

Hurricane Harvey's Marine Supply Chain Disruption

Exercising Business Continuity in a Post Storm Environment

Naxon Farris
Canal Barge Company

How's the weather?

- Preparation
- Planning for the uncontrollable
- Exercising business continuity
- Dampen volatility of disruptive events

Simple Question - Big Impact

2017 Hurricane Season

An active year in the tropics

- 15 named storms
- 5 major hurricanes
- Harvey, Irma, Jose, Maria, Nate



Canal Barge Company

- Canal Barge Company is the oldest inland barge operator
- Owns 100% of Canal Barge Operations
- Full operations: 400 miles of canals, 800 locks, 1000+ barges, 1000+ employees
- 100% Canal is owned
- High volume of dry cargoes, liquid, between Corpus Christi, TX and New Orleans, LA
- "Sudamax Pipeline" across California



Inland Waterway Operators
• 100% owned by U.S. Dept. of Transportation
• 100% owned by U.S. Dept. of Transportation
• 100% owned by U.S. Dept. of Transportation
• 100% owned by U.S. Dept. of Transportation

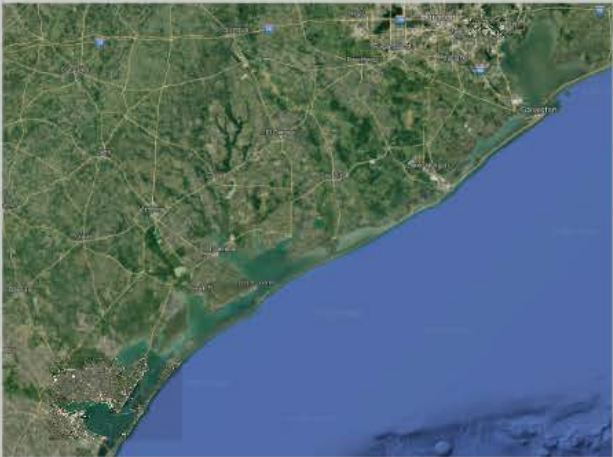
Canal Barge Company
• 100% owned by U.S. Dept. of Transportation
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Overhead Program
• 100% owned by U.S. Dept. of Transportation
• 100% owned by U.S. Dept. of Transportation
• 100% owned by U.S. Dept. of Transportation
• 100% owned by U.S. Dept. of Transportation



Wayway Weather
• 100% owned by U.S. Dept. of Transportation
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Weather Data Schedule
• 100% owned by U.S. Dept. of Transportation
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Weather Data
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Exercising Business Continuity in a Post
Storm Environment

Mason Eustis
Canal Barge Company

How's the weather?

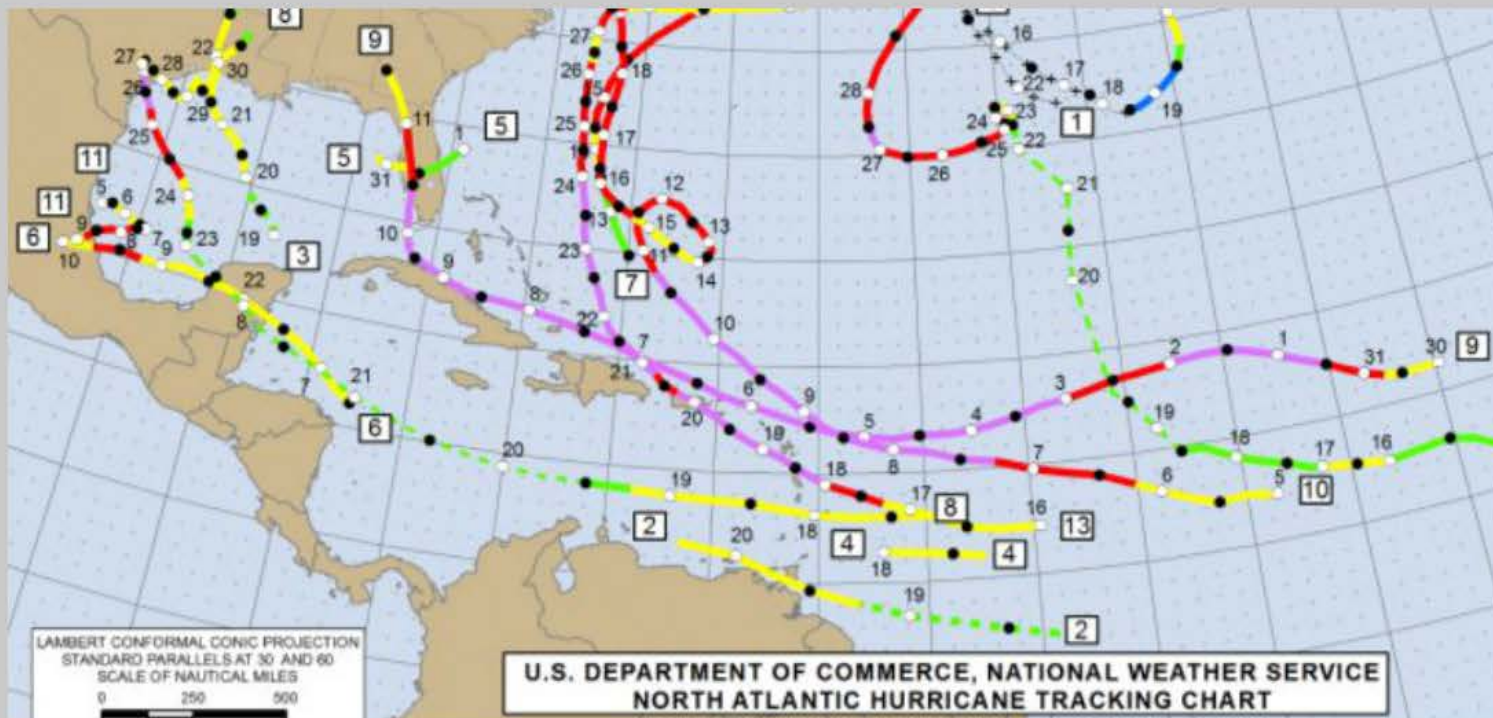
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Canal Barge Company

- Canal Barge Company is an inland marine boat and barge operator
- Core business in liquid cargo transportation
 - Fuel components, lube oils, chemicals, black oils
- Niche in long haul affreightment services
- US Gulf Coast is critical segment of our operations
- High volume of our cargoes originate between Corpus Christi, Tx. and Lake Charles, La.
- "Solutions Provider" to our customers

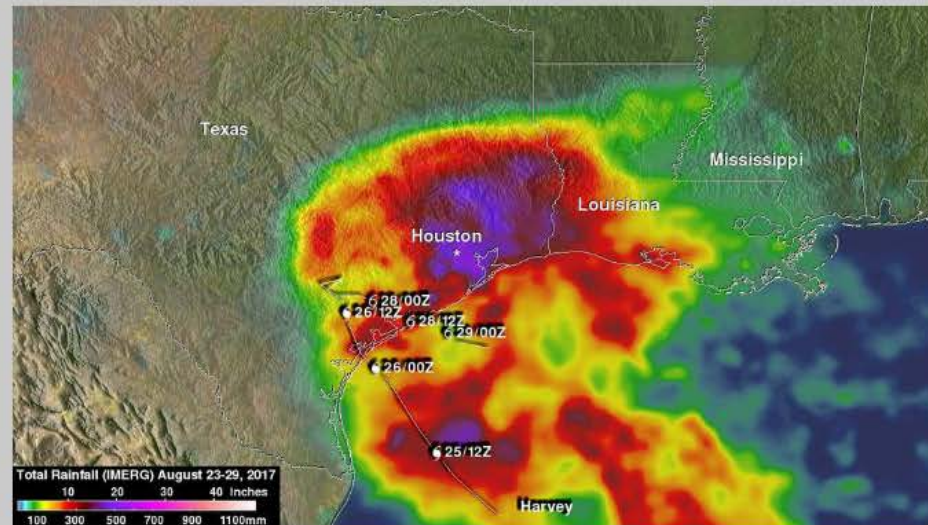


Hurricane Harvey



Harvey

- Landfall in Rockport, Tx August 25th
- Characteristics
 - Surge and wind impacts to communities in immediate cone
 - Stalled system with substantial rainfall

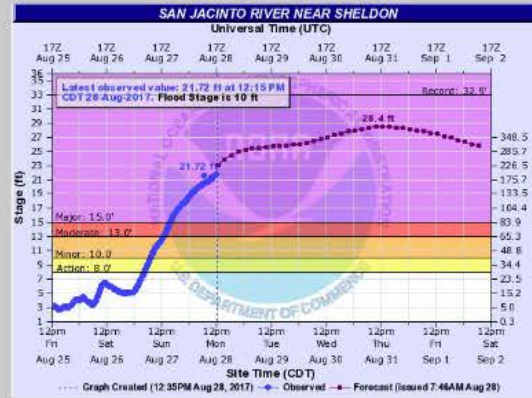


Cumulative rainfall of 42-60 inches



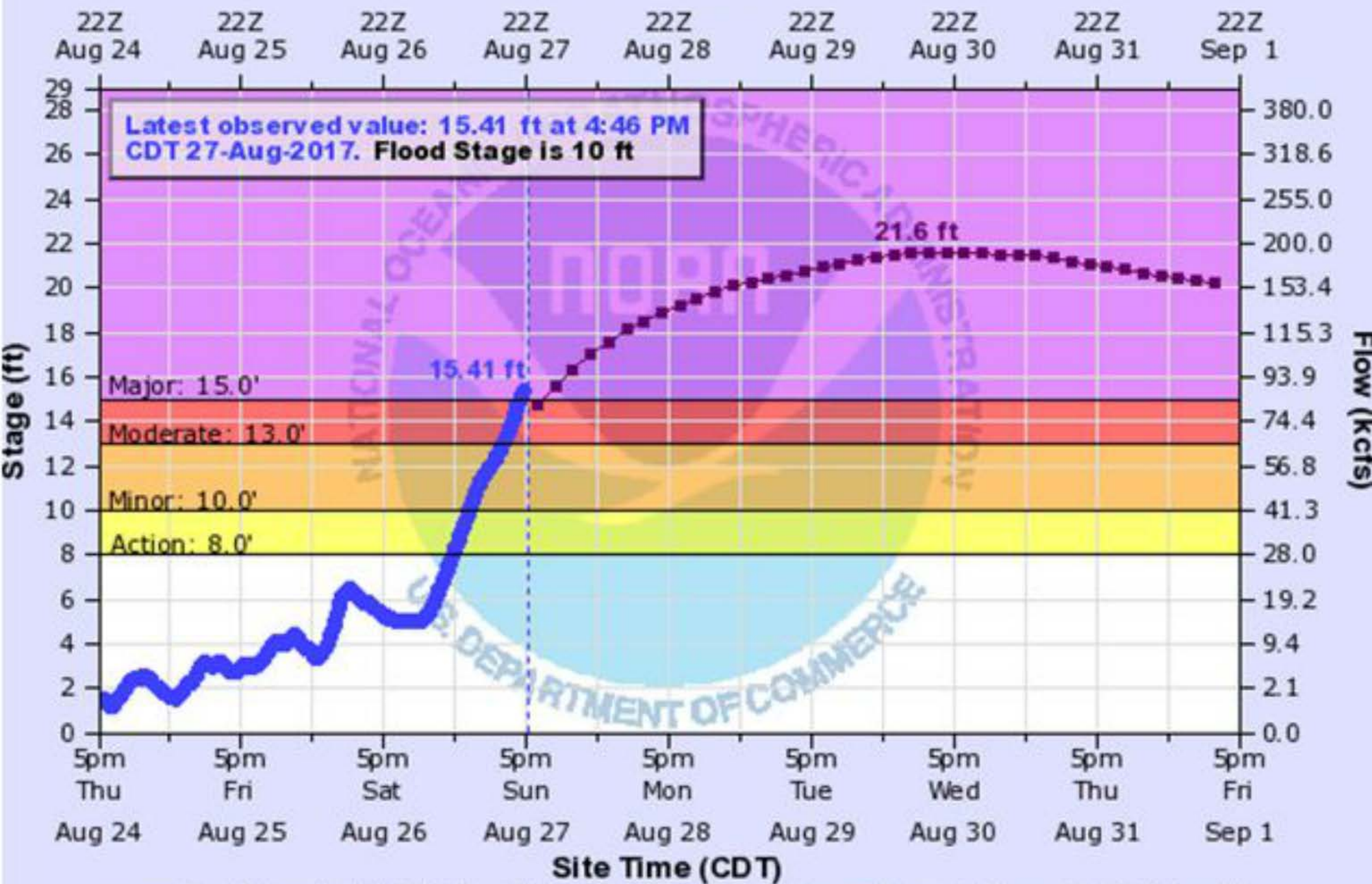
You Tube

San Jacinto River Stages



SAN JACINTO RIVER NEAR SHELDON

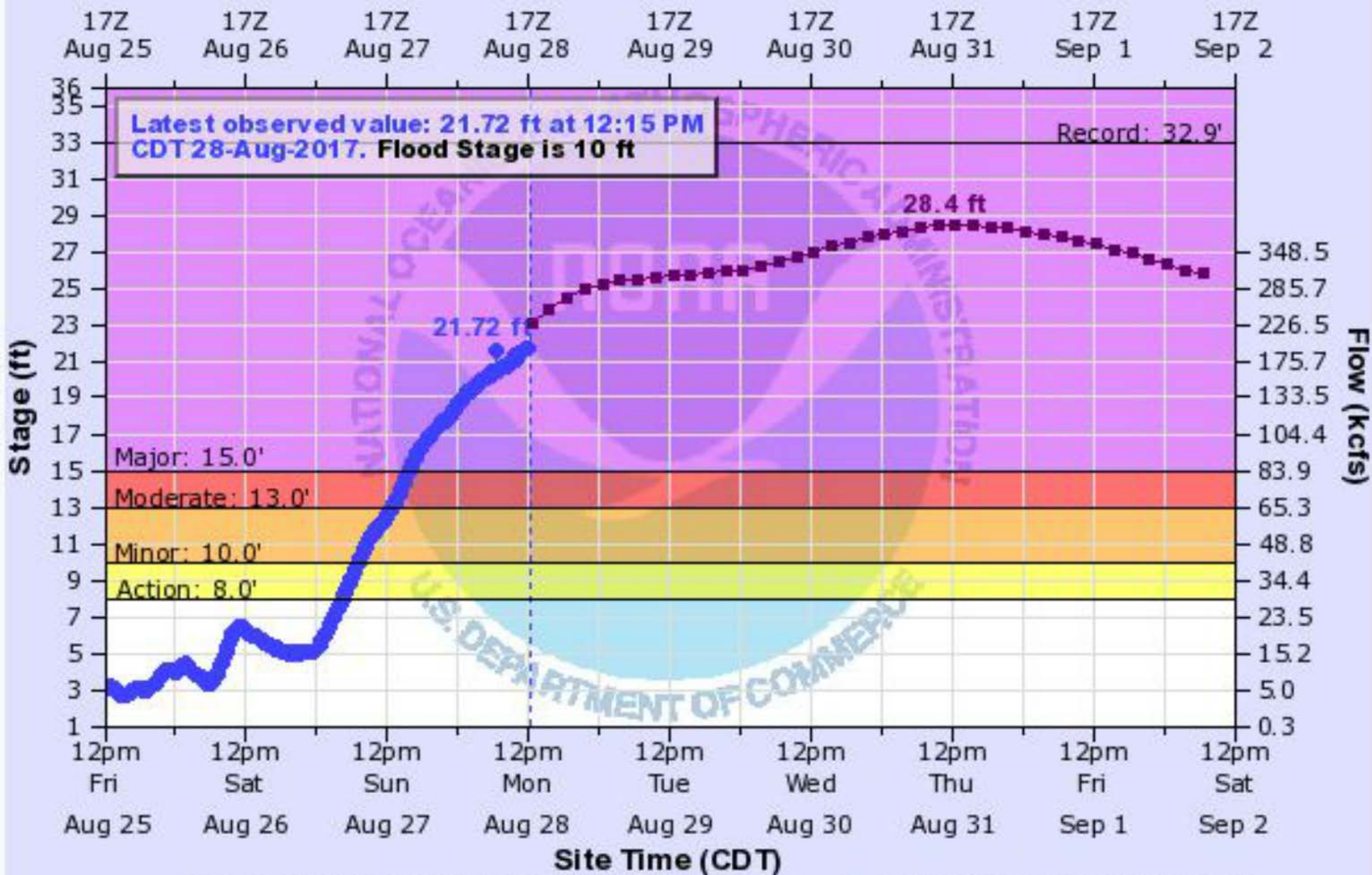
Universal Time (UTC)



----- Graph Created (5:21PM Aug 27, 2017) ●— Observed ■— Forecast (issued 2:16PM Aug 27)

SAN JACINTO RIVER NEAR SHELDON

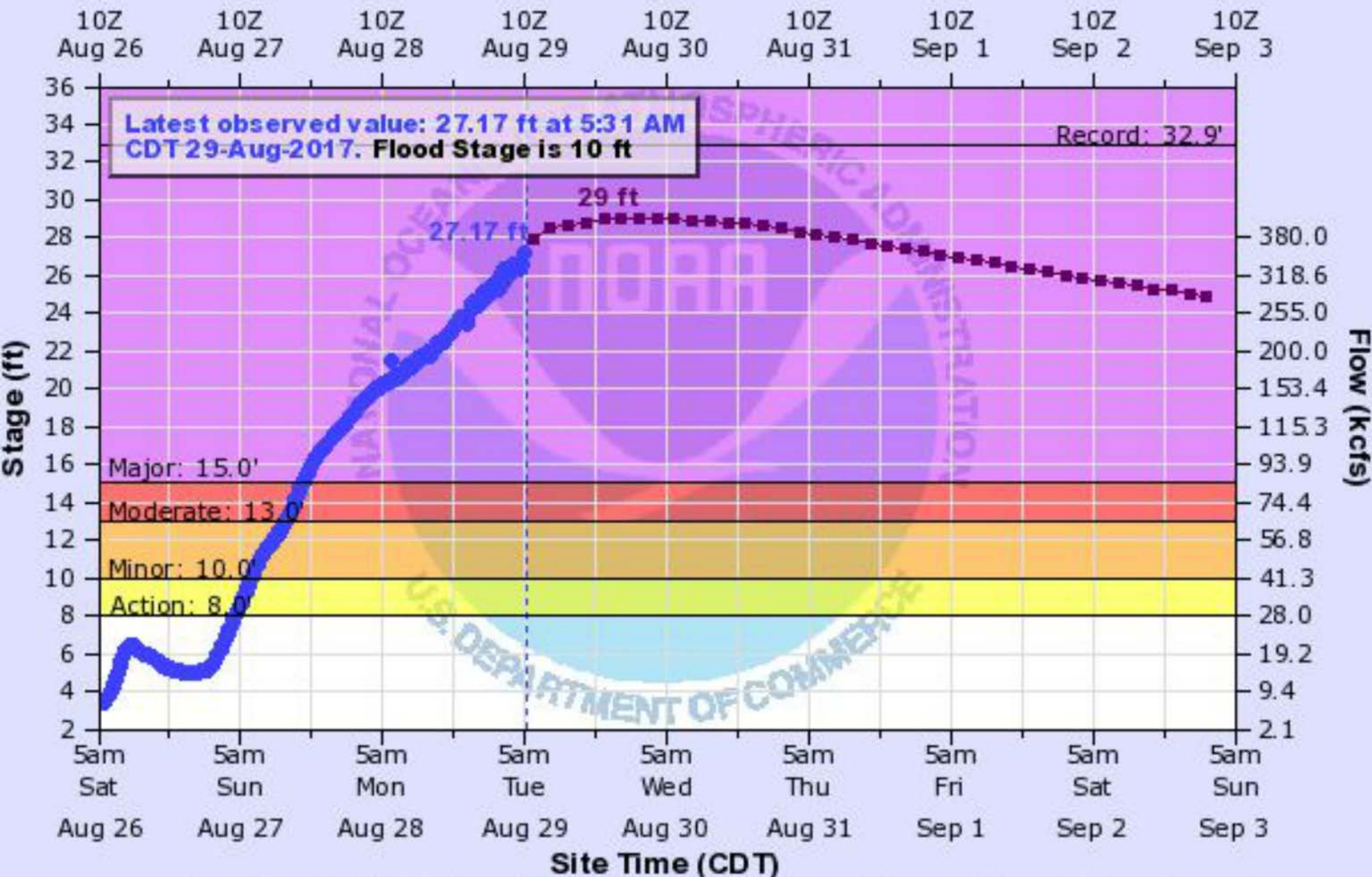
Universal Time (UTC)



---- Graph Created (12:35PM Aug 28, 2017) —◆— Observed —■— Forecast (issued 7:46AM Aug 28)

SAN JACINTO RIVER NEAR SHELDON

Universal Time (UTC)



---- Graph Created (5:51AM Aug 29, 2017) —◆— Observed —■— Forecast (issued 2:35AM Aug 29)



SAN JACINTO RIVER NEAR SHELDON

Universal Time (UTC)

22Z Aug 27 22Z Aug 28 22Z Aug 29 22Z Aug 30 22Z Aug 31 22Z Sep 1 22Z Sep 2 22Z Sep 3 22Z Sep 4



----- Graph Created (5:50PM Aug 30, 2017) ● Observed ■ Forecast (issued 2:00PM Aug 30)



08/30/2017 10:20:55

1027





08/31/2017 11:23:40

1027

Canal Barge Company Storm Prep

- In advance of Harvey some 20% of our tank barge fleet and 23% of our boat fleet were in the path of the storm
- 15% of our workforce lives in the storm zone

Business Continuity Plan

- Implemented in advance of the storm - maintained until normal operations were restored
- 2 x daily internal coordination calls
- ICS model
 - Clearly designated authority, specifically allocated responsibilities

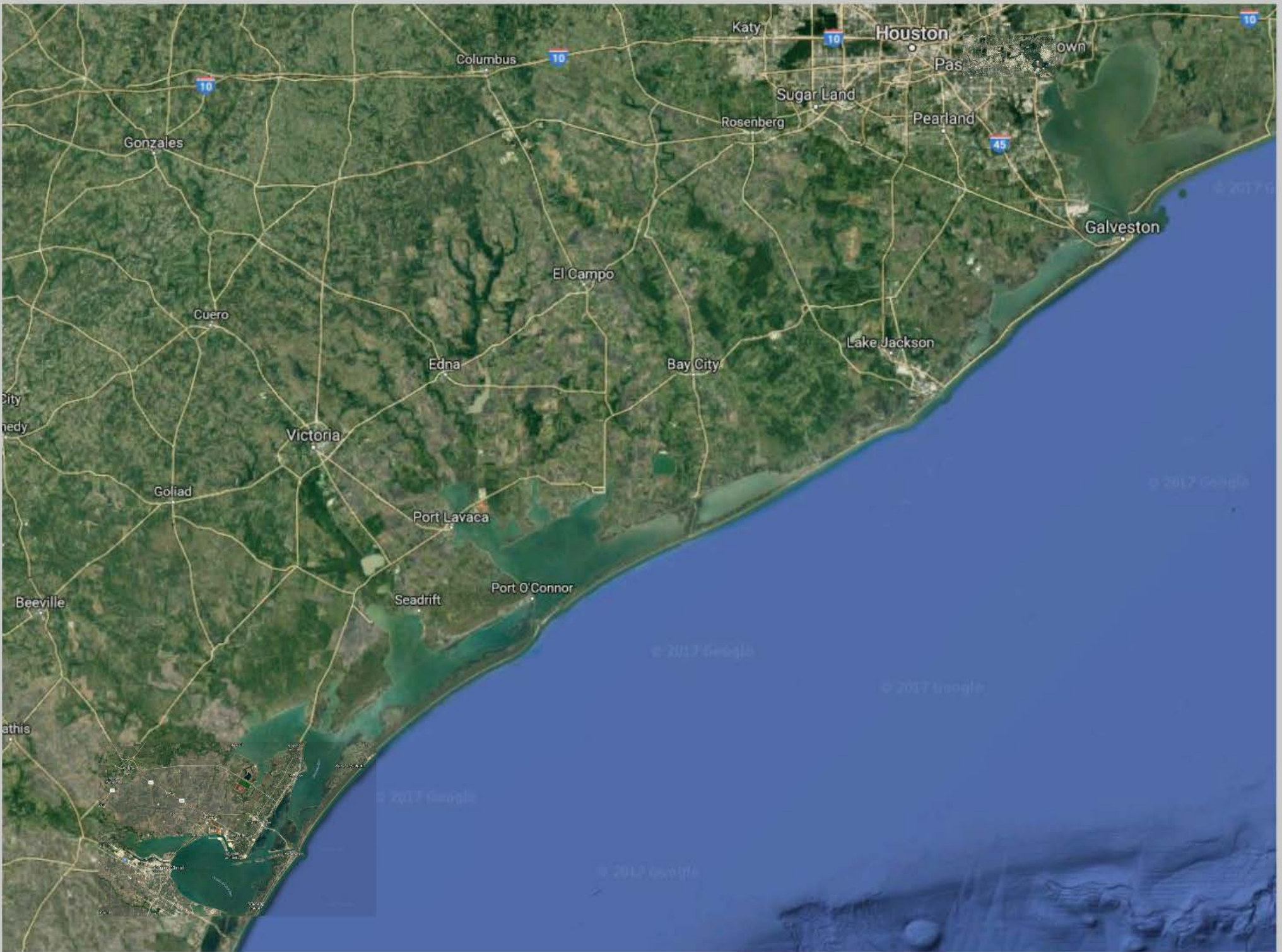
Inland Waterway Closures

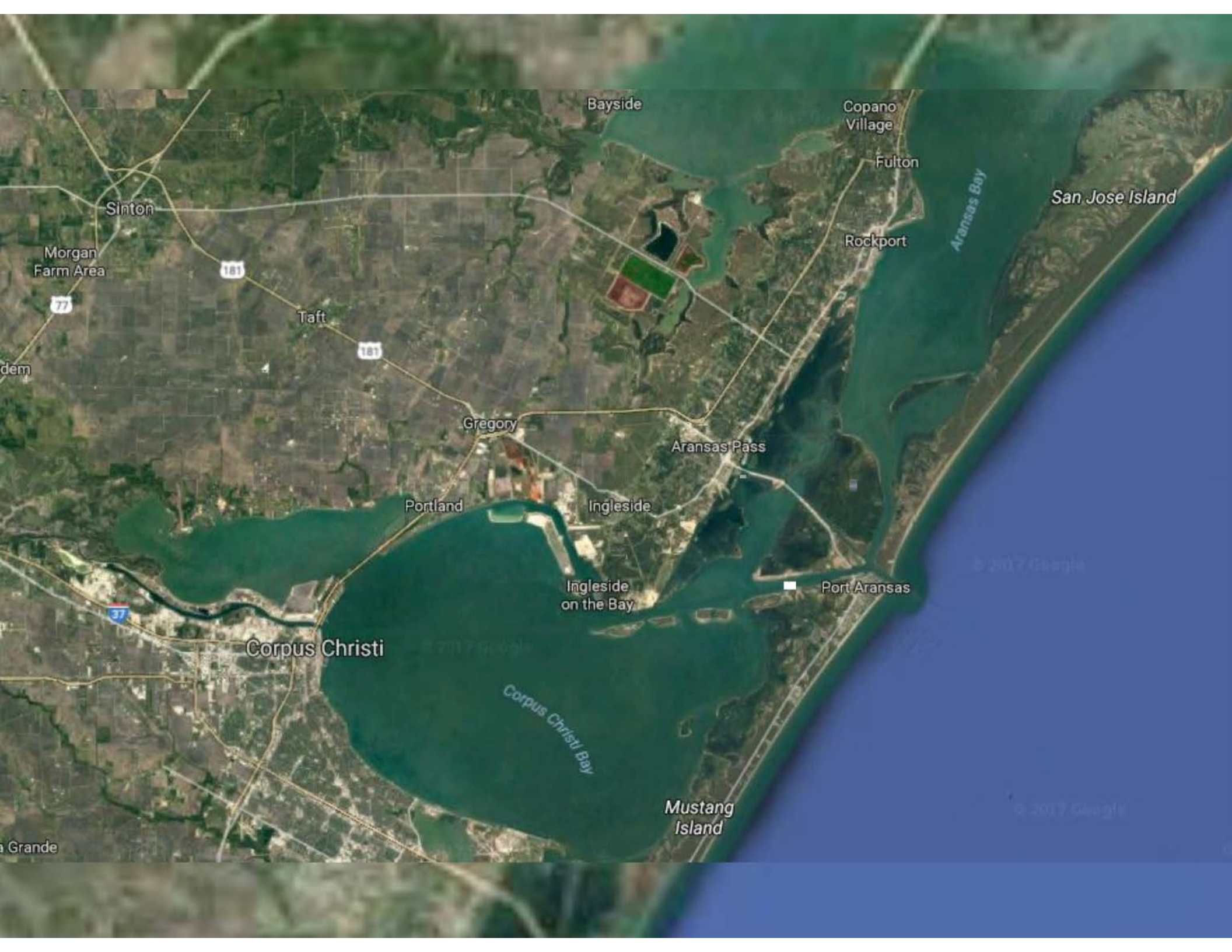
- Port of Houston completely closed for 7 days
 - 'Port Stage Zulu' - no ships in or out, no cargo transfers, no barge or tow movement
- Intercoastal Waterway closed from Houston to Lake Charles for 9 days
- Intercoastal Waterway closed at Colorado Locks - Houston to Corpus - Aug 25 until September 27

No inland marine access to Corpus for a month



**Hurricane Harvey
Marine Casualties**





Bayside

Copano Village

San Jose Island

Sinton

Fulton

Morgan Farm Area

181

Taft

Rockport

Aransas Bay

77

181

dem

Gregory

Aransas Pass

Portland

Ingleside

© 2017 Google

37

Ingleside on the Bay

Port Aransas

Corpus Christi

© 2017 Google

Corpus Christi Bay

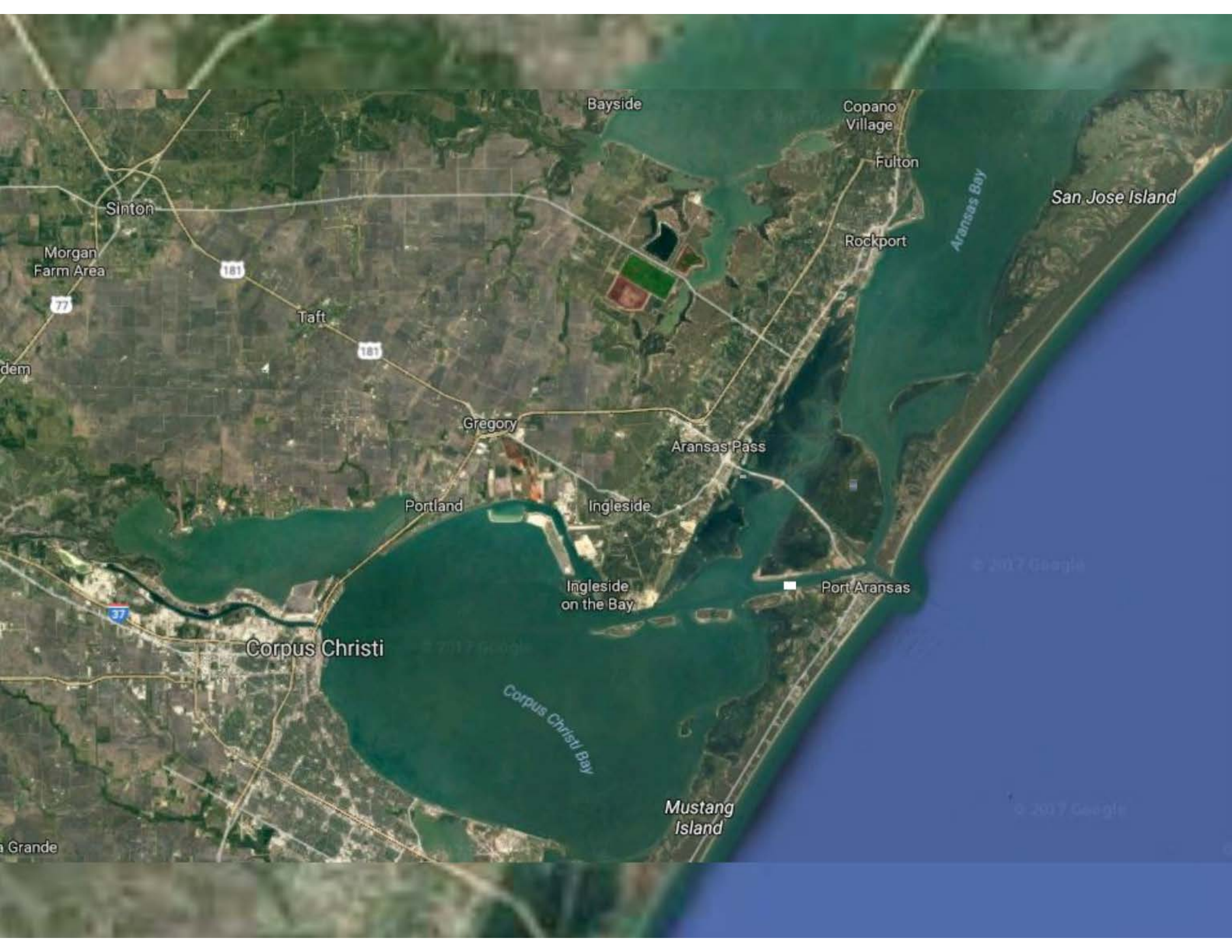
Mustang Island

© 2017 Google

a Grande



Sunken MV Signet Enterprise
USCG rescued 4 crew
aboard, all survived



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Copano Village

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Corpus Christi

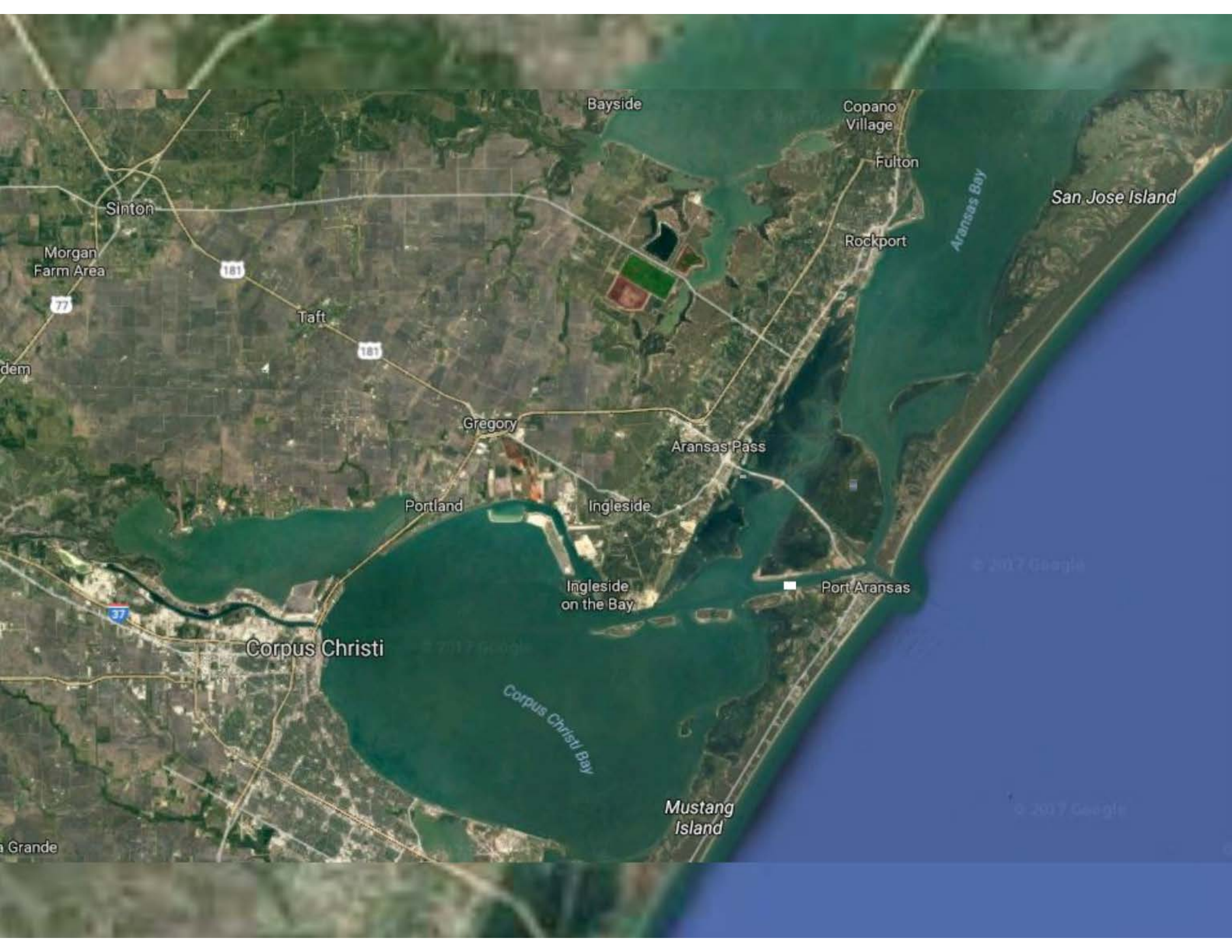
Corpus Christi Bay

Mustang Island

a Grande

Grounded Drillship - Corpus Christi Ship Channel





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Corpus Christi

Corpus Christi Bay

Mustang Island

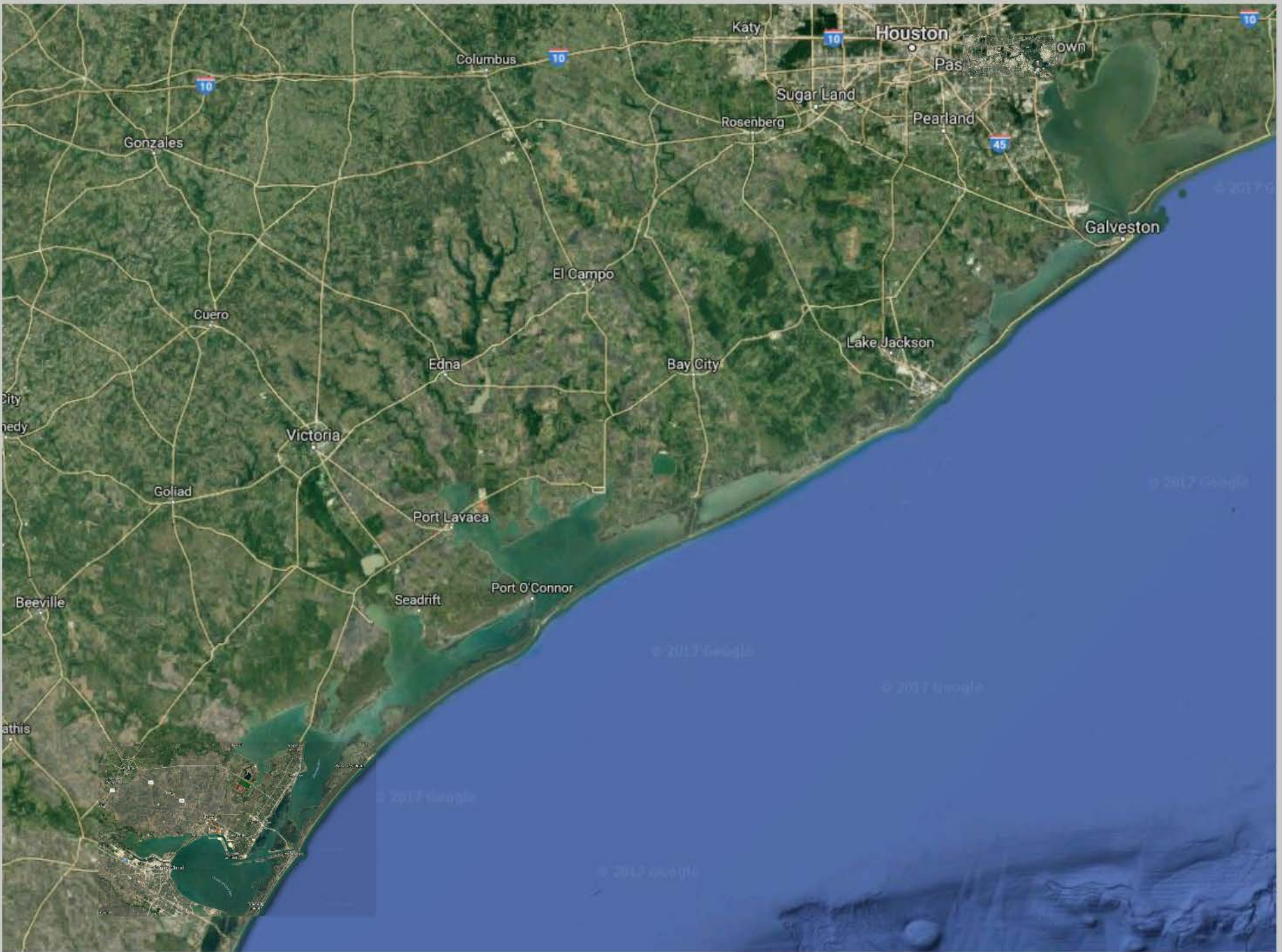
a Grande

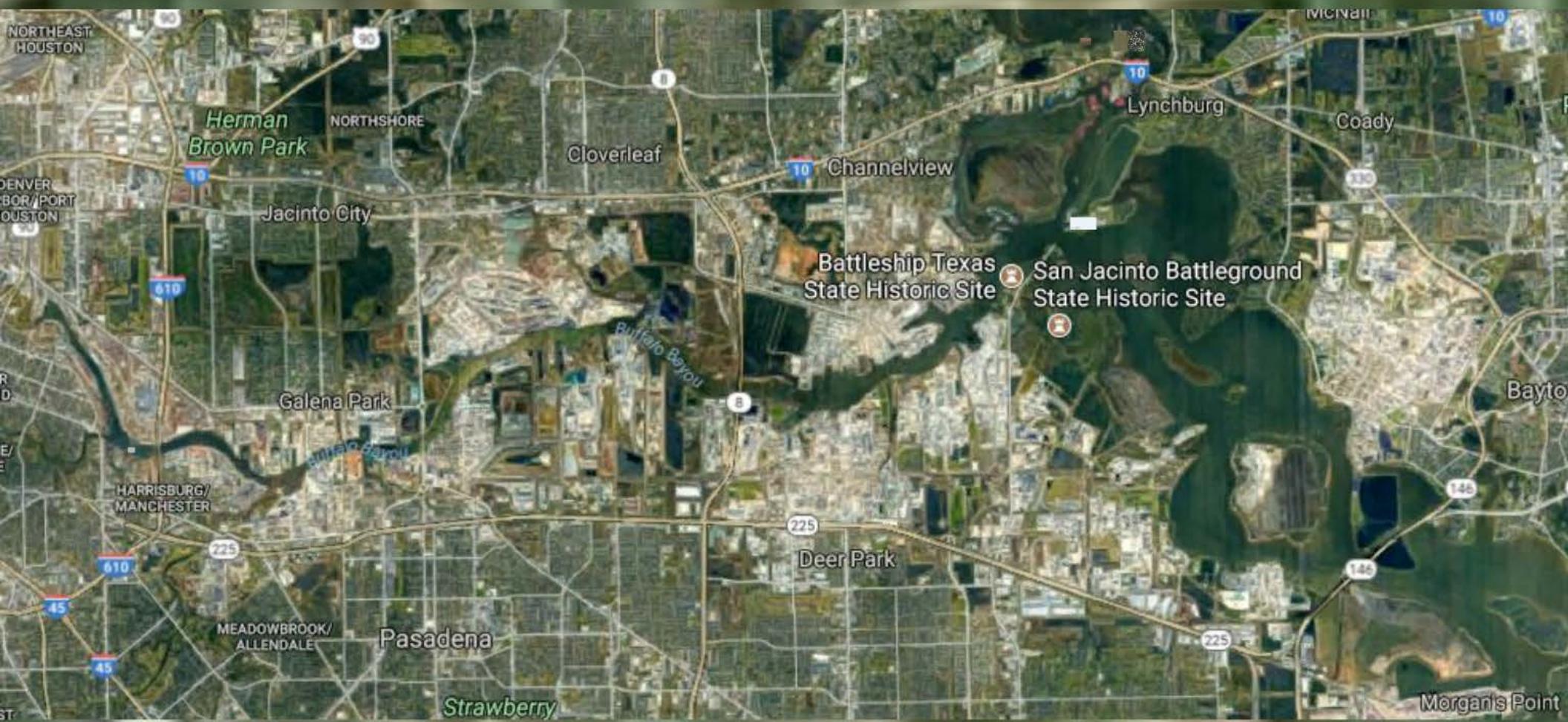
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Grounded Tank Barges







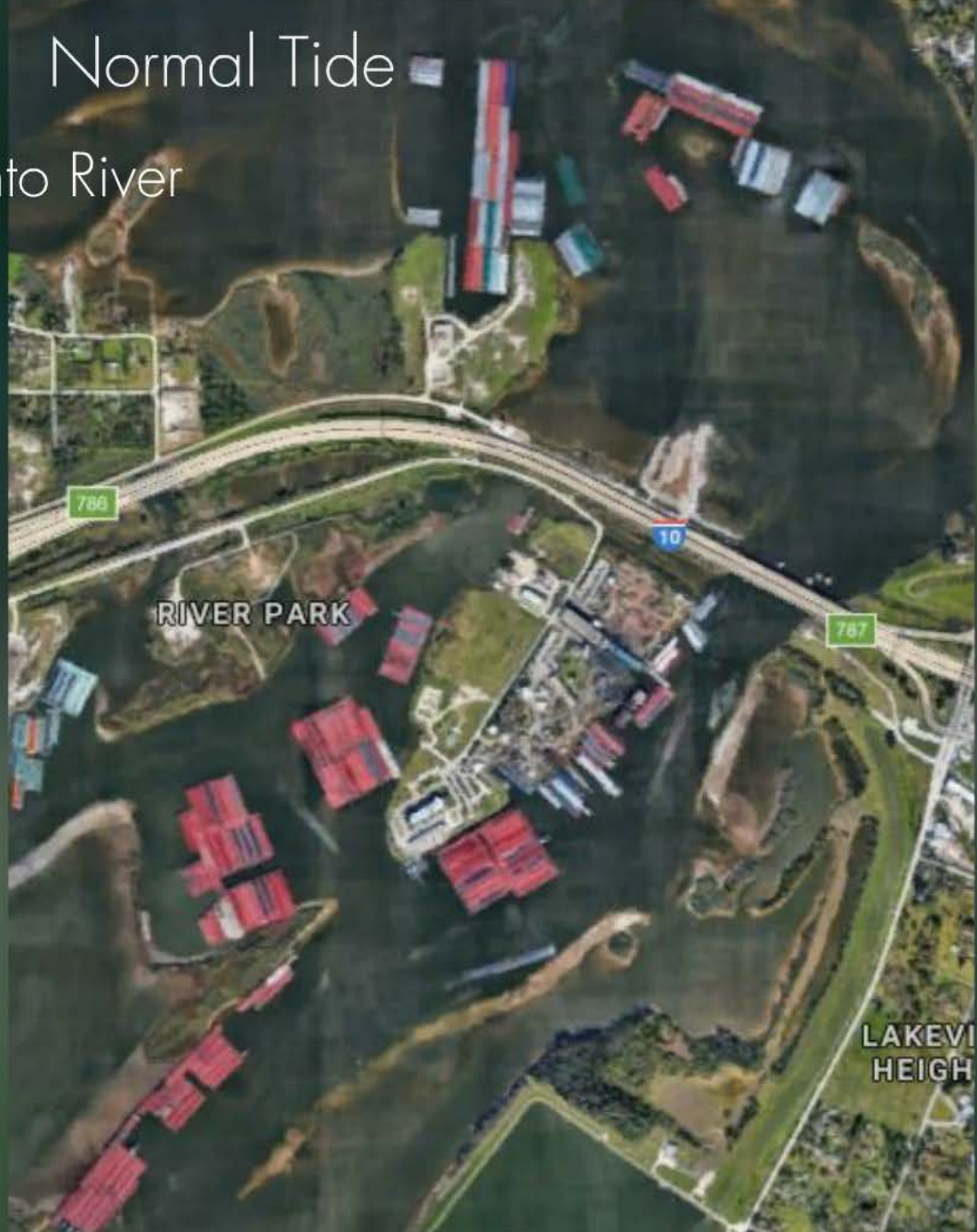
Channel Shipyard

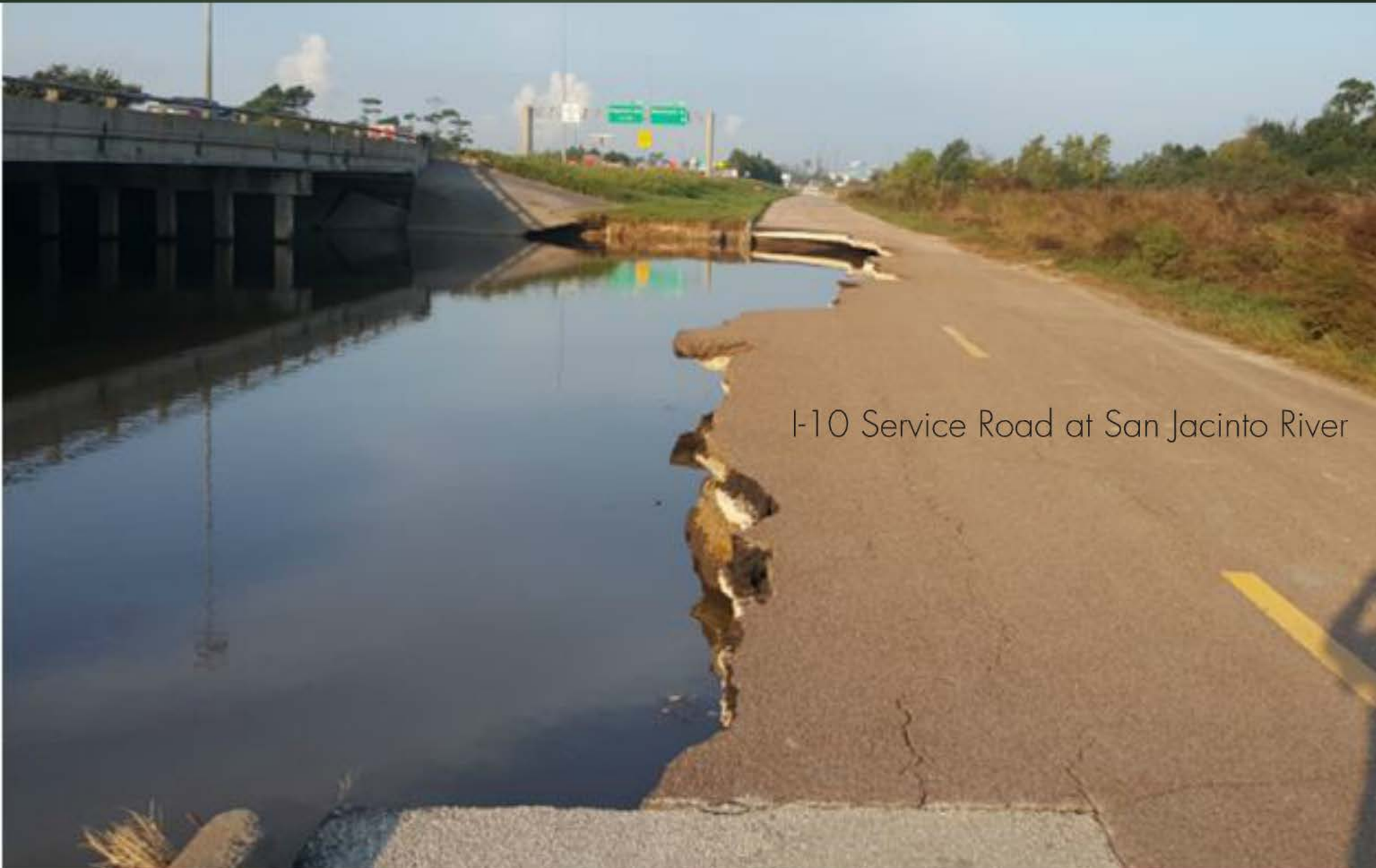
Harvey Flooding

San Jacinto River

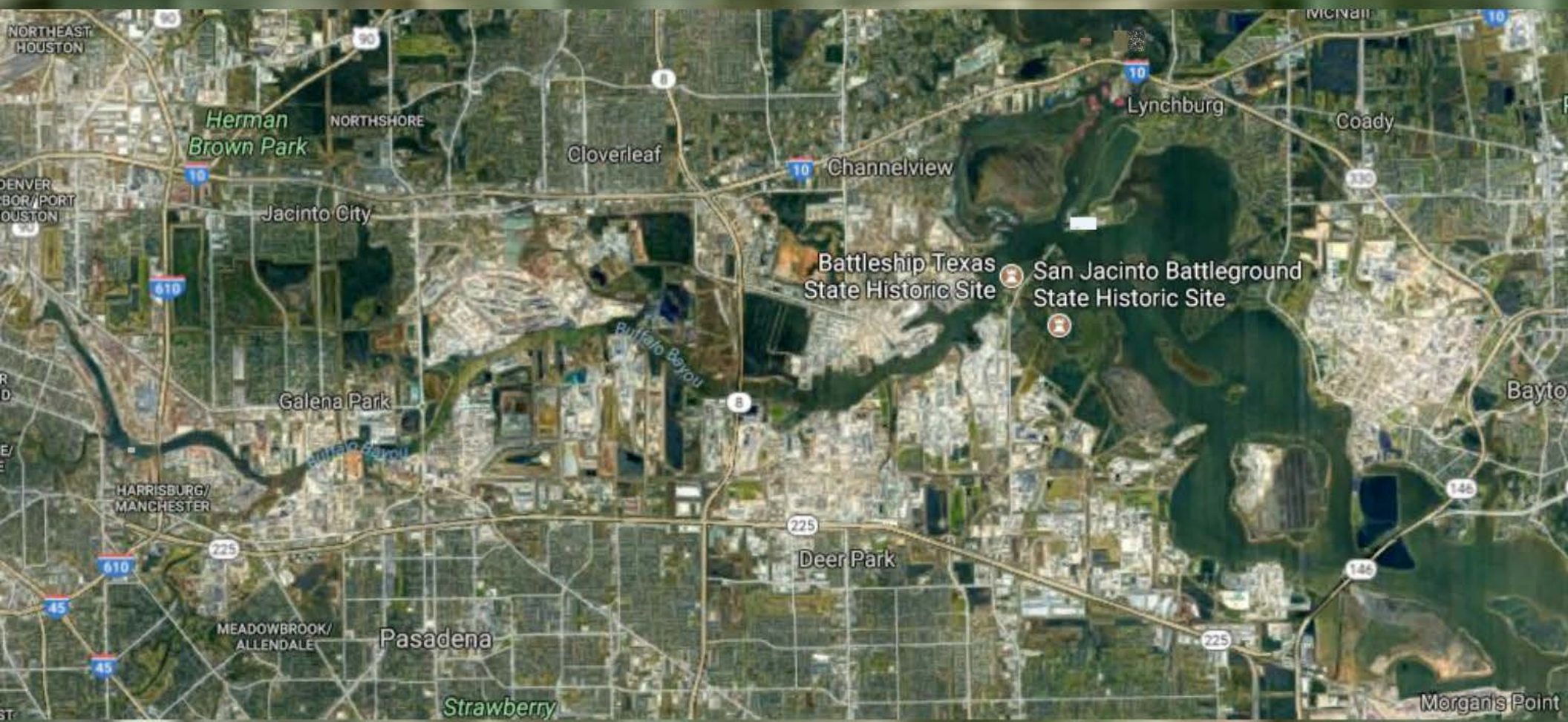


Normal Tide



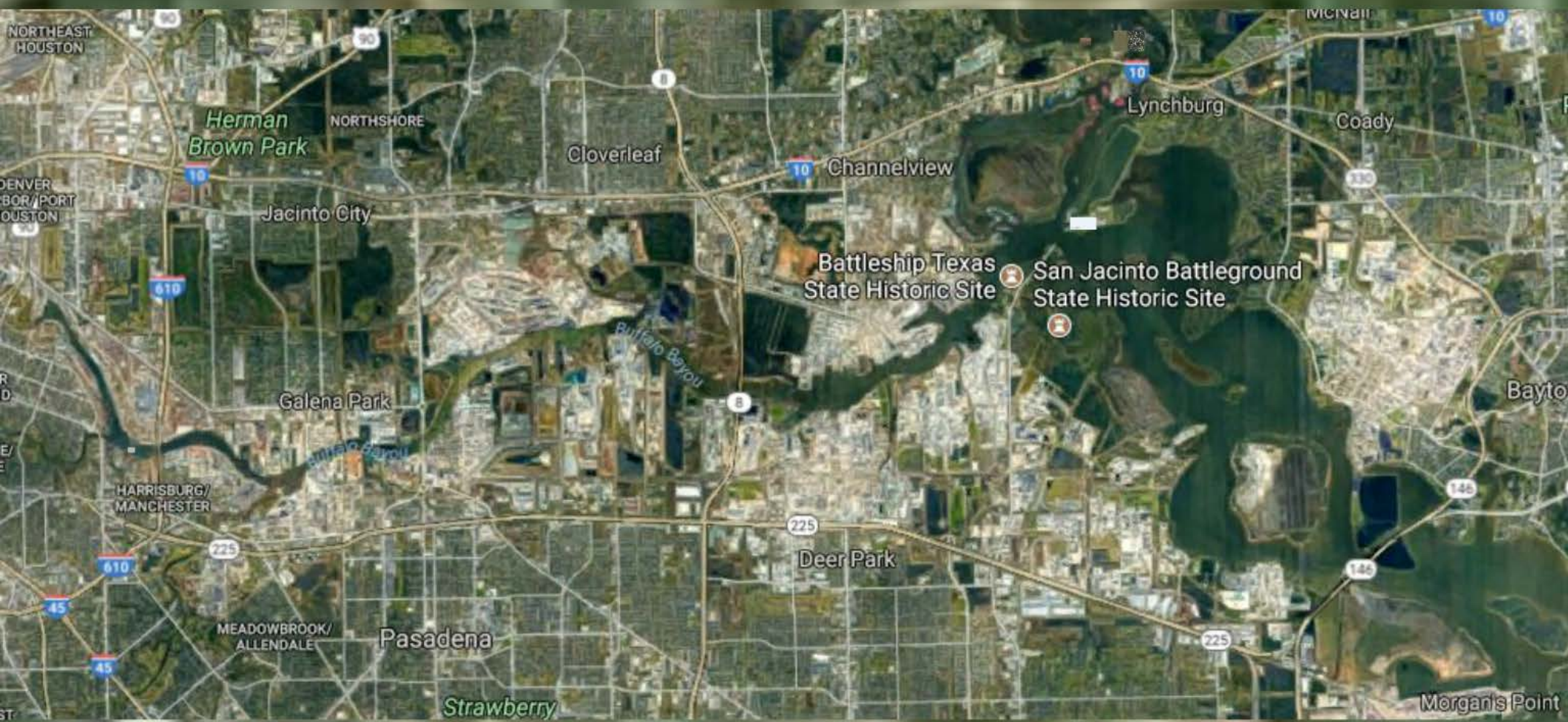


I-10 Service Road at San Jacinto River



Sunken Drydock at Southwest Shipyard CBC Deck Barge Salvage Operation





Waterways Restoration

In a post storm environment - major impediments to restoration of navigation are:

- Shoaling - sandbar formation reducing water depth
 - Colorado Locks - 4 week dredging op
- Debris in waterways
 - Requires salvage ops
 - Dry dock at Brady Island
 - Barges in Greens Bayou Houston - Salvage ops ongoing into October

Coordinated Response

- USCG and USACE maintain legal responsibility for restoration of the waterway
- Industry participants, regulators, shipper stakeholders work together
- Industry Participant embedded in USCG VTS
- Coordination conference calls
 - Sharing waterway condition information
 - Prioritization of vessel movements

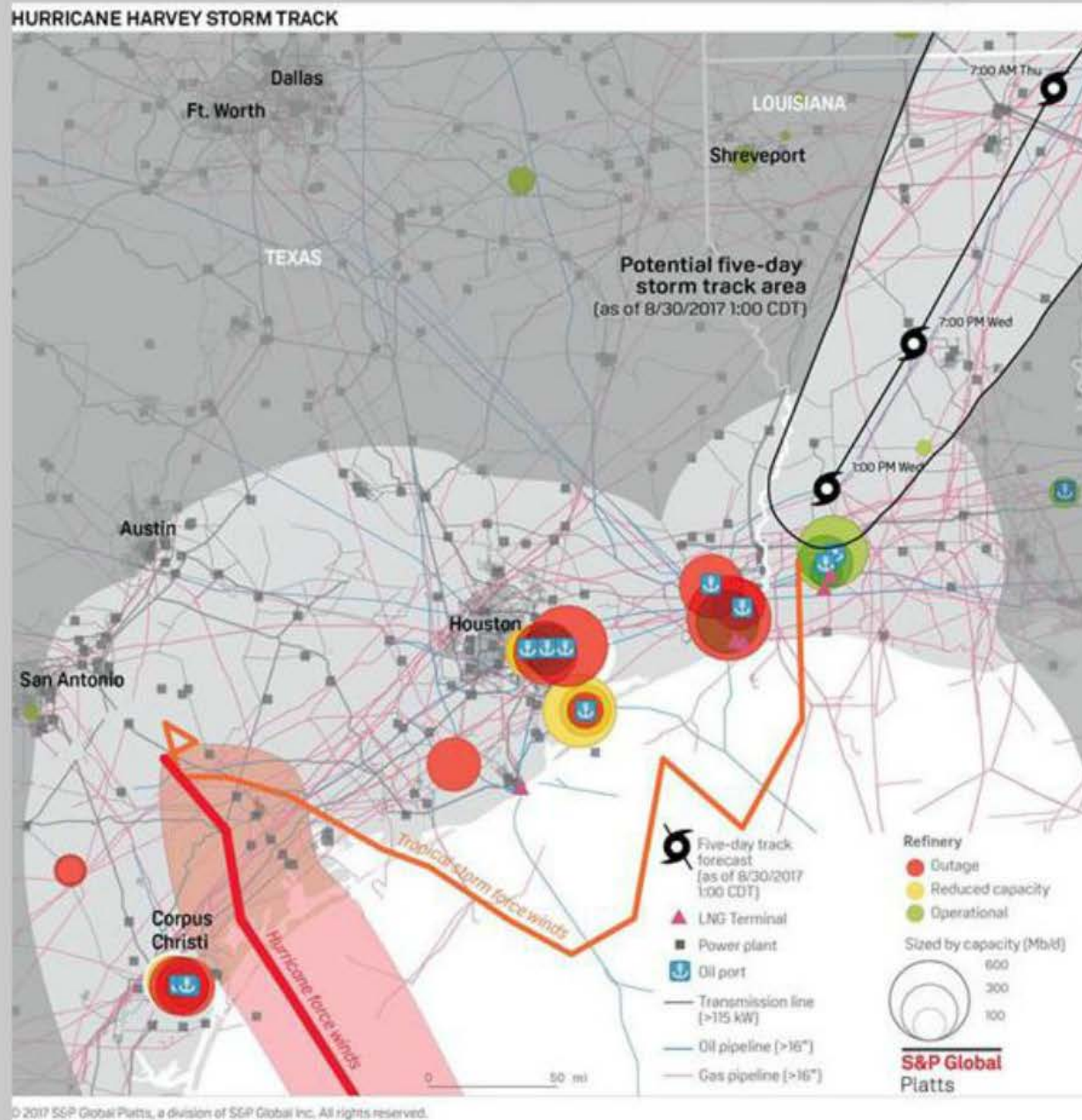


**Hurricane Harvey
Impact to Shippers**

East Texas A Critical Refining and Transportation Hub



US Gulf Coast Refinery Corridor



The following plants have been shut down:

| Company | Location | Capacity (b/d) |
|-----------------------|--------------------|----------------|
| ExxonMobil | Baytown, TX | 560,500 |
| ExxonMobil | Beaumont, TX | 362,300 |
| Citgo | Corpus Christi, TX | 157,500 |
| Magellan | Corpus Christi, TX | 50,000 |
| Buckeye** | Corpus Christi, TX | 50,000 |
| Shell | Deer Park, TX | 340,000 |
| Petrobras | Pasadena, TX | 112,229 |
| Motiva | Port Arthur, TX | 603,000 |
| Total | Port Arthur, TX | 225,500 |
| Valero | Port Arthur, TX | 335,000 |
| Phillips 66 | Sweeny, TX | 247,000 |
| Total capacity closed | | 3,043,029 |
| Share of US capacity | | 16% |

- Valero, Citgo and Flint Hills Corpus Christi offline 8/24
- Exxon Baytown closed dock 8/25 and shut down production 8/27
- Motiva Pt Arthur implemented a phased shut down starting 8/29
- Exxon Beaumont shut down production 8/30 after running at reduced rates from 8/28
- Also offline – Shell Deer Park, Petrobras Pasadena
- Partially offline – Marathon Texas City, LyondellBasel

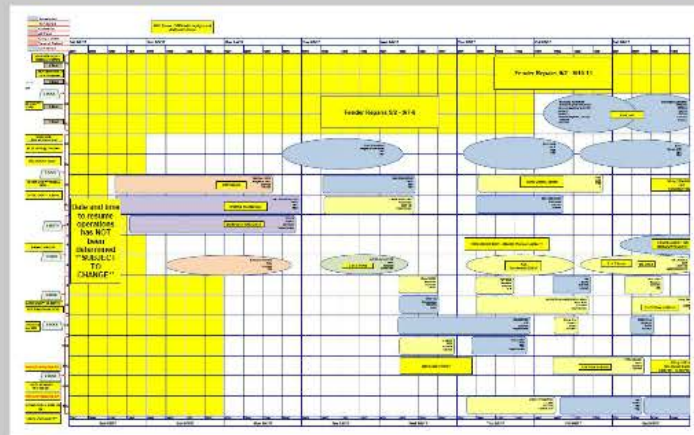
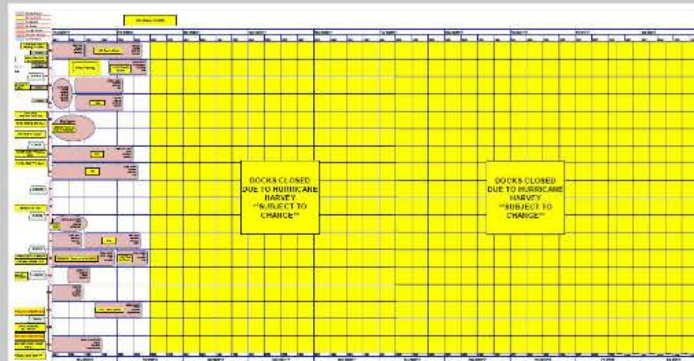
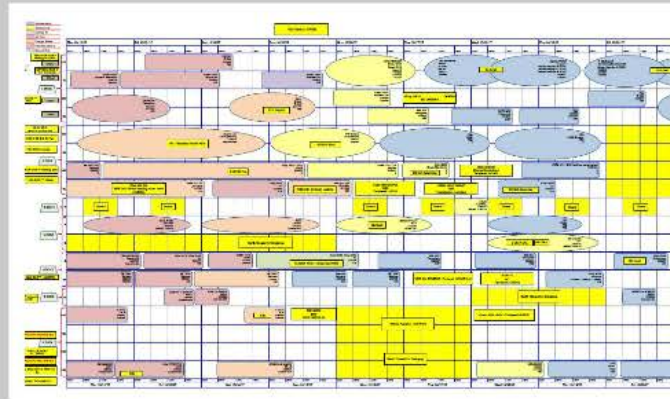
22% of US refining Capacity offline

* The following plants have reduced rates or are returning:

| Company | Location | Capacity (b/d) | 50% of Capacity (b/d) |
|---------------------------|---------------------------|----------------|-----------------------|
| Flint Hills*** | Corpus Christi, TX - West | 230,000 | 115,000 |
| Flint Hills*** | Corpus Christi, TX - East | 70,000 | 35,000 |
| Valero*** | Corpus Christi, TX | 293,000 | 146,500 |
| Valero*** | Three Rivers, TX | 89,000 | 44,500 |
| Lyondell | Houston, TX | 263,776 | 131,888 |
| Valero | Texas City, TX | 225,000 | 112,500 |
| Marathon*** | Galveston Bay, TX | 459,000 | 229,500 |
| Marathon | Texas City, TX | 86,000 | 43,000 |
| Valero | Houston, TX | 191,000 | 95,500 |
| Total capacity reduced | | 953,388 | |
| Closed + reduced capacity | | 3,996,417 | |
| Share of US capacity | | 22% | |

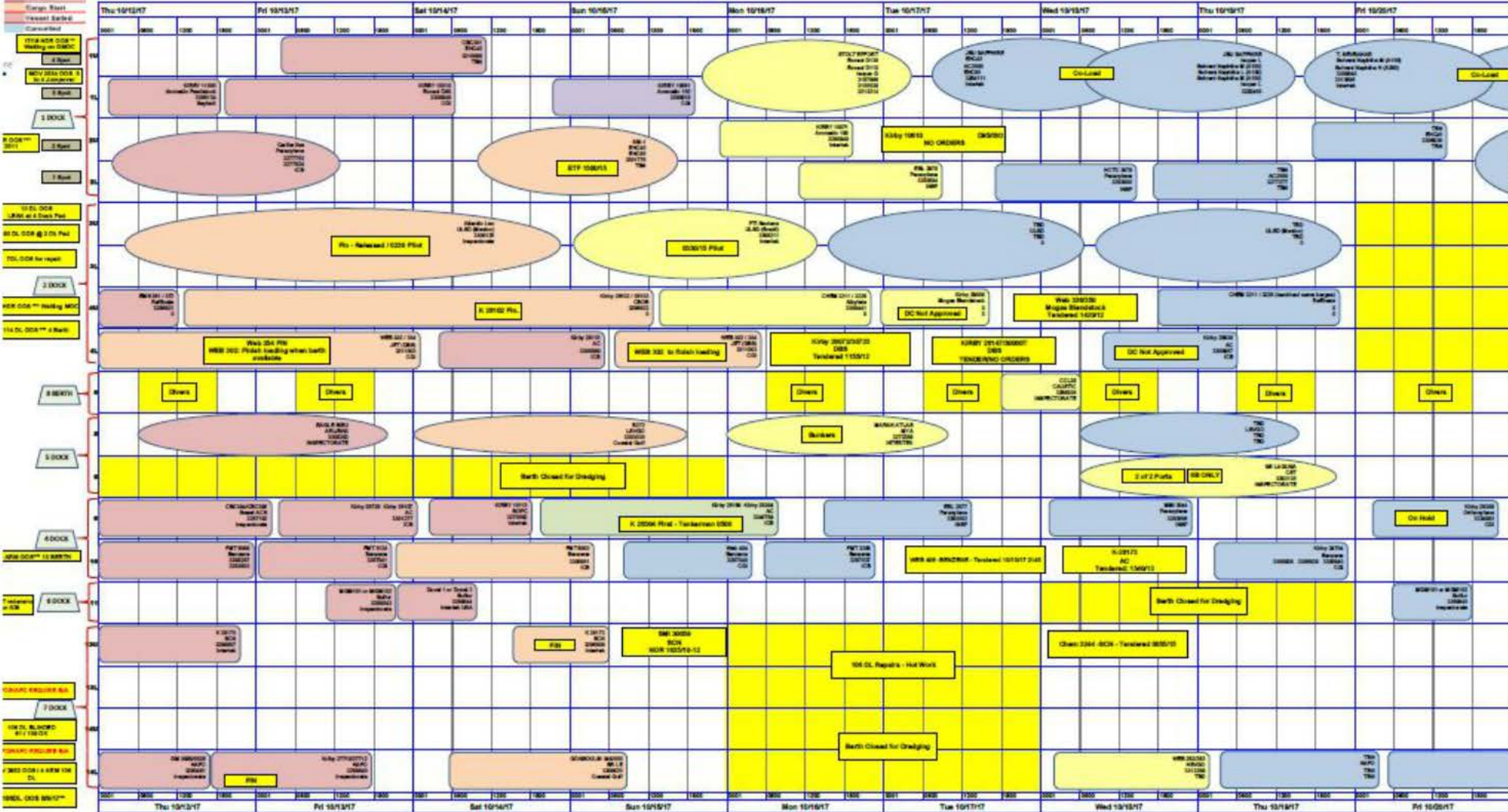
***Returning

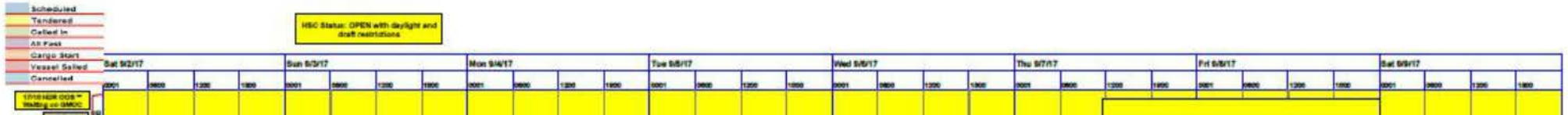
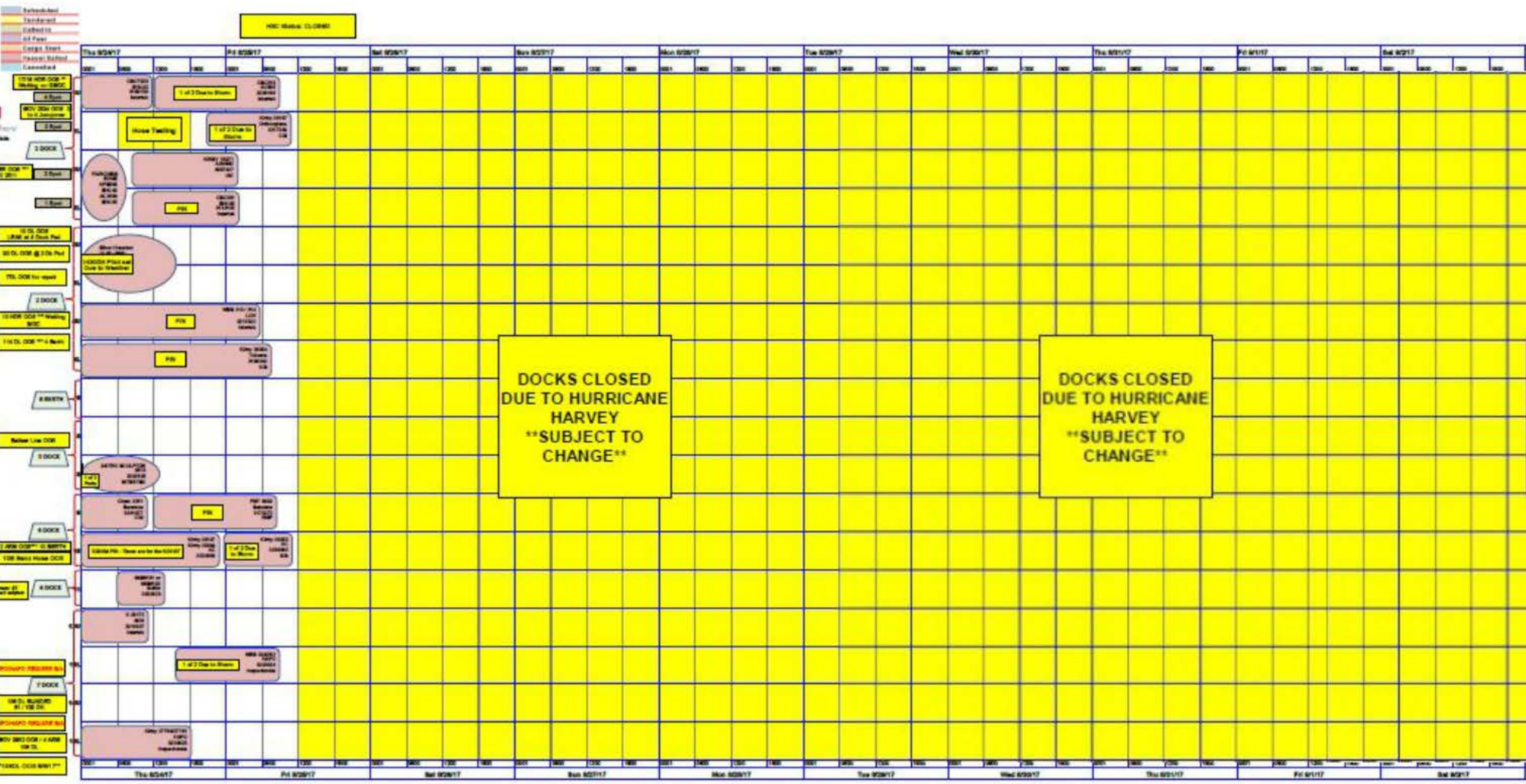
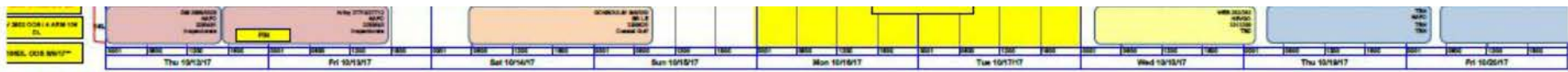
Houston Dock Schedule

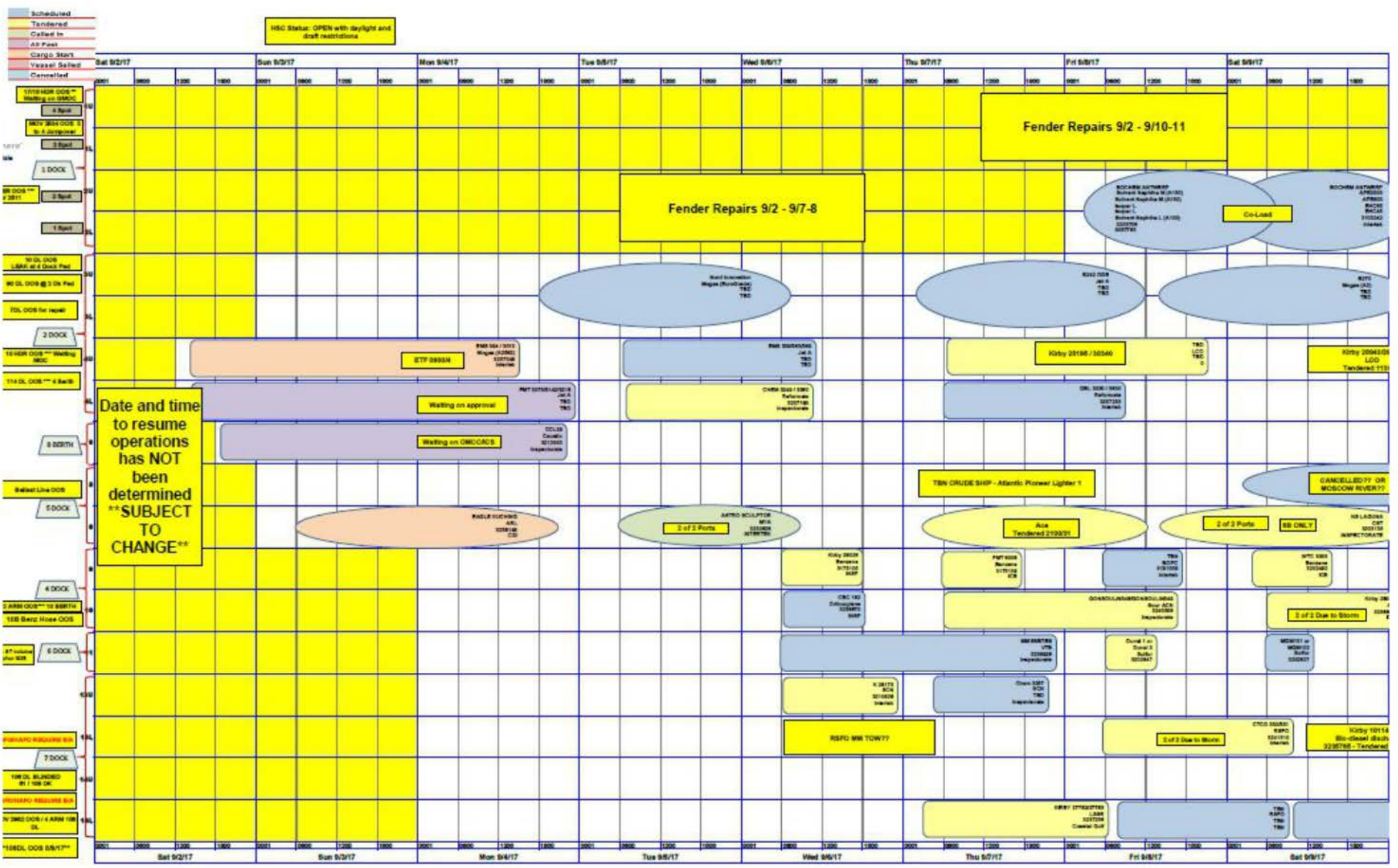


- Schedule
- Terminal
- Control Pt
- All Ports
- Control Start
- Control Status
- Control End
- Control Status
- Control End
- Control Status

HSC Status: OPEN







Disrupted Shipping Patterns

- Storm Contingencies implemented
 - Sourcing away from Houston
 - Inventory management - how much is enough?
- Fuel Feedstocks - High Priority shipments - out of the ordinary directions
 - Fuel shipped from Chicago to blender in St Louis that had not received a barge for decades - lack of pipeline capacity
 - Seagoing barge to inland barge jet fuel lightering in NOLA
 - Supporting resumption of airline ops at IAH
- Reports of a shipper with a single sourced material in Corpus trucking cargo to keep plant running - through a 30 day closure

Common Theme

- Plants across the country running at reduced capacities due to lack of inbound feedstocks
- Explicit design – integrated plants run on an interdependent basis – one site consumes production of another

Houston impacted – explicitly and directly – but due to the interconnected transportation network the impacts extended across the country and world

- Two barges that were held up east of Corpus when the storm hit will be delivered into Chicago this weekend

Lost Time Value

Consider those barges and boats that spent a month waiting on waterway to re-open at Colorado Locks

- 1/12th of that asset's 2017 earning potential was destroyed

No recovery of that opportunity - the lost time cannot be recouped on the asset

Minimal recourse with shippers

No major spills, injuries or loss of life

A Human Story about resiliency - binding together to achieve and re-establish normalcy for a city, a region and our country

A photograph of a sunset over a large body of water. The sky is filled with orange and yellow clouds, and the sun is low on the horizon. The water reflects the colors of the sky. In the distance, a boat is visible on the right side of the frame. The overall mood is serene and hopeful.

Questions?

Thank You!

