# **2019 CPRA Lidar Block Dates and Gage Trends**

Summary provided by: Yvonne Allen (USFWS Southeast Science Applications and Migratory Birds Program; yvonne\_allen@fws.gov)

This document summarizes the available data regarding hydrologic conditions that occurred during lidar acquisition for each of the 6 CPRA blocks. This analysis closely mirrors the methods outlined in Allen (2016).

The information presented in this document should be used with this AGOL map of Southeast-wide inundation extent and frequency with gages and lidar blocks: <https://fws.maps.arcgis.com/apps/mapviewer/index.html?webmap=971855403c384fd0b47922400e92d9fc>

The Southeast Inundation Frequency (IF) map was built using multiple observations of inundation extent using Landsat imagery. ***Any extent that is shaded blue on the AGOL map is subject to typical seasonal inundation***. This composite map should be used to identify any areas that are potential low confidence areas due to inundation. ***Lidar acquired over these areas should be carefully inspected to ensure that the returns are bare earth and not flooded land***. Examination of the lidar data over these areas is the most robust method for determining data confidence since comprehensive gaging data are not available for each stream in the Southeast.

Where gage data are available, figures below plot the long-term hydrographs (line) for NWIS gages intersecting each lidar acquisition block. Note that several gaging stations are on reservoirs and are not necessarily useful. For each figure:

* Dates of lidar acquisition are shown with green dots.
* Red dots are observations of inundation extent based on Landsat.
* Long term annual mean gage height is horizontal line.

Tables show gage heights on all the lidar acquisition dates for each lidar acquisition block. The date that lidar was flown directly over a gaging station is shown in bold - but note that a single lidar swath (acquired at a single point in time) may cross multiple watershed boundaries and hydrologic conditions at that point in time may vary dramatically between watersheds. For this reason, it is best to err on the side of caution and always examine the lidar return data over all areas that are subject to inundation.

Example application of gaging information:

Block 1 - The Lower Atchafalaya River at Morgan City is the key gaging station for this block. During lidar acquisition in April 2019 (10-26 April 2019), gage heights at Morgan City were 7.2-7.5 feet.

This gage height is:

1. higher than the annual average (horizontal line on the gage plot) and
2. higher than any observations of inundation extent using Landsat

Therefore: the lidar for this area was acquired when the extent of inundation equaled to or exceeded **any areas shaded in blue** on the AGOL map for Block 1.

# Block 1

Atchafalaya River at Morgan City <https://waterdata.usgs.gov/nwis/uv?site_no=07381600>



StartDate source gage\_ht site\_no

2019-04-10 Lidar 7.5 07381600

2019-04-15 Lidar 7.3 07381600

2019-04-16 Lidar 7.3 07381600

2019-04-20 Lidar 7.3 07381600

2019-04-21 Lidar 7.2 07381600

2019-04-22 Lidar 7.2 07381600

2019-04-23 Lidar 7.2 07381600

2019-04-26 Lidar 7.4 07381600

# Blocks 2 & 5 (PR 2437)

**16 May 2019** Little Corney Bayou near Lillie, LA <https://waterdata.usgs.gov/nwis/uv?site_no=07366200>

Above annual average – some areas may have been inundated depending on location and time of acquisition. Lidar returns should be inspected over potentially inundated areas.



**StartDate source gage\_ht site\_no**

2019-05-14 Lidar 6.515625 07366200

2019-05-15 Lidar 6.080208 07366200

**2019-05-16 Lidar 5.618750 07366200**

2019-05-17 Lidar 4.852083 07366200

2019-05-27 Lidar 3.695208 07366200

2019-05-29 Lidar 3.372708 07366200

2019-06-01 Lidar 3.232292 07366200

2019-06-02 Lidar 3.168958 07366200

2019-06-03 Lidar 3.039583 07366200

2019-06-11 Lidar 3.176458 07366200

2019-06-19 Lidar 3.364375 07366200

**15 May 2019**

Saline Bayou near Lucky, LA <https://waterdata.usgs.gov/nwis/uv?site_no=07352000>

Above annual average – some areas may have been inundated depending on location and time of acquisition. Lidar returns should be inspected over potentially inundated areas.



**StartDate source gage\_ht site\_no**

2019-05-14 Lidar 6.848750 07352000

**2019-05-15 Lidar 6.583750 07352000**

2019-05-16 Lidar 6.187292 07352000

2019-05-17 Lidar 5.680208 07352000

2019-05-27 Lidar 4.684583 07352000

2019-05-29 Lidar 4.390625 07352000

2019-06-01 Lidar 4.155625 07352000

2019-06-02 Lidar 4.073125 07352000

2019-06-03 Lidar 4.039792 07352000

2019-06-11 Lidar 4.030625 07352000

2019-06-19 Lidar 4.728958 07352000

**June 2019**

Lake Claiborne near Aycock, LA <https://waterdata.usgs.gov/nwis/uv?site_no=07364840>

Reservoir gage - so this data is of limited use



StartDate source gage\_ht site\_no

2019-05-14 Lidar 10.820000 07364840

2019-05-15 Lidar 10.611458 07364840

2019-05-16 Lidar 10.442083 07364840

2019-05-17 Lidar 10.296875 07364840

2019-05-27 Lidar 9.812083 07364840

2019-05-29 Lidar 9.723750 07364840

**2019-06-01 Lidar 9.633958 07364840**

**2019-06-02 Lidar 9.601458 07364840**

**2019-06-03 Lidar 9.573542 07364840**

**2019-06-11 Lidar 9.753333 07364840**

**2019-06-19 Lidar 9.591458 07364840**

# Block 3

**October 2019**

3.1: Bayou Dorcheat near Minden, LA <https://waterdata.usgs.gov/monitoring-location/07349000>

Data were collected over the gaging station in October which is typically low water. Lidar is likely to be fine, but returns should be inspected over potentially inundated areas to be certain.



**StartDate source gage\_ht site\_no**

2019-06-11 Lidar 7.6987500 07349000

2019-06-12 Lidar 7.6800000 07349000

2019-06-19 Lidar 7.3852083 07349000

2019-07-03 Lidar 9.0312500 07349000

**2019-10-12 Lidar 0.7222917 07349000**

**2019-10-16 Lidar 0.8891667 07349000**

**2019-10-17 Lidar 0.9993750 07349000**

**2019-10-18 Lidar 0.9004167 07349000**

**2019-10-19 Lidar 0.9162500 07349000**

**2019-10-23 Lidar 1.0187500 07349000**

**2019-10-24 Lidar 1.3833333 07349000**

**October 2019**

3.2: Bayou Dorcheat near Springhill, LA <https://waterdata.usgs.gov/nwis/uv?site_no=07348700>

Lidar is likely to be fine, but returns should be inspected over potentially inundated areas to be certain.



**StartDate source gage\_ht site\_no**

2019-06-11 Lidar 9.020333 07348700

2019-06-12 Lidar 8.107188 07348700

2019-06-19 Lidar 4.969583 07348700

2019-07-03 Lidar 7.029271 07348700

**2019-10-12 Lidar 3.988958 07348700**

**2019-10-16 Lidar 4.386042 07348700**

**2019-10-17 Lidar 4.143021 07348700**

**2019-10-18 Lidar 4.082396 07348700**

**2019-10-19 Lidar 5.317604 07348700**

**2019-10-23 Lidar 5.389896 07348700**

**2019-10-24 Lidar 4.984167 07348700**

**11 June 2019**

3.3: Bodcau Bayou near Sarepta, LA <https://waterdata.usgs.gov/nwis/uv?site_no=07349500>

Higher than annual average - Lidar returns should be inspected over potentially inundated areas.



StartDate source gage\_ht site\_no

**2019-06-11 Lidar 10.005625 07349500**

2019-06-12 Lidar 9.493542 07349500

2019-06-19 Lidar 6.130625 07349500

2019-07-03 Lidar 9.634375 07349500

2019-10-12 Lidar 2.540000 07349500

2019-10-16 Lidar 2.903542 07349500

2019-10-17 Lidar 2.778333 07349500

2019-10-18 Lidar 2.673958 07349500

2019-10-19 Lidar 2.590625 07349500

2019-10-23 Lidar 2.786667 07349500

2019-10-24 Lidar 2.691042 07349500

3.4: Bodcau Bayou near Springhill, LA <https://waterdata.usgs.gov/nwis/uv?site_no=07349450>

At annual average - Lidar is likely to be fine, but returns should be inspected over potentially inundated areas to be certain.



StartDate source gage\_ht site\_no

**2019-06-11 Lidar 5.686667 07349450**

2019-06-12 Lidar 5.525208 07349450

2019-06-19 Lidar 4.708125 07349450

2019-07-03 Lidar 6.599687 07349450

2019-10-12 Lidar 4.243333 07349450

2019-10-16 Lidar 4.247708 07349450

2019-10-17 Lidar 4.208229 07349450

2019-10-18 Lidar 4.207604 07349450

2019-10-19 Lidar 4.203021 07349450

2019-10-23 Lidar 4.240208 07349450

2019-10-24 Lidar 4.225521 07349450

# Block 4

**2019-05-16**

Little Corney Bayou near Lillie, LA - No better stations for this Block – need to look at the lidar data to determine potential inundation at TOA - https://waterdata.usgs.gov/nwis/uv?site\_no=07366200

Higher than average for that date and coming down off a large peak - Lidar returns should be inspected over potentially inundated areas.



StartDate source gage\_ht site\_no

2019-04-26 Lidar 5.974167 07366200

2019-04-27 Lidar 5.843333 07366200

**2019-05-16 Lidar 5.618750 07366200**

2019-10-05 Lidar 2.473750 07366200

2019-10-08 Lidar 2.312917 07366200

2019-10-12 Lidar 2.273125 07366200

2019-10-16 Lidar 4.365208 07366200

2019-10-17 Lidar 4.698750 07366200

2019-10-18 Lidar 4.579583 07366200

2019-10-19 Lidar 4.611875 07366200

2019-10-22 Lidar 3.778750 07366200

2019-11-01 Lidar 5.276667 07366200

# Block 6

Way too high. Atchafalaya River and Mississippi Rivers



StartDate source gage\_ht site\_no

2019-04-10 Lidar 18.57740 07381515

2019-04-15 Lidar 18.39500 07381515

2019-04-16 Lidar 18.35385 07381515

2019-04-20 Lidar 18.60125 07381515

2019-04-21 Lidar 18.59448 07381515

2019-04-22 Lidar 18.59677 07381515

2019-04-23 Lidar 18.62344 07381515

2019-04-26 Lidar 18.79437 07381515



| **StartDate** | **source** | **gage\_ht** | **site\_no** |
| --- | --- | --- | --- |
| 2019-04-10 | Lidar | 40.82844 | 07374000 |
| 2019-04-15 | Lidar | 40.22333 | 07374000 |
| 2019-04-16 | Lidar | 40.15990 | 07374000 |
| 2019-04-20 | Lidar | 40.79000 | 07374000 |
| 2019-04-21 | Lidar | 40.88792 | 07374000 |
| 2019-04-22 | Lidar | 40.92437 | 07374000 |
| 2019-04-23 | Lidar | 41.03598 | 07374000 |
| 2019-04-26 | Lidar | 41.48271 | 07374000 |

Allen, Y. (2016) Landscape Scale Assessment of Floodplain Inundation Frequency Using Landsat Imagery. *River Res. Applic.*, 32: 1609– 1620. doi: [10.1002/rra.2987](https://doi.org/10.1002/rra.2987).