# American Hardwood Environmental Profile

Data is provided on the environmental impact to deliver a defined consignment of lumber of a specified U.S. hardwood species to an overseas customer (1). Data is derived from the PE LCA study of U.S. hardwoods (2), the U.S. Forest Service Forest Inventory and Analysis (FIA) program (3), the Seneca Creek Risk Assessment of Legality and Sustainability in U.S. Hardwood Exports (4), and the FSC Risk Register (5). The issuing organisation should identify the consignment and species and enter the quantity and thickness(es) of lumber. The issuing organisation may choose to use standard statements on the legality and sustainability of individual U.S. species prepared by AHEC drawn from the above referenced sources, or amend these to include specific data on their own U.S. hardwood operations. The issuing organisation may also choose to use default U.S. average values for energy consumption of the kiln and for transport distance and mode or may enter values specific to their own hardwood operations or the supply chain to the customer.

| | | | |
|---|---|---|---|
| **Id. number(s) (6)** | | **Cross-refs (7)** | |
| **Issued by (8)** | American Hardwood Export Council, 3 St Michael's Alley, London EC3V 9DS, UK europe@americanhardwood.org | **Issued to (9)** | A.N. Other Hardwood Importer GmbH, Messeplatz 1 50679 Cologne, Germany T: + 49 221 821-0 |
| **Description of product (10)** | Sawn wood of yellow poplar<br>HS 4407.99.01.72 | **Common name(s) (11)** | American tulipwood/yellow poplar |
| **Scientific name (12)** | Liriodendron tulipifera | **Country of harvest (13)** | USA |
| **Sub-national region of harvest (14)** | Eastern United States with concentrations in Virginia, North Carolina, Georgia, Tennessee, Kentucky and West Virginia (Figure 1) | **Concession of harvest (15)** | Multiple private forest owners |

| **List up to 3 thicknesses & quantity in consignment:** | | **Thickness** | **Quantity** | | **Thickness** | **Quantity** |
|---|---|---|---|---|---|---|
| | **1** | 1 inch | 1 | **3** | 3 inch | 1 |
| | **2** | 2 inch | 1 | **Unit of quantity** | | cubic meters |

## Legal compliance (16)

- The Seneca Creek Risk Assessment concludes that: there is negligible risk of any U.S. hardwood containing wood from illegal sources; stolen timber represents much less than 1% of total U.S. hardwood production; and there can be high confidence regarding legal compliance in the U.S. hardwood sector. See http://www.americanhardwood.org/sustainability/sustainable-forestry/seneca-creek-study/
- The FSC Global Risk Register concludes that the United States is Low Risk against all 4 FSC Controlled Wood criteria for legality. See http://www.globalforestregistry.org/map.
- U.S. hardwood companies are regulated by the Lacey Act requiring declarations for all U.S. timber imports & imposing sanctions on U.S. companies found in possession of timber sourced contrary to the laws of any country.

## Sustainable forestry (17)

- The PE LCA study concludes with respect to land-use change: "in the system under investigation the main material – wood – comes from naturally re-grown forests. The harvested areas had undergone several iterations of harvesting and re-growth. After harvesting, the land is returned to forest so there is no direct land use change to account for in the timeline of a few hundred years".
- On biodiversity impacts, the PE LCA study concludes that: "Conversion of any other commercial land into the hardwood forest would most probably be a positive impact on the land quality including biodiversity and associated ecosystem services".
- FIA data indicates that tulipwood makes up 7.5% of U.S. hardwood standing volume. The tulipwood resource is not only renewable, but is expanding. Tulipwood in the U.S. forest is growing at a rate of 35 million m3/per year while the harvest is 17 million m3 per year. The net volume (after harvest) is increasing by 18 million m3 each year. According to FIA data, annual forest growth exceeds harvest in all states with the exception of Delaware (Figure 2) where special controls have now been introduced to protect the species.
- The Seneca Creek Risk Assessment concludes that there is Low Risk of U.S. hardwoods being derived from any of the five categories of controversial forest source identified in the FSC Controlled Wood standard.

**Figure 1: Distribution of tulipwood/yellow poplar**

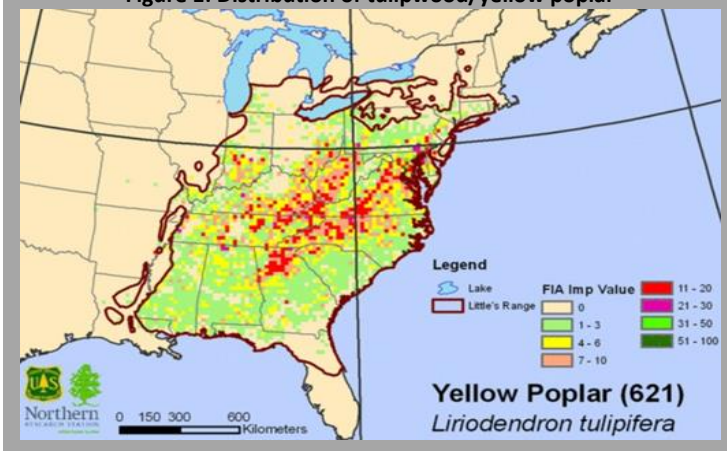
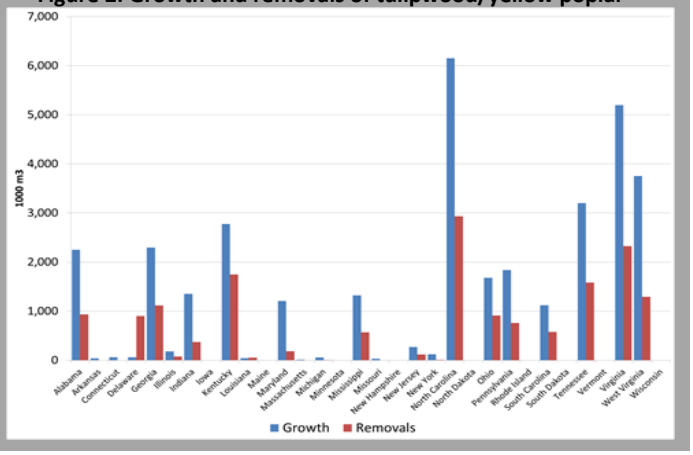
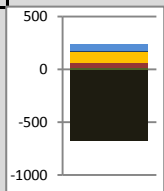
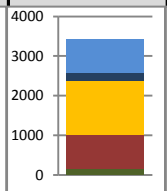
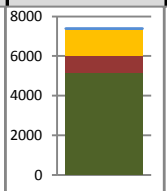
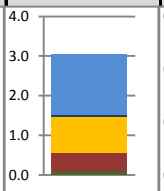
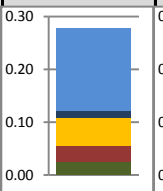
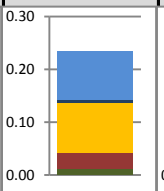
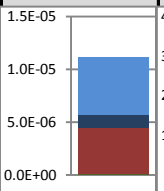
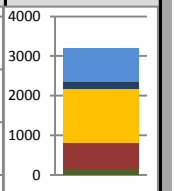
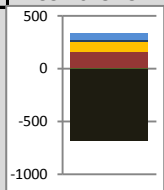
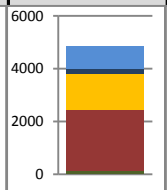
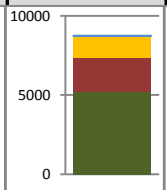
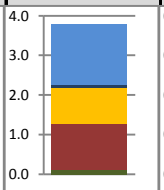
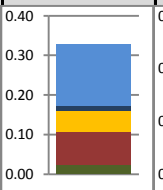
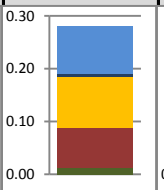
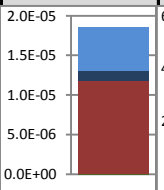
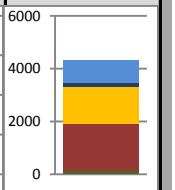
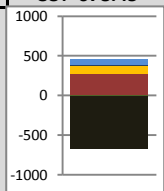
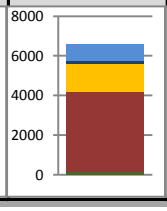
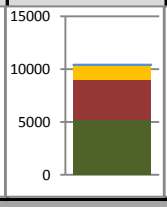
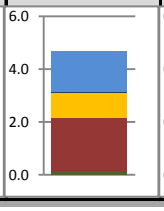
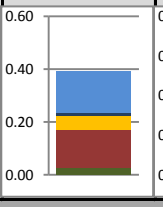
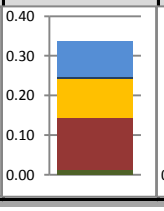
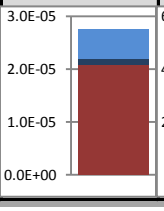
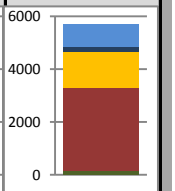



**Figure 2: Growth and removals of tulipwood/yellow poplar**



## Life cycle assessment (cradle to gate plus transport) (18)

The following charts show the environmental impact of delivering this consignment to the overseas customer. The data is derived from the ISO-conformant LCA model prepared by PE. The Parameters table summarises all values entered by the issuing organisation. All other parameters required to calculate the environmental profile are derived and fixed in the model by PE. Results are categorised according to process steps (forestry, sawmill, kiln drying, transport forest to kiln, transport kiln to customer, and carbon uptake).

| Impact category: | Global Warming Potential | Primary Energy Demand from Resources | Primary Energy Demand from Renewables | Acidification Potential | Eutrophication Potential | Photochemical Ozone Creation Potential | Abiotic Depletion Potential (Elements) | Abiotic Depletion Potential (Fossil) |
|---|---|---|---|---|---|---|---|---|
| Unit | kg CO2-equiv. | MJ | MJ | kg SO2-equiv. | kg PO42-equiv | kg Ethene-equiv. | kg Sb-equiv. | MJ |
| **1" lumber - 1 cubic meter** | | | | | | | | |
| Total | E: 242.60<br>CU: -678.45 | 3420 | 7370 | 3.04 | 0.277 | 0.233 | 0.0000112 | 3210 |
| Data by process steps |  |  |  |  |  |  |  |  |
| **2" lumber - 1 cubic meter** | | | | | | | | |
| Total | E: 335.73<br>CU: -678.45 | 4829 | 8723 | 3.77 | 0.329 | 0.28 | 0.0000185 | 4320 |
| Data by process steps |  |  |  |  |  |  |  |  |
| **3" lumber - 1 cubic meter** | | | | | | | | |
| Total | E: 450.67<br>CU: -678.45 | 6610 | 10400 | 4.66 | 0.392 | 0.34 | 0.0000275 | 5680 |
| Data by process steps |  |  |  |  |  |  |  |  |
| Key | Carbon uptake ■ Forestry ■ Kiln drying ■ Sawmill ■ Transport forest-kiln ■ Transport kiln-customer | | | | | | | |

## Description of impact categories

| | |
|---|---|
| **Global Warming Potential** | Often termed "carbon footprint". Expressed in kg of carbon dioxide equivalent. The sum of the warming potential of all gases emitted (including carbon dioxide, methane and water vapour) which influence the energy balance of the atmosphere leading to increased average temperatures. Data is reported separately for all greenhouse gas emissions (E) from processes to extract, process and deliver the timber and for carbon uptake (CU) during tree growth (which is a negative number in GWP terms). |
| **Primary energy demand (resources)** | Use of fossil fuels in mega-joules. The impact category has limited application on its own because it does not differentiate between energy sources (e.g. oil or coal). Nor does it represent "embodied energy". However it is an important driver of other environmental impacts including global warming, acidification, eutrophication, and resource depletion. |
| **Primary energy demand (renewables)** | Use of energy derived from renewable raw materials in mega-joules. |
| **Acidification Potential** | Potential for acidification of soil and damage to plant health resulting from emissions to air, water and land of acidifying compounds such as sulphur dioxide (SO2) and nitrogen oxides (NOX). Expressed in kg of sulphur dioxide equivalent. |
| **Eutrophication Potential** | Nutrient enrichment of waters by release of phosphorous or nitrogen compounds (such as fertilisers) and organic matter (e.g. in effluents). This causes excess growth of plant matter and depletion of oxygen levels in the water. Expressed in kg of phosphate equivalent. |
| **Photochemical Ozone creation Potential** | Often referred to as "photochemical smog". Increased levels of ozone at ground level arise through the reaction of volatile organic compounds, for example ethene, with oxygen compounds or oxides of nitrogen in air and under the influence of sunlight. The problem afflicts modern cities and impacts human health and reduces vegetative production. Expressed in kg of ethene equivalent. |
| **Abiotic depletion potential (Elements)** | Measures depletion of non-renewable mineral resources. Compiled from the ratios of annual production to size of remaining reserves for all minerals consumed. Expressed in relation to the ratio for the mineral Antimony (SB). |
| **Abiotic Depletion Potential (Fossil)** | Measures depletion of non-renewable fossil resources in mega-joules. |

## Parameters and assumptions

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Kilning** | **Kiln Efficiency (%) (19)** | 53 | **Kiln Thermal Energy (kwh/day,MBF,inch) (20)** | 25 | **Kiln Power (kwh/day,MBF,inch)** | 17 | **Kilning assum-ptions** | Default US hardwood industry average calculated by PE drawing on data from AHEC members |
| | **Kiln fuel for thermal energy (%) (22)** | **Biomass** | **Heavy fuel oil** | **Light fuel oil** | **Natural gas** | | | |
| | | 90 | 0 | 0 | 10 | | | |

| | | Truck | Rail | Ship | Transport assumptions |
|---|---|---|---|---|---|
| **Trans-port** | **Forest to sawmill (km)** | 116 | | | Default US hardwood industry average for US hardwood drawn from AHEC-PE LCA study |
| | **Sawmill to kiln (km)** | 103 | | | Default US hardwood industry average for US hardwood drawn from AHEC-PE LCA study |
| | **Kiln to port (km)** | 655 | | | Central point of US tulipwood harvest region to Norfolk, the leading US East Coast port for tulipwood |
| | **Port to port (km)** | | | 6818 | Sea distance from Norfolk Terminal to Bremerhaven Terminal |
| | **Port to customer (km)** | 350 | | | Road distance from port of Bremerhaven to Cologne |

**Notes**

(1) Consignments containing a mix of species require a separate environmental profile for each species. Additional profiles are also required for consignments containing more than three different thicknesses of lumber.

(2) PE International AG, global leader in sustainability performance solutions (see http://www.pe-international.com), was commissioned by the American Hardwood Export Council (AHEC) to prepare a LCA for US hardwood lumber and veneers delivered into export markets. The study has been undertaken fully in conformance to ISO 14040/44, the international standard for LCA, including requirements for independence and critical review by an external panel of experts. It was also prepared in line with EN15804 providing core product category rules for all construction products and services. The ISO-conformant report covering US hardwood lumber was published in July 2012 (see http://www.americanhardwood.org/fileadmin/docs/sustainability/Final_LCA_Lumber_report.pdf). The study addresses 19 different US species representing more than 95% of hardwood harvested in the US by volume.

(3) The U.S. Forest Service Forest Inventory and Analysis (FIA) program is a Federal Government program to ensure regular monitoring of the condition of the nation's forests. The system is comprehensive and statistically verified and widely acknowledged to be a model of its type. Data is collected from field plots established across the United States on public and private lands. Further details: http://www.fia.fs.fed.us/

(4) The "Assessment of Lawful Harvesting and Sustainability of U.S. Hardwood Exports" was commissioned from Seneca Creek Associates LLC by AHEC in 2008. The report was prepared by a team comprised of well-regarded and independent analysts and experts in the field of U.S. forest policy and forest certification and subject to a process of peer review. It assesses the risk of any hardwood exported from the US being derived from an illegal source or from any of the controversial sources to be avoided as defined in the FSC Controlled Wood standard (see note 5). Adoption of a risk based approach to legality and sustainability verification in the US hardwood sector is a necessary response to the fact that over 90% of American hardwood logs are sourced from private landowners, mainly small family foresters owning less than 10 hectares. There are an estimated 4 million such owners in the US hardwood producing estates. Hardwood mills purchase from hundreds of different landowners each year, usually in small quantities. Much is sold through wood dealers who amass logs and lumber from many different sources over a long period of time (perhaps a year or more). The study confirms that all U.S. hardwood is Low Risk of illegal harvest or originating from other controversial sources. See: http://www.americanhardwood.org/fileadmin/docs/Seneca_Creek_Study/Seneca_Creek_Study_-_Full_Version.pdf

(5) The Forest Stewardship Council (FSC) Risk Register is a free source of information on the risk of sourcing controversial timber throughout the world covering more than 150 countries (see See http://www.globalforestregistry.org/map). It is developed by NEPCon, an independent certifier, in cooperation with the FSC and Rainforest Alliance. Drawing on official FSC national risk assessments or alternative best available data, the Register determines whether countries are "Low Risk" or "Unspecified Risk" against the 5 categories of forest source to be avoided according to the FSC Controlled Wood standard. These categories are: illegal harvesting; harvesting in violation of traditional or civil rights; harvesting in forests where high conservation values are threatened by management activities; harvesting in forests being converted to plantations or non-forest use; and harvesting from forests where genetically modified trees are planted. At this stage the Risk Register only assesses risk at national level and makes no attempt to differentiate between wood products derived from varying forest types in the same country (e.g. softwoods and hardwoods). A more comprehensive assessment of US hardwoods is provided by the Seneca Creek study (see note 4) which analyses sector-specific risks in line with the FSC Controlled Wood standard down to state and, where necessary, county level.

(6) Number(s) identifying the specific consignment to which this profile refers such as order or invoice numbers.

(7) Cross-references to other relevant documentation specific to this consignment such as NHLA Kiln Drying Certificate number, Phytosanitary Certificate Number, license or certificate number for 3rd party environmental certification systems

(8) Name and contact details of the organisation issuing the environmental profile. Issuing organisations include AHEC and individual AHEC members that are exporting hardwoods

(9) Name and contact details of the organisation to which the environmental profile is issued - typically customers of U.S. hardwood exporting companies.

(10) A description of the U.S. hardwood product including reference to the relevant Harmonized System (HS) product customs code. The full list of U.S. HS custom codes for wood products is available at: http://www.usitc.gov/publications/docs/tata/hts/bychapter/1300C44.pdf.

(11) Name of the U.S. hardwood species most commonly used in commerce

(12) Latin name including the genus and species of tree from which the American hardwood product is derived.

(13) The country(s) where the hardwood product is harvested. Typically USA, however some American hardwoods may be harvested in Canada

(14) This term is taken from the EU Timber Regulation (EUTR) which, if negligible risk of illegal harvest cannot be shown at national level, requires information on the specific "sub-national region" where timber is harvested. For EUTR conformance, this information is technically not required for US hardwoods since both the Seneca Creek study and the FSC Risk Register confirm that all US hardwood producing regions are low risk of illegal supply. However data on the geographic distribution of hardwood species in the US is readily accessible from the US Forest Service Tree Atlas and is made available as useful background for the environmental profile. To increase the precision of the profile, the issuing organisation is encouraged wherever possible to provide more specific data on the sub-national region of harvest of a consignment.

(15) This term is taken from the EUTR which, if negligible risk of illegal harvest cannot be shown at national or sub-national regional level, requires information on the "concession(s) of harvest" from which timber derived. EUTR states that "any arrangement conferring the right to harvest timber in a defined area shall be considered a concession of harvest". For reasons stated under note 14, this information is technically not required for US hardwoods under EUTR. In the EC's EUTR Guidance Document, use of the phrase "Multiple private forest owners" is recommended to identify the "concession of harvest" in regions like the U.S. hardwood producing states with widespread private ownership and good governance. To increase the precision of the profile, the issuing organisations is encouraged wherever possible to provide more specific data on the "concession of harvest" of a consignment.

(16) Statements derived from, and references providing access to, documents or other information indicating compliance of the U.S. hardwood product to applicable national legislation. The issuing organisation may choose to use the standard default statement prepared by AHEC but is encouraged, wherever possible, to include specific data on their own U.S. hardwood operations.

(17) Statements derived from, and references providing access to, documents or other information indicating that the U.S. hardwood product is sourced from sustainably managed forest. The issuing organisation may choose to use the standard default statement prepared by AHEC but is encouraged, wherever possible, to include specific data on their own U.S. hardwood operations.

(18) The PE LCA study is technically a "cradle-to-gate plus transport" study rather than a full "cradle-to-grave" or cradle-to-cradle" study. It identifies and measures environmental impacts from point of extraction in the U.S. forest through to delivery to the overseas customer, including all processes to extract, saw, kiln dry and transport the wood. The study does not include coverage of any additional processing, product fabrication, wastage, use, recycling, or final disposal occurring in the overseas market. However, since the data has been prepared fully in accordance with ISO standards and European Norms for LCA, wood product manufacturers can draw with confidence on this profile during preparation of full "cradle-to-grave" or "cradle-to-cradle" assessments of their products.

(19) Kiln efficiency is the percentage of thermal energy that evaporates water in the wood and which is not lost e.g. during initial heating or for ventilation.

(20) The thermal energy needed in the kiln to evaporate water in the wood measured in kwh per day per MBF per inch.

(21) The power used in the kiln, primarily for fans, in kwh per day per MBF per inch.

(22) The percentage mix of fuels burned in the boiler to produce thermal energy for kilning.