

Researchers complete first comprehensive threat assessment of all U.S. trees

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For the first time, researchers have completed threat assessments for all 881 native tree species in the contiguous United States, resulting in a comprehensive checklist and synthesis that will serve as a critical baseline to guide future tree conservation efforts.

The new assessment of U.S. trees reveals that 11-16% of tree species in the contiguous 48 U.S. states are threatened with extinction, with the most common threat being invasive and problematic pests and diseases. According to Abby Meyer, executive director of Botanic Gardens Conservation International-U.S. (BGCI-US), a partner on the project, "These results lay the groundwork for U.S. tree and ecosystem conservation efforts that will contribute to achieving critical international conservation goals, including the United Nations Decade for Ecosystem Restoration and the Global Tree Assessment."

Murphy Westwood, Ph.D., vice president of science and conservation at The Morton Arboretum and senior author of the report, noted that much of the world's biodiversity depends on trees, which offer food and habitat for countless plant, animal and fungal species while providing invaluable benefits to humans. "Understanding the current state of trees within the U.S. is imperative to protecting those species, their habitats and the countless communities they support," she said.

The report, available through early access online, will be published in an upcoming special issue of *Plants, People, Planet* highlighting this and other projects of the Global Tree Assessment initiative. This study is the culmination of five years of research conducted by BGCI-US, The Morton Arboretum and NatureServe, in partnership with the United States Botanic Garden (USBG) and United States Department of Agriculture (USDA) Forest Service.

Researchers examined the extinction risk, patterns of geographic and taxonomic diversity and leading threats facing tree species native to the continental U.S. Most U.S. species had never been assessed or were outdated on the two most widely used threat assessment platforms, the International Union for Conservation of Nature (IUCN) Red List and NatureServe.

"This assessment advances our understanding of the threats faced by America's native trees and will help focus the conservation efforts of public gardens, federal agencies and conservation organizations," said Susan Pell, Ph.D., acting executive director of USBG. "The U.S. Botanic Garden is proud to sponsor national partnerships such as this that advance plant conservation."

"Trees form the basis of many of the world's terrestrial ecosystems," said Sean T. O'Brien, Ph.D., president and CEO of NatureServe. "Understanding what trees are threatened and why is critical to informing conservation for trees and ecosystems across the nation."

The authors built the checklist based on the standardized Global Tree Assessment definition of a tree: a woody plant with usually a single stem, growing to a height of at least two meters; or if multi-stemmed, then at least one vertical stem five centimeters in diameter at breast height. Based on this definition, the checklist of trees native to the contiguous U.S. contains 881 species.

Oaks (genus *Quercus*) and hawthorns (genus *Crataegus*) dominate the tree flora of the U.S., with 85 and 84 native species, respectively. Hawthorns and oaks were also found to have the most threatened species, with 29 and 17 species, respectively.

The research found that geographically, the distribution of native (plants that evolved in the contiguous U.S.) and endemic (plants found only in the contiguous U.S.) trees is primarily concentrated in the southeastern U.S., California and Texas. Florida and Texas have the highest number of native tree species, with 342 and 321, respectively. Florida and California have the highest number of threatened tree species, with 45 and 44, respectively.

According to BGCI's PlantSearch database of plants in botanical collections, 95% (849) of native U.S. tree species are located in at least one ex-situ (outside natural locations) collection, such as a botanic garden, arboretum or seed bank. Most species are represented in dozens or even hundreds of collections, such as *Franklinia alatamaha*, which is extinct in the wild. However, 17 threatened tree species are not currently conserved in any ex-situ collection and thus have no insurance policy against extinction.

The checklist and synthesis of U.S. trees is the culmination of a project that began in 2017, when BGCI-US, The Morton Arboretum, NatureServe, USBG and the USDA Forest Service began efforts to assess the threats to all U.S. trees. The authors also established a data sharing methodology for future updates to improve efficiency and conservation collaboration to protect U.S. trees.

"Through initiatives like the Global Tree Assessment, tree research and conservation has evolved from a series of small individual efforts to a global venture grounded in collaborative, scientifically-backed strategies," said Westwood. "The checklist is a major milestone for trees, but most importantly, our hope is that this study will inform and amplify the scope of tree conservation efforts across the country," she added.

The checklist of U.S. trees is available on The Morton Arboretum's

website: <https://mortonarb.org/science/projects/data-sharing-for-conservation-us-trees/>