



2021 Delta-X Open Data Workshop

November 17, 2021

Delta-X Website

Summary

River deltas and their wetlands are drowning as a result of sea level rise and reduced sediment inputs. The Delta-X mission (NASA EVS-3) will determine which parts will survive and continue to grow, and which parts will be lost. The Delta-X team has completed their Spring and Fall 2021 airborne and field campaigns. Learn about the data and how to access it.

Agenda

2:00 PM Introduction to Delta-X

2:20 PM Datasets

2:50 PM Data Location & Access

3:40 PM Discussion & Questions

4:00 PM End of workshop



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Delta-X

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Products

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River deltas and their wetlands are drowning as a result of sea level rise

Products

Data Products

Data Collected

Here are the **field data** that were collected during the Spring and Fall 2021 campaigns:

Instrument	Spring 2021	Fall 2021
Acoustical Doppler Current Profiler (ADCP)	Collected	Collected
Anemometers	<i>Not collected</i>	Collected
Fallout radionuclide	<i>Not collected</i>	Collected
Feldspar plots (soil accretion)	Collected	Collected
GPS	<i>Not collected</i>	Collected
Laser In-situ Scattering & Transmissometry (LISST)	Collected	Collected
Particular Organic Carbon (POC) concentrations	Collected	Collected
Sediment concentration & grain size	Collected	Collected
Sediment core	Collected	Collected
Sonar	<i>Not collected</i>	Collected
Total Suspended Solids (TSS)	Collected	Collected
Turbidity within islands	Collected	Collected
Vegetation structure	Collected	Collected
Water level gauges	Collected	Collected
Water quality indicators	Collected	Collected
Water reflectance	Collected	Collected

Here are the **airborne data** that were collected during the Spring and Fall 2021 campaigns:

Instrument	Spring 2021	Fall 2021
UAVSAR	Collected (high, low, rising tides)	Collected (high, rising tides)
AVIRIS	Collected	Collected
AirSWOT	Collected (high, low, rising tides)	Collected (high, low, rising tides)

Products

Delta-X delivers **L0-L4 data products** progressively by level.

Level Description

L0 Field data (in situ)

L1 Raw remote sensing data

L2 Georeferenced remote sensing data

L3 Remote sensing measurements

L4 Science products

Delta-X begins with airborne and field 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**.

Here is the list of products that will be delivered:

Level Deliverable Products

0 In situ only: vegetation structure, RTK, GPS, ADCP, sonar, accretion, water level, TSS

1 UAVSAR single-look complex (SLC) images, quad-polarized

1 AVIRIS-NG hyperspectral

1b UAVSAR interferometric products

1b AirSWOT interferogram

2 UAVSAR georeferenced interferometric products

2 AirSWOT georeferenced interferogram

2 AVIRIS-NG reflectance

2b AVIRIS-NG bidirectional reflectance distribution function

UVASAR area maps of water level vs. time (georeferenced)
UVASAR channels > 10 m wide

3 AirSWOT water-surface elevation vs. time

AVIRIS-NG hydrogeomorphic zones

AVIRIS-NG aboveground biomass

AVIRIS-NG water quality (sediment concentration)

Map of bathymetry/elevation
Map of friction coefficient in channels
Map of friction coefficient in wetlands
Relationship of friction coefficient with vegetation structure
Calibrated hydrodynamic model for Mississippi River Delta (MRD)
Discharge in channels from model

4 Flow of water from model

Mineral sediment deposition across landscape from model

Map of vegetation belowground biomass

Calibrated NUMAN/MEM for MRD

Ecosystem biomass from model

Map of soil accretion at annual time steps to year 2100

Validated soil accretion at annual time steps to year 2024



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Products

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Data Download

Final datasets

Final Delta-X (and Pre-Delta-X) products are made available to download at the **Oak Ridge National Laboratory Distributed Active Archive Center (ORNL DAAC)**.

[View datasets at the ORNL DAAC](#)

Level 1 (raw remote sensing data)

UAVSAR L1 SLC quad-pol stack data is available on the project website.

NOTE: **UAVSAR login required**.

- [atchaf_06309_02](#) (Mar 27–Apr 2, 2021), Atchafalaya River Delta, LA
- [atchaf_19809_02](#) (Mar 27–Apr 2, 2021), Atchafalaya River Delta, LA
- [wterre_16300_02](#) (Apr 5–7, 2021), West Terrebonne Basin, LA
- [wterre_34202_02](#) (Apr 5–7, 2021), West Terrebonne Basin, LA
- [eterre_08705_02](#) (Apr 12–18, 2021), East Terrebonne Basin, LA
- [eterre_27309_01](#) (Apr 12–18, 2021), East Terrebonne Basin, LA



UAVSAR flight lines

Preliminary data

No preliminary data products available yet.

The screenshot shows the ORNL DAAC homepage with a search bar and navigation menu. The main content area is titled "Delta-X" and includes an "Overview" section with a mission logo and text about the study of the Mississippi River Delta. Below this is a "Delta-X Datasets List" section with a table of 16 datasets. The table columns include "Dataset", "Updated", "Published", "User Guide", "Download", and "Size". Each row shows a dataset name, its date, and download links.

Dataset	Updated	Published	User Guide	Download	Size
Delta-X: Acoustic Doppler Current Profiler Channel Surveys, Coastal Louisiana, 2021 <small>NEW</small>	2021-10-29	2021-10-29	User Guide	Download	3.5MB
Pre-Delta-X: UAVSAR Georeferenced Channel Maps, Atchafalaya Basin, LA, USA, 2016	2021-09-23	2021-09-23	User Guide	Download	8.8MB
Pre-Delta-X: L1 UAVSAR Single Look Complex and Interferograms, MRD, LA, USA, 2016	2021-07-23	2021-02-26	User Guide	Download	
Pre-Delta-X: UAVSAR-derived Water Level Change Maps, Atchafalaya Basin, LA, USA, 2016	2021-04-05	2021-02-18	User Guide	Download	613.5MB
Pre-Delta-X: Aboveground Biomass and Vegetation Maps, Wax Lake Delta, LA, USA, 2016	2021-04-03	2021-02-26	User Guide	Download	3.8MB
Pre-Delta-X: AVIRIS-derived Total Suspended Solids Maps for MRD, LA, USA, 2015-2016	2021-04-03	2021-02-26	User Guide	Download	288.9MB
Pre-Delta-X: L2 AirSWOT Water Surface Elevations, Atchafalaya Basin, LA, USA, 2016	2021-04-03	2021-02-18	User Guide	Download	
Pre-Delta-X: L3 AirSWOT-derived Water Level Profiles, Wax Lake Outlet, LA, USA, 2015	2021-04-03	2021-02-18	User Guide	Download	4.7MB
Pre-Delta-X: Lidar-derived Water Level Profiles in the Wax Lake Outlet, LA, USA, 2016	2021-04-03	2021-02-26	User Guide	Download	14.9MB
Pre-Delta-X: L2 AVIRIS-NG Surface Spectral Reflectance across MRD, LA, USA, 2015-2016	2021-02-26	2021-02-26	User Guide	Download	
Pre-Delta-X: Channel Bathymetry of the Atchafalaya Basin, LA, USA, 2016	2020-08-31	2020-08-31	User Guide	Download	561.2MB



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Delta-X

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River deltas and their wetlands are drowning as a result of sea level rise

Search

Explore the data in a map interface

Currently only includes Pre-Delta-X field data



Data Search

Filters

Search Results

Downloads include data from all selected campaigns & documentation.

- Atchafalaya Basin [download KML](#)
- Terrebonne Basin [download KML](#)

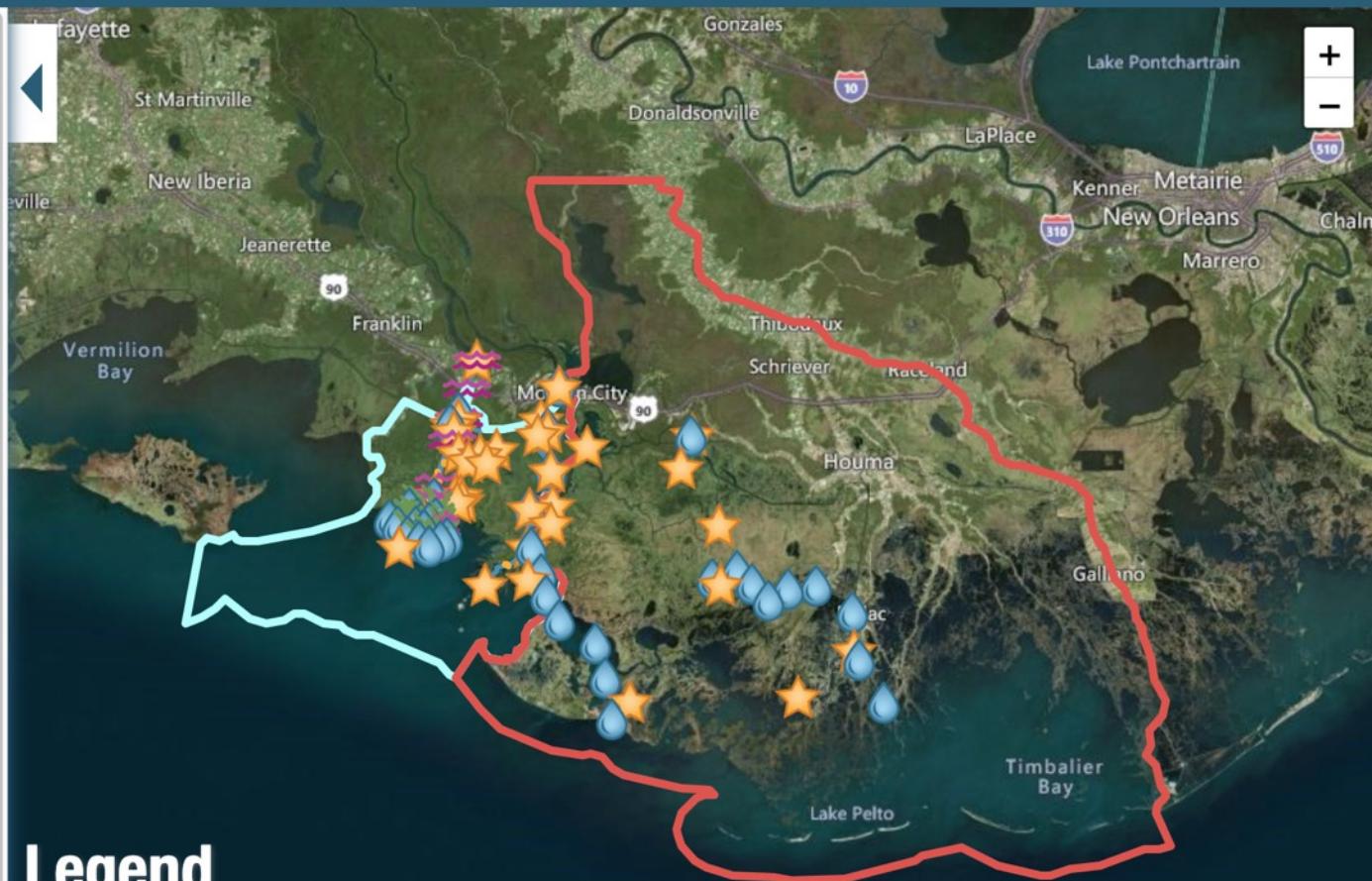
Field Data i

[select all](#) [unselect all](#)

- Bathymetry [download](#)
- Biomass & species [download](#)
- Water discharge [download](#)
- Water level [download](#)

Water quality

- Spectral reflectance [download](#)
- Total suspended solids (TSS) [download](#)



Legend

- Bathymetry
- Biomass
- Intensive site
- Water discharge
- Water level
- Water quality

Search

Filters (search criteria)

- campaigns
- datasets

Information button (i)

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Data Search

Filters

Campaign
 Pre-Delta-X (2015 & 2016)

Field Data (i)

select all **unselect all**

- Bathymetry
- Biomass & species
- Water discharge
- Water level

Water quality

- Spectral reflectance
- Total suspended solids (TSS)

Search

A map of the Mississippi River delta area, including Vermilion Bay, Lake Pontchartrain, and Lake Borgne. A red outline highlights a specific region around Morgan City and Thibodaux. Numerous data points are marked with orange stars (Intensive site) and blue water droplets (Water quality). The map also shows major roads like I-10 and I-310, and towns like Donaldsonville, LaPlace, and Marrero.

Legend

- Bathymetry
- Biomass
- Intensive site
- Water discharge
- Water level
- Water quality

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Search

Instrument
information
pop-up

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Data Search | Filters

Campaign Pre-Delta-X (2015 & 2016)

Field Data i

select all **unselect all**

- Bathymetry
- Biomass & species
- Water discharge
- Water level

Water quality

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- Total suspended solids (TSS)

Search

Search Results

Info: Field Data

Field Data products are generated from the following instruments:

ADCP (Water discharge): Acoustical doppler current profiler (ADCP) data provided near-instantaneous estimates of river discharge across the sampled channels. Surveys were taken using the SonTek M9 ADCP system.

Discrete water samples (Total suspended solids (TSS)): Water samples were collected by bottle. The total suspended solids (TSS) concentration was calculated as the difference of the filter weight

OK

Legend:

- Bathymetry
- Biomass
- Intensive site
- Water discharge
- Water level
- Water quality

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Search

Results

select/unselect checkboxes



Data Search

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Search Results

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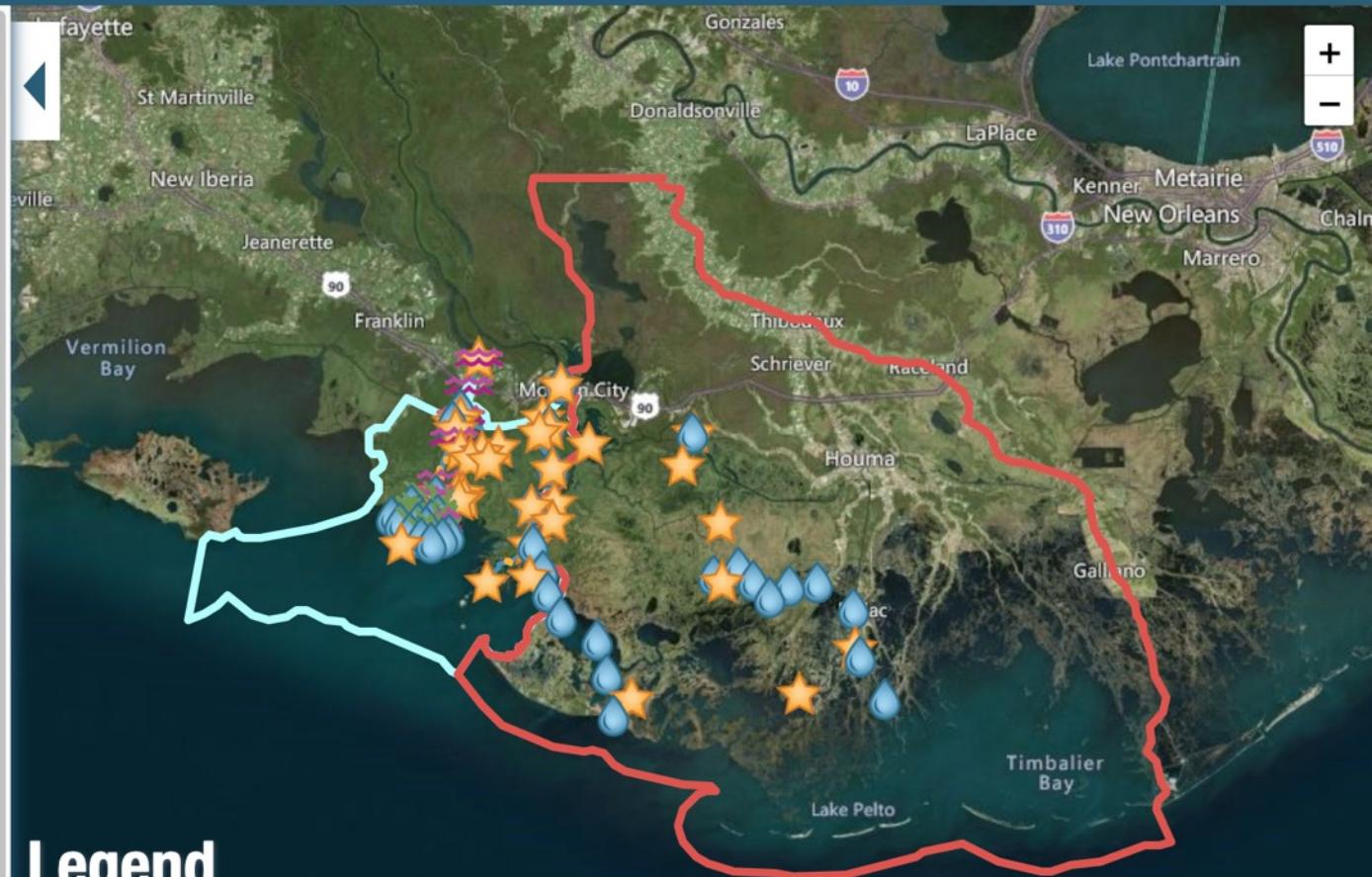
Field Data

[select all](#) [unselect all](#)

- Bathymetry [download](#)
- Biomass & species [download](#)
- Water discharge [download](#)
- Water level [download](#)

Water quality

- Spectral reflectance [download](#)
- Total suspended solids (TSS) [download](#)



Legend

- Bathymetry
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- Intensive site
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- Water level
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Search

Basin KML
files



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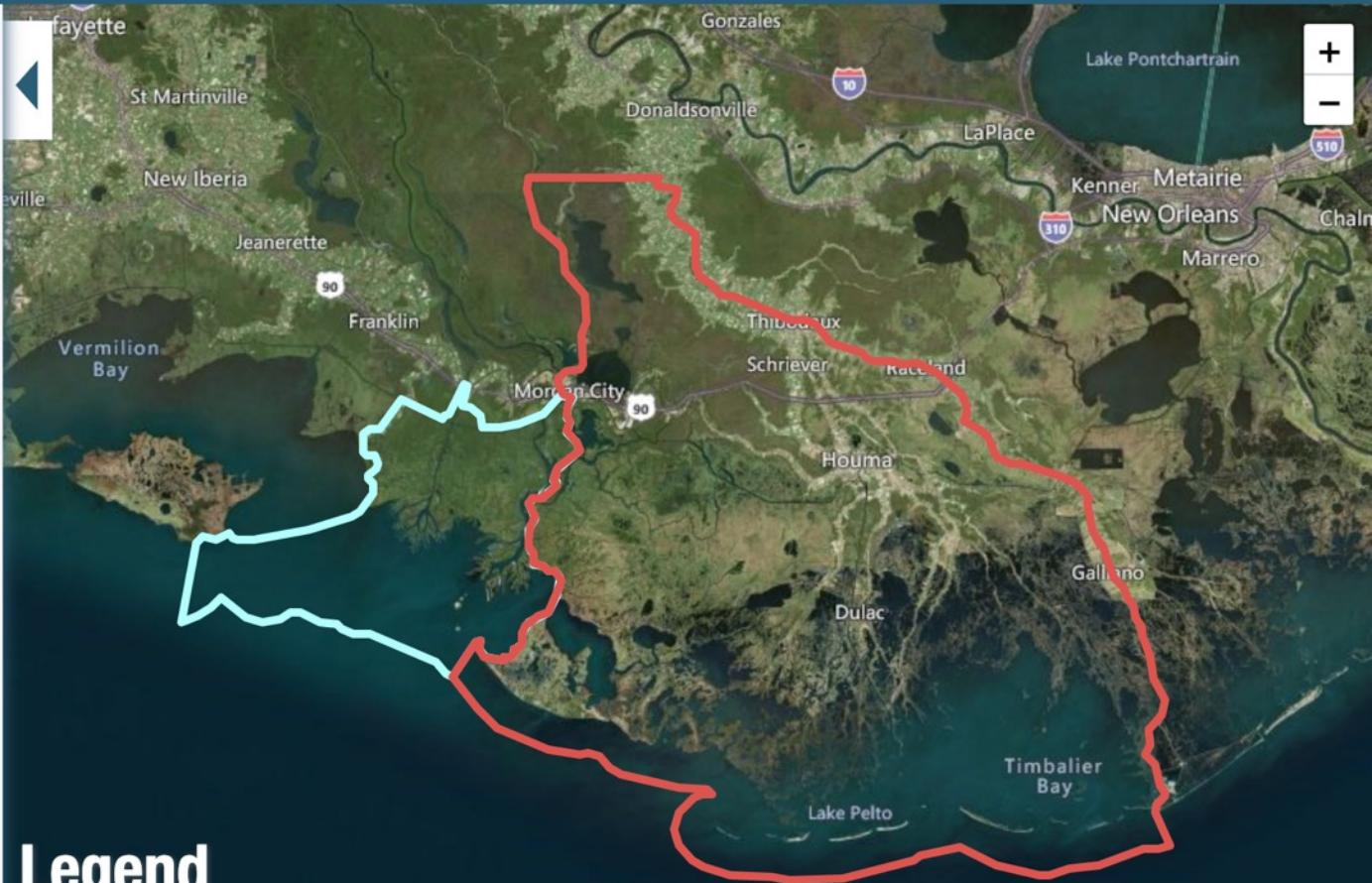
Field Data i

[select all](#) [unselect all](#)

- Bathymetry [download](#)
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- Water level [download](#)

Water quality

- Spectral reflectance [download](#)
- Total suspended solids (TSS)



Legend

- Bathymetry
- Biomass
- ★ Intensive site
- Water discharge
- ~ Water level
- Water quality

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Search

Map legend
& items

Data Search

Filters

Search Results

Downloads include data from all selected campaigns & documentation.

- Atchafalaya Basin [download KML](#)
- Terrebonne Basin [download KML](#)

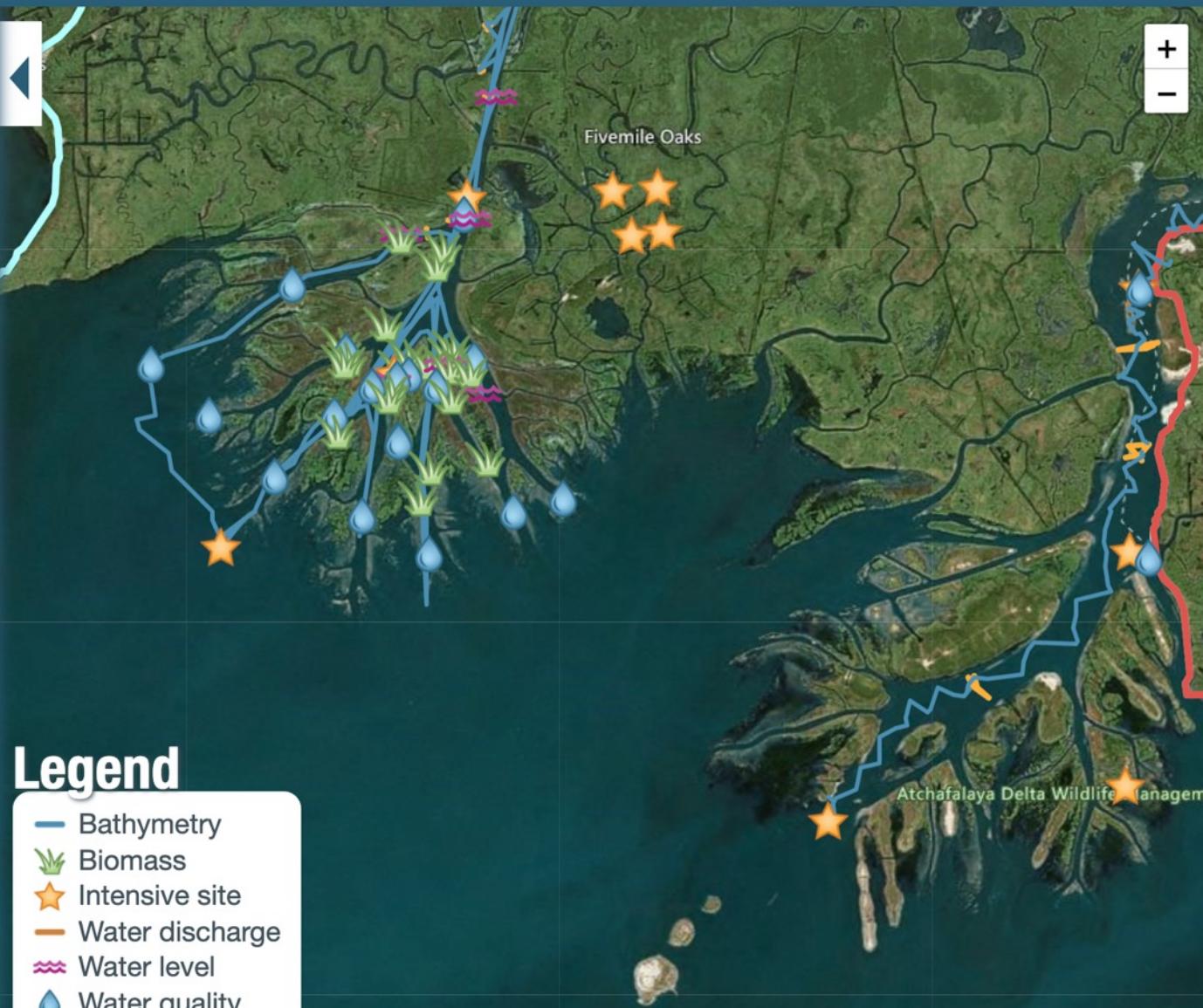
Field Data

[select all](#) [unselect all](#)

- Bathymetry [download](#)
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- Water discharge [download](#)
- Water level [download](#)

Water quality

- Spectral reflectance [download](#)
- Total suspended solids (TSS)



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Search

Map items

Data Search

Filters

Search Results

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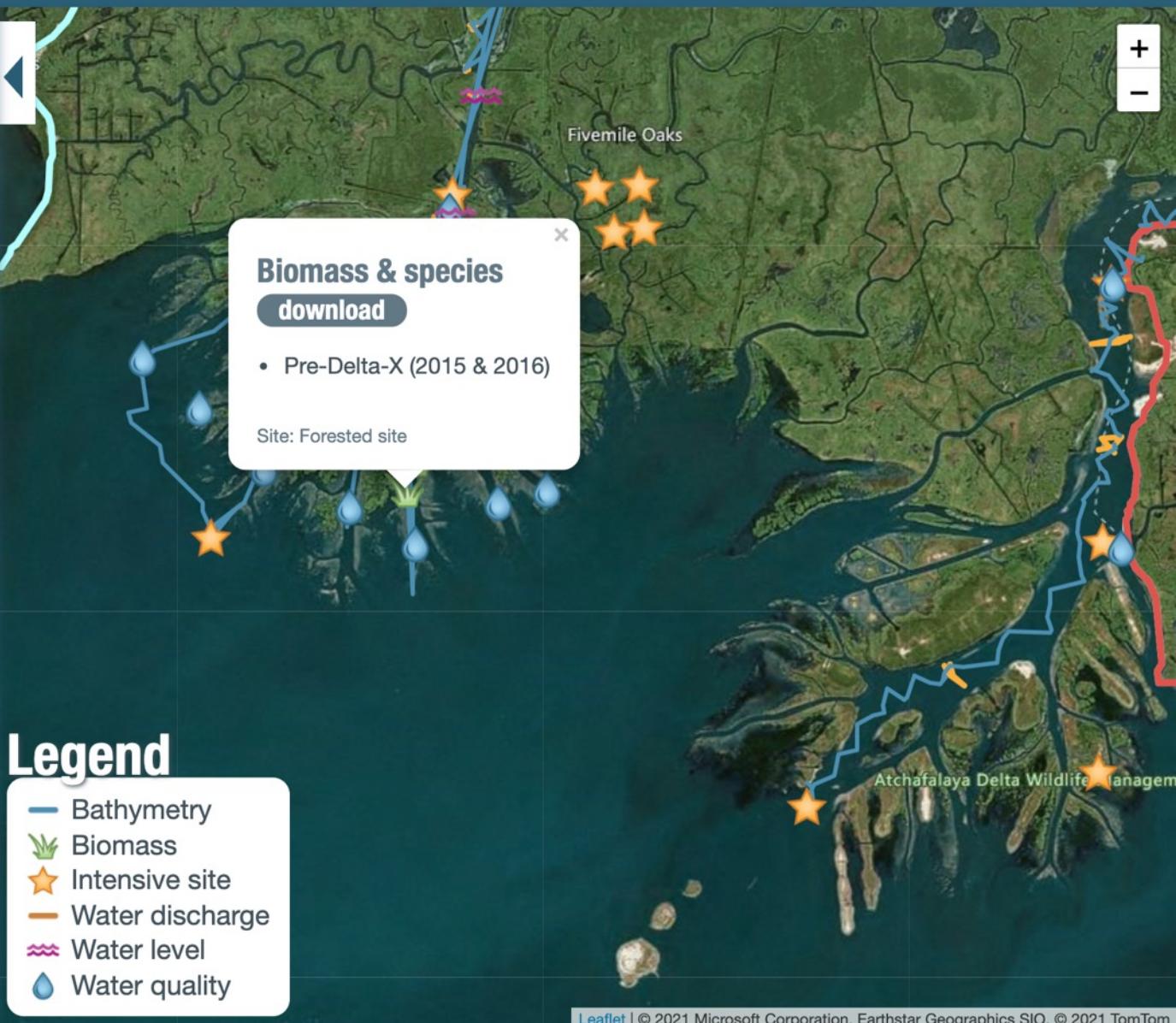
Field Data

[select all](#) [unselect all](#)

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Water quality

- Spectral reflectance [download](#)
- Total suspended solids (TSS) [download](#)



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Search

Intensive site

Data Search

Filters

Search Results

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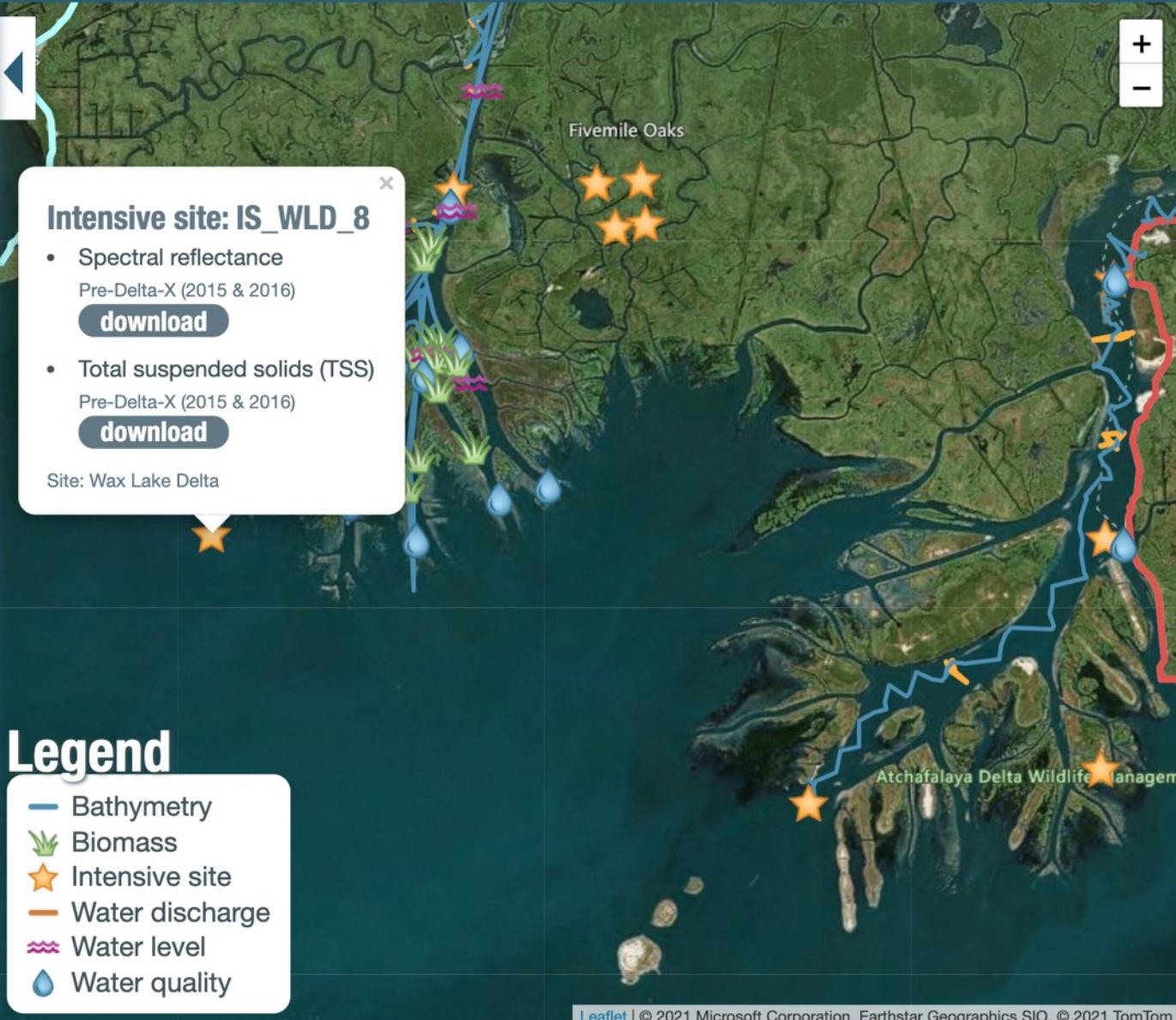
Field Data

[select all](#) [unselect all](#)

- Bathymetry [download](#)
- Biomass & species [download](#)
- Water discharge [download](#)
- Water level [download](#)

Water quality

- Spectral reflectance [download](#)
- Total suspended solids (TSS)



Search

Download
example



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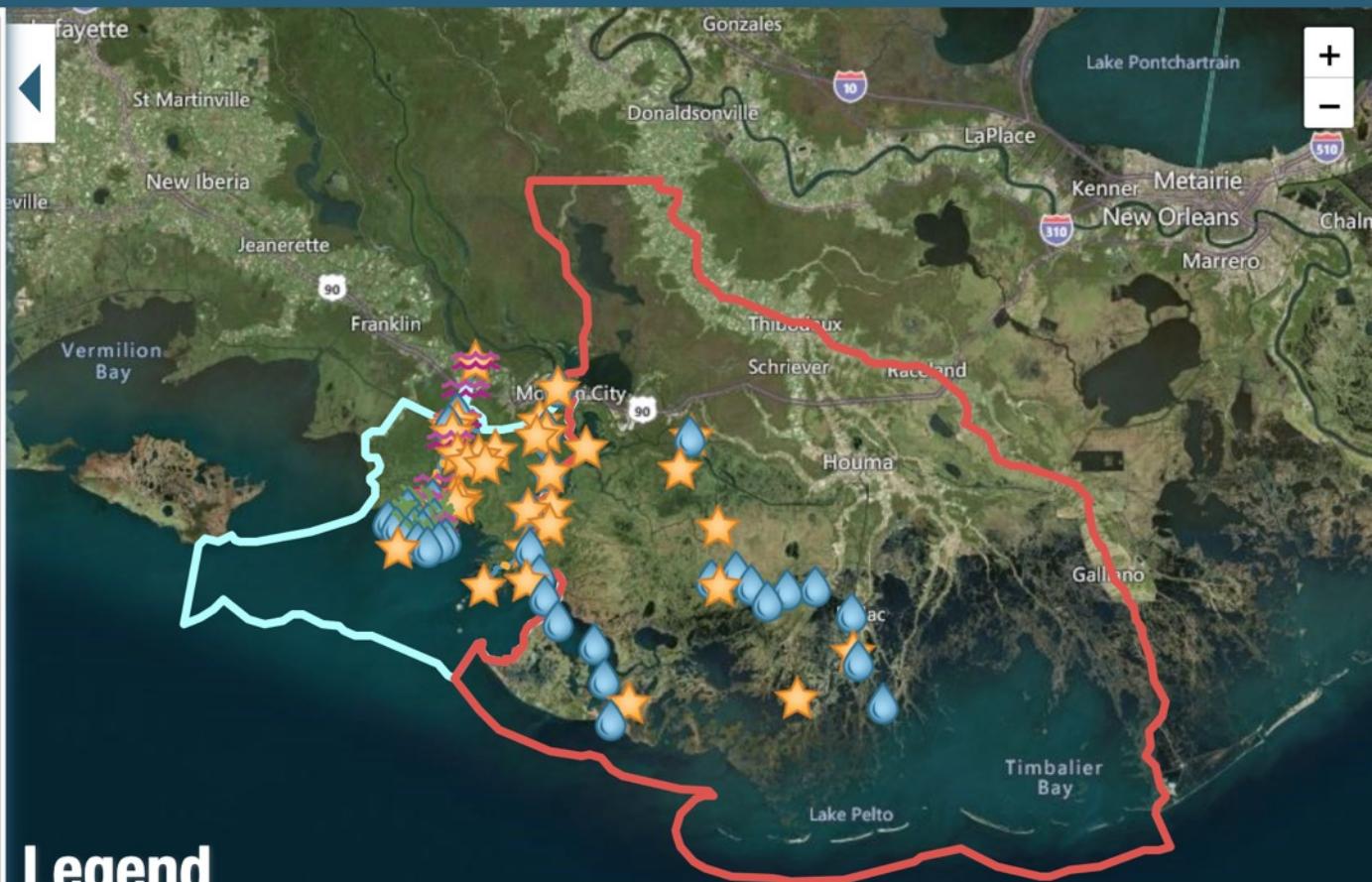
Field Data i

[select all](#) [unselect all](#)

- Bathymetry [download](#)
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- Total suspended solids (TSS)



Legend

- Bathymetry
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- ★ Intensive site
- Water discharge
- ~~~ Water level
- Water quality

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Search

Download example:
pop-up

Downloads a
gzip file

The screenshot shows the Delta-X Data Search interface. At the top, the NASA logo, Jet Propulsion Laboratory, California Institute of Technology, and Delta-X are displayed. The main area shows a map of the Atchafalaya Basin with various data layers and a legend. A search results panel is visible on the left, and a download dialog box is overlaid on the map.

Download Files

These files will be downloaded:

- PreDeltaX_Water_Level_Data.pdf (1.3 MB)
- PreDeltaX_WaterLevel_Atchafalaya_WL01.csv (271 KB)
- PreDeltaX_WaterLevel_Atchafalaya_WL02.csv (271 KB)
- PreDeltaX_WaterLevel_Atchafalaya_WL03.csv (271 KB)
- PreDeltaX_WaterLevel_Atchafalaya_WL04.csv (93 KB)
- PreDeltaX_WaterLevel_Atchafalaya_WL05.csv (100 KB)
- PreDeltaX_WaterLevel_Atchafalaya_WL06.csv (100 KB)
- PreDeltaX_WaterLevel_Atchafalaya_WL07.csv (271 KB)

Documentation (highlighted with a red arrow)

Cancel **Download**

Legend:

- Bathymetry
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- Intensive site
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- Water quality

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Search

Documentation

Pre-Delta-X: Water Levels across Wax Lake Outlet, Atchafalaya Basin, LA, USA, 2016

Get Data

Documentation Revision Date: 2020-08-25

Dataset Version: 1

Summary

This dataset provides absolute water level elevations derived for 10 locations across the Wax Lake Delta, Atchafalaya Basin, in Southern Louisiana, USA, within the Mississippi River Delta (MRD) floodplain. Field measurements were made during the Pre-Delta-X campaign on October 13–20, 2016. Relative water level measurements were recorded every five minutes during a one-week period using in situ pressure transducers (Solinst) to measure water surface elevation change with millimeter accuracy. The Solinst system combines a total pressure transducer (TPT) and a temperature sensor. One unit of the TPT measures the sum of the atmospheric and water pressure above the TPT. Atmospheric pressure fluctuations must be accounted for to obtain the height of the water column above the TPT. An absolute elevation correction was applied to the water level data using an iterative approach with the USGS Calumet Station water level height and Airborne Snow Observatory (ASO) lidar water level profiles. These Pre-Delta-X water level measurements served to calibrate and validate the campaign's remote sensing observations and hydrodynamic models.

Pre-Delta-X was a joint airborne and field campaign in the MRD beginning Spring 2015 and continuing through Fall 2016. The Pre-Delta-X campaign conducted airborne (remote sensing) observations and field (*in situ*) measurements to characterize delta hydrology, water quality (e.g., total suspended solids), and vegetation structure. These data facilitate the continued development of sampling methods, algorithms, and models to support the upcoming airborne and field campaigns (2021–2023) in support of the Delta-X mission.

There are 10 data files with this dataset in comma-separated value (.csv) format.

a) Total pressure transducer (TPT) to measure water level changes (Solinst; 6.25 in long). b) Installation of a TPT in shallow water within a PVC pipe. The pipe is embedded into the sediment with the TPT 20 cm above the bottom of the channel. c) Installation of a TPT in deep water attached to a concrete block. The TPT is protected inside the small black PVC pipe. The TPT must be above the block once sitting on the bottom of the channel. The rope is attached to a nearby tree or post for later retrieval. Source: Thomas et al. 2019

Figure 1. Water level pressure transducer field deployment. a) A total pressure transducer (TPT) to measure water level changes (Solinst; 6.25 in long). b) Installation of a TPT in shallow water within a PVC pipe. The pipe is embedded into the sediment with the TPT 20 cm above the bottom of the channel. c) Installation of a TPT in deep water attached to a concrete block. The TPT is protected inside the small black PVC pipe. The TPT must be above the block once sitting on the bottom of the channel. The rope is attached to a nearby tree or post for later retrieval. Source: Thomas et al. 2019

Name	Date Modified	Size	Kind
water-level	Today at 10:51 AM	--	Folder
water-level-fall-2016	Nov 11, 2021 at 9:56 AM	--	Folder
PreDeltaX_Water_Level_Data.pdf	Nov 11, 2021 at 9:51 AM	1.3 MB	PDF Document
PreDeltaX_WaterLevel_Atchafalaya_WL01.csv	Jan 7, 2021 at 5:14 PM	169 KB	Comma-separated (.csv)
PreDeltaX_WaterLevel_Atchafalaya_WL02.csv	Jan 7, 2021 at 5:14 PM	171 KB	Comma-separated (.csv)
PreDeltaX_WaterLevel_Atchafalaya_WL03.csv	Jan 7, 2021 at 5:14 PM	169 KB	Comma-separated (.csv)
PreDeltaX_WaterLevel_Atchafalaya_WL04.csv	Jan 7, 2021 at 5:14 PM	91 KB	Comma-separated (.csv)
PreDeltaX_WaterLevel_Atchafalaya_WL05.csv	Jan 7, 2021 at 5:14 PM	95 KB	Comma-separated (.csv)
PreDeltaX_WaterLevel_Atchafalaya_WL06.csv	Jan 7, 2021 at 5:14 PM	95 KB	Comma-separated (.csv)
PreDeltaX_WaterLevel_Atchafalaya_WL07.csv	Jan 7, 2021 at 5:14 PM	178 KB	Comma-separated (.csv)
PreDeltaX_WaterLevel_Atchafalaya_WL08.csv	Jan 7, 2021 at 5:14 PM	178 KB	Comma-separated (.csv)
PreDeltaX_WaterLevel_Atchafalaya_WL09.csv	Jan 7, 2021 at 5:14 PM	178 KB	Comma-separated (.csv)
PreDeltaX_WaterLevel_Atchafalaya_WL10.csv	Jan 7, 2021 at 5:14 PM	92 KB	Comma-separated (.csv)

	A	B	C	D	E	F	G	H	I
1	basin	site_id	latitude	longitude	bias	calibration_source	time	absolute_water_level_NAVD88	absolute_water_level_WGS84
2	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/13/16 23:45	0.672	-25.082
3	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/13/16 23:50	0.668	-25.086
4	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/13/16 23:55	0.664	-25.09
5	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:00	0.66	-25.094
6	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:05	0.657	-25.097
7	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:10	0.653	-25.101
8	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:15	0.65	-25.104
9	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:20	0.646	-25.107
10	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:25	0.643	-25.111
11	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:30	0.64	-25.114
12	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:35	0.637	-25.117
13	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:40	0.634	-25.12
14	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:45	0.631	-25.123
15	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:50	0.627	-25.126
16	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 0:55	0.625	-25.129
17	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 1:00	0.622	-25.132
18	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 1:05	0.619	-25.135
19	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 1:10	0.616	-25.138
20	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 1:15	0.614	-25.142
21	Atchafalaya	Wax_Lake_1	29.7018	-91.3735	0.09	ASO_Lidar	10/14/16 1:20	0.611	-25.142

Citation
Simard, M., M.W. Denbina, D.J. Jensen, and R. Lane. 2020. Pre-Delta-X: Water Levels across Wax Lake Outlet, Atchafalaya Basin, LA, USA, 2016. ORNL DAAC, Oak Ridge, Tennessee, USA. <https://doi.org/10.3334/ORNLDAAC/1801>

Delta-X Data Search: future development

Level	Description
L0	Field data (in situ)
L1	Raw remote sensing data
L2	Georeferenced remote sensing data
L3	Remote sensing measurements
L4	Science products

More datasets will be added throughout the mission:

- Pre-Delta-X campaign (2015–2016):
 - Remote sensing data (L2 & L3)
- Delta-X campaigns (Spring & Fall 2021):
 - Field data (L0)
 - Remote sensing data (L2 & L3)
 - Science products (L4)



Thank you.

Questions?