



Workshop Report:

Engaging Stakeholders in the Conservation of Threatened Trees in Belize

July 2023

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August 2023

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This document reports on the aims and outcomes of a threatened tree conservation workshop, held virtually from July 5th-7th, 2023. Special thanks is given to all participants for their contributions. We are especially grateful for the guidance and species review provided by Dr. Steven Brewer of Wild Earth Allies before and during the workshop.

This workshop was supported by Fauna and Flora with funding from Fondation Franklinia, through the project "Catalyzing new action for threatened trees in Belize."

Workshop organising team

Nathaniel Castillo, Janiel Chan, and Elizabeth Dorgay of Ya'axché Conservation Trust with support from Alicky Davey and Rainie Schultz of Fauna & Flora.

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Cover images. Clockwise from top left: *Bravaisia grandiflora* (Arizona State University Biocollections, 2023); *Forestiera corollata*- (Grant S, von Konrat M, 2023); *Quercus insignis* (iNaturalist, 2023), *Pithecellobium johansenii* (iNaturalist, 2023)

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List of acronyms

BAS	Belize Audubon Society
BBG	Belize Botanic Garden
BKHC	Belize Karst Habitat Conservation
CBO	Community-Based Organization
CR	Critically Endangered
DD	Data Deficient
EN	Endangered
FCD	Friends for Conservation and Development
FD	Belize Forest Department
FWC	Friends for Wildlife Conservation
GOB	Government of Belize
HETA	Hummingbird Environmental Tour Guide Association
LC	Least Concern
MBEDG	Mayflower Bocawina Environmental Development Group
MFT	Maya Forest Trust
NBIO	Belize National Biodiversity Office
NGO	Non-Governmental Organization
NT	Near Threatened
PA	Protected Area
SATIIM	Sarstoon-Temash Institute for Indigenous Management
TIDE	Toledo Institute for Development and Environment
VU	Vulnerable
WCS	Wildlife Conservation Society

Executive summary

On July 5th and 7th 2023, 12 organizations across Belize participated in a virtual Threatened Tree Stakeholder Workshop hosted by Ya'axché Conservation Trust in partnership with Fauna & Flora. The workshop discussion focused on the most at-risk tree species in Belize—those assessed by the IUCN Red List as Critically Endangered or Endangered. During the workshop, stakeholders reviewed species, shared knowledge, identified gaps, and prioritized species for action.

This event was an initial step toward the greater outcome: **Belize's threatened trees are benefiting from new, targeted conservation actions, and more organizations are aware of and engaged with addressing their needs.**

This report summarizes what was achieved in the workshop; it consolidates information on the status and needs of these most vulnerable tree species and serve as a reference for stakeholders to coordinate conservation action. The report appendices contain detailed information about each species as well as a breakdown of priority species per terrestrial protected area.

This first round of partner engagement will be followed by capacity building and the provision of seed funding in 2024 to catalyze new action for Belize's most vulnerable trees.

Workshop structure

Participants

A total of 15 stakeholders (excluding facilitators) participated in the event, representing a wide range of organizations and expertise from across Belize. Participation reflected a wide range of interests from government, non-governmental organizations (NGO), community-based organizations (CBO), and private sector companies.

Participant	Organization	Survey	Day 1	Day 2
Dominique Lizama	Belize Audubon Society	Yes	Yes	Yes
Rudy Aguilar	Belize Botanic Gardens	Yes	No	Yes
Aaron Juan	Belize Karst Habitat Conservation	Yes	No	No
Alson Ovando	Belize Karst Habitat Conservation	Yes	Yes	Yes
Elma Kay	Belize Maya Forest Trust	Yes	No	No
Ermain Requena	Belize Maya Forest Trust	No	Yes	Yes
Louis Peña	Bull Run Overseas Ltd., Mtn Pine Ridge	Yes	Yes	Yes
Alicky Davey	Fauna & Flora	No	Yes	No
Rainie Schulte	Fauna & Flora	No	Yes	Yes
Rigoberto Saqui	Itzamna Society	Yes	Yes	No
Eli Miller	Monkey Bay Wildlife Sanctuary - NGO	Yes	No	No
Nigel Gomez	National Biodiversity Office	No	No	Yes

Rasheda Garcia	National Biodiversity Office	No	Yes	Yes
Vladimir Rodriguez	Programme for Belize	Yes	Yes	No
Adam Henson	Wild Earth Allies	No	Yes	No
Steven Brewer	Wild Earth Allies	Yes	Yes	Yes
Boris Arevalo	Wildlife Conservation Society	Yes	Yes	No
Elizabeth Dorgay	Ya'axche Conservation Trust	Yes	Yes	Yes
Janiel Chan	Ya'axche Conservation Trust	No	Yes	Yes
Nathaniel Castillo	Ya'axche Conservation Trust	No	Yes	Yes

Agenda

Time	Item	Person Responsible
DAY 1: July 5, 2023	Knowledge sharing, review of threatened tree conservation gaps, prioritization of species.	
8:30-8:45 am	Welcome	Elizabeth Dorgay, Ya'axché
8:45-9:05 am	Presentation: global context for tree conservation, Fauna & Flora's work on threatened species	Alicky Davey & Rainie Schultz, Fauna and Flora
9:05-9:25 am	Presentation: Trees of Belize	Steven Brewer, Wild Earth Allies
9:25-9:40 am	Presentation: Fauna & Flora-Ya'axche collaboration, current project goals and activities	Elizabeth Dorgay, Ya'axché
9:40-9:50 am	BREAK	
9:50-10:00 am	Presentation: threatened species story map and datasets	Janiel Chan, Ya'axché
10:00-11:50 am	Group review of Belize threatened trees: locations, threats, and conservation actions in place. Exercise: species prioritization polls.	Elizabeth Dorgay & Janiel Chan, Ya'axché
11:50am-12:00pm	Closing	Elizabeth Dorgay, Ya'axché

Time	Item	Person Responsible
DAY 2: July 7, 2023	Continuation from day 1: knowledge sharing, review of threatened tree conservation gaps, prioritization of species.	
8:30-8:40 am	Welcome	Elizabeth Dorgay, Ya'axché
8:40-9:00 am	Presentation: summary from day 1 and review of stakeholder pre-workshop survey results	Elizabeth Dorgay, Ya'axché
9:00-11:50 am	Group review of Belize threatened trees: locations, threats, and conservation actions in place. Exercise: species prioritization polls.	Elizabeth Dorgay & Janiel Chan, Ya'axché
11:50-12:00 pm	Summary and closing	Elizabeth Dorgay, Ya'axché

National context for tree conservation

Stakeholder review

11 organizations responded to a pre-workshop online survey intending to gauge general awareness of threatened tree species and to identify the current status and purpose of tree conservation-related activities occurring across Belize. Participants were asked about the types of tree conservation actions they are currently implementing, whether these actions are inclusive of any threatened species, with whom they collaborate, and at which sites the actions are taking place.

Stakeholder network: collaborations

When it comes to partnerships for tree conservation activities, most NGO and CBO co-managers are connected through Government of Belize (GOB) departments (Forest Department, National Biodiversity Office, or the overall Ministry) but do not work directly with each other. Notably, Itzamna Society responded that it does not currently collaborate with any other organization but is interested in connecting. Research institutions such as the University of Belize and the Belize Botanic Gardens currently have few connections to the wider network (**Figure 1**).

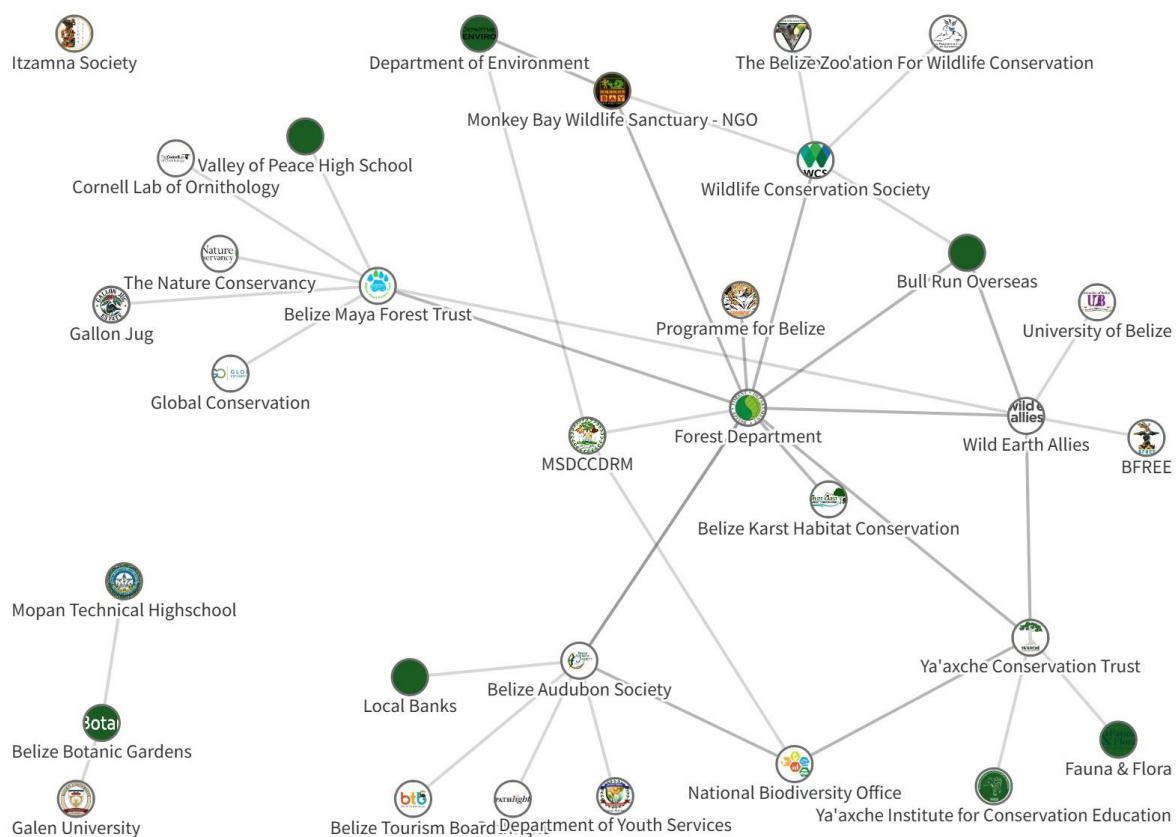


Figure 1. Network graph highlighting collaborations between organizations involved in tree conservation activities. Survey question, “Do you collaborate with any partner organizations for tree conservation activities?”

Stakeholder current tree conservation actions

Most organizations who responded to the survey are implementing in-situ conservation activities such as patrolling, surveys and inventory, plot-based monitoring, and restoration plantings. Fewer organizations are involved in ex-situ activities like propagation research or cultivating botanic gardens; none of the respondents are involved in seed banking (Figure 2).

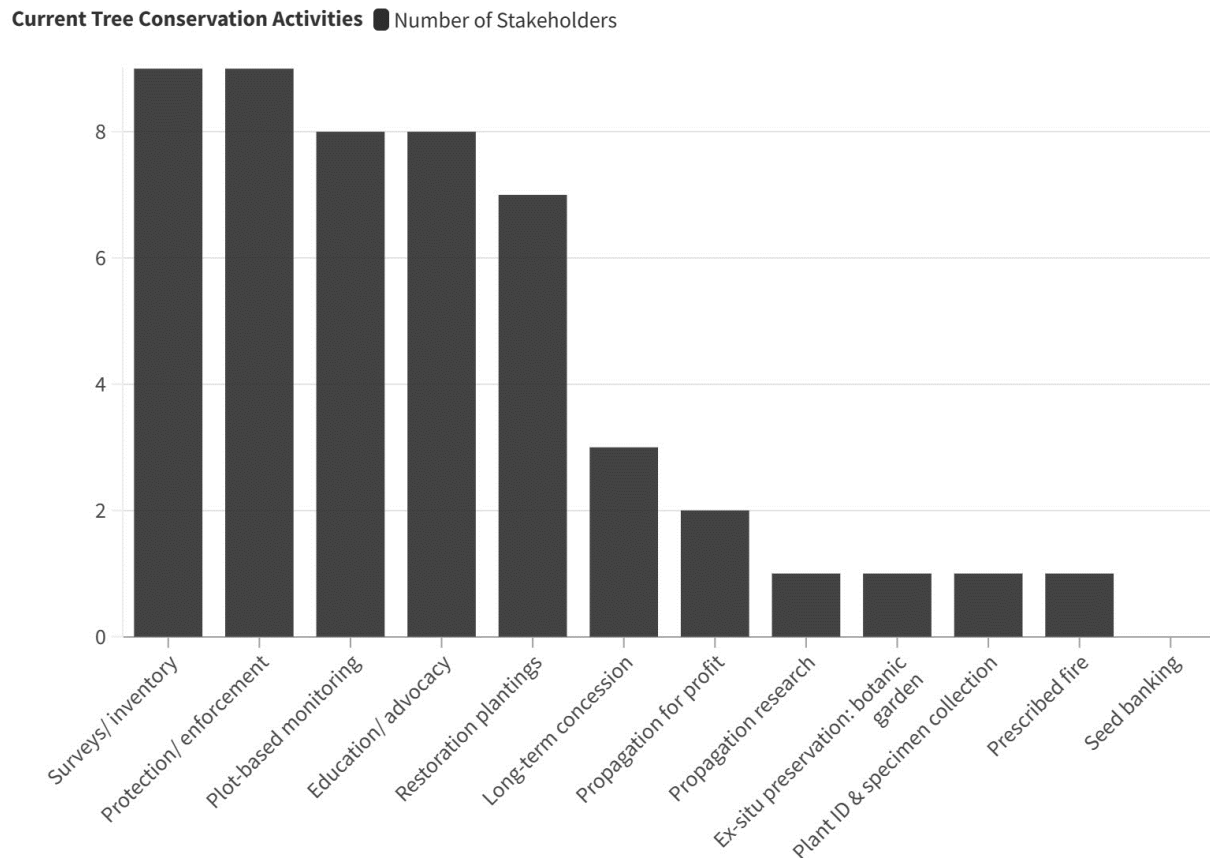


Figure 2. Tree conservation activities currently conducted by 11 stakeholders across Belize.

Stakeholder awareness of threatened species

In the survey responses, most stakeholders acknowledged uncertainty as to whether Belize's Critically Endangered (CR) and Endangered (EN) tree species are present in their management areas. Generally, most stakeholders who responded are unfamiliar with these species (Figure 3). Based on this, the workshop was structured around increasing participant awareness of CR and EN species, including their threats and locations in Belize, and review of the main points from the species' Red List assessments.

Survey prompt

My organization works with the following species:

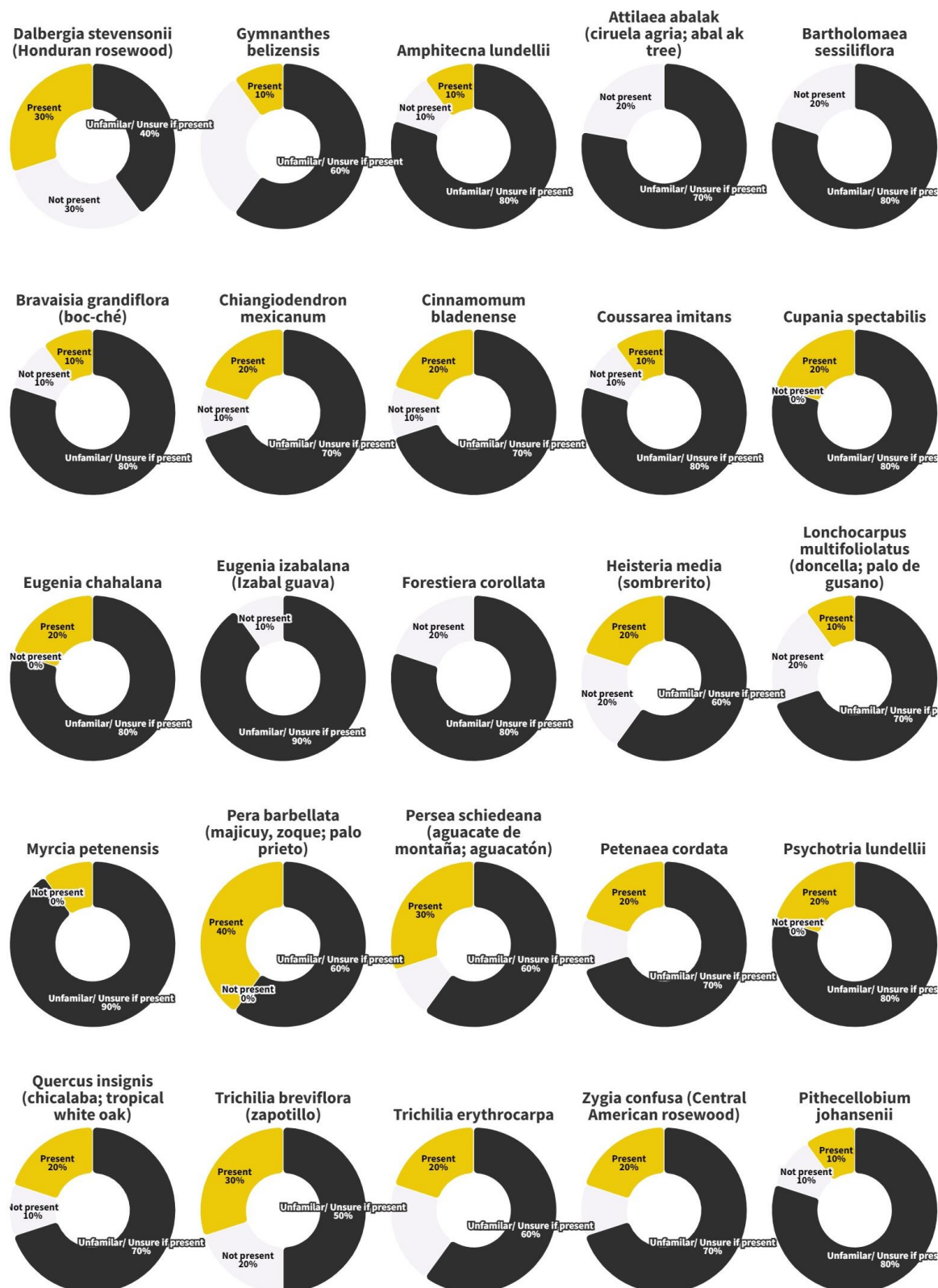


Figure 3. Survey results indicate that most stakeholders are either unfamiliar with or unsure whether the CR and EN tree species are present in their management areas.

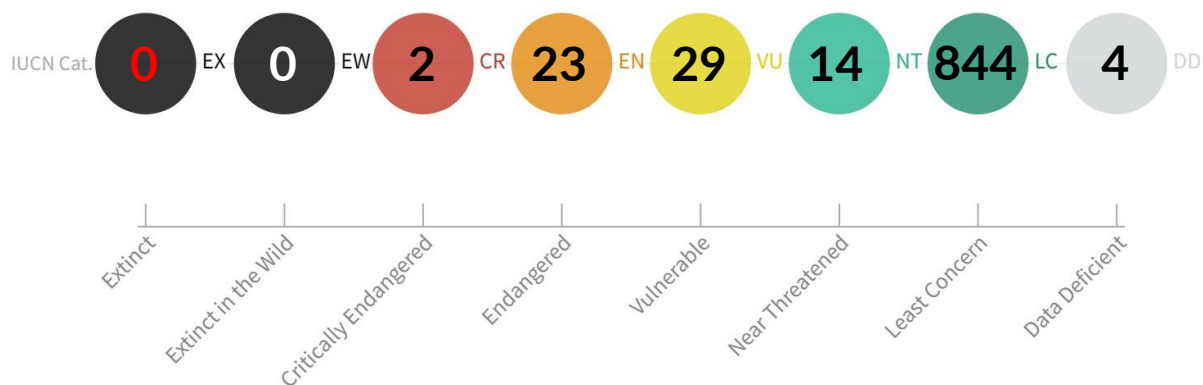
Status of threatened trees in Belize

Species overview

As the aim of the workshop was to review and prioritize action for the most at-risk tree species in Belize, the event focused species that have Critically Endangered and Endangered statuses according to The IUCN Red List of Threatened Species (2022). The names of all species of elevated conservation concern are reported in **Table 1**. The breakdown of species across all IUCN categories is seen in the image below.

Trees of Belize Assessed for the IUCN Red List

Source: edited from The IUCN Red List of Threatened Species. Version 2022-2. Downloaded on October 13, 2022.



In preparation for this workshop, Ya'axché staff conducted a review of all CR, EN, Vulnerable (VU), and Near Threatened (NT) trees in Belize as reported on the IUCN Red List website (2022). The original list generated from the IUCN was reduced from 85 species to 68 species based on updated information available from the concurrent Trees of Belize project spearheaded by Dr. Steven Brewer and Wild Earth Allies (Steven Brewer, pers. comm., June 2023). An additional 844 species that appear on the Red List as Least Concern and 4 species with Data Deficient (DD) statuses were not included in the literature review nor workshop discussion. More details of the threatened species review process are explained in Appendix I.

Group review of Belize's threatened trees

The remaining information in this report was captured from the discussion with stakeholders during the workshop. For each of the 25 CR and EN species, IUCN assessment information was reviewed, and Belize-specific locations, threats, conservation actions in place, knowledge gaps, and key stakeholders were identified. Notes were captured in Microsoft Whiteboard.

Information pages for each species, highlighting their IUCN Red List assessments and all workshop updates, additions, and corrections, can be found in Appendix III.

Table 1. List of tree species of elevated conservation concern in Belize, as of October 2022. Species with Critically Endangered and Endangered statuses were prioritized during the workshop.

Family Name	Scientific Name	Red List Category
FABACEAE	<i>Dalbergia stevensonii</i>	Critically Endangered
EUPHORBIACEAE	<i>Gymnanthes belizensis</i>	Critically Endangered
BIGNONIACEAE	<i>Amphitecna lundellii</i>	Endangered
SALICACEAE	<i>Bartholomaea sessiliflora</i>	Endangered
ACANTHACEAE	<i>Bravaisia grandiflora</i>	Endangered
ACHARIACEAE	<i>Chiangiodendron mexicanum</i>	Endangered
LAURACEAE	<i>Cinnamomum bladenense</i>	Endangered
RUBIACEAE	<i>Coussarea imitans</i>	Endangered
SAPINDACEAE	<i>Cupania spectabilis</i>	Endangered
MYRTACEAE	<i>Eugenia chahalana</i>	Endangered
MYRTACEAE	<i>Eugenia izabalana</i>	Endangered
OLEACEAE	<i>Forestiera corollata</i>	Endangered
FABACEAE	<i>Harpalyce rupicola</i>	Endangered
ERYTHROPALACEAE	<i>Heisteria media</i>	Endangered
FABACEAE	<i>Lonchocarpus multifoliolatus</i>	Endangered
MYRTACEAE	<i>Myrcia petenensis</i>	Endangered
PERACEAE	<i>Pera barbellata</i>	Endangered
LAURACEAE	<i>Persea schiedeana</i>	Endangered
PETENAEACEAE	<i>Petenaea cordata</i>	Endangered
FABACEAE	<i>Pithecellobium johansenii</i>	Endangered
RUBIACEAE	<i>Psychotria lundellii</i>	Endangered
FAGACEAE	<i>Quercus insignis</i>	Endangered
MELIACEAE	<i>Trichilia breviflora</i>	Endangered
MELIACEAE	<i>Trichilia erythrocarpa</i>	Endangered
FABACEAE	<i>Zygia confusa</i>	Endangered
LAURACEAE	<i>Aiouea areolata</i>	Vulnerable
FABACEAE	<i>Bauhinia dipetala</i>	Vulnerable
MELASTOMATACEAE	<i>Blakea calycularis</i>	Vulnerable
MELIACEAE	<i>Cedrela odorata</i>	Vulnerable
RUBIACEAE	<i>Cosmocalyx spectabilis</i>	Vulnerable
URTICACEAE	<i>Coussapoa oligocephala</i>	Vulnerable
ARECACEAE	<i>Gaussia maya</i>	Vulnerable
RUBIACEAE	<i>Guettarda tikalana</i>	Vulnerable
BIGNONIACEAE	<i>Handroanthus chrysanthus</i>	Vulnerable
FABACEAE	<i>Inga davidsei</i>	Vulnerable
CHRYSOBALANACEAE	<i>Leptobalanus sparsipilis</i>	Vulnerable
SOLANACEAE	<i>Lycianthes hypoleuca</i>	Vulnerable
FABACEAE	<i>Mariosousa usumacintensis</i>	Vulnerable
LAURACEAE	<i>Nectandra belizensis</i>	Vulnerable
OCHNACEAE	<i>Ouratea insulae</i>	Vulnerable
ANNONACEAE	<i>Oxandra maya</i>	Vulnerable
PINACEAE	<i>Pinus tecunumanii</i>	Vulnerable

SAPOTACEAE	<i>Pouteria amygdalina</i>	Vulnerable
SAPOTACEAE	<i>Pouteria belizensis</i>	Vulnerable
BURSERACEAE	<i>Protium multiramiflorum</i>	Vulnerable
ARECACEAE	<i>Pseudophoenix sargentii</i>	Vulnerable
FAGACEAE	<i>Quercus acutifolia</i>	Vulnerable
RUBIACEAE	<i>Rondeletia belizensis</i>	Vulnerable
ARECACEAE	<i>Schippia concolor</i>	Vulnerable
SAPOTACEAE	<i>Sideroxylon stevensonii</i>	Vulnerable
MELIACEAE	<i>Swietenia macrophylla</i>	Vulnerable
ARECACEAE	<i>Synechanthus fibrosus</i>	Vulnerable
MELIACEAE	<i>Trichilia minutiflora</i>	Vulnerable
FABACEAE	<i>Vatairea lundellii</i>	Vulnerable
SAPOTACEAE	<i>Pouteria izabalensis</i>	Near Threatened
CAPPARACEAE	<i>Capparidastrium quiriguense</i>	Near Threatened
ANNONACEAE	<i>Desmopsis erythrocarpa</i>	Near Threatened
AQUIFOLIACEAE	<i>Ilex tectonica</i>	Near Threatened
ARALIACEAE	<i>Oreopanax geminatus</i>	Near Threatened
FABACEAE	<i>Pterocarpus officinalis</i>	Near Threatened
FAGACEAE	<i>Quercus cortesii</i>	Near Threatened
FAGACEAE	<i>Quercus oleoides</i>	Near Threatened
FAGACEAE	<i>Quercus purulhana</i>	Near Threatened
FAGACEAE	<i>Quercus skinneri</i>	Near Threatened
ASTERACEAE	<i>Sinclairia discolor</i>	Near Threatened
ELAEOCARPACEAE	<i>Sloanea petenensis</i>	Near Threatened
SAPINDACEAE	<i>Talisia floresii</i>	Near Threatened
ASTERACEAE	<i>Telanthophora cobanensis</i>	Near Threatened

Distribution across Belize

Tree species of elevated conservation concern in Belize are found primarily in the Maya Mountains (72%) and the central-eastern coastal plains (28%). They are scattered in central-northern Belize (8%) and the southern coastal plains (12%), with some species overlap between geographic areas (**Figure 5**). An interactive map of all CR, EN, and VU species across Belize can be found at [Threatened Tree Species in Belize \(arcgis.com\)](https://arcgis.com).

When it comes to protected areas, 68% of CR and EN species have been recorded within more than one Protected Area (PA). 24% have been recorded in only one PA. Two species (8% of total species) have not yet been recorded within any PA and can be considered at elevated risk. (**Figure 4**).

General Locations of CR and EN Tree Species in Belize

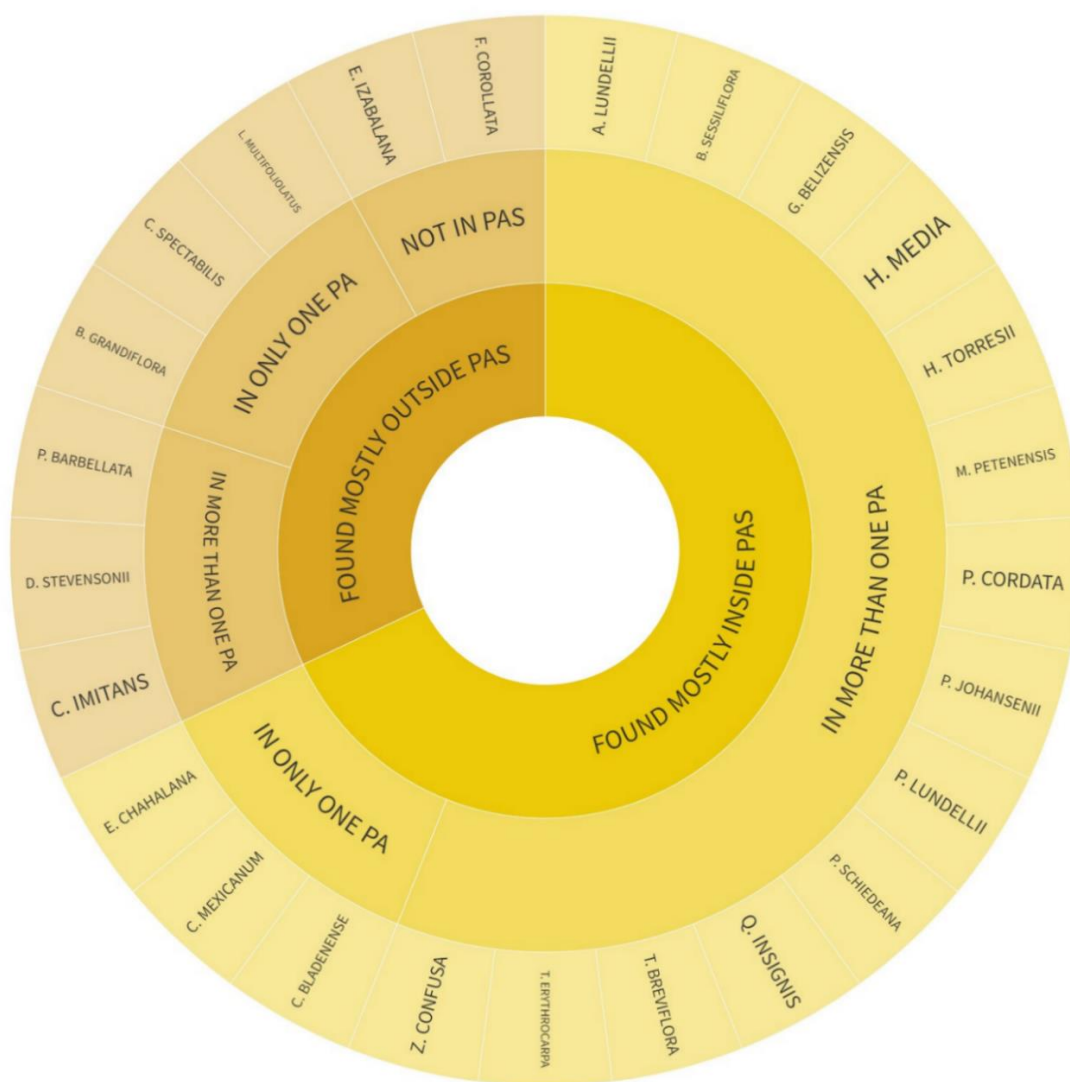


Figure 4. The majority of CR and EN species are distributed mostly inside of protected areas (and in more than one PA) based on current records. For the eight species that are distributed mostly outside of protected areas, 75% have still been recorded in at least one protected area.

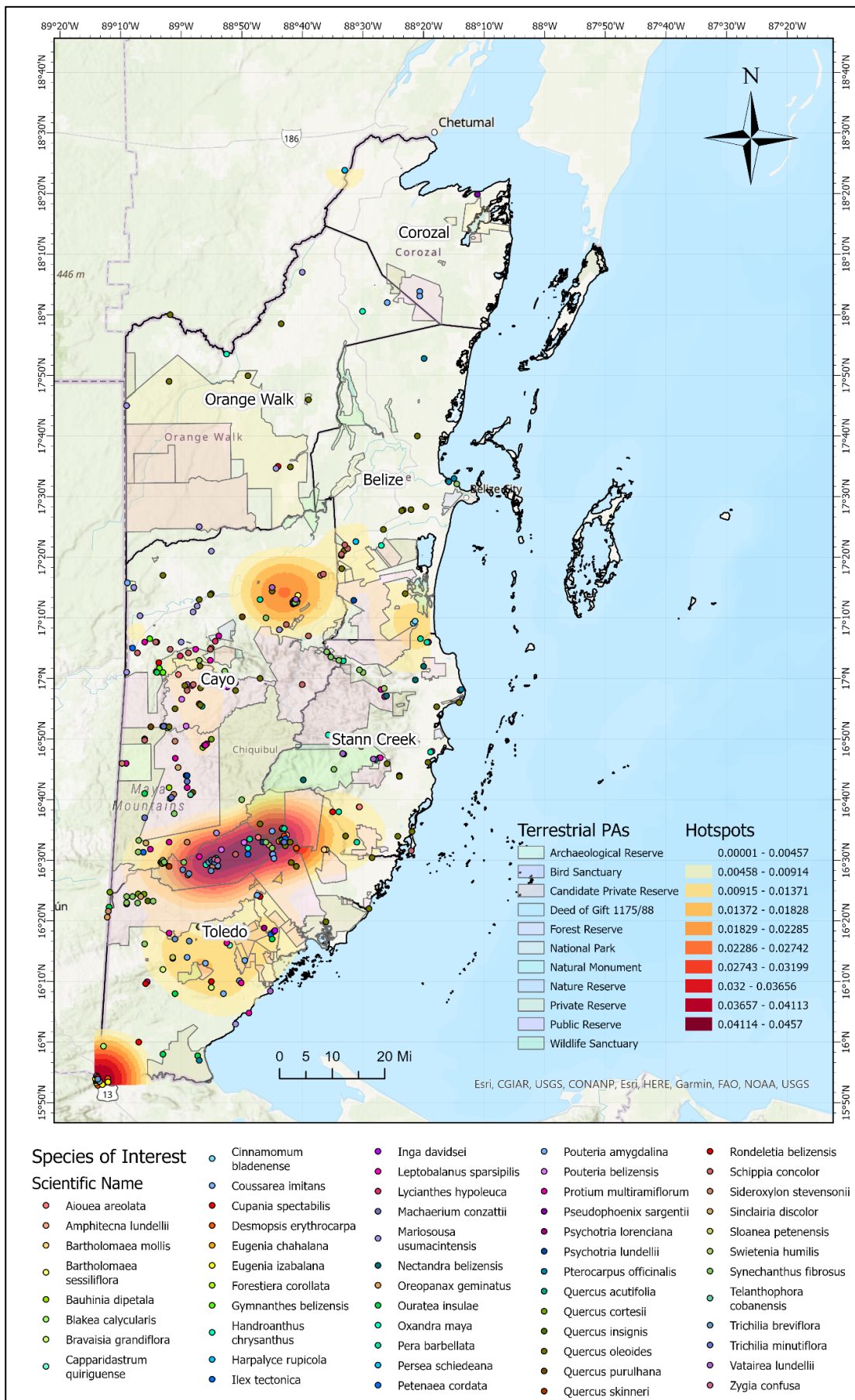


Figure 5. CR, EN, and VU species distribution according to records attained from GBIF.org (2022) and individual IUCN Red List assessments (2022). This distribution map is limited to the publicly available occurrence data. Hotspots are influenced by species presence but also favor the protected areas that have had the most extensive survey coverage to date.

Certain habitat types (e.g. wetlands and swamps, and ridges of the Maya Mountains) are known to be under-sampled. Workshop participants identified additional protected areas that contain the preferred habitat types of individual species and noted where they are likely to be found through additional botanical surveys (**Figure 6**).

Number of protected areas where CR and EN trees occur

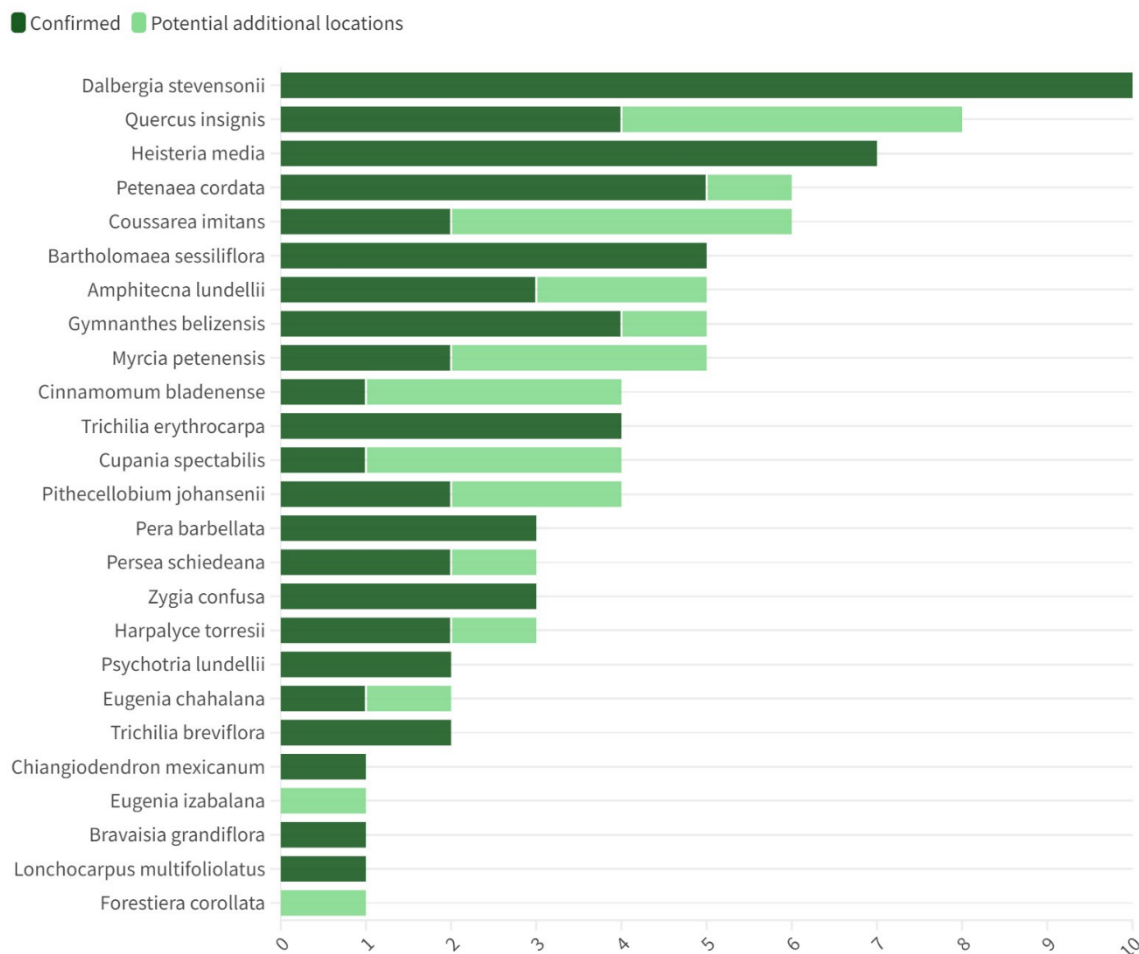


Figure 6. The total number of protected areas in Belize where each CR and EN species has been recorded. Also reported are the additional protected areas in which species are likely to occur but have not yet been recorded. Targeted surveys of key habitats are needed to confirm species presence.

Threats

Of the 25 CR and EN tree species, one (4%) is found only in Belize. 60% of species have global ranges that are restricted to the neighbouring departments of Guatemala and/or Mexico, while 36% have ranges that extend farther into Central America. Human impacts to forests in other Central American countries have fragmented habitats and reduced the

majority of species' ranges drastically, making their protection within Belizean forests even more critical.

Change in land use, including the clear cutting of forest, is the most prevalent threat to Belize's threatened tree species, both globally and within Belize (**Figure 7**). There are also a few very specific but potentially severe threats that affect individual species. This is the case for the endemic *Gymnanthes belizensis*, where the Chalillo dam has altered hydrology and sedimentation downstream at the site where the only known population occurs.

The presence of a species inside protected areas does not automatically protect it from threats and decline. Many threats occur across protected area boundaries, such as illegal and commercial logging, habitat degradation, climate change, seedling death/ seed predation and fire.

What's pushing Belize's threatened species toward extinction? ■ Globally ■ In Belize

Percent of CR and EN species affected by threat

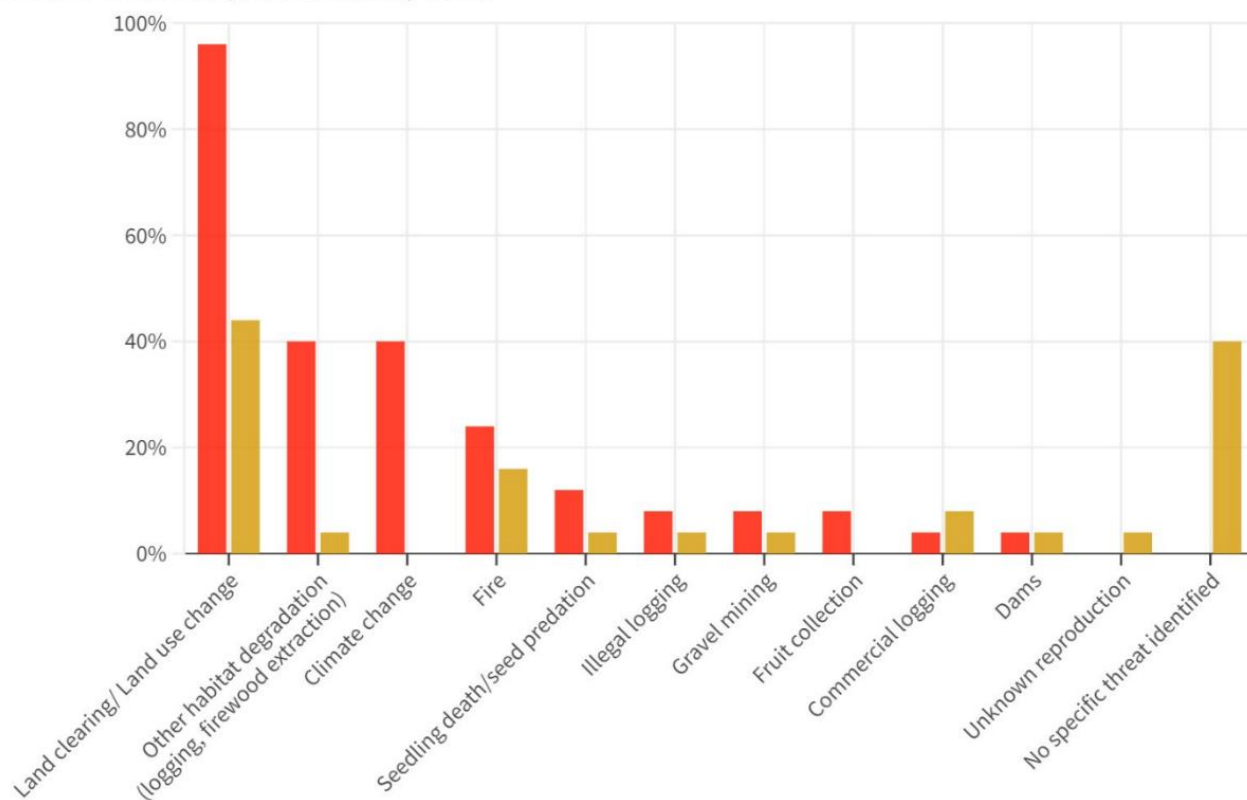


Figure 7. Global threats are reported from IUCN (2022). Threats to species within Belize were reviewed during the workshop and are reported where known. 40% of species did not have a Belize-specific threat identified and may face the same threats in country as they do globally. Some species are affected by more than one threat.

Actions in place

As of July 2023, there are limited actions or measures in place that purposefully intend to reduce threats and improve the conservation status of Critically Endangered and Endangered tree species in Belize (**Figure 8**). Actions broadly could include policy and legislation, research and monitoring, education and awareness, alternative livelihood or economic incentives, and management practices targeted to the species' needs.

Specific examples of protective measures for trees include national legislation/ policy; international legislation/ policy; targeted patrols to deter illegal extraction or preserve habitat; sustainable forest management activities like restoration plantings, fire management, and grazing exclusion; and ex-situ conservation activities like seed banking.

Examples of tree research actions include monitoring growth and mortality; monitoring life cycles/phenology; propagation research; surveys to improve knowledge of population size, distribution, and trends; modelling climate change impacts; and monitoring habitat trends.

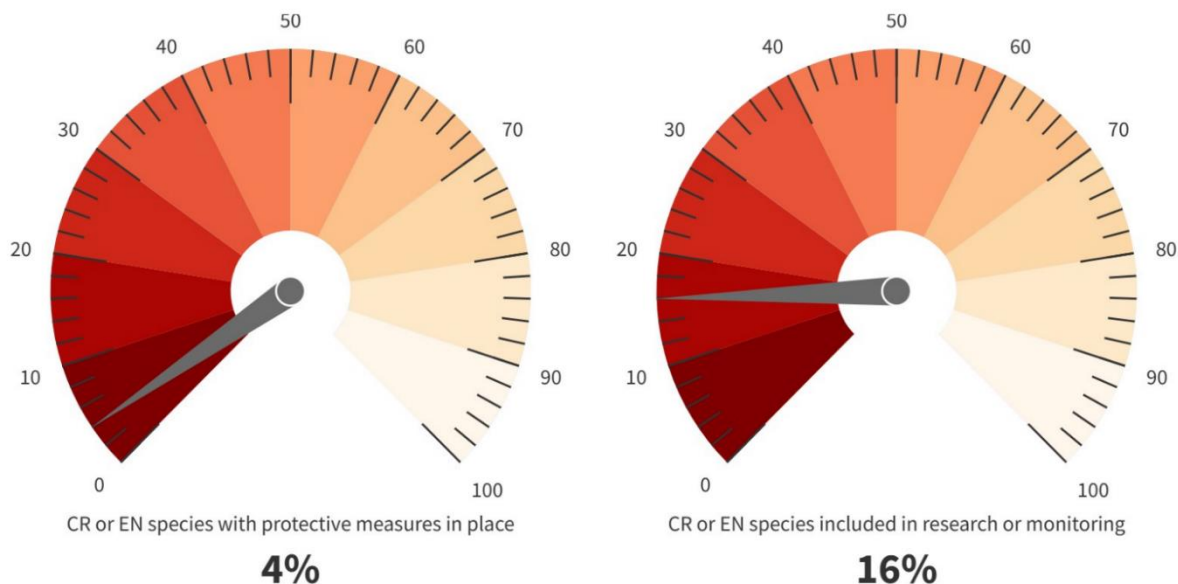


Figure 8. Few trees with Critically Endangered and Endangered statuses are benefitting from targeted conservation actions in Belize.

The pre-workshop survey indicated that most stakeholders are unfamiliar with the CR and EN species and are unsure whether they occur within their management areas. This is likely the primary reason that protective measures, research, and management for these species is currently minimal. Most stakeholders indicated that they currently have some established research, patrolling, or other management activities in place for the conservation of trees, but CR and EN species are not explicitly included in these efforts.

Any new, targeted actions should consider the threats, gaps, and needs identified for each species.

Gaps and information needs

Of the 25 Critically Endangered and Endangered tree species reviewed, the information gap affecting the most species is knowledge on their distribution in Belize; i.e. workshop participants identified 18 of the 25 species whose conservation could be supported with additional surveys (**Figure 9**). The second most critical need is for information on population trends, which affects 17 species.

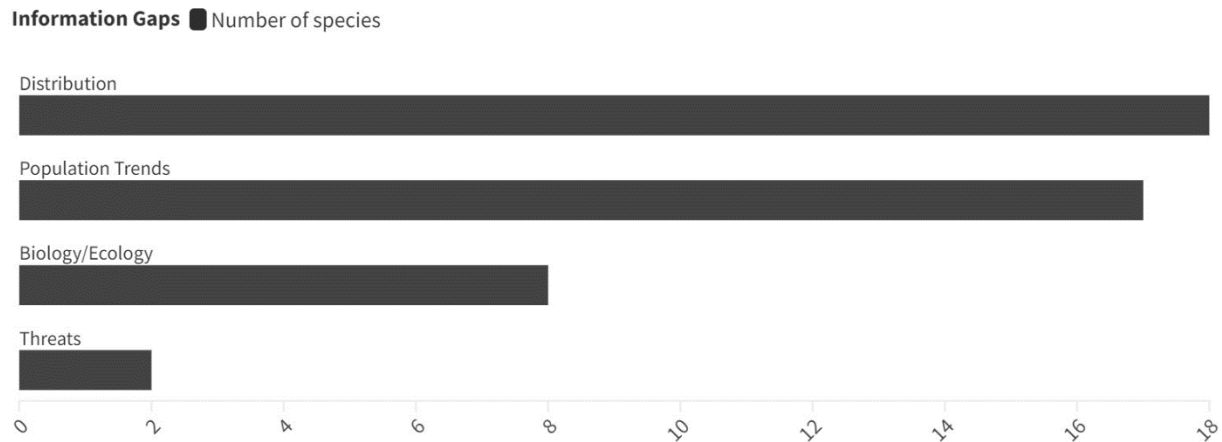


Figure 9. Information gaps for CR and EN trees in Belize.

For some species, specific obstacles leading to the gaps were noted (**Figure 10**). Limited survey effort is the main reason for gaps in distribution; related obstacles include when species occur in areas that are hard to survey (i.e. have low accessibility), when species are hard to identify (commonly confused with others in the same genus), and when species are hard to survey (e.g. the species is thorny or flowers irregularly).

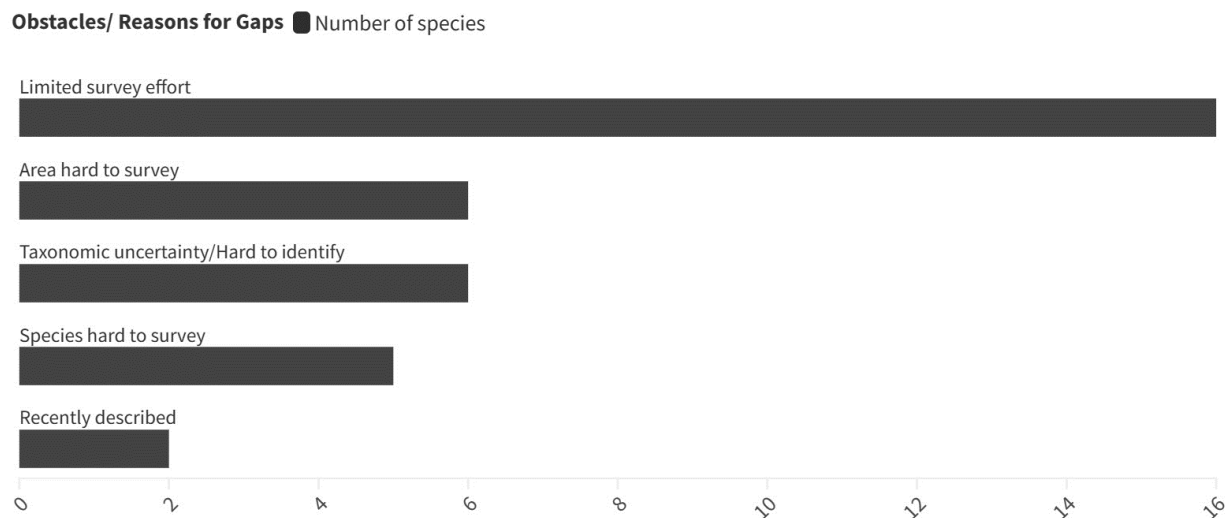


Figure 10. Obstacles contributing to the information gaps for CR and EN trees.

Key stakeholders for conserving species

After reviewing the available location data and identifying possible sites for additional surveys, a list of key stakeholders was generated (**Table 2**). NGO and CBO co-managers, as well as private sector companies involved in forest management, have the opportunity to influence these species through increased research and monitoring, patrol efforts, advocacy and education, and habitat management for the species that fall within their areas of focus.

The Forest Department and National Biodiversity Office are in a position to influence the conservation of all threatened tree species by integrating conservation strategies into national policies and forest management plans. These departments play a key role in ensuring that Belize meets its national targets identified through its National Biodiversity Strategy and Action Plan, and regional and international commitments including the Convention on Biological Diversity, Convention on the International Trade in Endangered Species of Wild Fauna and Flora, and the Convention on Wetlands of International Importance (Ramsar Convention).

Wild Earth Allies (not listed in the table) is also an important stakeholder for all species, especially for lending expertise to species identity, habitat preferences, and biological or ecological attributes.

Table 2. CR and EN tree species and the stakeholders positioned to support their conservation

Species	Key Stakeholders
<i>Amphitecna lundellii</i>	BAS, Ya'axché, FCD/FD/Bull Run Overseas Ltd for surveys, NBIO
<i>Bartholomaea sessiliflora</i>	Bull Run Overseas Ltd, Ya'axché, FD, NBIO
<i>Bravaisia grandiflora</i>	Ya'axché, Toledo communities
<i>Chiangiodendron mexicanum</i>	Ya'axché, NBIO
<i>Cinnamomum bladenense</i>	BAS, Ya'axché, FD, NBIO, communities outside Manatee Forest Reserve, logging concessionaires in Stann Creek and Toledo
<i>Coussarea imitans</i>	BAS, Ya'axché, TIDE, SATIIM, Toledo communities
<i>Cupania spectabilis</i>	SATIIM, Bull Run Overseas Ltd, FD, Ya'axché, possibly the Belize Zoo
<i>Dalbergia stevensonii</i>	BBG, SATIIM, BAS, FCD, Ya'axché, FD, NBIO, TIDE, logging concessionaires in Toledo, Fauna & Flora
<i>Eugenia chahalana</i>	Ya'axché, FD, NBIO
<i>Eugenia izabalana</i>	SATIIM, Bull Run Overseas Ltd, FD, NBIO, Toledo communities near Sarstoon River (Machakilha and Graham Creek)
<i>Forestiera corollata</i>	Co-managers near Toledo and Stann Creek coastal plains, Toledo communities, FD, NBIO
<i>Gymnanthes belizensis</i>	Itzamna Society, FCD, FD, NBIO, BKHC
<i>Harpalyce torresii</i>	Programme for Belize, BAS, MFT, NBIO
<i>Heisteria media</i>	FD, NBIO, MBEDG, FCD, Ya'axché, Toledo community of Laguna
<i>Lonchocarpus multifoliolatus</i>	FCD, FD, Toledo community of San Pedro Columbia
<i>Myrcia petenensis</i>	FWC, BKHC, BAS, Itzamna Society, Bull Run Overseas Ltd, FD, NBIO

<i>Pera barbellata</i>	BAS, Ya'axché, FD, NBIO, Bull Run Overseas Ltd, Inst. of Archaeology at Nohoch Cheen. Stann Creek communities of Red Bank, San Juan, Independence, Sittee River, and New Mullins River.
<i>Persea schiedeana</i>	BAS, FCD, Ya'axché, FD, NBIO
<i>Petenaea cordata</i>	FCD, FD, NBIO, Ya'axché, Bull Run Overseas Ltd
<i>Pithecellobium johansenii</i>	Monkey Bay Wildlife Sanctuary, BAS, HETA, WCS, NBIO
<i>Psychotria lundellii</i>	FD, FCD, Inst. of Archaeology, Ya'axché, NBIO
<i>Quercus insignis</i>	Itzamna Society, FCD, Ya'axché, BAS, FD, NBIO
<i>Trichilia breviflora</i>	Ya'axché, Toledo communities of Crique Jute & San Pedro Columbia
<i>Trichilia erythrocarpa</i>	FCD, Ya'axché, FD
<i>Zygia confusa</i>	HETA, Ya'axché, FCD, NBIO

Setting goals for tree conservation

Priority Species

Identifying priority species was necessary to streamline available funding and efforts, mobilize stakeholders, and lead to new action for Critically Endangered and Endangered trees. It should be noted that despite the workshop ratings, all species in the list are still at high risk globally and their conservation statuses should not be undervalued.

After reviewing all available data for a species, workshop participants responded to a poll to rate that species in terms of priority level, or “urgency,” for new conservation action in Belize (**Figure 11**). Results were compiled after the workshop and used to separate the species list into the following levels: Higher Priority, Intermediate Priority, and Lesser Priority for action. Ten (10) species fall into the “Higher Priority” category. All results are in **Figure 12**.

A list of species per priority category, sorted by the protected areas in which they are found, is captured in Appendix II.

Figure 11. Example slido poll in which participants were asked to rate *Dalbergia stevensonii* from 1-3, with 3 being higher priority for action and 1 being lower priority for action.

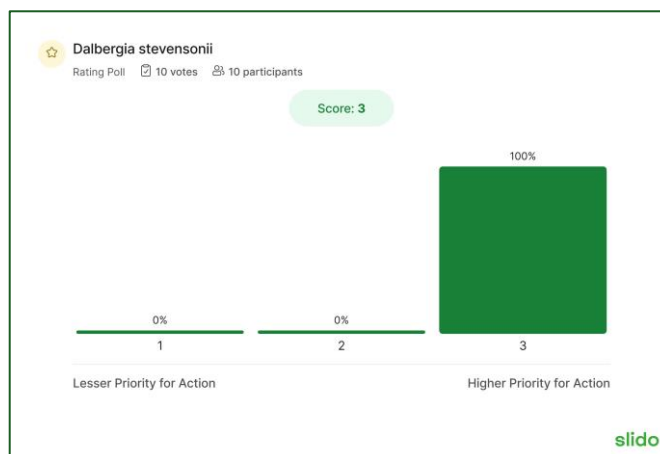


Figure 12. Species organized into priority levels according to the rating given during the workshop. Possible rating values range from 1-3 with 3 being highest priority.

Priority Level	Work-shop Priority Rating	Scientific name	IUCN Cat.	Additional values and uses							Key threats in Belize	Protective measures are in place	Organizations are working w/ the species	Data gaps and needs
				endemic	construction	crafts	fruit is eaten	agricultural	firewood	ecosystem or genetic value				
Higher Priority Level	3.00	<i>Dalbergia stevensonii</i>	CR		x	x					Transboundary and local illegal extraction. Legal harvest.	Yes ¹	Yes ²	Its wider ecological role. Whether the 2013 CITES listing has reduced species decline. If management plans which offer a 20–30 year cutting cycle are sustainable. How the historic loss of large, seed-bearing trees has impacted genetic diversity, recruitment, and vigor. Greater enforcement of nat. and internat. protective legislation, including implementation of CITES NDFs, better ID options at the point of trade, and incentives to encourage sust. management. Further exploration of vegetative propagation.
	2.83	<i>Pithecellobium johansenii</i>	EN								Development in central Belize in areas of likely habitat.	No	No	Additional surveys are needed. Note: the species is thorny, which makes it more difficult to collect. Its location in swampy areas makes it easier to find in the dry season.
	2.67	<i>Harpalyce torresii</i>	EN								No threats specific to Belize were identified.	No	No	Increased research efforts to better understand the population size, distribution, and trends to prepare a possible species action/recovery plan. Additional surveys are needed in Rio Bravo CMA and St. Herman's Blue Hole NP. Specimens near Hattieville were collected in 1981-1982; the specimen from Blue Hole collected in 1972. Note that it is difficult to find but easy to identify, at least to genus.
	2.67	<i>Myrcia petenensis</i>	EN								Agric. and urban expansion. Escaped fire. Sand / gravel mining.	No	No	Research is recommended to understand the current population size and trends as well as impact of possible future threats.
	2.60	<i>Quercus insignis</i>	EN		x	x		x		x	Global range is highly disturbed, increasing the importance of the Belize subpopulation.	No	No	Increased surveys. This can possibly be done with air support. There's a wider need to explore oak forests in Belize as there is generally a lack of information on those forest types.
	2.50	<i>Gymnanthes belizensis</i>	CR	x - BZ							Increasing agriculture and human settlement. Escaped fire. Chalillo Dam affecting natural processes.	No	No	Surveying, mapping and tagging individuals. Monitoring growth, reproduction and phenology in multiple microhabitats. Effects of threats on reproduction. Gathering seeds for population restoration and/or mitigation of threats via habitat degradation. Additional survey sites are the Macal River gorge, limestone hills next to the gorge, valleys in the Vaca plateau, Tapir Mtn; near creeks and rivers. Suspected to be limestone-obligate. Field note: It is difficult to spot the tree when it is without flowers or fruit.

Priority Level	Work-shop Priority Rating	Scientific name	IUCN Cat.	Additional values and uses							Key threats in Belize	Protective measures are in place	Organizations are working w/ the species	Data gaps and needs
				endemic	construction	crafts	fruit is eaten	agricultural	firewood	ecosystem or genetic value				
	2.50	<i>Coussarea imitans</i>	EN								Shifting cultivation and community expansion in Toledo.	No	No	It would be beneficial to have more information about the population size and trends, harvest, use, and livelihoods of this species. It is suggested to monitor the conservation efforts of the protected areas, in order to maintain the habitat. Need to check locations of trees in and around the Toledo communities- many were recorded nearly a century ago. Community land use has changed. The lack of collections is concerning and needs more exploration.
	2.50	<i>Forestiera corollata</i>	EN								Habitat loss from development along Coastal Plains Highway.	No	No	Monitoring of the habitat and population trends is recommended globally. Additional surveys are needed. Coastal plain forest habitat is not well explored in Belize and should be a high priority for surveys. Low number of collections could be reflecting threatened habitat. Surveys should cover into Stann Creek and Toledo coastal plains.
	2.40	<i>Lonchocarpus multifoliolatus</i>	EN		x				x		It is expected that the species is used for timber in Belize.	No	No	There is an urgent need for tools that can provide an integrated assessment of human impacts on forest biodiversity and that can support decision making related to forest use. It is suggested to monitor the habitat and population trends. This is a difficult genus to ID. As a result, the species is probably under-collected. More surveys by trained teams would be valuable.
	2.40	<i>Zygia confusa</i>	EN								Habitat loss from development along the Coastal Plains Highway.	No	No	More surveys are needed in the coastal hills. The species could be fairly easy to survey for if you know what to look for; it is distinctive but loses its flowers quickly.
Intermediate Priority Level	2.29	<i>Bravaisia grandiflora</i>	EN								Shifting cultivation and urban expansion by Toledo communities.	No	No	There is (generally) a need for tools that can provide an integrated assessment of human impacts on forest biodiversity and that support decision making related to habitat restoration and the forest use. It would be beneficial to recommend sustainable production activities and livelihood alternatives to the destruction of forests. In addition, it is suggested to monitor the habitat and population trends. Needs additional surveys in Belize. The species is likely to be truly rare, but more collections would help determine this.
	2.20	<i>Cupania spectabilis</i>	EN								No threats specific to Belize were identified.	No	No	It would be beneficial to monitor habitat trends. Some difficulty with identification. Looks very similar to <i>C. rufescens</i> - needs fruit for ID. Some of the collections have been confirmed by experts but others are pending. Generally, it can be considered a Mexican species.

Priority Level	Work-shop Priority Rating	Scientific name	IUCN Cat.	Additional values and uses							Key threats in Belize	Protective measures are in place	Organizations are working w/ the species	Data gaps and needs
				endemic	construction	crafts	fruit is eaten	agricultural	firewood	ecosystem or genetic value				
	2.17	<i>Petenaea cordata</i>	EN				x			x	Is possibly fire adapted. Not much is known about its reproduction.	No	No	In order to reduce the habitat decline, it is recommended to improve the territorial planning and mitigate human activities, and monitor the habitat trends. Better information is needed on its reproduction.
	2.17	<i>Trichilia breviflora</i>	EN								Shifting cultivation in community areas in Toledo.	No	No	It would be beneficial to monitor the habitat trends. There is a need to confirm species presence in Toledo communities.
	2.00	<i>Eugenia chahalana</i>	EN	x - BZ/ GT							No threats specific to Belize were identified.	No	No	Additional surveys in Toledo
	2.00	<i>Persea schiedeana</i>	EN					x		x	Mortality risk from fire at high elevations.	No	No	Germplasm collection and duplicated ex situ storage is recommended, as well as the development of strategies for in situ conservation. Additional surveys. Note: it is difficult to survey for this species because of its location at high elevations. Drones or helicopters might have limited value as these are generally subcanopy trees (one exceptional individual in BNR stands at 45m tall).
	2.00	<i>Trichilia erythrocarpa</i>	EN								Logging disturbance in Forest Reserves where commonly found.	No	No	It would be beneficial to monitor the habitat and population trends.
	1.89	<i>Amphitecna lundellii</i>	EN								No threats specific to Belize were identified.	No	No	More surveys could find additional locations, but even if more trees are found this species would likely still keep its EN status. Field note: It is difficult to distinguish this from A. breedlovei without flowers. The tree doesn't flower regularly. The two species appear in similar habitat.
	1.83	<i>Eugenia izabalana</i>	EN	x - BZ/ GT							Known from limited locations, appearing outside PAs.	No	No	Additional surveys in Toledo
	1.71	<i>Bartholomaea sessiliflora</i>	EN								Land conversion. Has some tolerance for natural disturbance.	No	No	It is recommended to increase the research efforts to better understand the population size, distribution, and trends in order to prepare a possible species action/recovery plan. Species is undersampled due to difficult access to high terrain. Likely more widespread on limestone in Belize than the collections show.

Priority Level	Work-shop Priority Rating	Scientific name	IUCN Cat.	Additional values and uses							Key threats in Belize	Protective measures are in place	Organizations are working w/ the species	Data gaps and needs
				endemic	construction	crafts	fruit is eaten	agricultural	firewood	ecosystem or genetic value				
Lesser Priority Level	1.67	<i>Heisteria media</i>	EN								No threats specific to Belize were identified.	No	Yes ³	Increase the research efforts to better understand the population size, distribution, and trends of <i>Heisteria media</i> in order to prepare a possible species action/recovery plan. Consider protection measures in situ or a genome resource bank as a measure of ex situ conservation, livelihood alternatives to the destruction of forests, legal regulations, and conservation payments. It would be beneficial to monitor habitat trends.
	1.50	<i>Psychotria lundellii</i>	EN								Is relatively protected in PAs unless illegal clear cutting occurs.	No	No	Monitoring of the habitat and population is recommended. There have not been many collections. It is an understory species, making it easy to collect; therefore, the lack of collection probably reflects rarity. Also note: this genus is difficult to identify. Possibly, the species is not collected when seen because of similarity to other common <i>Psychotria</i> . Belize collections at least have been confirmed at Missouri Botanical Garden.
	1.20	<i>Pera barbellata</i>	EN						x		No threats specific to Belize were identified.	No	No	Monitoring of the habitat is suggested
	1.00	<i>Chiangiodendron mexicanum</i>	EN							x	No threats specific to Belize were identified.	No	Yes ³	The habitat of the taxon is being seriously threatened, so it is necessary to consider a genome resource bank as a measure of ex situ conservation. In addition, it is suggested to monitor the habitat and population trend.
	1.00	<i>Cinnamomum bladenense</i>	EN	?							No threats specific to Belize were identified.	No	Yes ³	Taxonomic uncertainty- <i>C. bladenense</i> may become <i>Aiouea maya</i> but needs genetic investigation. Would help to collect more leaf samples for testing. Ya'axché to follow up with Steven Brewer/WEA with collection from Bladen NR. The species is possibly not as rare as it seems, but it depends on the genetic testing outcome.

1- Former moratorium on harvest, 2012-2016. Strict permits require trees retained as 'reserve' or 'seed bearing' trees, and only 'crop' trees can be cut or concession owners will be fined. The cutting cycle is 20 to 25 years and only trees between 35 and 70 cm dbh can be cut.
2- Ya'axché, BBG, FD, logging concessionaires, SATIIM
3- Ya'axché (in Bladen NR permanent sample plot)
Abbreviations: BZ = Belize, GT = Guatemala.

Priority Sites

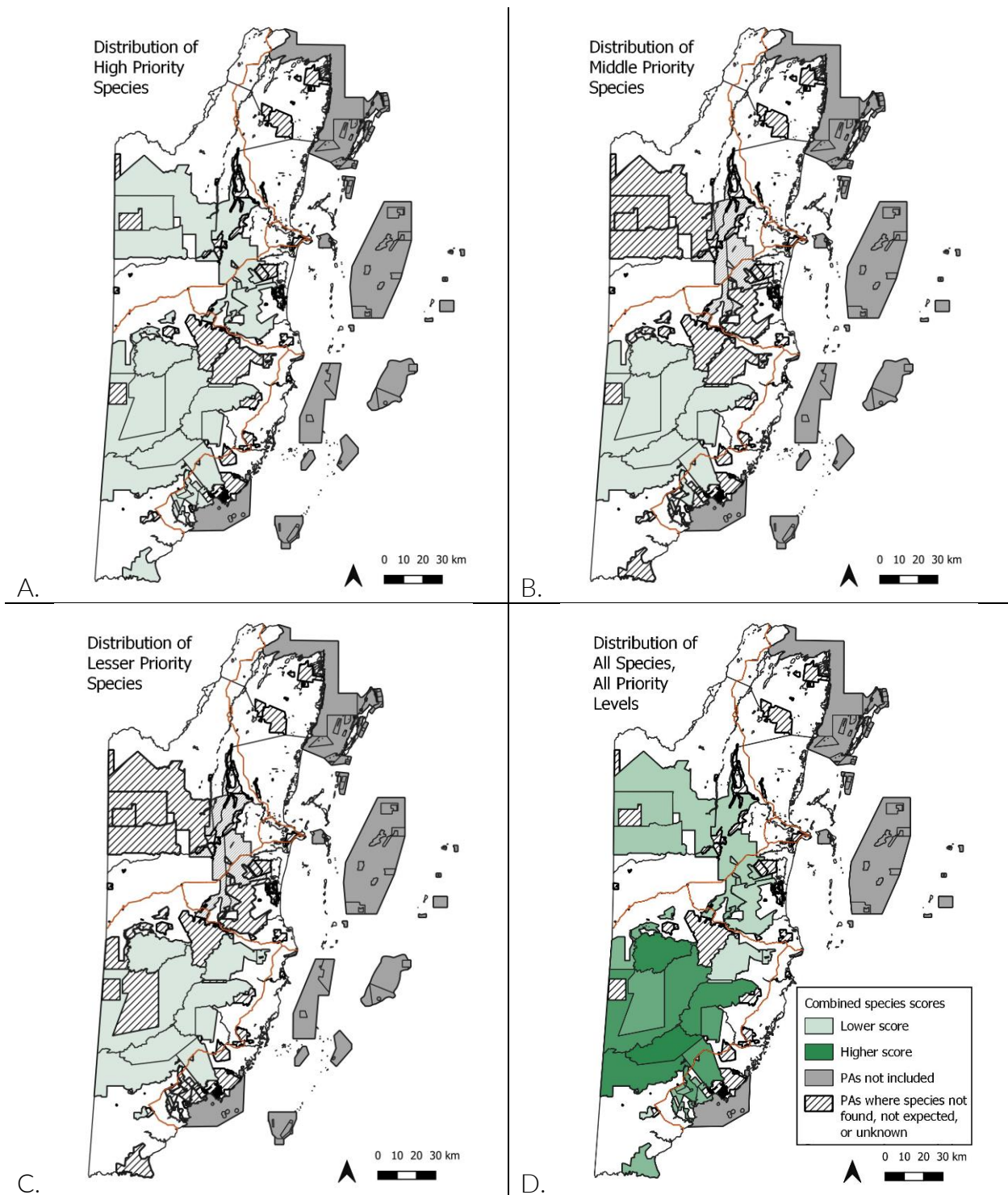


Figure 13. Map series highlighting the protected areas where higher (A), intermediate (B), and lesser (C) priority species occur across Belize. (D) ranks all protected areas according to a composite score attained by combining the workshop rankings of all species found within their boundaries.

Priority sites for conservation of Belize's threatened trees were mapped out, post-workshop, based on the species' priority rankings and their distributions (including their known and potential locations). Protected areas where the higher, intermediate, and lesser priority species occur or are likely to occur are presented in **Figure 13 A-D**.

As reported from the pre-workshop survey, the majority of stakeholders are already engaged in some tree conservation actions across the priority sites (**Figure 14 A**). Exceptions (areas in red) include Elijio Panti National Park which is managed by Itzamna Society, who has an interest in building its capacity for tree research and management. The Boden Creek Ecological Preserve, newly managed by Ya'axché, does not yet have active tree research or management in place but is due to start in the near future. Of higher concern are the Columbia River Forest Reserve and Deep River Forest Reserve; Deep River FR has an active long-term logging concession with sustained management oversight, while Columbia River FR has no co-management presence.

There are many opportunities for managers to integrate actions for CR and EN species into their existing management strategies. Similarly, there are many opportunities for integrating advocacy and education messaging for these species into the pre-existing outreach network, which has wide coverage around the priority sites (**Figure 14 B**).

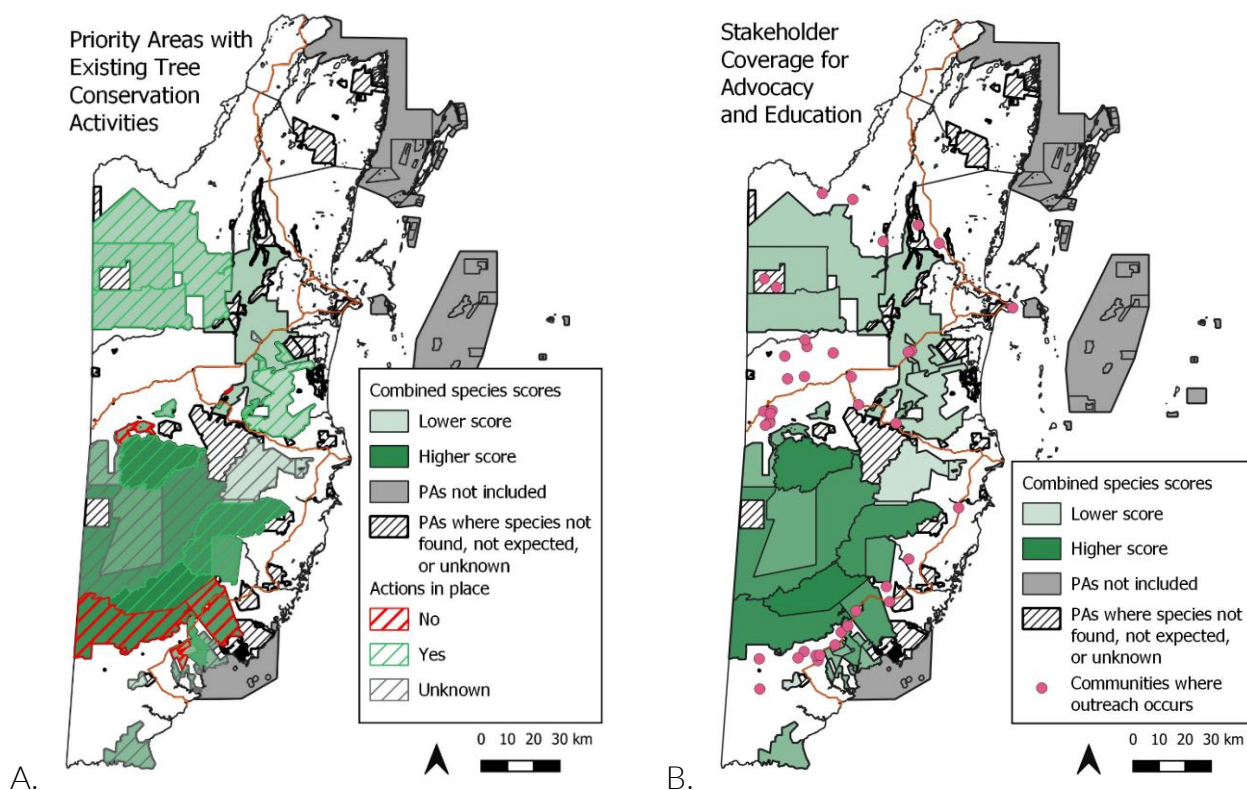


Figure 14. (A) most protected areas that contain high priority species already have some tree conservation actions included in their management. (B) stakeholders who are involved in in-situ tree conservation are also engaged in education and advocacy in nearby communities.

Next steps: additional engagement

National threatened trees discussion group

A threatened tree discussion group was launched after the workshop using the Microsoft Viva Engage (formerly Yammer) platform. This group is open to workshop participants and all other field, technical, and administrative staff of forest management organizations in Belize. It is dedicated to helping organizations across Belize connect, engage, and share knowledge to improve the status of the country's most vulnerable trees.

Viva Engage allows users to organize and consolidate relevant literature, manuals, and policies for easy access, while also allowing for dynamic discussion and more informal questions and answers. Users are encouraged to share best practices, add content, and forge connections between other organizations working to conserve the same species. Conversations are organized around sub-group topics such as “Belize Trees: Current Status and Roadmap” which includes content from the stakeholder workshop, “Taxonomic and ID Resources,” and “Funding Opportunities.” Ya’axché is committed to managing the group content for the long-term.

Please contact Elizabeth Dorgay if you would like to be sent an invitation to the group.

Building stakeholder capacity

A stakeholder needs assessment will be conducted before the end of 2023 to prioritize knowledge and technical training needs across participating organizations. The trainings will support stakeholders to address the species knowledge gaps and research needs identified through the workshop (i.e. distribution, population trends, etc.) and build capacity for new action. Trainings will be hosted by Ya’axché in the dry season of 2024.

Supporting new conservation actions

Through the project, “Catalyzing new action for threatened trees in Belize”, Ya’axché will administer a limited number of small grants to participating organizations in 2024. This seed funding is to help stakeholders to achieve new conservation actions for CR and EN tree species. Competitive projects will focus on priority species and priority sites. Information related to the small grants will be announced through the national threatened tree discussion group platform as it becomes available.

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Appendices

I. How the workshop species list was established

The list of species discussed at the workshop were selected by applying the following search terms to the IUCN Red List website (IUCN 2022): **Taxonomy** = Plantae – Kingdom, Tracheophyta – Phylum; **Geographical Scope** = Global; **Red List Category** = EX, EW, CR, EN, VU, NT; **Land Regions** = Belize; **Plant and Fungal Growth Forms** = Tree – size unknown, Tree – large, Tree – small, Shrub – large; **Include** = Species. The definition of “tree” was by default the definition used by the IUCN. The resulting list of 85 species was reviewed for accuracy by cross-checking current versions of plant names against the World Flora Online plant list (WFO 2022). The assessment location data were confirmed and combined with occurrence data from GBIF.org (2022). The list was further narrowed down to 68 species with assistance from Dr. Steven Brewer of Wild Earth Allies (**Table 1**).

During the species review process, 17 species of conservation concern were excluded from the list of threatened species and were therefore not discussed at the workshop. The species and justifications for excluding them are listed below.

Species that appear in a Red List search as present in Belize but have been confirmed as not present:

- *Dalbergia retusa* (CR)
- *Attilaea abalak* (EN)
- *Bartholomaea mollis* (EN)
- *Pleradenophora tikalana* (VU)

Species that are likely not present because Belize does not meet their habitat requirements:

- *Dalbergia calycina* (VU)
- *Swietenia humilis* (EN)¹

Species that could be present in Belize but have not yet been confirmed:

- *Machaerium konzattii* (EN)
- *Psychotria lorenciana* (EN)
- *Pithecellobium furcatum* (NT)
- *Guaciacum sanctum* (NT)

Species with recently updated taxonomy where new Red List assessments have not yet been completed for their current names:

- *Ceratozamia robusta* (EN) which is misapplied and should be *C. osbornei* (Not Assessed) in Belize
- *Zanthoxylum belizense* (EN) which is a synonym of *Zanthoxylum ekmanii* (Not Assessed)
- *Zanthoxylum procerum* (EN), synonym of *Zanthoxylum acuminatum* subsp. *juniperinum* (Not Assessed)

¹ *Swietenia humilis* is a Pacific slope species. Any natural presence in Belize is very unlikely, and individuals recorded here are assumed to be cultivated.

Species with recently updated taxonomy that appear as Least Concern under their current names:

- *Pithecellobium stevensonii* (EN), synonym of *Zygia cognata* (LC)
- *Quiina schippii* (EN), synonym of *Quiina macrophylla* (LC)
- *Vitex kuylenii* (EN), synonym of *Vitex hemsleyi* (LC)

Special consideration should be given to *Magnolia montebelloensis*. *Magnolia yoroconte* (VU) appears in the Red List search but is misapplied; *M. montebelloensis* is the correct name for the species in Belize. A recently published taxonomic update preliminarily assesses *M. montebelloensis* as CR (Vázquez-García et al., 2017); however, the authors did not include individuals in Belize as part of the assessment. *M. montebelloensis* and the other species that have not yet been assessed should be monitored for future Red List updates.

II. Species checklist organized by location

Species per Protected Area

Regular font = species has been confirmed. *Italics* = species is possible but not yet confirmed.

Site	Species of Highest Priority Level	Species of Intermediate Priority Level	Species of Lesser Priority Level	Primary Stakeholders
5 Blues Lake NP	Pithecellobium johansenii, Zygia confusa			Hummingbird Environmental Tour Guide Association
Aguacaliente WS			Heisteria media	
Archaeological Sites (multiple)		Petenaea cordata, Bartholomaea sessiliflora		Institute of Archaeology
Belize Maya Forest	<i>Harpalyce torresii</i>			Belize Maya Forest Trust
The Belize Zoo		<i>Cupania spectabilis</i>		The Belize Zoo
Bladen NR	Dalbergia stevensonii, Quercus insignis, Zygia confusa	Petenaea cordata, Trichilia breviflora, Eugenia chahalana, Persea schiedeana, Trichilia erythrocarpa, Amphitecna lundellii, Bartholomaea sessiliflora	Heisteria media, Pera barbellata, Chiangiodendron mexicanum, Cinnamomum bladenense	Ya'axche Conservation Trust
Boden Creek Ecological Preserve	Dalbergia stevensonii, <i>Coussarea imitans</i>			Fauna & Flora, Ya'axche Conservation Trust
Cockscomb Basin WS	Dalbergia stevensonii, Coussarea imitans, <i>Quercus insignis</i>	Amphitecna lundellii, <i>Persea schiedeana</i>	Pera barbellata, <i>Cinnamomum bladenense</i>	Belize Audubon Society
Chiquibul FR	Dalbergia stevensonii, Gymnanthes belizensis, Lonchocarpus multifoliolatus	Trichilia erythrocarpa		Friends for Conservation and Development
Chiquibul NP	Quercus insignis, Zygia confusa	Petenaea cordata, Persea schiedeana, <i>Amphitecna lundellii</i>	Heisteria media	Friends for Conservation and Development

Site	Species of Highest Priority Level	Species of Intermediate Priority Level	Species of Lesser Priority Level	Primary Stakeholders
Columbia River FR	<i>Dalbergia stevensonii</i> , <i>Quercus insignis</i>	<i>Trichilia breviflora</i> , <i>Trichilia erythrocarpa</i> , <i>Bartholomaea sessiliflora</i> , <i>Eugenia chahalana</i>	<i>Heisteria media</i> , <i>Cinnamomum bladenense</i>	Forest Department
Deep River FR	<i>Dalbergia stevensonii</i> , <i>Coussarea imitans</i>	<i>Bartholomaea sessiliflora</i> , <i>Cupania spectabilis</i>	<i>Psychotria lundellii</i>	Forest Department, logging concessionaires
Eljio Panti NP	<i>Quercus insignis</i> , <i>Gymnanthes belizensis</i> , <i>Myrcia petenensis</i>			Itzamna Society
Golden Stream Corridor Preserve	<i>Dalbergia stevensonii</i> , <i>Coussarea imitans</i>	<i>Bravaisia grandiflora</i> , <i>Cupania spectabilis</i>		Ya'axche Conservation Trust
Manatee FR	<i>Forestiera corollata</i>			Forest Department
Mayflower Bocawina FR			<i>Heisteria media</i>	Mayflower Bocawina Environment and Development Group
Maya Forest Corridor	<i>Pithecellobium johansenii</i>			Wildlife Conservation Society
Maya Mountain North FR	<i>Dalbergia stevensonii</i> , <i>Quercus insignis</i>	<i>Petenaea cordata</i> , <i>Amphitecna lundellii</i>	<i>Cinnamomum bladenense</i>	Ya'axche Conservation Trust, Hummingbird Furnishings
Monkey Bay WS	<i>Pithecellobium johansenii</i>			Monkey Bay Wildlife Sanctuary- NGO
Mountain Pine Ridge FR	<i>Gymnanthes belizensis</i> , <i>Myrcia petenensis</i>	<i>Cupania spectabilis</i> , <i>Bartholomaea sessiliflora</i> , <i>Petenaea cordata</i> , <i>Amphitecna lundellii</i> , and <i>Eugenia izabalana</i>	<i>Heisteria media</i> , <i>Psychotria lundellii</i> , <i>Pera barbellata</i>	Forest Department, Bull Run Overseas

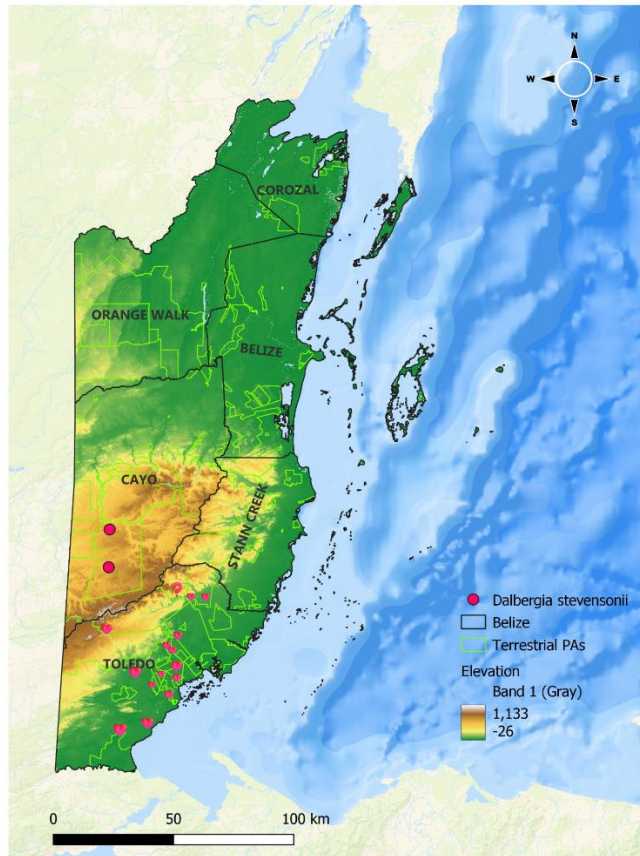
Site	Species of Highest Priority Level	Species of Intermediate Priority Level	Species of Lesser Priority Level	Primary Stakeholders
Rio Brave CMA	Harpalyce torresii			Programme for Belize
Runaway Creek NR	Myrcia petenensis			Friends for Wildlife Conservation
Sarstoon Temash NP	Dalbergia stevensonii, <i>Coussarea imitans</i>			Sarstoon Temash Institute for Indigenous Management
Sittee River FR			Heisteria media	Forest Department
St. Herman's Blue Hole NP	Harpalyce torresii, <i>Myrcia petenensis</i> , <i>Pithecellobium johansenii</i>			Belize Audubon Society
Tapir Mountain NR	Myrcia petenensis, <i>Gymnanthes belizensis</i>			Belize Karst Habitat Conservation
TIDE Private Lands	Dalbergia stevensonii, <i>Coussarea imitans</i>			Toledo Institute for Development and Environment
Vaca FR	Gymnanthes belizensis	Petenaea cordata, Trichilia erythrocarpa		Friends for Conservation and Development
Victoria Peak Natural Monument	<i>Quercus insignis</i>			


Abbreviations: CMA = Conservation Management Area; FR = Forest Reserve; NP = National Park; NR= Nature Reserve; WS = Wildlife Sanctuary

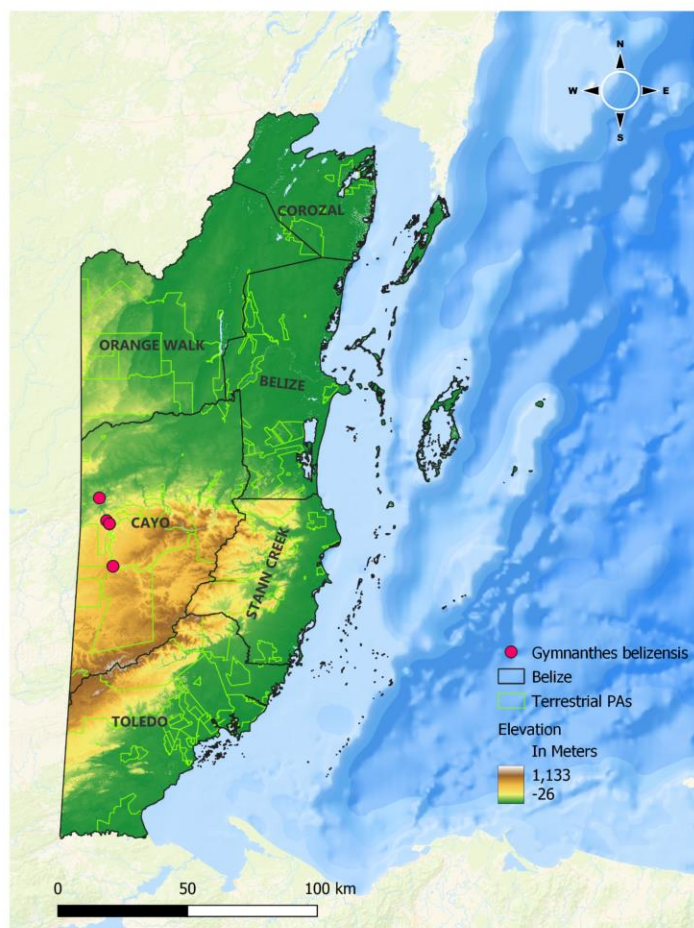
III. Species information pages

Summary of the IUCN Red List assessment (2022) per species, with workshop updates, additions, and corrections.

Critically Endangered species



<div></div> <div><i>Dalbergia stevensonii</i></div>		Authority Standl.	Family FABACEAE
Date Assessed 27-Mar-19		Global Distribution BLZ, GTM (Petén) and MEX (Chiapas). The limited range is likely due to habitat specificity and dispersal limitations. Reports of the species in HND, SLV and NIC have not been verified.	
Habitat BLZ: it is most abundant on low-lying, seasonally inundated, highly weathered and acidic, nutrient poor soils derived primarily from igneous material, frequently with a shallow clay layer impeding vertical drainage. These soils form tropical evergreen, "broken ridge" comprised mostly of low trees (c. 10–15 m) and shrubs with scattered taller trees. Also infrequent to occasional along streams over igneous rock in the S Maya Mountains, and rare on limestone at higher elevations (to 700 m) of the SW Maya Mountains. GTM: it is found in broadleaf forest. MEX: found in evergreen rainforest, oak forest and transformed areas. The species occurs near watercourses on deep soils.			
Global Population Described as 'rare' and observations suggest a population reduction of 90% in the past 20 years. Ongoing population decline and loss of genetic diversity is likely.	Global Trends Decreasing	Global Threats Timber exploitation over the last 2 centuries. The species is slow growing and has high levels of seed abortion. Regeneration limited by seed weevils and by infrequent 'pulse' recruitment. Possible out-breeding as occurs with <i>D. retusa</i> , <i>D. sissoo</i> and <i>D. micoelobium</i> .	Conservation Actions in Place Regional Red Lists: Endangered in GTM and proposed as a species in danger of extinction in MEX. Listed in CITES Appendix II under the generic listing for all species of <i>Dalbergia</i> . Present in PAs in all countries. Not in any ex-situ collections.
Belize Distribution Habitats are scattered throughout the coastal plains Toledo and southern Cayo in the foothills of the Maya Mountains. In Belize, it is estimated that 50% of commercial stock was lost from 2007–2012.	Belize PAs 40% of BZ range is inside PAs: Bladen NR, Chiquibul FR, Sarstoon Temash NP, Cockscomb Basin WS, Golden Stream Corridor Preserve, Columbia River FR, Deep River FR, Maya Mountain North FR, Boden Creek Ecol. Preserve, TIDE Private Lands	Belize Threats Transboundary, illegal extraction happening in western Bladen NR from Guatemala. No reports of extraction from CBWS. The species is legally allowed to be harvested with permit.	Belize Actions in Place Former moratorium, 2012–2016. Strict permits require trees retained as 'reserve' or 'seed bearing' trees, and only 'crop' trees can be cut or concession owners will be fined. The cutting cycle is 20 to 25 years and only trees between 35 and 70 cm dbh can be cut.
Organizations Working with the Species YCT BBG logging concessionaires SATIIM?	Key Stakeholders YCT BBG SATIIM BAS FCD FD NBIO TIDE logging concessionaires, Fauna&Flora	Knowledge / Capacity Gaps Limited information available about the role of <i>D. stevensonii</i> in the wider forest ecosystem. No data yet to support whether CITES listing in 2013 has reduced species decline. Due to this life history, it is not certain if management plans which offer a 20–30 year cutting cycle will sustainably manage the species. Also, a historic loss of large, seed bearing trees (often the most targeted for timber) is likely to have caused loss of genetic diversity in the global population and may cause a genetic bottleneck. This can reduce recruitment and vigour of the species but requires further investigation. There needs to be greater enforcement of national and international protective legislation, including implementation of CITES non-detriment findings, better ID options at the point of trade and incentives to encourage sustainable management. Strengthening of sustainable in situ and ex situ conservation efforts should also be considered throughout the range of the species. Further exploration of vegetative propagation options. YCT has some history attempting this with minor success.	Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.) Timber value for construction, furniture, musical instruments, crafts.



Gymnanthes belizensis

Authority

G.L. Webster

Family

EUPHORBIACEAE

Date Assessed

26-Aug-20

Global Distribution

Belize. Only four specimens known from the Macal River gorge. The EOO is 25.664 km² and the AOO is 16 km² using a cell width of 2 km.

Habitat

3 of the 4 specimens are associated with limestone, the 4th on undetermined substrate. Small tree to about 10 m tall, found under the cover of forest. Although it is possible that this species grows on limestone outside of the Macal gorge, that substrate outside of the gorge exhibits strong edaphic drought and supports relatively low forest (canopies mostly around 15–25 m tall; Brewer pers. obs.).

Global Population

Size is unknown, but exploration by S. Brewer on portions of both sides of the Macal river and into the hills revealed only 1 individual, on colluvium at the base of a limestone slope. The population trend is inferred.

Global Trends

Decreasing

Global Threats

Increasing agriculture and human settlement on the Vaca Plateau adjacent to the Macal river. Moderate to severe seasonal drought can lead to unchecked agricultural fires which are documented to spread rapidly in this area.

Conservation Actions in Place

none

Belize Distribution

Macal River gorge

Belize PAs

Eljio Panti NP/Vaca FR (3 trees)

Chiquibul FR/Mountain Pine Ridge (1 tree)

Could be located in Tapir Mtn with additional surveys

The Chalillo Dam upstream has altered the flooding regime and sediment deposition in the Macal gorge, possibly affecting the population in ways that are manifest over decades.

Belize Actions in Place

none

Organizations Working with the Species

none

Key Stakeholders

Itzamna Society
 FCD
 FD
 BKHC - for additional surveys

Knowledge / Capacity Gaps

Needs: Surveying, mapping and tagging individuals, monitoring growth, reproduction and phenology in multiple places and multiple microhabitat types where feasible.

Determining potential indirect effects of threats on reproduction.

Gathering seeds for potential population restoration and/or mitigation of effects of threats via habitat conversion or degradation.

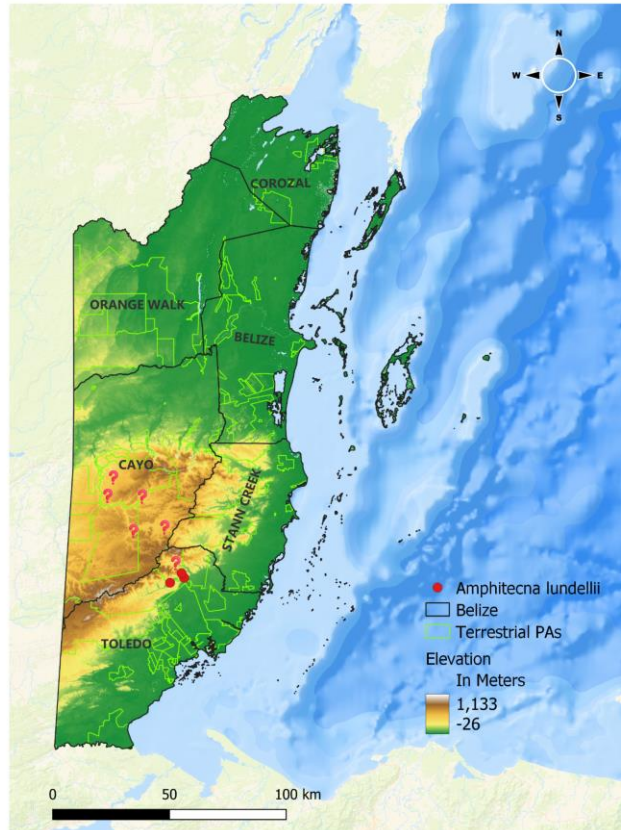
Survey notes: there is a need for additional surveys going up the Macal River gorge. Possibly found on limestone hills next to the gorge. Could also be found in valleys in the Vaca plateau. Is suspected to be limestone-obligate. Possibly in Tapir Mtn, near creeks and rivers. In general, this species has not been well surveyed.

Field note: It is difficult to spot the tree when it is without flowers or fruit.

Significance
 (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

Endemic

Endangered species



Amphitecna lundellii

Authority

A.H.Gentry

Family

BIGNONIACEAE

Date Assessed

29-Jun-20

Global Distribution

GTM and BLZ. This tree species is found in two localities in Baja Verapaz montane forest in Guatemala and one locality in Toledo, Belize.

Habitat

This species has been recorded on high mountain forest in Guatemala and at a lower elevation in Belize.

Global Population

There is no population information available for this species.

Global Trends

Decreasing

Global Threats

The habitat of this species is threatened by logging, agriculture and increasing intensity and frequency of fires.

Conservation Actions in Place

The species is not kept in any ex-situ collections.

Belize Distribution

Northern Toledo District.

Appears to like granite, poor, acid soils

Belize PAs

Bladen NR,
Maya Mountain N FR,
Cockscomb Basin WS

Could be found in the Chiquibul NR/FR (lower elevation areas more likely) and Mountain Pine Ridge FR with more surveys.

Belize Threats

No threats specific to Belize.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

YCT
BAS
FCD - surveys
FD - surveys
Bull Run Overseas - surveys

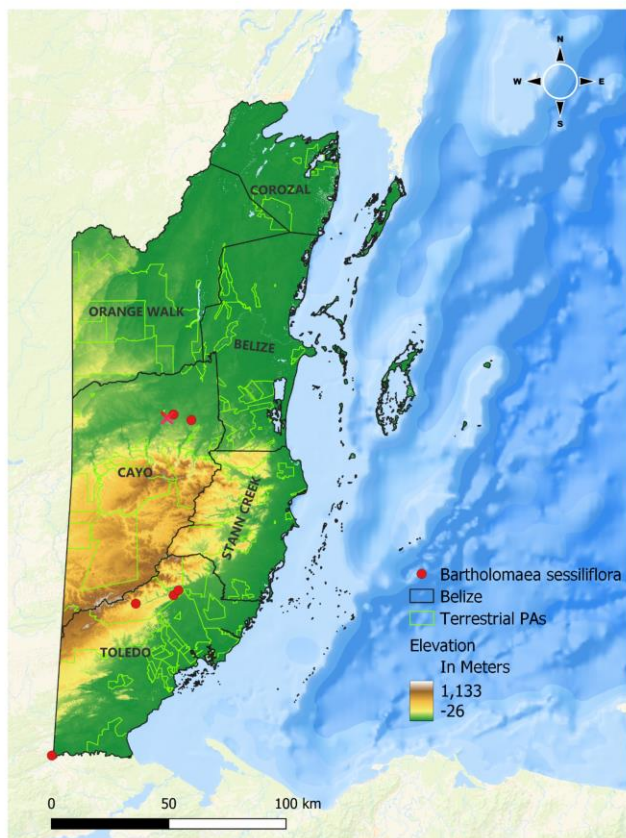
Knowledge / Capacity Gaps

Field note: It is difficult to distinguish this from *A. breedlovei* without flowers. The tree doesn't flower regularly. The two species appear in similar habitat.

More surveys could find additional locations, but even if more trees are found this species would likely still keep its EN status.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

....



Bartholomaea sessiliflora

Authority

(Standl.) Standl.
& Steyererm.

Family

SALICACEAE

Date Assessed

23-Sep-20

Global Distribution

Belize, Guatemala, and Mexico (Chiapas). The extent of occurrence (EOO) is 11,891.691 km² and an area of occupancy (AOO) of 24 km². The calculated number of locations is 4.

Habitat

This tree can be 2-15 m tall. It is located at 100-1,170 m elevation, within cloud forest and in humid forests.

Global Population

It is not considered an abundant plant with a large and stable population. Its 4 locations are threatened mainly by changing land use. It is estimated that in the last 30 years the population has decreased by 77% and will continue to decline.

Global Trends

Unknown

Global Threats

Deforestation due to land use change from urban expansion.

Conservation Actions in Place

GTM: located within Tikal NP. BZE: located in the Columbia Forest Reserve National Park, and Deep River Forest Reserve. There are two ex situ collections (BGCI 2020). This species was evaluated as Rare (R) in 1997 (Walter and Gillett 1998).

Belize Distribution

Fairly common on limestone hills in the Cayo District. MPR hills to the west. Not especially rare.

Note: The Belmopan point on this map is generic to indicate the species is found in Belize. Does not indicate a collection location.

Belize PAs

Bladen NR,
Mountain Pine Ridge NR,
near Nohoch Cheen

Belize Threats

Land conversion. Has some tolerance for natural disturbance (tolerant of fire but not catastrophic fire).

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

YCT
NBIO
Bull Run Overseas
FD

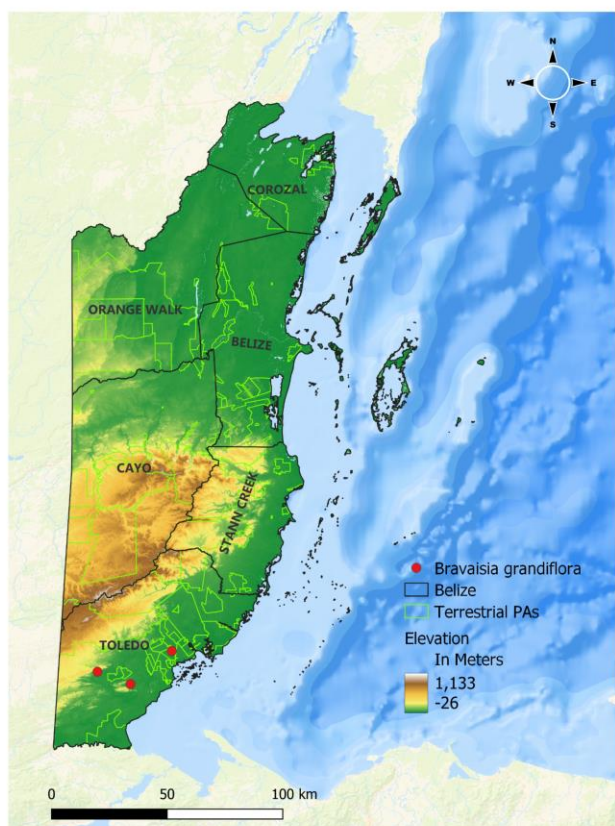
Knowledge / Capacity Gaps

Needs: It is recommended to increase the research efforts to better understand the population size, distribution, and trends in order to prepare a possible species action/recovery plan.

Species is undersampled due to difficult access to high terrain. Likely more widespread on limestone in Belize than the collections show.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Bravaisia grandiflora

Authority

Donn.Sm.

Family

ACANTHACEAE

Date Assessed

25-Mar-22

Global Distribution S MEX, N GTM, and S BLZ. The EOO is measured as 18,888.855 km²; AOO is calculated as 52 km². The number of locations is calculated to be no more than five locations, based on presence inside and outside PAs, and according to the geography and habitat threats.

Habitat

Shrub to understory tree of 9 m tall. This plant occurs along streams and at the edges of forests in regions of tropical wet forest at elevations from 90 to 1,000 m. The habitat is subject to decline as a consequence of the wood extraction and global climate change.

Global Population

It is known only from few sub-populations in regions of wet forest. These have been reduced due to the habitat threats (mainly by unintentional wood extraction). Therefore, it is considered that the current population trend is experiencing a continuing decline.

Global Trends

Decreasing

Global Threats

The main threat is deforestation caused by wood extraction, which has caused the decline in habitat quality, as well as direct mortality. In addition, wet tropical forests are among the terrestrial ecosystems most vulnerable to climate change.

Conservation Actions in Place

This species occurs in at least in three protected areas.

The taxon is not known from any ex situ collection site.

Belize Distribution

Toledo. Near communities of Blue Creek and Jacintoville.

Possibly found farther north in Toledo and along the coastal plains of Stann Creek.

Belize PAs

Golden Stream Corridor Preserve

Key Stakeholders

YCT
Toledo communities

Organizations Working with the Species

None.

Belize Threats

Shifting cultivation and urban expansion by Toledo communities.

Knowledge / Capacity Gaps

Needs: There is a need for tools that can provide an integrated assessment of human impacts on forest biodiversity and that support decision making related to habitat restoration and the forest use. It would be beneficial to recommend sustainable production activities and livelihood alternatives to the destruction of forests. In addition, it is suggested to monitor the habitat and population trends.

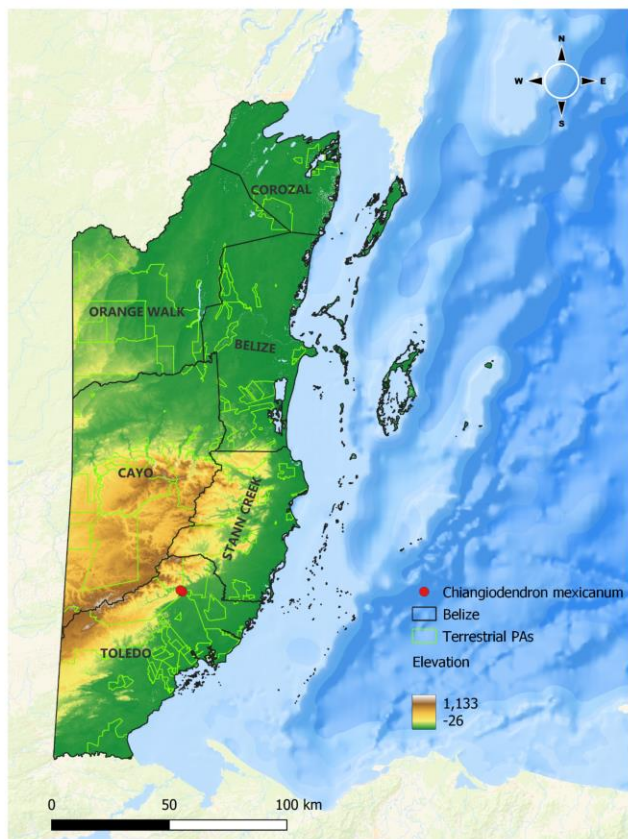
Needs additional surveys in Belize. The species is likely to be truly rare, but more collections would help determine this.

Belize Actions in Place

None.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Chiangiodendron mexicanum

Authority

Wendt

Family

ACHARIACEAE

Date Assessed

22-Nov-19

Global Distribution S. MX and C. Am. In MX: only occurring in remnant rainforest in the Uxpanapa region in extreme SE Veracruz and adjacent Oaxaca, rainforests of Chiapas in El Ocote, and La Trinitaria in the Lacandon rainforest. In CR: in Pacific Talamanca and Filo Aguabuena rain forests. Also in Toledo, BZ. The EOO is measured as 240,177.596 km²; the AOO is 88 km².

Habitat

Medium-size tree that can reach up to 20 m tall and 60 cm diameter. The geographical distribution of this species has a peculiar distribution among the mid-story trees of lowland tropical rainforests. It occurs on karst terrain at low altitude, in a range of 100–150 m elevation. Codominant trees in this forest include *Dialium guianense*, *Brosimum alicastrum*, *Guarea glabra* and *Bursera boresus*. The habitat is experiencing a continuing decline due to the extensive change in land use.

Global Population

Known only from a few subpopulations. Population size is considered to have reduced 50% in the last three generations due to expanding agriculture and extensive cattle ranching. Total pop. size is estimated at < 2,500 mature individuals and a continued decline of at least 20% is expected from habitat threats.

Global Trends

Decreasing

Global Threats

Mainly land use change due to expanding agriculture and cattle ranching. In MX, forests are increasingly fragmented and the patches smaller. Shifting-agriculture using fire reduced the EOO, AOO, and habitat quality, and also caused direct mortality.

Conservation Actions in Place

Occurs in 2 PAs: Bladen NR and Biosphere Reserve "El Ocote" (Chiapas).

This species is not known from any ex situ collections.

Belize Distribution

Toledo

Belize PAs

Bladen NR

Belize Threats

No threats specific to Belize.

Belize Actions in Place

None

Organizations Working with the Species

YCT - in BNR PSP

Key Stakeholders

YCT
NBIO

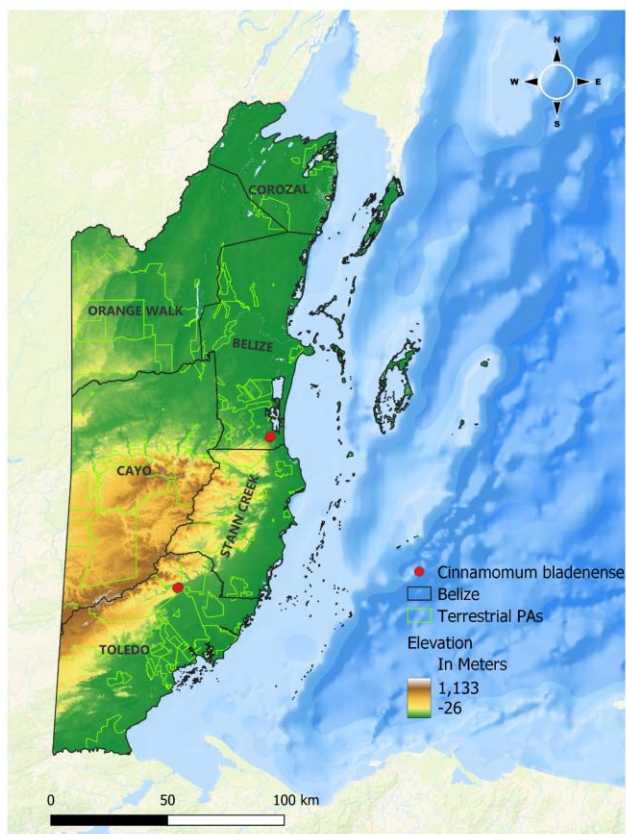
Knowledge / Capacity Gaps

Needs: The habitat of the taxon is being seriously threatened, so it is necessary to consider a genome resource bank as a measure of ex situ conservation.

In addition, it is suggested to monitor the habitat and population trend.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

Monotypic genus and the only New World member of its tribe.



Cinnamomum bladenense

Authority

S.W.Brewer &
G.L.Stott

Family

LAURACEAE

Date Assessed

16-Oct-20

Global Distribution Belize. This tree species is known from one limestone ridge-and-knoll system south of the Bladen branch of the Monkey River. It was also collected in 2020 in isolated limestone hills of the central eastern coastal plain. The extent of occurrence (EOO) is very likely to be over 800 km.

Habitat

This species is a canopy tree up to 25 m tall. It grows on limestone ridges and knolls in semi-evergreen forest between 60 and 320 m in altitude on very well-drained, steep and rocky slopes.

Global Population

At Bladen Nature Reserve this species is currently only known from fewer than 10 individuals.

Global Trends

Unknown

Global Threats

The main threats to this species are escaped fires from nearby agriculture and deforestation and mining of the limestone hills outside of protected areas.

Conservation Actions in Place

This species is not kept in any ex situ collection.

Belize Distribution

Limestone hills in Bladen NR, and on central eastern coastal plain outside of Manatee FR

Belize PAs

Bladen NR;
Could also occur in SE Cockscomb Basin WS, Maya Mountain FR, and Columbia River FR where similar habitat occurs

Belize Threats

None specific to Belize.

Belize Actions in Place

None

Organizations Working with the Species

YCT - in BNR PSP

Key Stakeholders

YCT
BAS
FD

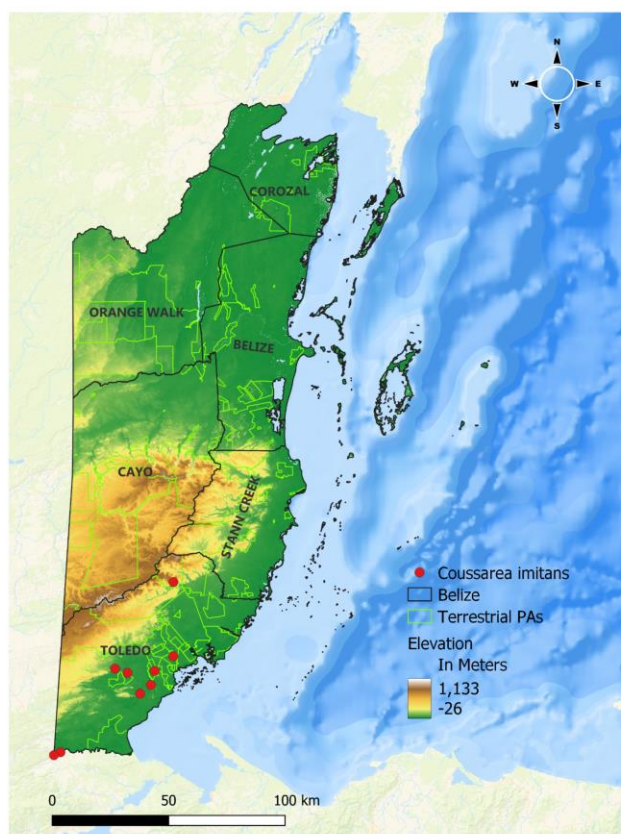
Knowledge / Capacity Gaps

Taxon uncertainty- *C. bladenense* may become *Alouea maya* but needs genetic investigation. Would help to collect more leaf samples for testing. YCT to follow up with Steven Brewer/WEA with collection from Bladen NR.

The species is possibly not as rare as it seems, but it depends on the genetic testing outcome.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

Endemic



Coussarea imitans

Authority

L.O.Williams

Family

RUBIACEAE

Date Assessed

16-Aug-18

Global Distribution

Known from GT, HN, BZ, and MX (Chiapas). The taxon has an EOO of 73,017.255 km² and an AOO of 112 km² based on the current reports from herbaria. It is found in three to five locations.

Habitat

Small tree of 8-12 m high. It grows in the subtropical wet forest at an altitude ranging from 0 to 500 m. The species grows in a region of high rainfall over 3,000 mm and considered a floristic refuge in the era of the "Pleistocene" glaciations. Its habitat is subject to decline due to human pressures on the land leading to urban expansion and associated agricultural activities.

Global Population

The subpopulation of Oaxaca and Chiapas has disappeared due to intensive agriculture and livestock. It is likely that the subpopulations of the Coban mountains in GT have disappeared too. The subpopulations near to the coast of BZ and HN persist.

Global Trends

Decreasing

Global Threats

Decrease in the habitat quality caused by human pressures on the land (removal of natural vegetation for agricultural activities). Additionally, the taxon is potentially threatened by climate change.

Conservation Actions in Place

Two subpopulations occur within a PA: Montes Azules National Park (MX) and Biotope Chacón Machacas (GT).

The species is not known from any ex situ sites worldwide.

Belize Distribution

Toledo- near communities of Mafredi, Pine Hill, Eldridgeville, San Felipe, Dump

Found in inundated, swampy soils- areas usually not developed. Expected along coastal plain

Belize PAs

Cockscomb Basin WS, Golden Stream CP.

Could be found in Deep River FR, Sarstoon Temash NP, Boden Creek Ecological Preserve and TIDE private lands.

Key Stakeholders

BAS
YCT
TIDE
SATIIM
Toledo communities

Organizations Working with the Species

None

Belize Threats

Habitat loss from shifting cultivation and community expansion in Toledo near where trees were documented in the 1930's.

Knowledge / Capacity Gaps

Needs: It would be beneficial to have more information about the population size and trends, harvest, use, and livelihoods of this species.

It is suggested to monitor the conservation efforts of the protected areas, in order to maintain the habitat.

Need to check locations of trees in and around the Toledo communities- many were recorded nearly a century ago. Community land use has changed.

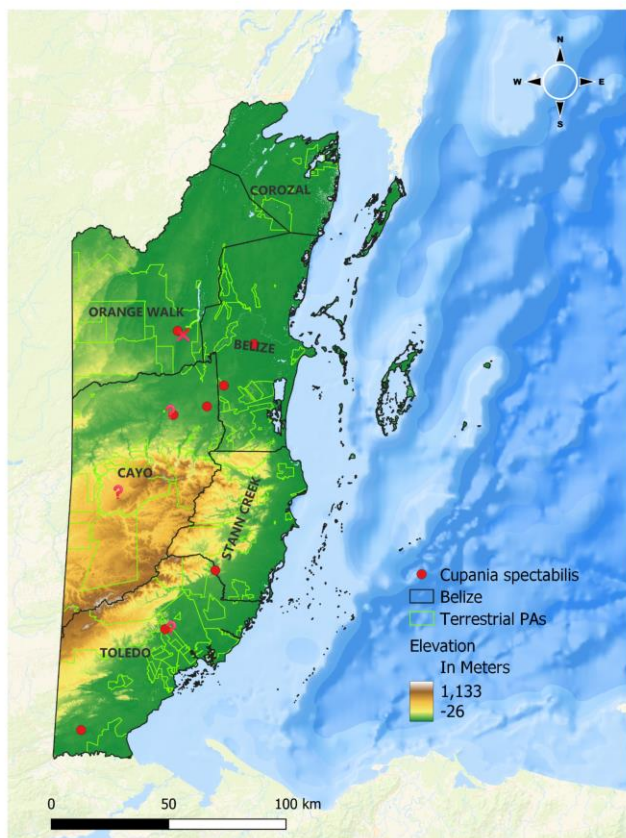
The lack of collections is concerning and needs more exploration.

Belize Actions in Place

None

Significance
(Cultural, Socio-Econ.,
Biol. Distinctiveness, etc.)

....



Cupania spectabilis

Authority

Radlk.

Family

SAPINDACEAE

Date Assessed

1-Oct-20

Global Distribution

BZ, GT, and MX (recorded in Chiapas and probably extinct in Veracruz). The taxon has an EOO of 49,218.891 km² and an AOO of 36 km².

Habitat

This tree can be 2-12 m tall. It is located at 10-1,000 m elevation, within tropical rainforest and tropical/subtropical moist montane forest.

Global Population

Requires further investigation to better understand the population size, distribution, and trends. Due to habitat threats, it is suspected that in the last 30 years the population has decreased by 77% and will continue to decline.

Global Trends

Decreasing

Global Threats

Land use change: urban expansion and associated human activities, mainly extensive agriculture and livestock ranching. In GT it is threatened by mining activities.

Conservation Actions in Place

The species is not known from any ex situ collections. In MX, it is located within the Montes Azules Biosphere Reserve (Chiapas), and the Bonampak Natural Monument (Chiapas). In BZ, in DRFR and Rio Bravo.

Belize Distribution

Disturbance areas. Records across the 4 southern districts including near communities- Crique Sarco, Red Bank, Belmopan, St. Matthews, Burrel Boom Rd.

Rare in Belize. Not all collections have been confirmed.

Note: collections from Swasey Branch of Monkey River and Sarstoon Temash area are likely accurate. Mile 35 along W highway is ok. Rio Bravo collection likely from misidentified specimen.

Belize PAs

Possibly Deep River FR, Golden Stream Corridor Preserve, the Belize Zoo.

Located at Mountain Pine Ridge FR- disturbed areas past Douglas Da Silva (with fruit, photos taken)- pending confirmation.

Belize Threats

No threats specific to Belize.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

SATIIM, Bull Run Overseas, FD, YCT

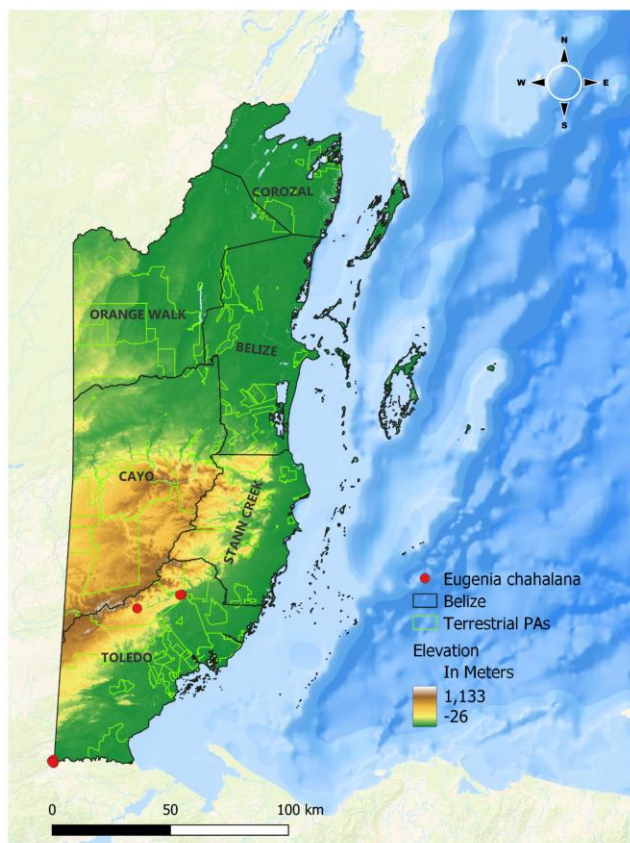
Knowledge / Capacity Gaps

Needs: It would be beneficial to monitor habitat trends.

Some difficulty with identification. Looks very similar to *C. rufescens*- needs fruit for ID. Some of the collections have been confirmed by experts but others are pending. Generally can be considered a Mexican species.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

Noted to be used as an ornamental globally, but not known to be used this way in BZ.



Eugenia chahalana

Authority

Lundell

Family

MYRTACEAE

Date Assessed

8-Jul-20

Global Distribution

Guatemala and Belize

Habitat

This endemic tree up to 20 m is found in lowland moist forests dominated by zapotales and chechemales in Guatemala and Belize.

Global Population

There is no population information available for this species.

Global Trends

Unknown

Global Threats

Even though threats to this species in particular are unknown the lowland forests as a whole are being threatened by agriculture and logging.

Most of the documented areas in GT have been converted to ag/settlements.

Conservation Actions in Place

This species is not kept in any ex situ collection.

Belize Distribution

Toledo District

Belize PAs

Bladen NR,
possibly CRFR

Belize Threats

No threat specific to Belize.

Belize Actions in Place

None.

Organizations Working with the Species

None.

Key Stakeholders

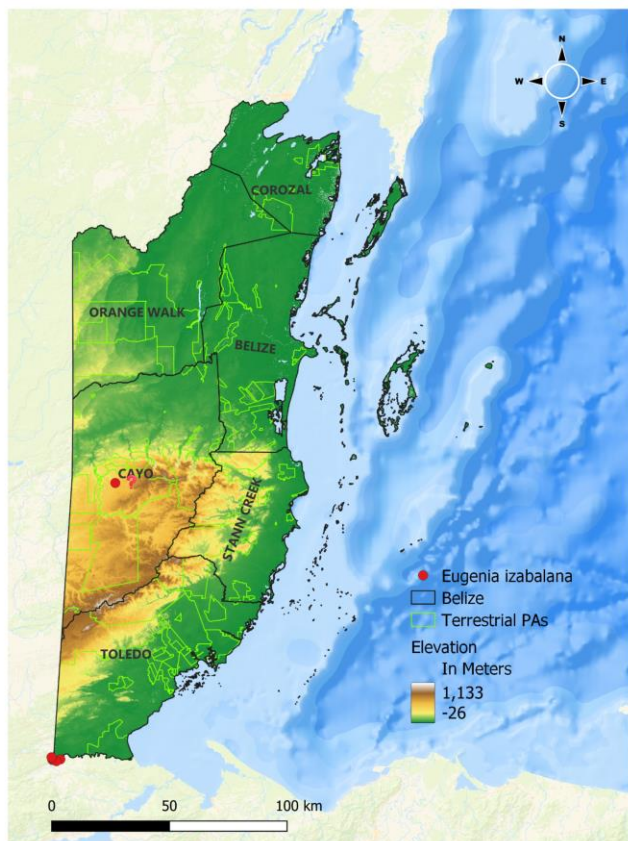
YCT
FD
NBIO

Knowledge / Capacity Gaps

Additional surveys in Toledo.

Significance
(Cultural, Socio-Econ.,
Biol. Distinctiveness, etc.)

Endemic to GT
and BZ



Eugenia izabalana

Authority

Lundell

Family

MYRTACEAE

Date Assessed

11-Aug-20

Global Distribution

Belize and Guatemala (Sarstoon River watershed).

Habitat

This small tree grows in lowland forests dominated by zapotales, at elevations of 0–400 m.

Global Population

There is no population information available for this species.

Global Trends

Decreasing

Global Threats

The forest habitat of this species is threatened by the expansion of logging.

Conservation Actions in Place

This species is not kept in any ex situ collection.

Belize Distribution

Sarstoon River watershed, mainly.

Belize PAs

Mountain Pine Ridge FR? record from 1988, seems unlikely.

Belize Threats

Limited locations, mostly appearing outside PAs.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

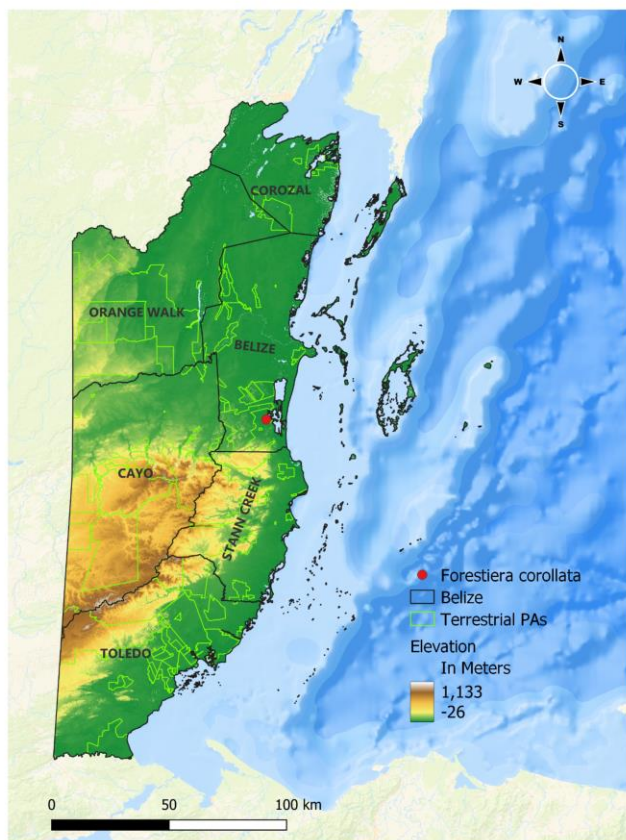
SATIIM
NBIO
Toledo communities near Sarstoon River-Machakilha and Graham Creek
Bull Run Overseas?
FD?

Knowledge / Capacity Gaps

Needs more surveys in Toledo.

Significance
(Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

Endemic to Guatemala and Belize



Forestiera corollata

Authority

Cornejo &
Wallander

Family

OLEACEAE

Date Assessed

7-Apr-20

Global Distribution

GT (Petén), BZ, and MX (Tabasco). The number of locations is calculated as fewer than five, likely closer to three, based on geography and independent threats.

Habitat

Small tree that can reach up to 10 m tall. This species grows in tropical rain forest (subtropical/tropical moist lowland) at low elevations from sea level to 200 m. The habitat has been subject to decline due to the intensive change in land use (urban growth, extraction oil, expansion of the agriculture frontier, livestock farming, and harvest of wood).

Global Population

Based on habitat loss in Tabasco, it is estimated that a total population size reduction of at least 50% has taken place over the past three generations (30 years). The population trend and number of mature individuals is declining due to ongoing threats.

Global Trends

Decreasing

Global Threats

Habitat degradation, loss, and fragmentation due to oil extraction, urban and ag expansion, and cattle ranching, which also cause direct mortality of the species. Illegal harvesting also occurs in GT and BZ. Climate change expected to impact forest.

Conservation Actions in Place

Occurs in Sierra del Lacandón NP in GT.

This species is not known from any ex situ collections.

Belize Distribution

The only country records are in the Belize District near Gales Point/Manatee FR (collected in 1931).

Belize PAs

None

Belize Threats

Habitat loss from development (agriculture) along coastal highway.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

Co-managers in Toledo and Stann Creek, FD, NBIO

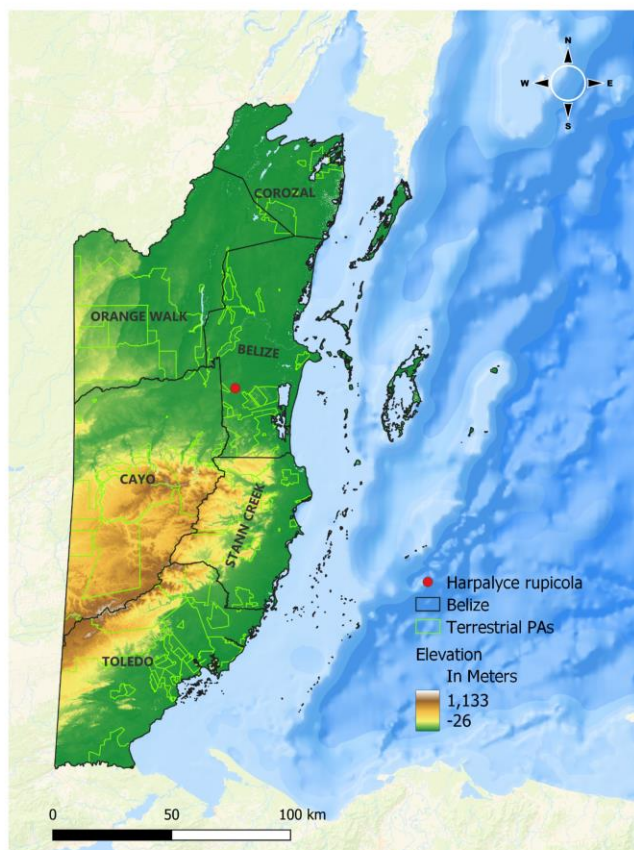
Knowledge / Capacity Gaps

Needs: Monitoring of the habitat and population trends is recommended globally.

Additional surveys are needed. Coastal plain forest habitat is not well explored in Belize and should be a high priority for surveys. Low number of collections could be reflecting threatened habitat. Surveys should cover into Stann Creek and Toledo coastal plains.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Harpalyce torresii

Authority

São-Mateus &
M. Sousa

Family

FABACEAE

Date Assessed Assessed as EN during taxonomic update (Queiroz, 2018) using IUCN Red List criteria. Not yet published to IUCN website.

Global Distribution

Occurs in Belize and Mexico (Campeche and Tabasco). Known only in four localities. The EOO is 13,173 km² and AOO is 16 km², as assessed through GeoCAT (Bachman et al. 2011).

Habitat

This species is found in seasonally dry tropical forest and woodlands ("selva baja caducifolia" and "selva baja subperenifolia") and less frequently in secondary forests. Such vegetation formations are characterized by tree canopy up to 15 m high, periodic flooding, with flat, deep, clay-rich soils with deficient drainage, where the caesalpinoid legume *Haematoxylum campechianum* Linnaeus generally predominates, forming dense groups locally known as "tintales" (Pennington & Sarukhán 2005). Flowers in June, fruits from September to April.

Global Population

Populations are assumed to be declining based on criteria used to assign EN status [B2a,b(i,ii,iii)], which highlights the species' limited number of localities and a decline in area, extent, or quality of habitat.

Global Trends

Not reported, assumed decreasing

Global Threats

Not reported, but habitat threats are assumed to be affecting the populations based on criteria used for the Red List assessment. Major habitat threats in the region are deforestation due to land use change for human activities and fires.

Belize Threats

No threat specific to Belize.

Conservation Actions in Place

Found in protected areas in Belize.

Belize Actions in Place

No specific actions in place.

Belize Distribution

It is a swamp species in Belize.

It is occasional near La Milpa in Rio Bravo CMA. Specimens have been collected 15-20 km W of Hattieville; 18 km SW of Hattieville on Western Highway; and 200 yds S of St. Herman's Blue Hole NP on Hummingbird Highway. More could be found in N Belize in remnant habitat.

Belize PAs

Rio Bravo CMA,
St. Herman's Blue Hole
NP

Key Stakeholders

Programme for Belize,
BAS,
Northern land managers,
NBIO

Organizations Working with the Species

None

Knowledge / Capacity Gaps

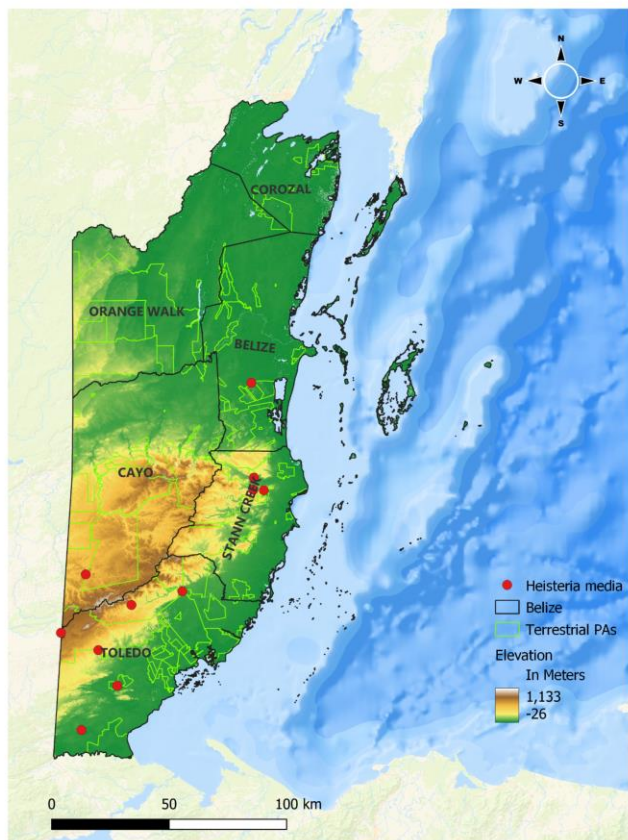
Needs: It is recommended to increase research efforts to better understand the population size, distribution, and trends to prepare a possible species action/recovery plan.

Additional surveys needed in Rio Bravo CMA and St. Herman's Blue Hole NP. Specimens near Hattieville were collected in 1981-1982; the specimen from Blue Hole collected in 1972. Note that it is difficult to find but easy to identify, at least to genus.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Source: QUEIROZ, D. (2018). Two new Mesoamerican species of *Harpalyce* (Leguminosae, Papilionoideae). *Phytotaxa*, 344(2), 160-168.



Heisteria media

Authority

S.F.Blake

Family

ERYTHROPALACEAE

Date Assessed

7-Sep-21

Global Distribution

BZ and GT. Possibly extinct in HN, MX (Chiapas and Oaxaca), and NI. The EOO is measured as 19,767.021 km². The current AOO is 88,000 km². The calculated number of locations is 4.

Habitat

This tree can be 12-20 m tall. It is located at 20-800 m elevation, within high evergreen forest. Flowering and fruiting from March to May.

Global Population

It is considered scarce. Due to habitat threats, it is assumed that the population trend of the species is declining. The EOO has decreased by 92% in the last 60 years, and this is likely causing a significant population decrease, but its percent reduction is not yet determined.

Global Trends

Decreasing

Global Threats

Deforestation due to land use change for extensive agriculture and livestock ranching. Extremely high forest loss recorded in Chiapas during the period 1990–2000 (6.1% yr⁻¹).

Conservation Actions in Place

The species is not known from any ex situ collections. Found in 2 PAs in GT and multiple PAs in BZ. This species was evaluated as threatened (VU) by the Red List of the Mexican Cloud Forest Trees.

Belize Distribution

Fairly common in the Maya Mountains. Mainly in the Southern district, areas with higher rainfall.

Belize PAs

Columbia River FR, Mountain Pine Ridge FR, Sittie River FR, Mayflower Bocawina NP, Chiquibul NP, Bladen NR, Aguacaliente WS

Belize Threats

None specific to Belize.

Belize Actions in Place

None

Organizations Working with the Species

YCT- in BNR PSP

Key Stakeholders

FD, NBIO, MBEDG, FCD, Bull Run Overseas, YCT, Laguna Village

Knowledge / Capacity Gaps

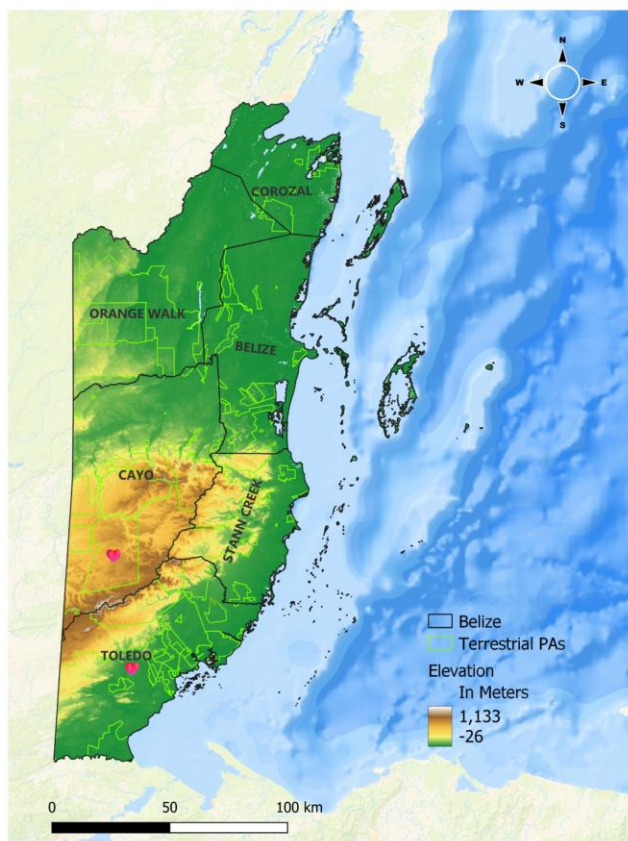
Needs: Increase the research efforts to better understand the population size, distribution, and trends of Heisteria media in order to prepare a possible species action/recovery plan.

Consider protection measures in situ or a genome resource bank as a measure of ex situ conservation, livelihood alternatives to the destruction of forests, legal regulations, and conservation payments.

It would be beneficial to monitor habitat trends.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Lonchocarpus multifoliolatus

Authority

M.Sousa

Family

FABACEAE

Date Assessed

30-Sep-19

Global Distribution

MX (Veracruz, Oaxaca, Tabasco, Chiapas), BZ, GT, and HN. It is likely this species no longer exists in many areas of Chiapas, Veracruz, BZ, and HN.

Habitat Deciduous tree up to 35 m. It grows in the subtropical/tropical moist lowland forest, swamp forest, tropical dry forest transitioning to subtropical/tropical moist lowland forest. Associated with the dominance of *Brosimum alicastrum*. Grows in soil derived from volcanic lava (sandy, stony, black color) that frequently occur on karst hills and in limestone soils. Altitude ranges from 50-350 m (in Los Tuxtlas from 400 to 900 m). Flowering occurs from mid-April to mid-June; fruiting from the beginning of July to the beginning of February, with seedlings in the soil at the beginning of March.

Global Population

It is likely many subpopulations in Chiapas, Veracruz, BZ and HN have disappeared due to the extensive LUC. The current trend is declining due to the accelerated agricultural expansion. It is considered that the population has reduced 50% in the last 3 generations.

Global Trends

Decreasing

Global Threats

Land use change and the fragmentation of ecosystems (expanding agriculture-livestock, clearing of natural vegetation, and firewood extraction). The dominant land use in Los Tuxtlas is grasslands, which cover 51% of the PA.

Conservation Actions in Place

Occurs in Los Tuxtlas Biosphere Reserve (Veracruz).

The species is not known from any ex situ collections.

Belize Distribution

Cayo: Chiquibul FR, San Pastor, 16°43' N, 88°59' O, alt. 550 m.

Toledo: San Pedro Columbia, alt. 50-100 ft

Belize PAs

Chiquibul FR

Belize Threats

It is expected that the species is used for timber in Belize.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

FCD,
FD,
San Pedro Columbia

Knowledge / Capacity Gaps

Needs: there is an urgent need for tools that can provide an integrated assessment of human impacts on forest biodiversity and that can support decision making related to forest use.

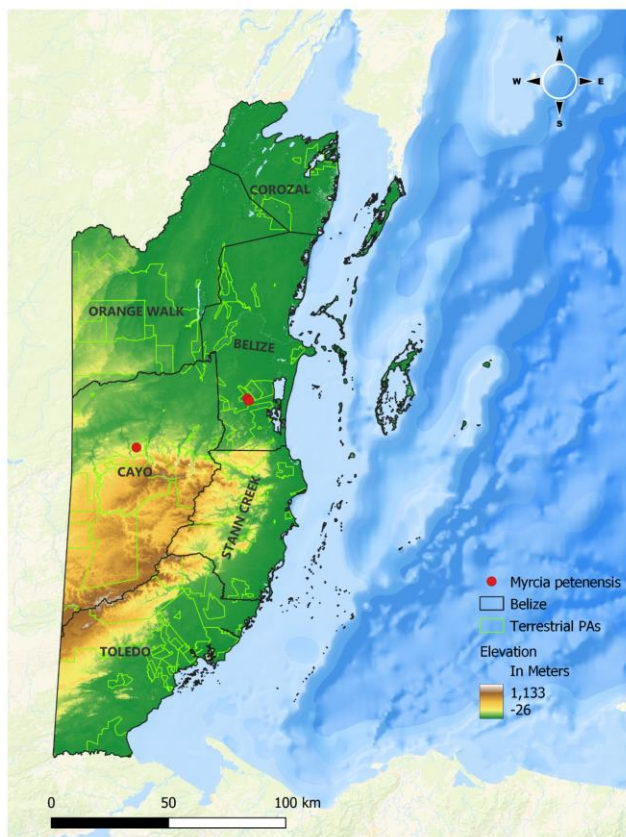
It is suggested to monitor the habitat and population trends.

This is a difficult genus to ID. As a result, the species is probably under-collected. More surveys by trained teams would be valuable.

Significance
(Cultural, Socio-Econ.,
Biol. Distinctiveness, etc.)

Lonchocarpus multifoliolatus is used as a living fence (Sousa 2011).

Likely is being used for timber in Belize. It is a relative to black cabbage bark but is not as hard.



Myrcia petenensis

Authority

(Lundell)
A.R.Lourengo &
Sánchez-Cháv

Family

MYRTACEAE

Date Assessed

28-Apr-20

Global Distribution

GT and BZ. There is not enough information to confidently calculate the AOO of this species but its EOO has been calculated as 1,800 km².

Habitat

This species is a small tree growing up to 6 m in height in low forest on rocky limestone hills, in the Petén-Veracruz moist forests ecoregion. In Belize it has only been collected and observed at the interface of limestone hills and "bajo" soils. There is no specific information on how this species is dispersed, but a study on Myrtaceae in the Atlantic Forest showed that species from this group are dispersed by birds.

Global Population

The overall population size is unknown due to lack of available information. It is known only from one collection in GT (1966) and two collections in BZ (2008 and 2014). Suspected decline based on habitat loss.

Global Trends

Decreasing

Global Threats

Habitat loss from agriculture, urban expansion and fires. Climate change (hurricanes, more frequent droughts, intense rainfalls and sea level rise).

Conservation Actions in Place

No information on ex situ conservation measures was found.

In 2 BZ protected areas.

Belize Distribution

Likely to be found among the scattered hills along the Central-Eastern coastal plain and limestone outcrops of the Mountain Pine Ridge and Eljio Pantí protected areas.

Expected on the north-facing limestone outcrops on the north side of the Maya Mountains. It is not very common but can be locally abundant.

Belize PAs

Runaway Creek NR,
Tapir Mtn NR

Possibly in:
St. Herman's Blue Hole NP,
Eljio Pantí NP,
Mountain Pine Ridge FR

Belize Threats

Est. to have lost 28.5% of its forest (1986-2018) mainly due to agriculture (cane, plantations, livestock) and urban expansion. At risk from fire coming into PAs, and sand and gravel mining in the area in the Runaway Creek Reserve.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

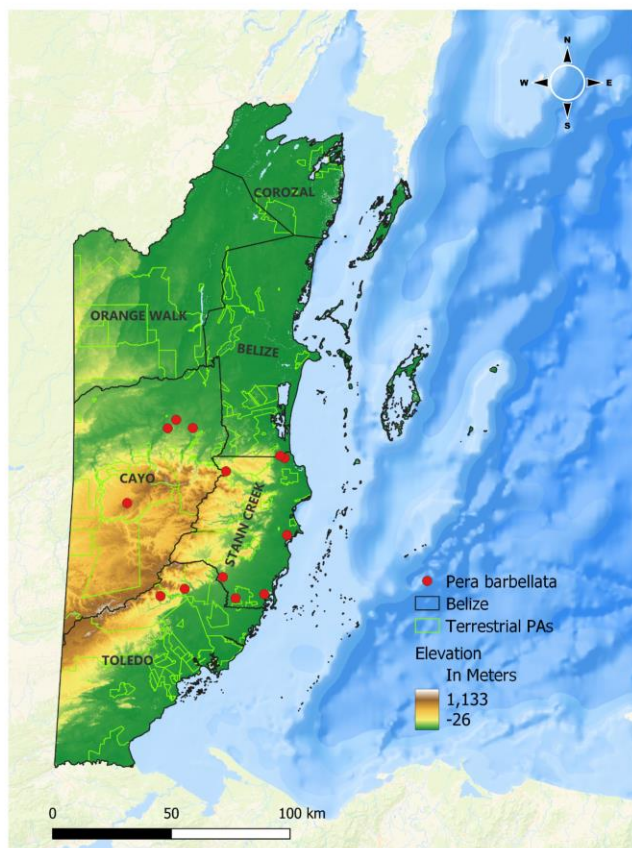
Foundation for Wildlife Conservation,
Belize Karst Habitat Conservation,
BAS,
Itzamna Society,
Bull Run Overseas,
FD,
NBIO

Knowledge / Capacity Gaps

Needs: Research is recommended to understand the current population size and trends as well as impact of possible future threats.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Pera barbellata

Authority

Standl.

Family

PERACEAE

Date Assessed

22-Apr-20

Global Distribution

MX (Chiapas, Oaxaca, Tabasco, and Veracruz), BZ, HN, and GT. The EOO has been reduced from 203,835 km² to 99,070 km². The AOO has been reduced from 108 km² to 76 km².

Habitat

Pera barbellata is a tree species that can reach up to 25 m tall. It grows in subtropical/tropical moist lowland at an altitudes between sea level to 800 m. This species can be found with *Andira galeottiana*, *Tapirira* spp., *Terminalia*, *Vochysia*, *Enterolobium schomburgkii*, *Schizolobium* and *Ficus*. Its habitat is experiencing a continuing decline due to intensive deforestation.

Global Population

Considered declining due to current habitat threats. Estimated that a population size reduction of at least 50% took place over the last three generations (90 years) as a consequence of the intensive land use change.

Global Trends

Decreasing

Global Threats

The potential loss, fragmentation or modification of the habitat. This is mainly due to the presence of human trails made for the clearing of natural vegetation cover and extraction of firewood.

Conservation Actions in Place

Occurs in several PAs: Mountain Pine Ridge FR and Biotopo Protegido Chocón Machacas (GT).

This species is not known from any ex situ collection.

Belize Distribution

Across Cayo, Stann Creek, and Toledo Districts.

It is fairly common in Belize on granite, acid soils.

Belize PAs

Mountain Pine Ridge FR, Cockscomb Basin WS, Bladen NR

Belize Threats

No threats specific to Belize.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

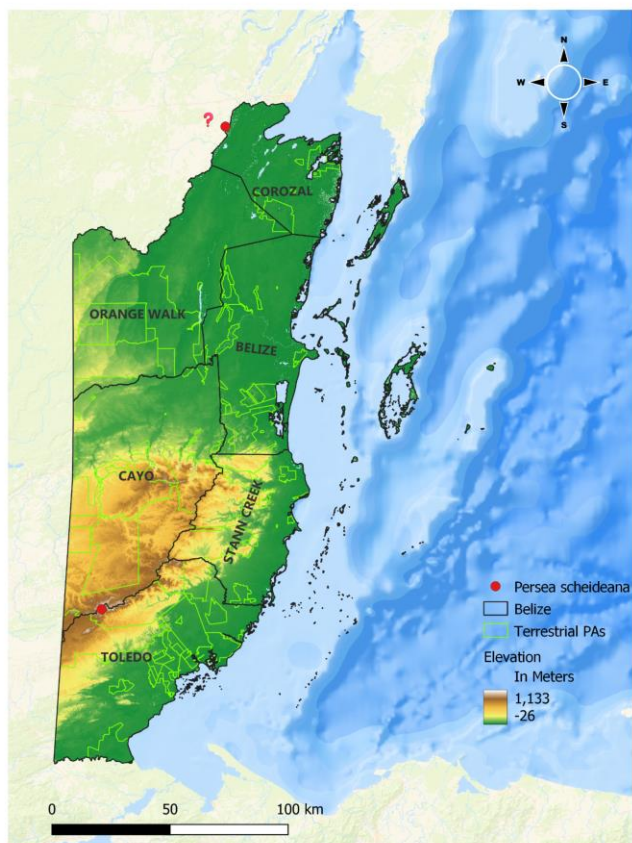
BAS, YCT, FD, NBIO, BullRun Overseas Ltd, Inst. of Archaeology/ Nohoch Cheen archaeological site, Communities of Red Bank, San Juan, Independence, Sittee River, and New Mullins River.

Knowledge / Capacity Gaps

Needs: Monitoring of the habitat is suggested.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

Globally, it is used as firewood. Uses in Belize are unknown.



Persea schiedeana

Authority

Nees

Family

LAURACEAE

Date Assessed

14-Feb-17

Global Distribution

Southern Mexico, through Central America to Panama.

Habitat

This species is found from lowland to montane tropical deciduous rainforest. It occurs at elevations between 500 and 2,800 m. It is also cultivated. There is a continuing decline in the forest habitat in which this species occurs.

Global Population

Not considered abundant in the wild. Overall, the species' global population is thought to be decreasing, and based on habitat lost, this is estimated to be at least 50% over the last 90 years (or three generations).

Global Trends

Decreasing

Global Threats

Habitat loss for avocado and coffee cultivation. Possible threat arising from the beetle *Hellipus lauri* (Coleoptera: Curculionidae). Local mgmt: fruit collection of the best specimens and cutting of poor specimens for wood may decrease genetic diversity.

Conservation Actions in Place

Occurs in at least one PA in MX: Los Tuxtlas.

Occurs in 5 PAs in CR: Braulio Carrillo NP, Chirripó NP, Guanacaste NP, Reserva de la Biosfera de la Amistad and Rincón de la Vieja NP.

Belize Distribution

The species is found along the Maya Mountain divide and in high forest.

Note: any records in northern Belize at lower elevations are cultivated and not naturally found there.

Belize PAs

Bladen NR (Ek Xux Valley), Chiquibul NP

Expected in western Cockscomb Basin WS

Belize Threats

In Belize, the species is at risk of mortality from fire at high elevations.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

BAS, FCD, YCT, FD, NBIO

Knowledge / Capacity Gaps

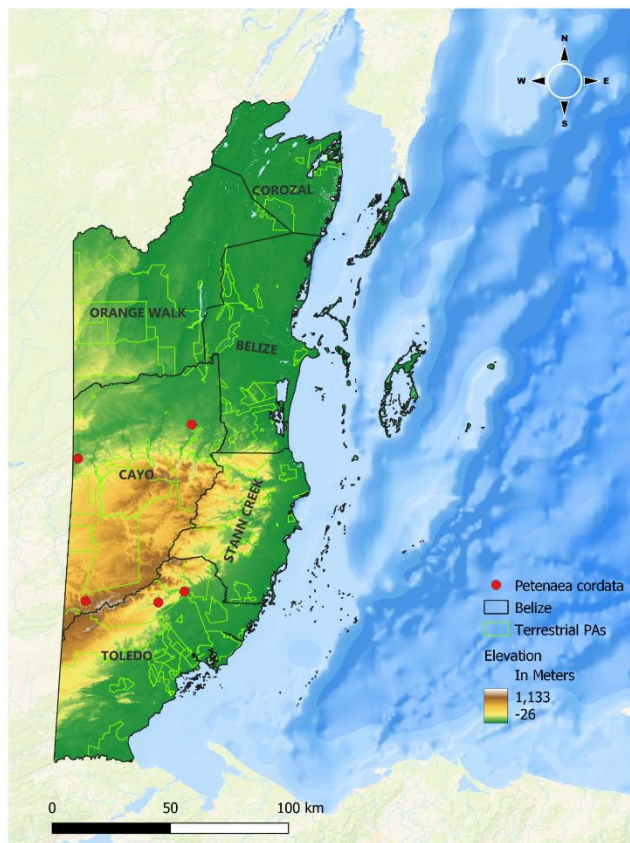
Needs: Germplasm collection and duplicated ex situ storage is recommended, as well as the development of strategies for in situ conservation.

Additional surveys.

Note: it is difficult to survey for this species because of its location at high elevations. Drones or helicopters might have limited value as these are generally subcanopy trees (one exceptional individual in BNR stands at 45m tall).

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

Is a wild relative and potential gene donor to avocado; can be a source of graft stock. Resistant to phytophthora. Less frequently used as a shade tree in coffee plantations and as an ornamental.



Petenaea cordata

Authority

Lundell

Family

PETENAEACEAE

Date Assessed

7-Aug-18

Global Distribution MX (scattered in Chiapas and Tabasco), GT (Huehuetenango, Alta Verapaz and Petén), and BZ. It has an EOO of 50,007.111 km². The AOO is 380 km² based on the current reports. It is found in four to five locations.

Habitat Shrub or small tree up to 2(5)–10 m tall. Found in seasonally dry to wet forest, often in somewhat open habitats like lakeshores and roadsides. It is established on porous substrate, produced by the dissolution of limestone. Appears to be a relict adapted to the lakeshore habitat. Is established on slopes (natural or product from rural road construction, that is why it is apparently common). It behaves as a pioneer species of very specific habitat. It also occurs in altered areas of high evergreen forest, high and medium subdeciduous forest, cloud forest, pine forests, even on the border of savannas. When the conditions of alteration disappear, the species of the forest displace it.

Global Population

No information on population size and trends. Can be locally common. Localities are described as "scattered" in relatively small areas, where soil and moisture conditions are adequate.

Global Trends

Unknown

Global Threats

Expansion of roads (destroying roadside slope habitat), use of limestone rock for construction (its exclusive substrate), climate change, and reforestation projects that increase shade and may destroy its very specific habitat.

Conservation Actions in Place

There are no known ex situ collections. Has been located in a small portion of Montes Azules Biosphere Reserve.

Belize Distribution

Found in limestone hills, in disturbance areas.

Belize PAs

Chiquibul NP, Maya Mountain North FR, Bladen NR, Vaca FR (pop. is relatively "big"). Near Xunantunich and Nohoch Cheen. Likely in Mountain Pine Ridge FR.

Belize Threats

The species is possibly fire adapted. Not much is known about its reproduction.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

FCD, FD, NBIO, YCT, Bull Run Overseas

Knowledge / Capacity Gaps

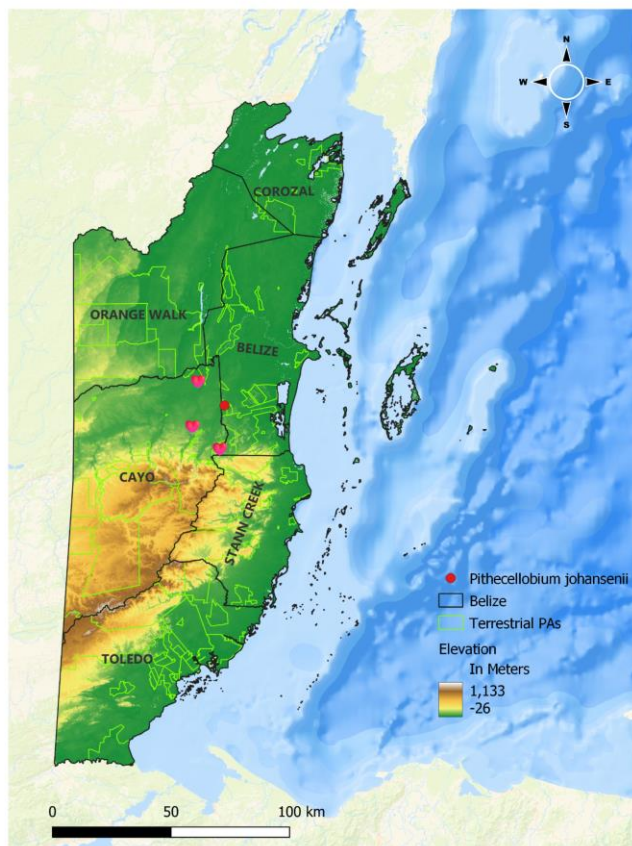
Needs: In order to reduce the habitat decline, it is recommended to improve the territorial planning and mitigate human activities, and monitor the habitat trends.

Better information is needed on its reproduction.

Significance
(Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

The berries are edible and eaten as a treat by local children in parts of Mexico.

Is one of only 12 monotypic tree families worldwide.



Pithecellobium johansenii

Authority

Standl.

Family

FABACEAE

Date Assessed

1-Jan-98

Global Distribution

HN (Atlántida), BZ and GT

Habitat

A tree of the wet Atlantic lowlands.

Global Population

RLA criteria C2a: indicates < 2,500 mature individuals and the number of mature individuals in each subpopulation ≤ 250. Note: though the Red List Assessment is from 1998, an updated assessment would likely keep the species as EN.

Global Trends

Unspecified

Global Threats

Unspecified

Conservation Actions in Place

Occurring in Lancetilla Biological Reserve, Honduras

Belize Distribution

Distribution is very patchy. Species has very narrow habitat.

Found in Maya Forest Corridor near Monkey Bay WS. In Cayo along Western Highway, in low-lying and seasonally wet swampy areas.

Belize PAs

5 Blues Lake NP, Maya Forest Corridor.

Possibly in Monkey Bay WS and St. Herman's Blue Hole NP.

Belize Threats

Development in central Belize in areas of likely habitat are expected to be a major threat.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

Monkey Bay WS, BAS, HETA, NBIO

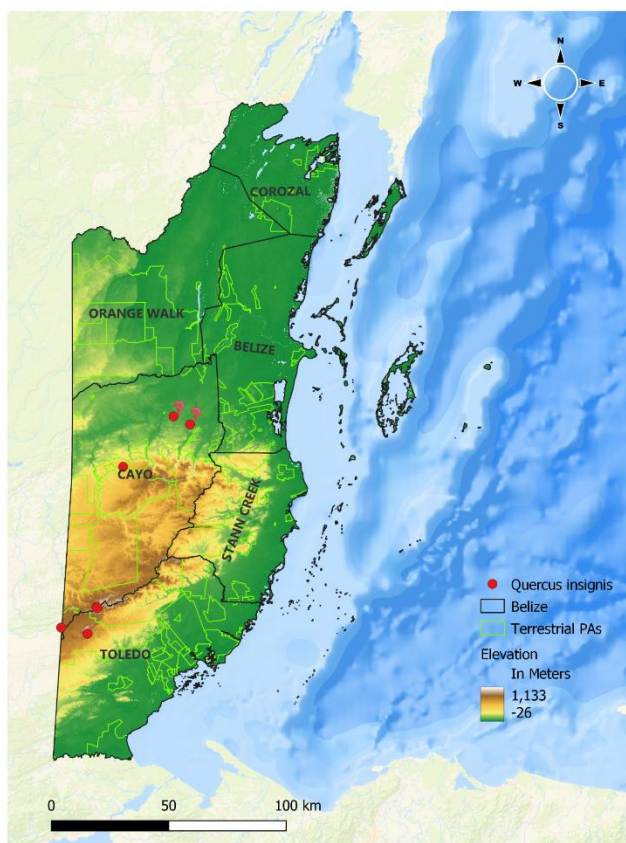
Knowledge / Capacity Gaps

Additional surveys.

Note: the species is thorny, which makes it more difficult to collect. Its location in swampy areas makes it easier to find in the dry season.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Quercus insignis

Authority

M.Martens &
Galeotti

Family

FAGACEAE

Date Assessed

2-Nov-17

Global Distribution

S MX (Oaxaca, Veracruz, Jalisco, Chiapas), GT, BZ, HN, NI, CR, and PA. *Quercus insignis* is confined to high elevations and is rare where it occurs.

Habitat

Large tree, up to 30 m. A cloud forest species forming low-density populations, it seems to face regeneration problems. It grows in mountain wet or rainforests in oak or pine-oak stands. Produces mature fruits in June–July in the southern parts of its range, and in October in the northernmost populations. Is very slow growing with very long life cycle; once the trees reach reproductive stage, they only produce fruits periodically (five to ten years).

Global Population

Has a wide range, but is rare and difficult to locate because of its low density. Reports indicate that it is still abundant in Nicaragua. Much of its habitat has been converted to coffee plantations, where occasionally a few individuals will remain.

Global Trends

Unknown

Global Threats

Lower altitude habitats are being logged for coffee plantations and pasture. Timber is extracted for construction and fuel. Acorns are used to make handicrafts. No problem with reproduction or germination but there is loss of seedlings and seed predation.

Conservation Actions in Place

Present in 13 ex situ collections worldwide according to BGCI (2017).

A nursery has been successfully established in Las Cañadas Reserve in Huatusco for propagation and re-planting.

Belize Distribution

Found on acid substrata, not limestone, and above 650m.

AOO is expected to be small, as with most oaks.

Belize PAs

Elijio Panti NP,
Chiquibul NP,
Bladen NR,
Columbia River FR.

Possible in Cockscomb Basin
WS, Victoria Peak Natural
Monument, Maya Mountain
FR.

Belize Threats

The species is sensitive to human activity. Much of its range is highly disturbed in MX and GT, placing high importance on Belize's subpopulation.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

Itzamna Society,
FCD,
YCT,
BAS,
FD,
NBIO

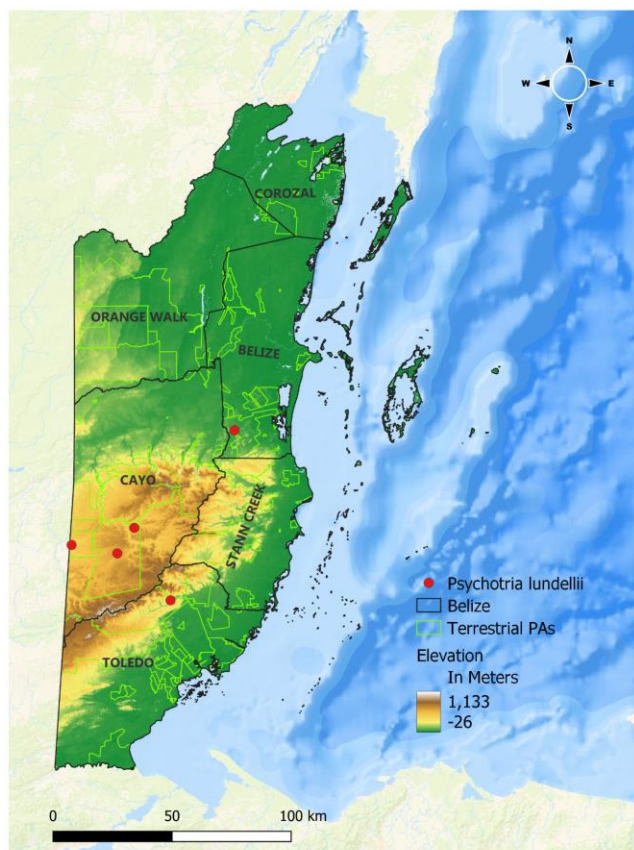
Knowledge / Capacity Gaps

Needs increased surveys. This can possibly be done with air support. There's a wider need to explore oak forests in Belize as there is generally a lack of information on those forest types.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

Globally, the wood is used for scaffolding, tool handles and floors; fruits are used to feed cattle. The large acorns are collected for making handicrafts.

Oaks are important species for creating habitat.



Psychotria lundellii

Authority

Standl.

Family

RUBIACEAE

Date Assessed
10-Sep-20

Global Distribution

MX (Usumacinta basin in Chiapas), GT, and BZ. The EOO has reduced from 35,434.108 km² to 15,480.414 km². The AOO has reduced from 108 km² to 80 km².

Habitat

Tree species of (1-)2-15 m tall that can reach up to 20 m tall. This species occurs in subtropical/tropical moist lowland forest, at elevations from 100 to 600 m.

Global Population

Estimated 50% reduction in population size over the last three generations (60 years). The population size estimated < 2,500 mature individuals. Projected to lose 20% of mature individuals over the next two generations (40 years) based on habitat.

Global Trends

Decreasing

Global Threats

Habitat fragmentation from logging, agriculture expansion, and cattle ranching. Frequent fires and climate change.

Conservation Actions in Place

Occurs in 2 PAs in GT and several in BZ.

This species is not known from any ex situ collections.

Belize Distribution

Maya Mountains

Belize PAs

Manatee FR,
Chiquibul FR,
Caracol,
Bladen NR

Belize Threats

It's relatively protected in its locations in PAs unless illegal clear cutting occurs.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

FD,
FCD,
Institute of Archaeology,
YCT,
NBIO

Knowledge / Capacity Gaps

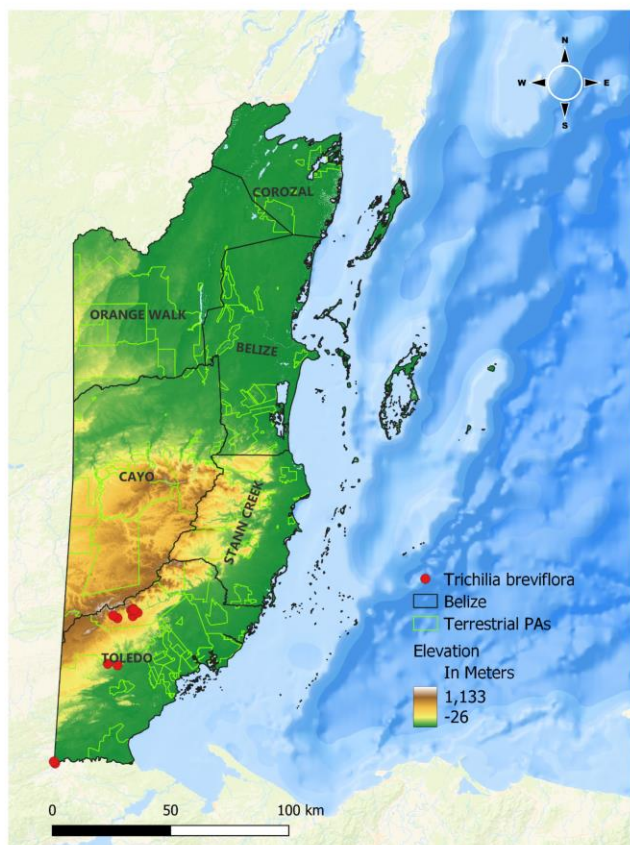
Monitoring of the habitat and population is recommended.

There have not been many collections. It is an understory species, making it easy to collect; therefore, the lack of collection probably reflects rarity.

Also note: this genus is difficult to identify. Possibly, the species is not collected when seen because of similarity to other common *Psychotria*. Belize collections at least have been confirmed at Missouri Botanical Garden.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Trichilia breviflora

Authority

Blake &
Standley

Family

MELIACEAE

Date Assessed

2-Jul-19

Global Distribution MX (Chiapas, Oaxaca, Tabasco and Veracruz), GT (Peten), BZ, northern HN. There is one doubtful sterile specimen from the Atlantic coast of NI. EOO is 145,430.912 km² and AOO is 276 km². Approximately 30% of the EOO has been reduced in the last years.

Habitat

Small tree that can reach up to 15 m tall, occurring in tropical evergreen rainforest (Subtropical/Tropical Moist Lowland/ Subtropical/Tropical Swamp). It thrives on rich wet soil at an altitude range from sea level up to 600 m.

Global Population

The current population is declining due to the habitat threats. Many sub-populations have disappeared. Approximately 70% of the population size has been reduced in the last three generations due to the intense change in land use.

Global Trends

Decreasing

Global Threats

The main threat is the fragmentation of ecosystems due to land-use change (extensive agriculture, cattle, urban expansion, and logging). Indirect effects of human activities such as climate change. Critical areas of forest have been cleared.

Conservation Actions in Place

Globally assessed as Endangered in 1998.

Occurs in at 2 PAs in Chiapas.

The species is not known from any ex situ collections.

Belize Distribution

Toledo District, in PAs and near the communities of Crique Jute and San Pedro Columbia.

Belize PAs

Bladen NR,
Columbia River FR

Belize Threats

Shifting cultivation in community areas in Toledo where the species was last recorded in the 1970's.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

YCT,
Communities of
Crique Jute and San
Pedro Columbia

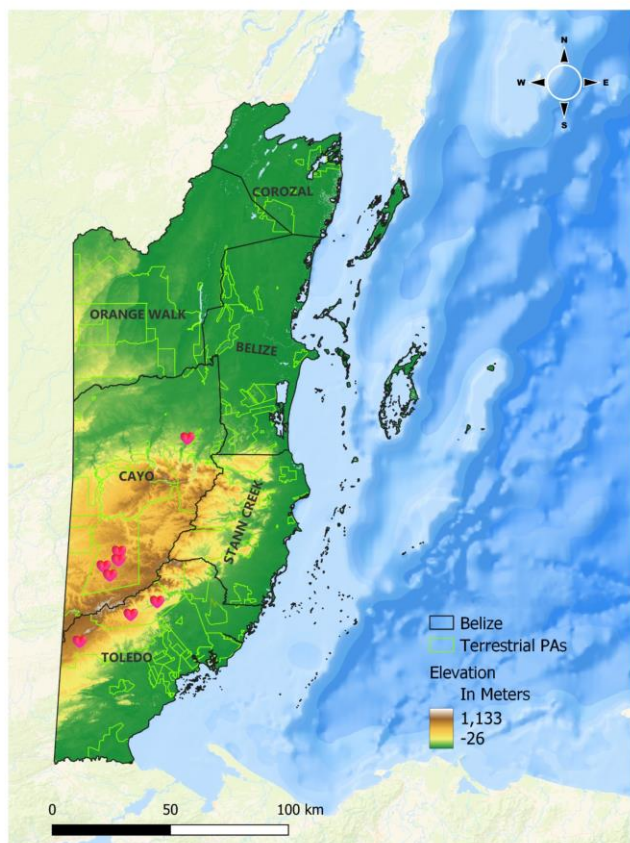
Knowledge / Capacity Gaps

It would be beneficial to monitor the habitat trends.

There is a need to confirm species presence in Toledo communities.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Trichilia erythrocarpa

Authority

Lundell

Family

MELIACEAE

Date Assessed

3-Jul-19

Global Distribution MX (Campeche, Chiapas, Veracruz, and Oaxaca), southern Yucatan Peninsula of GT, and BZ. Currently only exists in a few areas from each country. More than 50% of the EOO has been reduced in the last years. The current EOO is measured as 29,231.419 km² and AOO is calculated as 128 km².

Habitat

Tall tree of 15 to 30 m. It is a component of evergreen or semideciduous rain forest, usually on limestone, between 90 to 800 m elevation in the Maya mountains in Belize.

Global Population

Due to the habitat threats, it is considered that the current population is declining. Many subpopulations have disappeared. Approximately 50% of the population size has been reduced in the last three generations.

Global Trends

Decreasing

Global Threats

Human transformation of ecosystems and alteration of natural landscapes. Habitat destruction and fragmentation (land use change for expansion of agriculture-livestock activities and logging). Climate change.

Conservation Actions in Place

Assessed as Possibly Threatened in 1998.

Occurs in 4 PAs in Mexico and 1 in GT.

Belize Distribution

Maya Mountains. Is very common in the Chiquibul and Vaca FR.

Belize PAs

Chiquibul FR,
Vaca FR,
Bladen NR,
Columbia River FR

Belize Threats

Logging disturbance in Forest Reserves where it is more commonly found.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

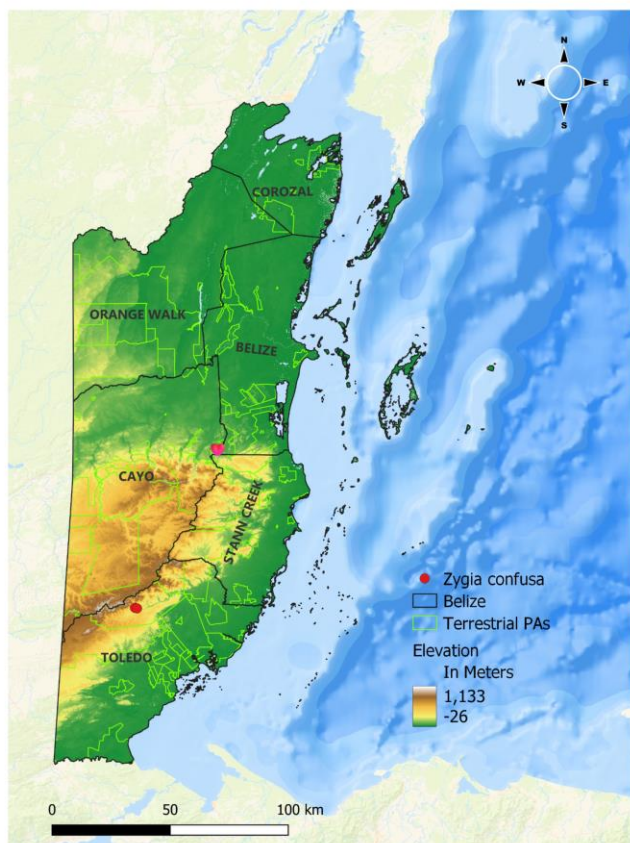
FCD,
YCT
FD

Knowledge / Capacity Gaps

Needs: it would be beneficial to monitor the habitat and population trends.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Zygia confusa

Authority

L.Rico

Family

FABACEAE

Date Assessed

7-Nov-20

Global Distribution

GT, BZ, NI and CR.

Habitat

Shrub, small tree or even sometimes as a scandent shrub of 5–10 m tall. It grows in tropical lowland rain forests, usually growing on undulate or hilly terrain or sometimes extending into flat and temporarily inundated terrain. In Costa Rica, this species has been seen common locally in restricted spot areas. Flowering from January to May; fruiting in April.

Global Population

There is no information about population size, however, the known subpopulations are separated by large distances and fragmented habitat. It is unlikely seed dispersal will take place between the subpopulations, making this species severely fragmented.

Global Trends

Unknown

Global Threats

Deforestation and habitat destruction through conversion to agriculture and plantations.

Illegal logging activities where most locations of this species are known are affecting its habitat.

Conservation Actions in Place

This species is known from some protected areas: 2 PAs in Nicaragua, 2 PAs in Costa Rica, and several PAs in BZ.

Belize Distribution

On limestone, in the Maya Mountains and coastal hills. Limestone obligate.

It is not particularly abundant where found. It is usually on limestone but has also been seen in swampy conditions along the coastal plain.

Belize PAs

Bladen NR,
Five Blues Lake NP,
Chiquibul NP

Belize Threats

Development along Coastal Plains Highway.

Belize Actions in Place

None

Organizations Working with the Species

None

Key Stakeholders

HETA,
Ya'axche,
FCD,
NBIO

Knowledge / Capacity Gaps

More surveys are needed in the coastal hills. The species could be fairly easy to survey for if you know what to look for; it is distinctive but loses its flowers quickly.

Significance (Cultural, Socio-Econ., Biol. Distinctiveness, etc.)

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Workshop Report:

Engaging Stakeholders in the Conservation of Threatened Trees in Belize

July 2023

