispersal mechanism?

(a) No=0

(b) Yes=1

(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). 0

(a) No=0

(b) Yes=1

(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). 1

(a) No=0

(b) Yes=1

(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? 0

(a) No=0

(b) Yes=1

D. Impact of human activity 0.4

$$\left(\frac{Total\ score}{10}\right)$$

(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. 1

(a) The plant benefits from the disturbance=-1

(b) It does not affect the plant, or it is unknown=0

(c) The plant is affected by the disturbance=1

(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that 1

have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. (a) The remaining habitat does not support the viability of existing populations=4 (b) The impact is significant and affects all populations=3 (c) The impact is severe in some, or moderate across all populations=2 (d) The impact is moderate and affects only a few populations=1 (e) There is no significant impact on any population=0	
(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? (a) No=0 (b) Yes=1	1
(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	1
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1	0

(b) No=0

Score (total of the 4 criteria)	1.58
Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S9. Assessments of *Abies neodurangensis* Debreczy, I. Rácz & R. M. Salazar in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List** **NOM-059-SEMARNAT-2010**	**EN B1ab(iii,iv);D1** **P**
	IUCN Red List	
	Criteria	**Assessment**
A. Population size reduction		
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4. (a) Direct observation [except A3] (b) An index of abundance appropriate to the taxon (c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality (d) Actual or potential levels of exploitation (e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites		

A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.

>90 %=CR; >70 %=EN; >50 %=VU

A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.

>80 %=CR; >50 %=EN; >30 %=VU

A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).

>80 %=CR; >50 %=EN; >30 %=VU

A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.

>80 %=CR; >50 %=EN; >30 %=VU

B. Geographical distribution — EN B1

B1. Extent of occurrence (*EOO*) — -4 553 km^2-

<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU

B2. Area of occupancy (*AOO*) — EN

<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU — ab(i,iii)

And at least 2 of the following 3 conditions:

(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU

(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area, extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals

(c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.

C. Small population size and decline

Number of mature individuals

<250=CR; <2 500=EN; <10 000=VU

And at least one of C1 or C2:

C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future):

25 % in 3 years or 1 generation (whichever is longer)=CR

20 % in 5 years or 2 generations=EN

10 % in 10 years or 3 generations=VU

C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions:

(i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU

(ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU

(iii) Extreme fluctuations in the number of mature individuals

D. Very small or restricted population

D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU — EN D1

D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.

Typically: if *AOO*<20 km^2 or number of locations <5=VU

E. Risk of extinction in wildlife

If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR

If ≥20 % within 20 years or 5 generations=EN

≥10 % within 100 years=VU

Result — EN B1ab(iii,iv);D1

Notes — Its inclusion on the Red List should be a priority

MERE of plants

A. Geographical distribution — 0.73

$$\left(\frac{Total\ score}{11}\right)$$

(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). — 3

(a) The range is less than or equal to 1 km^2=4

(b) The range covers more than 1 km^2 but less than 1 % of the country=3

(c) The range covers >1-<5 % of the country=2

(d) The range covers >5-<40 % of the country=1

(e) The range covers >40 % of the country=0

(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). — 2

(a) 1-3=3

(b) 4-8=2

(c) 9-25=1

(d) Greater than or equal to 26=0

(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points. (a) 1=3 (b) 2-3=2 (c) 4-5=1 (d) Greater than or equal to 6	3
(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. (a) Peripheral or extralimital distribution=1 (b) Non-peripheral or extralimital distribution=0	0
B. Habitat $\left(\frac{Total\ score}{9}\right)$	0.78
(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. (a) 1=3 (b) 2=2 (c) 3=1 (d) Greater than or equal to 4=0	3

(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003).	1
(a) Yes=1	
(b) No=0	
(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994).	1
(a) Yes=1	
(b) No=0	
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas.	0
(a) Yes=1	
(b) No=0	
(5) Altitudinal range of the taxon.	2
(a) Less than 200 m=3	
(b) 200 m-<500 m=2	
(c) 500 m-<1 000 m=1	
(d) Greater than or equal to 1 000m=0	
C. Vulnerability	0.22
$\left(\frac{Total\ score}{25}\right)$	
C1. Demographics (If no information is available, assign a value of 0)	
(1) Total number of individuals (If no information is available, assign a value of 0)	3
(a) Less than or equal to 500=3	
(b) 501-5 000=2	

(c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	0
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	3
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	0
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	0
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0
(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1	0

No=0

C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated

(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]).

(a) Low (=10 %)=1

(b) High (>10 %)=0

(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1).

(a) Low (=20 %)=0

(b) High (>20 %)=1

(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. 0

(a) Low=1

(b) High=0

(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). 0

(a) Low=0

(b) High=1

C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).

(1) Does the taxon require a nurse for its establishment? 0

(a) No=0

(b) Yes=1

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). 0

(a) No=0

(b) Yes=1

(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). 0

(a) No=0

(b) Yes=1

(4) Does the taxon have a specific dispersal mechanism? 0

(a) No=0

(b) Yes=1

(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). 0

(a) No=0

(b) Yes=1

(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). 1

(a) No=0

(b) Yes=1

(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? 0

(a) No=0

(b) Yes=1

D. Impact of human activity 0.3

$$\left(\frac{Total\ score}{10}\right)$$

(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. 1

(a) The plant benefits from the disturbance=-1

(b) It does not affect the plant, or it is unknown=0

(c) The plant is affected by the disturbance=1

(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. 1

(a) The remaining habitat does not support the viability of existing populations=4

(b) The impact is significant and affects all populations=3

(c) The impact is severe in some, or moderate across all populations=2

(d) The impact is moderate and affects only a few populations=1

(e) There is no significant impact on any population=0

(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? 1

(a) No=0

(b) Yes=1

(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	0
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	2.02

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S10. Assessments of *Picea chihuahuana* Martínez in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**EN A2+3;B2b(ii,iii)+c(iv)**
	NOM-059-SEMARNAT-2010	**P**
	IUCN Red List	
Criteria		**Assessment**
A. Population size reduction		EN A2+3
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.		(Pinedo-Alvarez et al., 2019)
(a) Direct observation [except A3]		
(b) An index of abundance appropriate to the taxon		
(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality		
(d) Actual or potential levels of exploitation		
(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites		
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.		
>90 %=CR; >70 %=EN; >50 %=VU		
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).		
>80 %=CR; >50 %=EN; >30 %=VU		
A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
B. Geographical distribution		NT B1
B1. Extent of occurrence (*EOO*)		-41 230 km^2-
<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU		
B2. Area of occupancy (*AOO*)		EN B2
<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU		
And at least 2 of the following 3 conditions:		EN
(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU		b(ii,iii)+c(iv)
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area,		

extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals (c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals. C. Small population size and decline Number of mature individuals <250=CR; <2 500=EN; <10 000=VU And at least one of C1 or C2: C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future): 25 % in 3 years or 1 generation (whichever is longer)=CR 20 % in 5 years or 2 generations=EN 10 % in 10 years or 3 generations=VU C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions: (i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU (ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU (iii) Extreme fluctuations in the number of mature individuals D. Very small or restricted population D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time. Typically: if *AOO*<20 km^2 or number of locations <5=VU E. Risk of extinction in wildlife If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR If ≥20 % within 20 years or 5 generations=EN ≥10 % within 100 years=VU	
Result	EN A2+3;B2b(ii,iii)+c(iv)
Notes	Although it has a large *EOO*, its populations are very small, so it is recommended that its current category be maintained

MERE of plants

A. Geographical distribution $\left(\frac{Total\ score}{11}\right)$	0.45 2

(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1 (e) The range covers >40 % of the country=0	
(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). (a) 1-3=3 (b) 4-8=2 (c) 9-25=1 (d) Greater than or equal to 26=0	0
(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points. (a) 1=3 (b) 2-3=2 (c) 4-5=1 (d) Greater than or equal to 6	3
(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. (a) Peripheral or extralimital distribution=1 (b) Non-peripheral or extralimital distribution=0	0
B. Habitat $\left(\frac{Total\ score}{9}\right)$	0.67

(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. (a) 1=3 (b) 2=2 (c) 3=1 (d) Greater than or equal to 4=0	3
(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). (a) Yes=1 (b) No=0	1
(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). (a) Yes=1 (b) No=0	1
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas. (a) Yes=1 (b) No=0	0

(5) Altitudinal range of the taxon. (a) Less than 200 m=3 (b) 200 m-<500 m=2 (c) 500 m-<1 000 m=1 (d) Greater than or equal to 1 000m=0	1
C. Vulnerability $\left(\frac{Total\ score}{25}\right)$	0.39
C1. Demographics (If no information is available, assign a value of 0)	
(1) Total number of individuals (If no information is available, assign a value of 0) (a) Less than or equal to 500=3 (b) 501-5 000=2 (c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	1
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	2
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	1

(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	0
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0
(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]). (a) Low (=10 %)=1 (b) High (>10 %)=0	1
(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1). (a) Low (=20 %)=0 (b) High (>20 %)=1	1

(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies.

(a) Low=1

(b) High=0

(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1).

(a) Low=0

(b) High=1

C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).

(1) Does the taxon require a nurse for its establishment? 0

(a) No=0

(b) Yes=1

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). 0

(a) No=0

(b) Yes=1

(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). 0

(a) No=0

(b) Yes=1

(4) Does the taxon have a specific dispersal mechanism? (a) No=0 (b) Yes=1	0
(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). (a) No=0 (b) Yes=1	0
(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). (a) No=0 (b) Yes=1	1
(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? (a) No=0 (b) Yes=1	1
D. Impact of human activity $\left(\frac{Total\ score}{10}\right)$	0.5
(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. (a) The plant benefits from the disturbance=-1 (b) It does not affect the plant, or it is unknown=0 (c) The plant is affected by the disturbance=1	1

(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. 2

(a) The remaining habitat does not support the viability of existing populations=4

(b) The impact is significant and affects all populations=3

(c) The impact is severe in some, or moderate across all populations=2

(d) The impact is moderate and affects only a few populations=1

(e) There is no significant impact on any population=0

(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? 1

(a) No=0

(b) Yes=1

(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. 1

(a) The impact of its use involves the removal of populations=4

(b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	2.01

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU =Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S11. Assessments of *Pinus cooperi* C. E. Blanco in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**LC**
	NOM-059-SEMARNAT-2010	**Pr**
	IUCN Red List	
	Criteria	**Assessment**
A. Population size reduction		

Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.	
(a) Direct observation [except A3]	
(b) An index of abundance appropriate to the taxon	
(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality	
(d) Actual or potential levels of exploitation	
(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites	
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.	
>90 %=CR; >70 %=EN; >50 %=VU	VU A3 (Ruacho-González et al., 2025)
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.	
>80 %=CR; >50 %=EN; >30 %=VU	
A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).	
>80 %=CR; >50 %=EN; >30 %=VU	
A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.	
>80 %=CR; >50 %=EN; >30 %=VU	
B. Geographical distribution	LC
B1. Extent of occurrence (*EOO*)	-77 005 km^2-
<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU	
B2. Area of occupancy (*AOO*)	VU B2
<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU	
And at least 2 of the following 3 conditions:	VU
(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU	b(iii)+c(iii)
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area, extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals	
(c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.	
C. Small population size and decline	
Number of mature individuals	
<250=CR; <2 500=EN; <10 000=VU	
And at least one of C1 or C2:	

C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future):

25 % in 3 years or 1 generation (whichever is longer)=CR

20 % in 5 years or 2 generations=EN

10 % in 10 years or 3 generations=VU

C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions:

(i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU

(ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU

(iii) Extreme fluctuations in the number of mature individuals

D. Very small or restricted population

D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU

D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.

Typically: if *AOO*<20 km^2 or number of locations <5=VU

E. Risk of extinction in wildlife

If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR

If ≥20 % within 20 years or 5 generations=EN

≥10 % within 100 years=VU

Result	VU A3;B2b(iii)c(iii)
Notes	The VU category remains in place, with additional criteria

MERE of plants

A. Geographical distribution $\left(\frac{Total\ score}{11}\right)$	0.45
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1 (e) The range covers >40 % of the country=0	2

(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). (a) 1-3=3 (b) 4-8=2 (c) 9-25=1 (d) Greater than or equal to 26=0	0
(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points. (a) 1=3 (b) 2-3=2 (c) 4-5=1 (d) Greater than or equal to 6	3
(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. (a) Peripheral or extralimital distribution=1 (b) Non-peripheral or extralimital distribution=0	0
B. Habitat $\left(\frac{Total\ score}{9}\right)$	0.44
(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. (a) 1=3 (b) 2=2 (c) 3=1	3

(d) Greater than or equal to 4=0	
(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003).	0
(a) Yes=1	
(b) No=0	
(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994).	1
(a) Yes=1	
(b) No=0	
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas.	0
(a) Yes=1	
(b) No=0	
(5) Altitudinal range of the taxon.	0
(a) Less than 200 m=3	
(b) 200 m-<500 m=2	
(c) 500 m-<1 000 m=1	
(d) Greater than or equal to 1 000m=0	
C. Vulnerability	0.13
$\left(\frac{Total\ score}{25}\right)$	
C1. Demographics (If no information is available, assign a value of 0)	
(1) Total number of individuals (If no information is available, assign a value of 0)	0
(a) Less than or equal to 500=3	
(b) 501-5 000=2	

(c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	0
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	0
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	0
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0

(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]). (a) Low (=10 %)=1 (b) High (>10 %)=0	
(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1). (a) Low (=20 %)=0 (b) High (>20 %)=1	
(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. (a) Low=1 (b) High=0	0
(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). (a) Low=0 (b) High=1	0

C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).

(1) Does the taxon require a nurse for its establishment? 0

(a) No=0

(b) Yes=1

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). 0

(a) No=0

(b) Yes=1

(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). 0

(a) No=0

(b) Yes=1

(4) Does the taxon have a specific dispersal mechanism? 0

(a) No=0

(b) Yes=1

(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). 0

(a) No=0

(b) Yes=1

(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). 1

(a) No=0

(b) Yes=1

(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? 1

(a) No=0

(b) Yes=1

D. Impact of human activity 0.3

$$\left(\frac{Total\ score}{10}\right)$$

(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. 0

(a) The plant benefits from the disturbance=-1

(b) It does not affect the plant, or it is unknown=0

(c) The plant is affected by the disturbance=1

(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. 1

(a) The remaining habitat does not support the viability of existing populations=4

(b) The impact is significant and affects all populations=3

(c) The impact is severe in some, or moderate across all populations=2

(d) The impact is moderate and affects only a few populations=1

(e) There is no significant impact on any population=0

(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? 1

(a) No=0

(b) Yes=1

(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	1
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	-1
Score (total of the 4 criteria)	1.22

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S12. Assessments of *Pinus gordoniana* var. *sinaloensis* (Debreczy & I. Rácz) Frankis in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**EN B2ab(iii,v)**
	NOM-059-SEMARNAT-2010	**A**
	IUCN Red List	
Criteria		**Assessment**
A. Population size reduction		
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.		
(a) Direct observation [except A3]		
(b) An index of abundance appropriate to the taxon		
(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality		
(d) Actual or potential levels of exploitation		
(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites		
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.		
>90 %=CR; >70 %=EN; >50 %=VU		
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).		
>80 %=CR; >50 %=EN; >30 %=VU		
A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
B. Geographical distribution		EN B1
B1. Extent of occurrence (*EOO*)		-1 813 km^2-
<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU		
B2. Area of occupancy (*AOO*)		
<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU		EN B2
And at least 2 of the following 3 conditions:		EN ab(iii,iv)

(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU

(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area, extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals

(c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.

C. Small population size and decline

Number of mature individuals

<250=CR; <2 500=EN; <10 000=VU

And at least one of C1 or C2:

C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future):

25 % in 3 years or 1 generation (whichever is longer)=CR

20 % in 5 years or 2 generations=EN

10 % in 10 years or 3 generations=VU

C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions:

(i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU

(ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU

(iii) Extreme fluctuations in the number of mature individuals

D. Very small or restricted population

D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU

D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.

Typically: if *AOO*<20 km^2 or number of locations <5=VU

E. Risk of extinction in wildlife

If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR

If ≥20 % within 20 years or 5 generations=EN

≥10 % within 100 years=VU

Result	EN B2ab(iii,v)
Notes	Its inclusion on the Red List should be a priority

MERE of plants

	0.81
A. Geographical distribution	
$\left(\frac{Total\ score}{11}\right)$	3

(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1 (e) The range covers >40 % of the country=0	
(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). (a) 1-3=3 (b) 4-8=2 (c) 9-25=1 (d) Greater than or equal to 26=0	3
(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points. (a) 1=3 (b) 2-3=2 (c) 4-5=1 (d) Greater than or equal to 6	3
(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. (a) Peripheral or extralimital distribution=1 (b) Non-peripheral or extralimital distribution=0	1
B. Habitat	0.55

$$\left(\frac{Total\ score}{9}\right)$$

(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. (a) 1=3 (b) 2=2 (c) 3=1 (d) Greater than or equal to 4=0	3
(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). (a) Yes=1 (b) No=0	0
(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). (a) Yes=1 (b) No=0	1
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas. (a) Yes=1 (b) No=0	0

(5) Altitudinal range of the taxon. (a) Less than 200 m=3 (b) 200 m-<500 m=2 (c) 500 m-<1 000 m=1 (d) Greater than or equal to 1 000m=0	1
C. Vulnerability $\left(\frac{Total\ score}{25}\right)$	0.3
C1. Demographics (If no information is available, assign a value of 0)	
(1) Total number of individuals (If no information is available, assign a value of 0) (a) Less than or equal to 500=3 (b) 501-5 000=2 (c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	0
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	0
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	0

(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	0
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0
(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0

C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated

(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]).

(a) Low (=10 %)=1

(b) High (>10 %)=0

(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1).

(a) Low (=20 %)=0

(b) High (>20 %)=1

(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies.	1
(a) Low=1	
(b) High=0	
(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1).	1
(a) Low=0	
(b) High=1	
C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).	
(1) Does the taxon require a nurse for its establishment?	0
(a) No=0	
(b) Yes=1	
(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992).	0
(a) No=0	
(b) Yes=1	
(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003).	0
(a) No=0	
(b) Yes=1	
(4) Does the taxon have a specific dispersal mechanism?	0

(a) No=0

(b) Yes=1

(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). 0

(a) No=0

(b) Yes=1

(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). 1

(a) No=0

(b) Yes=1

(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? 0

(a) No=0

(b) Yes=1

D. Impact of human activity 0.1

$$\left(\frac{Total\ score}{10}\right)$$

(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. 0

(a) The plant benefits from the disturbance=-1

(b) It does not affect the plant, or it is unknown=0

(c) The plant is affected by the disturbance=1

(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest 1

on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. (a) The remaining habitat does not support the viability of existing populations=4 (b) The impact is significant and affects all populations=3 (c) The impact is severe in some, or moderate across all populations=2 (d) The impact is moderate and affects only a few populations=1 (e) There is no significant impact on any population=0	
(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? (a) No=0 (b) Yes=1	0
(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	0
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	1.73

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2

	(b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table S13. Assessments of *Pinus maximartinezii* Rzed. in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**EN B1ab(ii,iii)+2ab(ii,iii)**
	NOM-059-SEMARNAT-2010	**P**
	IUCN Red List	
Criteria		**Assessment**
A. Population size reduction		
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.		
(a) Direct observation [except A3]		
(b) An index of abundance appropriate to the taxon		
(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality		
(d) Actual or potential levels of exploitation		
(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites		
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.		
>90 %=CR; >70 %=EN; >50 %=VU		

A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.

>80 %=CR; >50 %=EN; >30 %=VU

A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).

>80 %=CR; >50 %=EN; >30 %=VU

A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.

>80 %=CR; >50 %=EN; >30 %=VU

B. Geographical distribution — EN B1

B1. Extent of occurrence (*EOO*) — -3 453 km^2-

<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU

B2. Area of occupancy (*AOO*)

<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU — EN B2

And at least 2 of the following 3 conditions: — EN ab(ii,iii)

(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU

(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area, extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals

(c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.

C. Small population size and decline

Number of mature individuals

<250=CR; <2 500=EN; <10 000=VU

And at least one of C1 or C2:

C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future):

25 % in 3 years or 1 generation (whichever is longer)=CR

20 % in 5 years or 2 generations=EN

10 % in 10 years or 3 generations=VU

C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions:

(i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU

(ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU

(iii) Extreme fluctuations in the number of mature individuals

D. Very small or restricted population

D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU

D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time.

Typically: if *AOO*<20 km^2 or number of locations <5=VU

E. Risk of extinction in wildlife

If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR

If ≥20 % within 20 years or 5 generations=EN

≥10 % within 100 years=VU

Result	EN B1ab(ii,iii)+2ab(ii,iii)
Notes	It maintains its current category

MERE of plants

A. Geographical distribution $\left(\frac{Total\ score}{11}\right)$	0.82
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1 (e) The range covers >40 % of the country=0	3
(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). (a) 1-3=3 (b) 4-8=2 (c) 9-25=1 (d) Greater than or equal to 26=0	3

(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points. (a) 1=3 (b) 2-3=2 (c) 4-5=1 (d) Greater than or equal to 6	3
(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. (a) Peripheral or extralimital distribution=1 (b) Non-peripheral or extralimital distribution=0	0
B. Habitat $\left(\frac{Total\ score}{9}\right)$	0.67
(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. (a) 1=3 (b) 2=2 (c) 3=1 (d) Greater than or equal to 4=0	3

(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). (a) Yes=1 (b) No=0	1
(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). (a) Yes=1 (b) No=0	1
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas. (a) Yes=1 (b) No=0	0
(5) Altitudinal range of the taxon. (a) Less than 200 m=3 (b) 200 m-<500 m=2 (c) 500 m-<1 000 m=1 (d) Greater than or equal to 1 000m=0	1
C. Vulnerability $\left(\frac{Total\ score}{25}\right)$	0.3
C1. Demographics (If no information is available, assign a value of 0)	
(1) Total number of individuals (If no information is available, assign a value of 0) (a) Less than or equal to 500=3 (b) 501-5 000=2	2

(c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	0
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1 No=0	0
(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	0
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0

(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0
C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated	
(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]). (a) Low (=10 %)=1 (b) High (>10 %)=0	1
(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1). (a) Low (=20 %)=0 (b) High (>20 %)=1	1
(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. (a) Low=1 (b) High=0	
(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). (a) Low=0 (b) High=1	

C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).

(1) Does the taxon require a nurse for its establishment? 0

(a) No=0

(b) Yes=1

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). 0

(a) No=0

(b) Yes=1

(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). 0

(a) No=0

(b) Yes=1

(4) Does the taxon have a specific dispersal mechanism? 0

(a) No=0

(b) Yes=1

(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). 0

(a) No=0

(b) Yes=1

(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). 1

(a) No=0

(b) Yes=1

(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? 1

(a) No=0

(b) Yes=1

D. Impact of human activity 0.3

$$\left(\frac{Total\ score}{10}\right)$$

(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. 1

(a) The plant benefits from the disturbance=-1

(b) It does not affect the plant, or it is unknown=0

(c) The plant is affected by the disturbance=1

(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. 1

(a) The remaining habitat does not support the viability of existing populations=4

(b) The impact is significant and affects all populations=3

(c) The impact is severe in some, or moderate across all populations=2

(d) The impact is moderate and affects only a few populations=1

(e) There is no significant impact on any population=0

(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? 1

(a) No=0

(b) Yes=1

(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4 (b) The impact of its use is significant and affects all populations=3 (c) The impact of its use is significant in some populations or moderate in all populations=2 (d) The impact of use is moderate and affects only a few populations=1 (e) There is no significant impact of use on any population=0	1
(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	-1
Score (total of the 4 criteria)	2.08

Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.

Table 14. Assessments of *Pinus yecorensis* Debreczy & I. Rácz in the IUCN Red List and the *MERE* of NOM-59-SEMARNAT-2010.

Category proposed in this work	**IUCN Red List**	**LC**
	NOM-059-SEMARNAT-2010	**--**
	IUCN Red List	
Criteria		**Assessment**
A. Population size reduction		
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4.		
(a) Direct observation [except A3]		
(b) An index of abundance appropriate to the taxon		
(c) A decline in area of occupancy (*AOO*), extent of ocurrence (*EOO*) and/or habitat quality		
(d) Actual or potential levels of exploitation		
(e) Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites		
A1. Population reduction observed, estimated, inferred, or suspected in the past where the causes of the reduction are clearly reversible, understood and have ceased.		
>90 %=CR; >70 %=EN; >50 %=VU		
A2. Population reduction observed, estimated, inferred, or suspected in the past where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
A3. Population reduction projected, inferred or suspected to be met in the future (up to a maximum of 100 years).		
>80 %=CR; >50 %=EN; >30 %=VU		
A4. An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a maximum of 100 years in future), and where the causes of reduction may not have ceased. Or may not be understood. Or may not be reversible.		
>80 %=CR; >50 %=EN; >30 %=VU		
B. Geographical distribution		VU B1
B1. Extent of occurrence (*EOO*)		-13 280 km^2-
<100 km^2=CR; <5 000 km^2=EN; <20 000 km^2=VU		
B2. Area of occupancy (*AOO*)		
<10 km^2=CR; <500 km^2=EN; <2 000 km^2=VU		
And at least 2 of the following 3 conditions:		VU c(iv)
(a) Severely fragmented or number of locations 1=CR; <5=EN; <10=VU		
(b) Continuing decline observed, estimated, inferred or projected in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Area,		

extent and/or quality of habitat; (iv) Number of locations or subpopulations; (v) Number of mature individuals (c) Extreme fluctuations in any of: (i) Extent of occurrence; (ii) Area of occupancy; (iii) Number of locations or subpopulations; (iv) Number of mature individuals.	
C. Small population size and decline Number of mature individuals <250=CR; <2 500=EN; <10 000=VU And at least one of C1 or C2: C1. An observed, estimated or projected continuing decline of at least (up to a maximum of 100 years in future): 25 % in 3 years or 1 generation (whichever is longer)=CR 20 % in 5 years or 2 generations=EN 10 % in 10 years or 3 generations=VU C2. An observed, estimated, projected or inferred continuing decline (different from the % of C1) and at least 1 of the following 3 conditions: (i) Number of mature individuals in each subpopulation: <50=CR; <250=EN; <1 000=VU (ii) % of mature individuals in one subpopulation: 90-100 %=CR; 95-100 %=EN; 100 %=VU (iii) Extreme fluctuations in the number of mature individuals	
D. Very small or restricted population D1. Number of mature individuals: <50=CR; <250=EN; <1 000=VU D2. Only applies to the VU category. Restricted area of occupancy or number of locations with a plausible future threat that could drive the taxon to CR or EX in a very short time. Typically: if *AOO*<20 km^2 or number of locations <5=VU	
E. Risk of extinction in wildlife If ≥50 % within 10 years or 3 generations, whichever is longer (maximum 100 years)=CR If ≥20 % within 20 years or 5 generations=EN ≥10 % within 100 years=VU	No reduction is expected (Ruacho-González et al., 2025)
Result	LC
Notes	Although it is classified as Vulnerable (VU) under Criterion B1, it does not meet 2 of the 3 required conditions. It is suggested that it be classified as Endangered (LC) until more information becomes available

MERE of plants

A. Geographical distribution $\left(\frac{Total\ score}{11}\right)$	0.64
(1) Distribution extent (the percentages were determined based on the land area of the biomes in the country). The extent of the distribution should take into account the area of occupancy (the area within the range of occurrence that is occupied by the taxon, since the range of occurrence may include unsuitable habitats [IUCN, 1994]) and not only the extent of presence (the area enclosed within the shortest continuous or imaginary boundary that can be drawn to include all known locations where a taxon is present). (a) The range is less than or equal to 1 km^2=4 (b) The range covers more than 1 km^2 but less than 1 % of the country=3 (c) The range covers >1-<5 % of the country=2 (d) The range covers >5-<40 % of the country=1 (e) The range covers >40 % of the country=0	3
(2) Number of known existing populations or localities (in the case of localities, these are points [3 mm in diameter] that can be distinguished on a map at a scale of 1:4 000 000). (a) 1-3=3 (b) 4-8=2 (c) 9-25=1 (d) Greater than or equal to 26=0	1
(3) Number of biogeographic provinces (Conabio, 1997) in which the taxon is found (or in which its historical range was located). The map that should be used to determine the biogeographic provinces in which a taxon occurs is that of the National Commission for the Knowledge and Use of Biodiversity (Conabio, 1997), "Biogeographic Provinces of Mexico," scale 1:4 000 000, México. If the species is found only on the border between two provinces, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Clowesia rosea* is found at elevations between 750 and 1 420 meters in the transition zone between the Pacific Coastal Plain province and the *Sierra Madre del Sur*; given its restricted distribution, it is assigned the maximum score of 3 points. (a) 1=3 (b) 2-3=2 (c) 4-5=1 (d) Greater than or equal to 6	3
(4) Representativeness of the taxon's distribution within Mexico. This refers to the significance that Mexican populations may have within the species' geographic distribution. For example, *Pinus attenuata* is found in more than 95 % of its range along the West coast of the United States, while in Mexico, only two locations have been reported in *Baja California Norte*. In this case, the range is said to be peripheral or extralimital. (a) Peripheral or extralimital distribution=1 (b) Non-peripheral or extralimital distribution=0	0

B. Habitat $\left(\frac{Total\ score}{9}\right)$	0.55
(1) In how many types of vegetation does it occur? (*sensu* Rzedowski, 1978) (Accidental occurrences should not be considered). The map that should be used to determine the vegetation types in which a taxon occurs is the Potential Vegetation Map from Rzedowski (1990). IV.8.2. *Atlas Nacional de México*. Vol II. Scale 1:4 000 000. *Instituto de Geografía*, *UNAM*. *México*. If the species is found only in an ecotone between two types of vegetation, for the purposes of the *MERE*-Plants, it is assigned the maximum value (3). For example, *Euphorbia colligata* grows in the ecotone between tropical subevergreen forest and pine-oak forest (Olson et al., 2005). Due to its narrow ecological range, a value of 3 would be assigned to this species. (a) 1=3 (b) 2=2 (c) 3=1 (d) Greater than or equal to 4=0	3
(2) Does the taxon have a specialized habitat? This refers to the taxon's presence only in a permanent specialized habitat (if the habitat is specialized but temporary, see subparagraph 4). Examples: *Geohintonia mexicana* is a cactus species endemic to Northern Mexico, found exclusively on outcrops of crystallized gypsum on nearly vertical walls (Anderson et al., 1994). *Mammillaria luethyi* is another cactus species endemic to Northern Mexico and is found exclusively on a fluoride outcrop associated with limestone slabs (Hinton, 1996). *Polypleurum prostratum* is a member of the Podostemaceae family that is found exclusively in streams with a substrate of silicate-rich rocks, the dissolution of which results in a high total water hardness (Mathew et al., 2003). (a) Yes=1 (b) No=0	1
(3) Does the survival of a population depend on a primary habitat? Example: *Poulsenia armata* (Moraceae) and *Psychotria* spp. (Rubiaceae) are tree species found in tropical evergreen forests, and their survival is limited to the remnants of that forest type when the it is cleared to create paddocks, as they depend primarily on fruit-eating dispersers from the original forest, which are absent from paddocks and open woodlands (Guevara et al., 1994). (a) Yes=1 (b) No=0	1
(4) Does the persistence of a population require specific disturbance regimes, or is it associated with transitional stages in succession? Examples: Orchids of the genera *Mormodes*, *Cycnoches and Catasetum* grow on decaying logs and require the bright light provided by clearings in a closed forest. A forest where tree falls are rare inevitably results in low recruitment (Hágsater et al., 2005). *Cypripedium irapeanum* is an orchid found exclusively in the early stages of secondary succession in oak forests of semi-warm climates. Its survival in each location necessarily requires a management program that includes the removal of dense vegetation cover, as the plant is very rare in mature forests except in specific locations such as steep slopes and rocky areas.	0

(a) Yes=1 (b) No=0 (5) Altitudinal range of the taxon. (a) Less than 200 m=3 (b) 200 m-<500 m=2 (c) 500 m-<1 000 m=1 (d) Greater than or equal to 1 000m=0	0
C. Vulnerability $\left(\frac{Total\ score}{25}\right)$	0.17
C1. Demographics (If no information is available, assign a value of 0)	
(1) Total number of individuals (If no information is available, assign a value of 0) (a) Less than or equal to 500=3 (b) 501-5 000=2 (c) 5 001-50 000=1 (d) Greater than or equal to 50 001=0	0
(2) Recruitment (If no information is available, assign a value of 0). This refers to the phenomenon in which new individuals join a population and often refers to individuals resulting from sexual reproduction. Low recruitment can manifest itself in various ways. For example, because of disturbance, many species do not produce seedlings, and the population consists only of adult individuals. In other cases, seedlings may be abundant, but high seedling mortality prevents the reproductive population from being sustained (as in *Quercus fusiformis* and *Q. buckleyi* in Texas, [Russel & Fowler, 1999]). Some long-lived desert species reproduce in long cycles and have age-separated cohorts (*e. g.*, the *saguaro*, *Carnegiea gigantea* [Pierson & Turner, 1998]). (a) Recruitment observations have been made in all populations=0 (b) There are reports of recruitment in some populations=2 (c) There are reports of a lack of recruitment across all populations=4	0
(3a) Is there evidence of density-dependence in reproduction? Example: many plants mimic the flowers of other species without producing nectar. If the population density of the mimicked species is low, the insects learn to recognize and avoid flowers without nectar, leaving the population severely limited in terms of pollination. Yes=1 No=0	0
(3b) Is clonality (the ability to produce new, independent individuals through asexual reproduction) present? Some studies suggest that clonality enables the survival of certain species (*e. g.*, *Stenocereus eruca* [Clark-Tapia et al., 2005]). Yes=1 No=0	1
(3c) Is there evidence of a decline in the country's populations? Yes=1	0

No=0

(3d) Is there evidence of a very large variation in fertility? In some species, very large reproductive individuals contribute disproportionately to the population's fertility. Yes=1 No=0	0
(3e) Is the taxon dioecious, or are the individuals dichogamous or self-incompatible? Yes=1 No=0	0
(3f) Is flowering synchronous or gregarious? Yes=1 No=0	0
(3g) Does the taxon produce few propagules (compared to other members of its lineage)? Yes=1 No=0	0

C2. Genetics (If no information is available, assign a value of 0). NOTE: To assign values in this section, criteria 1 and 2 should be evaluated when molecular data is available; otherwise, criteria 3 and 4—which are indirect estimates—should be evaluated

(1) Molecular variation (heterozygosity). This refers to the amount of genetic variation detected using indicators of genetic diversity or heterozygosity. Its level depends on the marker used. For example, for isoenzymes, an expected heterozygosity of less than 10 % is considered low variation, whereas for chloroplast microsatellites in conifers, a haplotype diversity of less than 20 % is considered a low value. If data from other markers are available, it is recommended to use comparable estimates from nearby taxa to assess whether the variation is low. The values listed here as low and high are guidelines to aid in decision-making and should not be considered universal values (see the review by Esparza-Olguín [2004]).

(a) Low (=10 %)=1

(b) High (>10 %)=0

(2) Molecular genetic structure (*Fst*, *Gst*, proportion of genetic variation found between populations). This estimator is less sensitive to the marker used; in this case, levels below 20 % are considered low. It is recommended to compare the values with those of closely related species. The values listed here as low and high are guidelines to help you decide and should not be considered universal values (if there is only one population, assign a value of 1).

(a) Low (=20 %)=0

(b) High (>20 %)=1

(3) Amount of genetic variation (estimated indirectly using other traits). When molecular genetic data are not available, the amount of genetic variation can be estimated by assessing variation in morphological traits, susceptibility to pathogens, etc. For example, the tequila agave suffered from several diseases that led to a decline in production. This is evidence of a low level of genetic variation, which, in the case of agave, is supported by its clonal propagation as well as molecular studies. 1

(a) Low=1

(b) High=0

(4) Level of differentiation among populations (estimated indirectly using other traits). When genetic differentiation estimates are not available, the degree of phenotypic differentiation (morphological, physiological, susceptibility to pathogens, etc.) can be used. A relationship has also been found in plants between the outcrossing rate and the degree of population differentiation, such that if a species primarily self-pollinates, it likely exhibits a high degree of differentiation, and vice versa (if there is only one population, assign a value of 1). 1

(a) Low=0

(b) High=1

C-3. Specialized biotic interactions. Have the following biotic interactions been observed (or inferred) in this taxon? (if no information is available, enter a value of 0).

(1) Does the taxon require a nurse for its establishment? 0

(a) No=0

(b) Yes=1

(2) Does the taxon require a specific host or phorophyte (in the case of holoparasites or hemiparasites and epiphytes or hemiepiphytes, respectively)? Example: *Laelia speciosa* is an orchid that has been reported as an epiphyte on oaks (*Quercus deserticola*, *Q. laeta*), some other plants such as *Opuntia* and *Yucca*, and even growing on rocks. However, quantitative studies in a locality in *Michoacán* (where the other substrates are found) indicate that nearly 100 % of the several thousand individuals recorded within a single hectare were growing on *Quercus deserticola* and that 96 % of them germinated directly on lichens of the genus *Parmelia*. These data suggest that *Quercus deserticola* and *Parmelia* constitute the specific phorophyte of *Laelia speciosa* and that the other substrates are more likely to be incidental (Hernández, 1992). 0

(a) No=0

(b) Yes=1

(3) Does the taxon require a specific pollinator? Example: orchids of the genus *Stanhopea* are pollinated by male bees of the Euglossini tribe that collect floral scents. *Stanhopea hernandezii* is pollinated exclusively by males of the species *Eufriesea coerulescens* and no other pollinators have ever been observed, even after many days of observation. Clearly, the reproduction of *Stanhopea hernandezii* would be disrupted if its pollinator were to disappear (Soto-Arenas, 2003). 0

(a) No=0

(b) Yes=1

(4) Does the taxon have a specific dispersal mechanism? (a) No=0 (b) Yes=1	0
(5) Does the taxon exhibit obligate myrmecophily? Example: the orchid *Coryanthes picturata* lives exclusively in the tree nests of various ant genera and appears to depend on the physicochemical conditions of the ant nest and the ants' continuous protection in order to thrive (Hágsater et al., 2005). (a) No=0 (b) Yes=1	0
(6) Is the taxon strictly dependent on mycorrhizae? Example: plants of several orchid genera are strictly mycoheterotrophic, lacking the ability to photosynthesize and relying entirely on their symbiotic fungi for nutrition (Hágsater et al., 2005). (a) No=0 (b) Yes=1	1
(7) Is the taxon significantly affected by predators or pathogens (including intense competition with non-native or invasive species)? (a) No=0 (b) Yes=1	0
D. Impact of human activity $\left(\frac{Total\ score}{10}\right)$	0.1
(1) How does human-induced habitat alteration affect the taxon? Example: many species, including some classified as at risk, see their population numbers increase because of habitat alteration caused by human activities. *Cecropia obtusifolia* is a pioneer tree that colonizes large clearings in the evergreen highland rainforest. However, it is even more abundant in the secondary vegetation of the rainforest, particularly in open areas and along roadsides. At least in certain areas, the tree is currently more abundant than in the past. (a) The plant benefits from the disturbance=-1 (b) It does not affect the plant, or it is unknown=0 (c) The plant is affected by the disturbance=1	0

(2) What is the extent of human impact on the taxon's habitat (impact=fragmentation, alteration, destruction, urbanization, grazing, or habitat contamination, referring to both intensity and extent)? Example: *Carpinus caroliniana* is an abundant tree in some mesophilic mountain forests. The clearing of trails and thinning of the forest in ravine areas appears to affect it by creating drier and more exposed conditions than those preferred by this species. On the other hand, there is evidence suggesting that this species benefits from the thinning of certain forests caused by selective logging, provided the disturbance has not been too severe. This same species also appears to have good recruitment, and its populations are stable in areas that have been inhabited for many years, such as the ravines of *Mexicapa*, *Morelos*. All evidence suggests that, in this species, human disturbance negatively affects some populations, benefits others, and appears to have no effect on still others, depending on the intensity of the disturbance. Other species are negatively affected by the disturbance caused by human activities. The clearing of the evergreen mesic forest on the slopes of Mount *Teotepec* in *Guerrero* and Mount *Tacaná* in *Chiapas* to establish coffee plantations has altered the canopy structure, and some shade-loving species with high atmospheric humidity requirements, which are highly sensitive to environmental changes, show a clear decline in their populations. Such is the case with *Kefersteinia tinschertiana*, an orchid without pseudobulbs that has thin, delicate leaves which burn when exposed to direct sunlight. (a) The remaining habitat does not support the viability of existing populations=4 (b) The impact is significant and affects all populations=3 (c) The impact is severe in some, or moderate across all populations=2 (d) The impact is moderate and affects only a few populations=1 (e) There is no significant impact on any population=0	1
(3) Is there evidence (measurements, models, or predictions) indicating a decline in habitat quality or extent because of global changes (*e. g.*, sensitivity to climate change), or is a drastic change in land use anticipated? (a) No=0 (b) Yes=1	0
(4) What is the impact of use on the taxon? This refers to both the intensity and the extent of use; use may involve extraction, the harvesting of propagules, or the removal of part of an individual's biomass. Human use of certain species is a risk factor that can lead to their extinction, but the intensity of this use varies greatly. The impact of human use can be observed in the decline or disappearance of certain populations or in the reduced vigor of individual organisms, which could have negative effects on their fertility, depending on the method of extraction. The vast majority of plants are not used by humans at all, so there is no impact from their use. The leaves of *Litsea glaucescens*, the Mexican laurel, are harvested in certain quantities from wild populations to meet the country's demand, however, this shrub or tree is abundant in many communities, and no decline in populations has been observed. In general, the shrubs show no serious signs of deterioration due to leaf harvesting. (a) The impact of its use involves the removal of populations=4	0

(b) The impact of its use is significant and affects all populations=3

(c) The impact of its use is significant in some populations or moderate in all populations=2

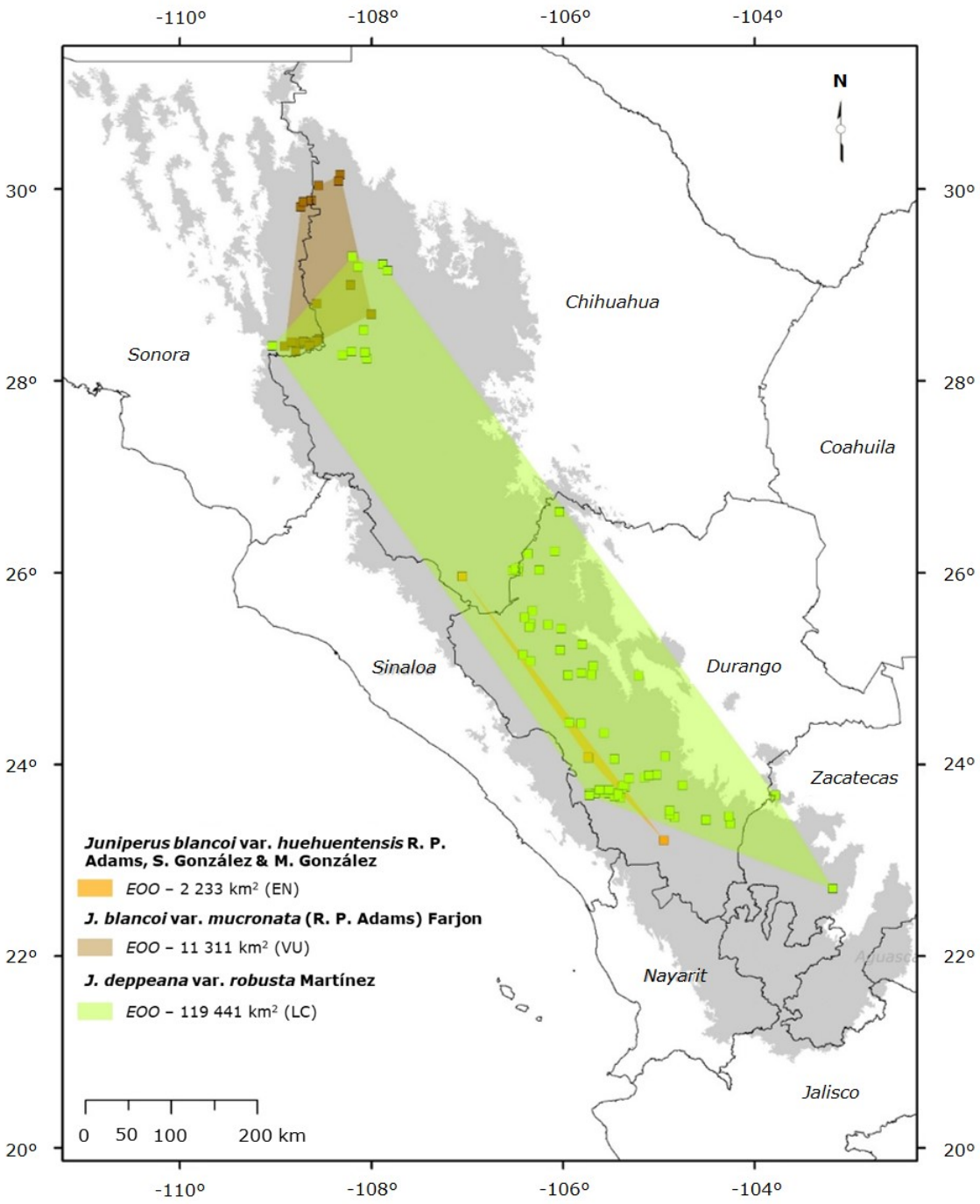
(d) The impact of use is moderate and affects only a few populations=1

(e) There is no significant impact of use on any population=0

(5) Is it cultivated or propagated *ex situ*? (nationally or internationally). Propagation reduces the pressure of collection on many commercially important species, and the propagated material can also serve as a source of specimens for *ex situ* conservation programs. (a) Yes=-1 (b) No=0	0
Score (total of the 4 criteria)	1.46

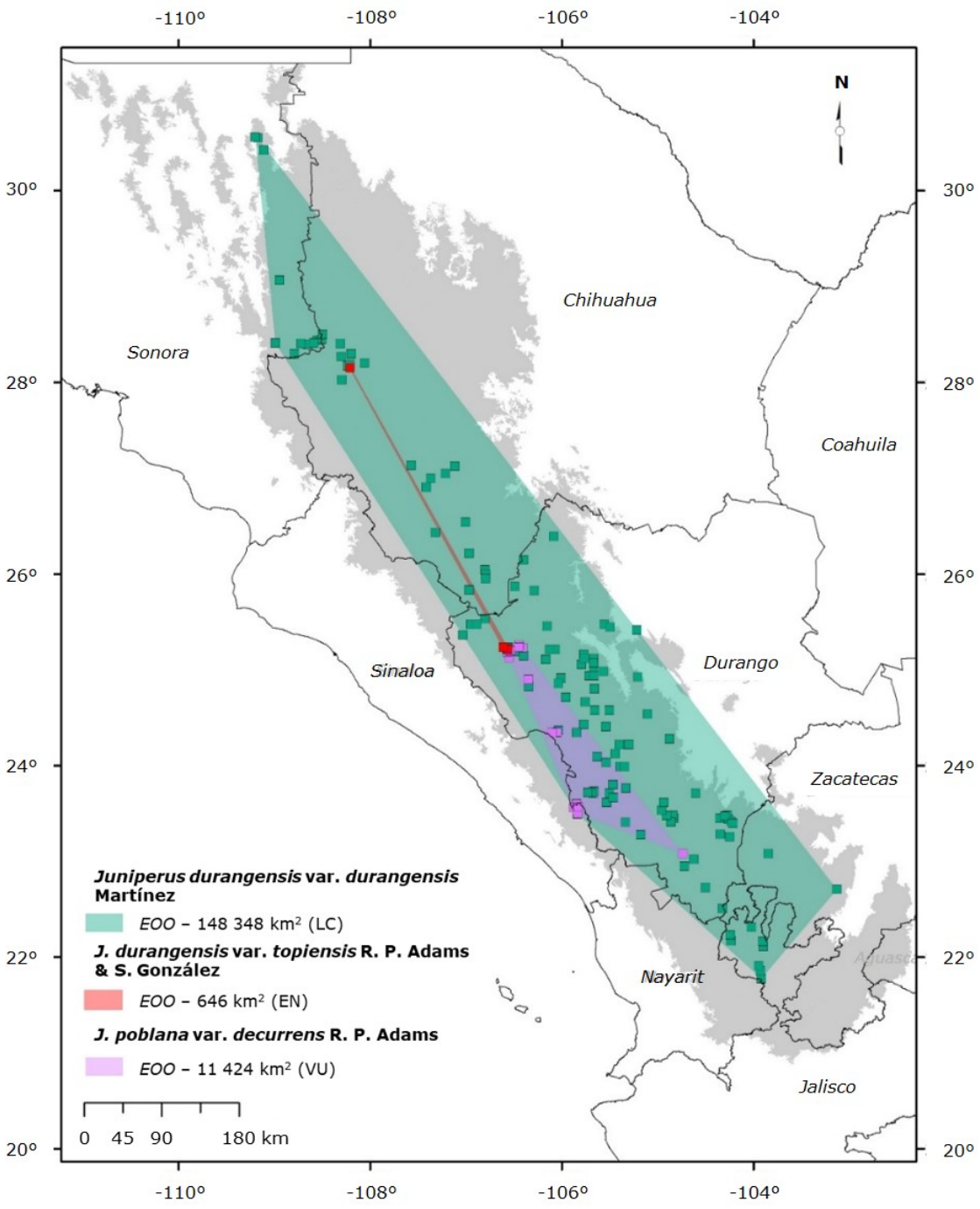
Category	Score achieved
Endangered (P)	(a) Greater than or equal to 2 (b) Direct ways: I. When, in terms of geographic distribution, the range is 1 km^2 or less; II. When, in terms of population size, the total number of individuals is 500 or fewer; III. When the level of human impact on the taxon's habitat, the remaining habitat does not support the viability of existing populations; IV. When the species has highly dispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.4
Threatened (A)	(a) Greater than 1.7 and less than 2 (b) Direct way: When the species has hyperdispersed populations with a population density of 1 individual per 5 ha or less, and the sum of Criterion D is greater than 0.3 and less than 0.4
Subject to Special Protection (Pr)	(a) Greater than or equal to 1.5 and less than 1.7 (b) Greater than or equal to 1 and less than 1.5, and that the sum of Criterion D is equal to or greater than 0.3

VU = Vulnerable; LC = Least Concern; EN = Endangered; P = Endangered.



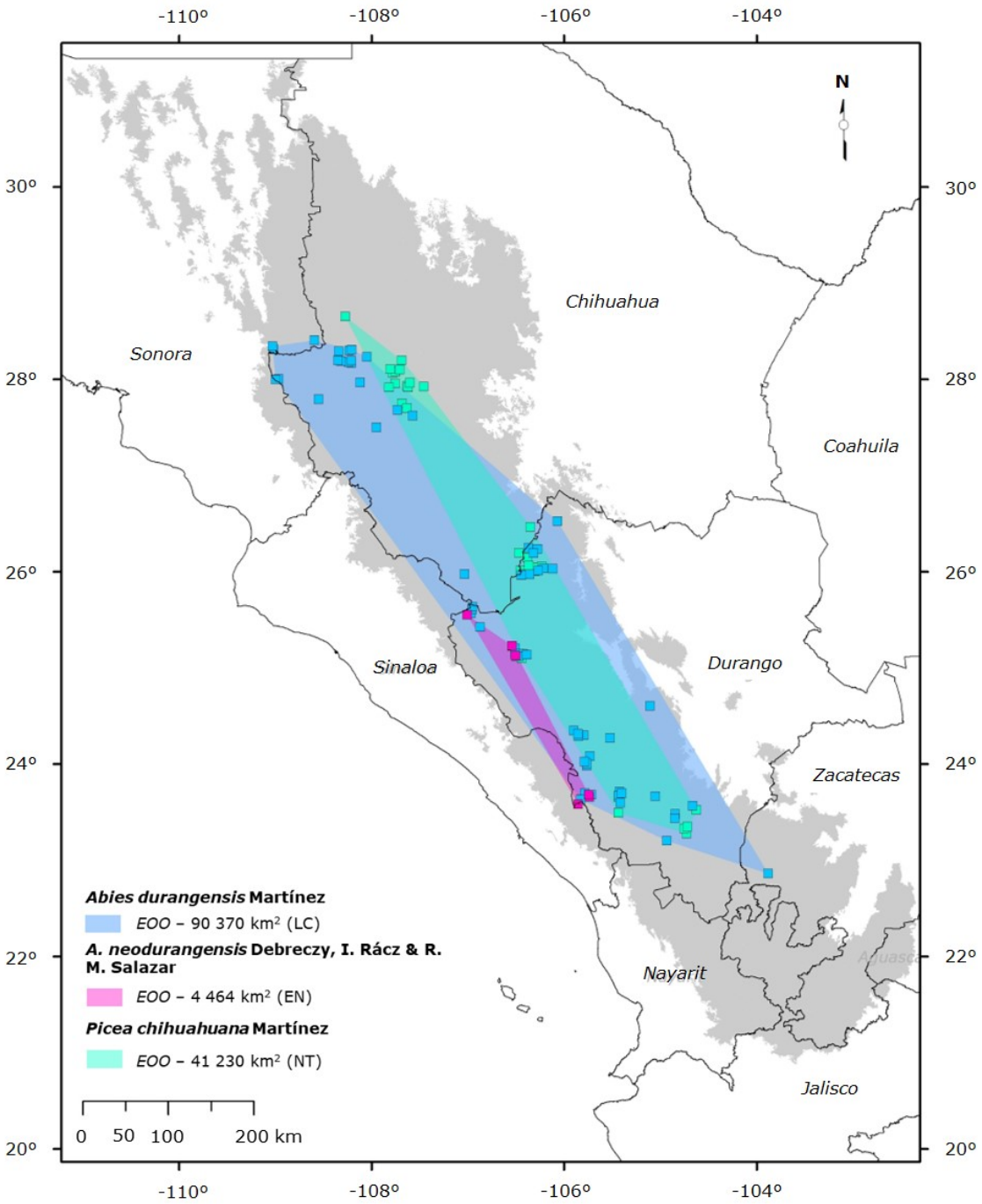
EN = Endangered; VU = Vulnerable; LC = Least Concern. The category proposed by the Red List based on *EOO* is indicated in parentheses.

Figure S1. Extent of occurrence (*EOO*) of *Juniperus blancoi* var. *huehuentensis* R. P. Adams, S. González & M. González, *J. blancoi* var. *mucronata* (R. P. Adams) Farjon and *J. deppeana* var. *robusta* Martínez in the *Sierra Madre Occidental*.



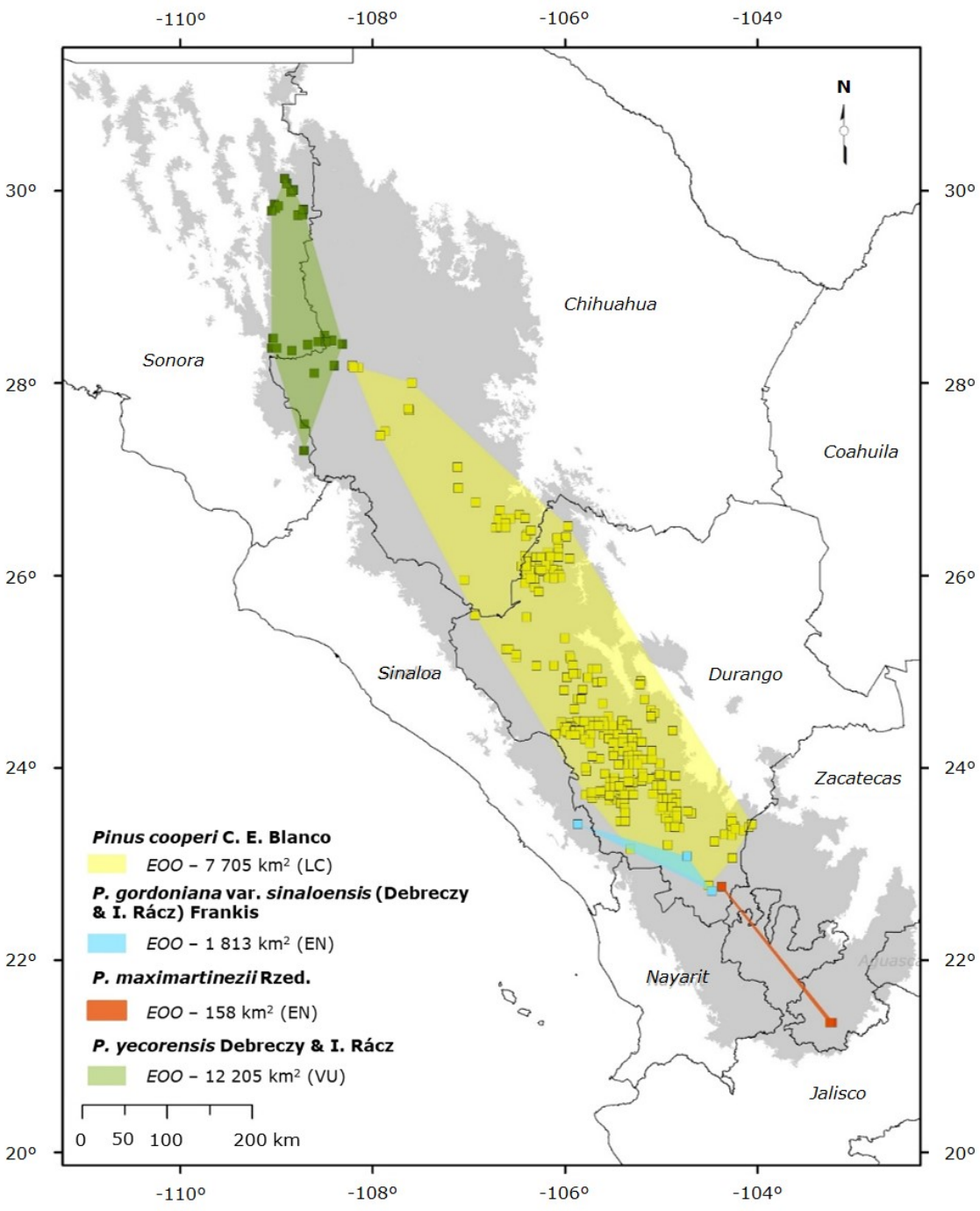
LC = Least Concern; EN = Endangered; VU = Vulnerable. The category proposed by the Red List based on *EOO* is indicated in parentheses.

Figure S2. Extent of occurrence (*EOO*) of *Juniperus durangensis* var. *durangensis* Martínez, *J. durangensis* var. *topiensis* R. P. Adams & S. González and *J. poblana* var. *decurrens* R. P. Adams in *the Sierra Madre Occidental*.



LC = Least Concern; EN = Endangered; NT = Near Threatened. The category proposed by the Red List based on *EOO* is indicated in parentheses.

Figure S3. Extent of occurrence (*EOO*) of *Abies durangensis* Martínez, *A. neodurangensis* Debreczy, I. Rácz & R. M. Salazar and *Picea chihuahuana* Martínez in the *Sierra Madre Occidental*.



LC = Least Concern; EN = Endangered; VU = Vulnerable. The category proposed by the Red List based on *EOO* is indicated in parentheses.

Figure S4. Extent of occurrence (*EOO*) of *Pinus cooperi* C. E. Blanco, *P. gordoniana* var*. sinaloensis* (Debreczy & I. Rácz) Frankis, *P. maximartinezii* Rzed. and *P. yecorensis* Debreczy & I. Rácz in the *Sierra Madre Occidental*.