The Red List of Oaks

Sara Oldfield and Antonia Eastwood

BGCI
Plants for the Planet

Global Trees Campaign

SSC
Species Survival Commission

IUCN
The World Conservation Union

FAUNA & FLORA INTERNATIONAL (FFI), founded in 1903 and the world's oldest international conservation organization, acts to conserve threatened species and ecosystems worldwide, choosing solutions that are sustainable, are based on sound science and take account of human needs.

BOTANIC GARDENS CONSERVATION INTERNATIONAL (BGCI) is a membership organization linking botanic gardens in over 100 countries in a shared commitment to biodiversity conservation, sustainable use and environmental education. BGCI aims to mobilize botanic gardens and work with partners to secure plant diversity for the well-being of people and the planet. BGCI provides the Secretariat for the IUCN/SSC Global Tree Specialist Group.

THE GLOBAL TREES CAMPAIGN is a joint initiative between FFI and BGCI in partnership with a wide range of other organizations around the world. The aim of the Campaign is to save the world's most threatened trees and the habitats in which they grow through the provision of information, delivery of conservation action and support for sustainable use.

THE IUCN/SSC GLOBAL TREE SPECIALIST GROUP forms part of the Species Survival Commission's volunteer network of over 7000 volunteers working to stop the loss of plants, animals and their habitats. SSC is the largest of the six Commissions of IUCN-The World Conservation Union. It serves as the main source of advice to the Union and its members on the technical aspects of species conservation. The aims of the IUCN/SSC Global Tree Specialist Group are to promote and implement global red listing for trees and act in an advisory capacity to the Global Trees Campaign.

Published by Fauna & Flora International, Cambridge, UK.

ISBN: 9781 903703 25 0

AUTHORS

Sara Oldfield is Secretary General of Botanic Gardens Conservation International (BGCI) and Chair of the IUCN/SSC Global Tree Specialist Group.

Antonia Eastwood was formerly Tree Red List Officer at Fauna & Flora International and is now Plant Ecologist at the Macaulay Institute, Aberdeen, Scotland.

COVER PHOTOS

Front cover: *Quercus rysophylla* by Juan Pablo Moreiras/FFI. Back cover: Girl with acorn of *Quercus insignis* by Allen Coombes.

COVER DESIGN

John Morgan, Seascape.

Printed on 80% recycled, 20% FSC certified paper.

The Red List of Oaks

Sara Oldfield and
Antonia Eastwood

BGCI
Plants for the Planet

Global Trees Campaign

SSC
Species Survival Commission

IUCN
The World Conservation Union

Contents

Acknowledgements

Many experts around the world have contributed information and undertaken assessments for this global evaluation. Their input is gratefully acknowledged. Simon Mickleburgh, FFI, prepared the lists of endemic species by country and species with widespread distributions considered to be Least Concern, undertook the preliminary assessments of the US species using the IUCN Red List Categories and Criteria and undertook much of the initial correspondence with experts. Tiffany Aylett made most of the arrangements for the Regional Tree Red Listing Workshop in the Caucusus, working with the local NGO NACRES. Dr Georgina Magin, Global Trees Campaign Coordinator, has managed various aspects of the project including final editing and production of the report. Fiona Wild helped to edit the document.

Allen Coombes of Sir Harold Hillier Gardens and Arboretum provided expert input throughout the project. He organized the workshop in China and, jointly with Maricela Rodriguez-Acosta, organized the workshop in Mexico. Other participants at the Mexican workshop were Susanna Valencia-Avalos, and Fernando Zavala-Chavez. Participants at the China workshop were Zhekun Zhou and D. Min. Participants at the Caucasus workshop were Dr Otar Abdaladze, Institute of Botany, Georgia; Dr Maia Akhalkatsi, Institute of Botany, Georgia; Ketevan Batsatsashvila, Institute of Botany, Georgia; Dr Marina Eristavi, Institute of Botany, Georgia; Dr George Fayvush, Institute of Botany, Armenia; Giorgi Gigauri, WWF Caucasus, Georgia; Dr Adil Güner; Dr Mirian Gvritishvili, Tbilisi Botanic Garden, Georgia; Professor Vahid Hajiyev, Institute of Botany, Azerbaijan; Professor Svetlana Litvinskaia, Suban State University, Russia; Dr Zurab Manvelidze, Batumi Botanical Garden, Georgia; Dr George Nakhutsrishvilli, Director of the Tbilisi Institute of Botany, Georgia; Dr Galina Pronkina; IUCN, Russia; Professor Dr Peter A. Schmidt, University of Dresden, Germany; Dr Shamil Shetekauri, Institute of Botany, Georgia; Dr Shalva Sikharulida, Bakuriani Alpine Botanical Garden, Georgia; Dr Tatyana Shulkina, Missouri Botanical Garden and Dr Kamilla Tamanyan, Institute of Botany, Armenia.

Participants at the Guatemala workshop held in September 2005 were, from CONAP: Omar Molina, Hiram Ordóñez, Julio Madrid, Edy Girón, Julio Tzirin, Otoniel Chacón, Mygdalia García, Lis Lima, Héctor Gutiérrez and Julio Cruz Corzo; from CECON: Miguel Flores, Ana María Ortiz, Rebeca Orellana, Marie Storek and Julio Morales; from other institutions: Conrado Valdés Markwordt (USAC), Martín Sánchez (Central University of the South West / USAC), Brenda Chávez (Museum Jorge Ibarra of Natural History), Herbert Ortega (National School of Agricultural Training, ENCA), Mario Díaz (INAB).

Other people who have contributed valuable advice and/or information are Dr Jeffrey Bacon, Mexico; Bruce Bartholemew, California Academy of Sciences; Rosalina Berazaín, Cuba; Y. Cheng, Taiwan; Dr Lillian Chua, Forest Research Institute Malaysia; Dr Giuseppe Garfi, Sicily; M. González-Espinosa, Mexico; Dr Felix Llamas, University of Leon, Spain; Martín E. Mitre, Panama; Neptali Ramírez-Marcia, Mexico; Dr Nghia, Vietnam; G. Rusea, Malaysia; and Dr Salma Talhouk, Lebanon.

List of acronyms

BGCI	Botanic Gardens Conservation International
CBD	Convention on Biological Diversity
CECON	Nature Conservation Centre, Guatemala
C&I	Criteria and Indicators
CONAP	National Council for Protected Areas, Guatemala
FFI	Fauna & Flora International
GSPC	Global Strategy for Plant Conservation
GTSG	Global Tree Specialist Group
IPA	Important Plant Area
INAB	National Forestry Institute, Guatemala
IUCN	International Union for the Conservation of Nature and Natural Resources
NGO	Non-government Organization
SSC	Species Survival Commission
UNEP-WCMC	United Nations Environment Programme-World Conservation Monitoring Centre
UNAM	Universidad Nacional Autonóma de México
USAC	University of San Carlos, Guatemala

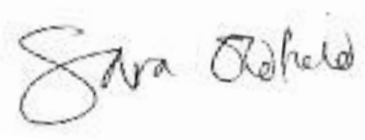
Foreword

Trees are important to the well-being of people in every country of the world, providing essential ecological, economic and cultural services. Oak trees are valued for their uses as a source of timber, cork, dyes and animal fodder. They are of symbolic value in many cultures and widely planted ornamentally. Ecologically, oaks are keystone species in a wide range of habitats from Mediterranean semi-desert to subtropical rainforest. Oaks are under threat in the wild from general forest loss and over-exploitation of particular species. This report presents a review of the conservation status in the wild of oaks worldwide, undertaken by the IUCN/SSC Global Tree Specialist Group.

Since its establishment in 2003, the primary role of the IUCN/SSC Global Tree Specialist Group has been to assess the global conservation status of tree species in selected geographical areas and taxonomic groups. The *Red List of Oaks* is the fourth publication in the series.

The collection of information on tree species of conservation concern is vital for planning conservation action. The second role of the IUCN/SSC Global Tree Specialist Group is to act as an advisory body for the Global Trees Campaign, which aims to save the world's most threatened tree species and the habitats where they grow. The Global Trees Campaign provides an important practical mechanism for implementation of the Global Strategy for Plant Conservation of the Convention on Biological Diversity. Global tree red listing contributes directly to Target 2 of the Strategy, which calls for a provisional list of threatened plant species by 2010. In many ways Target 2 underpins the other ambitious targets that relate to *in situ* and *ex situ* conservation and sustainable use and trade in plants. Projects of the Global Trees Campaign carried out in partnership with organizations and individuals around the world help to deliver these various targets. The projects contribute to halting the loss of forest biodiversity and the provision of support to rural livelihoods.

The Global Tree Specialist Group is committed to undertaking a global assessment of the conservation status of tree species. Results of the global assessment will be published as components of the work are completed. This will ensure that regular indicators of progress are produced, updated tree conservation data are made widely available and that tree conservation initiatives around the world can be supported. This fourth publication highlights the urgent need to take action for globally threatened oak species. Unfortunately, it also highlights major information gaps in the conservation status of species in the wild. The report makes a strong plea for further research and action to save the globally threatened oak species and the habitats where they occur.



Sara Oldfield
Chair of the IUCN/SSC Global Tree Specialist Group

INTRODUCTION

Oaks (*Quercus* spp.) are of global ecological and economic importance and have great symbolic value in many countries. They have provided a major source of timber and coppice wood for centuries and continue to provide a significant proportion of temperate hardwood production. Other useful products derived from oaks include fuelwood, charcoal, medicinal products, dyes, cork and bark used in tanning. Acorns have provided food in times of famine and continue to provide animal fodder. Many species of oak are grown ornamentally around the world.

The genus *Quercus* contains over 500 species, mainly growing in the northern hemisphere. They occur in habitats ranging from arid Mediterranean areas to subtropical rainforest, with species predominantly found in deciduous or evergreen forest with summer rainfall. The greatest diversity of species is found in Mexico, with around 160 species, 109 of which are endemic to the country. Oaks are a dominant component of species-rich montane forests and lowland dry forests in Mexico and are amongst the most important trees for supporting rural livelihoods, primarily because of their widespread use as fuelwood and timber. Of the Mexican oak species, 33 species share their range with the USA whereas 20 extend into countries further south (Valencia-A., 2004).

A second centre of diversity for oaks is China, also with over 100 taxa. This includes species within the genus *Cyclobalanopsis*, which is treated as a separate genus in the Flora of China (Flora of China Editorial Committee, 1999). Oaks are important components of the broadleaved evergreen forest of China. Zhou Yue *et al* (2001) reported that the traction of lateral roots of *Cyclobalanopsis* plants plays an important role in effecting soil stability and slope protection in shelter forests, especially in mountainous areas. This has significant ecological importance in the development and succession of tree communities. As in other parts of the world, Chinese oaks are harvested for timber, charcoal, the production of dyes and medicinal products.

Around the world many species of oak are threatened with extinction, mainly because of land use changes, livestock grazing and unsustainable harvesting. For the past 200 years, large areas of oak forest in the highlands of Mexico, Central America and the northern Andes have been cleared for coffee plantations and cattle ranching. Continuing threats to these forests include exploitation for timber, fuelwood and charcoal (Kappelle, 2006b).

In the USA, entire oak ecosystems have declined due to a combination of factors still imperfectly known. Fire suppression, increased consumption of acorns by growing mammal populations, herbivory of seedlings, introduced pests and climate change are all thought to be contributory factors. (Lorimer, 2003). In some areas of the southern USA, forest management practices favour replacement of hardwood forests with conifer plantations. Invasive species including insects and fungal pathogens such as *Phytophthora ramorum*, which causes Sudden Oak Death, are threats to oaks in various countries. Oaks in western USA have been severely affected by this pathogen and outbreaks of oak death caused by *Phytophthora* have recently been reported in Mexico.

Various studies have recently been published or are underway on the impact of climate change on the distribution of oak species. Based on initial bioclimatic modelling, some of the species expand their ranges with increase in temperature, but, in more drastic scenarios, most of the species contract their ranges. In the USA, for example, some widespread oaks are expected to increase their ranges whereas narrow endemics in California are predicted to become increasingly threatened with extinction. In Mexico preliminary work linking the distribution of oak species with *in situ* conservation of rare plant hotspots and climate change has been undertaken by Universidad Nacional Autonóma de México (UNAM) (Tellez-Valdes, 2006).

INFORMATION COLLECTION FOR CONSERVATION ASSESSMENT

The collection of information on the conservation status of oaks and evaluation using the IUCN Red List Categories and Criteria has been a collaborative endeavour involving botanists worldwide. The experts who have provided information for this report are listed on p.3.

The starting point for the global evaluation was the *World Checklist and Bibliography of Fagales* (Govaerts & Frodin, 1998). This provides a readily available global list of oak taxa. More recent taxonomic literature has been consulted where available, but the taxonomy of oaks remains controversial and complex in many countries. Using the *World Checklist*, single-country endemics and oak species with restricted geographical ranges were identified for further consideration of rarity and threat status. Some endemic taxa included in the *World Checklist* have subsequently been excluded following correspondence with experts. *Quercus sicula* Borzí, for example, previously considered endemic to Sicily, is only known through a unique specimen cultivated at the Botanical Garden of Palermo. Although in the *Flora d'Italia* (Pignatti, 1982) it is reported in the wild in the region between the towns of Mirto and Cutò in the Nebrodi Mountains (Province of Messina), it has not been recently collected and no more detailed information about its

distribution is available. The true taxonomic status of the cultivated specimen is controversial (Garfi, 2006).

The conservation status of additional species published since 1998 (when the *World Checklist* was published) have been considered based on recent literature. Information on the 58 taxa already assessed as globally threatened and recorded in the IUCN Red List was incorporated into the list of taxa for further consideration. These 58 taxa, mostly trees occurring in Mexico and the USA, had been assessed using the IUCN Red List Categories and Criteria version 2.3 and new assessments were necessary using version 3.1 of the Categories and Criteria. A list of widespread oak species assumed to be Least Concern was also compiled and placed on the Global Trees Campaign website, with comments invited to verify the status of these species.

For the species identified as single-country endemics or of restricted geographical range, experts were identified to undertake conservation assessments. According to the *World Checklist and Bibliography of Fagales*, a total of 345 *Quercus* species are endemic to a single country. Thirty-two countries worldwide have endemic oaks. Status assessments were made using an edited version of the standard IUCN Red List Assessment Sheet. A series of small workshops was also held to facilitate the evaluation process. The workshops took place in Puebla, Mexico in May 2004 (Coombes *et al*, 2004). and in China in October 2004.

Oaks occurring in Guatemala were evaluated as part of a broader tree Red Listing exercise for the country, which involved extensive consultation within Guatemala and a national workshop held in September 2005 (Vivero *et al*. 2006). Oaks of the Caucasus were also evaluated during a three-day regional workshop to assess threats to tree species in the Caucasus in September 2005, held in Tbilisi, Georgia (Global Tree Specialist Group, 2005). In 2005, NatureServe reviewed the conservation status of oaks of the USA as a contribution to the global evaluation.

Results of the evaluation

This report presents the results of a global evaluation of the conservation status of oak species. Initially, an attempt was made to apply the IUCN Red List Categories and Criteria version 3.1 to all taxa within the genus, with the general exception of naturally occurring hybrids. However, for over half the species it proved impossible to collect sufficient information and these species remain Not Evaluated. In total there are around 500 taxa in the genus and IUCN Red List Categories and Criteria have been applied to 208 of these. A significant number are recorded as Data Deficient, where experts have considered the available information and have not been able to evaluate the degree of threat. These species are assumed to be threatened on the basis of restricted distribution, but field work is required to verify the status. In some cases there is taxonomic uncertainty about the species concerned.

SUMMARY OF RESULTS

Conservation Status	Number of oak taxa
Extinct	0
Critically Endangered	13
Endangered	16
Vulnerable	27
Near Threatened	22
Data Deficient	33
Not Evaluated	c.300
Least Concern	97

Current conservation measures for threatened oaks

Information on the distribution and abundance of threatened plant species is of primary importance in the planning and implementation of biodiversity conservation activities. The need for attention to be focused on rare and threatened species is recognized within the objectives and implementing mechanisms of the main international biodiversity conventions, notably the Convention on Biological Diversity (CBD). Target 2 of the Global Strategy for Plant Conservation (GSPC) calls for a provisional list of threatened plant species by 2010. Target 2 underpins the other ambitious targets of the GSPC, which relate to *in situ* and *ex situ* conservation and sustainable use and trade in plants.

In situ conservation of oak species can be undertaken by the inclusion of the habitat of threatened species within protected areas or by the sustainable management of the forest habitats of oak species of conservation concern. Examples of globally threatened oak species that occur within protected areas include Q. *benthamii*, which occurs in the El Triunfo Biosphere Reserve in Mexico, and *Quercus hinckleyi*, most of the known populations of which occur in Big Bend Ranch State Park, under the management of Texas Parks and Wildlife, USA.

In situ protection measures were proposed for the Endangered species, *Quercus hintonii*, based on a project supported by the Global Trees Campaign. These included working with private owners of land where the species occurs to decrease deforestation on that land, training relevant authorities in propagation of the species and reintroduction techniques and improving public awareness of the value and rarity of *Q. hintonii* (Rodriguez-Acosta & Coombes, 2000).

Sustainable management of the neotropical montane oak forests is discussed in Kappelle (2006a). Criteria and Indicators (C&I) for sustainable management of this particular forest type are proposed by Herrera & Chaverri (2006) within that publication. As improved information becomes available, the specific needs of threatened oak species can be taken into account in the development and application of C&I.

Oaks are relatively well represented in *ex situ* collections within botanic gardens and arboreta. Such collections are valuable as an insurance policy at a time of rapid global change. *Ex situ* collections also provide an opportunity for research into propagation and recovery techniques. For example, *Q. hintonii* is grown in three botanic gardens in Mexico as well in overseas collections. Although this species shows a good germination rate, its adaptation to cultivated conditions has been of limited success so more work on cultivation conditions is being done at the Botanic Garden in the University of Puebla (Coombes & Rodriguez-Coombes, 2007).

BGCI's PlantSearch Database records around 240 oak taxa as occurring in living collections. This includes ten species that are Endangered or Critically Endangered. More work is needed to identify other living collections, particularly as oak seeds are not generally able to be stored under conventional seed bank conditions. Cryopreservation techniques using embryogenic cultures and embryonic axes have been developed for a few species (Pritchard, 2007).

Some efforts are being made to reintroduce threatened oak species in their natural habitats. Seedlings of *Q. benthamii* have been massively produced in local nurseries and allow its re-introduction into impoverished stands in highland areas of Chiapas, Mexico (Ramírez-Marcial *et al*. 2005). A nursery has been successfully established in Las Cañadas Reserve in Huatusco for the propagation and re-planting of *Q. insignis* (Coombes & Rodriguez-Coombes, 2007).

Priority needs for further action

The information compiled in this report should be used to guide conservation policy both at an ecosystem and species level. Although incomplete, it provides a useful baseline for planning conservation action. At the same time, the conservation status of oak species is poorly known in various parts of the world and further information collection is needed. In Mexico, the country with the highest diversity of oak taxa, 17 are still considered Data Deficient and others have not yet been evaluated. The need to review further the conservation status of oaks in Mexico was discussed at a workshop on the Conservation status of Mexican cloud forest tree species organised by the Global Tree Specialist Group in May 2007 (Newton, 2007). Other countries where the evaluation of the conservation status of oak species, based as far as possible on field survey, remains a priority include India, Laos, Lebanon and Viet Nam.

Urgent attention is required for the 12 species considered to be Critically Endangered. Three of these species are known to be in cultivation in botanic gardens, providing a basis for research and potential re-introduction into the wild. A more thorough survey of *ex situ* collections of globally threatened oak species is a priority action that is being undertaken by BGCI. The information on existing holdings and propagation techniques will be used to guide both species and habitat restoration.

Oaks will only be effectively conserved if their natural habitats are secure. Specific needs of threatened oak species should be taken into account in the development and application of C&I for forest management, for example in Mexico, Central America and China. Information on the conservation status of oaks should also be taken into account in the regional planning of forest conservation action.

Looking ahead, more information is needed on the impact of climate change on oak species. Given the, albeit preliminary, results of this global evaluation of the conservation status of oak species and their global importance, there is great potential to use oaks as indicators of the impacts of climate change.

Box 1: Conservation of *Quercus hinckleyi*

San Antonio Botanical Garden, Texas, is helping to conserve the Critically Endangered *Quercus hinckleyi* as part of the Center of Plant Conservation (CPC) National Collections scheme for endangered plants of the USA. Acorns have been collected from the wild for propagation within the Garden, which maintains and monitors plants of this species in field test plots and within the Garden grounds. The species is listed on the US Endangered Species Act and a recovery plan was devised in 1992.

Source: http://www.centerforplantconservation.org

References

Coombes, A., Rodriguez-Coombes, M., Valencia-A, S. & Zavala-C, F. (2004). Report on a meeting to assess the status of threatened oaks in Mexico. Unpublished report, Fauna & Flora International, Cambridge.

Coombes, A., & Rodriguez-Coombes, M. (2007). E-mail correspondence with Sara Oldfield.

Flora of China Editorial Committee (eds) (1999). *Flora of China*, Volume 4 (Cycadaceae through Fagaceae). Science Press, Beijing and Missouri Botanical Garden Press, St Louis.

Garfi, G. (2006). E-mail correspondence with Sara Oldfield.

Global Tree Specialist Group (2005). *Globally Threatened Trees of the Caucasus*. A report on the Caucasus regional tree Red Listing workshop (Tbilisi, Georgia, 26–28 September 2005). IUCN/SSC Global Tree Specialist Group.

Govaerts, R. & Frodin, D.G. (1998). *World Checklist and Bibliography of Fagales* (Betulaceae, Corylaceae, Fagaceae and Ticodendraceae). Royal Botanic Gardens, Kew, Richmond, UK.

Herrera, B. & Chaverri, A. (2006). Criteria and indicators for sustainable management of Central American montane oak forests. In: Kappelle, M. (ed.) *Ecology and conservation of Neotropical montane oak forests. Ecological Studies No. 185.* Springer-Verlag, Berlin.

Lorimer, C.G. (2003). Editorial: the decline of oak forests. http://www.aibs.org/bioscience-editorials/editorial_2003_10.html

Kappelle, M. (ed.) (2006a). *Ecology and conservation of neotropical montane oak forests*. Ecological Studies No. 185. Springer-Verlag, Berlin.

Kappelle, M. (2006b). Neotropical montane oak forests: overview and outlook. In: Kappelle, M. (ed.). *Ecology and conservation of neotropical montane oak forests. Ecological Studies No. 185.* Springer-Verlag, Berlin.

Newton, A. (2007). Conservation status of Mexican cloud forest tree species Report of Red List Workshop 13th – 15th May 2007, ECOSUR, San Cristobal de las Casas, Chiapas, Mexico. Unpublished report, Fauna & Flora International, Cambridge.

Pignatti, S. (1982). *Flora d'Italia*. 1-3. Edagricole, Bologna.

Pritchard, H. (2007). *Quercus* seed conservation: a digest. Unpublished document prepared by Dr H. Pritchard of the Millennium Seed Bank, Royal Botanic Gardens Kew.

Ramírez-Marcial, N., Camacho-Cruz, A. & González-Espinosa, M. (2005). *Potencial florístico para la restauración de bosques en Los Altos y Montañas del Norte de Chiapas*. Pp. 325–369 in: González-Espinosa, M., Ramírez-Marcial, N. & Ruiz-Montoya, L. (eds). Diversidad Biológica en Chiapas. Plaza & Valdés, Mexico City.

Rodriguez-Acosta, M. & Coombes, A. (2000). *Estrategia de Conservación de* Quercus hintonii. Reporte Final. Fauna & Flora International. Referencia 99429. BUAP, Puebla, Puebla, Mexico.

Tellez-Valdes, O. (2006). *Biological diversity, conservation and climate change in Mexico*. Presentation given at the Second Meeting of the Gran Canaria Group on Climate Change and Plant Conservation. Las Palmas de Gran Canaria, Spain. 10-11 April 2006.

Valencia-A., S. (2004). Diversidad del género *Quercus* (Fagaceae) en México. Bol. Soc. Bot. Méx. 75: 33–53.

Vivero, J.L., Szejner, M., Gordon, J. and Magin, G. (2006). *The Red List of Trees of Guatemala*. Fauna & Flora International, Cambridge.

Zhou Yue, Zhang Jun, Luo Hua-Song, Xu Qiang (2001). Tensile strength in lateral roots of Pinus and Cyclobalanopsis and its significance in maintaining slope stability in a shelter-forest system. *Acta Phytoecologica Sinica*. 25(1):105-109.

GLOBALLY THREATENED OAKS

Quercus acerifolia (E.J.Palmer) Stoynoff & Hess
EN B1ac(iv)+2ac(iv)
USA (Arkansas)
Six localities of *Q. acerifolia* are currently known in the Magazine and Ouachita Mountains, Arkansas (Logan, Montgomery, Polk, Sebastian). Populations are small, usually not numbering more than a few hundred individuals. The species distribution in Oklahoma is currently under review.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 4

Quercus acrodonta Seemen
DD
China (Gansu, Guizhou, Henan, Hubei, Sichuan, Shaanxi, Yunnan)
Although a fairly widespread species, it is not common and populations tend to be small. Found in valleys and mountains from 300–2300 m.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 10, 12

Quercus ajoensis C.H.Mull.
VU B2ab(iii)
Mexico (Baja California), USA (Arizona, Colorado)
The species is considered to be Vulnerable in the USA and has a very limited distribution in Mexico, where it is thought to be Endangered. The taxon is part of a poorly understood species complex which requires taxonomic revision. In Mexico the species has been virtually uncollected since the first half of the 20th century. It has no formal protection status. The IUCN category and criteria are provisional, based on available information.
Assessor: Global Tree Specialist Group
Refs: 2, 4, 8, 28

Quercus albicaulis Chun & W.C.Ko
CR D
China (Hainan)
This species is known to occur in only one province, Hainan. However, there have been no recent records and it is possibly extinct. Found in mesophytic forests from 200–600 m. Treated as *Cyclobalanopsis albicaulis* (Chun & W.C.Ko) Y.C.Hsu & H.Wei Jen in the *Flora of China*.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 10, 12

Quercus alpestris Boiss.
EN B1ab(iii)+2ab(iii)
Spain
The taxon is restricted to one population in the western high mountains of Málaga province in the Sierra de las Nieves and Tolox. Threats to the taxon include poor natural regeneration, over-grazing, loss of habitat, fire and soil erosion. Although the taxon is considered to fall within *Quercus faginea* Lam. s.l. by some taxonomists, this isolated population is still of great conservation interest and importance. A population augmentation programme was recently established for the species.
Assessor: B. Cabezudo, Y. Gil, D. Navas, P. Navas & A.V. Pérez Latorre
Refs: 24, 26

Quercus alnifolia Poech
VU B1ab(iii)
Cyprus (Troodos Mountains)
Restricted to the Troodos massif in south-west Cyprus, this endemic oak is found on volcanic and serpentine soils at mid-elevations. Habitat degradation by fire, grazing, wood cutting and development threaten the species.
Assessor: Global Tree Specialist Group
Refs: 2, 25

Quercus argyrotricha A.Camus
EN D
China (Guizhou)
The species is known from only two localities in one province, occurring in broadleaved evergreen forest at around 1600 m. It is treated as *Cyclobalanopsis argyrotricha* (A.Camus) Chun & Y.T.Chang ex Y.C.Hsu & H.Wei Jen in the *Flora of China*.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 10, 12

Quercus arkansana Sarg.
VU B1ab(iii)
USA (Alabama, Arkansas, Florida, Georgia, Louisiana, Texas)
Endemic to the Gulf of Mexico, *Q. arkansana* has a scattered distribution with small fragmented populations. It is threatened by habitat conversion into forestry plantations and farmland. However, relatively large healthy populations of the species still occur in Florida, some numbering several thousand individuals.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 3, 4

Quercus aucheri Jaub. & Spach
NT
Greece, Turkey
A small tree very similar to *Q. coccifera* L. It grows in the Aegean region on the Greek islands and in Anatolia, Turkey. Recorded in the Turkish Red Data Book as Low Risk (Conservation Dependent). Populations are localised and isolated.
Assessor: Adil Güner
Refs: 1, 2

Quercus austrocochinchinensis Hickel & A.Camus
DD
China (Yunnan), Laos, Thailand, Viet Nam
Although considered to be Critically Endangered in China, with very few individuals known, the extent of distribution of the species in neighbouring countries is unknown. It is treated as *Cyclobalanopsis austrocochinchinensis* (Hickel & A.Camus) Hjelmq. in the *Flora of China*.
Assessor: Global Tree Specialist Group
Refs: 12

Quercus austroglauca (Y.T.Chang) Y.T.Chang
EN D
China (Yunnan)
Only found in south-east Yunnan in broadleaved evergreen forests, 800–1500 m. Treated as *Cyclobalanopsis austroglauca* Y.T.Chang in the *Flora of China*.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 10, 12

Quercus bawanglingensis C.Huang, Z.X.Li & F.W.Xing
CR D
China (Hainan)
Found growing on limestone in mountains at around 1000 m. The taxonomic status of this species is uncertain and it is thought to be closely related to *Q. phillyreoides* A.Gray, which is a widely distributed species.
Assessor: Zhekun Zhou *et al*.
Refs: 5, 10, 12

Quercus benthamii A.DC.
VU A2cd
Costa Rica, Guatemala, Mexico (Chiapas, Oaxaca), Panama
This species is found in wet montane forest at 1500–3000 m and is typically used for firewood and charcoal. In Chiapas, Mexico it is sparsely distributed along the Sierra Madre (mostly in southern areas close to Guatemala), and in the northern mountains. Mature individuals can reach up to 40 m high, as at the El Triunfo Biosphere Reserve (Chiapas). Outside protected areas, the species is threatened by logging and habitat destruction. *Q. rapurahuensis* Pittier ex Seemen (distribution Costa Rica and Panama) is now considered a synonym of this species.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 6, 8, 30, 36

Quercus boyntonii Beadle
CR B1ab(iii)
USA (Alabama, Texas)
The species is only known from a few localities in Texas and Alabama. The population in Alabama appears healthy and is under conservation protection. However, it may have been extirpated in Texas as most of its habitat has been converted to forestry plantations or pasture land.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 3, 4

Quercus brandegeei Goldman
EN B1ab(iii,v)
Mexico (Baja California)
The species occurs at low densities in xeric habitat in the foothills of the Sierra Lazaro. The area is subject to grazing pressure and no regeneration has been observed in recent years.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus brenesii Trel.
DD
Costa Rica
A taxonomically doubtful species, apparently endemic to the department of Alajuela. Recently considered a synonym of *Q. cortesii* Liebm.
Assessor: K. Nixon *et al*.
Refs: 1, 2

Quercus bumelioides Liebm.
NT
Costa Rica, Guatemala, Honduras, Mexico (Chiapas), Nicaragua, Panama
Although previously evaluated as Vulnerable, a recent assessment in Guatemala indicates this taxon is less threatened. In Guatemala the taxon is NT and is a dominant species of montane cloud forest (1500–3200 m). Its timber is valued for its strength and durability and is used to make furniture, posts, floorboards and tools. In Mexico it is considered Vulnerable due

to habitat loss and logging, and it has become locally extinct in extensive areas of northern Chiapas. It is also considered Endangered in Panama. More information is required on its status elsewhere in the region. The species is highly variable, leading to a complicated taxonomy and many synonyms, one of which is *Q. sapotifolia* Liebm.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 6, 7, 30, 35

Quercus carmenensis C.H.Mull.
NT
Mexico (Coahuila), USA (south-west Texas)
This species is only known from the Sierra del Carmen region in Coahuila, Mexico and the Chisos Mountains, Texas. It is considered to be threatened in Texas. The taxonomic status of the species is uncertain.
Assessor: Global Tree Specialist Group
Refs: 2, 4, 8, 28

Quercus cedrosensis C.H.Mull.
VU B2ab(iii)
Mexico (Baja California), USA (California)
A species restricted to sclerophyllous vegetation in both lowland and mountainous areas. It occurs on Cedros Island where the vegetation suffers from over-grazing by goats. Recent surveys by the California Native Plant Society have discovered four new localities near Otay Mountain, San Diego, California, where it is considered rare.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 4, 11

Quercus chapensis Hickel & A.Camus
DD
China, Laos, Thailand, Viet Nam
Although only known from one population in China (south and south-east Yunnan), the species is fairly well distributed in South-East Asia. It is treated as *Cyclobalanopsis chapensis* (Hickel & A.Camus) Y.C.Hsu & H.Wei Jen in the *Flora of China*.
Assessor: Global Tree Specialist Group
Refs: 2, 5, 10, 12

Quercus chenii Nakai
DD
China (Anhui, Fujian, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Zhejiang)
The species has a wide distribution in China, but populations tend to be small and fragmented. There is some uncertainty as to its taxonomic status as some taxonomists consider it a close relative of *Q. acutissima* Carruth.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 5, 10, 12

Quercus chrysocalyx Hickel & A.Camus
DD
Cambodia, China, Laos, Thailand, Viet Nam
In China the species is considered to be Critically Endangered and is only known from one herbarium collection. However, it has a wider distribution in South-East Asia where its status is not known.
Assessor: Global Tree Specialist Group
Refs: 2, 5, 12

Quercus chrysotricha A.Camus
NT
Malaysia (Sarawak, Sabah), Indonesia (Kalimantan)
Endemic to Borneo, the species is known to occur at five localities in lowland Kerangas forest to mid-altitude (1200–1300 m) montane forest in Sarawak and Sabah. The species has also been recorded in Kalimantan. The species may be at threat from shifting agriculture.
Assessor: Rusea Go & Lillian Chua
Refs: 2, 18, 22

Quercus coahuilensis Nixon & C.H.Mull.
DD
Mexico (Coahuila, Chihuahua)
A locally abundant narrow endemic, this species may prove to be threatened when the area of occupancy is calculated, taking into account its altitudinal range (2000–3550 m). It is in need of taxonomic revision.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8, 28

Quercus convallata Trel.
DD
Mexico (Jalisco, Nayarit, Durango, Zacatecas)
A locally common endemic with dubious taxonomy which, with further morphometric investigation, may prove to be a synonym of *Q. obtusata* Bonpl.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8, 28

Quercus costaricensis Liebm.
NT
Costa Rica, Panama
Occurring in the montane forest of Volcáa Irázu and Cerro Chirripó up to 3000 m, the species is restricted to an area of less than 2000 km². Although deforestation has been extensive in the past, these areas are now given some degree of protection. The main population of this species occurs within La Amistad National Park.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 30, 31

Quercus crispifolia Trel.
NT
Mexico (Chiapas, Guerrero, Oaxaca), Guatemala, El Salvador
In Guatemala the species occurs in rainforests between 900–1550 m and is considered Near Threatened. In Mexico, the forest cover in most of the localities where it has been previously collected has disappeared, due to conversion into coffee plantations. It has not been collected during the last 50–60 years.
Assessor: Global Tree Specialist Group
Refs: 2, 6, 7, 30

Quercus cualensis L.M.González
DD
Mexico (Jalisco)
Currently very little information is known about this Mexican endemic species, other than that it occurs in the state of Jalisco at altitudes of 1800–2420 m.
Assessor: A. Coombes *et al*.
Refs: 7, 8

Quercus cupreata Trel. & C.H.Mull.
DD
Mexico (Nuevo León)
Currently very little information is known about this Mexican endemic species, other than that it occurs in the state of Nuevo León.
Assessor: A. Coombes *et a*l.
Refs: 2, 7, 8

Quercus daimingshanensis (S.K.Lee) C.C.Huang
EN D
China (Guangxi)
This species is restricted to one mountain range in the province of Guangxi, where it occurs in mixed mesophytic forests. It is treated as *Cyclobalanopsis daimingshanensis* S.K.Lee in the *Flora of China*.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 10, 12

Quercus delicatula Chun & Tsiang
CR D
China (Guangdong, Guangxi, Hunan)
The species has been recorded as occurring in the provinces of Guangdong, Guangxi and Hunan and is well represented in herbaria. However, there is now only one population left of this species. It is treated as *Cyclobalanopsis delicatula* (Chun & Tsiang) Y.C.Hsu & H.Wei Jen in the *Flora of China*.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 5, 10, 12

Quercus deliquescens C.H.Mull.
VU D2
Mexico (Chihuahua)
A species of dry montane scrub known only from one population system in the valley of Río Concho and north along Río Grande.
Assessor: K. Nixon *et al*.
Refs: 1, 2, 8

Quercus depressa Bonpl.
DD
Mexico (Hidalgo, Oaxaca, Puebla, Veracruz)
A species endemic to four states in Mexico. Records indicate it grows at altitudes of 1800–2600 m.
Assessor: A. Coombes *et al*.
Refs: 2, 7, 8

Quercus devia Goldman
VU D2
Mexico (Baja California Sur)
Two or three populations occur in dry montane forest, at altitudes of 2600 m where grazing pressure is high. The mainland Mexican species, *Q. viminea* Trel., may be synonymous, in which case the species would qualify for a status of lower risk.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 7, 8

Quercus disciformis Chun & Tsiang
VU D1
China (Guangdong, Guangxi, Guizhou, Hainan, Hunan)
The species is recorded to occur in five provinces and is well represented in herbaria. However, there are now only three

populations left in China. It is treated as *Cyclobalanopsis disciformis* (Chun & Tsiang) Y.C.Hsu & H.Wei Jen in the *Flora of China*.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 5, 10, 12

Quercus dumosa Nutt.
EN A2(c)
Mexico (Baja California), USA (California)
A number of populations (e.g. Santa Barbara, Hollywood and Griffith Park) have disappeared. The lowland scrub habitat of the remaining populations is under threat from pollution and the expansion of urban and industrial areas. A recent inventory commissioned by the California Native Plant Society recorded 16 separate localities for the species. However, it is considered to be threatened in 80 per cent of these localities, with development still being the greatest threat. The status in Mexico is not known.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8, 11

Quercus duratifolia C.H.Mull.
DD
Mexico (Chiapas)
Very little information has been gathered about this supposedly endemic species of Chiapas. It is known only from the southern Sierra Madre of Chiapas and has been considered a synonym of *Q. sapotifolia* Liebm., which is thought not to be threatened.
Assessor: Global Tree Specialist Group
Refs: 2, 7, 8, 30

Quercus edithiae Skan
NT
China, Viet Nam
The species is considered to be Vulnerable in China as it is now thought to occur in only one province, Hainan. There are records of it occurring in Guangdong, Guangxi and Hainan in the *Flora of China,* where it is treated as *Cyclobalanopsis edithiae* (Skan) Schottky in the *Flora of China*.
Assessor: Global Tree Specialist Group
Refs: 2, 10, 12

Quercus engelmannii Greene
VU A2(c)
Mexico (Baja California), USA (California)
Extensive declines of the sclerophyllous habitat of this species have been observed over the past 50 years. Regeneration of the species is poor and the remaining habitat is under threat from grazing and urban, agricultural and industrial developments. Only one tree remains on Santa Catalina Island in California, but a part of the population on Santa Rosa is protected in the Santa Rosa Plateau Reserve.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus fimbriata Y.C.Hsu & H.Wei Jen
CR D
China (Sichuan, Yunnan)
Although recorded to occur in the provinces of Sichuan and Yunnan, the species has not been found recently. There is also some uncertainty regarding its taxonomic status as it may be a hybrid of *Q. dolicholepis* A.Camus and *Q. aquifolioides* Rehder & E.H.Wilson.
Assessor: Zhekun Zhou
Refs: 2, 5, 10, 12

Quercus flagellifera Trel.
VU A2cd
Guatemala
Grows in mixed wet or rainforest at 1250–2500 m. It is distributed throughout the mountains in the east and central part of Guatemala and is a difficult species to identify. This and other species of the genus require taxonomic study using molecular techniques.
Assessor: J.L. Vivero & M. Szejner
Refs: 1, 6, 30

Quercus gaharuensis Soepadmo
VU A2c
Malaysia (Sarawak, Sabah, Peninsular Malaysia), Indonesia (Sumatra)
The species is known to occur at a number of localities throughout Malaysia and the island of Sumatra. The species' habitat is threatened by land conversion and logging.
Assessor: Rusea Go & Lillian Chua
Refs: 2, 18, 20, 21

Quercus galeanensis C.H.Mull.
VU D2
Mexico (Nuevo León, Tamaulipas)
A rare species characterised by the leaves being vertically appressed to the twigs. Occurring in submontane to montane chaparral, it is restricted to two populations occupying a narrow band (150 km x 10–20 km) from Galeana, Nuevo León to the

Miquihrana region in Tamaulipas.
Assessor: Global Tree Specialist Group
Refs: 1, 2

Quercus georgiana M.A.Curtis
EN B1ab(iii,iv)+2ab(iii,iv)
USA (Alabama, Georgia)
The species is restricted to small isolated populations on granite outcrops, occupying an area less than 500 km^2. Drought, poor regeneration, soil erosion and compaction all threaten the species and on Stone Mountain the impact of tourism is considerable. It has been extirpated in South Carolina but in Georgia it still occurs on granite outcrops in 14 counties.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 4

Quercus germana Schltdl. & Cham.
VU A1c
Mexico (Hidalgo, Oaxaca, Puebla, San Luis Potosi, Tamaulipas, Veracruz)
A species of submontane, seasonal dry forest which has experienced dramatic declines over the last few decades. Forest has been converted for agricultural use, especially coffee plantations.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus graciliformis C.H.Mull.
CR B1ab(iii); C2b
USA (Texas)
One small isolated population exists in riparian oak woodland in mesic canyons in the Chisos Mountains. The distribution covers an extremely limited area (<65 km^2) in Brewster County. The locality is threatened by the activities of tourists from a nearby camping ground and by occasional drought.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 4

Quercus gulielmitreleasei C.H.Mull.
NT
Costa Rica, Panama
The taxonomic status of the species is uncertain. It is confined to Chiriquí in Costa Rica and Cartago in Panama in wet montane forests. It is considered Endangered in Panama.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 31, 35

Quercus hinckleyi C.H.Mull.
CR A2ace; B1ab(iii)+2ab(iii)
Mexico (Chihuahua, Sonora), USA (Texas)
A narrow endemic with holly-like leaves known from isolated populations, most of which are in the Big Bend Ranch State Natural Area. Most populations consist of fewer than 100 individuals and cover an area of less than 2 hectares. Gene flow between the existing populations is thought to be virtually impossible. Historical climate change is thought to be the main factor that has caused the species to have such a restricted range today. Hybridization with other *Quercus* species, roadway construction, collecting by horticulturists, drought and grazing are threats. Although acorn yields are good, all reproduction appears to be vegetative. The species is listed on the US Endangered Species Act and a recovery plan was devised in 1992. Mexican populations, if they exist, are completely unprotected and subjected to heavy grazing pressure.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 4, 8, 28

Quercus hintonii E.F.Warb.
EN A1cd+2cd; B1 ab(i,ii,iii,iv)+2ab(i,ii,iii,iv)
Mexico (México State)
Previously considered to be Critically Endangered, extensive field work and mapping have yielded more information on the species and its status has changed accordingly. The species is confined to three main localities in Mexico State: between Temascalttepec and Tejupilco, Sierra de Goleta and Sierra de Nanchititla. It grows on steep mountain slopes at 1400–2000 m in mixed dry pine–oak forest. Much of the area is in the process of conversion into avocado plantations and human settlements. There has also been a huge reduction in forest area due to agricultural expansion and logging. A previously recorded locality in neighbouring Michoacan no longer exists.
Assessor: A. Coombes *et al*.
Refs: 1, 2, 8, 13

Quercus hintoniorum Nixon & C.H.Mull.
VU D2
Mexico (Nuevo León, Coahuila)
A montane forest species occurring in two locations close to each other in the Sierra Lamata.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus hirtiifolia Vázquez-Villagrán, Valencia & Nixon
DD
Mexico (Hidalgo, Puebla)
A recently described species with no information on distribution or status.
Assessor: A. Coombes *et al*.
Refs: 7, 8, 14

Quercus hypophaea Hayata
NT
Taiwan
Endemic to the east and south parts of Taiwan.
Assessor: Yu-pin Cheng
Refs: 2, 17

Quercus hypoxantha Trel.
NT
Mexico (Coahuila, Nuevo León, San Luis Potosí)
It is suspected that this species will prove to be threatened when the area of occupancy is calculated, taking into account its altitudinal range.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus ilex L. subsp. ***ballota*** (Desf.) Samp.
NT
Portugal, Spain
This species is present in a large part of the Iberian Peninsula within areas of lowland dry forest. It is locally abundant, forming extensive woodlands in places. Previous threats from over-cutting and expanding agriculture have now ceased, although there is still a high risk of fire. The trees are legally protected throughout the range.
Assessor: J.L. Vivero *et al*.
Refs: 1, 26

Quercus insignis M.Martens & Galeotti
NT
Mexico (Oaxaca, Veracruz), Guatemala, Belize, Honduras, Nicaragua, Costa Rica, Panama
The species appears to have a wide distribution in Central America. However, it is considered threatened in Mexico (Endangered), Panama (Endangered) and Guatemala (Near Threatened), although reports indicate that it is still abundant in Nicaragua. The species grows in mountains in rainforest and cloud forest at 800–3000 m. In Mexico, the species has a very restricted distribution and populations tend to be small and fragmented. In Chiapas it has been collected in scattered locations along the Sierra Madre and in the Northern Mountains region. At lower altitudes its habitat is being logged to make way for coffee plantations. Its timber is used for construction, fuel and handicrafts.
Assessor: Global Tree Specialist Group
Refs: 2, 6, 7, 8, 15, 35

Quercus invaginata Trel.
NT
Mexico (Coahuila, Chihuahua, Nuevo León)
It is suspected that the species will prove to be threatened when the area of occupancy is calculated, taking into account its altitudinal range.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus jinpinensis (Y.C.Hsu & H.Wei Jen) C.C.Huang
CR D
China (Yunnan)
Only known from the type locality in south-east Yunnan. Treated as *Cyclobalanopsis jinpinensis* Y.C.Hsu & H.Wei Jen in the *Flora of China*.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 10, 12

Quercus kerangasensis Soepadmo
DD
Brunei, Malaysia (Sarawak), Indonesia (central Kalimantan)
The species is endemic to Borneo where it has been recorded from a few localities. It is considered Vulnerable in Sarawak (Malaysia) where it is found in lowland Kerangas forest. The record from central Kalimantan may be an incorrect identification.
Assessor: Rusea Go & Lillian Chua
Refs: 2, 18, 19

Quercus kotschyana O.Schwarz
DD
Lebanon
Contact with botanists in Lebanon has not revealed any current knowledge on the status of this species.
Assessor: Global Tree Specialist Group
Ref: 2

Quercus kouangsiensis A.Camus
EN D
China
The species has been recorded to occur in the provinces of Guangdong, Guangxi, Hunan and Yunnan in wet, broadleaved evergreen forests (200–2000 m). However, it is now probably only present in Hainan as all the other localities have been lost. It is treated as *Cyclobalanopsis kouangsiensis* (A.Camus) Y.C.Hsu & H.Wei Jen in the *Flora of China* and considered to be closely related to *C. thorelii* (Hickel & A.Camus) Hu.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 5, 10, 12

Quercus leiophylla A.DC.
NT
Mexico (Jalisco, Veracruz)
In the Huatusco region of Veracruz, *Q. leiophylla* acorns are collected and used to produce religious and decorative artefacts.
Assessor: A. Coombes *et al*.
Refs: 2, 7, 8, 15

Quercus litseoides Dunn
DD
China (Guangdong, Guangxi, Hong Kong)
The species is treated as *Cyclobalanopsis litseoides* (Dunn) Schottky in the *Flora of China* and is recorded as occurring in forests at 700–1000 m. A revision of this and other small-leaved *Quercus* species in the region is required.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 5, 10, 12

Quercus lodicosa O.E.Warb. & E.F.Warb.
DD
China (south-east Tibet), India (Assam), Myanmar
Although the species is considered to be Endangered in China, it has a wider distribution into India and northern Myanmar.
Assessor: Global Tree Specialist Group
Refs: 2, 12

Quercus macdougallii Martínez
VU D2
Mexico (Oaxaca)
A distinctive species known only from the type locality in the dry montane forests of Oaxaca. It has not been collected recently and it is biologically poorly known.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus marlipoensis Hu & W.C.Cheng
CR D
China (Yunnan)
Known to exist only from the type locality. Taxonomically very close to *Q. engleriana* Seemen and may in fact be the same species.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 5, 10, 12

Quercus martinezii C.H.Mull.
DD
Mexico (Guerrero, Jalisco, México State, Michoacán, Nayarit, Oaxaca)
Grows at altitudes of 1800–2600 m.
Assessor: A. Coombes *et al*.
Refs: 2, 7, 8

Quercus miquihuanensis Nixon & C.H.Mull.
EN B1ab(iii)+2ab(iii)
Mexico (Nuevo León, Tamaulipas)
An endemic of Peña Nevada and Miquihuana, locally common in montane pine–oak forest and also chaparral, covering an area of less than 500 km^2. Logging activities and over-grazing threaten the habitat.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus monterreyensis Trel. & C.H.Mull.
DD
Mexico (Nuevo León)
Grows at altitudes of 600–1300 m.
Assessor: A. Coombes *et al*.
Refs: 2, 7, 8

Quercus mulleri Martínez
DD
Mexico (Oaxaca)
Grows at altitudes of 1000–1800 m.
Assessor: A. Coombes *et al*.
Refs: 7, 8

Quercus nixoniana Valencia & Lozada
DD
Mexico (Guerrero, Jalisco, Oaxaca)
Found at altitudes of 1300–2300 m.
Assessor: A. Coombes *et al*.
Refs: 7, 8

Quercus obovatifolia C.C.Huang
CR B2ab(iii)
China (Fujian, Guangdong, south Hunan)
Thought to now only occur on a few mountain tops in broadleaved evergreen forests, 1600–1800 m. Treated as *Cyclobalanopsis obovatifolia* (C.C.Huang) Q.F.Zheng in the *Flora of China*.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 5, 10, 12

Quercus oglethorpensis W.H.Duncan
EN B1ab(iii)+ 2ab(iii)
USA (Georgia, Mississippi, South Carolina, Louisiana)
Although distributed in four states, populations of this species are small and severely fragmented. It is known from a small area in the piedmont of north-east Georgia, neighbouring western South Carolina and a disjunct population in Mississippi. In total, approximately 1000 individuals, covering an area of occupancy less than 150 km², are estimated to exist. The most common habitats are roadsides and old fence rows. A survey in 1985 failed to locate 11 per cent of the previously known sites. Changes in land use continue to be the biggest threat to this species. Poor seed viability and chestnut blight are also reported.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 4

Quercus orocantabrica Rivas Mart., Penas, T.E.Díaz & Llamas
EN B1ab(iii)+2ab(iii)
Spain
The species is endemic to the north of Spain (Cantabrian Mountains, Montes de León and Sierra Segundera). It occurs in small patches along the tree line at altitudes of 1400–1800 m, on rocky siliceous substrates. The species is threatened by frequent burning and conversion to pine plantations.
Assessor: F. Llamas & C. Acedo
Ref: 27

Quercus pachucana Zavala-Chávez
DD
Mexico (Hidalgo)
Found at altitudes of 2800–2900 m.
Assessor: A. Coombes *et al*.
Refs: 7, 8

Quercus pacifica Nixon & C.H.Mull.
VU D2
USA (California)
Found on three Channel Islands in California.
Assessor: Global Tree Specialist Group
Refs: 2, 4

Quercus parvula Greene var. ***parvula***
EN B1ab(ii,iii)+2ab(ii,iii)
USA (California)
Two small populations on Santa Cruz Island and five to six populations in Santa Barbara County are known. Occurring in maritime chaparral and pine forests, no population extends over more than 10 km². Habitat degradation and grazing are threats on Santa Cruz Island. The *Flora of North America* considers the three varieties of *Q. parvula* to be *Q. wislizenii* A.DC.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 11, 16

Quercus parvula var. ***tamalpaisensis*** S.K.Langer
EN B2ab(i)
USA (California)
A localised endemic variety confined to Mount Tamalpais in Marin County. The number of localities and individual plants is small. The *Flora of North America* considers the three varieties of *Q. parvula* to be *Q. wislizenii* A.DC.
Assessor: Global Tree Specialist Group
Refs: 2, 4, 16

Quercus pauciradiata Penas, Llamas, Pérez Morales & Acedo
CR B2ab(iii)
Spain
The species is endemic to the north-east of León province, where only one population is now known to occur. Threats to the species include poor regeneration (imbalance of sex ratios, low seed viability), small population size and hybridization. A small population in the Picos de Europa Regional Park has recently become extinct. The total area of occupancy is not more than 5 km². The population is now included in an LIC (Site of Community Interest) which affords it some protection.
Assessor: F. Llamas, C. Acedo, R. Alonso & C. Lence
Refs: 24, 26

Quercus paxtalensis C.H.Mull.
NT
Mexico (Chiapas)
Very little appears to be known about this species endemic to Chiapas. It has been considered to be a synonym of *Q. cortesii* Liebm. Its current distribution range is reduced by frequent fires, grazing and forest logging.
Assessor: Global Tree Specialist Group
Refs: 2, 7, 8, 30

Quercus peninsularis Trel.
DD
Mexico (Baja California)
A montane species for which the number of localities and conservation status remain unknown.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus percoriacea Soepadmo
VU A2c; B1ab(iii)
Malaysia (Sarawak), Brunei
The species is restricted to a few localities in Sarawak and Brunei. In Sarawak it is found in primary Kerangas forest at altitudes of 1000–1200 m. In Brunei the species has been recorded to occur on brown clay-loam soils at altitudes of 480–540 m. Logging is a potential threat in certain areas.
Assessor: Rusea Go & Lillian Chua
Refs: 2, 18, 19, 20

Quercus perpallida Trel.
DD
Mexico (Baja California, Chihuahua, Sinaloa, Sonora).
In western Chihuahua and adjacent Sonora, this species is reported to be occasional at lower elevations in canyons, often mixed with *Q. oblongifolia* Torr.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 29

Quercus polymorpha Schltdl. & Cham.
NT
Mexico (Chiapas, Hidalgo, Nuevo León, Oaxaca, Puebla), Guatemala, USA (Texas)
The species is found in both dry and wet oak forests at altitudes of 900–1200 m. Its distribution ranges from eastern Sierra Madre (Mexico) to Guatemala, with one population in Texas. In Guatemala it is restricted to a few mountain ranges and is considered Vulnerable.
Assessor: Global Tree Specialist Group
Refs: 2, 4, 6, 8, 30

Quercus pontica K.Koch
VU B1ab(iii)
Georgia, Turkey
A species with a very narrow distribution limited to the southern Caucasus (Georgia and Turkey). A tertiary relict, it is found in the Colkhic forests of Georgia as well as at sub-alpine elevations on acidic soils. In Georgia it is threatened by over-grazing where it occurs on the timberline.
Assessor: Global Tree Specialist Group
Refs: 2, 9

Quercus purulhana Trel.
VU A2c
Belize, Guatemala, Honduras, Nicaragua, Mexico (Chiapas)
A montane forest species, abundant in some areas but subject to general declines in habitat. In Chiapas it has been collected in highly seasonal and frost-free habitats with dry oak and pine–oak forests at 1060–1600 m elevation.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 30

Quercus repanda Bonpl.
NT
Mexico (Hidalgo, Puebla, Tlaxcala, San Luis Potosí, Veracruz)
Found at altitudes of 1700–2800 m. It is a relatively rare species that has not been protected.
Assessor: Global Tree Specialist Group
Refs: 2, 7, 8, 30

Quercus repandifolia Liao
VU B2 a(i)b(iii)
Taiwan
Only found in the south-eastern part of Taiwan and restricted to small areas. It is considered by some taxonomists as a synonym of *Q. glauca* Thunb., which is widely distributed in Asia. This species may also be distributed in China, in which case its conservation status will need to be re-assessed.
Assessor: Yu-pin Cheng
Ref: 17

Quercus rex Hemsl.
DD
China (Yunnan), India (north-east), Laos, Myanmar, Viet Nam
Although the species is considered Critically Endangered in China (possibly as it is at the edge of its distribution range), it occurs in other neighbouring countries where its conservation status is not yet known.
Assessor: Global Tree Specialist Group
Refs: 2, 5, 12

Quercus robur subsp. ***imeretina*** (Steven ex Woronow) Menitsky
VU 2ab (iii,v)
Georgia, Russia
A rare tree found only in western Georgia and the Black Sea coast in Russia. The population is in decline due to felling and agriculture. The wood is considered as valuable timber. There is some uncertainty as to its taxonomic status.
Assessor: Global Tree Specialist Group
Refs: 2, 9

Quercus rysophylla Weatherby
NT
Mexico (Nuevo León, San Luis Potosí, Tamaulipas)
The species is scarce and populations are fragmented.
Assessor: Global Tree Specialist Group
Refs: 7, 8, 12

Quercus saltillensis Trel.
DD
Mexico (Coahuila, Nuevo León)
Assessor: A. Coombes *et al*.
Refs: 2, 7, 8

Quercus saravanensis A.Camus
DD
China (Yunnan), Laos, Viet Nam
Although considered Endangered in China (possibly at the edge of its distribution range), it occurs in neighbouring countries where more information is needed. Found in wet forests in mountains at around 1700 m. Treated as *Cyclobalanopsis saravanensis* (A.Camus) Hjelmq. in the *Flora of China*.
Assessor: Global Tree Specialist Group
Refs: 2, 5, 10, 12

Quercus sebifera Trel.
NT
Mexico (Chiapas, Hidalgo, Nuevo León, Oaxaca, Puebla, San Luis Potosí)
A low shrubby species, usually less than 2 m high, found growing in dense mats by rhizome propagation, usually at altitudes of 1600–2400 m. It is frequently found on dried, infertile soils. Much of its habitat is severely altered by over-grazing.
Assessor: Global Tree Specialist Group
Refs: 2, 7, 8, 30

Quercus sichourensis (Hu) C.C.Huang & Y.T.Chang
CR D
China (Yunnan)
Only known from type locality in south-east Yunnan. Treated as *Cyclobalanopsis sichourensis* Y.C.Hu in the *Flora of China*. Found in broadleaved evergreen forests, 800–1500 m.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 5, 10, 12

Quercus skinneri Benth.
NT
El Salvador, Guatemala, Honduras, Mexico (Chiapas, Oaxaca, Veracruz), Nicaragua
The species is widespread and often occurs in abundance in moist montane forests. It is also frequently planted. General rates of deforestation in recent decades have, however, caused significant population declines. In Guatemala the species is considered Near Threatened and grows in rainforest and mixed forests on the Pacific plains and on volcanic slopes at 1000–2400 m. Populations in some areas of Guatemala and Mexico have been considerably reduced. The species is very polymorphic in Central America and its differentiation from *Q. xalapensis* Bonpl. is not always clear. In Quetzaltenango the leaves are used to fertilize fields.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 6, 30

Quercus skutchii Trel.
EN A2cd
Guatemala, Mexico (Chiapas)
It is considered Endangered in Guatemala, where it is found on plains and dry montane slopes at 1800–2900 m. Deforestation is the greatest threat to the species in Guatemala. The sites where it was collected in the 1930s have been almost entirely deforested although new populations have been recorded recently. Although Ramirez-Marcial *et al*. (2005) indicated DD for the status of this species in Chiapas, the species' habitat has been severely reduced, and it is subjected to over-exploitation for charcoal and fuelwood. Some taxonomists treat this taxon as *Q. crispipilis* var. *pannosifolia* (C.H.Mull.) C.H.Mull.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 6, 30

Quercus subspathulata Trel.
VU A1c
Mexico (Durango, Jalisco, Nayarit, Sinaloa, Sonora, Chihuahua)
A forest species that has suffered extensive destruction of its habitat, it is poorly collected and represented in herbaria collections. In many cases it is confused with other species and requires taxonomic revision. It is rarely, if ever, found in large populations, and its habitat range is very limited.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8, 28

Quercus tarokoensis Hayata
NT
Taiwan
Only found on the eastern part of Taiwan, usually on limestone.
Assessor: Yu-pin Cheng
Refs: 2, 17

Quercus tenuicupula (Y.C.Hsu & H.Wei Jen) C.C.Huang
CR D
China (Yunnan)
Only known from its type locality. Treated as *Cyclobalanopsis tenuicupula* Y.C.Hsu & H.Wei Jen in the *Flora of China*. However, the *Flora of China* considers it to be almost identical to *C. sichourensis*, and it will most probably be amalgamated into *C. sichourensis* as more collections are made.
Assessor: Zhekun Zhou *et al*.
Refs: 2, 5, 10, 12

Quercus thorelii Hickel & A.Camus
DD
China, Laos, Viet Nam
Although considered to be VU in China, the species has a wider distribution in South-East Asia. Treated as *Cyclobalanopsis thorelii* (Hickel & A.Camus) Hu in the *Flora of China*.
Assessor: Global Tree Specialist Group
Refs: 2, 5, 10, 12

Quercus tinkhamii C.H.Mull.
DD
Mexico (Nuevo León, San Luis Potosí)
Assessor: A. Coombes *et al*.
Refs: 2, 7

Quercus tomentella Engelm.
VU B1ab(iii)+2ab(iii)
Mexico (Guadalupe Island, Baja California), USA (California)
The regeneration of the species is hampered by over-grazing in the dry forest areas, which are restricted to the Channel Islands of California and Guadalupe Island of Mexico. Populations on Guadalupe Island, in particular, have declined dramatically in recent years.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus tonduzii Seemen
DD
Costa Rica
A species of uncertain taxonomic status, found in the mountains of central Costa Rica in Alajuela. One collection from 1896 is cited from Volcan Poas.
Assessor: K. Nixon *et al*.
Refs: 1, 2

Quercus tuitensis González-Villarreal
DD
Mexico (Jalisco)
Occurs at altitudes of 980–1400 m
Assessor: A. Coombes *et al*.
Refs: 7, 8

Quercus uxoris McVaugh
VU A2c
Mexico (Colima, Guerrero, Jalisco, Michoacán, Oaxaca)
The extent of population declines is not documented but the level of forest destruction has been dramatic.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 8

Quercus vulcanica Boiss. & Heldr. ex Kotschy
NT
Turkey
A species similar to *Q. petraea* subsp. *pinnatiloba* (K.Koch) Menitsky and with affinities to *Q. frainetto* Ten. It occurs in south-west and central Anatolia mixed with *Cedrus libani* A.Rich., *Pinus nigra* Arnold, *Acer hyrcanum* Fisch & C.A.Mey. and *Quercus cerris* L. It is under protection in a specially established nature reserve near Isparta province, Turkey.
Assessor: Adil Güner
Refs: 2, 23

Quercus vicentensis Trel.
VU A2c
El Salvador, Mexico (Chiapas Oaxaca, Guerrero, Michoacán, Jalisco)
Declines in population numbers have not been recorded, but the species occurrence in an area of extensive forest destruction qualifies it as Vulnerable. The species is recorded as occurring in Guatemala in the *Flora of Guatemala*. However, there are no herbarium collections of it from Guatemala and the consensus among most experts is that it doesn't occur there.
Assessor: Global Tree Specialist Group
Refs: 1, 2, 6, 8, 30

Quercus xalapensis Bonpl.
VU A1c
Honduras, Nicaragua, Mexico (Chiapas, Hidalgo, San Luis Potosí, Tamaulipas, Veracruz)
In Chiapas it may be a relatively abundant tree in well preserved montane rainforests between 1000 m and 1800 m. Its differentiation from *Q. skinneri* Benth. is not yet clear. Some Chiapas specimens have been erroneously identified as *Q. acutifolia* Née.
Assessor: Global Tree Specialist Group
Refs: 1, 8, 30

Quercus xanthotricha A.Camus
DD
China (Yunnan), Laos, Viet Nam
A South-East Asian species whose distribution just reaches into southern China, where one population is known. Treated as *Cyclobalanopsis xanthotricha* (A.Camus) Y.C.Hsu & H.Wei Jen in the *Flora of China*, where it is recorded to occur in mixed mesophytic forests in mountains, 800–1300 m.
Assessor: Global Tree Specialist Group
Refs: 2, 5, 10, 12

QUERCUS SPECIES EVALUATED AS LEAST CONCERN (LC)

Quercus acatenangensis Trel.
Mexico, Guatemala, El Salvador
Considered to be very abundant in mountains throughout Guatemala, it is a species with very variable phenotypes, making taxonomic identification difficult in many cases.
Assessor: J.L. Vivero & M. Szejner
Ref: 2, 34

Quercus acutissima Carruth.
Central and southern Japan, Korea, China, Indo-China, Himalaya
Ref: 2

Quercus agrifolia Née
USA (western California), Mexico
Ref: 2

Quercus alba L.
Central and eastern USA, south-east Canada
Ref: 2

Quercus aliena Blume
Japan, Korea, China, Thailand
Ref: 2

Quercus annulata Sm.
Himalaya to north Viet Nam
Ref: 2

Quercus argentata Korth.
Indonesia (Kalimantan, Sumatra, western Java), Malaysia (Peninsular Malaysia, Sabah, Sarawak)
Ref: 2

Quercus arizonica Sarg.
USA (Arizona, New Mexico, west Texas), north-west Mexico
Ref: 2

Quercus augustinii Skan
North-east Burma, China, Thailand, Viet Nam
Ref: 2

Quercus austrina Small
South-eastern USA
Ref: 2

Quercus berberidifolia Liebm.
California, Mexico (Baja California)
Ref: 2

Quercus bicolor Willd.
North-central and eastern USA, Canada (south Quebec, south-eastern Ontario)
Ref: 2

Quercus brachystachys Benth.
Guatemala
Grows on both wet and dry mountains in Chiapas (Mexico) and Guatemala and is especially associated with *Pinus*, sometimes forming extensive forests at elevations between 1500 m and 2600 m. There are many herbarium specimens of this species.
Assessor: J.L. Vivero & M. Szejner
Ref: 34

Quercus brantii Lindl.
East and south-east Turkey, Syria, northern Iraq, western and southern Iran
Ref: 2

Quercus buckleyi Nixon & Dorr
USA (Texas, Oklahoma, Kansas)
A tree previously listed as Vulnerable, being confined to scrub on Edward's Plateau. However, NatureServe records indicate that it is a widespread species in Texas with occurrences in Oklahoma and Kansas as well.
Refs: 1, 2, 3

Quercus candicans Née
Guatemala, Mexico
Typically grows on dry mountain slopes, in gullies and ravines at 1500–2000 m. This species is one of the best for firewood given its high density and the ease with which it can be split. There are many specimens of this species in Guatemala and it is one of the widespread oaks in Mexico.
Assessor: J.L. Vivero & M. Szejner
Ref: 2, 8, 34

Quercus castanea Née
Mexico, Guatemala
Ref: 2

Quercus cerris L.
Southern and south-central Europe, Turkey, Syria, Lebanon, Iran, Afghanistan
Ref: 2

Quercus chrysolepis Liebm.
USA (California, western Oregon, Arizona, southern Nevada, New Mexico), Mexico
Ref: 2

Quercus coccifera L.
Mediterranean
Ref: 2

Quercus coccinea Münchh.
North-central and eastern USA
Ref: 2

Quercus conspersa Benth.
Guatemala, Mexico
Ref: 2

Quercus corrugata Hook.
Central America, Mexico
Ref: 2

Quercus cortesii Liebm.
Guatemala, Mexico
Ref: 2

Quercus crassifolia Bonpl.
Mexico, Guatemala
Ref: 2

Quercus crispipilis Trel.
Guatemala, Mexico
Ref: 2

Quercus dalechampii Ten.
East-central and south-eastern Europe
Ref: 2

Quercus dentata Thunb.
Russian Far East, Japan, Korea, Mongolia, China, Taiwan
Ref: 2

Quercus depressipes Trel.
Mexico (Chihuahua, Durango, Jalisco, Zacatecas), USA (Texas)
A species endemic to the central and northern Sierra Madre Occidental and Texas. Although the species has a limited distribution, it is locally abundant and not considered to be threatened. In fact, it is considered to be a weed by many foresters and farmers.
Assessor: J.R. Bacon
Refs: 1, 2, 28

Quercus ellipsoidalis E.J.Hill
North-central & east-central USA, Canada (south-west Ontario)
Ref: 2

Quercus elliptica Née
Mexico, Guatemala, Nicaragua, El Salvador, Honduras
Ref: 2

Quercus emoryi Torr.
USA (Arizona, New Mexico, west Texas), Mexico
Ref: 2

Quercus falcata Michx.
Central and eastern USA
Ref: 2

Quercus frainetto Ten.
Southern and central Italy, Balkan Peninsula to north-western Romania, north-western Turkey
Ref: 2

Quercus fusiformis Small
Mexico (Coahuila, Nuevo León, Tamaulipas) and USA (Oklahoma, Texas)
A relatively widespread species in the USA and therefore not of conservation concern on a global scale. Poorly known in Mexico.
Assessor: Global Tree Specialist Group
Refs: 2, 3, 4, 7

Quercus gambelii Nutt.
West-central and south-central USA, northern Mexico
Ref: 2

Quercus garryana Douglas ex Hook.
Western USA, south-western Canada
Ref: 2

Quercus geminata Small
South-eastern USA
Ref: 2

Quercus glauca Thunb.
Himalaya to Japan, USA
Ref: 2

Quercus gravesii Sudw.
Mexico (Coahuila), USA (Texas)
A widespread species in Texas, where it is considered secure. Status in Mexico is not known.
Assessor: Global Tree Specialist Group
Refs: 2, 4

Quercus griffithii Hook.f. & Thomson ex Miq.
India (Sikkim, Assam), Bhutan, China (south-west, Tibet), Burma, Thailand, Laos, Viet Nam
Ref: 2

Quercus helferiana A.DC.
India (Assam), Burma, Laos, Viet Nam, Thailand, China
Ref: 2

Quercus hemisphaerica Bartram ex Willd.
USA (south-western to Texas)
Ref: 2

Quercus humboldtii Bonpl.
Colombia, Panama
Ref: 2

Quercus ilex L.
Mediterranean to south-central Europe
Ref: 2

Quercus ilicifolia Wangenh.
South-east Ontario, eastern USA
Ref: 2

Quercus imbricaria Michx.
Central and eastern USA
Ref: 2

Quercus incana Bartram
South-eastern USA to Oklahoma and Texas
Ref: 2

Quercus infectoria G.Olivier
Greece
Ref: 2

Quercus ithaburensis Decne.
South-eastern Italy to eastern Mediterranean
Ref: 2

Quercus laeta Liebm.
Mexico
Ref: 2

Quercus laevis Walter
South-eastern USA
Ref: 2

Quercus lamellosa Sm.
Central Himalaya to southern China
Ref: 2

Quercus lanata Sm.
Nepal, Bhutan, India (Assam, Uttarakhand), Sri Lanka, Burma, Thailand, Viet Nam, China
Ref: 2

Quercus lancifolia Schltdl. & Cham.
Guatemala, Mexico
Ref: 2

Quercus laurifolia Michx.
South-eastern USA to Texas
Ref: 2

Quercus leucotrichophora A.Camus
Northern Pakistan to northern Burma, northern Thailand, Viet Nam
Ref: 2

Quercus libani G.Olivier
Ref: 2

Quercus lyrata Walter
Eastern and central USA
Ref: 2

Quercus macrocarpa Michx.
Canada (south-central, northern and south-eastern) to USA (Alabama)
Ref: 2

Quercus margarettiae (Ashe) Small
East-central and south-eastern USA
Ref: 2

Quercus marilandica (L.) Münchh.
South-central and eastern USA
Ref: 2

Quercus michauxii Nutt.
East-central and eastern USA
Ref: 2

Quercus microphylla Née
North-eastern and south-central Mexico
Ref: 2

Quercus minima (Sarg.) Small
South-eastern USA
Ref: 2

Quercus mohriana Buckley ex Rydb.
Mexico (Coahuila), USA (New Mexico, Oklahoma, Texas)
Grows on limestone hills and slopes at altitudes of 500–2500 m. The species is considered to be secure in the USA.
Assessor: Global Tree Specialist Group
Refs: 2, 4, 8

Quercus mongolica Fisch. ex Ledeb.
Russian Far East, Mongolia, north-east China, Korea, Japan
Ref: 2

Quercus montana Willd.
Eastern USA to Illinois
Ref: 2

Quercus muehlenbergii Engelm.
Canada (southern Ontario), eastern and central USA, north-eastern Mexico
Ref: 2

Quercus myrtifolia Willd.
South-eastern USA
Ref: 2

Quercus nigra L.
Central and eastern USA
Ref: 2

Quercus obtusata Bonpl.
North-central and central Mexico
Ref: 2

Quercus oleoides Schltdl. & Cham.
Guatemala, Mexico, Central America
Ref: 2

Quercus oleoides Schlecht. & Cham. subsp. ***sagraeana*** (Nutt.) Borhidi
Cuba
This taxon, previously known as *Quercus cubana* A.Rich., occurs in the Pinar del Rio Province of Cuba, where it is widespread.
Assessor: Rosalina Berazaín
Ref: 37

Quercus oxyodon Miq.
Nepal to China
Ref: 2

Quercus pagoda Raf.
East-central and eastern USA
Ref: 2

Quercus palustris Münchh.
East-central and north-eastern USA, Canada (south Ontario)
Ref: 2

Quercus peduncularis Née
Guatemala, Mexico, Honduras
This is a widely distributed, extremely variable species which is very common in Guatemala. It is one of the best trees in the country for firewood, due to its high density and the ease with which it can be split. It is not clear whether this is the same species as *Q. purulhana* Trel.
Assessor: J.L. Vivero & M. Szejner
Refs: 2, 34

Quercus petraea (Matt.) Liebl.
Europe to northern Iran
Ref: 2

Quercus petraea subsp. ***huguetiana*** Franco & G.López
France, northern Spain
Occurring in moist forest up to altitudes of 1800 m, the species is abundant over a relatively wide range. It is also legally protected in Spain.
Assessor: J.L. Vivero *et al*.
Refs: 1, 2

Quercus phellos L.
Central and eastern USA
Ref: 2

Quercus praineana Trel.
Mexico (Jalisco, Sinaloa)
Locally abundant on the western slopes of the Sierra Madre Occidental, it appears to have increased with forestry disturbances in the region. Thought to be a synonym of *Q. coffeicolor* Trel.
Assessor: Global Tree Specialist Group
Refs: 1, 28

Quercus prinoides Willd.
Canada (southern Ontario), central and eastern USA
Ref: 2

Quercus prinopsis Trel.
Mexico
Ref: 2

Quercus pubescens Willd.
Eastern, central and southern Europe, northern Turkey
Ref: 2

Quercus pumila Walter
South-eastern USA
Ref: 2

Quercus robur L.
Europe to Iran
Ref: 2

Quercus rubra L.
South-eastern Canada, east-central and eastern USA
Ref: 2

Quercus rugosa Née
USA (Texas, New Mexico, Arizona), Mexico, Guatemala, Honduras
Ref: 2

Quercus sapotifolia Liebm.
Guatemala, Central America, Mexico
This is a very common and dominant species found in pine–oak forests at 800–3000 m, widely distributed throughout Central America. It is favoured for firewood, due to its slow rate of burning and good heat production. Its bark is rich in tannins, excellent for tanning leather. In some regions of Guatemala, a coffee-coloured textile dye is made from the tree.
Assessor: J.L. Vivero & M. Szejner
Refs: 2, 34

Quercus segoviensis Liebm.
Guatemala, Mexico, Honduras, Nicaragua
Ref: 2

Quercus semecarpifolia Sm.
Eastern Afghanistan, northern Pakistan, eastern Nepal, India (Sikkim, Uttarakhand), Bhutan, China (south-eastern Tibet)
Ref: 2

Quercus semiserrata Roxb.
India (Assam), Bhutan, China (Tibet, Yunnan), Burma, Thailand, Malaysia (Peninsular Malaysia), Indonesia (Sumatra)
Ref: 2

Quercus serrata Thunb.
E. Himalaya, China (Taiwan), Korea
Ref: 2

Quercus shumardii Buckley
Canada (southern Ontario)
Ref: 2

Quercus similis Ashe
USA (south-eastern, eastern Texas)
Ref: 2

Quercus sinuata Walter
Mexico (Coahuila, Nuevo León, Tamaulipas), USA (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Texas)
A widely distributed species in central and south-eastern USA and apparently secure.
Assessor: Global Tree Specialist Group
Refs: 2, 4

Quercus spinosa David
China (Fujian, Gansu, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Yunnan, Tibet), Myanmar, Taiwan, Burma
Although considered to be Vulnerable in China, the species is considered to be of Least Concern in Taiwan where it occurs at high altitudes. It may actually be a species complex and further taxonomic research is required.
Assessor: Global Tree Specialist Group
Refs: 2, 5, 12, 17

Quercus stellata Wangenh.
Central and southern USA
Ref: 2

Quercus suber L.
Western and central Mediterranean
Ref: 2

Quercus texana Buckley
East-central and south-eastern USA
Ref: 2

Quercus toumeyi Sarg.
Mexico (Chihuahua), USA (Arizona, New Mexico, Texas)
Apparently secure in the USA. It is fairly abundant from central-western Chihuahua and adjacent Sonora northward. It has no formal classification in Mexico. It is part of a taxonomically confusing species complex of white oaks and needs taxonomic revision.
Assessor: Global Tree Specialist Group
Refs: 2, 4, 28, 29

Quercus tristis Liebm.
Guatemala, Honduras, Mexico (Chiapas), Guatemala, El Salvador
Ref: 2

Quercus turbinella Greene
South-western and central USA
Ref: 2

Quercus variabilis Blume
Central and southern Japan, Korea, Taiwan, central, eastern and southern China, Viet Nam, Tibet
Ref: 2

Quercus velutina Lam.
East-central and eastern USA, Canada (south-eastern Ontario)
Ref: 2

Quercus virginiana Mill.
South-eastern and south-central USA
Ref: 2

References

1 **Oldfield, S., Lusty, C. & MacKinven, A. (1998)**. *The World List of Threatened Trees*. 650pp. World Conservation Press, Cambridge, UK.

2 ***Govaerts, R. & Frodin, D.G. (1998)***. *World Checklist and Bibliography of Fagales* (Betulaceae, Corylaceae, Fagaceae and Ticodendraceae). Royal Botanic Gardens, Kew, Richmond, UK.

3 ***NatureServe (2005)***. Data from the NatureServe central database.

4 ***NatureServe (2006)***. *NatureServe Explorer: An Online Encyclopedia of Life*. Version 4.7. NatureServe, Arlington, Virginia. Available at http://wwwnatureserve.org/explorer

5 **Bartholomew, B. (2006)**. E-mail correspondence with A. Eastwood on the global status of *Quercus*.

6 **Vivero, J.L., Szejner, M., Gordon, J. and Magin, G. (2006)**. *The Red List of Trees of Guatemala*. Fauna & Flora International, Cambridge, UK.

7 **Coombes, A., Rodriguez-Coombes, M., Valencia-A, S. & Zavala-C, F. (2004)**. Report on a meeting to assess the status of threatened oaks in Mexico. Unpublished report, Fauna & Flora International, Cambridge..

8 **Valencia-A., S. (2004)**. Diversidad del género *Quercus* (Fagaceae) en México. *Bol. Soc. Bot. Méx*. 75: 33–53.

9 **Global Tree Specialist Group (2005)**. *Globally Threatened Trees of the Caucasus*. A report on the Caucasus regional tree Red Listing workshop (Tbilisi, Georgia 26–28 September 2005). IUCN/SSI Global Tree Specialist Group, Fauna & Flora International, Cambridge.

10 **Flora of China Editorial Committee (Eds.) (1999)**. *Flora of China*, Volume 4 (Cycadaceae through Fagaceae). Science Press, Beijing and Missouri Botanical Garden Press, St. Louis.

11 **California Native Plant Society (2006)**. *Inventory of Rare and Endangered Plants* (online edition, v6-05d). California Native Plant Society, Sacramento, CA, USA.

12 **Zhou, Z., Coombes, A. & Min, D. (2004)**. Report on a meeting to assess the status of *Quercus* in China. Unpublished report, Fauna & Flora International, Cambridge.

13 **Rodriguez-Acosta, M. & Coombes, A. (2000)**. *Estrategia de Conservación de* Quercus hintonii. *Reporte Final, Fauna & Flora International*. Referencia 99429, Benemérita Universidad Autónoma de Puebla, Mexico.

14 **Vázquez, M.L., Valencia-A., S. & Nixon, K.C. (2004)**. Notes on red oaks (*Quercus* sect. *Lobatae*) in eastern Mexico, with description of a new species, *Quercus hirtiifolia*. *Brittonia* 56: 136–142.

15 **Rodríguez-Coombes, M. & Coombes, A. (Undated)**. Preliminary report on *Quercus insignis*. Mexican Oaks Conservation Project. Unpublished report, Fauna & Flora International, Cambridge.

16 **Flora of North America Editorial Committee (Eds.) (1993-)**. *Flora of North America* North of Mexico. Volume 3. New York & Oxford.

17 **Cheng, Y. (2006)**. *The Conservation Status of Oaks in Taiwan*. Unpublished report sent to Antonia Eastwood.

18 **Soepadmo, E., Julia, S. & Rusea, G. (2000)**. Fagaceae. In: Soepadmo, E. & Saw, L.G. (eds.). *Tree Flora of Sabah & Sarawak*. Vol. 3. Forest Research Institute Malaysia, Sabah Forest Department & Sarawak Forest Department. Pp. 1–118.

19 **Coode, M.J.E., Dransfield, J., Forman, L.L., Kirkup, D.W. & Idris, M.S. (1996)**. *A Checklist of the Flowering Plants & Gymnosperms of Brunei Darussalam*. Ministry of Industry and Primary Resources, Brunei Darussalam.

20 **Anderson, J.A.R. (1980)**. *A Checklist of the trees of Sarawak*. Forest Department Sarawak, Malaysia.

21 **Soepadmo, E. (1972)**. Fagaceae. *Flora Malesiana* Ser. I, 7: 265–403.

22 **Whitmore, T.C., Tantra, I.G.M. and Sutisna, U. (eds) (1989)**. *Tree Flora of Indonesia*. Forest Research and Development Centre, Bogor, Indonesia.

23 **Güner, A. (2005)**. E-mail correspondence with Sara Oldfield on the conservation status of *Quercus vulcanica*.

24 **Cabezudo, B., Gil, Y., Navas, D., Navas P. & Pérez Latorre A.V. (2004)**. *Quercus alpestris* Boiss. In: Bañares, Á., Blanca, G., Güemes, J., Moreno, J.C. & Ortiz, S. eds. (2004) *Atlas y libro de la flora vascular amenazada de España*. Dirección General de Conservación de la Naturaleza. Madrid, 1069 pp.

25 **Eva Economidou (Undated)**. Proposal for the addition of scrub and low forest vegetation with *Quercus alnifolia* into the Habitats Directive (Annex 1). Department of Botany, University of Athens, Greece.

26 **Llamas, F. (2006)**. E-mail correspondence with Antonia Eastwood on the conservation status of Spanish oaks.

27 **Rivas-Martínez, S., Díaz, T.E., Fernández-González, F., Izco, J., Loidi, J., Lousã & Penas, A. (2002)**. *Quercus orocantabrica* Rivas Mart., Penas, T.E. Díaz & Llamas. In: Vascular plant communities of Spain and Portugal. Addenda to the syntaxonomical checklist of 2001. *Itinera Geobotanica* 15: 5–922.

28 **Bacon, J.R. (2006)**. Comments on the provisional list of globally threatened oaks. E-mail correspondence with Sara Oldfield.

29 **Spellenberg, R. (2006)**. Comments on the provisional list of globally threatened oaks. E-mail correspondence with Sara Oldfield.

30 **Ramírez-Marcial, N. & González-Espinosa, M. (2006)**. Comments on the provisional list of globally threatened oaks. E-mail correspondence with Sara Oldfield.

31 **Zamora, N. (2006)**. Personal communication with Sara Oldfield.

32 **Ekim, T., Koyuncu, M., Vural, M., Duman, H., Aytac, Z. & Adiguzel, N. (2000)**. *Red Data Book of Turkish Plants*. Turkish Association for the Conservation of Nature, Ankara, Turkey.

33 **Phengklai, C. (2006)**. E-mail correspondence on *Quercus longistyla* and *Q. wangsaiensis* with Antonia Eastwood.

34 **Vivero, J.L. & Szejner, M. (2006)**. Correspondence on *Quercus sapotifolia, Quercus peduncularis* and *Quercus acatenangensis* with Sara Oldfield.

35 **Autoridad Nacional del Ambiente (ANAM) (2000)**. *Primer informe de la riqueza y estado de la biodiversidad de Panamá*. ANAM, Panama City, República de Panamá.

36 **Mitre, M. (2007)**. E-mail correspondence with Sara Oldfield on the taxonomic and conservation status of oaks in Panama.

37 **Leiva, A. (2006)**. E-mail correspondence with Sara Oldfield.

ANNEX 1
IUCN RED LIST CATEGORIES AND CRITERIA

EXTINCT (EX)
A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time-frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)
A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time-frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)
A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)
A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)
A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)
A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)
A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)
A taxon is Not Evaluated when it is has not yet been evaluated against the criteria.

THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

CRITICALLY ENDANGERED (CR)
A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

A. Reduction in population size based on any of the following:
   1. An observed, estimated, inferred or suspected population size reduction of ≥90% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
      (a) direct observation
      (b) an index of abundance appropriate to the taxon
      (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
      (d) actual or potential levels of exploitation
      (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

   2 An observed, estimated, inferred or suspected population size reduction of ≥80% over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may

not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of ≥80%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of ≥80% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
   1. Extent of occurrence estimated to be less than 100 km^2, and estimates indicating at least two of a-c:
      a. Severely fragmented or known to exist at only a single location.
      b. Continuing decline, observed, inferred or projected, in any of the following:
         (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 the following:
         (i) extent of occurrence
         (ii) area of occupancy
         (iii) number of locations or subpopulations
         (iv) number of mature individuals.

   2. Area of occupancy estimated to be less than 10 km^2, and estimates indicating at least two of a-c:
      a. Severely fragmented or known to exist at only a single location.
      b. Continuing decline, observed, inferred or projected, in any of the following:
         (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 the following:
         (i) extent of occurrence
         (ii) area of occupancy
         (iii) number of locations or subpopulations
         (iv) number of mature individuals.

C. Population size estimated to number fewer than 250 mature individuals and either:
   1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR

   2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
      (a) Population structure in the form of one of the following:
         (i) no subpopulation estimated to contain more than 50 mature individuals, OR
         (ii) at least 90% of mature individuals in one subpopulation.
      (b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

A. Reduction in population size based on any of the following:
   1. An observed, estimated, inferred or suspected population size reduction of ≥70% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
      (a) direct observation
      (b) an index of abundance appropriate to the taxon
      (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
      (d) actual or potential levels of exploitation
      (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of ≥50% over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of ≥50%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of ≥50% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
   1. Extent of occurrence estimated to be less than 5000 km^2, and estimates indicating at least two of a-c:
      a. Severely fragmented or known to exist at no more than five locations.
      b. Continuing decline, observed, inferred or projected, in any of the following:
         (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 the following:
         (i) extent of occurrence
         (ii) area of occupancy
         (iii) number of locations or subpopulations
         (iv) number of mature individuals.

   2. Area of occupancy estimated to be less than 500 km^2, and estimates indicating at least two of a-c:

      a. Severely fragmented or known to exist at no more than five locations.
      b. Continuing decline, observed, inferred or projected, in any of the following:
         (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 the following:
         (i) extent of occurrence
         (ii) area of occupancy
         (iii) number of locations or subpopulations
         (iv) number of mature individuals.

C. Population size estimated to number fewer than 2500 mature individuals and either:
   1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR

   2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
      (a) Population structure in the form of one of the following:
         (i) no subpopulation estimated to contain more than 250 mature individuals, OR
         (ii) at least 95% of mature individuals in one subpopulation.
      (b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 250 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:

A. Reduction in population size based on any of the following:
   1. An observed, estimated, inferred or suspected population size reduction of ≥50% over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
      (a) direct observation
      (b) an index of abundance appropriate to the taxon
      (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation
(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of ≥30% over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of ≥30%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of ≥30% over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:
   1. Extent of occurrence estimated to be less than 20,000 km^2, and estimates indicating at least two of a-c:
      a. Severely fragmented or known to exist at no more than 10 locations.
      b. Continuing decline, observed, inferred or projected, in any of the following:
         (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 the following:
         (i) extent of occurrence
         (ii) area of occupancy
         (iii) number of locations or subpopulations
         (iv) number of mature individuals.

   2. Area of occupancy estimated to be less than 2000 km^2, and estimates indicating at least two of a-c:
      a. Severely fragmented or known to exist at no more than 10 locations.
      b. Continuing decline, observed, inferred or projected, in any of the following:
         (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 the following:
         (i) extent of occurrence
         (ii) area of occupancy
         (iii) number of locations or subpopulations
         (iv) number of mature individuals.

C. Population size estimated to number fewer than 10,000 mature individuals and either:
   1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR

   2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
      (a) Population structure in the form of one of the following:
         (i) no subpopulation estimated to contain more than 1000 mature individuals, OR
         (ii) all mature individuals are in one subpopulation.
      (b) Extreme fluctuations in number of mature individuals.

D. Population very small or restricted in the form of either of the following:
   1. Population size estimated to number fewer than 1000 mature individuals.

   2. Population with a very restricted area of occupancy (typically less than 20 km^2) or number of locations (typically five or fewer) such that it is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.

E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

Source: IUCN (2001)

The Red List of Oaks

For further information please contact:

Fauna & Flora International
4th Floor, Jupiter House,
Station Road, Cambridge,
CB1 2JD United Kingdom
Tel: + 44 (0) 1223 571000
Fax: + 44 (0) 1223 461481
E-mail: info@fauna-flora.org
Web: www.fauna-flora.org
www.globaltrees.org

BGCI
Descanso House
199 Kew Road, Richmond
Surrey, TW9 3BW
United Kingdom
Tel: +44 (0)20 8332 5953
Fax: +44 (0)20 8332 5956
E-mail: info@bgci.org
Web: www.bgci.org