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## Katrina - Scenario B1: Modeling conditions

- I next modeled Hurricane Katrina to isolate and study the incremental impact on flooding at each Trial Property of the MRGO's expansion and the degradation of the Polder's surrounding wetlands relative to 1956 conditions.
- Specifically, Scenario B1 incorporates modified topography, bathymetry and Manning's  $n$  friction coefficients reflecting:
  - The dimensions of the MRGO as of the time of its completion in 1968.
  - The 1956 wetland conditions.
- The MRGO is now represented by a narrower channel as it was originally constructed.
  - It is approximately as deep as the 2005 MRGO channel but the shallow bank widening that occurred after construction has been eliminated.
  - The wetlands are modified to reflect an increased bottom surface friction coefficient (*i.e.*, the Manning's  $n$  coefficient) in the areas adjacent to the MRGO channels and in the Biloxi Marsh and the Golden Triangle Marsh.
  - In addition, the Central Wetlands within St. Bernard Polder and the La Loutre Ridge reflect increases in densities and resistance of the vegetation that existed there in 1956.

# Katrina - Scenario B1: Modeling conditions

- The following table compares the relevant differences in modeling conditions for Scenarios A1, A2 and B1.

Scenario	MRGO Status	Marsh Status	Levee Breaches	Description
A1 (Katrina Actual Event Conditions)	2005 pre-Katrina dimensions	2005 pre-Katrina conditions	Breaching occurring as during Katrina	Base case: Actual Katrina Hindcast
A2 (2005 MRGO/ 2005 Wetlands/ IHNC Breaches Only)	2005 pre-Katrina dimensions	2005 pre-Katrina conditions	IHNC Breaches Only	Base case reflecting levee breaches only in the IHNC floodwall
B1 (MRGO As-Designed/1956 Wetlands)	MRGO at its authorized dimensions as of completion in 1968	1956 Wetland conditions	Breaching occurring as during Katrina	Katrina impact absent bank erosion channel widening/ wetland degradation

Table 7

## Katrina - Scenario B1: Flooding in St. Bernard Parish

- In Scenario B1, flooding evolves within St. Bernard Polder in much the same way as in the actual Hurricane Katrina event, *i.e.*, Scenario A1.
- The reduced dimensions of the MRGO and the increased surface friction representing the 1956 wetland system led to a 0.7 ft reduction in water levels in the central and southern portions of the IHNC.
- The difference in flow conveyance between the *as designed* MRGO Reach 1 and the 2005 MRGO Reach 1 is small, but does result in a small increase in head drop through the MRGO Reach 1, which in turn reduces water levels within the IHNC as water flows from Paris Road to Seabrook and Lake Pontchartrain.
- Within St. Bernard Polder there was a reduction in water levels of a little more than 1 ft in the Lower Ninth Ward and its vicinity, and overall reductions in water levels a little less than a ft in other areas.
- These small reductions in interior Polder flooding levels reflect the reduction in flow through the IHNC breaches caused by the reduction in water levels within the IHNC.

## **Katrina - Scenario B1: Flooding in St. Bernard Parish**

- The next set of slides (Figures 28a-q) depict in greater in detail the evolution of flooding experienced within St. Bernard Polder in Scenario B1.
- As in Scenario A1, the flooding within the Polder begins between 6:00 am and 8:00 am CDT, as floodwater pours into the Lower Ninth Ward of New Orleans through the breaches in the IHNC floodwall.
- Likewise as in Scenario A1, between 8:00 am and 9:00 am CDT floodwaters pouring through both IHNC floodwall breaches have inundated almost the entire Lower Ninth Ward, with water surface elevations between 6 and 8 ft near the breaches.
- Between 9:00 am and 12:00 noon CDT, water accumulating in the Central Wetlands from the MRGO Reach 2 breaches begins to overtop the 40 Arpent levee, and quickly inundates the portion of St. Bernard Parish east of Paris Road.
- Water surface elevations continue to rise throughout the afternoon, with peak water surface elevations reaching 10-12 ft throughout the Polder and at each Trial Property location within the federal levee system.

8/29/2005 at 2 am CDT

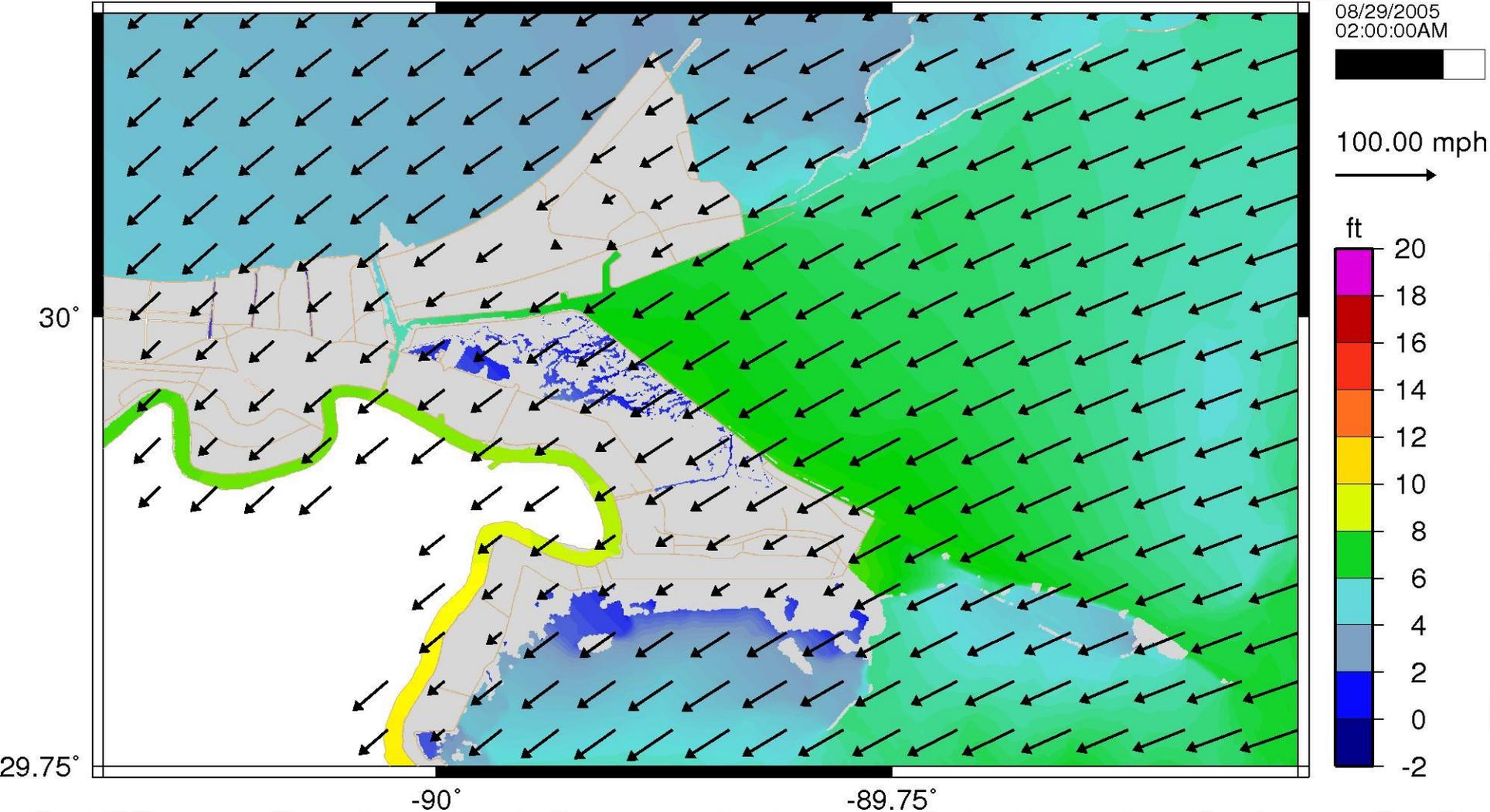


Figure 28a

8/29/2005 at 4 am CDT

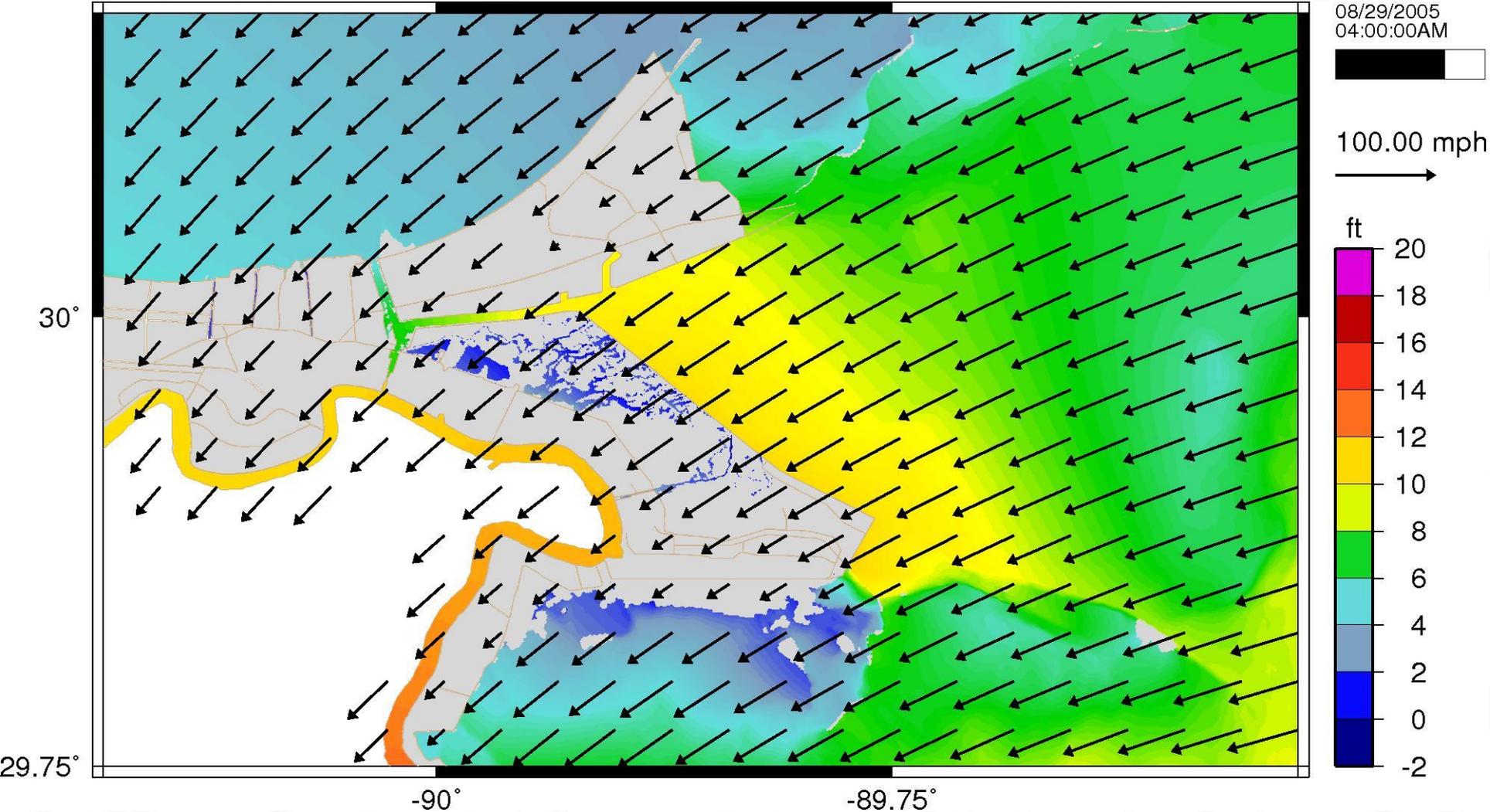


Figure 28b

8/29/2005 at 6 am CDT

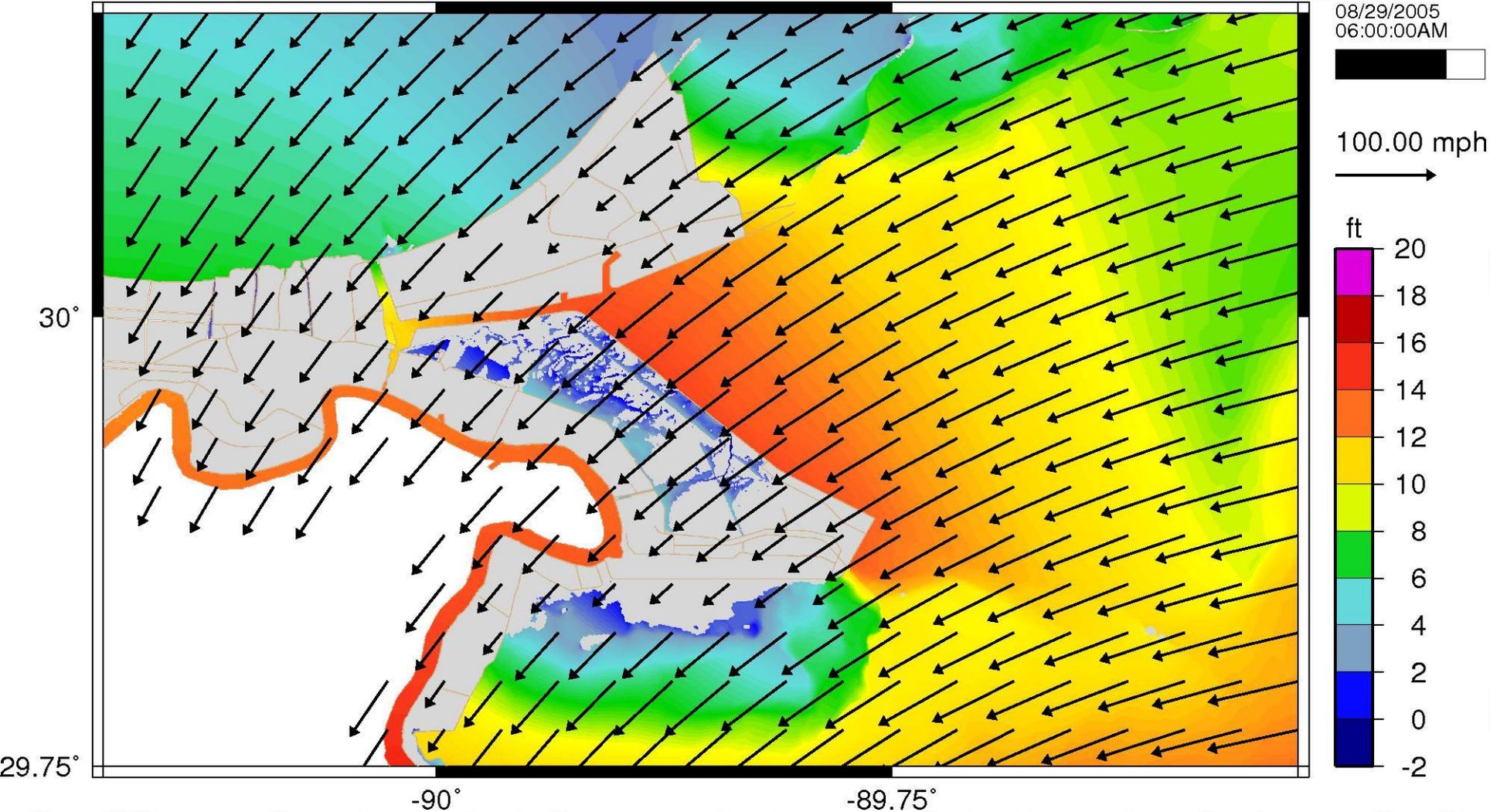


Figure 28c

8/29/2005 at 7 am CDT

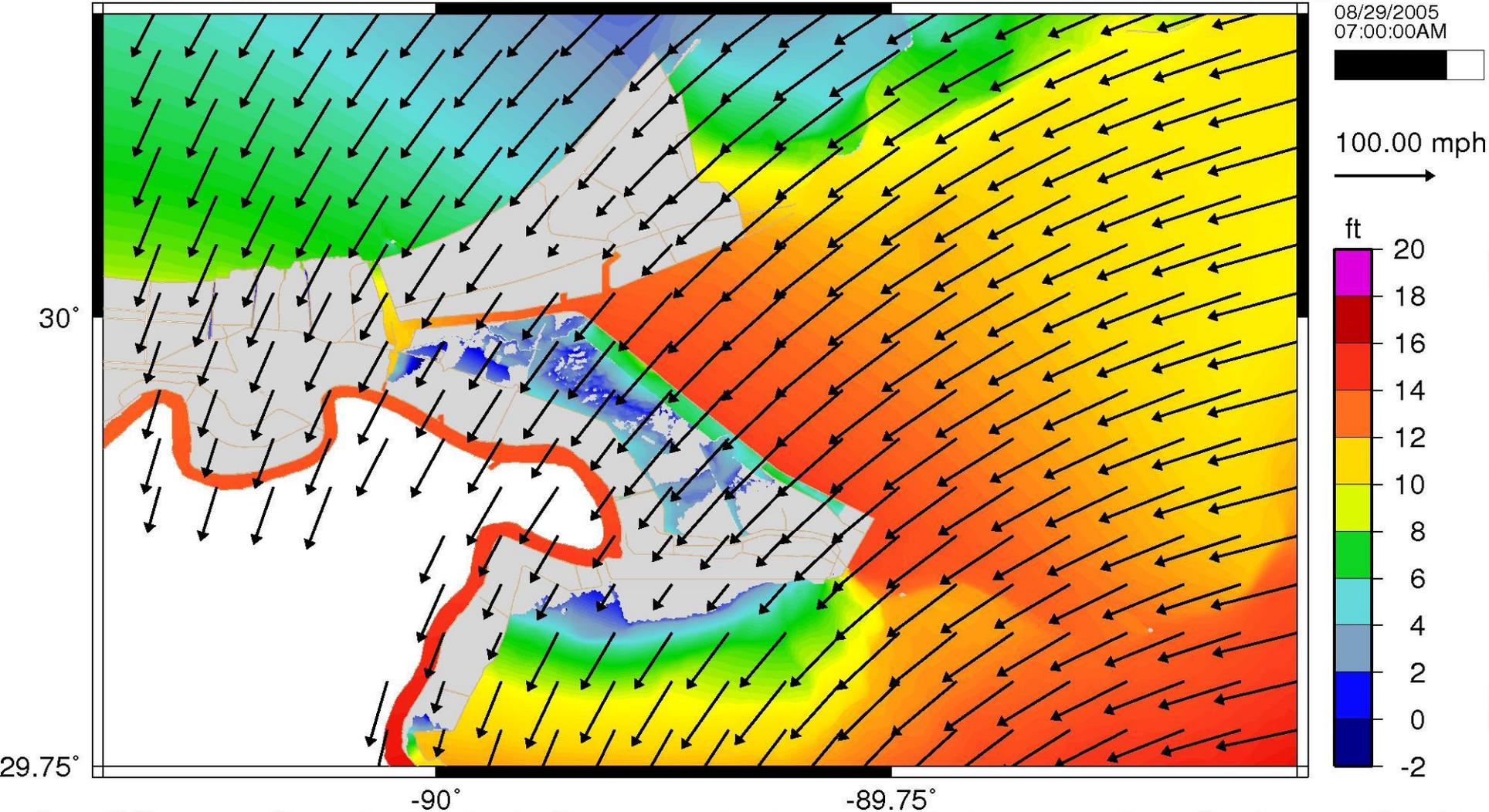


Figure 28d

8/29/2005 at 8 am CDT

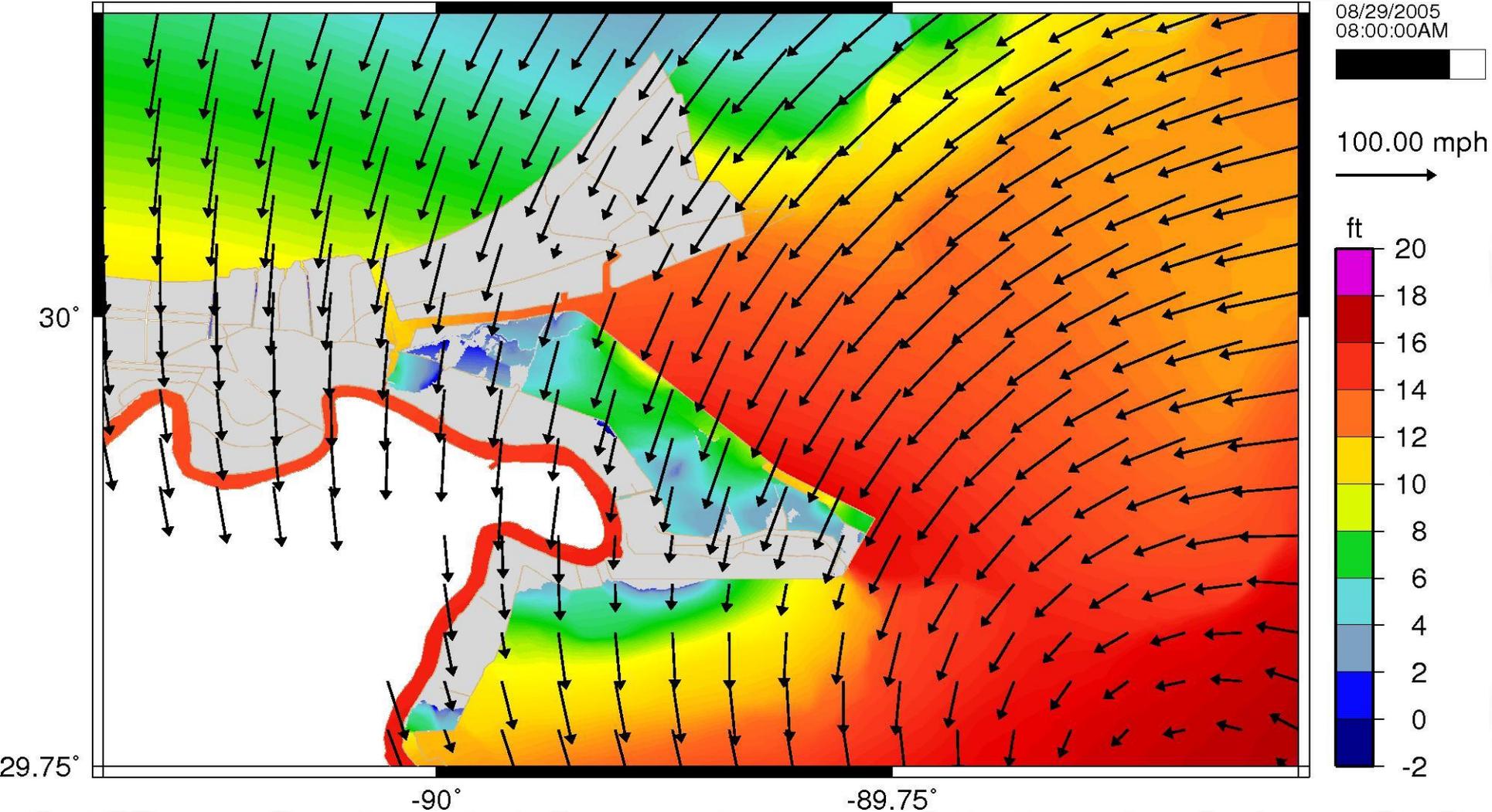


Figure 28e

8/29/2005 at 9 am CDT

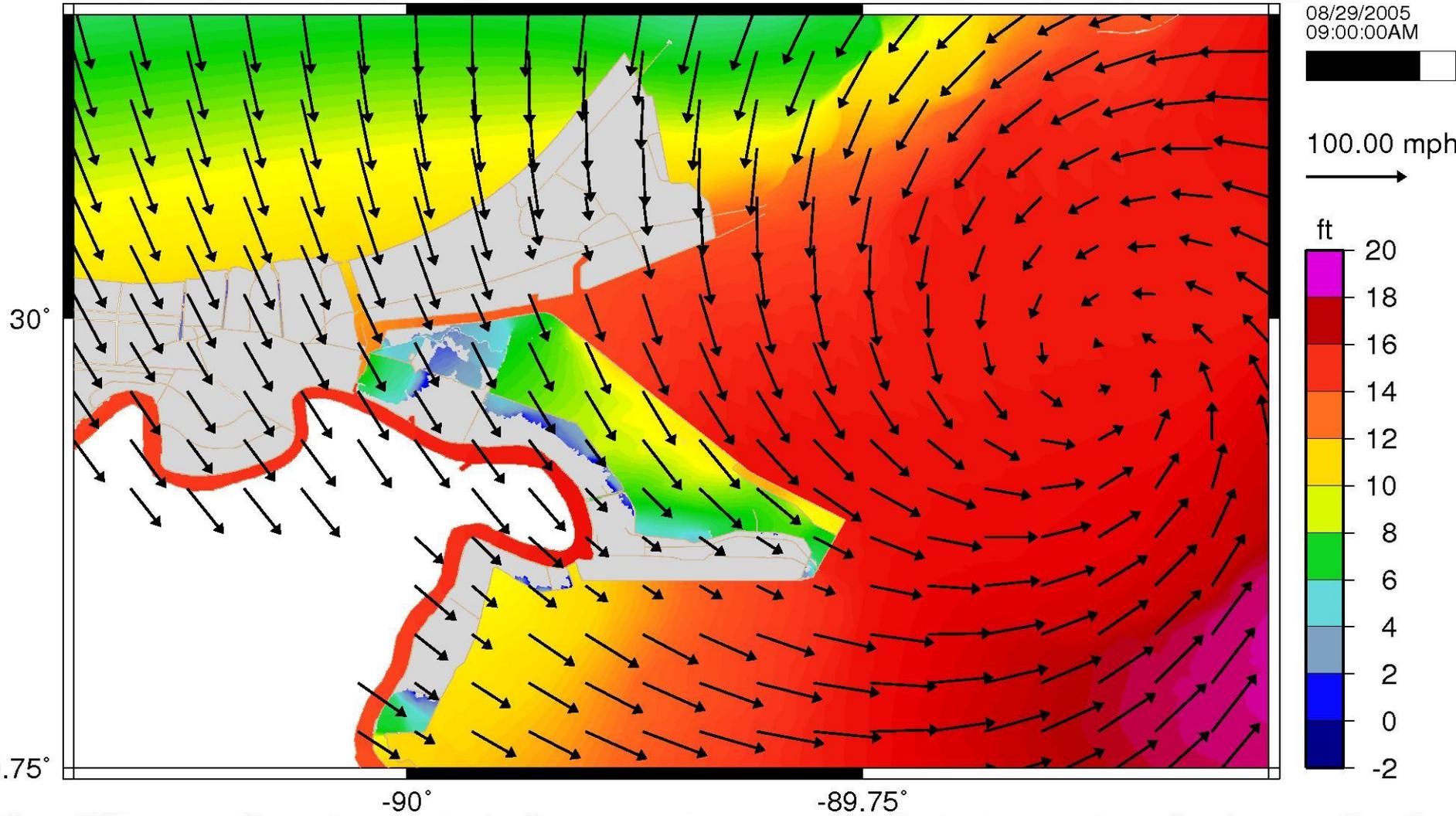


Figure 28f

8/29/2005 at 10 am CDT

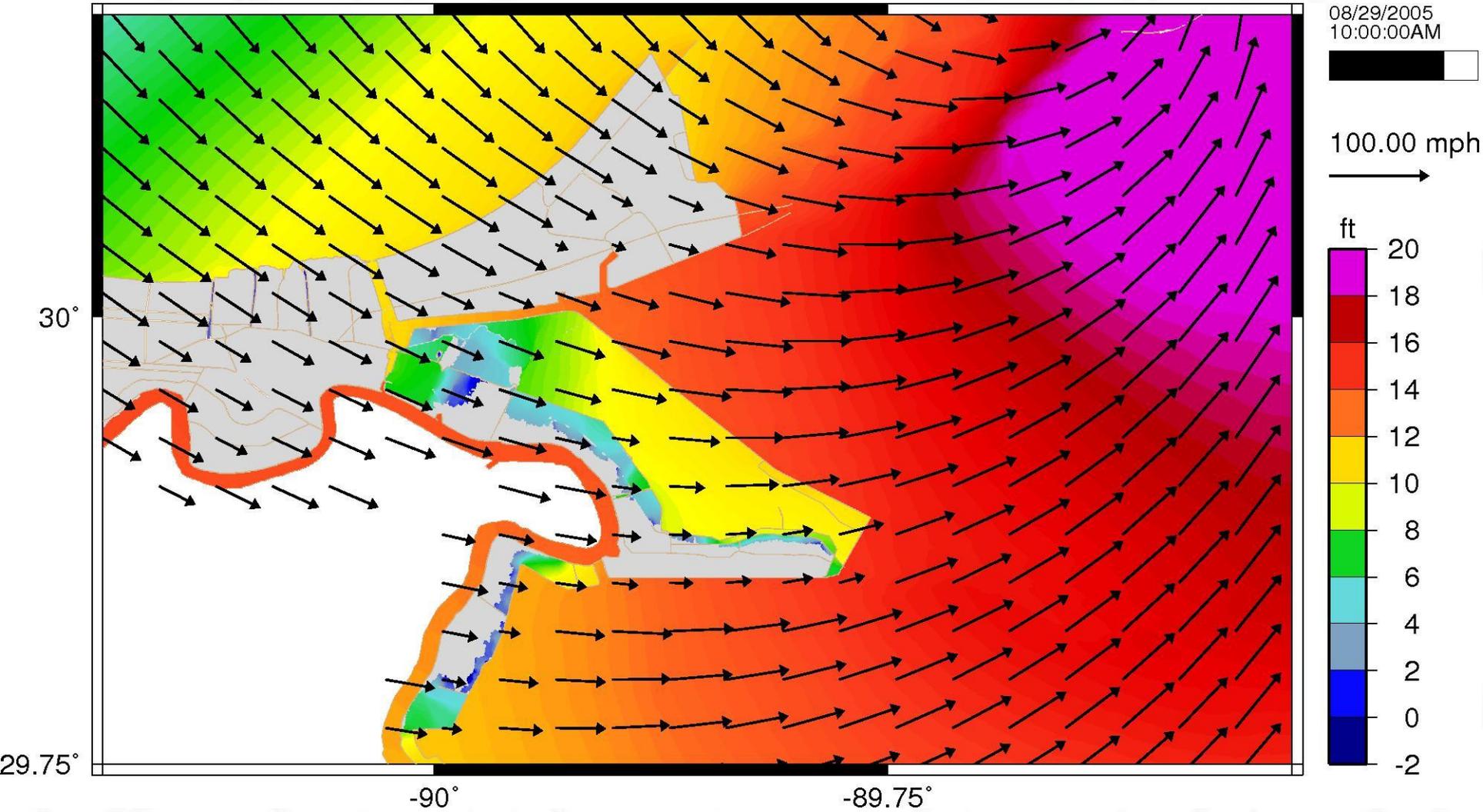


Figure 28g

8/29/2005 at 11 am CDT

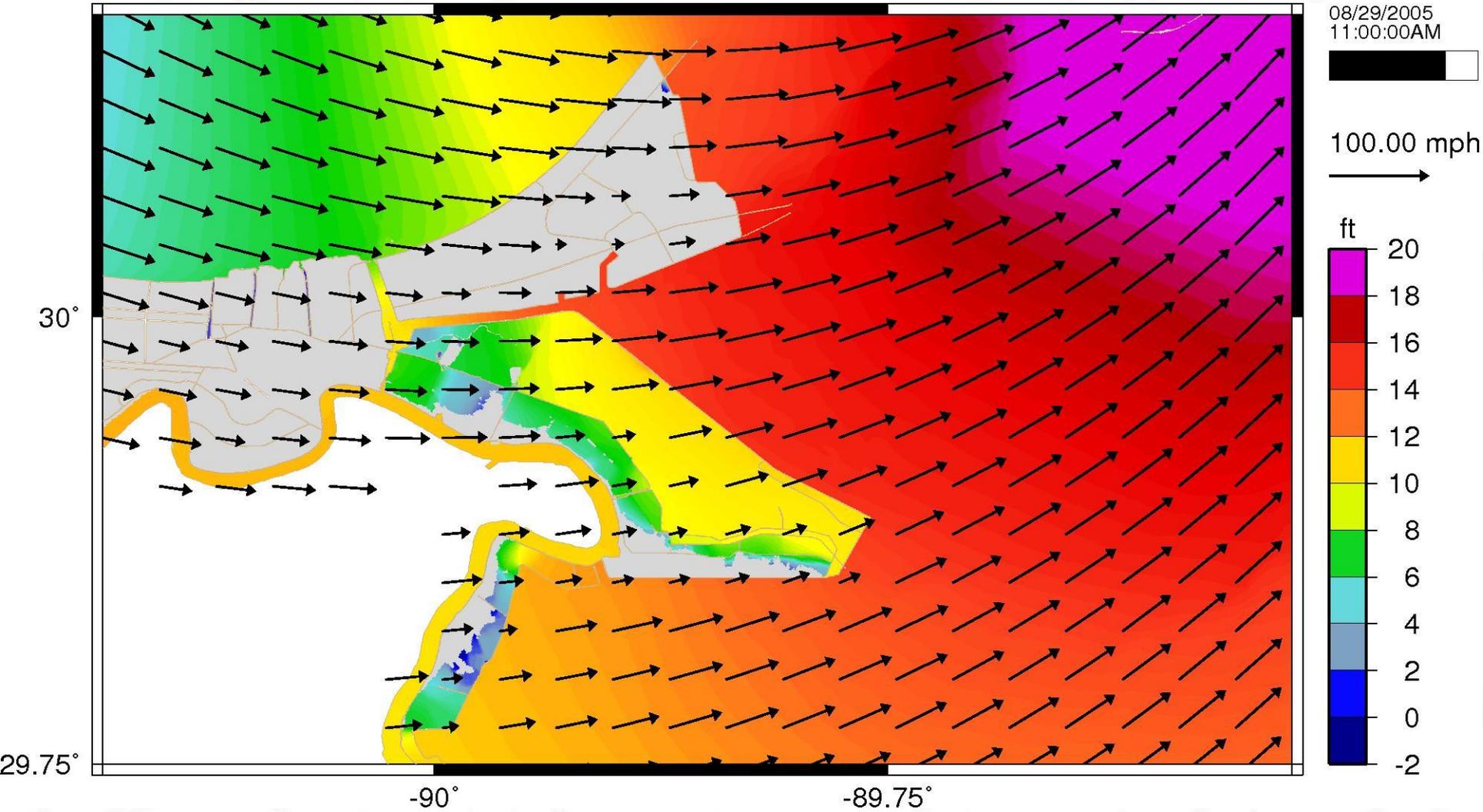


Figure 28h

8/29/2005 at 12 pm CDT

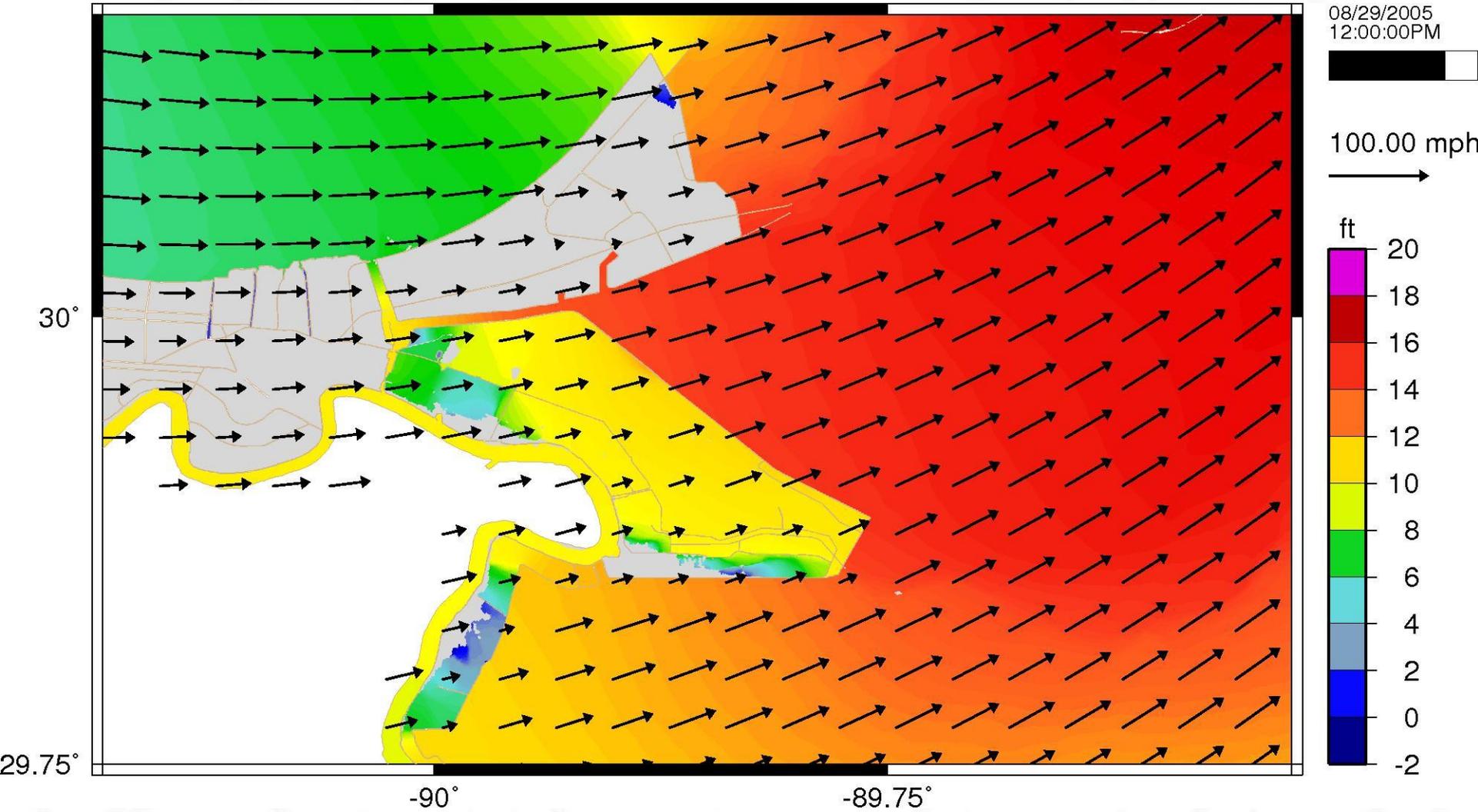


Figure 28i

8/29/2005 at 1 pm CDT

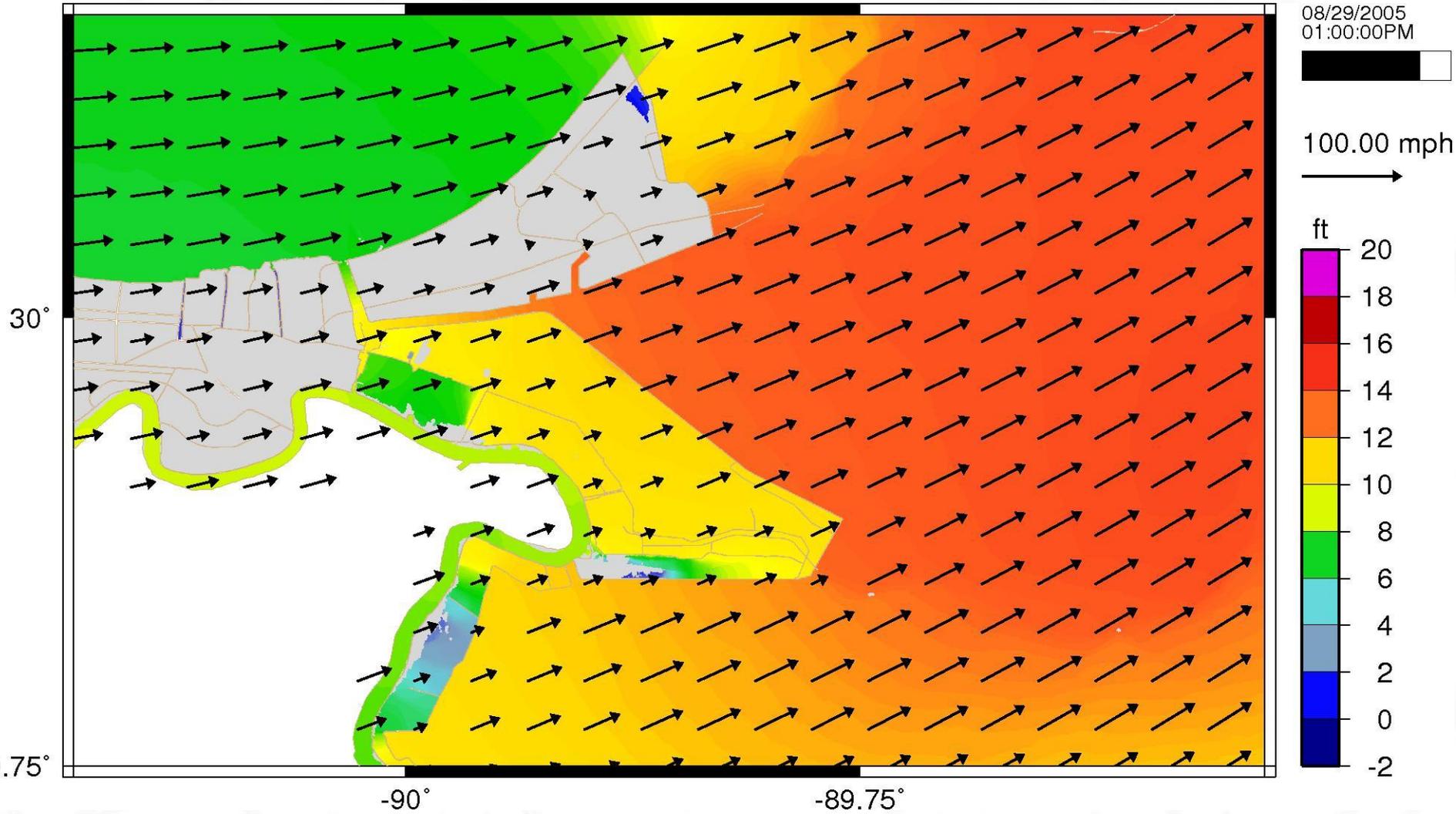


Figure 28j

8/29/2005 at 2 pm CDT

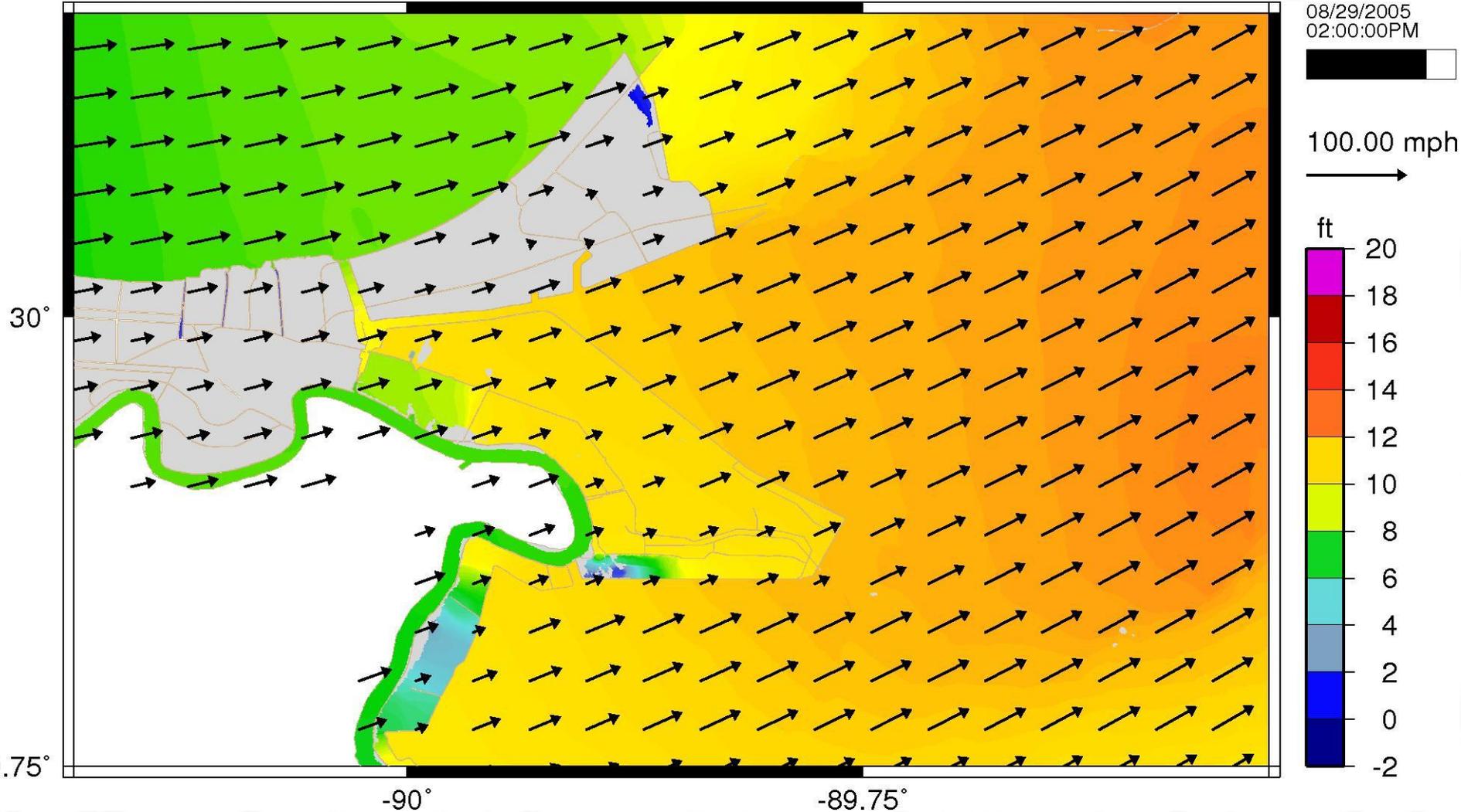


Figure 28k

8/29/2005 at 3 pm CDT

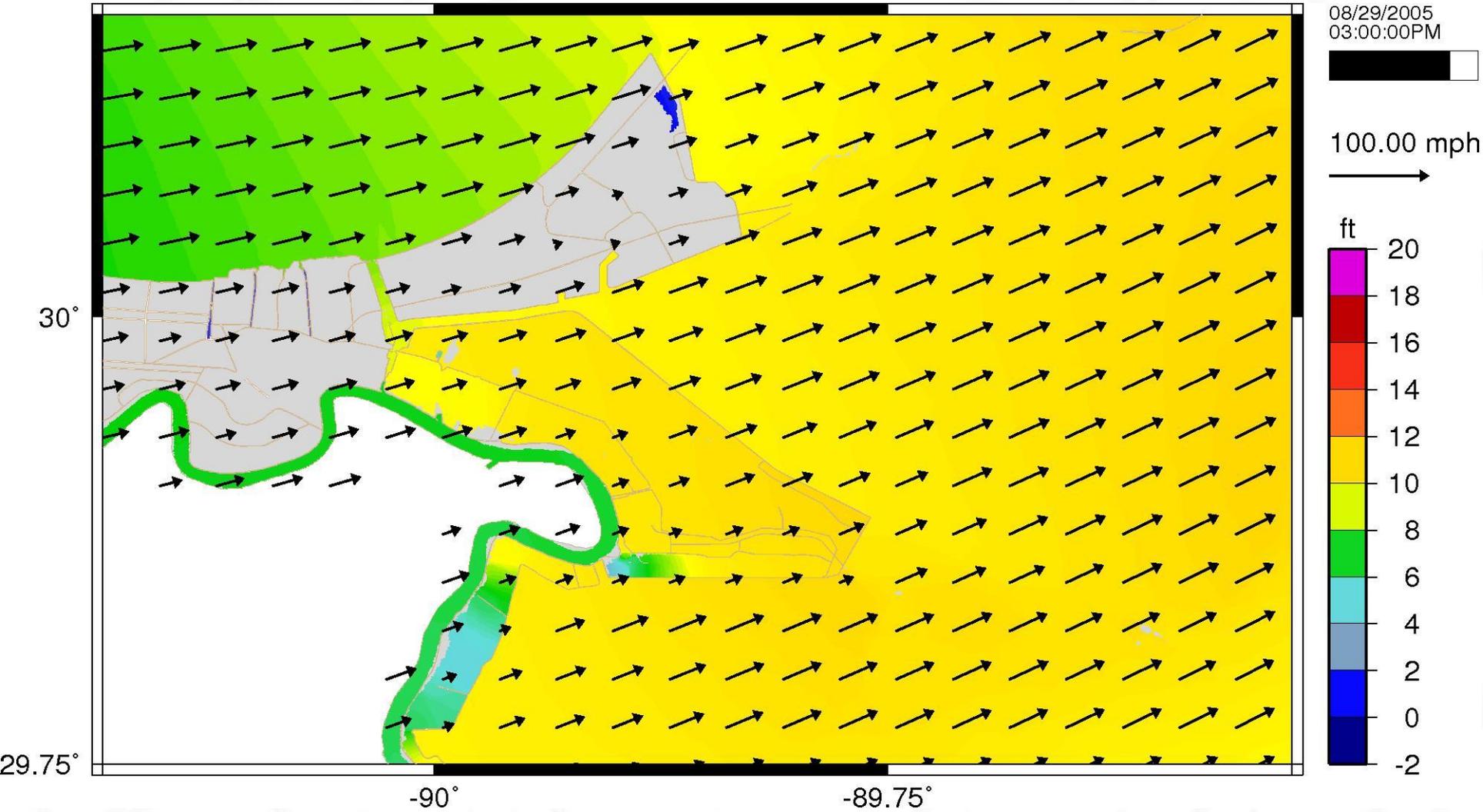


Figure 28l

8/29/2005 at 4 pm CDT

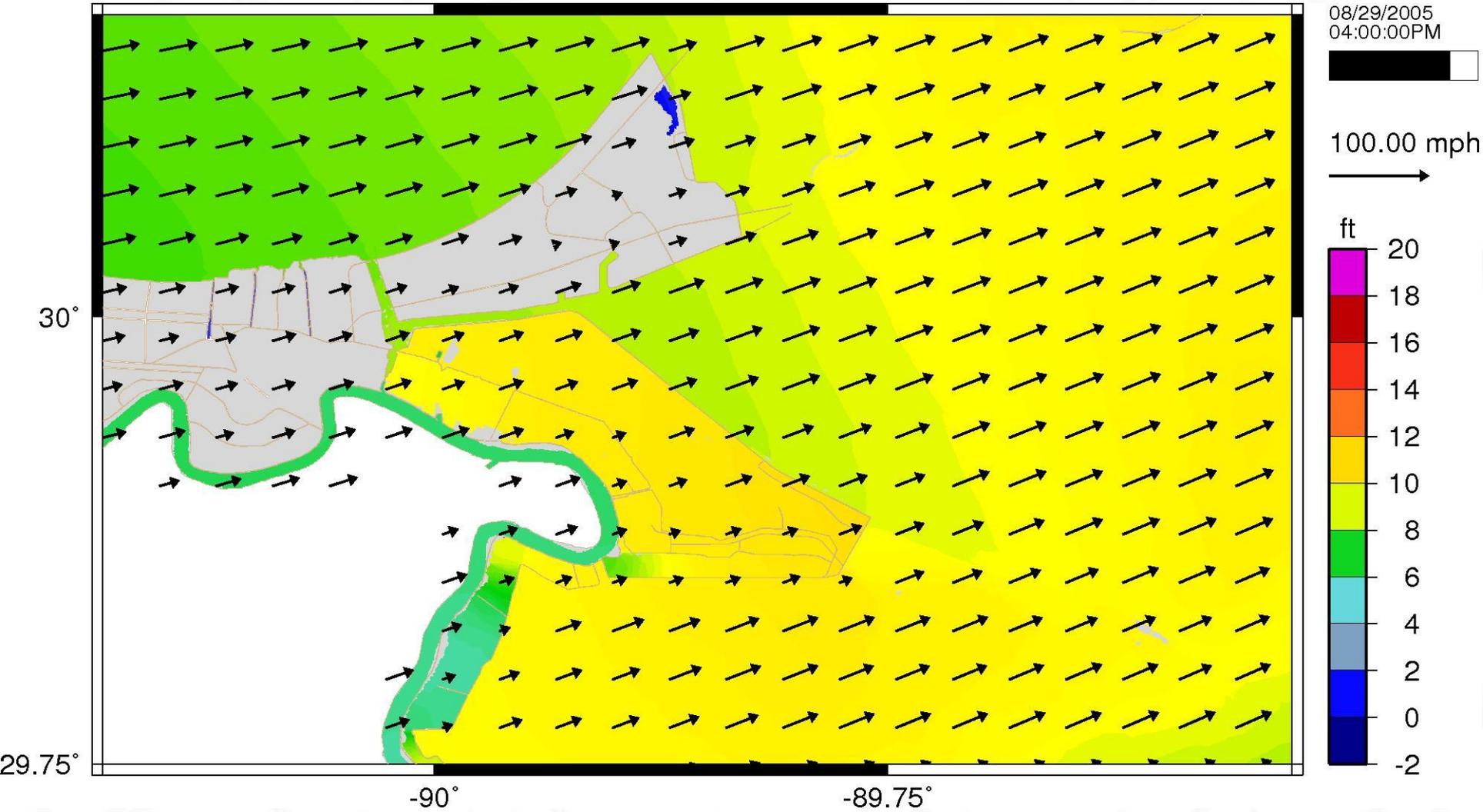


Figure 28m

8/29/2005 at 6 pm CDT

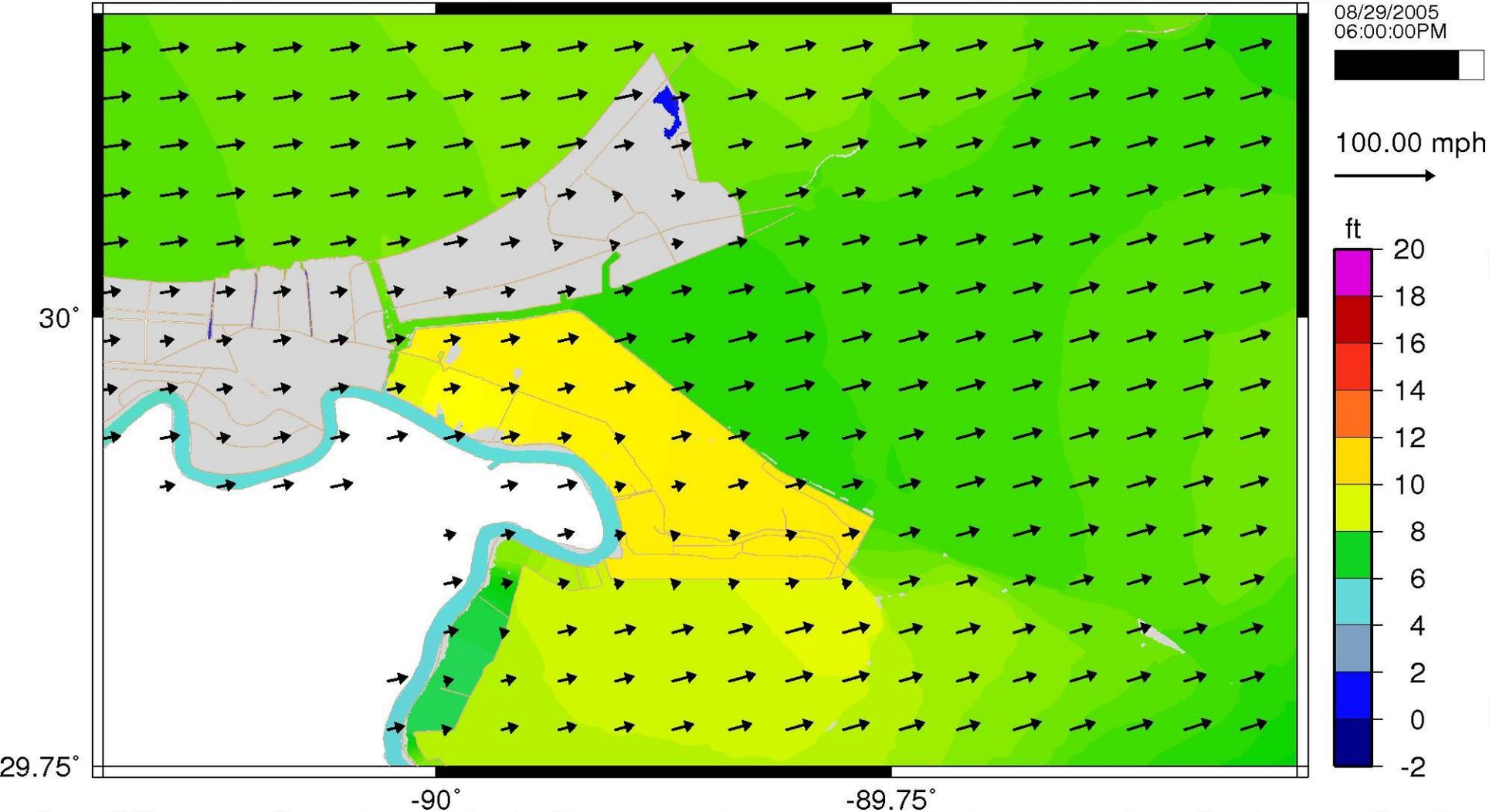


Figure 28n

8/29/2005 at 8 pm CDT

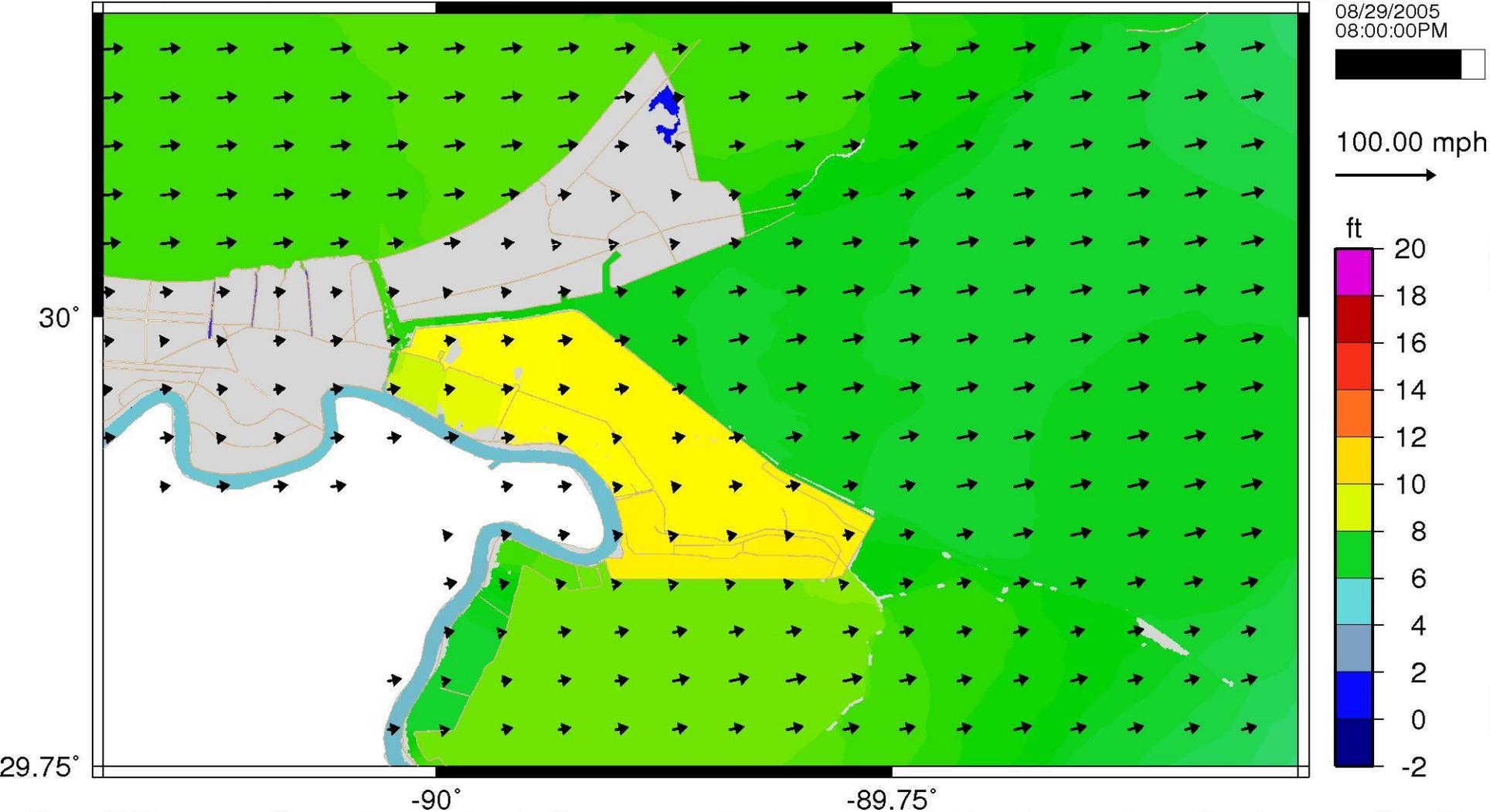


Figure 28o

8/29/2005 at 10 pm CDT

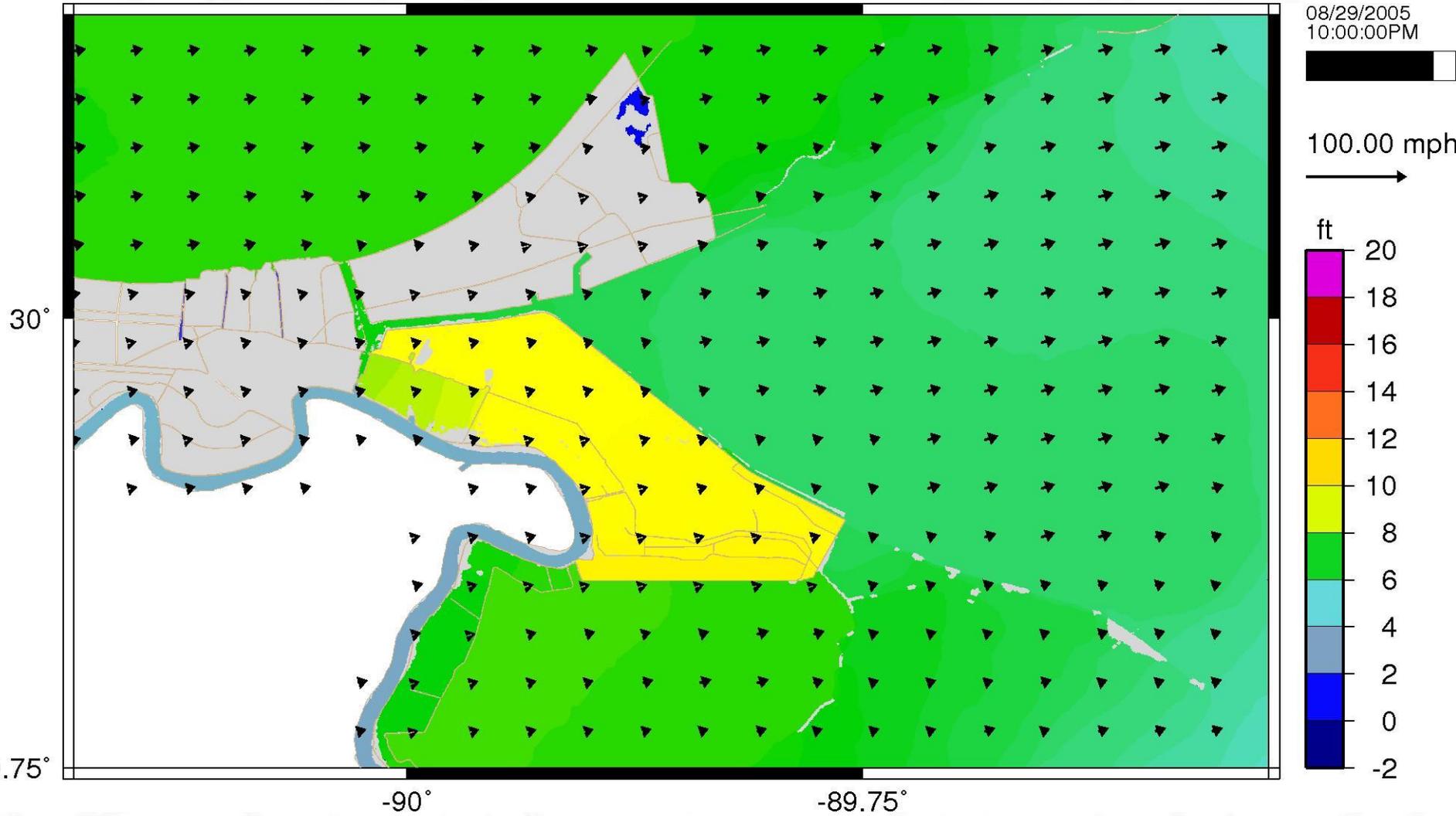


Figure 28p

8/30/2005 at 12 am CDT

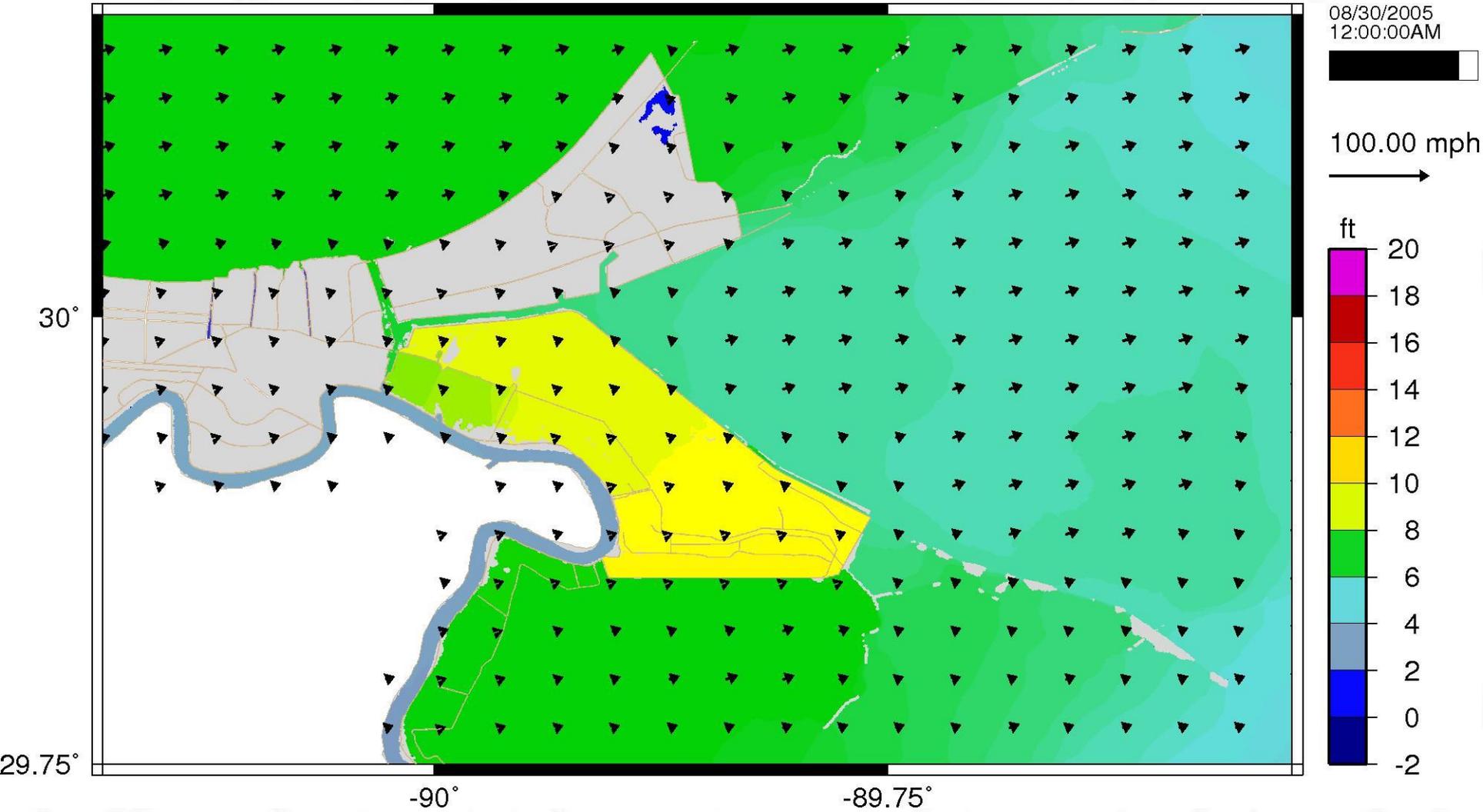


Figure 28q

- As depicted in the next set of slides (Figures 29-31), the maximum water elevations throughout St. Bernard Polder in Scenario B1 vary little from the maximum flooding levels actually experienced during the storm, *i.e.*, Scenario A1.
- These results reflect the somewhat reduced flow of water through the IHNC breaches caused by the reduction of water levels in the IHNC.
- The B1 Scenario modeling results confirm that flooding very similar to that actually experienced during Hurricane Katrina would have taken place throughout St. Bernard Polder under circumstances where levees breached but the MRGO remained at its original completed dimensions, and the surrounding wetlands remained in their 1956 condition.

## Maximum B1

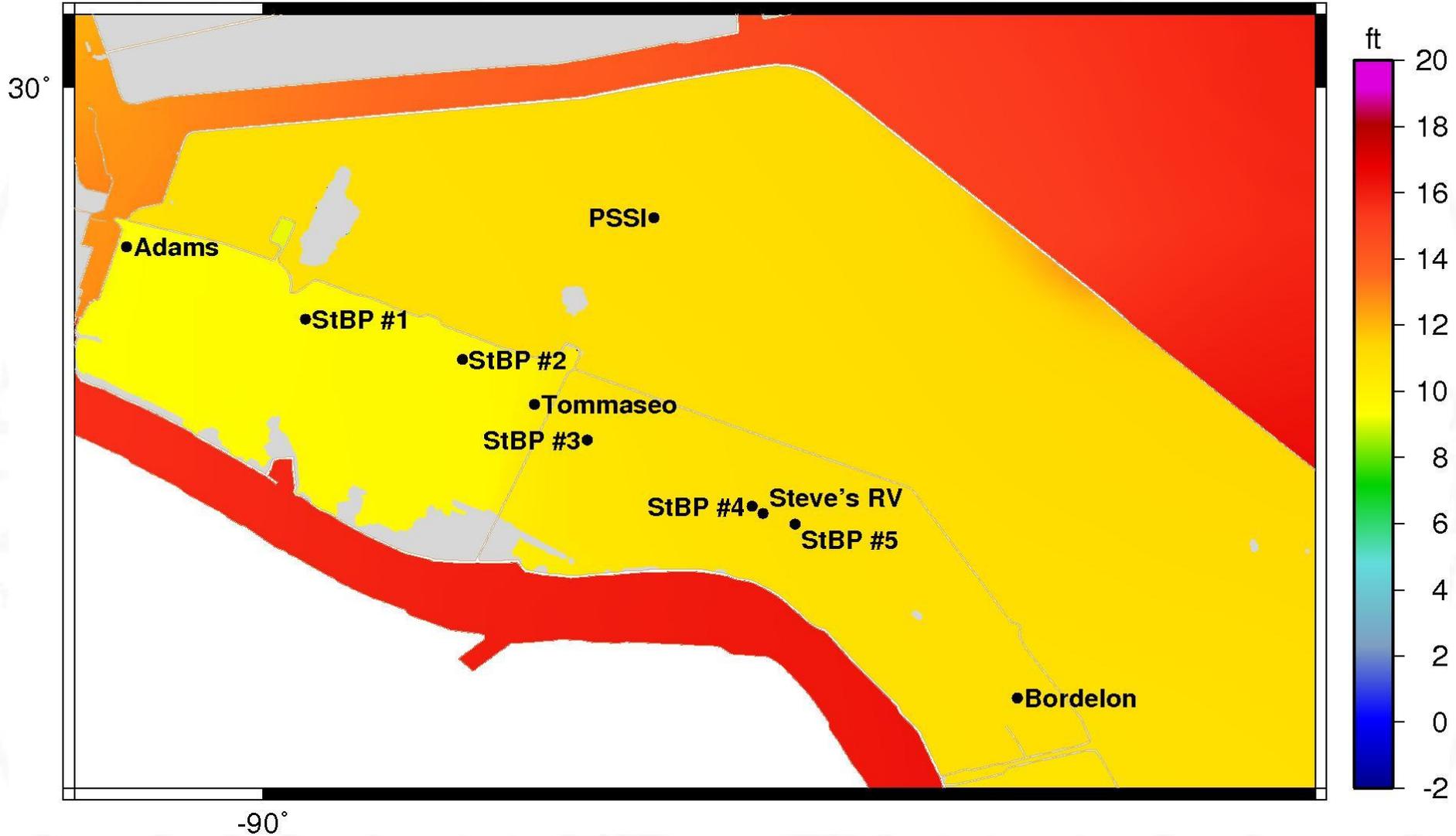


Figure 29

# Maximum A1

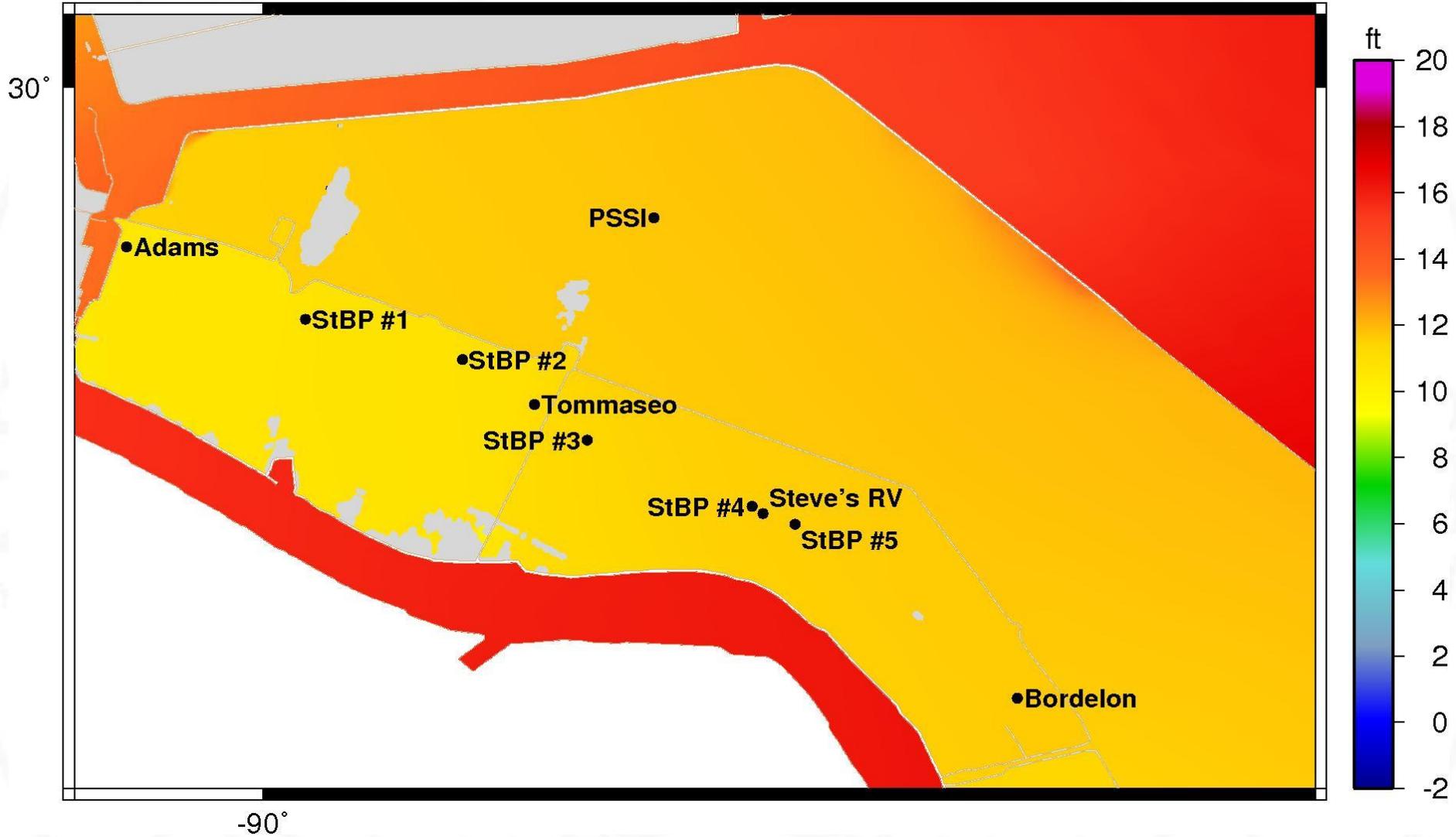


Figure 30

**Maximum A1 less Maximum B1**

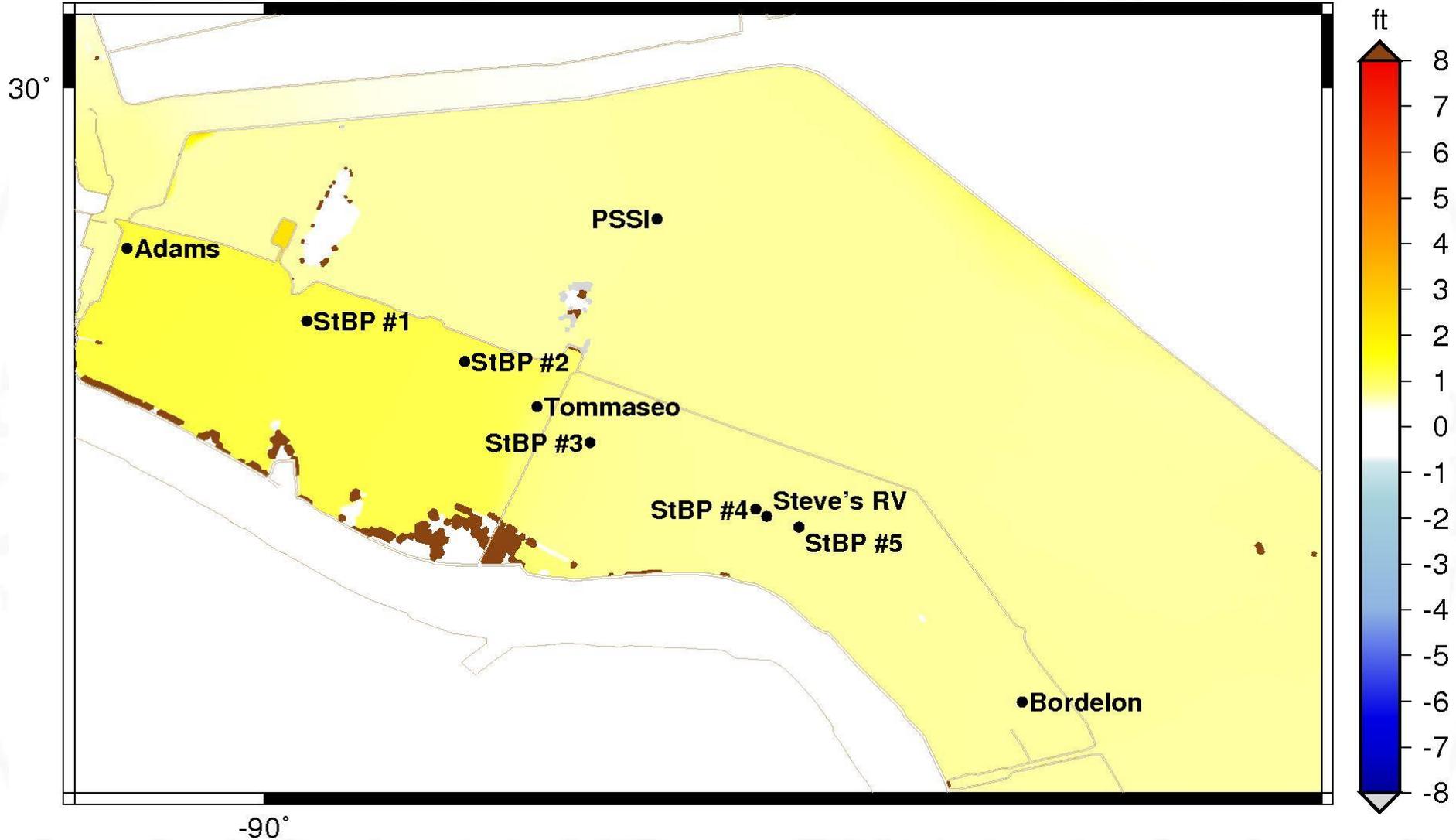


Figure 31

## ***Properties***

- The following hydrographs, Figures 32a-k, depict the maximum flood elevations and the timing of the flooding at each Trial Property in Scenarios A1 (red), A2 (green) and B1 (dark blue).
- The hydrographs also indicate the geographic location of each Trial Property inside the Polder.

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# Katrina - Scenario B1: Interior water surface time series at Plaintiff Properties

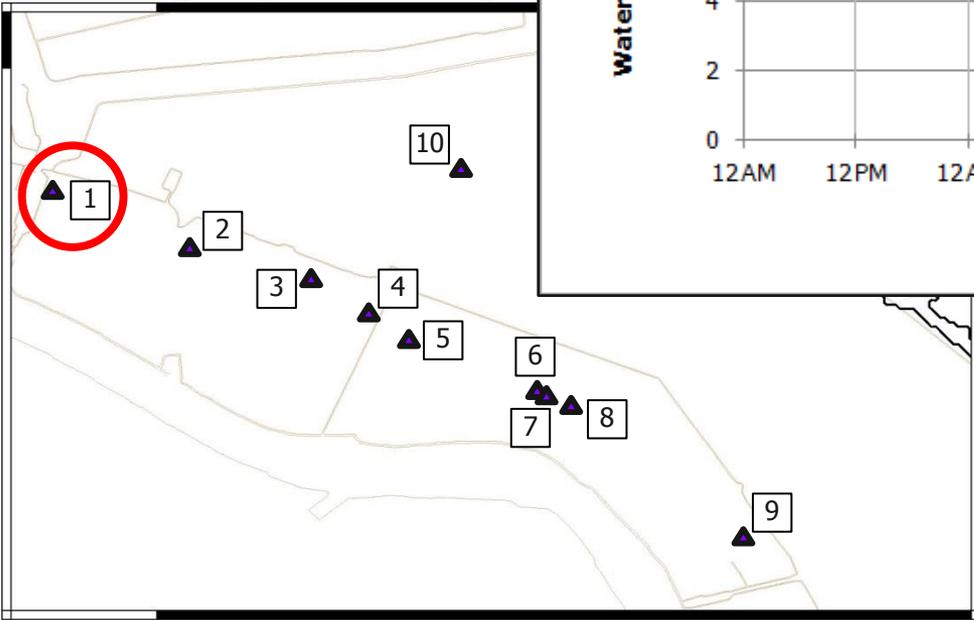
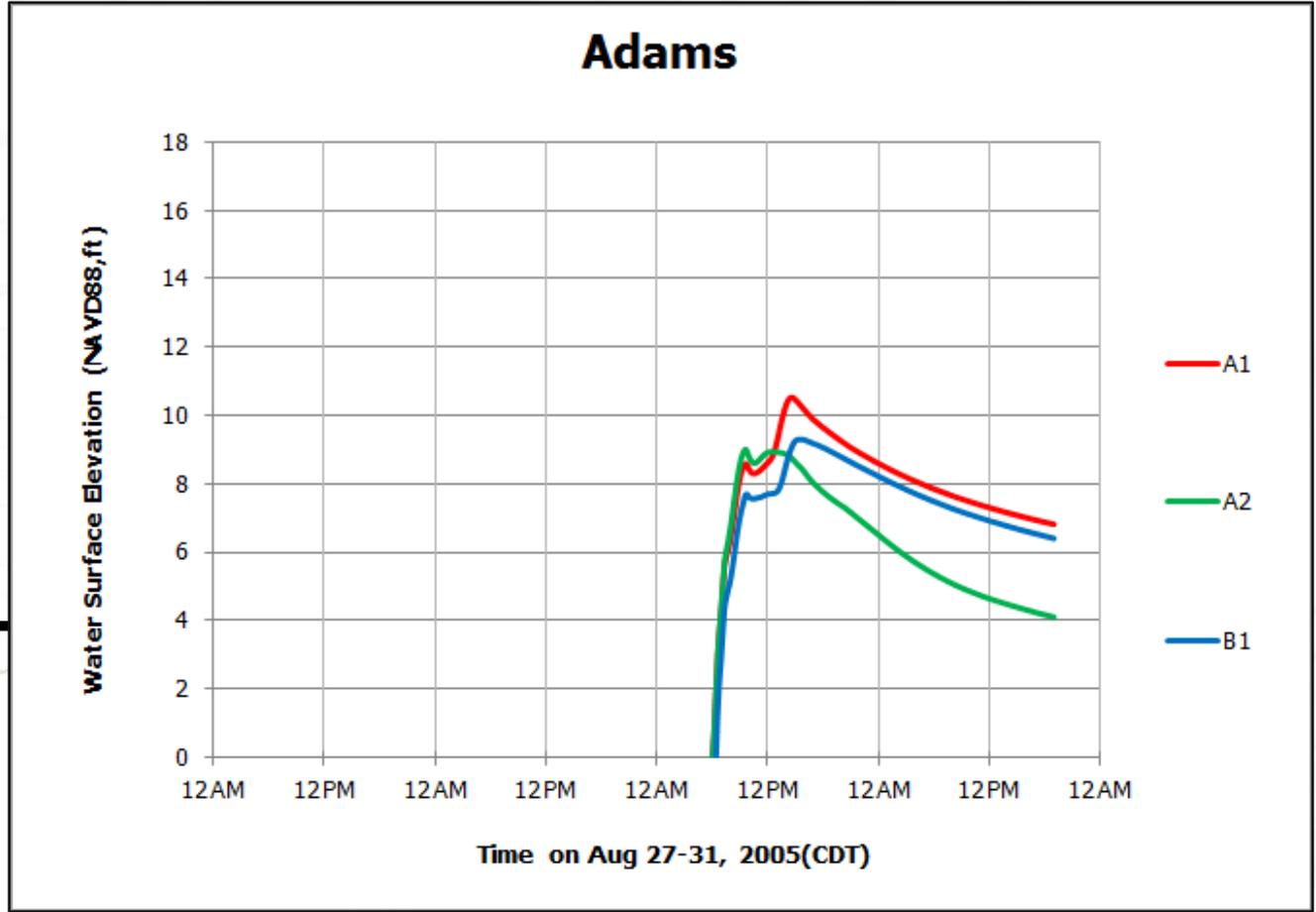


Figure 32a

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# Katrina - Scenario B1: Interior water surface time series at Plaintiff Properties

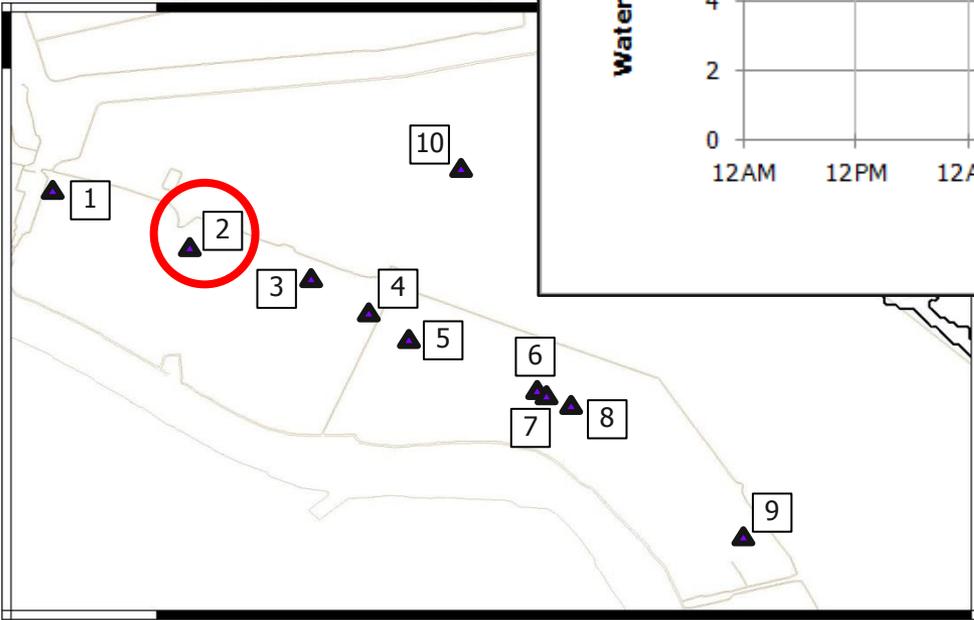
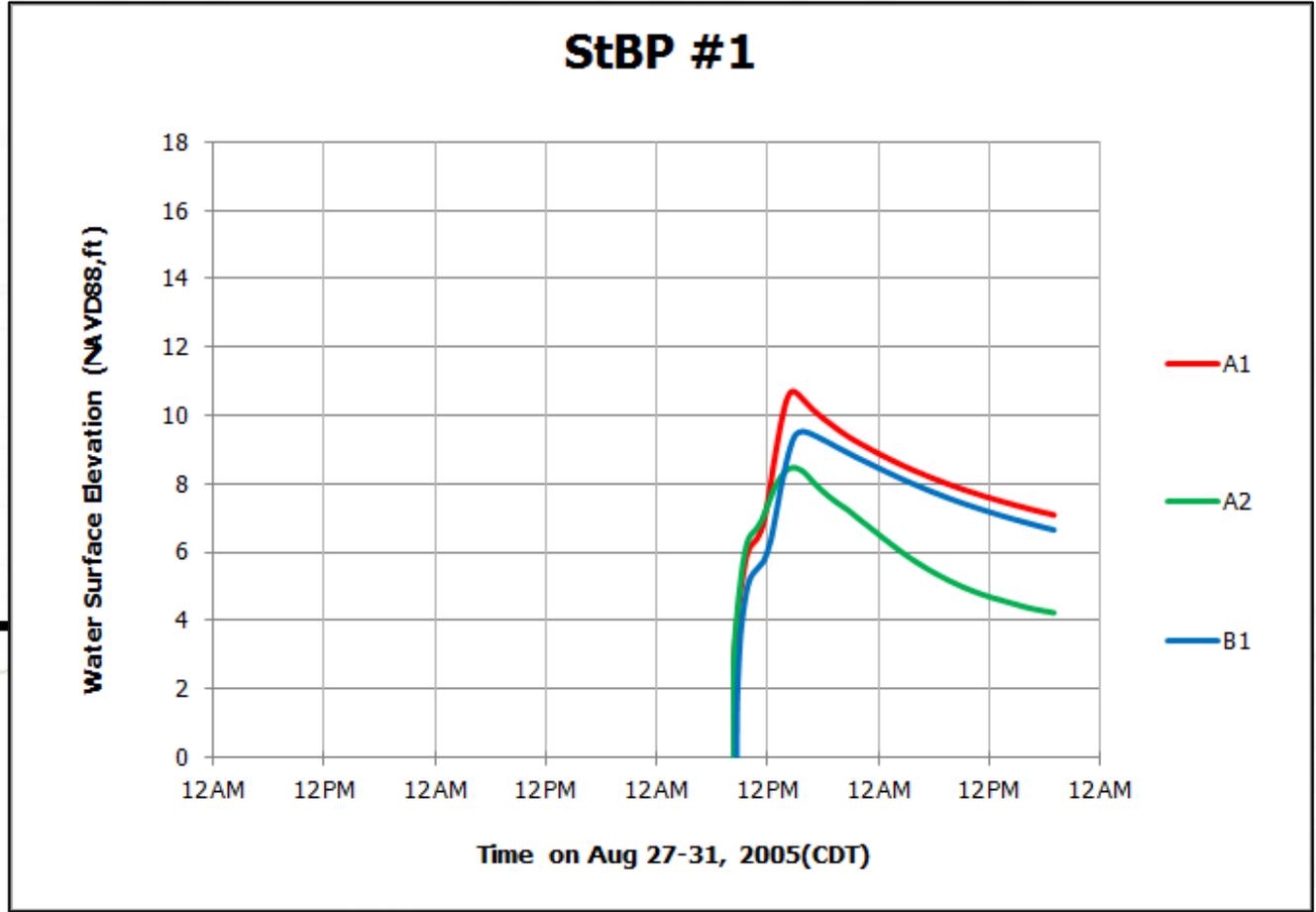


Figure 32b

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# Katrina - Scenario B1: Interior water surface time series at Plaintiff Properties

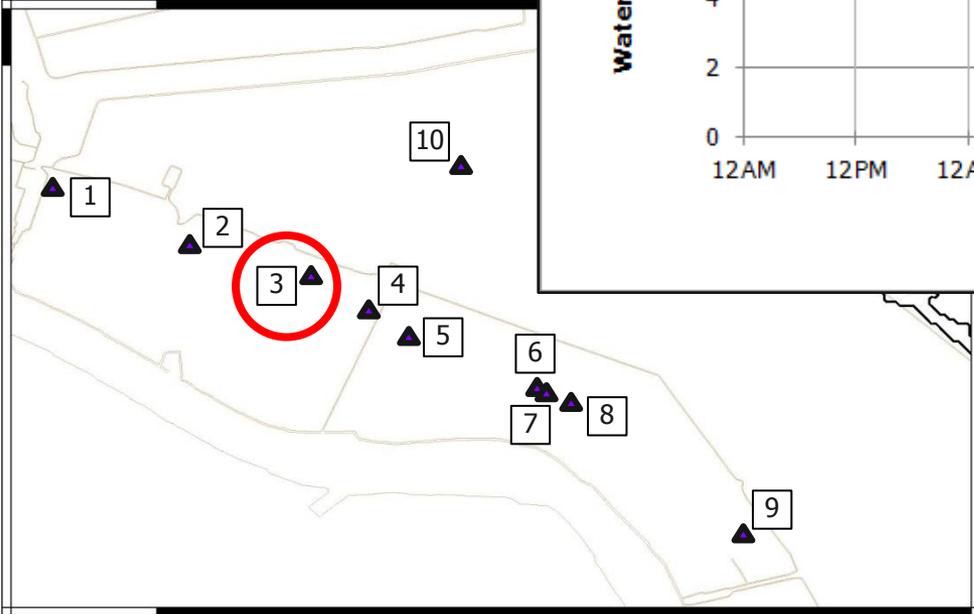
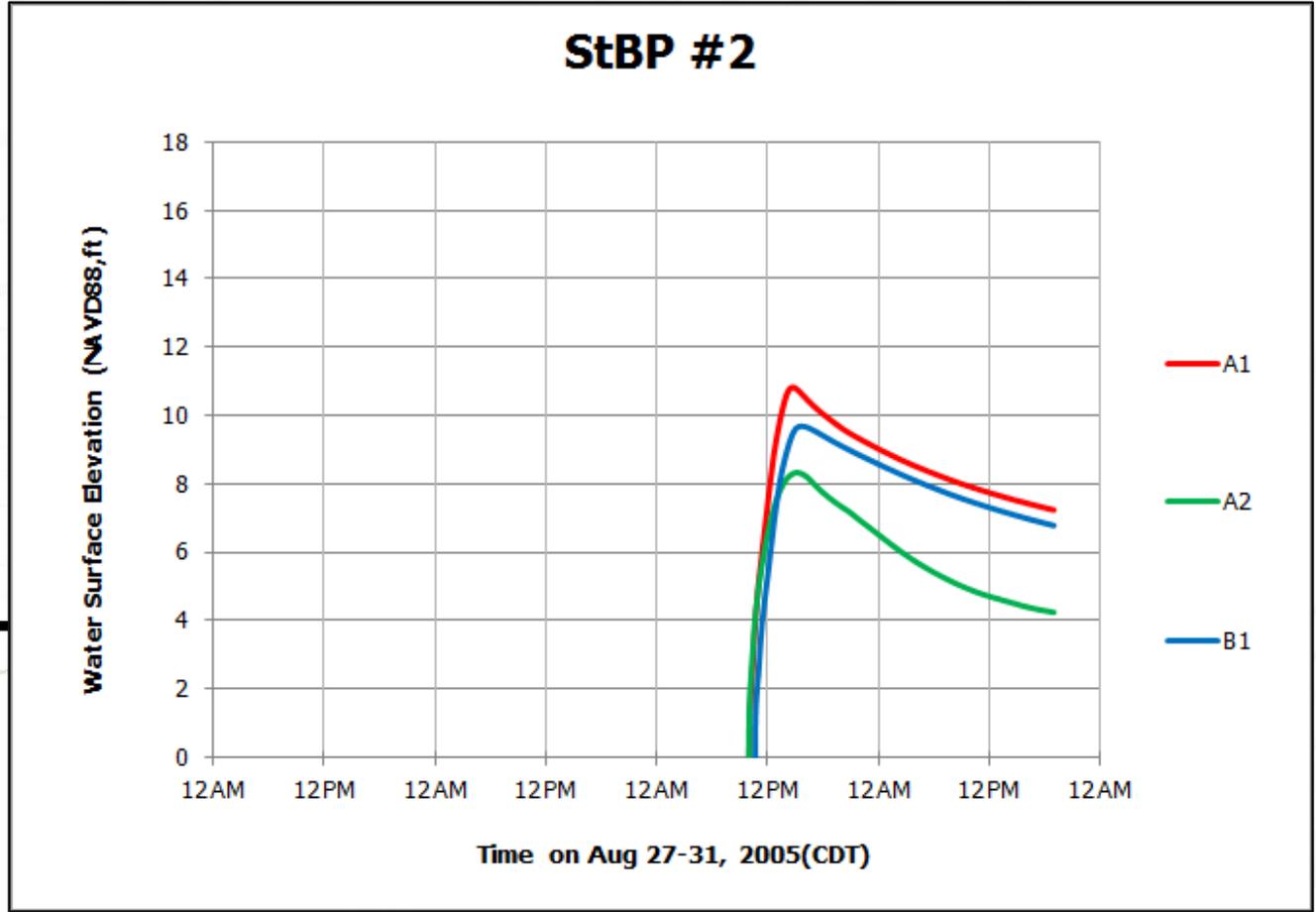


Figure 32c

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# Katrina - Scenario B1: Interior water surface time series at Plaintiff Properties

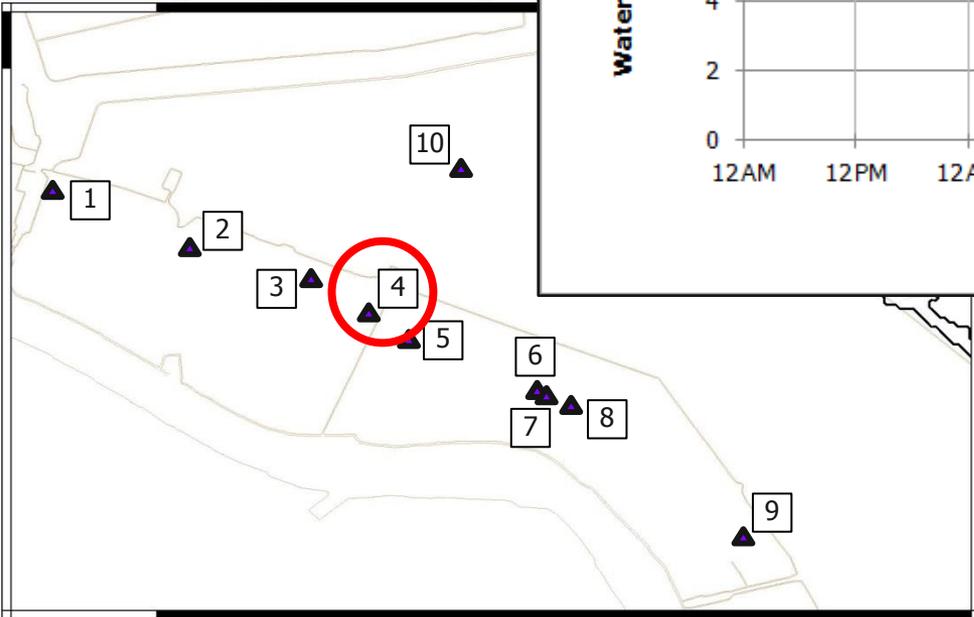
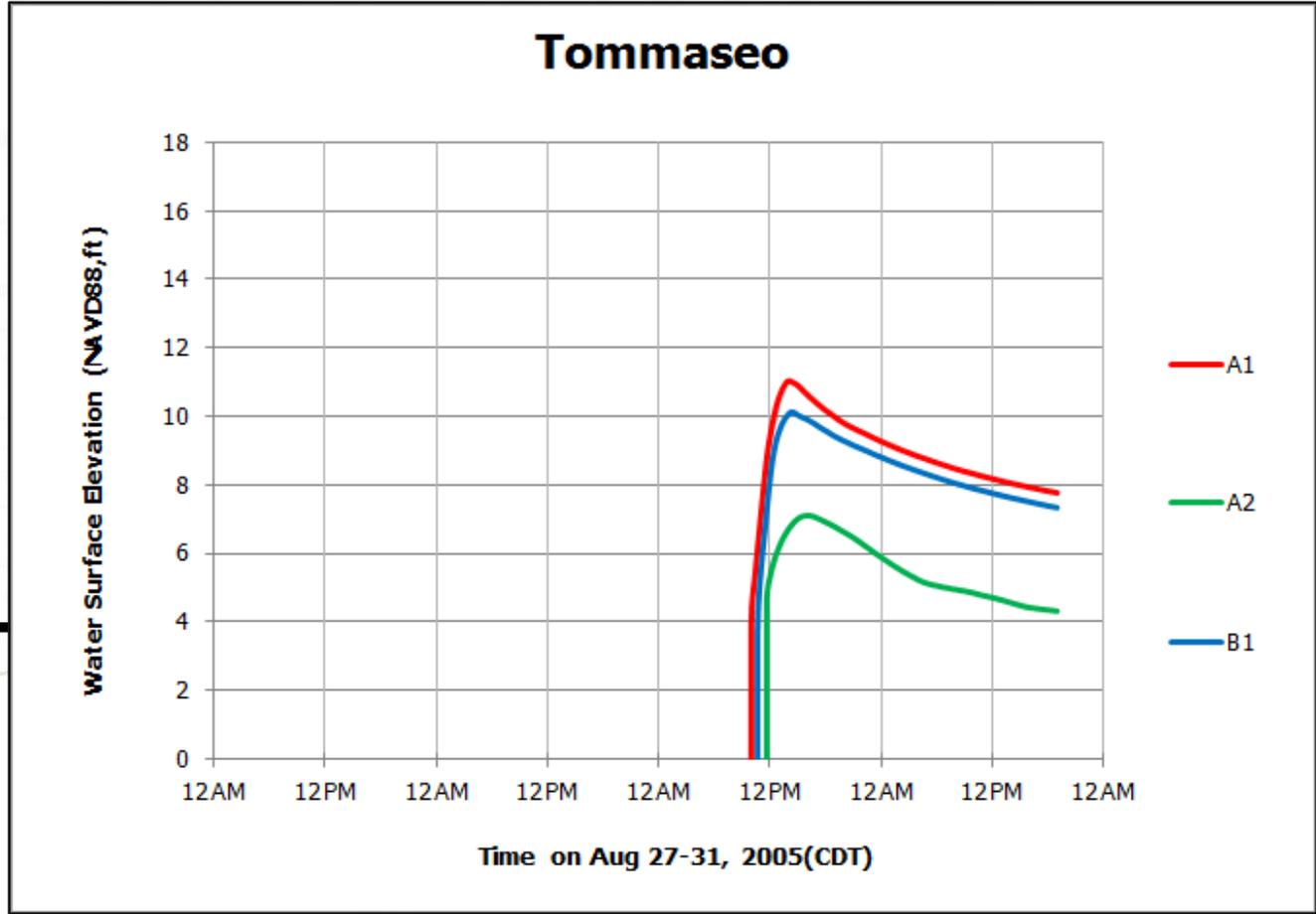


Figure 32d

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# Katrina - Scenario B1: Interior water surface time series at Plaintiff Properties

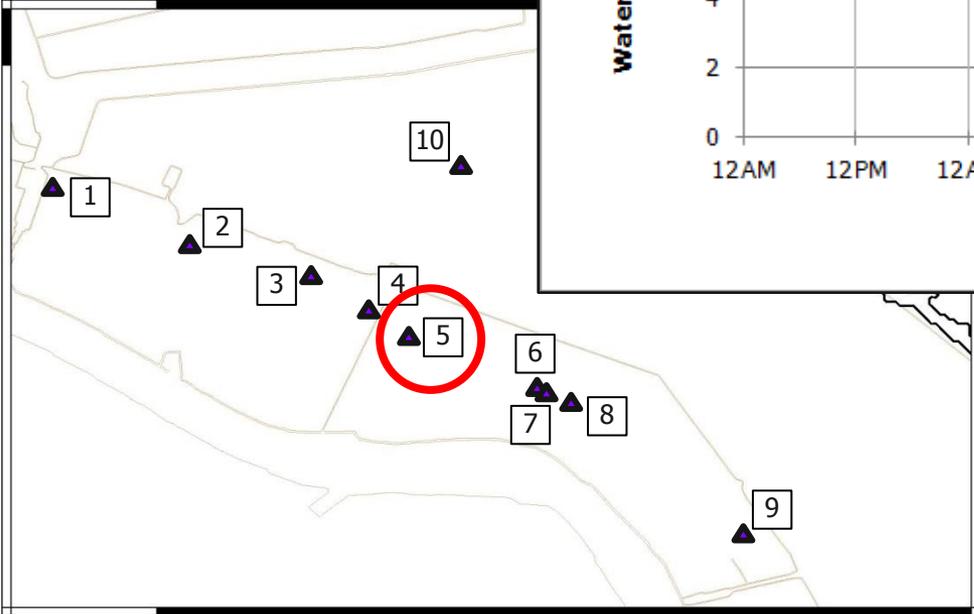
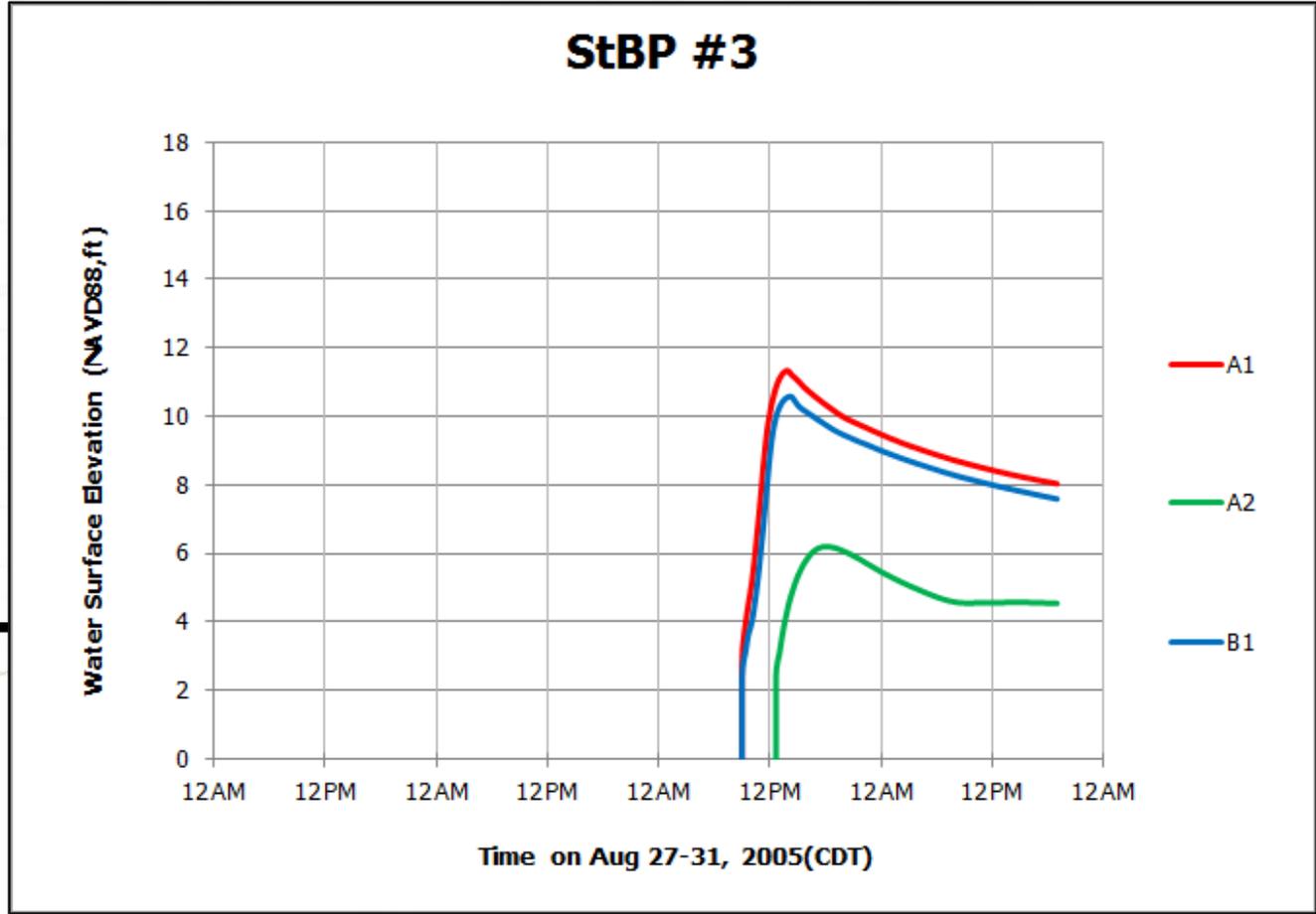


Figure 32e

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# Katrina - Scenario B1: Interior water surface time series at Plaintiff Properties

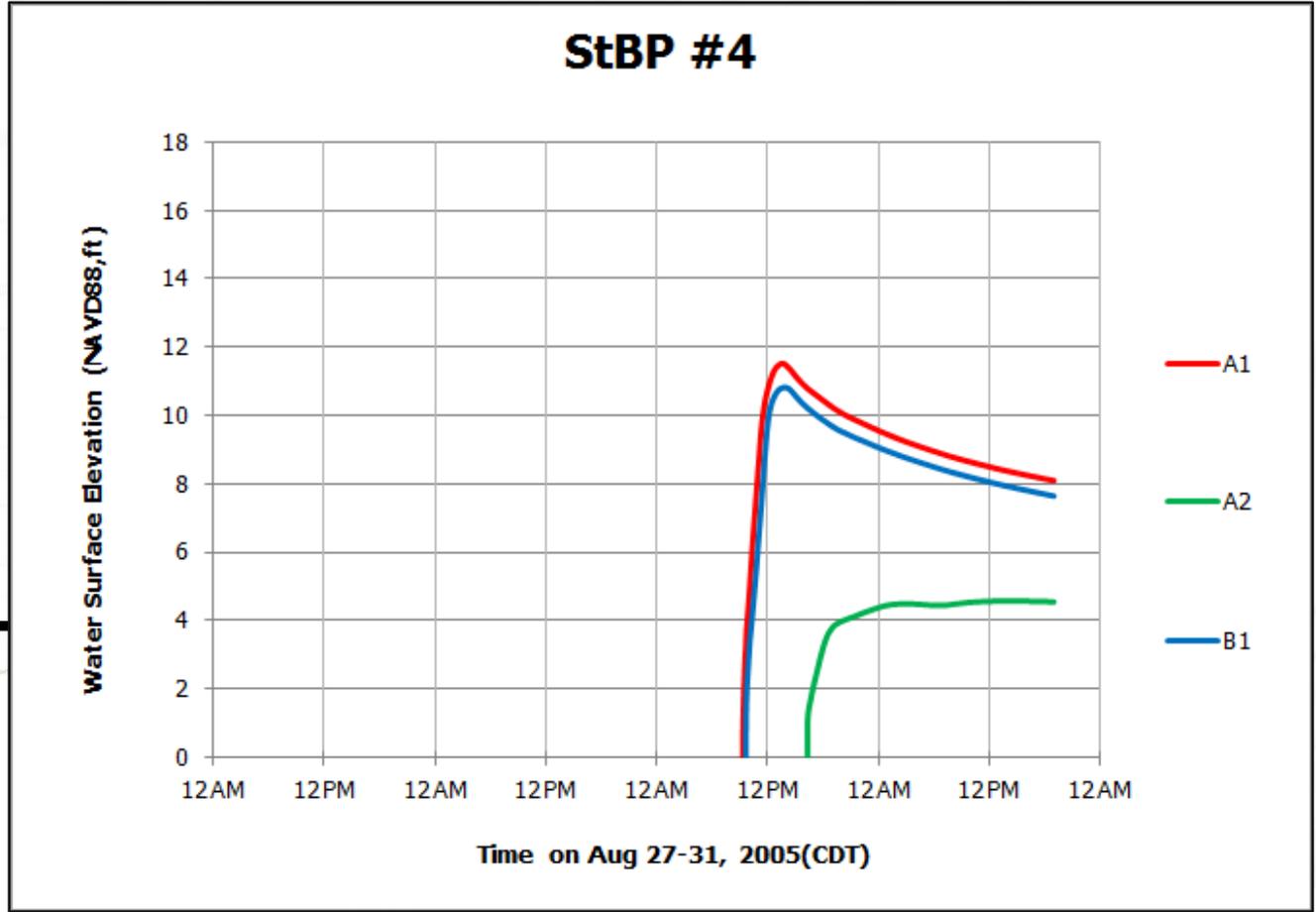
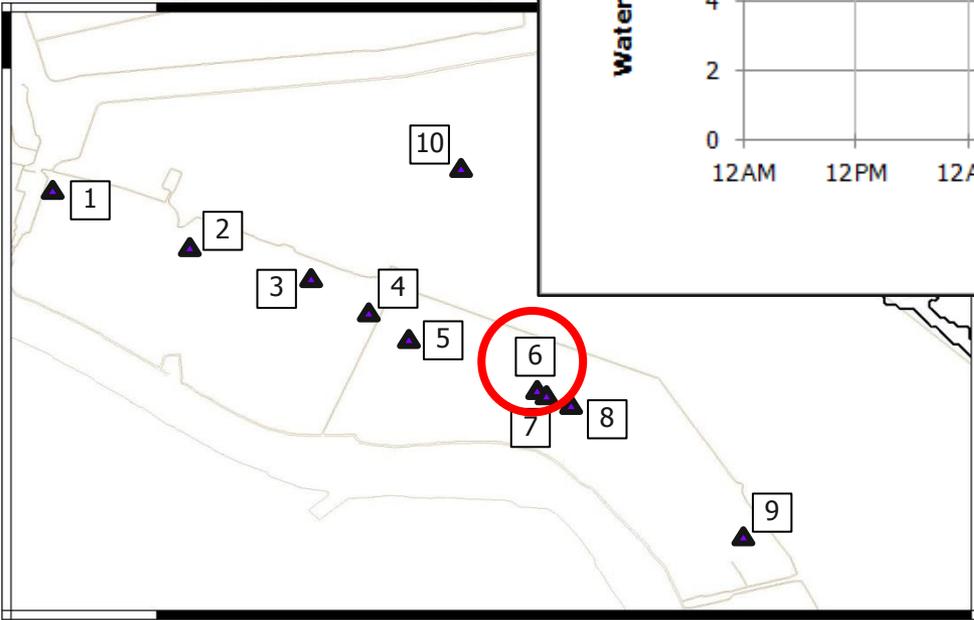


Figure 32f



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# Katrina - Scenario B1: Interior water surface time series at Plaintiff Properties

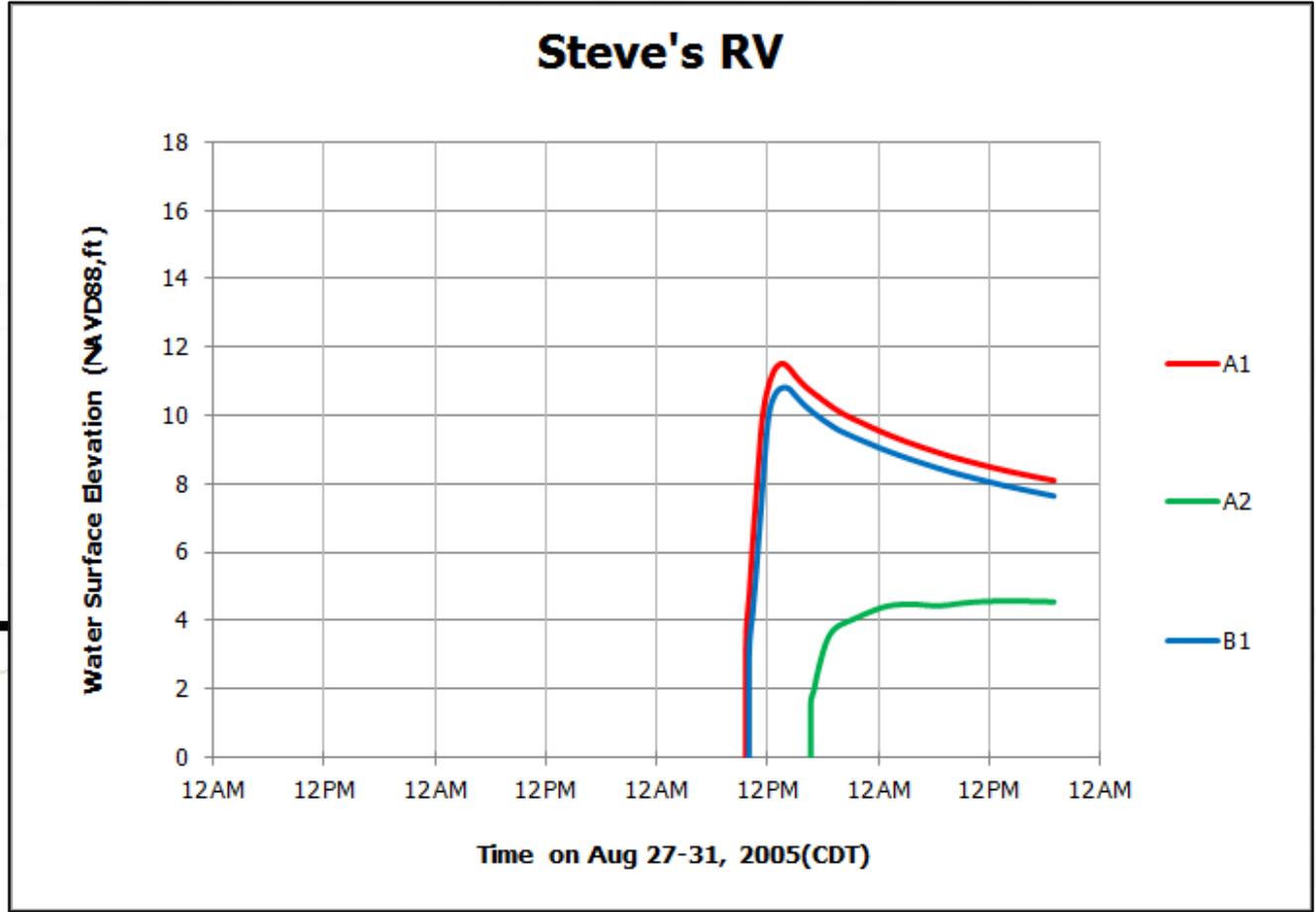
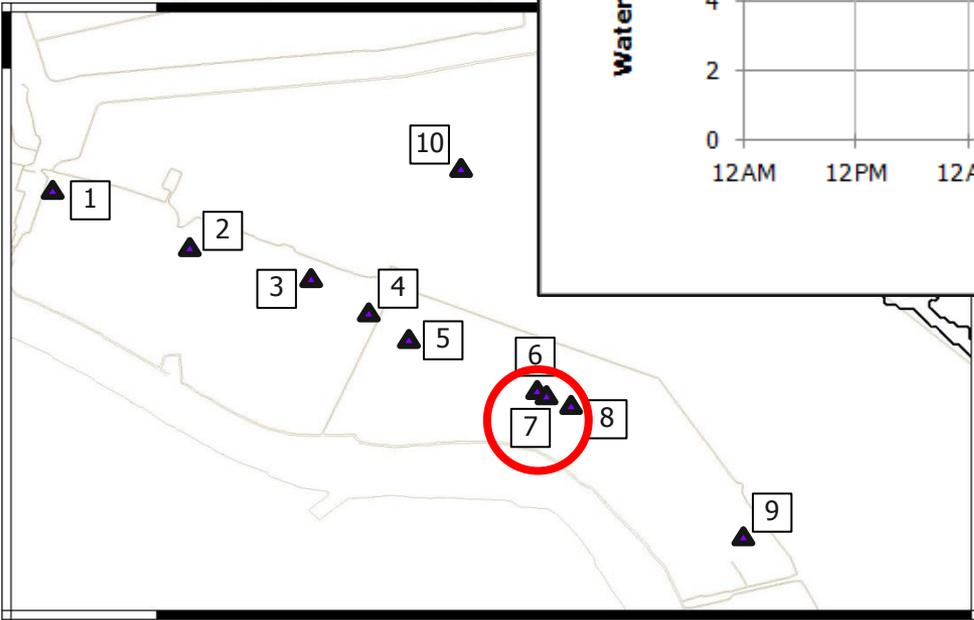


Figure 32g



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# Katrina - Scenario B1: Interior water surface time series at Plaintiff Properties

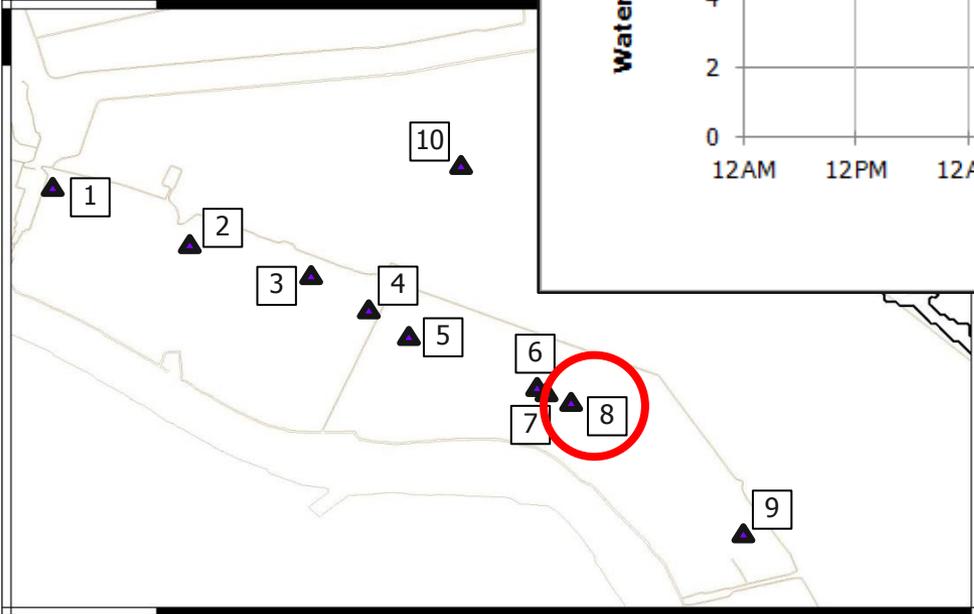
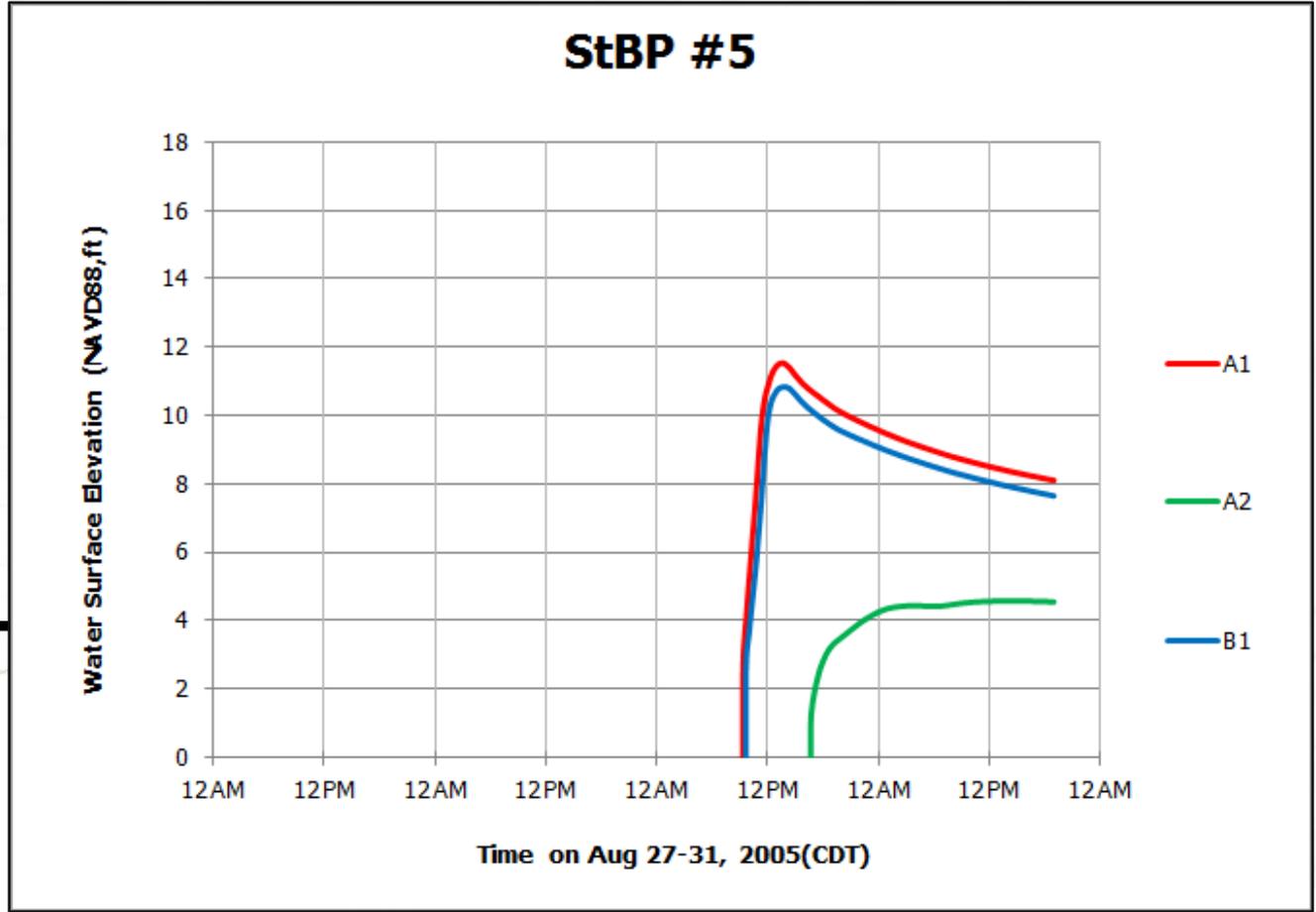


Figure 32h



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# Katrina - Scenario B1: Interior water surface time series at Plaintiff Properties

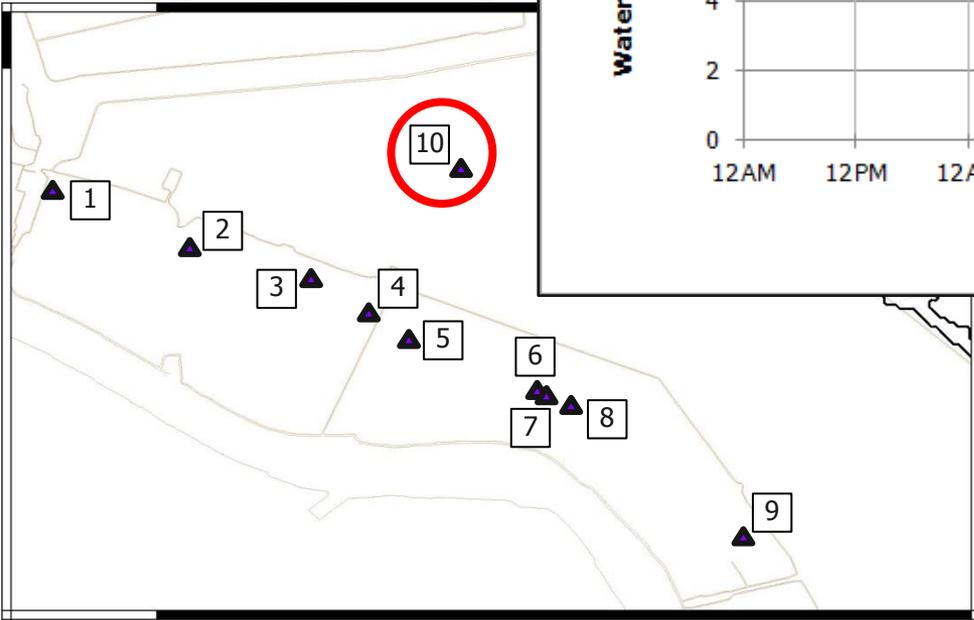
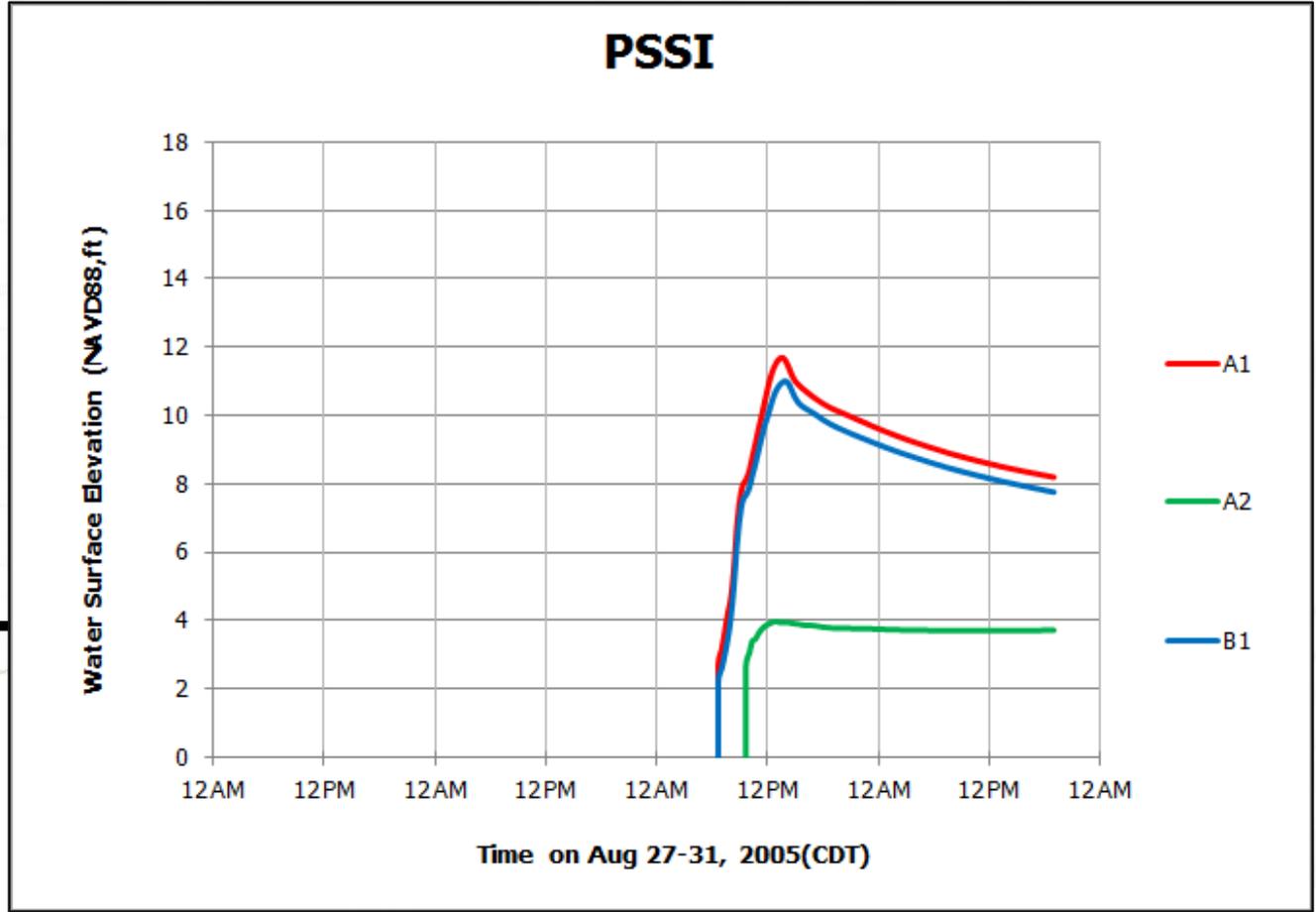


Figure 32j



- The maximum water surface elevations (in ft) at each Trial Property in the Scenario B1 “MRGO as Designed/1956 Wetlands” are summarized in the table below.

Location	Scenario A1	Scenario A2	Scenario B1
Adams	10.5	9.0	9.3
SBP #1	10.7	8.5	9.5
SBP #2	10.8	8.3	9.7
Tommaseo	11.0	7.1	10.1
SBP #3	11.3	6.2	10.6
SBP #4	11.5	4.6	10.8
Steve’s RV	11.5	4.6	10.8
SBP #5	11.5	4.6	10.8
Bordelon	11.6	4.6	10.9
PSSI	11.7	4.0	11.0
Florissant	17.3	17.5	17.2

Table 8