



Ecosystem Services of Regional Native Tree Species

Tree species	Total CO ₂ Stored (lbs.)	CO ₂ sequestered (lbs./tree/year)	Flood mitigation (gal./year)	Air pollutants removal w PM2.5 (lbs./year)	Canopy width (ft)	Mycorrhiza Fungi Relationship
	DBH = 10 years*	DBH = 10 years*	DBH = 10 years*	DBH = 10 years*	DBH = 10 years*	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						
Water Oak						
American Sycamore						
Live Oak						
Black Walnut						
Red Maple						
Black Walnut						
Laurel Oak						
Slippery Elm						
Water Oak						
American Elm						
Laurel Oak						
Boxelder						
River Birch						
Green Ash						
White Ash						
Willow Oak						
Black Cherry						
Loblolly Pine						
Southern Magnolia						
Black Tupelo						
Eastern Cottonwood						
Red Mulberry						
Hickory						
Redbay						
Flowering Dogwood						
Black Willow						
Oak						
Southern red Oak						
Oak						
Shortleaf Pine						
Carolina cherry Laurel						
Southern Crabapple						
Swamp chestnut Oak						
Plum						
American Basswood						
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Pecan						
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American Holly						
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Southern red Oak						
Swamp chestnut Oak						
Pecan						
Red Mulberry						
Black Willow						
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Southern Magnolia						
Longleaf Pine						
Southern red Oak						
Shumard Oak						
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Sugarberry/Hackberry						
Eastern Redbud						
Eastern red Cedar						

References:

Native tree species selected from City of Houston tree ordinance

* Total CO₂ stored and CO₂ 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 O₃ + NO₂ + SO₂ + small particulate matter (PM_{2.5})

* 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>