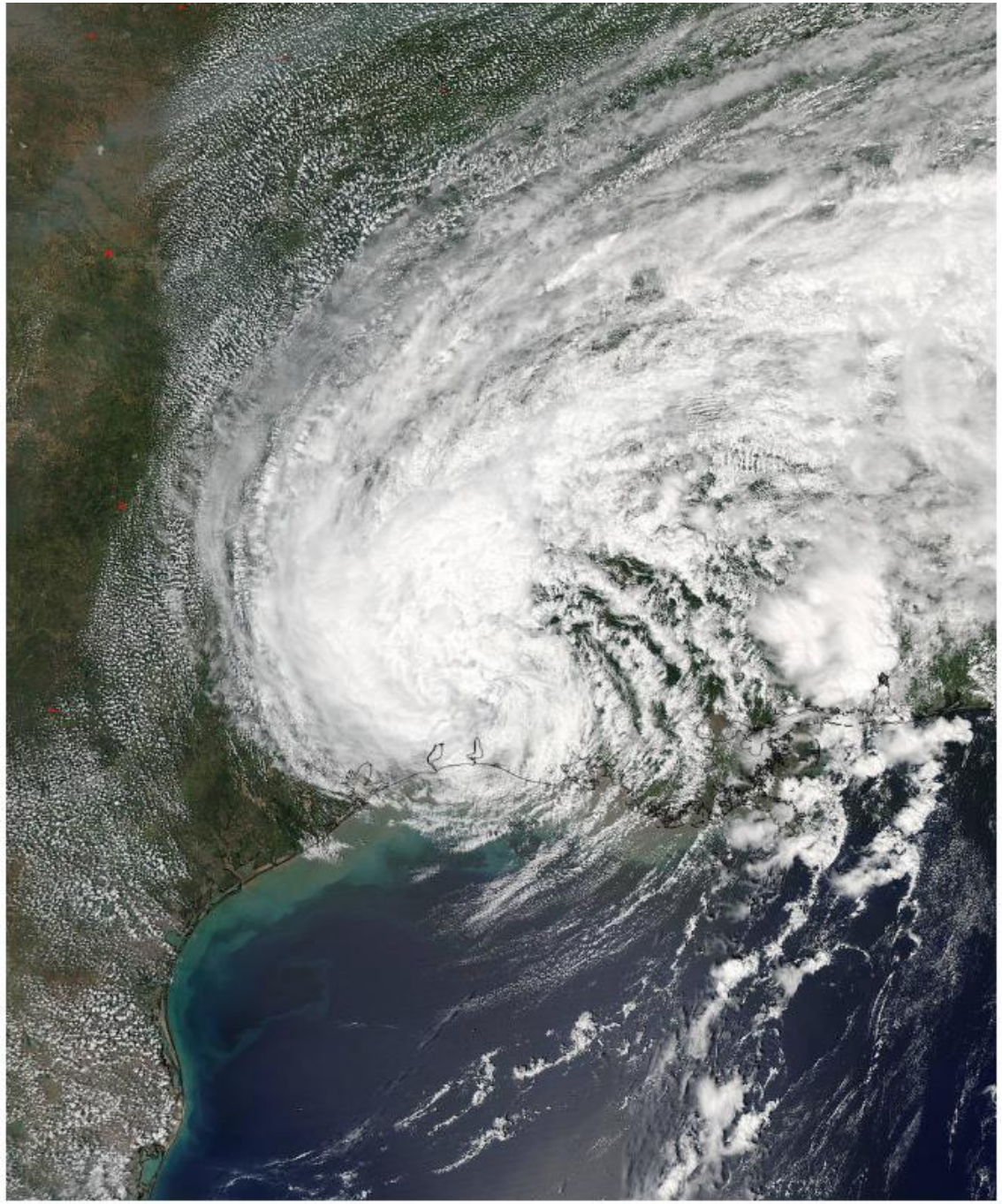

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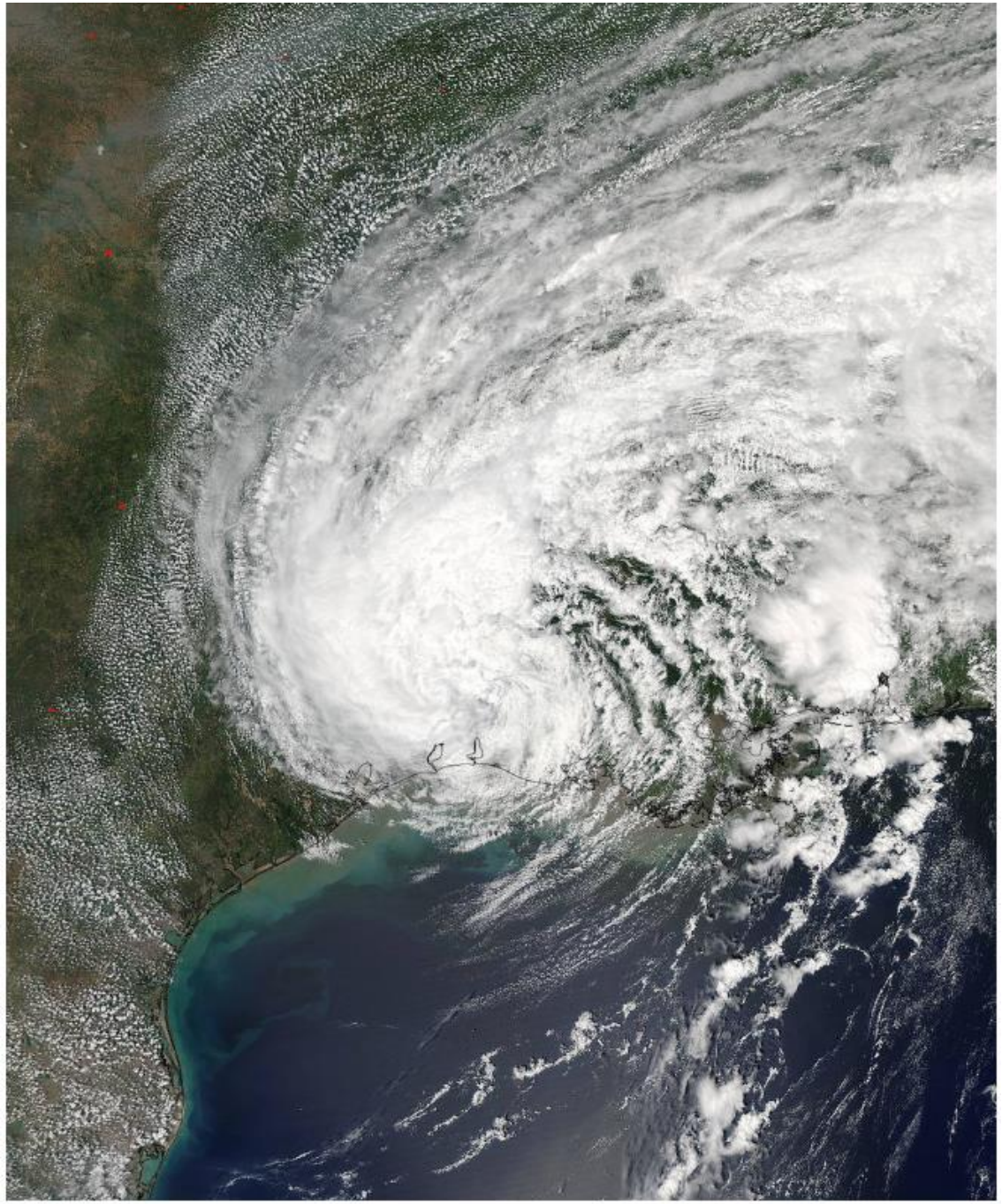
Credits: NASA Goddard MODIS Rapid Response Team
https://www.nasa.gov/feature/goddard/2017/harvey-atlantic-ocean

Hurricane Harvey Relief

A summary of relief efforts under FEMA's new Public Assistance program delivery model

Jennifer Lewis, EIT
Water Resources Engineer
Wood Environmental and Infrastructure Solutions



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Presentation Includes:

- Hurricane Harvey Overview
- Summary of FEMA's New PA Program Delivery Model
- My Experience as a Site Inspector
  - 3 month deployment in Beaumont, TX in response to Hurricane Harvey: 9/18/17-12/15/17

Jennifer Lewis, EIT
Water Resources Engineer
Wood Environmental and Infrastructure Solutions

- Combination of slow moving path and climatic conditions resulted in torrential rainfall
- Documented 6.8 inches of rain in 1 hr in Houston.
- As of September 1, approximately 33 trillion gallons had fallen along the Gulf Coast.

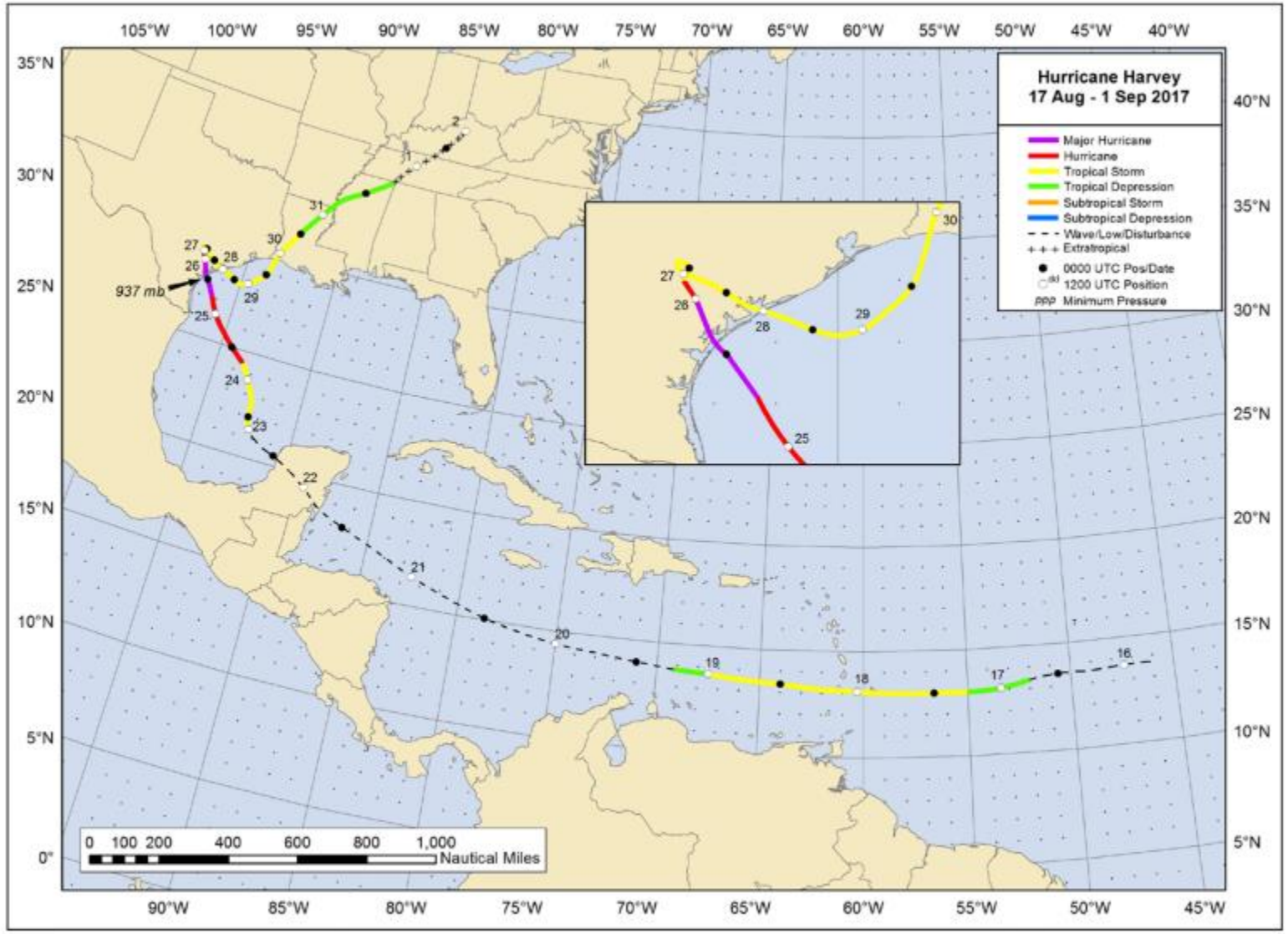
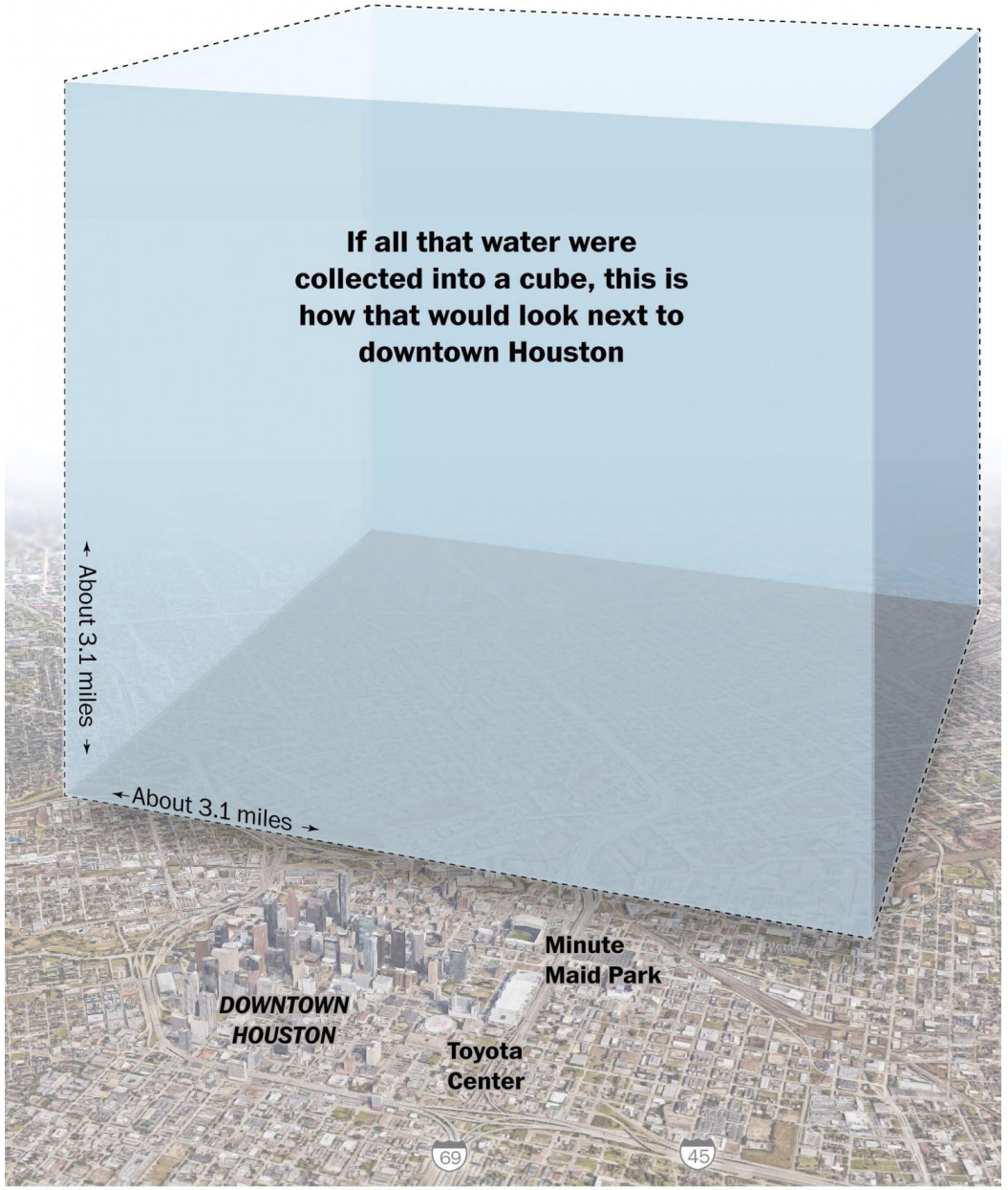


Figure 2. Best track positions for Hurricane Harvey, 17 August – 1 September 2017.

National Hurricane Center Tropical Cyclone Report – Hurricane Harvey – AL092017
https://www.nhc.noaa.gov/data/tcr/AL092017_Harvey.pdf

What would 33 trillion gallons of water look like?

As of Saturday, Sep. 1, about 33 trillion gallons of rain have fallen along the Gulf of Mexico.



Sources: Ryan Maue, Capital Weather Gang, Google Earth

THE WASHINGTON POST

https://www.washingtonpost.com/news/capital-weather-gang/wp/2017/08/30/harvey-has-unloaded-24-5-trillion-gallons-of-water-on-texas-and-louisiana/?utm_term=.24024fb103d3

- Previous US total rainfall record: 52” in HI (Hiki)
- Previous Continental US total rainfall record: 48” in Minnesota (Amelia)
- Highest recorded precipitation: 60.58” near Nederland, TX.

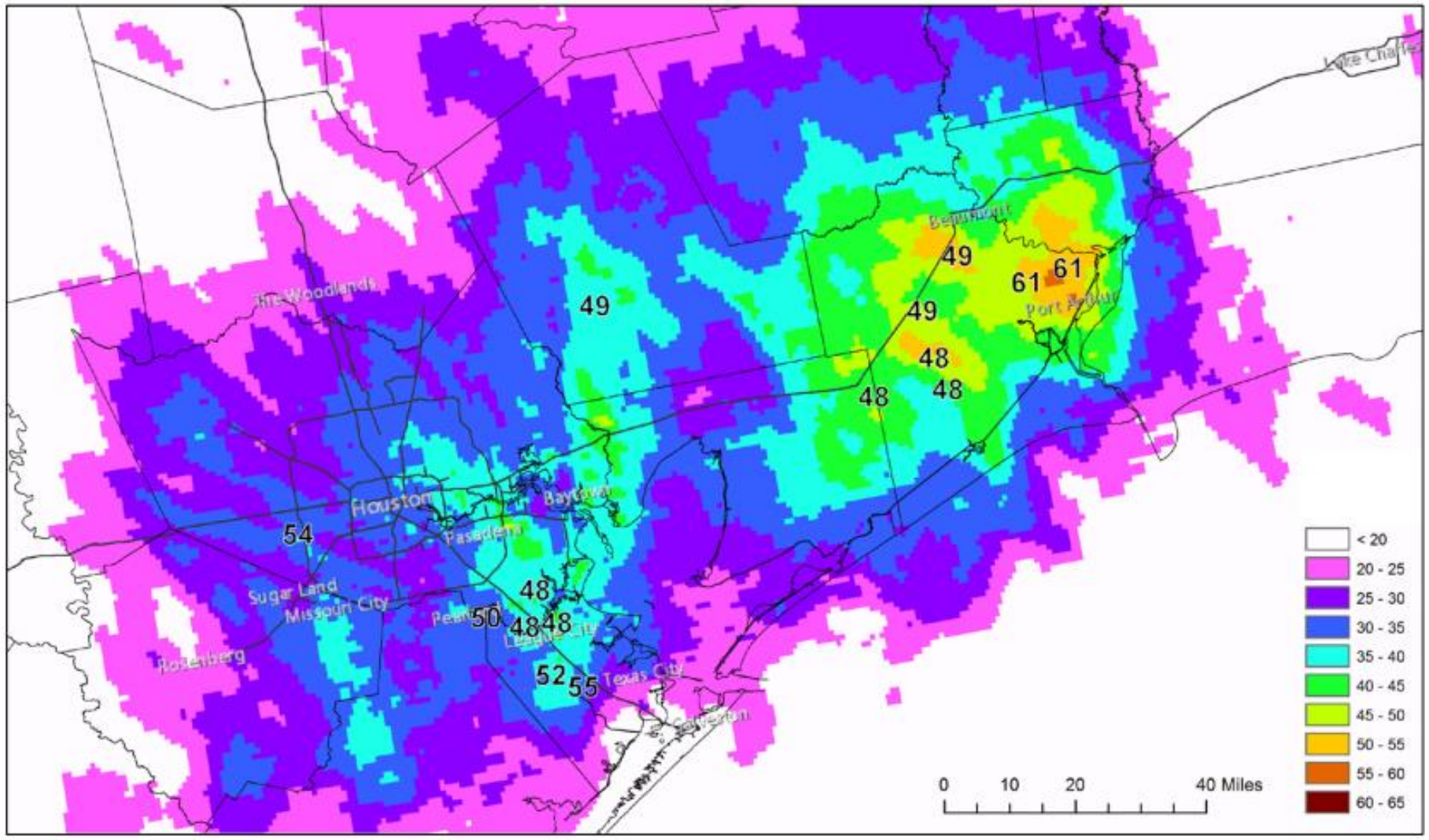


Figure 9. NOAA gauge-corrected, multi-radar multi-sensor quantitative precipitation estimates for Harvey (inches), 25 August-1 September 2017. The black numbers are actual rain gauge values, all of which exceed the previous U.S. continental rainfall record for a tropical cyclone.

National Hurricane Center Tropical Cyclone Report – Hurricane Harvey – AL092017
https://www.nhc.noaa.gov/data/tcr/AL092017_Harvey.pdf

Cost

- Estimates indicate that Hurricane Harvey is the second most costliest hurricane in US history

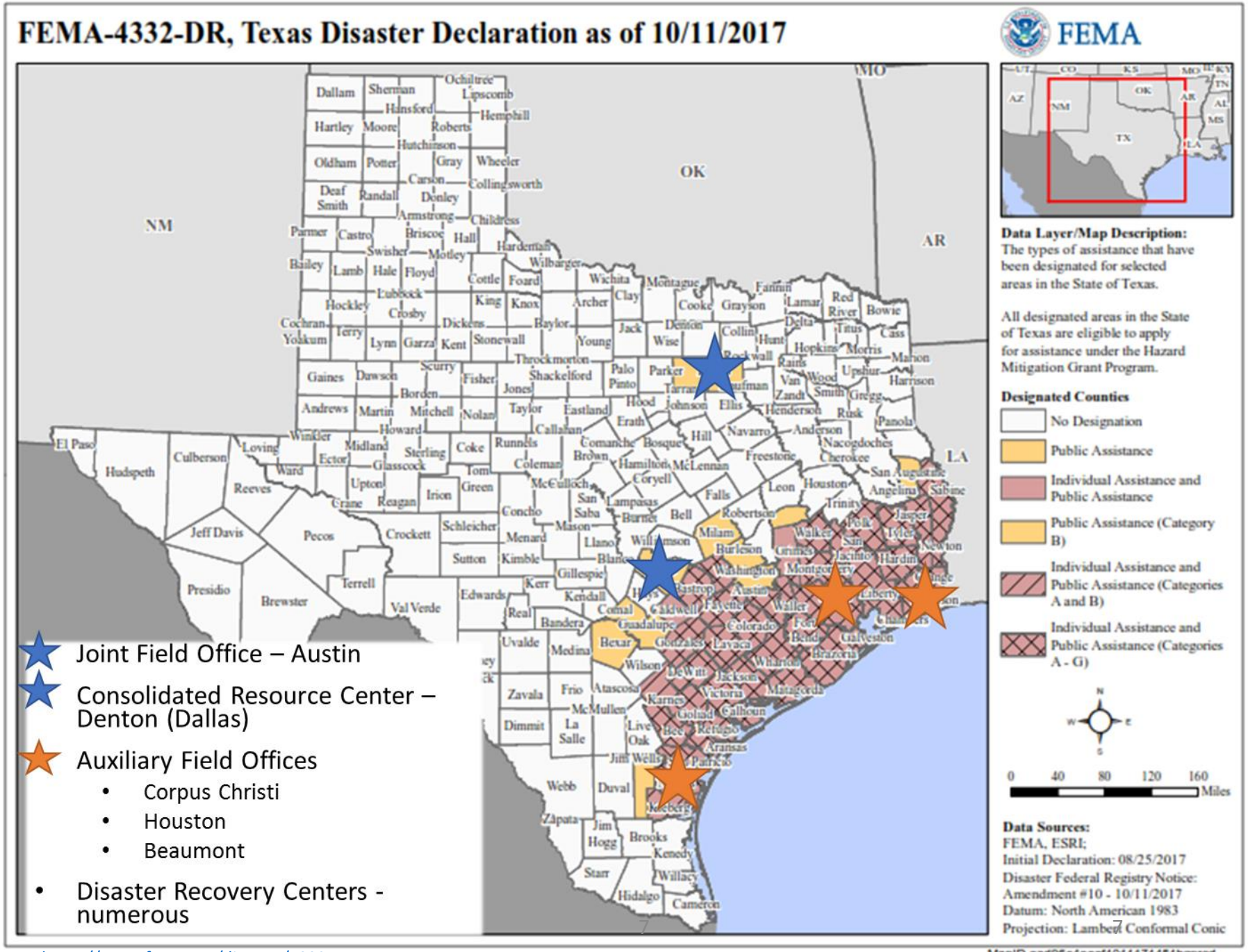
Table 3b. Costliest mainland United States tropical cyclones, 1900-2017, after accounting for inflation to 2017 dollars.

RANK	TROPICAL CYCLONE	YEAR	CATEGORY	DAMAGE (U.S.)
1	*KATRINA* (SE FL, LA, MS)	2005	3	$160,000,000,000
2	*HARVEY (TX, LA)*	2017	4	$125,000,000,000
4	*SANDY* (Mid-Atlantic & NE US)	2012	1	70,200,000,000
5	*IRMA* (FL)	2017	4	50,000,000,000
6	*ANDREW* (SE FL/LA)	1992	5	47,790,000,000
7	*IKE (TX, LA)*	2008	2	34,800,000,000
8	*IVAN* (AL/NW FL)	2004	3	27,060,000,000
9	*WILMA* (S FL)	2005	3	24,320,000,000
10	*RITA* (SW LA, N TX)	2005	3	23,680,000,000
ADDENDUM				
3	*MARIA* (PR, USVI)	2017	4	90,000,000,000

https://www.nhc.noaa.gov/news/UpdatedCostliest.pdf
(updated January 2018)

Hurricane Harvey DR-4332

- Major Disaster Declaration declared on **August 25, 2017**
- Incident Period: **August 23, 2017 - September 15, 2017**



https://www.fema.gov/disaster/4332

Federal Disaster Declaration

1) Disaster occurs
2) Public entity assesses the damage
3) Public entity requests assistance
4) President declares a disaster

The Stafford Act (1988) – created the system in which the Disaster Declaration triggers financial and physical assistance through FEMA

PAPPG (https://www.fema.gov/media-library/assets/documents/111781)

FEMA Disaster Assistance Programs

- **Individual Assistance (IA)**
  - "aid to individuals and households"
- **Public Assistance (PA)**
  - "Aid to public (and certain private non-profit) entities for certain emergency services and the repair or replacement of disaster damaged public facilities"
- **Hazard Mitigation**
  - "Funding for measures designed to reduce future losses to public and private property"

"A Guide to the Disaster Declaration Process & Federal Disaster Assistance"
https://www.fema.gov/pdf/rrr/dec_proc.pdf

Public Assistance Program and Policy Guide

FP 104-009-2 / April 2018

FEMA

"Papa G"

https://www.fema.gov/media-library/assets/documents/111781

Public Assistance: Applicants

- State and Territorial Governments
- Indian Tribe Governments
- Local Governments:
  - Counties
  - Cities
  - Towns
  - Local public authorities
  - School districts
  - Full list in PAPPG
- Certain Private Nonprofit Organizations

Public Assistance: Facilities

- Example facilities:
  - Roads
  - Schools
  - Vehicles
  - Powerlines
  - Culverts
  - Water treatment plants
  - Libraries
  - Hospitals
  - Parks
  - Bridges
  - Dams
  - Museums
  - Local Government Buildings
  - Police stations
  - Public Housing

The New PA Program Delivery Model

- Hurricane Harvey – first large scale disaster with the New Model
- More **modular** approach
  - Separates the tasks delegated to people with specific training
    - Site Inspector
    - Site Inspector Technical Specialists
    - Hazard Mitigation
    - Environmental and Historic Preservation
- Includes a **Program Delivery Manager** (PDMG) assigned to an applicant to oversee the entire project and be the point of contact

OPERATIONAL PLANNING

APPLICANT BRIEFING

- Briefing is scheduled and conducted by the State and Tribal governments
- Apply for Public Assistance
- Learn about the program

FEMA Program Delivery Manager

The single point-of-contact assigned to provide customer service to Applicants throughout the Public Assistance process

https://www.fema.gov/new-public-assistance-delivery-model

WITHIN 7 DAYS – **EXPLORATORY CALL**

- Introduction to your Program Delivery Manager
- Get an initial sense of needs and damage
- Identify who needs to be at Recovery Scoping Meeting

WITHIN 21 DAYS – **RECOVERY SCOPING MEETING**

- In-depth meeting to review damages
- Gather documentation
- Develop list of projects
- Talk through your priorities

SITE INSPECTION(S) if necessary

Me!

Grants Manager

https://www.fema.gov/new-public-assistance-delivery-model

INTAKE DAMAGE & ELIGIBLITY ANALYSIS

- Disaster-related damages captured and documented

SCOPING & COSTING

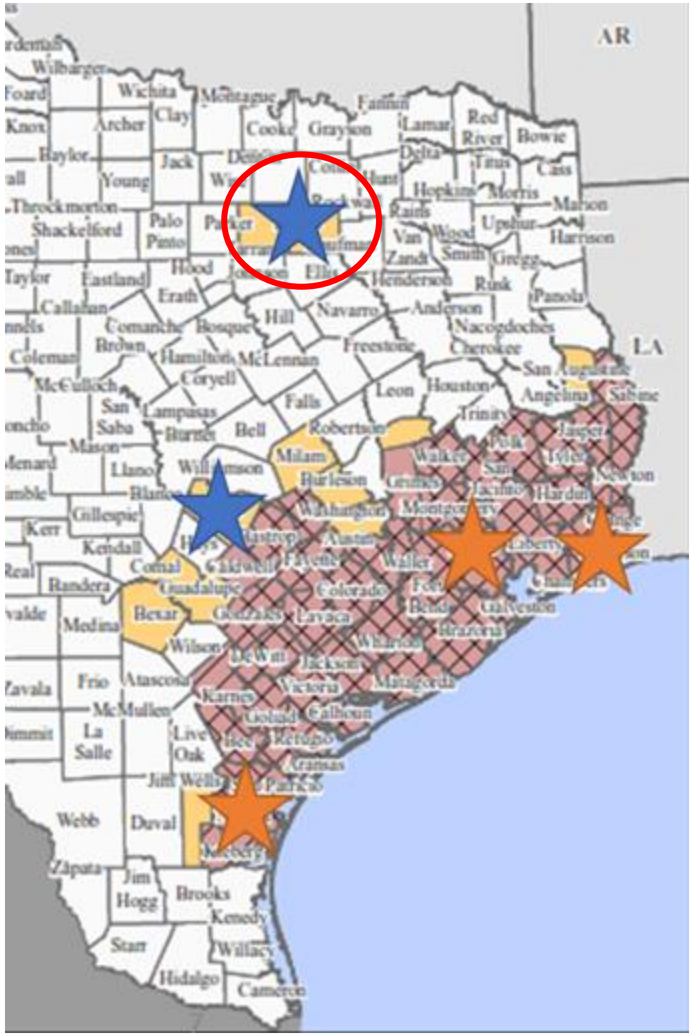
- Based on site visits and documentation
- To be reviewed for eligibility

FINAL REVIEW & SIGN-OFF

- Quality assurance reviews for accuracy
- Project acceptance by Applicant

RECEIVE FUNDING

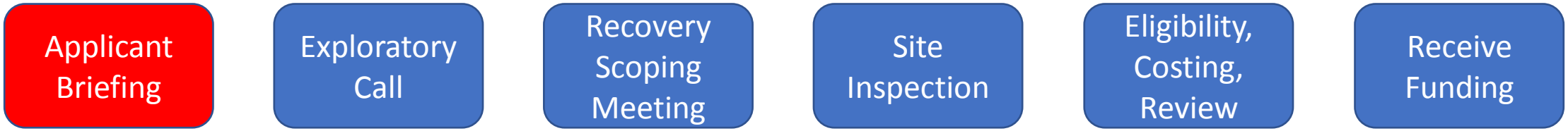
Consolidated Resources Center



https://www.fema.gov/new-public-assistance-delivery-model

The PA Process from the Applicant's Perspective

- The Town of Floodville experiences road damage from flooding
- They send Sam, the town manager, to represent them at an **Applicant Briefing**:
  - Sam applies for public assistance and learns about the program



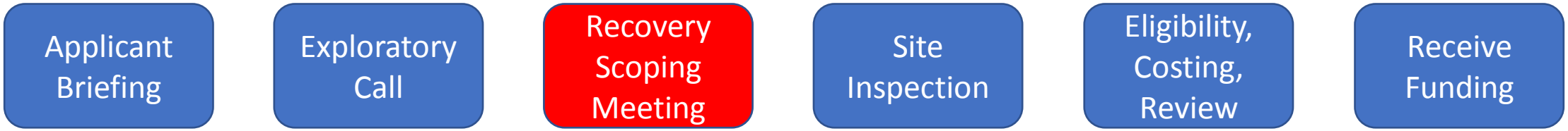
The PA Process from the Applicant's Perspective

- Sam receives an **Exploratory Call** from his new Program Delivery Manager
  - He explains that several gravel roads in his town washed out
  - They plan for the Recovery Scoping meeting and decide who should attend

Applicant Briefing | **Exploratory Call** | Recovery Scoping Meeting | Site Inspection | Eligibility, Costing, Review | Receive Funding

The PA Process from the Applicant's Perspective

- Sam and his staff, and the town mayor attend the **Recovery Scoping Meeting**
  - They further discuss damaged roads in depth
  - They show photos, maps and other documentation
  - They develop a list of the roads needing repair



The PA Process from the Applicant's Perspective

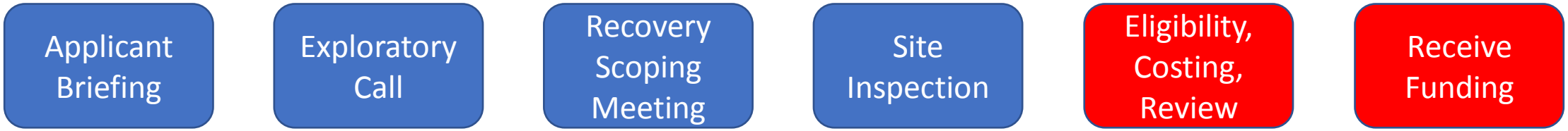
- The PDMG schedules a **Site Inspection**, Sam and a knowledgeable staff member accompany a FEMA Site Inspector who records damages to the roads
  - Together the group documents, measures and photographs the damages to the roads

Applicant Briefing | Exploratory Call | Recovery Scoping Meeting | **Site Inspection** | Eligibility, Costing, Review | Receive Funding

The PA Process from the Applicant's Perspective

- All information is uploaded on Grants Manager for **Intake Damage and Eligibility Analysis**, **Scoping & Costing** and **Final Review and Sign-Off**
  - Sam can view all of the information too with his Grants Manager login

- The Town of Floodville receives federal aid to fix their roads!



My Experience

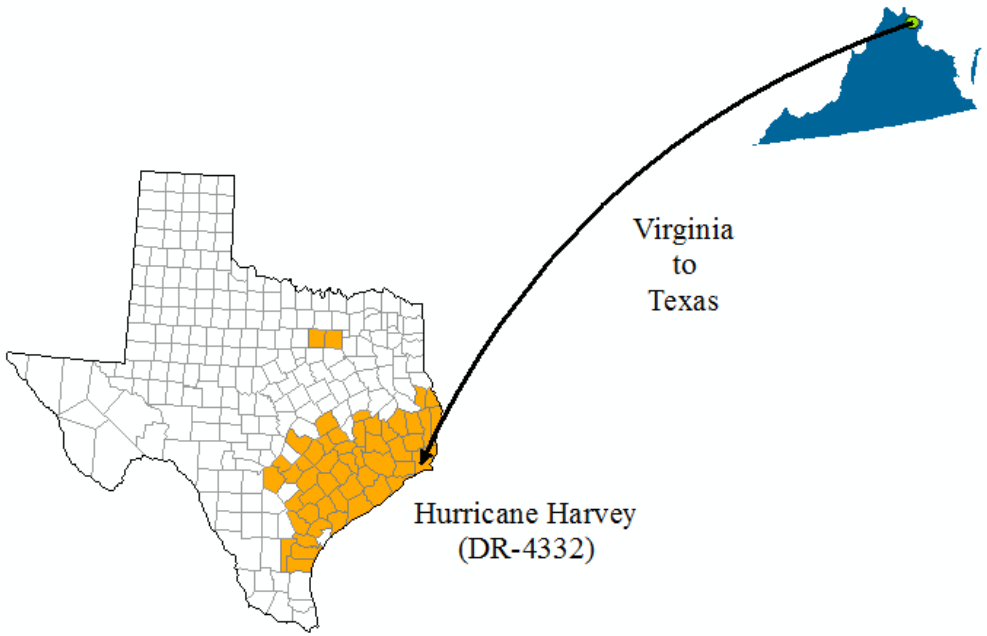
June 2017:
Received FEMA badge (application started in January)

Aug 25, 2017:
Hurricane Harvey is declared a major disaster

Sep 1, 2017:
Learned I may have an opportunity to deploy – began preparation in case of deployment

Sep 14, 2017
Informed of Mobilization Authorization for CCPRS

Sep 18, 2017
Began a 3 month deployment



EMI, Emmitsburg, MD

https://www.fema.gov/hi/media-library/assets/images/164215

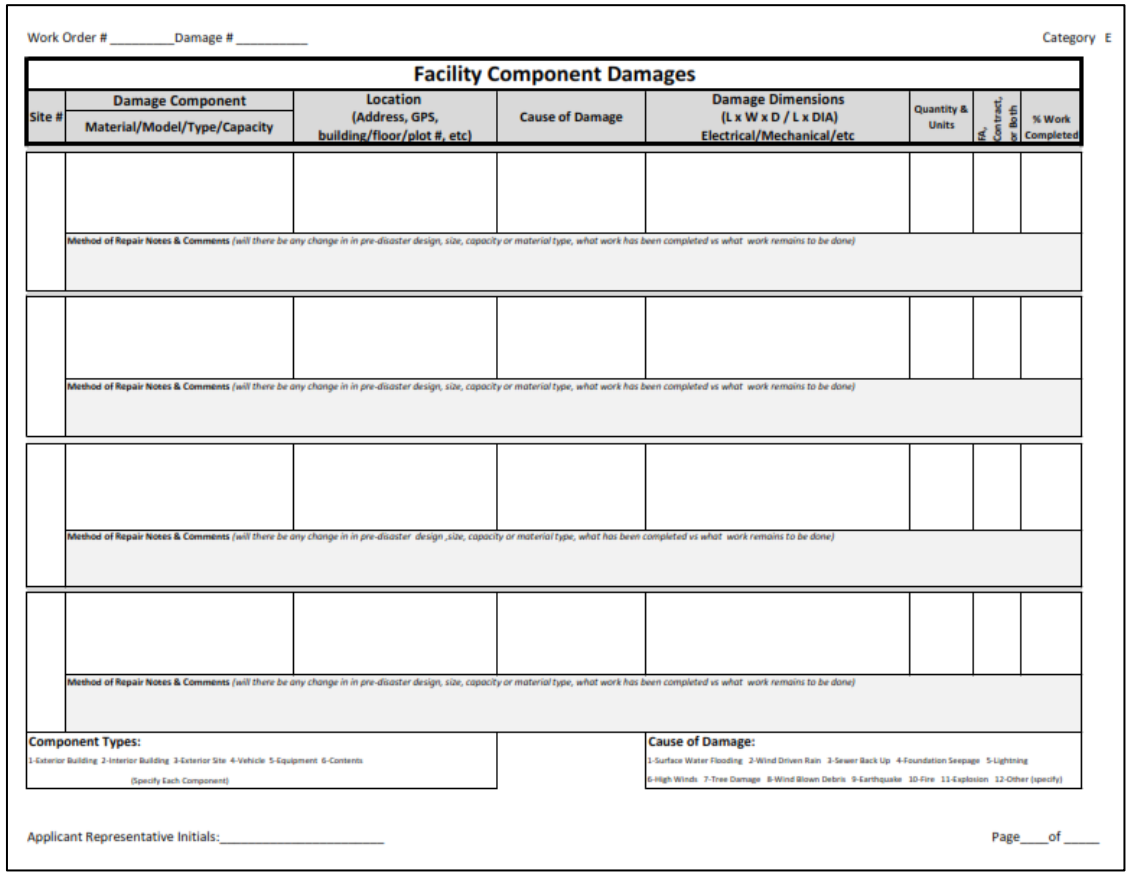
- **4 days** training at the Emergency Management Institute in Emmitsburg, MD
- **Week and a half** training at the Austin, TX JFO
- **3 weeks** in Huntsville
- Sent to Beaumont until end of deployment **12/15**

SITE INSPECTION(S) if necessary

The Site Inspector

Main Role: Record all damages caused by the disaster with the applicant present then enter data into Grants Manager

- Communication with Applicant
  - Local official
  - Head of facilities
  - Mayor



Work Order # _____Damage # _____ Category E

Facility Component Damages

Site #	Damage Component Material/Model/Type/Capacity	Location (Address, GPS, building/floor/plot #, etc)	Cause of Damage	Damage Dimensions (L x W x D / L x DIA) Electrical/Mechanical/etc	Quantity & Units	PA, Contract, or Both	% Work Completed
	Method of Repair Notes & Comments *(will there be any change in in pre-disaster design, size, capacity or material type, what work has been completed vs what work remains to be done)*						
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Component Types:
1-Exterior Building 2-Interior Building 3-Exterior Site 4-Vehicle 5-Equipment 6-Contents
(Specify Each Component)

Cause of Damage:
1-Surface Water Flooding 2-Wind Driven Rain 3-Sewer Back Up 4-Foundation Seepage 5-Lightning
6-High Winds 7-Tree Damage 8-Wind Blown Debris 9-Earthquake 10-Fire 11-Explosion 12-Other (specify)

Applicant Representative Initials:_____ Page____of _____

Grants Manager

Challenges:

- Difficult to see extent of damage
  - Sometimes already repaired
- Unknown previous condition

Culvert:
Material
Dimensions
length
Damage

Fill:
Material
Layers?
Length
Width
Depth

Culvert:
Material
Dimensions
length
Damage

Fill:
Material
Layers? Riprap?
Length
Width
Depth

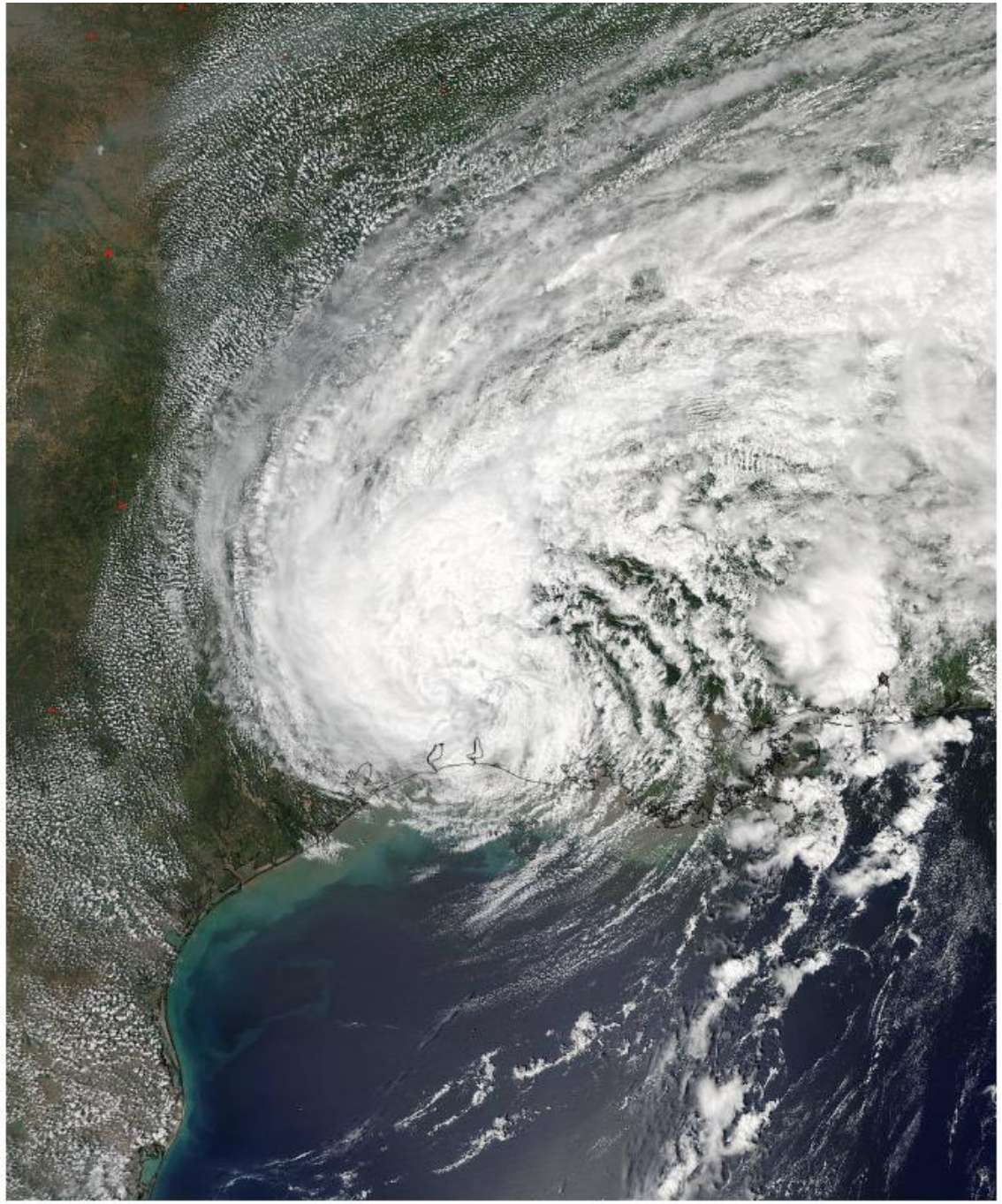
Road fill washed out
Culverts lost support and sunk

Hazard Mitigation – could improvements to the culvert reduce the risk of future floods?

Severe bridge damage

Repairs already completed

- Water mark on a middle school shed
- 4-5 ft of water sat in the school for several days
- Difficult to see all damages, and repairs were in process



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Final Notes:

- The New PA Program Delivery Model is still being adjusted
- Good perspective on importance of floodplain management work

Thank you!

Jennifer Lewis, EIT
Water Resources Engineer
Wood Environmental and Infrastructure Solutions