



# Temporal and Spatial pattern of Vulnerability to Flash-Flood in Texas Project Status

Team 4

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0.00K	0.00K
80.00M	0.00K
95.00M	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
0.00K	0.00K
1.00M	0.00K
8.00M	0.00K
1.00M	0.00K
50.00M	0.00K

# Data Processing (TX\_FlashFlood2000-2019)

- Re-organized economic damage data
- The raw data was in K and M units
- The processed data is now in numerical values
  - Via Excel
    - Replace every “K” with “\*1000” and “M” with “\*1000000” and use formulas to get the result of each cell.
    - Use Format Cell to add “=” in every cell.
    - Convert the format values into plain text.
    - Set those values as currency.

0	0
80000000	0
95000000	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
0	0
1000000	0
8000000	0
1000000	0
50000000	0

# New Data

- Information of all counties in Texas
  - Income: this will be used to evaluate the wealth of each county
    - Income per capita
    - Medium income of each household
    - Medium income of each family
  - Population: this will be used to calculate the damage per capita
    - Population & Household

Rank	County	Income_P	MediumIn	MediumIn	Population	Num_Household
1	Collin	42220	83889	84306	782341	181970
2	Borden	40916	58409	60536	641	264
3	King	39511	61563	80500	286	113
4	Loving	37362	80504	94785	134	31
5	Kendall	36418	66655	80801	33410	12617
6	Rockwall	33274	78032	83639	78337	26448
7	Denton	32538	70622	86891	662614	240289
8	Fort Bend	32016	79845	88454	585375	187384
9	Montgom	31959	65620	76096	455746	162530
10	Comal	31862	64752	75831	108472	41363
11	Irion	31857	48833	67604	1599	653
12	Travis	31785	54074	69646	1024266	404467
13	Edwards	31109	40163	44118	2002	839
14	Midland	30956	54945	64913	136872	50845
15	Hood	30687	54882	65844	51182	20795
16	Williamso	29663	68780	78040	422679	152606
17	Andrews	29605	48699	55905	14786	5259
18	Hemphill	29343	62159	76176	3807	1382
19	Roberts	29291	52500	61375	929	359

# Database (via Access)

- Query created
  - The relationship between each event and the county that event took place in.
  - Include the data of start time, end time, injuries, fatalities and economic damage of each event.
  - Include the data of income and population of the county where each event

County_Event										
TX_1	County	TX_FlashFlood2000-2019	TX_FlashFlood2000-2019	TX_FlashFl	TX_FlashFl	TX_FlashFl	TX_FlashFl	TX_FlashFlood20C	TX_FlashFl	
3	Garza	10/15/2006 3:00:00 AM	10/15/2006 7:00:00 AM	0	0	0	0	\$50,000.00	\$0	
35	Hale	10/15/2006 11:20:00 AM	10/15/2006 12:30:00 PM	0	0	0	0	\$40,000.00	\$0	
44	King	10/15/2006 8:05:00 PM	10/15/2006 11:45:00 PM	0	0	0	0	\$0.00	\$0	
46	Cottle	10/15/2006 6:35:00 PM	10/15/2006 11:45:00 PM	0	0	0	0	\$0.00	\$0	
247	Gaines	10/14/2006 9:20:00 PM	10/14/2006 11:59:00 PM	0	0	0	0	\$0.00	\$0	
822	Harris	10/16/2006 5:00:00 AM	10/16/2006 4:30:00 PM	0	0	2	0	\$12,000.00	\$0	
897	Brazoria	10/16/2006 12:01:00 AM	10/16/2006 6:30:00 PM	0	0	0	0	\$500,000.00	\$0	
898	Fort Bend	10/16/2006 4:05:00 AM	10/16/2006 6:40:00 AM	0	0	0	0	\$5,000.00	\$0	
899	Galveston	10/16/2006 4:30:00 AM	10/16/2006 6:30:00 PM	0	0	0	0	\$35,000.00	\$0	
900	Harris	10/16/2006 4:15:00 AM	10/16/2006 4:30:00 PM	0	0	0	0	\$750,000.00	\$0	
901	Galveston	10/16/2006 4:30:00 AM	10/16/2006 6:30:00 PM	0	0	0	0	\$250,000.00	\$0	
903	Liberty	10/16/2006 4:05:00 AM	10/16/2006 4:30:00 PM	0	0	0	0	\$2,000.00	\$0	
905	Montgomery	10/16/2006 7:00:00 AM	10/16/2006 3:00:00 PM	0	0	0	0	\$3,000.00	\$0	
912	San Jacinto	10/16/2006 7:00:00 AM	10/16/2006 3:15:00 PM	0	0	0	0	\$44,000.00	\$0	
913	Polk	10/16/2006 8:45:00 AM	10/16/2006 3:15:00 PM	0	0	0	0	\$50,000.00	\$0	
914	Waller	10/16/2006 7:00:00 AM	10/16/2006 3:00:00 PM	0	0	0	0	\$33,000.00	\$0	
993	Starr	10/13/2006 5:00:00 PM	10/13/2006 6:30:00 PM	0	0	0	0	\$0.00	\$0	
1083	Angelina	10/26/2006 10:55:00 PM	10/27/2006 4:45:00 AM	0	0	0	0	\$0.00	\$0	
1084	San Augustine	10/26/2006 11:25:00 PM	10/27/2006 4:45:00 AM	0	0	0	0	\$0.00	\$0	
1087	Sabine	10/16/2006 10:50:00 AM	10/16/2006 1:45:00 PM	0	0	0	0	\$0.00	\$0	
1088	San Augustine	10/16/2006 12:30:00 PM	10/16/2006 1:45:00 PM	0	0	0	0	\$0.00	\$0	
1457	Tarrant	10/10/2006 7:00:00 AM	10/10/2006 9:00:00 AM	0	0	0	0	\$5,000.00	\$0	
1458	Ellis	10/10/2006 8:00:00 AM	10/10/2006 9:40:00 AM	0	0	0	0	\$0.00	\$0	

# Obstacles

- Define the disaster level (hazard) of each event
  - Disaster level would be necessary to classify all these events for eliminating the influence of the differences in threat.
- Quantify the wealth of each county
  - The wealth could influence the damage
    - E.g. If a county is rich and there are more buildings in the same area, flash flood could lead to higher damage even if the vulnerability are similar.
    - This is a type of exposure, so its influence need to be eliminate in this project.
  - More data needed.
  - As an alternative, currently we are going to use income per household/capita to reflect the wealth of each county.



Thank you all for attention  
Any Question?