

Houston Ship Channel TREES Program Trees & Riparian Enhancement of Ecosystem Services (TREES)

Background: Houston Ship Channel TREES Program (formerly Port of Houston TREES program) is a multi-year, multipartners collaborative program by Houston Wilderness, Port Houston, Houston Health Department, Buffalo Bayou Partnership, and multiple municipalities and private business along the Houston Ship Channel and Galveston Bay that is focused on enhanced ecosystem services through targeted large-scale tree plantings. The HSC TREES Program is accomplished through a comprehensive tree inventory and installation of thousands of native trees along Lower East Buffalo Bayou, and 25 miles of the Houston Ship Channel, using targeted native tree species, GIS-based data mapping, and avian analysis.

<u>Goals & Impacts</u>: The Port of Houston landscape is distributed over a 25-mile long chain of land areas that are utilized for storage and active port operations but still provide significant green spaces. The HSC TREES Program identified the number and species of trees that already existed and now targets locations along the Ship Channel where additional native trees can be planted. The ability to conduct a comprehensive inventory of a large-scale riparian corridor allowed the program partners to analyze and value this riparian ecosystem more effectively and gain valuable insight into the impacts of the ecosystem services and how to enhance them.

A GIS-based database tracks the trees inventoried, and



the number and tree species planted. Houston Wilderness staff researched, calculated and ranked the ecosystem services values associated with native tree species in our region. Based on these rankings, the top 17 "Super Tree" species are targeted for large-scale plantings along the riparian corridor. These native *Super Tree* species were ranked in priority based on their respective levels of air pollution absorption (GHGs), water absorption and carbon sequestration. Large-scale native *Super Tree* plantings provide a multitude of ecosystem services - increased air & water quality, erosion control, phytoremediation and habitat enhancement. For more information, please see Houston Wilderness website: https://houstonwilderness.org/houston-ship-channel-trees-program

Project Breakdown: Phase 1, 2 and 3 are divided into 5 different sections throughout the 25 miles Houston Ship Channel riparian corridor. To date, over 30,904 native trees have been planted under this Program with many more planned in 2021-2025. The *Houston Ship Channel TREES* program will be particularly impactful to the natural environment and human health and welfare in the industrial and residential areas along the Houston Ship Channel.

- *Phase 1:* Port Houston-owned properties
- Phase 2: Private landowners along Port Houston
- Phase 3: Public properties along the Houston Ship Channel



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Houston Ship Channel TREES Program

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			Ecosystem Services of Regional Native Tree Species							
LDERNESS 6 Our Nature	Total CO ₂ Stored (Ibs.)	CO ₂ sequestrated (lbs./tree/year)		Flood mitigation (gal./year)		Air pollutants removal w PM2.5 (lbs./year)		Canopy width (ft) DBH.≈ 10 years*		Mycorrhiza Fu Relationship A
Tree species	DBH = 10 years*	DBH = 10 years*	Tree species	DBH = 10 years*	Tree Species	DBH.= 10 years*	Tree Species	boin- to fears	Tree Species	or EM**
Live Oak	1023	268	Tulio Tree	2005	American Sycamore	1.9	American Sycamore	17	Live Oak	AM/EM
Black Cherry	971	101	Water Oak	2879	Live Oak	1.9	American Sycamore	16	Black Cherry	AM
River Birch	925	215	American Sycamore	2747	Tulip Tree	1.9	River Birch	15	River Birch	AM/EM
Boxelder	898	159	Live Oak	2656	Black Walnut	1.9	Tulip Tree	14	Boxelder	AM
Laurel Oak	875	194	River Birch	2646	Red Maple	1.6	Black Walnut	14	Laurel Oak	AM/EM
Water Oak	869	173	Red Maple	2592	Slippery Elm	1.5	Red Maple	14	Water Oak	AM/EM
Red Maple	859	139	Black Walnut	2578	Sweetgum	1.5	Sweetgum	14	Red Maple	AM
Willow Oak	739	142	Laurel Oak	2528	Water Oak	1.5	White Ash	14	Willow Oak	AM/EM
Sweetgum	719	142	Sweetgum	2395	American Elm	1.4	Live Oak	13	Sweetgum	AM/EM
	669	197	American Elm	2395	Laurel Oak	1.3	Water Oak	13		AM
Slippery Elm									Slippery Elm	
American Elm	667		Willow Oak	2316	Boxelder	1.3	Black Cherry	11	American Elm	AM
Tulip Tree			Slippery Elm		River Birch		Green Ash	-11	Tulip Tree	AM
American Sycamore	652		Black Cherry	2095	Green Ash	1.3	Laurel Oak	11	American Sycamore	AM
Green Ash	624		Boxelder	2051	White Ash	1.3	Loblolly Pine	11	Green Ash	AM/EM
Loblolly Pine	479	106	Green Ash	1977	Willow Oak	1.1	Willow Oak	11	Loblolly Pine	AM/EM
White Ash	447	118	White Ash	1839	Black Cherry	1.1	Slippery Elm	9	White Ash	AM/EM
Black Walnut	386	76	Loblolly Pine	1480	Loblolly Pine	1.1	Boxelder	9	Black Walnut	AM/EM
Eastern Cottonwood	591	175	Hickory	1907	Southern Magnolia	13	Southern red Oak	17	Eastern Cottonwood	AM/EM
Black Willow	590	169	Red Mulberry	1876	Black Tupelo	1.2	Swamp chestnut Oak	16	Black Willow	AM/EM
Washington Hawthorn	448	68	Black Tupelo	1858	Eastern Cottonwood	1.1	Pecan	16	Washington Hawthorn	AM
Southern Crabapple	445	27	Southern red Oak	1858	Red Mulberry	-	Red Mulberry	14	Southern Crabapple	AM
Plum	445	139	Eastern Cottonwood	1791	Hickory	1	Black Willow	14	Plum	AM
Baldcypress	443	146	Oak	1740	Redbay	1	Willow	14	Baldcypress	AM
Longleaf Pine	425	85	Swamp chestnut Oak	1779	Flowering Dogwood	0.9	Southern Magnolia	13	Longleaf Pine	AM/EM
Southern red Oak	416	121	Flowering Dogwood	1639	Black Willow	0.9	Sugarberry/Hackberry	13	Southern red Oak	AM/EM
Shumard Oak	413	90	Plum	1493	Sugarberry/Hackberry	0.9	Hickory	12	Shumard Oak	AM/EM
Swamp chestnut Oak	412	114	Shumard Oak	1492	Shumard Oak	0.9	Shumard Oak	12	Swamp chestnut Oak	AM/EM
Oak	407	94	Black Willow	1466	Elm	0.9	Oak	-11-	Oak	AM/EM
Shortleaf Pine	374	91	Southern Magnolia	1458	Southern red Oak	0.9	Shortleaf Pine	11	Shortleaf Pine	AM/EM
Hickory	355	75	Redbay	1368	Oak	0.9	Southern Crabapple	11	Hickory	EM
Black Tupelo	354	46	Southern Crabapple	1359	Shortleaf Pine	0.9	Eastern Redbud	11	Black Tupelo	AM
Flowering Dogwood	338	46	Shortleaf Pine	1332	Carolina cherry Laurel	0.9	Sugar Maple	11	Flowering Dogwood	AM
Holly	337	59	Fim	1323	Southern Crabapple	0.8	American Hornbeam	11	Holly	AM
Winged Elm	327	179	Carolina cherry Laurel	1312	Swamp chestnut Oak	0.8	Common Persimmon	11	Winged Elm	AM
Elm	326	151	Pecan	1283	Plum	0.8	White Oak	11	Elm	AM
Southern Magnolia	320	55	Winged Elm	1267	American Basswood	0.8	Black Tupelo	9	Southern Magnolia	AM
Redbay	322	64	Eastern Redbud	1238	Eastern Redbud	0.8	Flowering Dogwood		Redbay	AM
Willow	281	79	American Basswood	1199	Winged Elm	0.7	Baldcypress		Willow	AM/EM
American Basswood	261	75	Sugarberry/Hackberry	1155	Sugar Maple	0.7	Washington Hawthorn		American Basswood	EM
Carolina cherry Laurel	232	2	Mockernu Hickory	1137	Mockernu Hickory	0.7	Savannah Holly	7	Carolina cherry Laurel	AM
Red Mulberry	232	44	Willow	1145	Longleaf Pine	0.7	American Holly	6	Red Mulberry	AM
	192	63		1098		0.6		5		AM
Savannah Holly	175	71	Bitternut Hickory	1098	American Hornbeam		Holly		Savannah Holly	
Sugar Maple			Longleaf Pine		Common Persimmon	0.6	Eastern red Cedar	4	Sugar Maple	AM
Common Persimmon			Common Persimmon		Willow	0.6	American Basswood	7	Common Persimmon	AM
Mockernu Hickory	140		Baldcypress	1078	Baldcypress	0.6	Bitternut Hickory	9	Mockernu Hickory	EM
Post Oak	139	55	American Hornbeam	1037	Holly	0.6	Carolina cherry Laurel	7	Post Oak	AM/EM
Bitternut Hickory	138	54	White Oak	907	Savannah Holly	0.6	Eastern Cottonwood	17	Bitternut Hickory	EM
White Oak	136	54	Sugar Maple	891	Bitternut Hickory	0.5	Elm	16	White Oak	AM/EM
Pecan	135	44	Washington Hawthorn	790	Pecan	0.5	Longleaf Pine	11	Pecan	EM
American Hornbeam	133	31	Post Oak	691	White Oak	0.5	Mockernu Hickory	9	American Hornbeam	AM/EM
American Holly	E 127	33	Holly	665	American Holly	0.3	Plum	7	American Holly	AM
Sugarberry/Hackberry	111	58	Savannah Holly	629	Post Oak	0.3	Post Oak	13	Sugarberry/Hackberry	AM
Eastern Redbud	72	19	American Holly	525	Washington Hawthorn	0.2	Redbay	7	Eastern Redbud	AM
Eastern red Cedar	45	17	Eastern red Cedar	324	Eastern red Cedar	0.2	Winged Elm	16	Eastern red Cedar	AM/EM

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** Heahu, Hein, et al. "Milling TR: Species Associated with Abuscular or Ectorrophic Mycorrhizata Reveals Dual Mycorrhization and Interactive Effects on the Fungal Partners." Ecology and Evolutions vol. 11, no. 10, Wiley, 2021, pp. 5424–40, https://doi.org/10.1002/ece3.7437.

(non-gg bactory counter) ** https://patnision.okstate.edu/fact-sheets/mycorrhizal-fungi.html ** https://www.iebanonturf.com/education-center/tree-shrub-and-flower-care/mycorrhizal-types-on-important-plants ** https://www.arboristnow.com/news/mycorrhizae-my-favorite-kind-of-fungi