August 2016 Louisiana Flood

Alek Krautmann
National Weather Service
New Orleans/Baton Rouge

Weather.gov/NewOrleans @NWSNewOrleans
2016 March Flood

- 20+ inches of rain across northeast Louisiana -- Annual exceedance probability of 0.1% to 0.2%

- Highest rainfall totals across southeast Louisiana and southern Mississippi were mostly in the 10 to 15 inch range -- Annual exceedance probability of 1% to 2%

- Estimated damages and losses in LA and TX was $1.3 billion
National Hurricane Center Periodically Carried the Low in their Outlooks

Five-Day Graphical Tropical Weather Outlook
National Hurricane Center Miami, Florida

Tropical Cyclone Formation Potential for the Five-Day Period Ending at 8:00 pm EDT Mon Aug 15 2016
Chance of Cyclone Formation in Five Days:  Low < 40%  Medium 40-60%  High > 60%
X indicates current disturbance location; shading indicates potential formation area.
Near Record Atmospheric Moisture

- Climatology of the moisture content in the atmosphere from all of our office weather balloon releases since 1948
- 3rd highest value on record was recorded during this event. It’s off the chart!
- 2.8 inches was observed twice and we were 2.4 inches or higher Aug 9-12
Gulf Temperatures

• Gulf of Mexico sea surface temperatures were at or near the record in the satellite era (since 1982) all summer
• The week before the event surface water temperatures across the northern Gulf were near 90F!
48 hour Forecast.
Issued 7AM Fri
Excessive Rainfall Outlook

Outlook is used by local offices to aid in decision for the threat of Flash Flooding.

Day 1
Issued Thu morning
Valid through 7AM Friday

Day 2
Issued Thu Morning
Valid 7am Fri thru 7am Sat

“High Risk” used in Day 2 – very unusual

Language included
“life threatening flash flooding”
“Model rainfall truly prolific”
Rainfall Totals

Best-Estimate Rainfall
3 day rainfall estimate ending August 14, 2016.
Rainfall Totals and Exceedance

Louisiana, 11 - 13 August 2016
Annual Exceedance Probabilities (AEPs) for the Worst Case 48-hour Rainfall

Hydrometeorological Design Studies Center
Office of Water Prediction, National Weather Service
National Oceanic and Atmospheric Administration
http://www.nws.noaa.gov/ohd/hdsc/

Figure 4. Annual exceedance probabilities for the worst case 48-hour rainfall.
Amite River Hydrograph

Latest observed value: 36.24 ft at 2:00 PM CDT 16-Aug-2016. Flood Stage is 29 ft

Record: 46.2'

Major: 39.0'

Moderate: 35.0'

Minor: 29.0'

Action: 26.0'

Graph Created (2:51PM Aug 16, 2016)  Observed  Forecast (issued 8:53AM Aug 16)

Observations courtesy of US Geological Survey
Amite River Hydrograph

Latest observed value: 16.34 ft at 2:15 PM CDT 16-Aug-2016. Flood Stage is 8 ft.
Comite River Hydrograph

Latest observed value: 27.95 ft at 1:15 AM CDT 16-Aug-2016. Flood Stage is 20 ft.
## Comite & Amite Flood Crests

<table>
<thead>
<tr>
<th>COMITE RIVER GAGE</th>
<th>Record Date</th>
<th>Event Crest</th>
<th>Previous Record Crest</th>
<th>Previous Record Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olive Branch</td>
<td>08/13/2016</td>
<td>26.96</td>
<td>23.37</td>
<td>03/18/1961</td>
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<tr>
<td>Joor Road</td>
<td>08/14/2016</td>
<td>34.22</td>
<td>30.99</td>
<td>06/09/2001</td>
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<table>
<thead>
<tr>
<th>AMITE RIVER GAGE</th>
<th>Event Date</th>
<th>Event Crest</th>
<th>Previous Record Crest</th>
<th>Previous Record Date</th>
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</thead>
<tbody>
<tr>
<td>Magnolia</td>
<td>08/13/2016</td>
<td>58.56</td>
<td>51.91</td>
<td>04/23/1977</td>
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<tr>
<td>Denham Springs</td>
<td>08/14/2016</td>
<td>46.20</td>
<td>41.50</td>
<td>04/08/1983</td>
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<td>Bayou Manchac Point</td>
<td>08/14/2016</td>
<td>E21.5</td>
<td>18.85</td>
<td>04/08/1983</td>
</tr>
<tr>
<td>Port Vincent</td>
<td>08/15/2016</td>
<td>E17.5</td>
<td>14.65</td>
<td>04/09/1983</td>
</tr>
<tr>
<td>French Settlement</td>
<td>08/16/2016</td>
<td>9.21</td>
<td>7.40</td>
<td>04/25/1977</td>
</tr>
</tbody>
</table>
Flood Photos

NOAA aerial survey imagery from Denham Springs and Port Vincent
(many more at http://oceanservice.noaa.gov/news/aug16/louisiana-flooding.html)
Key Points

Slow moving, broad area of low pressure produced prolific/record rainfall.

- Slow forward speed of low allowed repetitive bands of showers and thunderstorms over the same area/river basins for approximately 48 hours
- Moisture levels were at or near record levels producing extremely efficient rainfall.

Flash flooding occurred across much of region’s small streams/bayous/drainages at the onset of the event

- 14 total fatalities – most flash flooding or vehicle related

River flooding ensued as runoff reached larger rivers

- Many record crests were set on gage locations Amite/Comite Rivers.
- Back water flooding was widespread at lower end of basins

Estimated $10.1 Billion in damages and losses (NOAA)
2016 Louisiana Flood

Alek Krautmann
National Weather Service
New Orleans/Baton Rouge
Weather.gov/NewOrleans
@NWSNewOrleans
Alek.Krautmann@noaa.gov

Referenced Papers
Hydrol. Earth Syst. Sci., 21, 897–921, 2017 (NOAA GFDL)
Scientific Investigations Report 2017–5005 (USGS)