MADERA: A standardized Pan-Amazonian dataset for tropical timber species

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Open Research Statement: The complete data set is available as Supporting Information at: [to be completed at proof stage]. Associated data are archived on Zenodo, at https://doi.org/10.5281/zenodo.7063870. All R scripts used in this research are available on Zenodo, at https://doi.org/10.5281/zenodo.8045101

Class I. Data Set Descriptors

A. Data set identity:

Title: MADERA: A standardized Pan-Amazonian dataset for tropical timber species

B. Data set identification code:

Data set: MADERA_Herrera-Alvarez_et_al_2023.csv

C. Data set description

1. Originators:

Ximena Herrera - Alvarez[1], Juan A. Blanco[1], Oliver L. Phillips[2], Vicente Guadalupe[3], Leonardo D. Ortega – López[4,5], Hans ter Steege[6,7], Gonzalo Rivas – Torres[8]

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2. Abstract:

We compiled and presented a dataset for all timber species reported in the Amazon region from all nine South American Amazonian countries. This was based on official information from every country, as well as from two substantial scientific references. We verified the standard taxonomic names from each individual source, using the Taxonomic Name Resolution Service (TNRS) and considered all Amazonian tree species with DBH ≥ 10 cm. We also obtained estimates of the current population size for most species from a published approach based on data from 1,900 tree inventory plots (1-hectare each) distributed across the Amazon region and part from the Amazon Tree Diversity Network (ATDN). We then identified the hyperdominant timber species. In addition, we overlapped our timber species list with data for species that are used for commercial purposes, according to the International Tropical Timber Organization (ITTO), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the International Union for Conservation of Nature (IUCN) taxa assessment and Red List categories. Finally, we also included IUCN Red List categories based on combined deforestation, and climate change scenarios for these species. Our final Amazonian timber species dataset contains 1,112 unique species records, which belong to 337 genera and 72 families from the lowland Amazonian rainforest, with associated information related to population, conservation, and trade status of each species. The authors of this research expect that the information provided will be useful to strengthen the public forestry policies of the Amazon countries, inform ecological studies, as well for forest management purposes.

Key words/phrases:

Amazon region, timber species, tree species, tropical taxonomy, tropical timber, woody species.

Class II. Research origin descriptors

A. Overall project description:

1. Identity:

Data on tropical Amazonian timber species with complementary information on population, trade, and conservation.

2. Originators:

Ximena Herrera - Alvarez[1], Juan A. Blanco[1], Oliver L. Phillips[2], Vicente Guadalupe[3], Leonardo D. Ortega – López[4,5], Hans ter Steege[6,7], Gonzalo Rivas – Torres[8]

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3. Period of study:

Data collection spans from 2020 to 2023

4. Objectives:

Our objectives were to: (1) make available public but unpublished information about timber species from the nine Amazon countries in an integrated standardized list, (2) provide an assessment of population- and community-level data by matching our standardized list with ecological data from botanically identified Amazon plots, and (3) provide information on conservation status by matching our standardized list with information related to trade (ITTO and CITES) and conservation (IUCN).

5. Abstract:

We compiled and presented a dataset for all timber species reported in the Amazon region from all nine South American Amazonian countries. This was based on official information from every country, as well as from two substantial scientific references. We verified the standard taxonomic names from each individual source, using the Taxonomic Name Resolution Service (TNRS) and considered all Amazonian tree species with DBH ≥ 10 cm. We also obtained estimates of the current population size for most species from a published approach based on data from 1,900 tree inventory plots (1-hectare each) distributed across the Amazon region and part from the Amazon Tree Diversity Network (ATDN). We then identified the hyperdominant timber species. In addition, we overlapped our timber species list with data for species that are used for commercial purposes, according to the International Tropical Timber Organization (ITTO), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the International Union for Conservation of Nature (IUCN) taxa assessment and Red List categories. Finally, we also included IUCN Red List categories based on combined deforestation, and climate change scenarios for these species. Our final Amazonian timber species dataset contains 1,112 unique species records, which belong to 337 genera and 72

families from the lowland Amazonian rainforest, with associated information related to population, conservation, and trade status of each species. The authors of this research expect that the information provided will be useful to strengthen the public forestry policies of the Amazon countries, inform ecological studies, as well for forest management purposes.

6. Sources of funding:

The compilation of this dataset was supported by the Public University of Navarre (Spain), the Government of Navarre (Spain), the University of Leeds (UK), the San Francisco de Quito University (Ecuador), and the Tiputini Research Station (Ecuador).

B. Specific subproject description

1. Site description

a. Site type:

See Geography and Habitat subsections.

b. Geography:

Amazonian countries of South America: Bolivia, Colombia, Ecuador, Peru, Venezuela (Andean Amazon), Brazil (Amazon region), Guiana, Surinam, and French Guiana (Atlantic Strip).

c. Habitat:

We focus on the lowland rain forest biome occurring across the Amazon, Orinoco, and Atlantic North Coast River basins (including Essequibo, Corantyne, etc.), as well as the Tocantins and Atlantic Western hydrological basins (including Mearim), with high above-ground biomass, relatively low seasonality, and high annual rainfall. This definition excludes savannas and dry forests, as well as habitats at elevations above 1,000 meters above sea level (m.a.s.l) (Cardoso et al., 2017, Supplementary Information p. 1).

2. Sampling design

a. Design characteristics:

We combined data from National Forest Departments in each Amazon country (Table 1) with bibliographic information related and 1-ha ATDN plots (the Amazon Tree Diversity Network, ter Steege et al., 2019) for ecological and population data. In addition, we included conservation status (IUCN), trade data (ITTO and CITES), and projected future conservation status (Gomes et al., 2019).

b. Permanent plots:

To estimate data on population size and hyperdominance we used data from the ATDN network of research plots. A detailed description of the network can be found in ter Steege et al. (2019).

c. Data collection period:

National contact persons identified, international institutional databases and ATDN data were collected during 2020-2023.

3. Research methods

a. Field/Laboratory: data compilation

Step 1. Collecting a list of Amazon tree timber species

During the months of April 2020 and November 2022, we requested information to the National Forest Departments from all nine Amazon countries (Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana, French Guiana, Suriname, and Brazil). We requested the official lists of Amazon timber species reported in each country by the administrative authorities overseeing forest management (all species, not only the most commercial). We received this information from all Amazonian countries (Table 1).

1 **Table 1.** Data reported on timber species by each institution in each Amazon country.

Country	Institution	Contact	Data reported
Bolivia	Forest and Land Inspection and Social Control Authority (ABT). Ministry of Environment and Water of Bolivia.	jteran@abt.gob.bo	Official information: Authorized volume for Amazon timber species 2019.
Brazil	Forest Products Laboratory (LPF) of the Brazilian Forest Service (SFB)	humberto.mesquita@florestal.gov.br	Official information: Brazilian timber species of commercial interest 2016.
Colombia	Department of Forests, Biodiversity and Ecosystem Services. Ministry of Environment and Sustainable Development of Colombia.	erodriguezb@minambiente.gov.com; jeicoblanco@hotmail.com	Official information: Timber species traded according to the Corporation for the Sustainable Development of the Northern and Eastern Amazon (CDA) and Corpoamazonia 2020.
Ecuador	National Forestry Directorate (DNF). Ministry of Environment and Water of Ecuador.	edison.plazas@ambiente.gob.ec	Official information: Timber species of the Ecuadorian amazon authorized for use January 2018 - June 2020.
French Guiana	Service bois et gestion durable. Office Nationale des Forêts (ONF)	bernard.garrivier@onf.fr	Official information: Commercial timber tree species. Office Nationale des Forêts, 2022.
Guyana	Guyana Forestry Commission (GFC). Ministry of Natural Resources of Guyana.	luannnero28@gmail.com	Official information: Alder (2000).
Peru	National Forestry and Wildlife Service (SERFOR). Ministry of Agriculture and Irrigation of Peru.	fcarreno@serfor.gob.pe	Official information: List of forest species 2019.
Suriname	Foundation for Forest Management and Production Control (SBB) as an implementation partner of the Ministry of Spatial Planning, Land and Forest Management of Suriname.	ReneS@sbb.sr	Official information: List of timber species of Suriname 2020.
Venezuela	General Directorate of Forest Heritage. Ministry of Popular Power for Ecosocialism of Venezuela.	direccciongeneralpatrimoniofore@gmail.com	Official information: Forest Technical Standard on minimum diameter size for harvesting, 2009. Official Gazette of the Bolivarian Republic of Venezuela.

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In addition, we incorporated data from two previous partial timber species lists in the Amazon countries. Appendix C of Herrero-Jáuregui et al. (2013) mainly includes the Western Amazon (Bolivia, Peru, Ecuador, Colombia, and Venezuela). We also included data from the Guiana Shield countries (Brazil and French Guiana) and a couple of Andean countries (Bolivia and Peru) according to Piponiot et al. (2019).

The compilation process to obtain the standardized dataset of Amazon timber species (including all variables described in the .csv file) was done in R version 4.1.0 (R Core Team, 2021) and RStudio version 1.4.1717 using the package *dplyr* (Wickham et al., 2022).

Step 2. Standardizing taxonomic names

We cleaned each database using Microsoft Excel release v2301 (Build 16026.20146). In each database, we checked the typos, duplicated names, and any other errors in each cell. In a second step, this preliminary list was formatted using the Taxonomic Name Resolution Service (TNRS, Boyle et al., 2021) template, which included variables such as "ID" and "taxa" (Figure 1).

Then, all lists of species provided by each country, as well as the species lists from the additional references (Herrero-Jáuregui et al., 2013; Piponiot et al., 2019) were submitted (input) and verified using the Taxonomic Name Resolution Service (TNRS) R package version 0.3.0 (Maitner and Boyle, 2022). This tool allowed us to have standard, up-to-date taxonomic names from all the sources, including those species that have recently changed their taxonomic status. The taxonomic sources applied within the TNRS tool were taken from Tropicos - Missouri Botanical Garden (“tropicos”), World Checklist of Vascular Plants (“wcvp”), United States Department of Agriculture (“usda”), and World Flora Online (“wfo”). We used the

"Accepted_species" column from the output list of each source as the matching variable to join the different output lists from each of the sources and references.

Next, a combined list of 1,714 entries (based on the unique name submitted in TNRS) from all sources was produced with all entries from each input data source. Then, using the variable of "Accepted_species", we eliminated species duplicated between countries and references, not matched, or not found species, and ended up with a total of 1,478 unique accepted species in TNRS (Figure 1).

Step 3. Adjusting the list to Amazonian species with diameter at breast height ≥ 10 cm

To confirm that the list of species contained only Amazon tree species, we used the taxonomically verified list for the lowland Amazon rain forests proposed by Cardoso et al. (2017). This list (6,727 species) was also previously curated with the TNRS package in R to get the standard, up-to-date accepted species names that can be matched to our list. Following the tree species definition proposed by Cardoso et al. (2017), we considered as tree to "all species that reach ≥10 cm DBH during their life" (Supporting Information p. 1). The life forms identified in this list using Cardoso et al. (2017) criteria were tree/shrub, tree, shrub/tree/subshrub, shrub/tree, and palm tree. In addition, the non-Amazon species (those not considered to be Amazonian by Cardoso et al., 2017) with DBH < 10 cm were removed from the 1,478 species list to obtain a final standardized list of Amazonian timber tree species that includes 1,112 species (Figure 1).

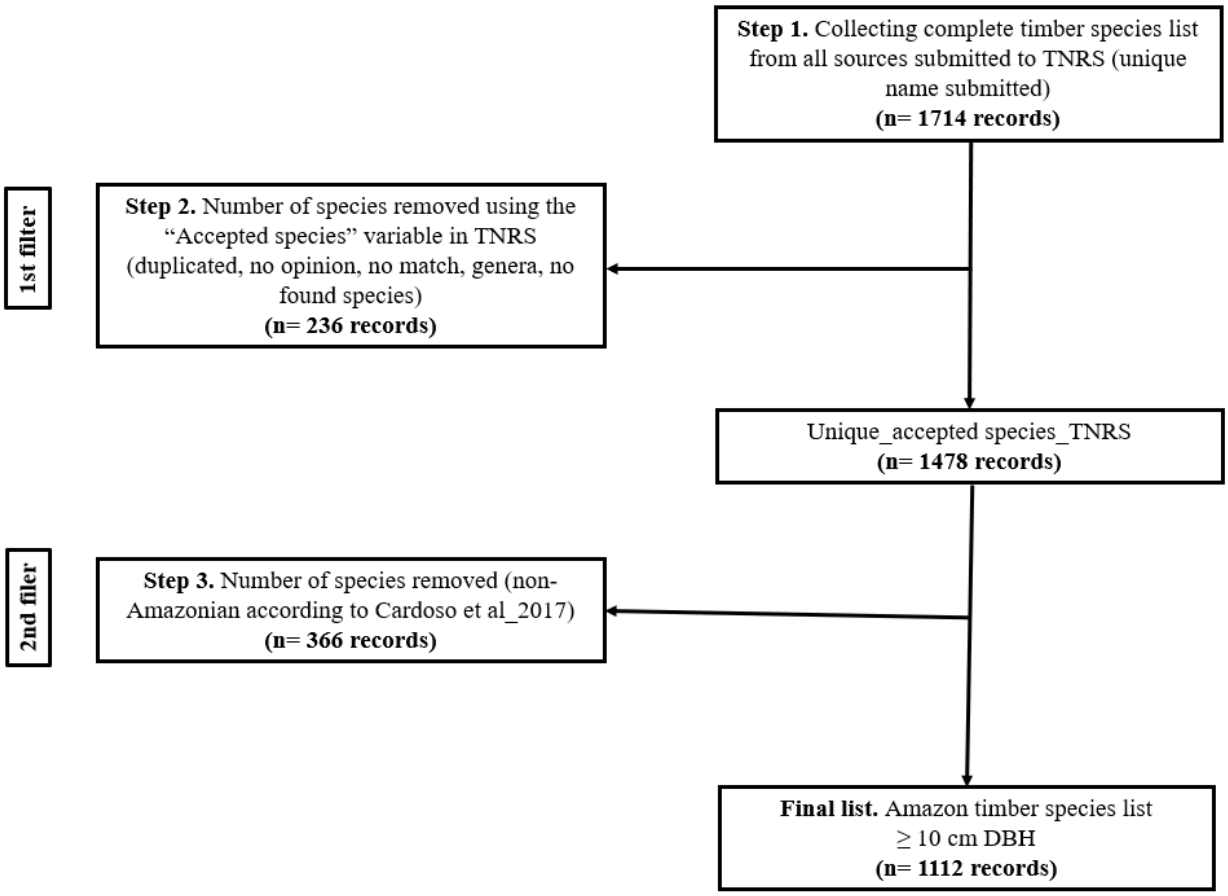

Figure 1. Flowchart of the process followed to compile the Amazon tree species list ≥ 10 cm DBH, indicating the number of records in the list at each step.

Step 4. Adding species richness, abundance and hyperdominance

To obtain the population data for the Amazonian timber species, we used the population size data from the Supplementary Material in ter Steege et al. (2020), curated in TNRS to standardize the current taxonomic nomenclature and matched to the timber species list by the "Accepted species" name. Data on hyperdominance from the Appendix S1- species data of ter Steege et al. (2013) were also curated in TNRS, and then matched by the "Accepted_species" name to our

timber species list. In addition, we included information about the forest type where the Indicator Value (see glossary of terms) was the highest (ter Steege et al., 2013). The forest types included in this hyperdominance information were: 1 = *igapó* (Black-water flooded forests), 2 = *podzol*, 3 = swamp, 4 = *terra firme* (non-flooded forests), and 5 = *várzea* (white-water flooded forests) (Table 2).

Step 5. Adding commercial and trade regulation status (up to 2022)

In the context of potential forest management initiatives, we also considered it important to highlight the timber species with commercial purposes according to the International Tropical Timber Organization (ITTO). During 2021, ITTO provided information on commercial timber species and lesser-used commercial species (LUS) in the file "Archive_07 lang file_may15". We curated this list in TNRS, and then matched it with the "Accepted_species" names in our timber tree dataset (Table 2).

Concerning the species that could be under some type of international trade regulation according to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), we downloaded the 46 CITES databases in July 2022 (UNEP-WCMC, 2021), curated them in TNRS for standardized and updated taxonomic names (available in https://trade.cites.org/en/cites_trade), and matched them to the "Accepted_species" names from our timber species list (Table 2).

Step 6. Adding conservation status (as of 2022)

To obtain the species and families assessed by The International Union for Conservation of Nature (IUCN) Red List of Threatened Species, we downloaded the Plantae Global Species list updated to 2022 from their website (available in https://www.iucnredlist.org/account), curated it in TNRS and then matched the "Accepted_species" names (Table 2).

In addition, we assigned the species in our list to the Red List Categories according to IUCN up to 2022. The Red List of threat Categories were: Critically Endangered (CR), Endangered (EN), Near Threatened (NT), Vulnerable (VU), Least Concern (LC), Not Evaluated by IUCN (NA), Data Deficient (DD), Lower Risk / conservation dependent (LR/cd), Lower Risk / least concern (LR/lc) and Lower Risk / near threatened (LR/nt).

Step 7. Adding predicted future conservation status (as in Gomes et al. 2019)

Finally, using the Taxonomic Name Resolution Service (TNRS, Boyle et al., 2021) template, which included variables such as "ID" and "taxa", we curated in TNRS the species list from Gomes et al. (2019) and matched the "Accepted_species" names. In addition, we included data about climate change and deforestation scenarios that are also described in Gomes et al. (2019) and according to the main IUCN threat Red List Categories (Vulnerable, Endangered and Critical Endangered) (Table 2).

Table 2. Number of records obtained from references used to include additional data for each species and number of species in each step of the compilation process.

Step	Reference	**Species submitted to TNRS** (after cleaning)	**Blank and duplicated rows**	**Unique accepted species TNRS**	**Species that matched our Amazon timber species dataset**
3	Cardoso et al. (2017)	6,725	36	6,689	1,112
4	ter Steege et al. (2020)	5,027	16	5,011	1,029
4	ter Steege et al. (2013)	227[a]	1	226	147
5	ITTO (2014a)	60	0	60	36
5	ITTO (2014b)	925	29	896	125
5	CITES (UNEP – WCMC, 2021)	15,715	2,712	13,003	5
6	IUCN Red List Category (2022)	58,343	837	57,506	800
7	Gomes et al. (2019)	4,923	9	4,914	834

[a] Only hyper-dominant species

Analysis of results

A brief numerical analysis and overview of the number of species per family, genus, and current and future conservation status can be found in the Supplementary Information S1 file.

Glossary of terms

Appendix_CITES: *"*Appendix I**:** all species threatened with extinction, which are or may be affected by trade. Trade in specimens of these species must be subject to particularly strict regulation in order not to endanger further their survival and must only be authorized in exceptional circumstances. Appendix II: i) all species which although not necessarily now threatened with extinction may become so unless trade in specimens of these species is subject to

strict regulation to avoid utilization incompatible with their survival; and ii) other species which must be subject to regulation in order that trade in specimens of certain species referred to in subparagraph i) above may be brought under effective control. Appendix III: all species which any Party identifies as being subject to regulation within its jurisdiction for the purpose of preventing or restricting exploitation, and as needing the cooperation of other Parties in the control of trade" (CITES, 2021).

ATDN: The Amazon Tree Diversity Network (ter Steege et al., 2019).

CITES: The Convention on International Trade in Endangered Species of Wild Fauna and Flora.

Commercial timber species*:* According to the International Tropical Timber Organization (2014), these species have a significant commercial volume mainly in Colombia, Brazil, and Ecuador. In addition, it is known that these species are representative in the international market.

Hyperdominant species: These species have larger geographic ranges than other species, reach higher maximum relative abundances in individual plots, and are more likely to be habitat specialists (ter Steege et al., 2013).

ITTO: The International Tropical Timber Organization.

IUCN: The International Union for Conservation of Nature.

IV.indcls: Indicator Values (IV value) for each species based on their frequency and relative abundance (hyperdominant) in the five major Amazonian forest types (see next glossary term) (ter Steege et al., 2013, Additional Resources excel file column K).

IV.maxcls: Forest type in which species has the highest Indicator value as hyperdominant and show a strong preference for one of the five major Amazonian forest types: 1 = *igapó* (Black-

water flooded forests), 2 = *podzol*, 3 = *swamp*, 4 = *terra firme* (non-flooded forests), and 5 = *várzea* (white-water forests) (ter Steege et al., 2013, Additional Resources excel file column J).

Lesser-Used Species (LUS): The tropical forests are characterized by their enormous diversity with many different species per unit area and relatively small volumes, compared to temperate forests. Many species can be considered as LUS. Several factors determine this situation, among them are the lack of enough technical and market information. In addition, for these species, the level of trade between countries is low and it is mainly used locally. These species can also be used as an alternative species with properties like the commercially used species (ITTO, 2014).

Timber species definition used in this study*:* We included all species reported as "timber" by each country and similar species included in data sets by Herrero-Jáuregui et al. (2013) and Piponiot et al. (2019). These timber species could be able to generate forest products for different purposes beyond commercial timber, such as local use for food, medicinal, technological, and reforestation applications (Herrero-Jauregui et al. 2013).

b. Instrumentation: Non-applicable

c. Taxonomy and systematics:

We extensively used the TNRS (Taxonomic Name Resolution Service; Boyle et al., 2021) to standardized taxonomic names used in the different data sources (see detailed explanations above).

4. Project personnel: Coauthors of this data paper.

Class III. Data set status and accessibility

A. Status

1. Latest update: May 10, 2023
2. Latest archive date: May 10, 2023
3. Metadata status: May 10, 2023
4. Data verification:

We checked all the information such as species names and all data from different sources used in this study. We standardized the accepted names according to the Taxonomic Name Resolution Service (TNRS).

B. Accessibility

1. Storage location and medium:

The complete dataset, the Supporting Information and associated files are available at Zenodo (https://doi.org/10.5281/zenodo.7063870).

2. Contact persons:

Ximena Herrera - Alvarez, Institute for Multidisciplinary Research in Applied Biology-IMAB, Departamento de Ciencias Universidad Pública de Navarra, Campus de Arrosadía, Pamplona, 31006 Navarra, Spain. ximena.herrera@unavarra.es.

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3. Copyright restrictions:

4. Proprietary restrictions:

a. Release date: May 10, 2023

b. Citation:

Herrera-Alvarez, X., Blanco, J.A., Phillips, O.L., Guadalupe, V., Ortega-López, L., ter Steege, H., & Rivas-Torres, G. (2023). MADERA: A standardized Pan-Amazonian dataset for tropical timber species [Data set]. In Ecology (*to de determined*). Zenodo https://doi.org/10.5281/zenodo.7063870

5. Costs: None

Class IV. Data structural descriptors

A. Data set file

1. Identity:

MADERA_Herrera-Alvarez_et_al_2023.csv

2. Size:

1112 unique records, 40 columns, 1113 rows, 221 KB.

3. Format and storage mode:

Comma - separated values

4. Header information: See column descriptors in section IV B.
5. Alphanumeric attributes: Mixed
6. Special characters/fields: None
7. Authentication procedures: None

B. Variable information

1. Variable identity: See Table 3.
2. Variable definition: See Table 3.
3. Units of measurement: see Table 3.

Table 3. Names and description of the variables contained in the dataset MADERA_Herrera-Alvarez_et_al_2023.csv. NA = Not applicable.

Variable identity	Description	Variable type	Unit	Range	Precision
ID	Timber species ID in this study	Text string	NA	NA	NA
Accepted_species	Species name as verified by TNRS	Text string	NA	NA	NA
Accepted_family	Taxonomic family as verified by TNRS	Text string	NA	NA	NA
Genus_matched	Genus verified name according to TNRS	Text string	NA	NA	NA
Accepted_name_author	Author of the scientific name according to TNRS	Text string	NA	NA	NA
Accepted_name_url	URL of accepted name species according to TNRS	Text string	NA	NA	NA
Life_form_Cardoso_et_al_2017	Life forms of these timber species according to Cardoso et al (2017). These species are mainly Amazonian (≤ 1000 masl) and trees ≥ 10 cm DBH. Life forms included: palm tree, shrub/tree, shrub/tree/subshrub, tree, tree/shrub.	Text string	NA	NA	NA
Bolivia	Variable indicating the Amazon country that reported timber species information for this study. See Table 1. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
Brazil	Variable indicating the Amazon country that reported timber species information for this study. See Table 1. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
Colombia	Variable indicating the Amazon country that reported timber species information for this study. See Table 1. Presence = 1, Absence = 0.	Boolean	NA	NA	NA

Variable identity	Description	Variable type	Unit	Range	Precision
Ecuador	Variable indicating the Amazon country that reported timber species information for this study. See Table 1. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
French_Guiana	Variable indicating the Amazon country that reportedtimber species information for this study. See Table 1. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
Guyana	Variable indicating the Amazon country that reported timber species information for this study. See Table 1. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
Peru	Variable indicating the Amazon country that reportedtimber species information for this study. See Table 1. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
Suriname	Variable indicating the Amazon country that reported timber species information for this study. See Table 1. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
Venezuela	Variable indicating the Amazon country that reported timber species information for this study. See Table 1. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
Herrero_Jauregui_et_al_2013	Timber species data included in this study as references. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
Piponiot_et_al_2019	Timber species data included in this study as references. Presence = 1, Absence = 0.	Boolean	NA	NA	NA
number_individuals_ATDN_plots	Number of total individuals of each species observed across all The Amazon Tree Diversity Network (ATDN) plots. Appendix 3 data 2019 (ter Steege et al., 2020).	Numeric	individuals	1 - 16101	5
number_plots_ATDN	Number of total plots where the species are present in ATDN plots. Appendix 3 data 2019 (ter Steege et al., 2020).	Numeric	plots	1 - 932	3
estimated_ind_amazonl	Estimated total number of individuals for each species in the Amazon lowland forest area ≤ 500 masl according to ATDN plots by ter Steege et al (2020), Appendix 3 data 2019.	Numeric	1-degree grid cell (1DGC)	107146 - 4684630963	10
log10_est_ind_Amazon	log10 of the variable “estimated_ind_amazon” according to ATDN plots by ter Steege et al (2020), Appendix 3 data 2019.	Numeric	not applicable	5,03 -9,67	3
check_hyperdominant_spp	Confirmation if the species is considered as hyperdominant according ter Steege et al (2013), Appendix S1 - species data. Confirmed = 1, Non confirmed = 0.	Boolean	NA	NA	NA

Variable identity	Description	Variable type	Unit	Range	Precision
Forest_type_IV_max_hyperdominant	Forest type in which the hyperdominant species has the highest Indicator Value (IV-value): Igapó =1, Podzol = 2, Swamp = 3, terra firme = 4, várzea = 5 (ter Steege et al., 2013). NA= information not available	Text string	NA	NA	NA
IV.indcls_hyperdominant	Indicator values for each species based on their frequency and relative abundance in the five forest types: *igapó*, *podzol*, swamp, *terra firme*, and *várzea* (ter Steege et al., 2013). NA= information not available.	Numeric	indicator value (IV value)	0.01-0.67	3
check_ITTO_commercial_spp	Confirmation if the species is considered as commercial timber species according to the dataset provided by The International Tropical Timber Organization (2014). Confirmed = 1, Non confirmed = 0.	Boolean	NA	NA	NA
check_ITTO_LUS_spp	Confirmation if the species is considered as lesser used timber species according to the dataset provided by The International Tropical Timber Organization (2014). Confirmed = 1, Non confirmed = 0.	Boolean	NA	NA	NA
redlistCategory_IUCN_2022	The International Union for Conservation of Nature (IUCN) Red List categories: Critically Endangered (CR), Endangered (EN), Near Threatened (NT), Vulnerable (VU), Least Concern (LC), Not Evaluated by IUCN (NA), Data Deficient (DD), Lower Risk / conservation dependent (LR/cd), Lower Risk / least concern (LR/lc) and Lower Risk / near threatened (LR/nt). NA= information not available.	Text string	NA	NA	NA
yearPublished_IUCN_2022	Year of assessment for each flora species by the International Union for Conservation of Nature (IUCN) Red List category database 2022. NA= information not available.	Text string	NA	NA	NA
Original_AOO_2050_IGS	IUCN potential Red List categories in this scenario: Combined original AOO (species original area of occupancy) and IGS Deforestation scenario by 2050 (Gomes et al., 2019). NA= information not available.	Text string	NA	NA	NA
Original_AOO_2050_BAU	IUCN potential Red List Categories in this scenario: Combined original AOO (species original area of occupancy) and BAU Deforestation scenario by 2050 (Gomes et al., 2019). NA= information not available.	Text string	NA	NA	NA
2050_RCP_2.6	IUCN potential Red List Categories in this scenario: AOO (species original area of occupancy) based on RCP 2.6 climate change scenario (Gomes et al., 2019). NA= information not available.	Text string	NA	NA	NA

Variable identity	Description	Variable type	Unit	Range	Precision
2050_RCP_8.5	IUCN potential Red List Categories in this scenario: AOO (species original area of occupancy) based on RCP 8.5 climate change scenario (Gomes et al., 2019). NA= information not available.	Text string	NA	NA	NA
2050_RCP_2.6_2050_IGS	IUCN potential Red List Categories in this scenario: AOO (species original area of occupancy) based on the combination between RCP 2.6 climate change scenario and 2050 IGS Deforestation scenario (Gomes et al., 2019). NA= information not available.	Text string	NA	NA	NA
2050_RCP_2.6_2050_BAU	IUCN potential Red List Categories in this scenario: AOO (species original area of occupancy) based on the combination between RCP 2.6 climate change scenario and 2050 BAU Deforestation scenario (Gomes et al., 2019). NA= information not available.	Text string	NA	NA	NA
2050_RCP_8.5_2050_IGS	IUCN potential Red List Categories in this scenario: AOO (species original area of occupancy) based on the combination between RCP 8.5 climate change scenario and 2050 IGS Deforestation scenario (Gomes et al., 2019). NA= information not available.	Text string	NA	NA	NA
2050_RCP_8.5_2050_BAU	IUCN potential Red List Categories in this scenario: AOO (species original area of occupancy) based on the combination between RCP 8.5 climate change scenario and 2050 BAU Deforestation scenario (Gomes et al., 2019). NA= information not available.	Text string	NA	NA	NA
Sub_region_AOO	Sub-region with the major part of the species' estimated AOO (species original area of occupancy): CA: central Amazon, EA: eastern Amazon, GS: Guiana Shield, SA: southern Amazon, WAN: northwestern Amazon, WAS: southwestern Amazon (Gomes et al., 2019). NA= information not available.	Text string	NA	NA	NA
check_CITES	Confirmation if the species is included in the 46 trade databases according to CITES 2022 (UNEP-WCMC, 2021). Confirmed = 1, Non confirmed = 0.	Boolean	NA	NA	NA
appendix_CITES	Appendix I, Appendix II and Appendix III. See Glossary of terms for more details. NA= information not available.	Text string	NA	NA	NA

4. Data type

    a. Storage type: Integer, floating point, character

    b. List and definition of variable codes: See Table 3.

    c. Range for numeric values: See Table 3.

    d. Missing value codes: NA= information not available.

    e. Precision: See Table 3.

5. Data format

    a. Fixed, variable length, 40 columns and 1,113 rows

    b. Columns: column A as start column and AN as end column

    c. Optional number of decimal places: Non applicable

C. Data anomalies: Not applicable.

Class V. Supplemental descriptors

A. Data acquisition

1. Data forms or acquisition methods:

Timber species data was requested by email (see Box 1) to each country with the support of the Amazon Cooperation Treaty Organization (ACTO) / Amazon Regional Observatory (ARO), see Table 1.

2. Data entry verification procedures:

Data sets were in the appropriate format for the TNRS package of R. All data presented in this dataset is the output of all work carried out in R, as described above (Class II. Research origin descriptors, section 3 Research methods, Figure 1, and Table 2).

B. Quality assurance/quality control procedures:

The authors visually checked the final output in R matched with each independent dataset for countries or references data (Figure 1 and Table 2). In addition, all inputs for R were checked with a cleaning process to assure quality requirements for TNRS and the dataset.

C. Related materials:

1. Supplementary Information file:

This file provides a brief numerical analysis and overview of the dataset, describing the number of species per family, genera, and conservation status in current and future conditions. The figures and tables that can be found this file are listed below:

Figure S1. The 20 most species-rich families of timber tree species identified in lowland Amazon rain forests.

Figure S2. The 20 most abundant families (based on number of individuals on a log10 scale) estimated for the Amazon region using data according to ter Steege et al., (2020).

Figure S3. Number of commercial timber species and families of this list according to the International Tropical Timber Organization (2014).

Figure S4. Number of lesser used species (LUS) and families of this timber species list according to the International Tropical Timber Organization (2014).

Figure S5. Number of timber species (≥10 spp.) and families according to the present study that are assessed by IUCN Red List Categories up to 2022.

Figure 6. Number of Amazon timber species threatened by 2050 under two different climate change scenarios (RCP 2.6 and RCP 8.5) (Gomes et al., 2019).

Figure S7. Number of Amazon timber species threatened by 2050 in the combined scenarios of climate change (RCP 2.6 and RCP 8.5) and improved governance deforestation (IGS) by 2050 (Gomes et al., 2019).

Figure S8. Number of Amazon timber species threatened in the combined scenarios of climate change (RCP 2.6 and RCP 8.5) and business- as-usual scenario (BAU) by 2050 (Gomes et al., 2019).

Table S1. Number of Amazon timber species list in each Red List Category up to 2022.

2. Email sent to request information (see Box 1):

Box 1: Generic email sent by the first author to the national contact points listed in Table 1.

Dear Delegate,

I am an Ecuadorian PhD student contacting you to inquire about the availability of some basic data in your country about timber species to be used in my academic research.
I am pursuing my PhD working as PhD student at the Public University of Navarre - UPNA (Pamplona, Spain) and the title of my dissertation is "Timber species dynamics in the Amazon forests, using long term data and modelling techniques". My supervisors are Dr. Juan A. Blanco (UPNA, Spain) and Dr. Gonzalo Rivas-Torres (San Francisco de Quito University, Ecuador). In addition, I work closely with Dr. Oliver L. Phillips (University of Leeds, UK).

PROJECT DESCRIPTION:

With this research, we want to assess if denominated timber species are presenting different growing and mortality patterns than other non – economically important species in the Amazonia (all countries: Bolivia, Peru, Ecuador, Colombia, Venezuela, Guyana, Suriname, French Guiana and Brazil) using long-term permanent plots from ForestPlots located along all the Amazonian regions.
I have been trying to get official information regarding timber species per country but are not accessible in the searching engines, which is why I am making this request to you. The results and information that my dissertation will generate could fill a knowledge gap between academy, governmental agencies and indigenous communities that manage and depend on these resources.
In this context, I am contacting you to please request the following information that is officially used by your institution:

1) Timber species concept used and officially accepted by your institution.
2) Criteria to define timber species (wood density, growth rate, among others) that your Institution uses.
3) Official list of Amazonian timber species (all species, not only the most commercialized) reported in your country if there is such list. Useful information that it could be important to consider are common name, scientific names, synonyms, and other information about commercialization and general information that you could provide.
4) Forest Management and traceability regulations for Amazonian timber species that your Institution uses.

The information provided will be used solely for scientific research, thus we will not cause any conflict with your institution if you provide the requested data. The valuable collaboration you can provide will

be acknowledged in the manuscripts that could be produced by my dissertation, and your institution will receive all papers about this research when these are finished if requested.

I hope you can help us with requested data no later than xxx, as I need to perform analyses as soon as possible. This project is founded by the Public University of Navarre, the provincial Government of Navarre (Spain), San Francisco de Quito University, and the Tiputini Research Station (Ecuador).

Many thanks in advance for your collaboration and best wishes,

Ximena Herrera- Alvarez on behalf of all the authors

D. Computer programs and data-processing algorithms:

Individual data sets were formatted in csv files with the help of the R-software (https://www.rproject.org/). In addition, all R scripts used in this research are available in Zenodo at https://doi.org/10.5281zenodo.8045101 and in GitHub at: https://github.com/XimenaHerreraAlvarez/Herrera_Alvarez_et_al_2023_MADERA_db_R_scripts_GitHub

E. Archiving

1. Archival procedures:

Datasets were saved in csv files. Original and updated files can be found in Zenodo at https://doi.org/10.5281/zenodo.7063870

2. Redundant archival sites: None

F. Publications and results:

Herrera-Álvarez X., Blanco J.A., Phillips O.L., Guadalupe V., Ortega-López L.D:, ter Steege H., Rivas-Torres G. 2022. A consensus Pan- Amazonian timber species database: A call for harmonization and conservation efforts. British Ecological Society Annual Conference. Edinburgh 18-21 December 2022.

G. History of data set usage

1. Data request history: 2020 - 2022

2. Data set update history: May 2023

3. Review history: May 2023, Ximena Herrera – Alvarez.

4. Questions and comments from secondary users: Any questions or comments do not hesitate to contact us (see contact persons and contact author).

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