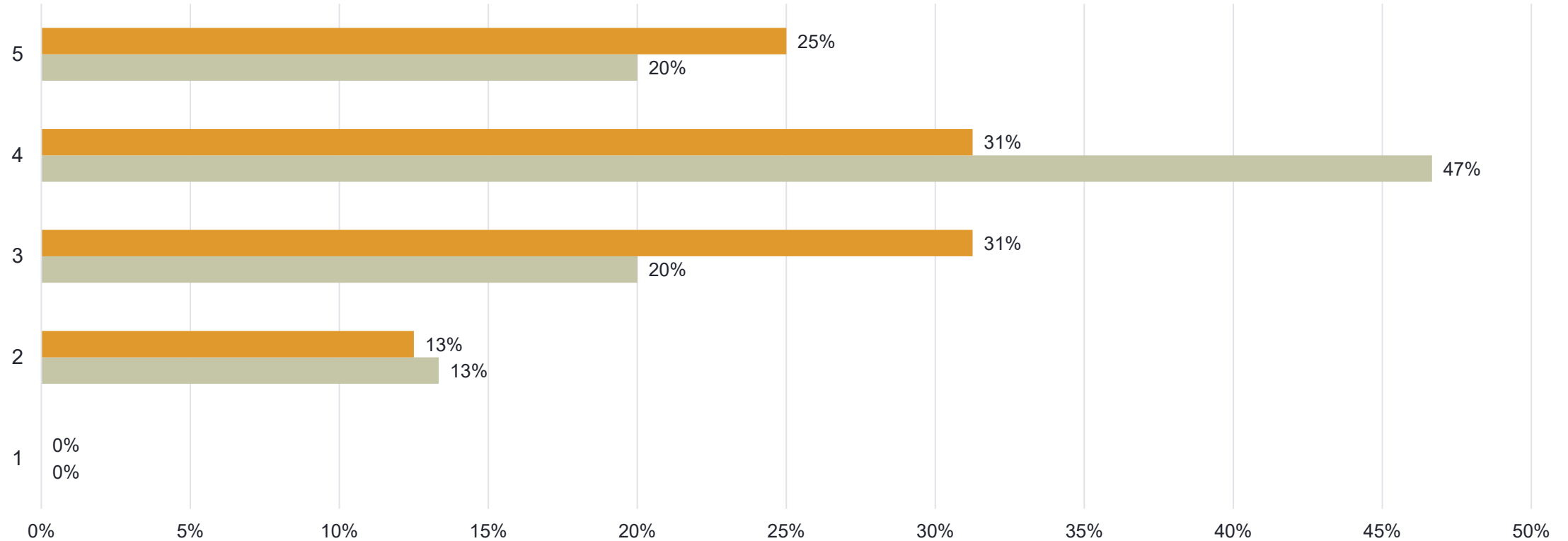


Data and Tools to Assist in Developing Metropolitan Planning (MPO) Resiliency Plans

Jolanda Prozzi and Andrew Birt

April 27, 2021

MPO Resiliency Survey



- Identifying available tools/methods to analyze regional transportation system risk to climate change/extreme weather and man-made events.
- Identifying/applying data to analyze regional transportation system risk to climate change/extreme weather and man-made events.

Resiliency Web Portal

- Assemble data in one place
- Catalogue/inventory data
- Simplify/clean data
 - Extract data relevant for resiliency planning
- Develop/host tools
 - Analyzing and visualizing data
 - Combine data from different sources
- Highlight applications/case studies
- Enable MPOs to upload own data (?)

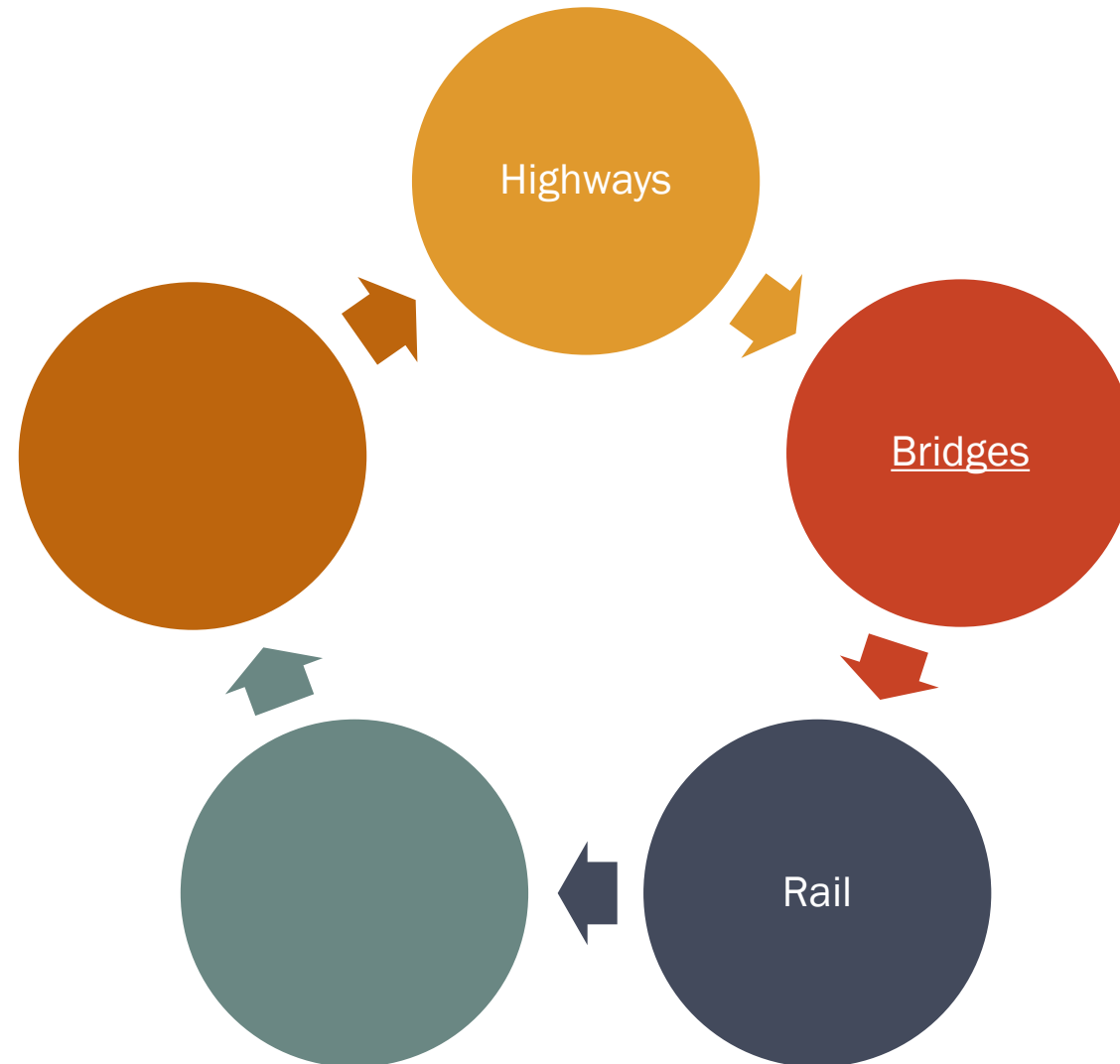
Agenda

- Web portal/data platform examples
- Two Resiliency Analysis Examples
 - Human-made – Bridge strikes
 - Weather - Flooding

Developing MPO Resiliency Plans – Simple Framework



Developing MPO Resiliency Plans



TxDOT Bridges

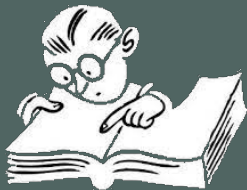


Description

The Bridge dataset is developed using data included in the Bridge Inspection Database. The Bridge Inspection Database contains a record for each Bridge Structure on public roadways in Texas. This includes Bridges maintained by TxDOT, Toll Authorities, Counties, Municipalities, and other jurisdictions.

Data Catalogue

Data Type	.csv KML Shapefile File Geodatabase
Data variables captured	>220 variables
Publicly available	Yes
Data update frequency	Annually/as needed
Limitations	No historic data
Resources/expertise required	Intermediate database and ArcGIS skills



[Link to Data/File Location](#)

[Application and Interpretation
\(when and how to use data\)](#)

[Links to case studies where
data have been used](#)

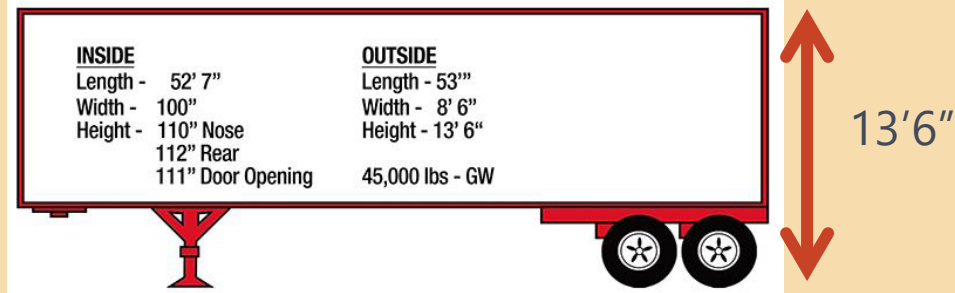
TxDOT Bridge Data

Application

TxDOT's Bridge Data includes bridge condition and the vertical and horizontal clearances of bridges over Texas highways and roads. Trucks (single and combination unit trucks) typically have a height of 13'6". Bridges over a highway with a vertical clearance of 14 feet or less therefore have a higher probability of being struck by a heavy truck. Oversize trucks poses an even higher risk of striking these bridges. Planners can extract the vertical clearance of bridges and visualize it in ArcGIS or a visualization tool to identify bridges potentially vulnerable to bridge strikes.



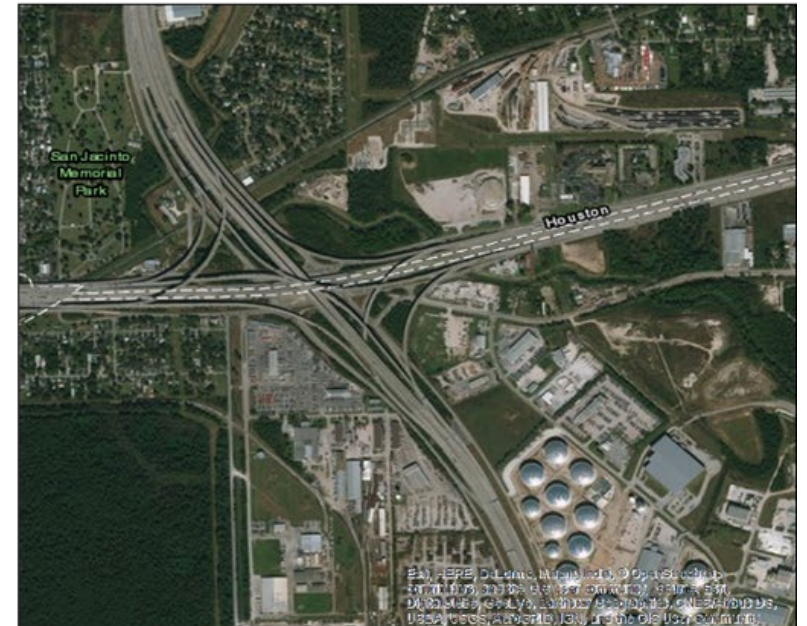
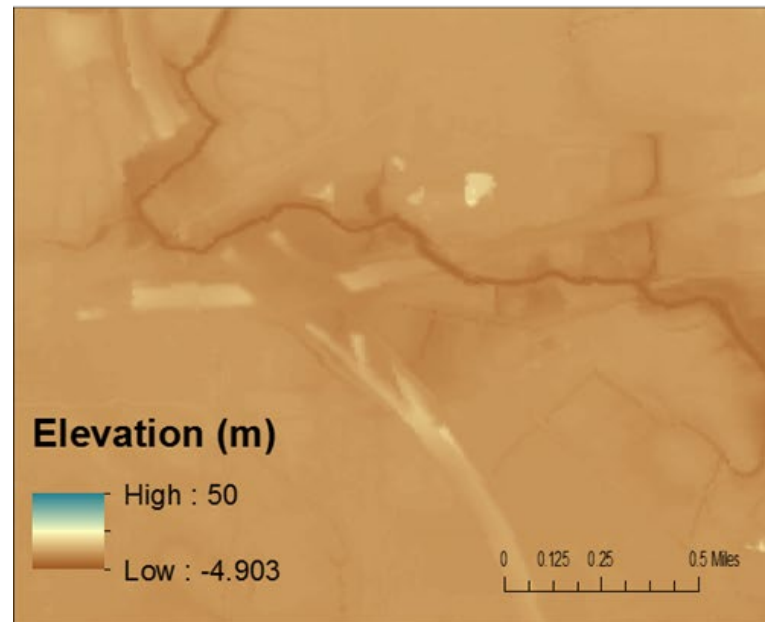
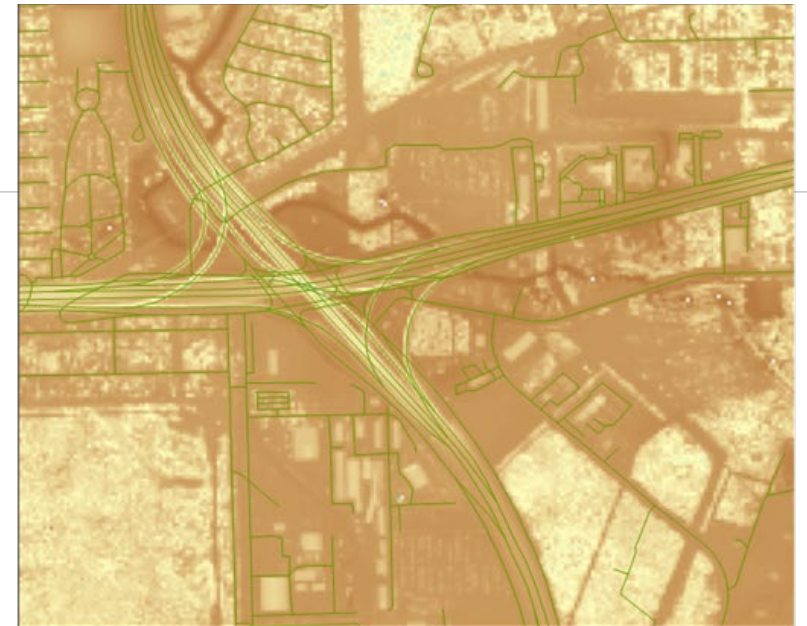
53' Air Ride Dry Van



Bridge Data Visualization Tool

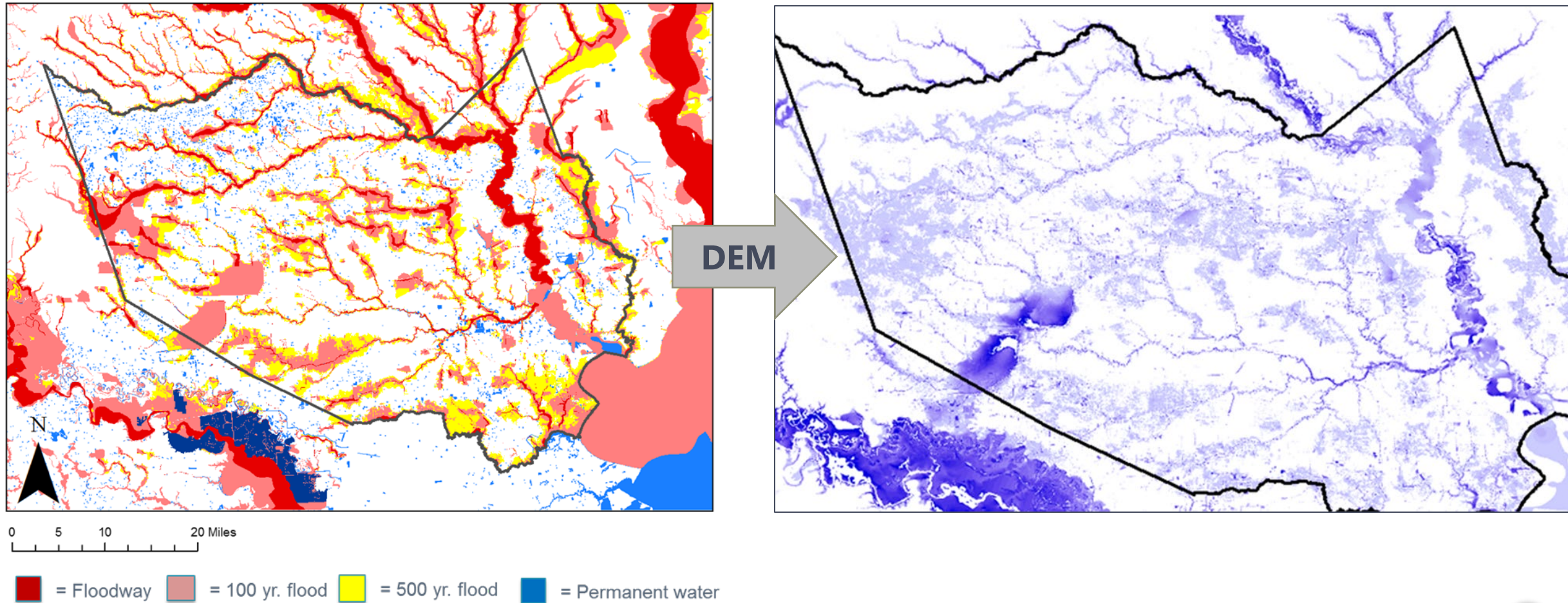
Flood Risk

- “Asset Management, Extreme Weather, and Proxy Indicators Pilot”

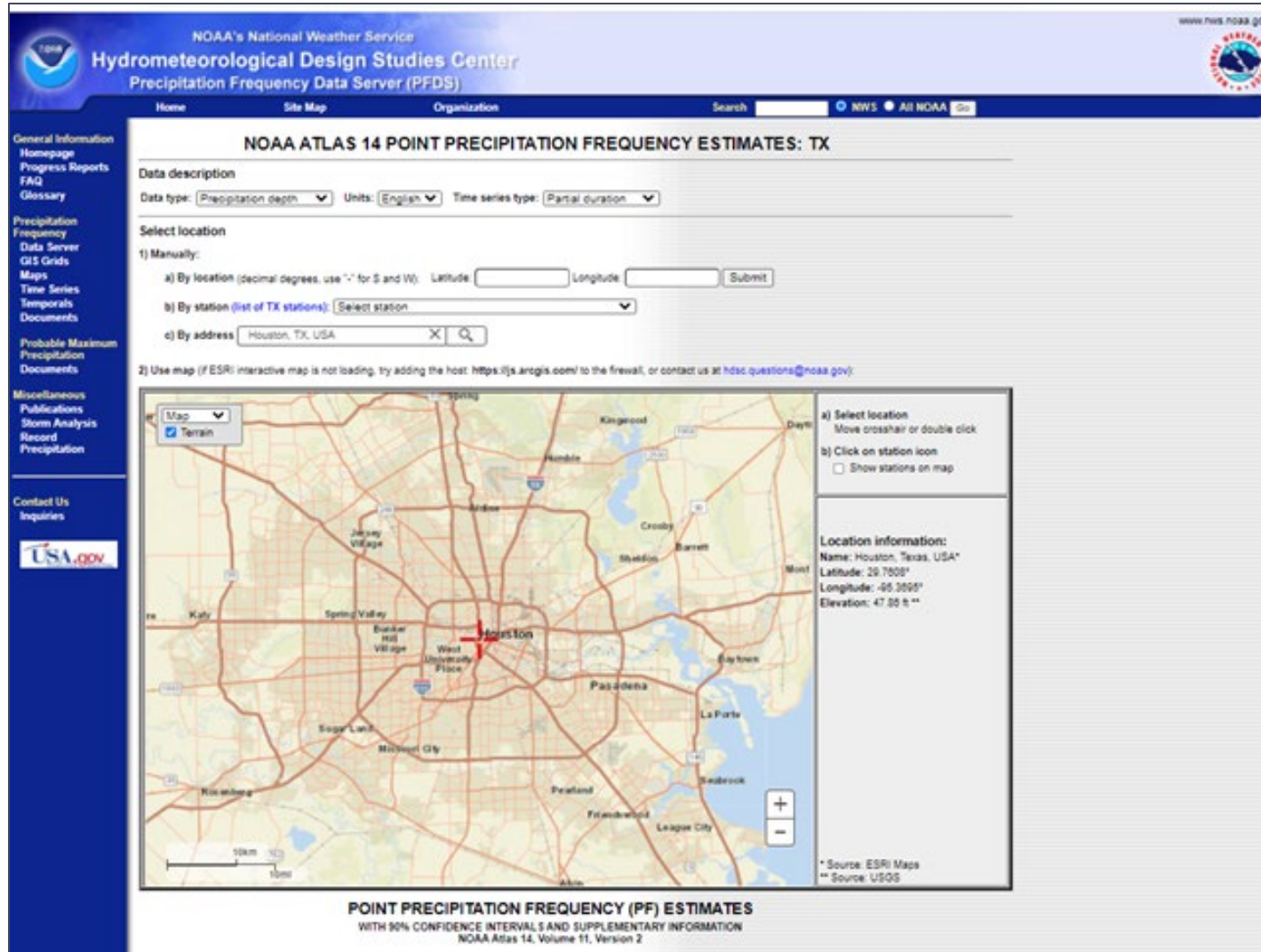


Flood Risk

- FEMA Flood Risk Maps
- Digital Elevation Models (height of land)



ATLAS 14 – Rainfall Intensity Data



PF tabular PF graphical Supplementary information Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)¹

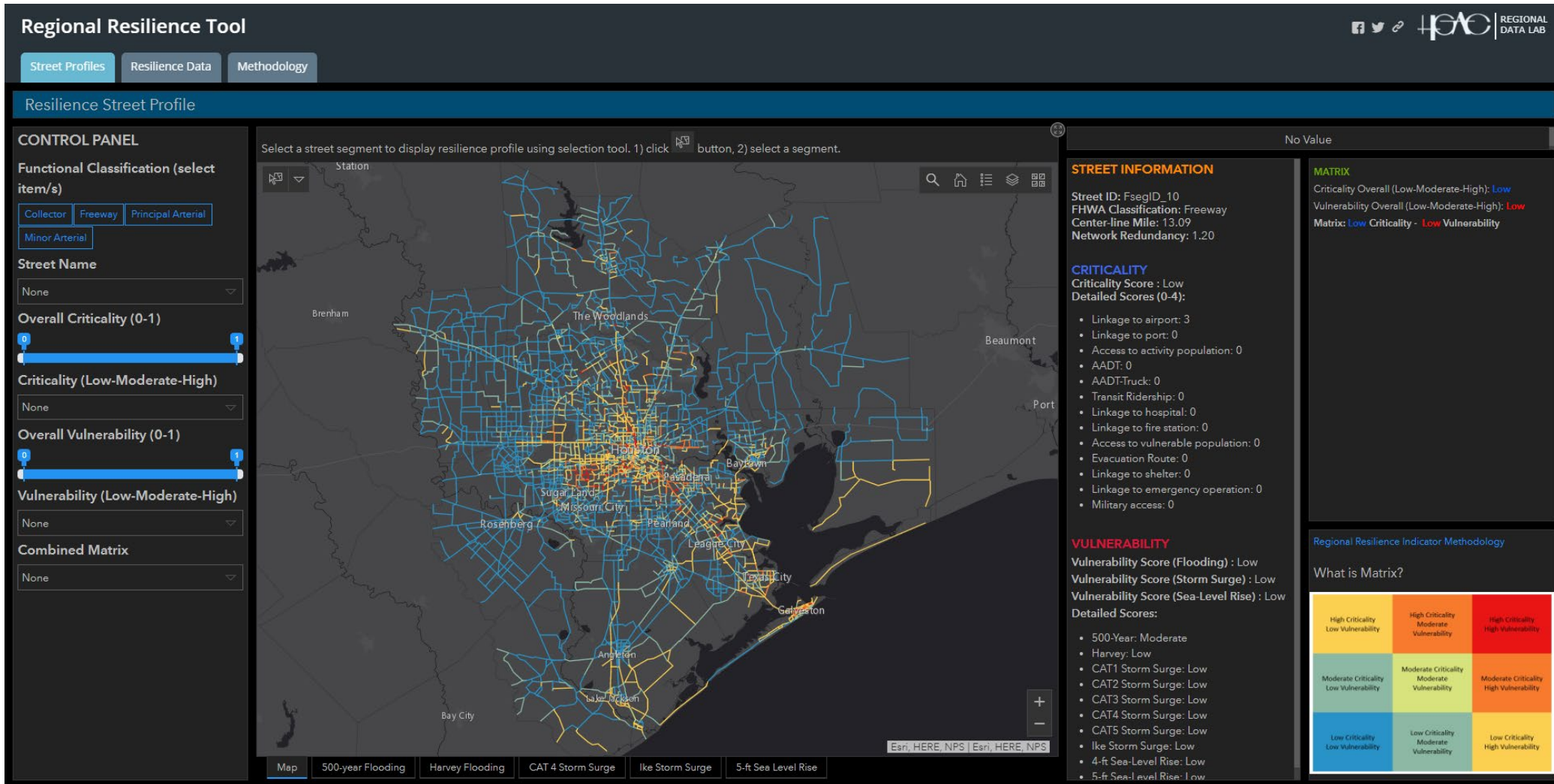
Duration	1	2	5	10	Average recurrence interval (years)	25	50	100	200	500	1000
5-min	0.485 (0.377-0.657)	0.585 (0.449-0.763)	0.726 (0.563-0.954)	0.845 (0.634-1.13)	1.01 (0.754-1.38)	1.14 (0.895-1.61)	1.27 (0.877-1.84)	1.41 (0.951-2.11)	1.61 (1.05-2.49)	1.77 (1.12-2.80)	
10-min	0.787 (0.595-1.04)	0.928 (0.707-1.21)	1.15 (0.879-1.52)	1.35 (1.01-1.79)	1.61 (1.17-2.22)	1.82 (1.29-2.67)	2.03 (1.40-2.95)	2.25 (1.51-3.35)	2.54 (1.65-3.91)	2.76 (1.75-4.36)	
15-min	1.00 (0.701-1.33)	1.18 (0.865-1.54)	1.46 (1.11-1.91)	1.69 (1.27-2.25)	2.02 (1.49-2.77)	2.27 (1.60-3.20)	2.53 (1.74-3.65)	2.80 (1.89-4.18)	3.19 (2.07-4.82)	3.50 (2.20-5.53)	
30-min	1.44 (1.09-1.91)	1.68 (1.26-2.30)	2.07 (1.58-2.72)	2.39 (1.80-3.19)	2.84 (2.06-3.89)	3.18 (2.24-4.47)	3.53 (2.44-5.12)	3.94 (2.65-5.87)	4.53 (2.94-6.94)	5.01 (3.17-7.82)	
60-min	1.90 (1.44-2.51)	2.23 (1.70-2.91)	2.77 (2.11-3.64)	3.23 (2.42-4.30)	3.86 (2.79-5.27)	4.33 (3.06-6.10)	4.85 (3.38-7.03)	5.46 (3.69-8.14)	6.38 (4.15-9.85)	7.16 (4.53-11.3)	
2 hr	2.29 (1.74-3.05)	2.90 (2.12-3.95)	3.56 (2.72-4.83)	4.25 (3.21-5.62)	5.26 (3.84-7.16)	6.07 (4.32-8.51)	6.99 (4.89-10.1)	8.09 (5.46-12.5)	9.76 (6.39-15.0)	11.2 (7.11-17.6)	
3 hr	2.50 (1.91-3.28)	3.13 (2.35-4.30)	4.07 (3.15-5.24)	4.93 (3.74-6.50)	6.24 (4.55-8.47)	7.33 (5.24-10.3)	8.59 (5.97-12.3)	10.1 (6.82-14.9)	12.4 (8.06-19.0)	14.4 (9.15-22.5)	
6 hr	2.88 (2.21-3.73)	3.75 (2.81-4.98)	4.96 (3.82-6.34)	6.15 (4.69-8.04)	7.97 (5.90-10.8)	9.56 (6.86-13.3)	11.4 (7.87-16.3)	13.6 (9.23-19.9)	17.0 (11.1-25.8)	19.8 (12.7-30.9)	
12 hr	3.31 (2.56-4.38)	4.40 (3.36-5.82)	5.90 (4.51-7.47)	7.39 (5.67-9.89)	9.69 (7.22-13.0)	11.7 (8.49-16.2)	14.1 (9.90-20.0)	16.9 (11.5-24.8)	21.2 (14.0-32.0)	24.9 (16.0-38.8)	
24 hr	3.90 (2.96-5.09)	5.12 (3.88-6.71)	6.94 (5.40-9.11)	8.74 (6.75-11.3)	11.6 (8.65-15.5)	14.1 (10.3-19.4)	17.0 (12.0-23.8)	20.4 (13.9-29.4)	25.5 (16.2-39.2)	29.8 (19.2-46.8)	
2-day	4.34 (3.40-5.49)	5.95 (4.49-7.90)	8.15 (6.38-10.1)	10.4 (8.09-13.2)	13.8 (10.5-18.5)	17.0 (12.5-23.3)	20.6 (14.6-28.7)	24.4 (16.8-34.9)	29.9 (19.8-44.8)	34.4 (22.2-52.5)	
3-day	4.74 (3.73-5.97)	6.50 (4.93-7.62)	8.91 (7.00-11.0)	11.3 (8.62-14.4)	15.1 (11.5-20.1)	18.5 (13.7-25.3)	22.3 (15.9-31.1)	26.4 (18.1-37.5)	31.9 (21.2-47.3)	36.4 (23.6-55.4)	
4-day	5.07 (4.00-6.37)	6.89 (5.26-9.10)	9.41 (7.42-11.8)	11.9 (9.30-15.1)	15.8 (12.0-20.9)	19.3 (14.3-26.5)	23.2 (16.5-32.1)	27.2 (19.8-38.5)	32.9 (21.4-49.5)	37.3 (24.2-56.7)	
7-day	5.85 (4.62-7.29)	7.72 (5.87-10.1)	10.4 (8.24-12.8)	13.0 (10.2-16.3)	16.9 (12.2-22.3)	20.5 (15.2-27.7)	24.4 (17.5-33.7)	28.5 (19.8-40.3)	34.2 (22.8-50.2)	38.7 (25.2-58.5)	
10-day	6.48 (5.16-8.06)	8.43 (6.37-10.9)	11.2 (8.92-13.7)	13.8 (10.9-17.4)	17.9 (13.7-23.4)	21.4 (15.9-28.9)	25.3 (18.2-34.8)	29.4 (20.4-41.4)	35.1 (23.5-51.3)	39.6 (25.8-59.8)	
30-day	8.59 (6.58-10.8)	10.6 (8.47-13.2)	13.7 (11.0-16.7)	16.5 (13.1-20.9)	20.5 (15.8-26.5)	23.9 (17.9-31.8)	27.5 (19.9-37.5)	31.4 (21.9-44.0)	36.8 (24.7-53.5)	41.1 (28.9-61.4)	
30-day	10.4 (8.35-12.8)	12.5 (10.1-15.1)	15.8 (12.6-19.3)	18.7 (14.9-23.2)	22.8 (17.5-29.2)	26.0 (19.3-34.3)	29.4 (21.2-39.9)	33.1 (23.2-46.2)	38.2 (25.5-55.4)	42.3 (27.7-63.0)	
60-day	13.0 (10.5-15.8)	15.3 (12.5-18.5)	19.1 (15.5-23.2)	22.2 (17.7-27.4)	26.5 (20.3-33.7)	29.7 (22.1-39.0)	32.9 (23.9-44.6)	36.4 (26.6-50.7)	41.1 (27.8-59.4)	44.8 (29.4-66.4)	
60-day	15.4 (12.5-18.8)	17.9 (14.7-21.7)	22.1 (18.0-26.8)	25.4 (20.4-31.3)	29.9 (23.0-38.0)	33.2 (24.8-43.5)	36.4 (26.5-49.2)	39.7 (28.0-53.1)	44.0 (29.6-62.4)	47.2 (31.0-69.9)	

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS). Numbers in parentheses are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP). Estimates may be higher than currently valid PMP values. Please refer to NOAA Atlas 14 document for more information.

Estimates from the table in CSV format: Submit

Main Link Categories
Home | DVPF

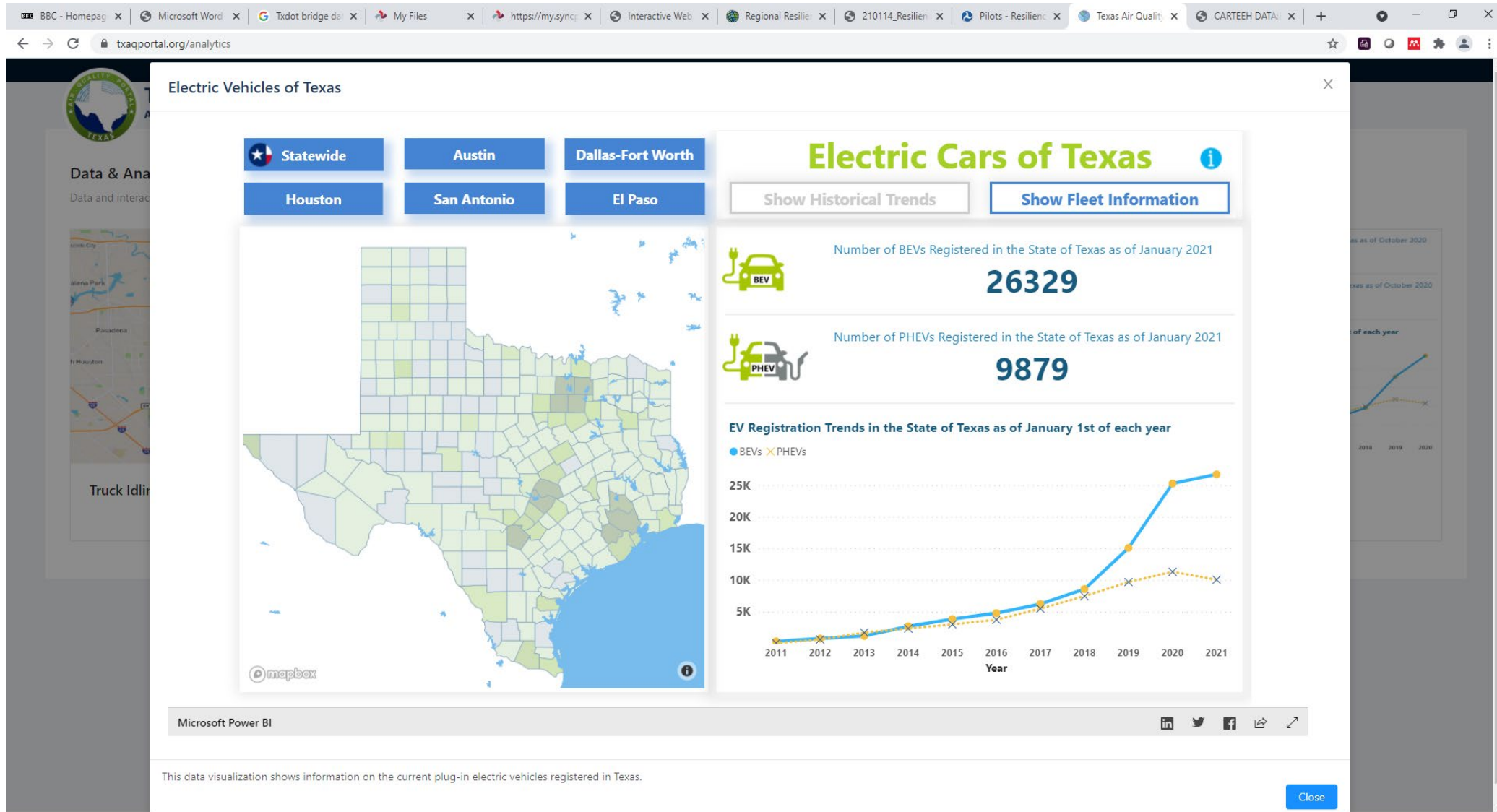
HGAC Regional Resilience Tool



Serves as an interactive tool (linking data sets) **as well as a** repository of resilience data.

<https://datalab.hgac.com/resilience>

Texas Air Quality Portal



Data Portals

- Assemble data in one place:
 - One stop shop for planners
- Catalogue/inventory data
 - Easier to find / see what's available
- Simplify/clean data
 - Makes data more usable for a specific problem / context
- Develop/host tools
 - Real Time Analysis and visualization
- Applications/case studies
 - Frameworks for operational planning and documenting the planning process

