

ORGANIZED CHAOS: MAKING SENSE OF EMERGENCY DATA

Presented by: City of Sugar Land GIS

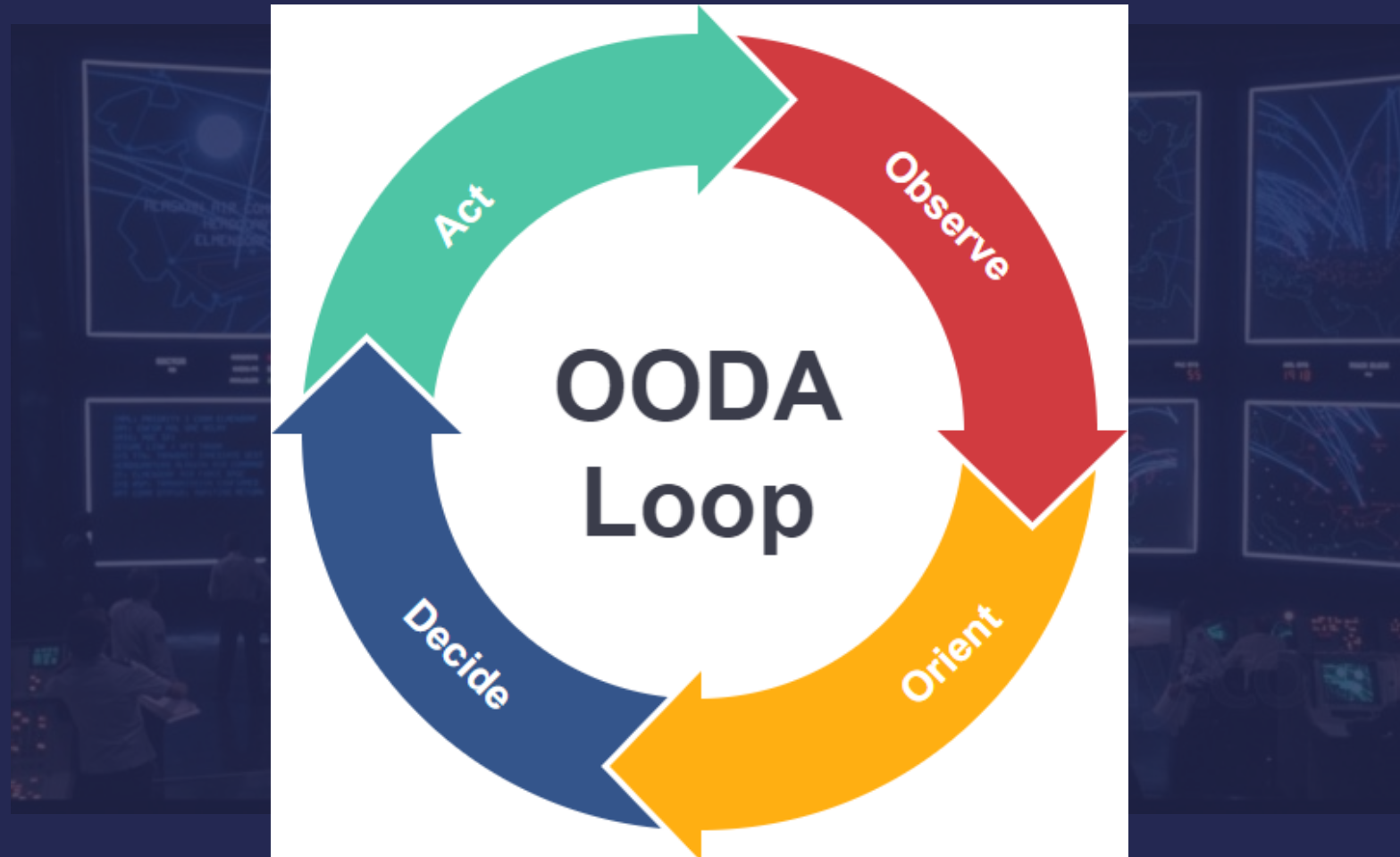


LEARNING OBJECTIVES

- Optimizing the use of spatial and non-spatial data in the emergency management industry
- Present a case study in GIS product development and implementation to support Emergency Operations Centers
- Leveraging the use of a virtual space to share emergency data

BACKGROUND

PROBLEM



PROBLEM

- Timely decision making is dependent on timely, relevant, accurate information.
- Information driven operations are more effective and efficient.
- Multiple data sources create uncertainty and delayed reporting.
- Multiple storage locations create silos



**Solution → Common Operational Picture
(COP)**

INFORMATION GATHERING

- Essential Elements of Information (EIs)
 - Based on operational requirements
 - Evidence based (Community Lifelines)
 - Centrally managed / aggregated
 - Prioritized
- Uses
 - Operational Prep of Environment / Shaping
 - Operational Decision Making
 - Transition Between Phases (Response / Recovery)



Safety and Security - Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety



Food, Water, Shelter - Food, Water, Shelter, Agriculture



Health and Medical - Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management



Energy - Power Grid, Fuel



Communications - Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch

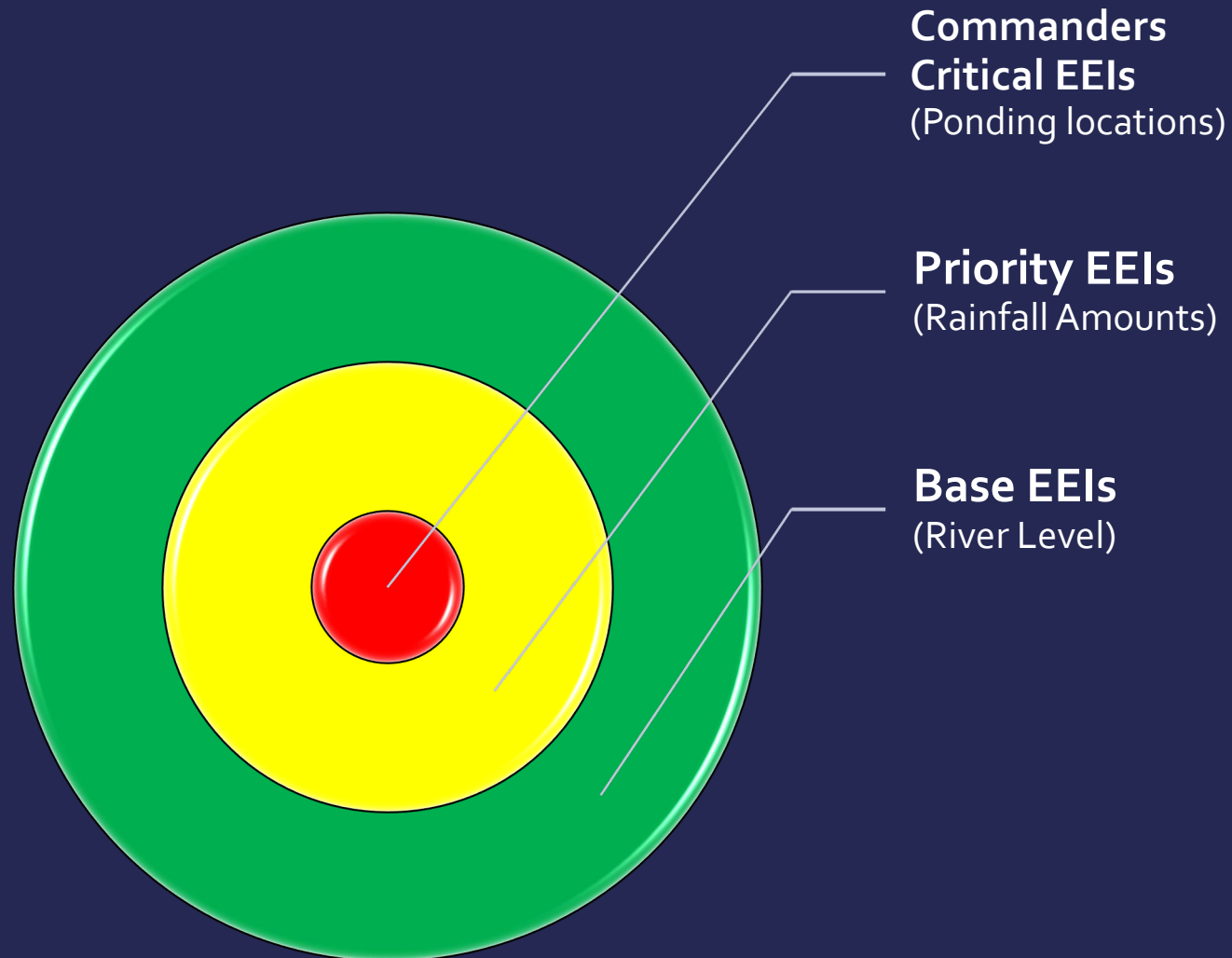


Transportation - Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime



Hazardous Material - Facilities, HAZMAT, Pollutants, Contaminants

PRIORITIZED DATA



DATA VISUALIZATION

Visual cues based on priority

- Color indicators and key data point to enhance easy to read.

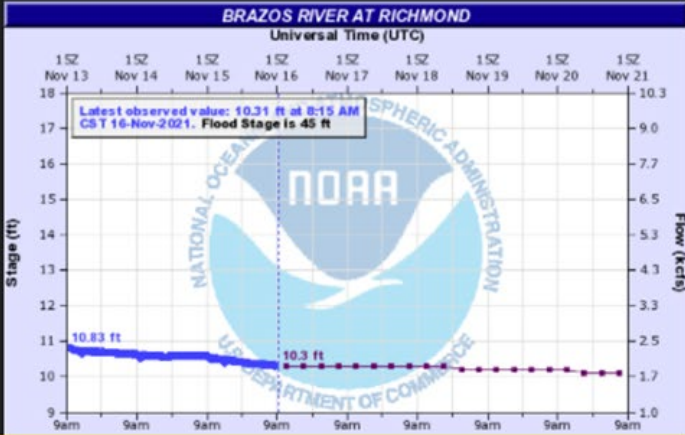
Easiest to access = most important / most used

- Tiered pages and map views

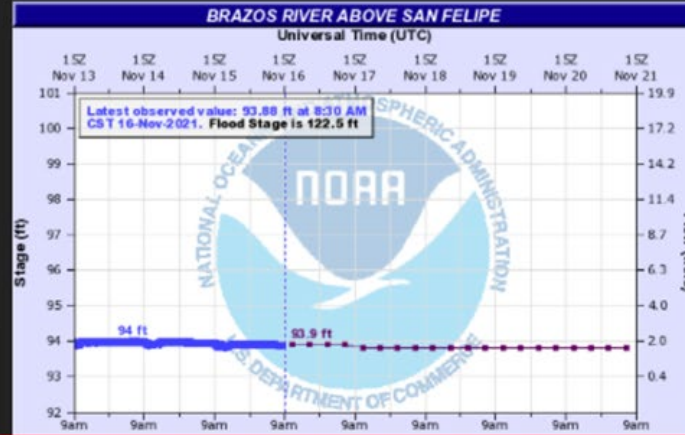
Customized user views to support specific needs

- Layer views for on / off
- Planning tools with the option to display on priority boards

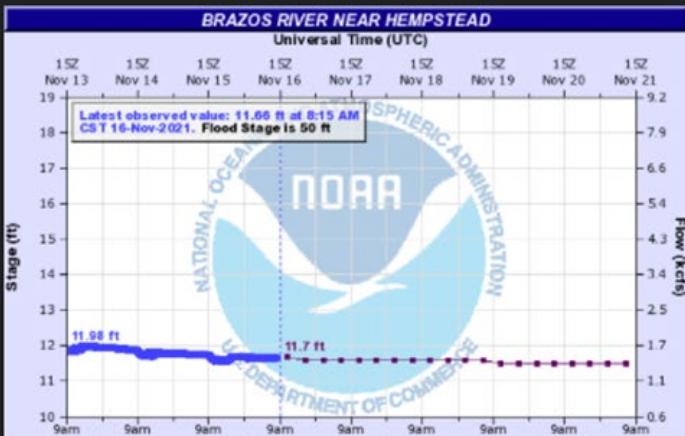
Brazos River
10.31ft
at Richmond



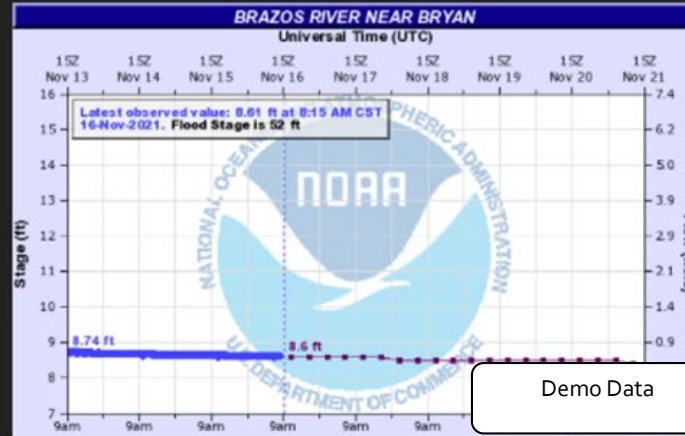
Brazos River @ San Felipe
93.88ft
action level



Brazos River near Hempstead
11.66ft
minor flooding



Brazos River @ Bryan
8.61ft
major flooding



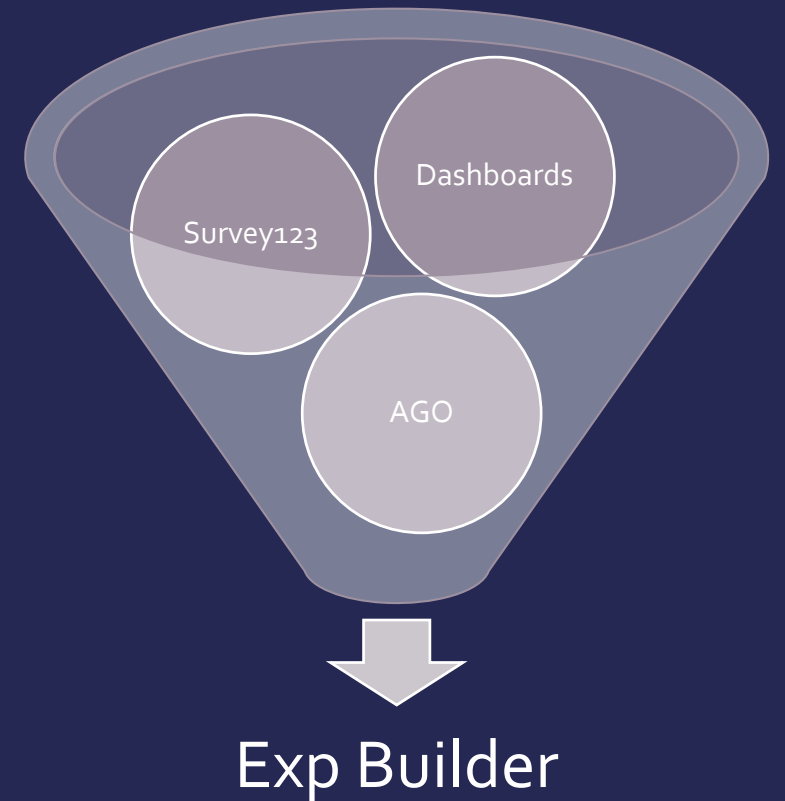
Demo Data

EXAMPLE

PROPOSED SOLUTION

PLATFORM

- Built using the ESRI online suite of tools
 - This allows data to be shared organization wide
 - Can combine spatial and non spatial data
 - Series of Dashboards sitting in an Experience Builder Site
- Individual tabs that show:
 - Situational Awareness
 - Weather Information
 - Recovery Operations
 - Planning Tools



DATA COLLECTION

- Various ESRI GIS tools to collect data
 - Survey123
 - QuickCapture
 - Field Maps
 - AGO Data Mining
- Data Flow:

Tactical Control Measures

Significant Events

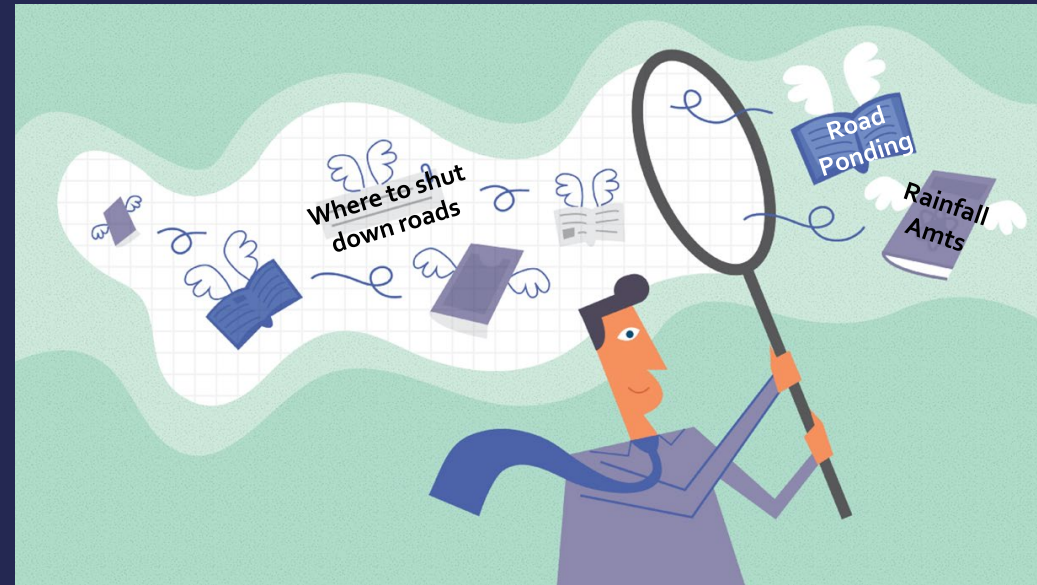
Critical Infrastructure

QA/QC

Data Feeds

Threat Hazard Analysis

AGO Maps



SIGNIFICANT EVENTS

Purpose: Submit relevant incidents that occur during an event

Date/Time

Significant Event Y/N

Location

Description

Number of Patients

Category (Fire, HAZMAT, S&R, etc)

Notes

COSL EOC Significant Events

Survey submissions will notify the EOC of significant events occurring around the city during an event.


Date/Time of Incident*

Is this a Significant Event?

Yes No

Location*

Use the map to mark the incident location. To search for a specific address, use the search bar.



Esri, USGS | Esri, FAO, NOAA Powered by Esri

Lat: 29.58142 Lon: -95.62253

Description*

Multiple Vehicle MVA, MCI, Flooded subdivision, etc..

TACTICAL CONTROL MEASURES

Purpose: Submit control and coordination points for the incident

Location

Site Type (Command Post, Shelter, POD, etc)

Location Name

Operated By & POC

Site Specific Questions

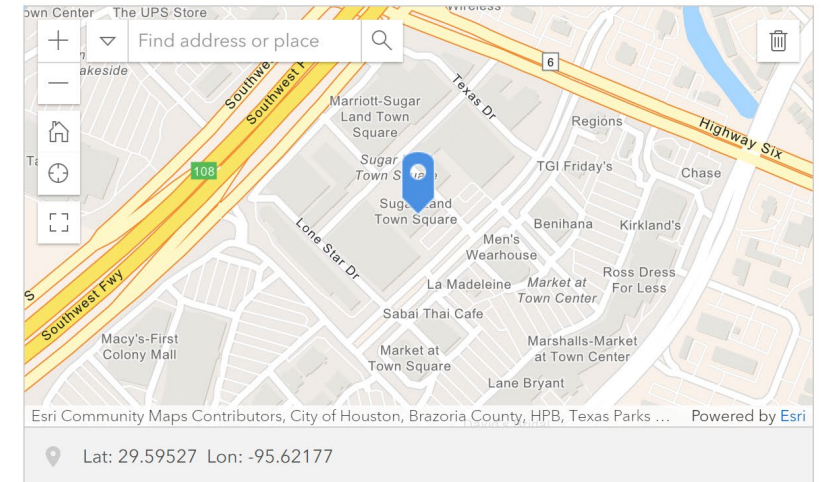
- Shelter Capacity
- Coordinates
- Radio Channel
- Etc

CoSL EOC Tactical Control Measures

If you have any questions, please contact Incident Command

Location*

Pick the location on the map of the site. You can use the search bar to look up an address.



Site Type*

Command Post

Location Name

Operated by

Point of Contact (POC)

For Command Post: **Incident Commander**

For an EOC location: **Manager Name**

THE SITE



Feedback

EOC Status: Level 3 - Increased Readiness

Department Operations Centers: Inactive

Activation | Disaster Declarations

Significant Events

0

There are no active significant events

Local Incidents

2

- 2/3/2022, 9:20 PM Iced over. Highway shutting down.
- 2/3/2022, 9:38 PM Bridge iced iced. Increase mutual aid to Richmond

Open Shelters

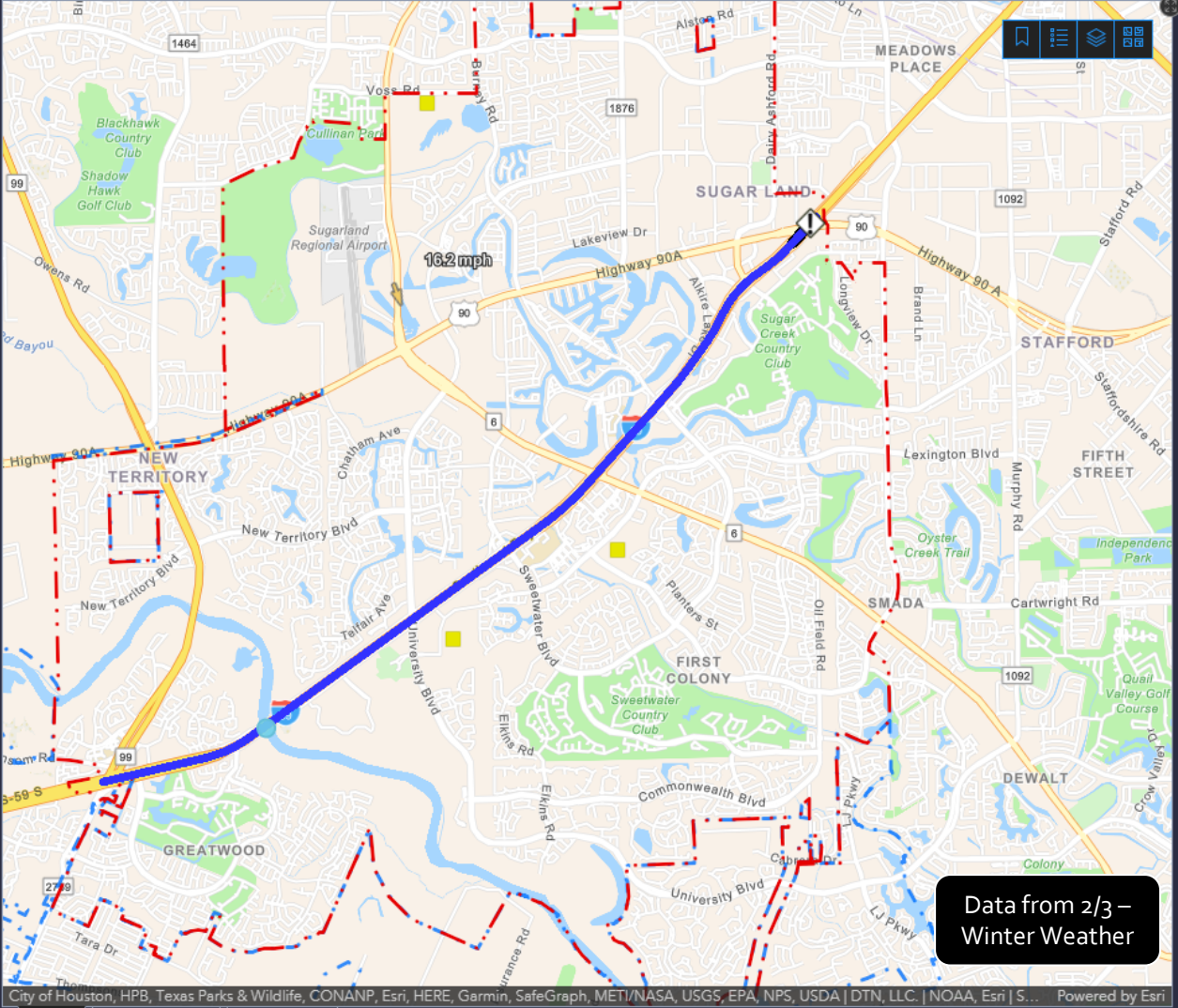
1

Open Shelter

Outage Percentage

0%

Last update: a minute ago
To update, click here



11:09 PM

Brazos River Wind Speed

16.08ft **16.16 mph**

Gust: 25.48 mph

at Richmond

Automated observation with no human

RISING | 43279

24 hr Precip. Total: 0.28 in.

Last Elevation Reading: 70.57 ft.

Second to Last Elevation Reading: 70.55 ft.

Third to Last Elevation Reading: 70.54 ft

[Harris County FWS Link](#)

FALLING | 43368

24 hr Precip. Total: 0.20 in.

Last Elevation Reading: 68.58 ft.

Second to Last Elevation Reading: 68.62 ft.

Third to Last Elevation Reading: 68.72 ft

[Harris County FWS Link](#)

STATIC | 43369

24 hr Precip. Total: 0.20 in.

Last Elevation Reading: 63.05 ft.

Second to Last Elevation Reading: 63.06 ft.

Third to Last Elevation Reading: 63.06 ft.

Active Traffic Incidents

0

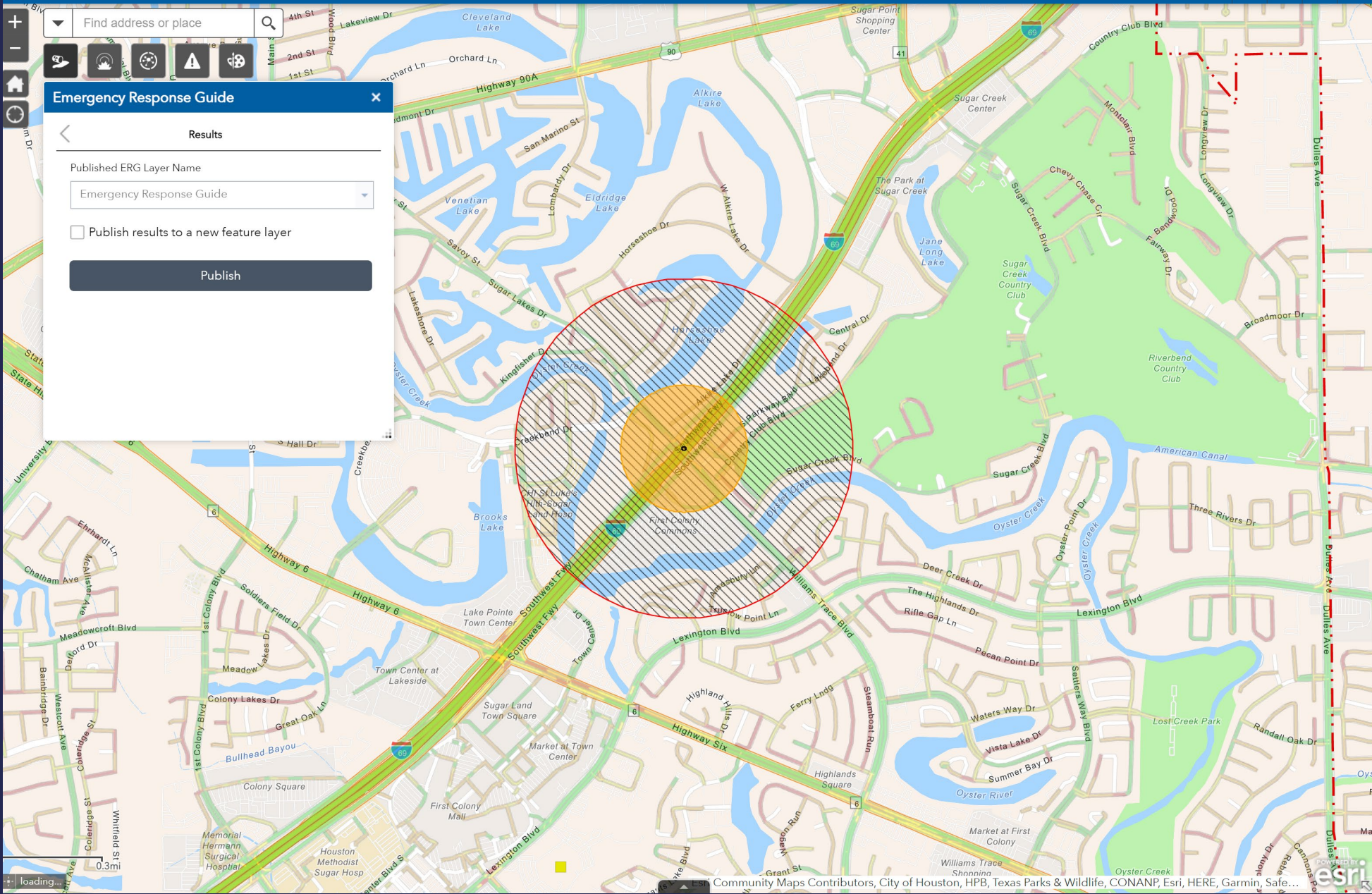
- US0059
- Ice and snow on bridges and overpasses, travel with caution.
 - Patches of ice and snow present, travel with caution.
 - Use alternate route

IH69/US59 north and south bound ice over bridge.

- UA0090
- Ice and snow on bridges and overpasses, travel with caution.
 - Travel discouraged due to icy conditions.



Threat/Hazard Tools Sugar Land EOC



Emergency Response Guide

Results

Published ERG Layer Name

Emergency Response Guide

Publish results to a new feature layer

Publish

Wind Speed
4.35 mph
Gust: 0 mph

Wind Origin: 80°
Blowing to: 100

Brazos River @ Richmond
24.88ft
action level

Broken Clouds at 1400 meters AGL, Overcast Cloud Deck at 1800 meters AGL

No significant weather present at this time.

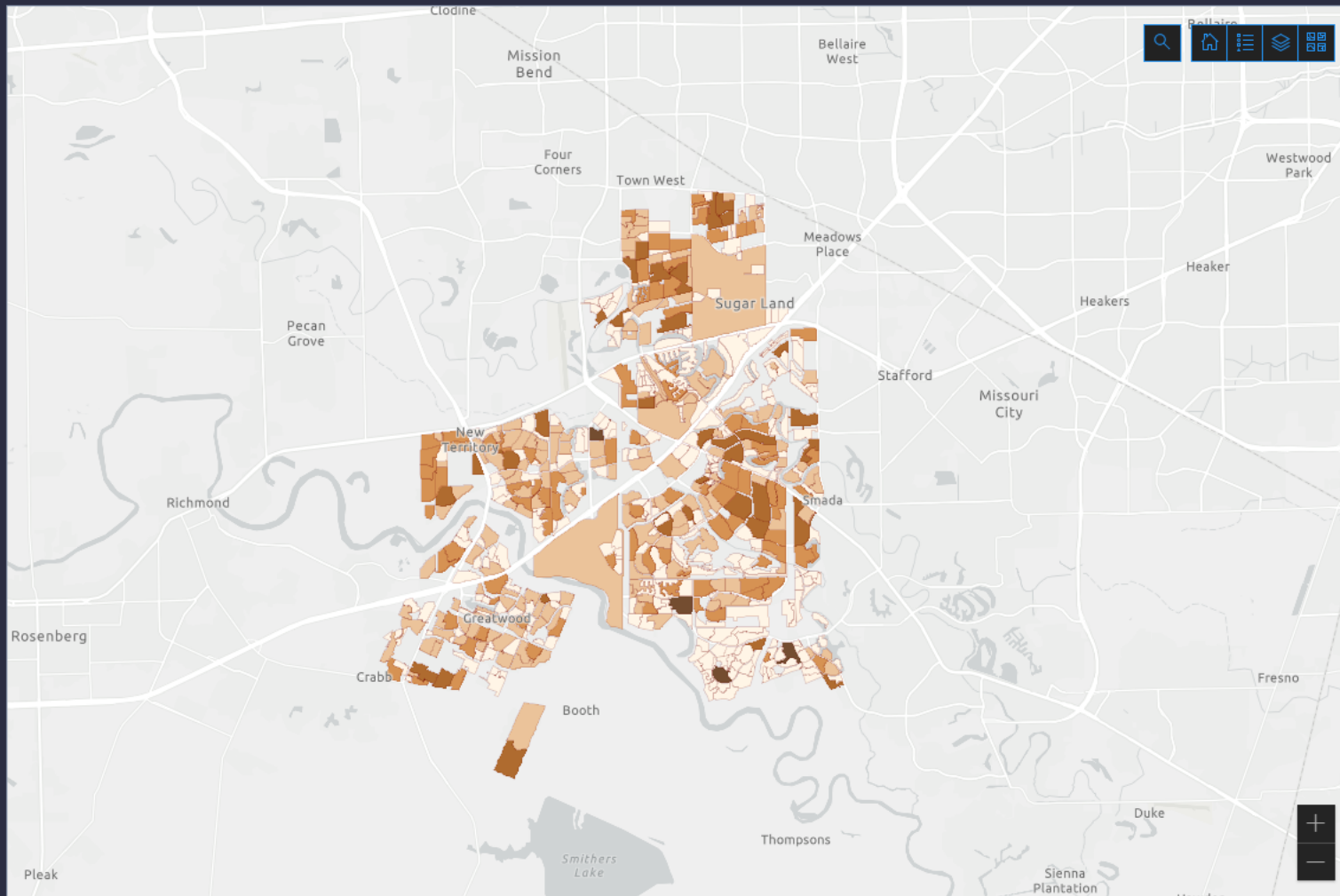


Total Population

111.8k

Housing Units

38.2k



Households below Poverty

1.7k

Households w/ Disability

5.7k

Unemployment Rate

4.6%

Using this Dashboard

The data shown on the map by default is the population for each unit. You can filter subdivisions in the header to see specific stats about certain areas.



Sugar Land Common Operation Picture | For Official Use Only (FOUO)

Feedback

Situational Awareness

Community Lifelines

Resource Tracker

Weather Outlook

DriveTexas

Recovery Operations

Surveys

NHC



Safety and Security

Law Enforcement/Security
No significant reporting / impact

Fire Service
No significant reporting / impact

Public Works
No significant reporting / impact

Government Services
No significant reporting / impact

Community Safety
No significant reporting / impact

Actions/Resources
No significant reporting / impact



Health and Medical

Fatalities
None

Medical Care
Bed capacity limited due to COVID patient increases.

Patient Movement
Hwy 59 closures in the region restricting access to Level 1 trauma and specialty centers.

Public Health
Increase in COVID cases due to variant spike

Fatality Management
No significant reporting / impact

Medical Supply Chain
No significant reporting / impact

Actions/Resources
No significant reporting / impact



Food, Water, Shelter

Food
No significant reporting / impact

Water
No significant reporting / impact

Shelter
No significant reporting / impact

Agriculture
No significant reporting / impact

Actions/Resources
No significant reporting / impact



Communications

Infrastructure
No significant reporting / impact

Alerts, Warnings, Messages
No significant reporting / impact

911 & Dispatch
No significant reporting / impact

Responder Comms
No significant reporting / impact

Financial Services
No significant reporting / impact

Actions/Resources
No significant reporting / impact



Transportation

Highways/Roadways
Interstate 59/69 closed due to icing. Multiple city/county roads experiencing icing delaying travel.

Mass Transit
No significant reporting / impact

Railways
No significant reporting / impact

Aviation
No significant reporting / impact

Maritime
No significant reporting / impact

Actions/Resources
Tx DOT treating interstate. City PW treating local bridges.



Energy (Power&Fuel)

Power
No significant reporting / impact

Fuel
No significant reporting / impact

Responder Fuel
No significant reporting / impact

Actions/Resources
No significant reporting / impact



Hazardous Materials

Facilities
No significant reporting / impact

HAZMAT, Pollutants, Contaminants
No significant reporting / impact

Actions/Resources
No significant reporting / impact

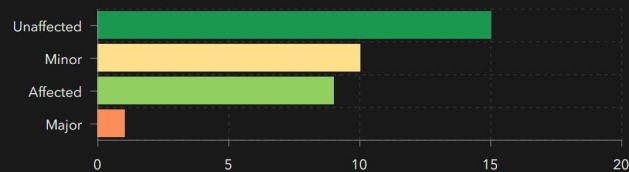
Data from 2/3 – Winter Weather



Damage Assessment Tracker

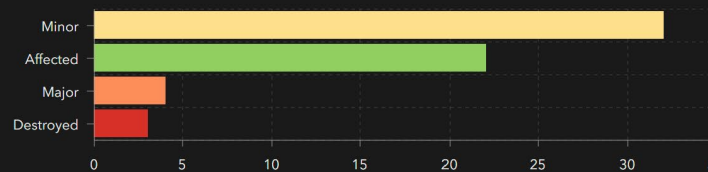
Commercial Buildings Assessed

35



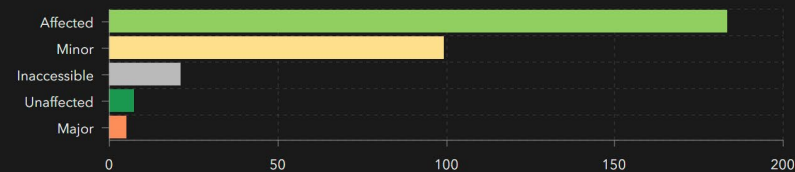
Public Buildings Assessed

61



Residential Buildings Assessed

312



Public Bldgs Damage Assessment

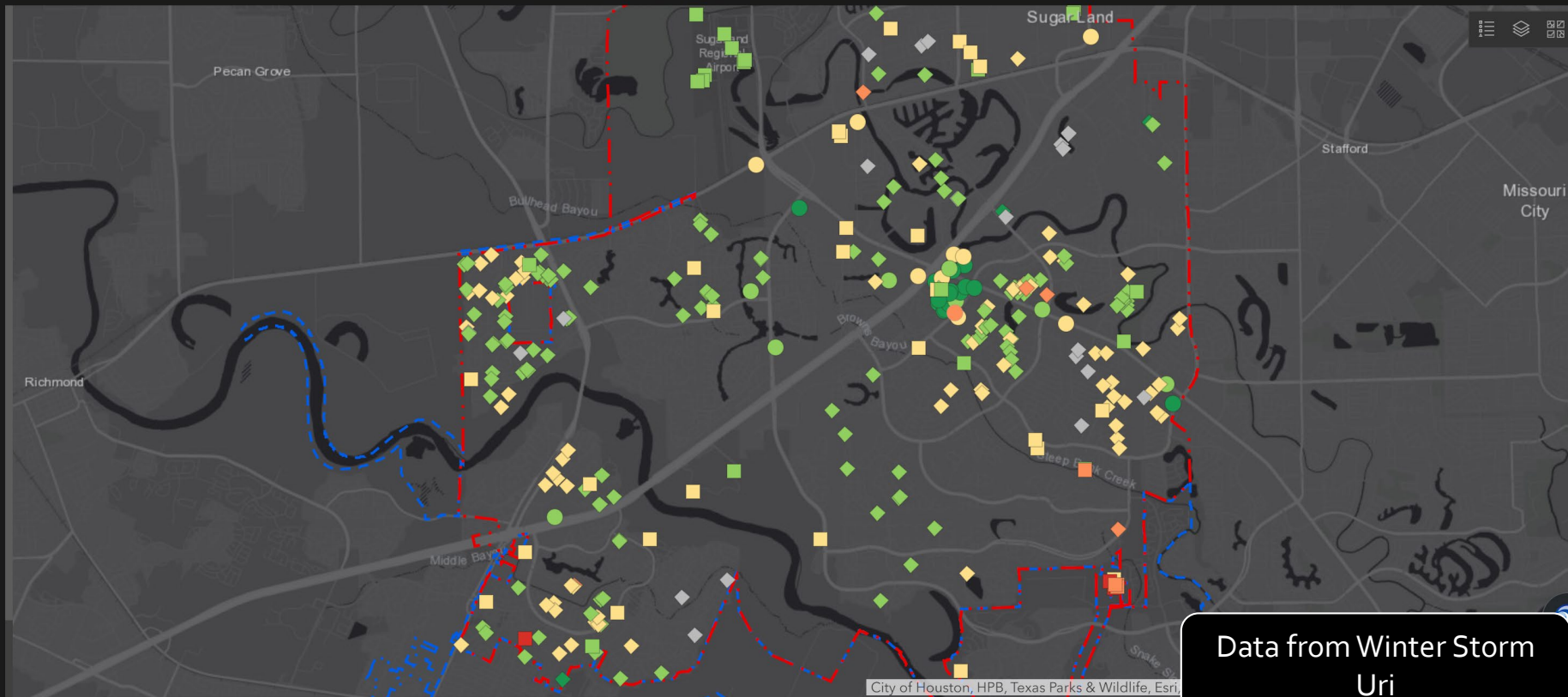
- Unaffected
- Affected
- Minor
- Major
- Destroyed
- Inaccessible

Residential Bldgs Damage Assessment

- Unaffected
- Affected
- Minor
- Major
- Destroyed
- Inaccessible

Commercial Bldgs Damage Assessment

- Unaffected
- Affected
- Minor
- Major



Data from Winter Storm Uri

TEAMS INTEGRATION

Teams

Emergency Operations Center (EOC) ...

General

Active Incident (No Active Incident)

Special Event - 2021 Christmas Tree Lighting

Special Event - 2022 International Kite Festi...

Winter Storm Uri (Feb 2021)

1 hidden channel

Active Incident (No Active Incid... Posts Files **Common Operating P...** Job Aids Incident Tasks Order Desk Resource Tracking EEs (U...

If your site isn't loading correctly, click here

Sugar Land Common Operation Picture | For Official Use Only (FOUO)

Situational Awareness Community Lifelines Resource Tracker Weather Outlook DriveTexas Recovery Operations

EOC Status: Level 3 - Increased Readiness

Department Operations Centers: Inactive
Threat Level: Minimal Community Risk

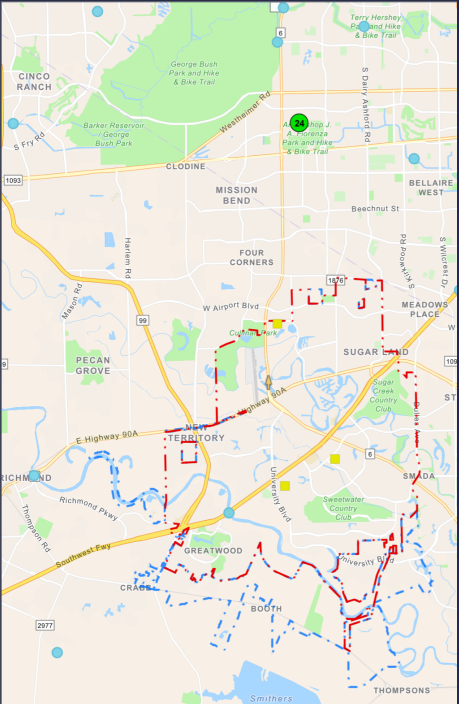
Activation Disaster Declarations

Significant Events 0

Local Incidents 0

There are no active significant events

There are no active local incidents



The map displays the Sugar Land area with various landmarks and incident locations. Key locations include CINCO RANCH, GEORGE BUSH PARK AND HIKE & BIKE TRAIL, BELLAIRE WEST, SUGAR LAND, and GREATWOOD. The map shows a network of roads and green spaces, with several red and blue markers indicating incident locations.

Posts Files Common Operating P... Job Aids Incident Tasks Order Desk Resource Tracking EEs (Under Developm... Contact List (ICS-205a) 3 more

Reply

Trevor Surface 9/15/21 4:48 PM
THIS IS AN AUTOMATED POST
214 Submission:
Wednesday, September 15, 2021 6:45 AM - Wednesday, September 15, 2021 6:00 PM
Unit: Liaison_Officer

See more

Reply

Trevor Surface 9/15/21 4:58 PM
THIS IS AN AUTOMATED POST
214 Submission:
Wednesday, September 15, 2021 7:00 AM - Tuesday, September 14, 2021 7:00 PM
Unit: Public_Works

See more

Reply

Trevor Surface 9/15/21 5:05 PM
THIS IS AN AUTOMATED POST
214 Submission:
Wednesday, September 15, 2021 7:00 AM - Tuesday, September 14, 2021 7:00 PM
Unit: Debris_Management_Group

See more

Reply

SUCCESSSES

IN ACTION



Galveston County Emergency Operations Center

[COP](#)
[Incident Operations](#)
[Operations](#)
[Weather](#)
[Reporting](#)
[Jurisdictions](#)
[gcoem.org](#)
[Misc](#)
[Critical Infrastructure](#)

EOC Activation:
Level 3

Disaster Declaration:
No

Boil Water Notices *

0

Galveston County
Last update: a few seconds ago

Clear Ck nr Friendswood, TX

0.52 ft

Status:

Clear Ck nr Friendswood, TX
STATUS: UNKNOWN
HEIGHT: 0.52 FEET (0.16 METERS)
FLOW: UNAVAILABLE
STATION: US05977500
LOCATION: TX, USA

Power Outages *

Therford, 433 993
 0.07%
Out: 93

Updated: March 7, 2022 10:43

Wind Speed

San Leon
 15 mph blowing to S
Gusts: 22 mph

Updated: 3/7/2022, 9:48 AM

Weather Watches and Warnings 3

Severity	Type	Areas Affected
Minor	Small Craft Advisory	Galveston Bay; Matagorda Bay

County Overview

Map | Event Details

Earthstar Geographics | NOAA/NOS/OCS nowCOAST and NOAA/NWS/SRH | Esri, HERE | NOAA, National Weather Service, Esri | Esri, HERE, Garmin | Powered by Esri

Significant Events*

No data

Construction

Location	Description	Last Updated
Gulf Fwy SOUTHBOUND	Between FM-1764/FM-2004/Exit 15 and FM-519/Ma...	3/7/2022, 9:01 AM
Gulf Fwy NORTHBOUND	Between FM-519/Main St/Exit 10 and FM-1764/FM-2...	3/7/2022, 9:01 AM
Intersection of Gulf Fwy and FM-1764/FM-2004/Exit ...	Between FM-1764/FM-2004/Exit 15 and FM-519/Ma...	3/7/2022, 9:01 AM
Texas Ave EASTBOUND	At I-45/Gulf Fwy - Roadwork.	3/7/2022, 9:01 AM

[Significant Events](#)
[Construction Details](#)
[Car Accident Details](#)
[Construction](#)
[Accidents](#)

ROADMAP

FUTURE PLANS

- ✓ Broader usage of the site (ex. PD dropping points to show when roads are impassable)
- ✓ Increased automation of data sources – currently around 30%
- ✓ Regional data sharing for complete situational picture



QUESTIONS & COMMENTS

THANK YOU

- Erik Schenck
 - IT Manager - GIS
 - eschenck@sugarlandtx.gov
- Trevor Surface
 - GIS Specialist & Part 107 Drone Pilot
 - tsurface@sugarlandtx.gov

For more information:

