



### Ecosystem Services of Regional Native Tree Species

Tree species	Total CO <sub>2</sub> Stored (lbs.) DBH = 10 years*	CO <sub>2</sub> sequestered (lbs./tree/year) DBH = 10 years*	Flood mitigation (gal./year) DBH = 10 years*	Air pollutants removal w PM2.5 (lbs./year) DBH = 10 years*	Canopy width (ft) DBH = 10 years*	Mycorrhiza Fungi Relationship AM or EM**
Live Oak	1023	268	3006	1.9	17	AM/EM
Black Cherry	971	101	2879	1.9	16	AM
River Birch	925	215	2747	1.9	15	AM/EM
Boxelder	898	159	2656	1.9	14	AM
Laurel Oak	875	194	2646	1.6	14	AM/EM
Water Oak	869	173	2592	1.5	14	AM/EM
Red Maple	859	139	2528	1.5	14	AM
Willow Oak	739	142	2518	1.4	14	AM/EM
Sweetgum	719	150	2395	1.4	13	AM
Slippery Elm	669	197	2364	1.3	13	AM
American Elm	667	114	2316	1.3	11	AM
Tulip Tree	659	81	2199	1.3	11	AM
American Sycamore	652	111	2095	1.3	11	AM
Green Ash	624	200	2051	1.3	11	AM/EM
Loblolly Pine	479	106	1977	1.1	11	AM/EM
White Ash	447	118	1839	1.1	9	AM/AM
Black Walnut	386	76	1480	1.1	9	EM+AM
Eastern Cottonwood	591	176	1907	1.3	17	AM/EM
Black Willow	590	169	1876	1.2	16	AM/EM
Washington Hawthorn	448	68	1858	1.1	16	AM
Southern Crabapple	445	27	1858	1	14	AM
Plum	445	139	1791	1	14	AM
Baldcypress	443	146	1740	1	14	AM
Longleaf Pine	425	85	1729	0.9	13	AM/EM
Southern red Oak	416	121	1639	0.9	13	AM/EM
Shumard Oak	413	90	1493	0.9	12	AM/EM
Swamp chestnut Oak	412	114	1492	0.9	12	AM/EM
Oak	407	94	1466	0.9	11	AM/EM
Shortleaf Pine	374	91	1458	0.9	11	AM/EM
Hickory	355	75	1368	0.9	11	EM
Black Tupelo	354	46	1359	0.9	11	AM
Flowering Dogwood	338	46	1332	0.9	11	AM
Holly	337	59	1323	0.8	11	AM
Winged Elm	327	179	1312	0.8	11	AM
Elm	326	151	1283	0.8	11	AM
Southern Magnolia	322	55	1267	0.8	9	AM
Redbay	322	64	1238	0.8	9	AM
Willow	281	79	1199	0.7	9	AM/EM
American Basswood	261	76	1157	0.7	9	EM
Carolina cherry Laurel	232	2	1145	0.7	7	AM
Red Mulberry	219	44	1114	0.7	6	AM
Savannah Holly	192	63	1098	0.6	5	AM
Sugar Maple	191	71	1094	0.6	4	AM
Common Persimmon	164	38	1093	0.6	7	AM
Mockernu Hickory	140	44	1078	0.6	9	EM
Post Oak	139	55	1037	0.6	7	AM/EM
Bitternut Hickory	138	54	907	0.6	17	EM
White Oak	136	54	891	0.5	16	AM/EM
Pecan	135	44	790	0.5	11	EM
American Hornbeam	133	31	691	0.5	9	AM/EM
American Holly	127	33	665	0.3	7	AM
Sugarberry/Hackberry	111	58	629	0.3	13	AM
Eastern Redbud	72	19	525	0.2	7	AM
Eastern red Cedar	45	17	324	0.2	16	AM+EM
Tulip Tree			3006	1.9	17	AM/EM
Water Oak			2879	1.9	16	AM
American Sycamore			2747	1.9	15	AM/EM
Live Oak			2656	1.9	14	AM
River Birch			2646	1.6	14	AM/EM
Red Maple			2592	1.5	14	AM/EM
Black Walnut			2528	1.5	14	AM
Laurel Oak			2518	1.4	14	AM/EM
Sweetgum			2395	1.4	13	AM
American Elm			2364	1.3	13	AM
Willow Oak			2316	1.3	11	AM
Slippery Elm			2199	1.3	11	AM
Black Cherry			2095	1.3	11	AM
Boxelder			2051	1.3	11	AM/EM
Green Ash			1977	1.1	11	AM/EM
White Ash			1839	1.1	9	AM/AM
Loblolly Pine			1480	1.1	9	EM+AM
American Sycamore				1.9	17	AM/EM
Live Oak				1.9	16	AM
Tulip Tree				1.9	15	AM/EM
Black Walnut				1.9	14	AM
Red Maple				1.6	14	AM/EM
Slippery Elm				1.5	14	AM/EM
Sweetgum				1.5	14	AM
Water Oak				1.4	14	AM/EM
American Elm				1.4	13	AM
Laurel Oak				1.3	13	AM
Boxelder				1.3	11	AM
River Birch				1.3	11	AM
Green Ash				1.3	11	AM
White Ash				1.3	11	AM/EM
Willow Oak				1.1	11	AM/EM
Black Cherry				1.1	9	AM/AM
Loblolly Pine				1.1	9	EM+AM
Southern Magnolia				1.3	17	AM/EM
Black Tupelo				1.2	16	AM/EM
Eastern Cottonwood				1.1	16	AM
Red Mulberry				1	14	AM
Hickory				1	14	AM
Redbay				1	14	AM
Flowering Dogwood				0.9	13	AM/EM
Black Willow				0.9	13	AM/EM
Sugarberry/Hackberry				0.9	12	AM/EM
Hickory				0.9	12	AM/EM
Shumard Oak				0.9	12	AM/EM
Oak				0.9	11	AM/EM
Southern red Oak				0.9	11	AM/EM
Oak				0.9	11	EM
Shortleaf Pine				0.9	11	AM
Carolina cherry Laurel				0.9	11	AM
Southern Crabapple				0.8	11	AM
Swamp chestnut Oak				0.8	11	AM
Plum				0.8	11	AM
American Basswood				0.8	9	AM
Eastern Redbud				0.8	9	AM
Winged Elm				0.7	9	AM/EM
Sugar Maple				0.7	9	EM
Mockernu Hickory				0.7	7	AM
Longleaf Pine				0.7	6	AM
American Hornbeam				0.6	5	AM
Common Persimmon				0.6	4	AM
Willow				0.6	7	AM
Baldcypress				0.6	9	EM
Holly				0.6	7	AM/EM
Carolina cherry Laurel				0.6	17	EM
Savannah Holly				0.6	16	AM/EM
Bitternut Hickory				0.5	11	EM
Pecan				0.5	11	EM
White Oak				0.5	9	AM/EM
American Holly				0.3	7	AM
Post Oak				0.3	13	AM
Washington Hawthorn				0.2	7	AM
Eastern red Cedar				0.2	16	AM+EM

**References:**

- Native tree species selected from City of Houston tree ordinance
- \* Total CO<sub>2</sub> stored and CO<sub>2</sub> sequestration Calculated with CUFR Carbon Calculator (CTCC)
- \* Flood mitigation, Air pollutants removal calculated with i-Tree planting tool
- Annual value calculated = total 10 year - total 9 year
- Flood mitigation = Rainfall interception + avoided runoff
- Air pollutants include O<sub>3</sub> + NO<sub>x</sub> + SO<sub>2</sub> + small particulate matter (PM<sub>2.5</sub>)
- \* Biogenic VOC emission rate includes isoprene and Monoterpenes volatile organic compounds
- \* Diameter at breast height (DBH) - calculated for each tree species when approximately 10 years old
- \* The references of the arbuscular mycorrhizal (AM) and ectomycorrhizal (EM) structural characteristics:

\*\* Teste, François P., et al. "Dual-mycorrhizal Plants: Their Ecology and Relevance." *The New Phytologist*, vol. 225, no. 5, 2020, pp. 1835–51, <https://doi.org/10.1111/nph.16190>.

\*\* Heklau, Heike, et al. "Mixing Tree Species Associated with Arbuscular or Ectotrophic Mycorrhizae Reveals Dual Mycorrhization and Interactive Effects on the Fungal Partners." *Ecology and Evolution*, vol. 11, no. 10, Wiley, 2021, pp. 5424–40, <https://doi.org/10.1002/ece3.7437>.

\*\* <https://extension.okstate.edu/fact-sheets/mycorrhizal-fungi.html>

\*\* <https://www.lebanonturf.com/education-center/tree-shrub-and-flower-care/mycorrhizal-types-on-important-plants>

\*\* <https://www.arboristnow.com/news/mycorrhizae-my-favorite-kind-of-fungi>