

Delta-X: Vegetation Species, Structure, Aboveground Biomass, MRD, LA, USA

Dataset Version: 1

Summary

This dataset provides vegetation species, height, stem density and diameter, and species aboveground biomass (AGB) measurements collected at herbaceous and forested wetland sites across the Atchafalaya and Terrebonne basins within the Mississippi River Delta (MRD) floodplain in coastal Louisiana, USA.

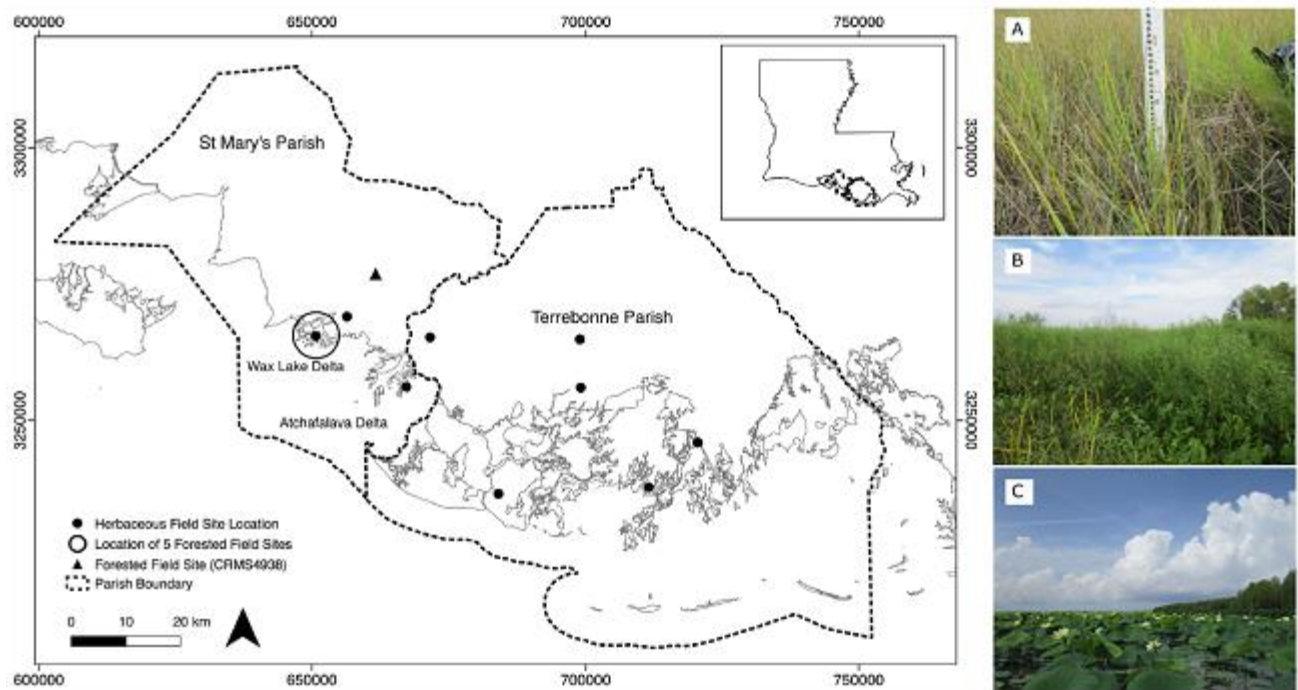


Figure 1. Site location map and vegetation representative in the areas. A) An example of *Spartina* which is common throughout the wetland. B) An example of the dense cover and heterogeneity of the herbaceous marsh. C) An example of floating vegetation at the study site Source: Thomas et al., 2019

Table of Contents

1. [Dataset Overview](#)
2. [Data Characteristics](#)
3. [Application and Derivation](#)
4. [Quality Assessment](#)
5. [Data Acquisition, Materials, and Methods](#)

6. [Data Access](#)
7. [References](#)

Dataset Overview

This dataset provides vegetation species, height, stem density and diameter, and species aboveground biomass (AGB) measurements collected at herbaceous and forested wetland sites across the Atchafalaya and Terrebonne basins within the Mississippi River Delta (MRD) floodplain in coastal Louisiana, USA.

Project: [Delta-X](#)

The Delta-X mission is a NASA Earth Venture Suborbital-3 mission to study the Mississippi River Delta in the United States, which is growing and sinking in different areas. River deltas and their wetlands are drowning as a result of sea level rise and reduced sediment inputs. The Delta-X mission will determine which parts will survive and continue to grow, and which parts will be lost. Delta-X begins with airborne and in situ data acquisition and carries through data analysis, model integration, and validation to predict the extent and spatial patterns of future deltaic land loss or gain.

Related Publications

Thomas, N., M. Simard, E. Castañeda-Moya, K. Byrd, L. Windham-Myers, A. Bevington, and R.R. Twilley. 2019. High-resolution mapping of biomass and distribution of marsh and forested wetlands in southeastern coastal Louisiana. *International Journal of Applied Earth Observation and Geoinformation*, 80:257–267. <https://doi.org/10.1016/j.jag.2019.03.013>

Jensen, Daniel, Kyle C. Cavanaugh, Marc Simard, Gregory S. Okin, Edward Castañeda-Moya, Annabeth McCall, and Robert R. Twilley. 2019. “Integrating Imaging Spectrometer and Synthetic Aperture Radar Data for Estimating Wetland Vegetation Aboveground Biomass in Coastal Louisiana.” *Remote Sensing* 11 (21): 2533. <https://doi.org/10.3390/rs11212533>

Related Datasets

Castaneda, E., A.I. Christensen, M. Simard, A. Bevington, R. Twilley, and A. McCall. 2020. Pre-Delta-X: Vegetation Species, Structure, Aboveground Biomass, MRD, LA, USA, 2015. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAAC/1805>

Acknowledgments

This work was supported by the Delta-X mission (funded under the NASA Earth Venture Suborbital-3 program), Caltech/JPL President Director's Fund FY14, JPL's Research and Technology Development (R&TD) FY15 and FY16, and JPL's Strategic R&TD FY17-19.

Data Characteristics

Spatial Coverage: Atchafalaya and Terrebonne Basins, Mississippi River Delta (MRD) floodplain, southern coast of Louisiana, USA

Spatial Resolution: Points

Temporal Coverage: 2021-03-21 to 2021-03-31

Temporal Resolution: One-time measurement

Site Boundaries: Latitude and longitude are given in decimal degrees.

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Atchafalaya and Terrebonne Basins	-91.44531	-90.82192	29.51	29.17143

Data File Information

There is one data file in comma-separated value (.csv) format. The file is named **DeltaX_AGB_Vegetation_Structure.csv**.

Table 1. Variable names and descriptions. Missing values are indicated by -9999 or NA. The descriptions and units need to be checked-the vars are correct for the new file

Variable	Units	Description
basin		Atchafalaya or Terrebonne
campaign		Spring 2015 or Fall 2015
date	YYYY-MM-DD	Date of sampling
latitude	decimal degrees	Latitude of site
longitude	decimal degrees	Longitude of site
site_id		Site name; sites labeled with "CRMS" are part of the Coastal Reference System (CRMS, Steyer et al., 2003); sites beginning with "T" are forested; they are large plots where multiple trees were measured, and allometric equations were used to estimate biomass
hydrogeomorphic_zone		
sampling_station		
quarter_id		
dominant_species		Name of vegetation
vegetation_class		
numbers_stems_per_quarter		

Variable	Units	Description
mean_height	cm	Height of plants within a plot; provided for forested sites for Spring 201
mean_diameter	cm	Diameter of plant stems within a plot; provided for forested sites for Spr only
stem_density	stems/m ²	Number of plant stems per unit area; provided for forested sites for Sprin only

Application and Derivation

Vegetation structure and AGB estimates will be used to calibrate remote sensing data (e.g., UAVSAR, AVIRIS-NG) and hydrodynamics and sediment transport models. The models will quantify the mesoscale (i.e., on the order of 1 ha) patterns of soil accretion that control land loss and gain and predict the resilience of deltaic floodplains under projected relative sea-level rise.

Understanding and mitigating the impact of the relative sea-level rise on coastal deltas is urgent. If ignored, relative sea-level rise will very soon have devastating consequences on the livelihood of the half-billion people that live in these low-lying coastal regions (Thomas et al., 2019).

Data Acquisition, Materials, and Methods

Study Area

The study area was the Atchafalaya and Terrebonne Basins on the southern coast of Louisiana within the Mississippi River Delta (MRD) floodplain (Figure 2). The Mississippi Delta formed as a series of overlapping lobes over the past 6000–7000 years and consists of two physiographic units, the Deltaic plain to the east and Chenier plain to the west. The deltaic plain contains the Atchafalaya River, a major tributary of the Mississippi River that dominates the study site and which terminates at the Wax Lake and Atchafalaya Deltas (Roberts, 1997). These deltas receive water and sediment discharge from the Atchafalaya River, which is maintained at 30% of the combined discharge of the Mississippi and Red Rivers. April is considered the early phase of the vegetation growing season and the peak of the spring river flood season. Several of the selected sites for field measurements are part of the Coastal Reference Monitoring System (CRMS, Steyer et al. 2003).

Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

[Pre-Delta-X: Vegetation Species, Structure, Aboveground Biomass, MRD, LA, USA, 2015](#)

Contact for Data Center Access Information:

- E-mail: uso@daac.ornl.gov

- Telephone: +1 (865) 241-3952

References

- Chojnacky, D.C., L.S. Heath, and J.C. Jenkins. 2013. Updated generalized biomass equations for North American tree species. *Forestry*, 87(1):129–151. <https://doi.org/10.1093/forestry/cpt053>
- Jenkins, J.C., D.C. Chojnacky, L.S. Heath, and R.A. Birdsey. 2003. National-scale biomass estimators for United States tree species. *Forest Science*, 49(1):12–35. <https://doi.org/10.1093/forestscience/49.1.12>
- Jenkins, J.C., D.C. Chojnacky, L.S. Heath, and R.A. Birdsey. 2004. Comprehensive database of diameter-based biomass regressions for North American tree species. General Technical Report NE-319. US Department of Agriculture, ForestService, Northeastern Research Station, Newtown Square, PA, pp. 45. <https://doi.org/10.2737/NE-GTR-319>
- Roberts, H.H. 1997. Dynamic changes of the Holocene Mississippi River delta plain: The delta cycle. *Journal of Coastal Research*, 605–627. <https://www.jstor.org/stable/4298659>
- Steyer, G.D., C.E. Sasser, J.M. Visser, E.M. Swenson, J.A. Nyman, and R.C. Raynie. 2003. A proposed coast-wide reference monitoring system for evaluating wetland restoration trajectories in Louisiana. *Environmental Monitoring and Assessment*, 81(1/3):107–117. <https://doi.org/10.1023/A:1021368722681>
- Thomas, N., M. Simard, E. Castañeda-Moya, K. Byrd, L. Windham-Myers, A. Bevington, and R.R. Twilley. 2019. High-resolution mapping of biomass and distribution of marsh and forested wetlands in southeastern coastal Louisiana. *International Journal of Applied Earth Observation and Geoinformation*, 80:257–267. <https://doi.org/10.1016/j.jag.2019.03.013>
-