Allocating Resources Aftermath of 2017 Storm Events

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Background and Scope

Hurricane Harvey

In 2017, Hurricane Harvey became one of the costliest hurricanes on record, causing approximately $125 billion in damage. Most of the damage was caused from flooding with some areas receiving over 40 inches (102 cm) of rain.

Hurricanes are large weather events with a specific definition – a rotating low-pressure weather system with sustained winds of 74+ mph (119 km/h). Harvey became a hurricane August 24th, made landfall on the 25th, and was downgraded to a tropical storm on August 26th.

The impact of Harvey was felt over much more than just 3 days. In the 2017 storm events data set, Harvey related events are reported beginning August 17th and end September 3rd as the system moved north and east across the United States. Flooding, thunderstorms, hail, and tornadoes are just a few of the weather events related to Harvey.

The Data and the most affected states

The data file contains a list of storm events that occurred in the United States in 2017. The events have been categorized by type and the state in which they occurred. The two most affected states by the Harvey are:

- Texas
- Louisiana

```
StormEvents2017finalProject = importStormEvents2017("StormEvents_2017_finalProject.csv");
StormEvents2017finalProject = StormEvents2017finalProject...
    (StormEvents2017finalProject.End_Date_Time < '2017-09-03 23:59:01',:);
StormEvents2017finalProject = StormEvents2017finalProject...
    (StormEvents2017finalProject.Begin_Date_Time >= '2017-08-17 00:00:00',:);

% Most Affected States
mostAffectedStates = groupsummary(StormEvents2017finalProject,...
    "State", "sum", "Property_Cost");
StormEvents2017finalProject = StormEvents2017finalProject(ismember...
    (StormEvents2017finalProject.State,{'LOUISIANA','TEXAS'}),:);
State = StormEvents2017finalProject.State;
Event_Type = StormEvents2017finalProject.Event_Type;

% New table for stete with event
viz = table(State, Event_Type)
```

viz = 357×2 table

	State	Event_Type
1	TEXAS	Tropical Storm
2	TEXAS	Tropical Storm
3	TEXAS	Tropical Storm
4	TEXAS	Tropical Storm
5	TEXAS	Tropical Storm
6	TEXAS	Tropical Storm
7	TEXAS	Flash Flood
8	TEXAS	Thunderstorm Wind
9	TEXAS	Flash Flood
10	TEXAS	Flash Flood
11	TEXAS	Flash Flood
12	TEXAS	Flash Flood
13	TEXAS	Flash Flood
14	TEXAS	Thunderstorm Wind

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Visualizations

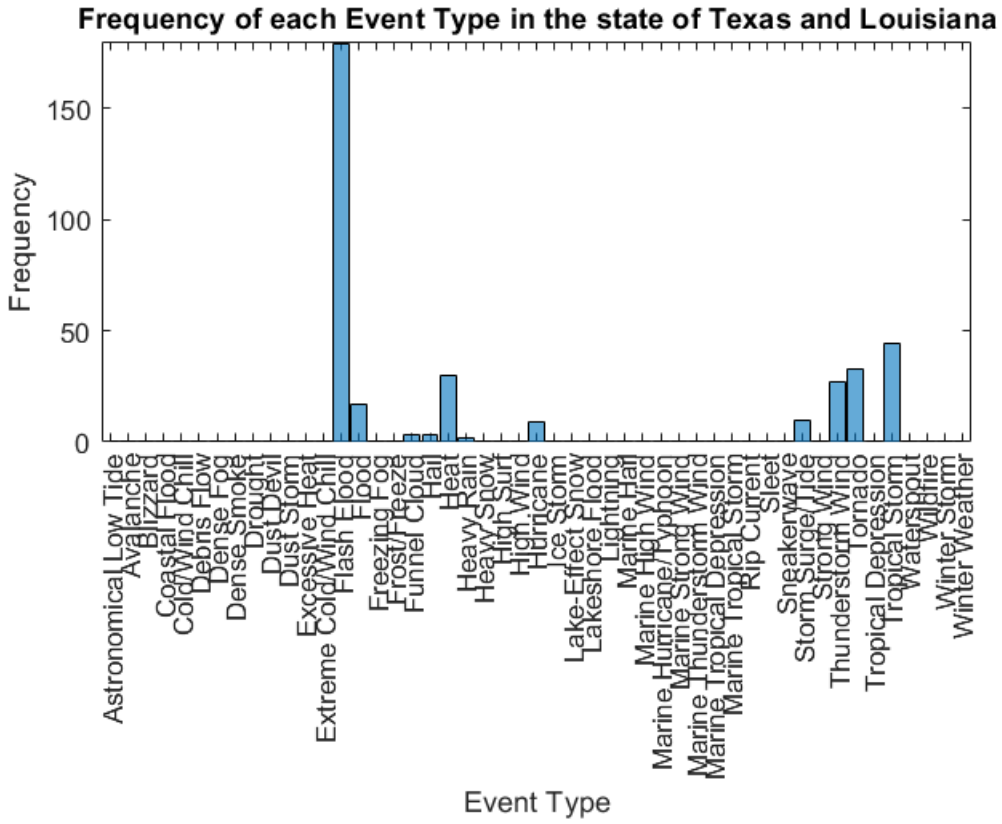
Event types and their occurance

The following events have the most occurance among all the events:

- Flash Flood
- Tropical Storm

- Tornado

```
histogram(viz.Event_Type)
title('Frequency of each Event Type in the state of Texas and Louisiana');
xlabel('Event Type');
ylabel('Frequency');
```

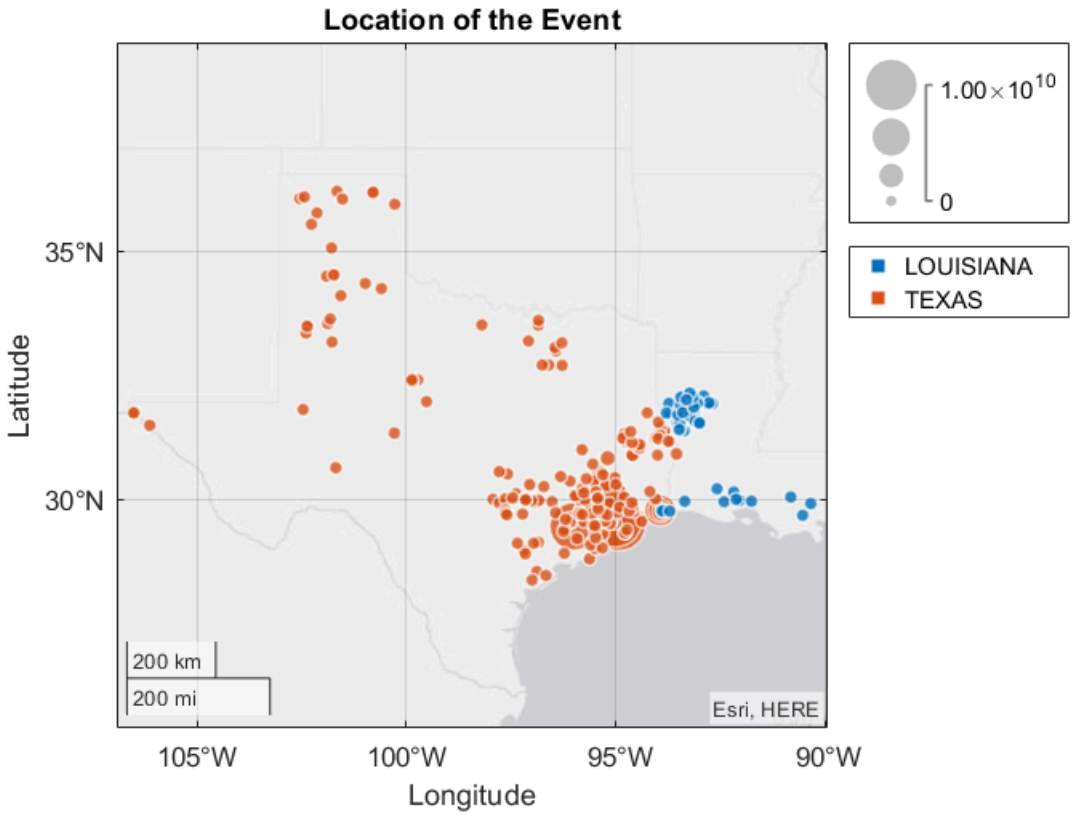


Place of the event occurance

```
viz.State = removecats(viz.State);
geobubble(StormEvents2017finalProject.Begin_Lat, StormEvents2017finalProject.Begin_Lon,...
    StormEvents2017finalProject.Property_Cost, viz.State)

legend show

title('Location of the Event')
```



Analysis

Three Counties with Most Events in Texas

The top three counties with most events in Texas state are:

1. Harris
2. Galveston
3. Fort Bend

```
onlyTexas = StormEvents2017finalProject(StormEvents2017finalProject.State == 'TEXAS',:);
threeCounties = groupsummary(onlyTexas, "CZ_Name");
threeCounties = sortrows(threeCounties,'GroupCount','descend');
threeCounties = threeCounties(1:3,:)
```

threeCounties = 3×2 table

	CZ_Name	GroupCount
1	HARRIS	21
2	GALVESTON	17
3	FORT BEND	13

Three Counties with Most Events in Louisiana

The top three counties with most events in Louisiana state are:

1. Natchitoches
2. Sabine
3. Red River

```
onlyLouisiana = StormEvents2017finalProject...
    (StormEvents2017finalProject.State == 'LOUISIANA',:);
threeCountiesL = groupsummary(onlyLouisiana, "CZ_Name");
threeCountiesL = sortrows(threeCountiesL,'GroupCount','descend');
threeCountiesL = threeCountiesL(1:3,:)
```

threeCountiesL = 3×2 table

	CZ_Name	GroupCount
1	NATCHITOC...	21
2	SABINE	15
3	RED RIVER	9

Three Counties with Highest Property Cost in Texas

Three counties with the highest reported property cost in Texas are:

1. Galveston: $20B
2. Harris: $16B
3. Fort Bend: $14B

```
threeCountiesTexProp = groupsummary(onlyTexas,...
    "CZ_Name", "sum", "Property_Cost");
threeCountiesTexProp = threeCountiesTexProp...
    (~ismissing(threeCountiesTexProp.sum_Property_Cost),:);
threeCountiesTexProp = sortrows(threeCountiesTexProp,...
    'sum_Property_Cost','descend');
threeCountiesTexProp = threeCountiesTexProp(1:3,:)
```

threeCountiesTexProp = 3×3 table

	CZ_Name	GroupCount	sum_Property_Cost
1	GALVESTON	17	2.0000e+10
2	FORT BEND	13	1.6004e+10
3	MONTGOMERY	6	1.4000e+10

Three Counties with Highest Property Cost in State 2

Three counties with the highest reported property cost in Louisiana are:

1. Calcasieu: $60M
2. Beauregard: $15M
3. Acadia: $200k

```
threeCountiesLouProp = groupsummary(onlyLouisiana,...
    "CZ_Name", "sum", "Property_Cost");
threeCountiesLouProp = sortrows(threeCountiesLouProp,...
    'sum_Property_Cost','descend');
threeCountiesLouProp = threeCountiesLouProp(1:3,:)
```

threeCountiesLouProp = 3×3 table

	CZ_Name	GroupCount	sum_Property_Cost
1	CALCASIEU	1	60000000
2	BEAUREGARD	1	15000000
3	ACADIA	1	200000

Conclusions and Recommendations

As per the 2017 Storm events data, Flash Flood, Tropical Storm and Tornado occured with high number of frequency in the state of Texas and the state of Louisiana. But, the state of Texas has the more number of affacted counties than of the state of Louisiana. Counties namely, Harris, Galveston and Fort Bend are the three highly affected as well as most frequently striked by the events in the state of Texas. The total property cost in these counties alone is estimated as arround $50B.

Whereas, the counties namely, Natchitoches, Sabine and Red River are the most frequently attacked by the events in the state of Louisiana. But, counties namely, Calcasieu, Beauregard and Acadia are the highly affected counties in the state of Louisiana. the total property cost in these counties are estimated as arround $75.2M.

When comparing both the states we can conclude that, Harris, Galveston and Fort Bend counties in the state of Texas are most frequently striked and has high number of total property cost of arround $50B.