Allocating Resources After a Major Weather Event

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Background and Scope

Import the Data

You may use an import function. If not using an import function, include the code used to import the data (it may be generated from the Import Tool)

```
Events = importData("StormEvents_2017_finalProject.csv");
```

Two States Most Impacted by Harvey

Clearly state the two states in order

```
data2 = Events;

AugSepData = data2(ismember(data2.Month,{'August','September'}),:);
AugSepData.Property_Cost(ismissing(AugSepData.Property_Cost)) = 0;

HarveyData = AugSepData(AugSepData.Begin_Date_Time >= '2017-08-17 00:00:00'...
    & AugSepData.End_Date_Time <= '2017-09-03 23:59:00',:);

statePropertyCost = groupsummary(HarveyData,"State","sum","Property_Cost");
statePropertyCost = sortrows(statePropertyCost,'sum_Property_Cost','descend')
```

statePropertyCost = 57×3 table

	State	GroupCount	sum_Property_Cost
1	TEXAS	272	7.7427e+10

	State	GroupCount	sum_Property_Cost
2	LOUISIANA	85	75277000
3	NORTH CA...	59	12338500
4	WASHINGTON	2	4000000
5	FLORIDA	68	2237000
6	MINNESOTA	24	1375000
7	NEBRASKA	62	1054000
8	MISSISSI...	39	915000
9	NEW YORK	109	641000
10	TENNESSEE	46	504000
11	PENNSYLV...	203	491630
12	KENTUCKY	20	435000
13	CALIFORNIA	74	329000
14	IOWA	54	321000
15	INDIANA	6	300000
16	NORTH DA...	17	141000
17	OHIO	48	112500
18	IDAHO	11	111000
19	MASSACHU...	17	92700
20	VERMONT	9	67000
21	ARKANSAS	52	61000
22	SOUTH CA...	42	54000
23	MISSOURI	78	49000
24	MICHIGAN	5	45000
25	GEORGIA	34	36000
26	ARIZONA	12	26000
27	VIRGINIA	64	23000
28	WEST VIR...	9	20100
29	SOUTH DA...	89	12000
30	HAWAII	28	10000
31	LAKE SUP...	1	10000
32	ALABAMA	16	5000
33	NEVADA	11	5000
34	OKLAHOMA	34	2000
35	NEW MEXICO	15	800

	State	GroupCount	sum_Property_Cost
36	AMERICAN...	1	0
37	ATLANTIC...	62	0
38	ATLANTIC...	32	0
39	COLORADO	7	0
40	DELAWARE	4	0
41	DISTRICT...	4	0
42	E PACIFIC	1	0
43	GULF OF ...	64	0
44	ILLINOIS	30	0
45	KANSAS	64	0
46	LAKE ERIE	5	0
47	LAKE MIC...	5	0
48	LAKE ONT...	1	0
49	MAINE	3	0
50	MARYLAND	64	0
51	MONTANA	6	0
52	NEW HAMP...	21	0
53	NEW JERSEY	27	0
54	OREGON	3	0
55	PUERTO R...	33	0
56	UTAH	2	0
57	WISCONSIN	6	0

```
% TEXAS , LOUISIANA (Top 2)

TopTwoStates = HarveyData(ismember(HarveyData.State,{'LOUISIANA','TEXAS'}),:);
```

Top two states impaced by Hurricane Harvey are:

- Texas
- Louisiana

Table of Events for Two Most Impacted States

Create and display a few rows of events that include only the two most affected states

```
EventsTopTwoStates = table(TopTwoStates.State, TopTwoStates.Event_Type);

% renaming variables
EventsTopTwoStates.Properties.VariableNames{'Var1'} = 'state';
EventsTopTwoStates.Properties.VariableNames{'Var2'} = 'event_Type';
EventsTopTwoStates
```

EventsTopTwoStates = 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
15	TEXAS	Thunderstorm Wind
16	TEXAS	Thunderstorm Wind
17	TEXAS	Flood
18	TEXAS	Flash Flood
19	TEXAS	Thunderstorm Wind
20	TEXAS	Flash Flood
21	TEXAS	Flash Flood
22	LOUISIANA	Heat
23	LOUISIANA	Heat
24	LOUISIANA	Heat
25	LOUISIANA	Heat
26	TEXAS	Thunderstorm Wind
27	LOUISIANA	Tropical Storm
28	TEXAS	Flash Flood

	state	event_Type
29	TEXAS	Flash Flood
30	TEXAS	Flash Flood
31	TEXAS	Flash Flood
32	TEXAS	Flash Flood
33	TEXAS	Flash Flood
34	LOUISIANA	Heat
35	LOUISIANA	Heat
36	LOUISIANA	Heat
37	LOUISIANA	Heat
38	LOUISIANA	Heat
39	TEXAS	Thunderstorm Wind
40	LOUISIANA	Tropical Storm
41	LOUISIANA	Tropical Storm
42	TEXAS	Flash Flood
43	TEXAS	Flash Flood
44	TEXAS	Thunderstorm Wind
45	TEXAS	Thunderstorm Wind
46	TEXAS	Flash Flood
47	LOUISIANA	Heat
48	LOUISIANA	Heat
49	LOUISIANA	Heat
50	LOUISIANA	Heat
51	LOUISIANA	Heat
52	TEXAS	Tropical Storm
53	TEXAS	Flash Flood
54	TEXAS	Thunderstorm Wind
55	TEXAS	Heavy Rain
56	TEXAS	Flash Flood
57	TEXAS	Flash Flood
58	TEXAS	Flash Flood
59	TEXAS	Flash Flood
60	TEXAS	Flash Flood
61	TEXAS	Flash Flood
62	TEXAS	Flash Flood

	state	event_Type
63	TEXAS	Flash Flood
64	TEXAS	Flash Flood
65	TEXAS	Flash Flood
66	TEXAS	Flash Flood
67	TEXAS	Flash Flood
68	TEXAS	Flash Flood
69	TEXAS	Hail
70	TEXAS	Flash Flood
71	TEXAS	Flash Flood
72	LOUISIANA	Heat
73	LOUISIANA	Heat
74	LOUISIANA	Heat
75	TEXAS	Heat
76	TEXAS	Flash Flood
77	TEXAS	Flash Flood
78	TEXAS	Flash Flood
79	LOUISIANA	Flash Flood
80	LOUISIANA	Flash Flood
81	LOUISIANA	Flash Flood
82	LOUISIANA	Flash Flood
83	LOUISIANA	Flash Flood
84	LOUISIANA	Flash Flood
85	LOUISIANA	Flash Flood
86	LOUISIANA	Flash Flood
87	LOUISIANA	Flash Flood
88	TEXAS	Hail
89	TEXAS	Thunderstorm Wind
90	TEXAS	Thunderstorm Wind
91	TEXAS	Flash Flood
92	TEXAS	Heat
93	TEXAS	Heat
94	TEXAS	Heat
95	TEXAS	Heat
96	LOUISIANA	Flash Flood

	state	event_Type
97	LOUISIANA	Flash Flood
98	LOUISIANA	Flash Flood
99	LOUISIANA	Flash Flood
100	LOUISIANA	Flash Flood

⋮

Visualizations

Figure of Event Types

Create a figure showing the type and number of occurances for events related to Harvey in the two states.

```
groupcounts(EventsTopTwoStates,"event_Type");

% This removes all categories with 0 occurrences from the state variable and event_type variabl
EventsTopTwoStates.state = removecats(EventsTopTwoStates.state);
EventsTopTwoStates.event_Type = removecats(EventsTopTwoStates.event_Type);

heatmap(EventsTopTwoStates,"state","event_Type")
```

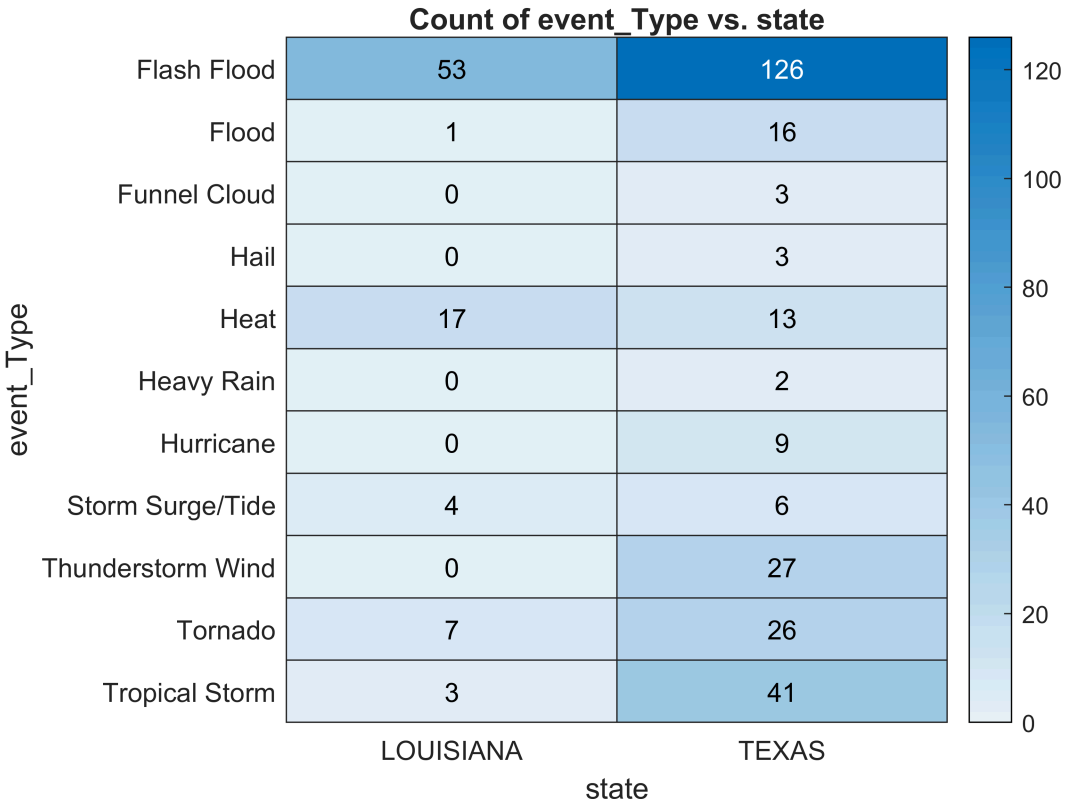


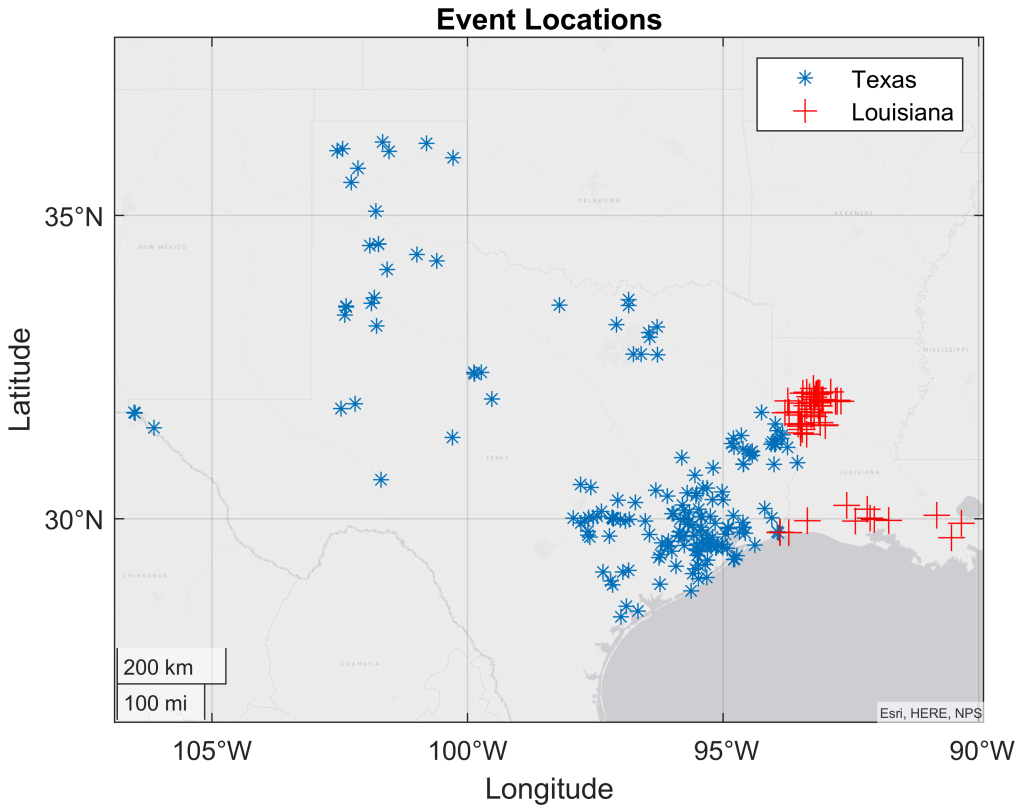
Figure of Event Locations

Show the location of events in the two states. Be sure to use different markers for the two states

```
eventTexas = TopTwoStates(TopTwoStates.State=="TEXAS" , :);
eventLouisiana = TopTwoStates(TopTwoStates.State=="LOUISIANA", :);

geoplot(eventTexas.Begin_Lat,eventTexas.Begin_Lon,'*');
hold on
geoplot(eventLouisiana.Begin_Lat,eventLouisiana.Begin_Lon,...
    "Color","red","LineStyle","none","Marker","+","MarkerSize",10);
hold off
legend('Texas','Louisiana');

geolimits([26.5 37.8],[-106.9 -89.9]);
title('Event Locations');
```



Analysis

Three Counties with Most Events in State 1

Either type out, show in a table, or show in a clear visualization the three counties with the most events in state 1.

```
%mode(HarveyData.CZ_Name);
```

```
%heatmap(TopTwoStates, "CZ_Name","Event_Type")
TopTwoStates;

Texas = TopTwoStates(TopTwoStates.State == 'TEXAS',:);
%summary(Texas);

Texas.State = removecats(Texas.State);
Texas.CZ_Name = removecats(Texas.CZ_Name);

mode(Texas.CZ_Name);
county = groupsummary(Texas,"CZ_Name");

county = sortrows(county,'GroupCount','descend')
```

county = 95×2 table

	CZ_Name	GroupCount
1	HARRIS	21
2	GALVESTON	17
3	FORT BEND	13
4	ANGELINA	12
5	BRAZORIA	12
6	SABINE	12
7	BASTROP	9
8	CHAMBERS	8
9	CALDWELL	7
10	MONTGOMERY	6
11	MATAGORDA	5
12	WHARTON	5
13	CALHOUN	4
14	FAYETTE	4
15	JEFFERSON	4
16	LIBERTY	4
17	WALKER	4
18	WALLER	4
19	AUSTIN	3
20	EL PASO	3
21	GRIMES	3
22	HOCKLEY	3
23	JACKSON	3
24	REFUGIO	3

	CZ_Name	GroupCount
25	SAN AUGUS...	3
26	SAN JACINTO	3
27	SHELBY	3
28	SWISHER	3
29	TAYLOR	3
30	VICTORIA	3
31	ARANSAS	2
32	BRAZOS	2
33	COLLIN	2
34	DALLAS	2
35	DE WITT	2
36	GONZALES	2
37	GRAYSON	2
38	HAYS	2
39	JASPER	2
40	LEE	2
41	LUBBOCK	2
42	MADISON	2
43	NACOGDOCHES	2
44	NUECES	2
45	OCHILTREE	2
46	ORANGE	2
47	POLK	2
48	SAN PATRI...	2
49	WASHINGTON	2
50	WILLIAMSON	2
51	BEE	1
52	BEXAR	1
53	BOWIE	1
54	BRISCOE	1
55	BURLESON	1
56	CASS	1
57	CLAY	1
58	COLEMAN	1

	CZ_Name	GroupCount
59	COLORADO	1
60	COMAL	1
61	CROCKETT	1
62	DALLAM	1
63	DENTON	1
64	ECTOR	1
65	GOLIAD	1
66	GREGG	1
67	GUADALUPE	1
68	HALE	1
69	HARDIN	1
70	HARRISON	1
71	HARTLEY	1
72	HEMPHILL	1
73	HUNT	1
74	HUTCHINSON	1
75	JIM WELLS	1
76	KARNES	1
77	KAUFMAN	1
78	KENEDY	1
79	KLEBERG	1
80	LAVACA	1
81	LIVE OAK	1
82	LYNN	1
83	MARION	1
84	MIDLAND	1
85	MOORE	1
86	MOTLEY	1
87	NEWTON	1
88	OLDHAM	1
89	PANOLA	1
90	RANDALL	1
91	RUSK	1
92	SHERMAN	1

	CZ_Name	GroupCount
93	TOM GREEN	1
94	TYLER	1
95	WILSON	1

```
% Top 3 counties - HARRIS, GALVESTON and FORT BEND
```

Top 3 counties are:

- HARRIS
- GALVESTON
- FORT BEND

Three Counties with Most Events in State 2

Either type out, show in a table, or show in a clear visualization the three counties with the most events in state 2.

```
Louisiana = TopTwoStates(TopTwoStates.State == 'LOUISIANA',:);
%summary(Louisiana);

Louisiana.State = removecats(Louisiana.State);
Louisina.CZ_Name = removecats(Louisiana.CZ_Name);

county2 = groupsummary(Louisiana,"CZ_Name");

county2 = sortrows(county2,'GroupCount','descend')
```

county2 = 30×2 table

	CZ_Name	GroupCount
1	NATCHITOC...	21
2	SABINE	15
3	RED RIVER	9
4	WINN	6
5	VERMILION	4
6	CAMERON	3
7	DE SOTO	3
8	UNION	2
9	ACADIA	1
10	BEAUREGARD	1
11	BIENVILLE	1
12	BOSSIER	1

	CZ_Name	GroupCount
13	CADDO	1
14	CALCASIEU	1
15	CALDWELL	1
16	CLAIBORNE	1
17	EAST CAME...	1
18	GRANT	1
19	IBERIA	1
20	JACKSON	1
21	LA SALLE	1
22	LAFAYETTE	1
23	LAFOURCHE	1
24	LINCOLN	1
25	OUACHITA	1
26	ST. CHARLES	1
27	ST. JAMES	1
28	ST. MARY	1
29	WEBSTER	1
30	WEST CAME...	1

```
% Top 3 counties - NATCHITOCHES, SABINE and RED RIVER
```

Top 3 counties are:

- NATCHITOCHES
- SABINE
- RED RIVER

Three Counties with Highest Property Cost in State 1

Either type out, show in a table, or show in a clear visualization the three counties with the highest property damage in state 1. *Be sure to include the dollar amount*.

```
TexasPropertyCost = groupsummary(Texas,"CZ_Name","sum","Property_Cost");
TexasPropertyCost = sortrows(TexasPropertyCost,'sum_Property_Cost','descend')
```

TexasPropertyCost = 95×3 table

	CZ_Name	GroupCount	sum_Property_Cost
1	GALVESTON	17	2.0000e+10
2	FORT BEND	13	1.6004e+10

	CZ_Name	GroupCount	sum_Property_Cost
3	MONTGOMERY	6	1.4000e+10
4	HARRIS	21	1.0001e+10
5	JEFFERSON	4	3.0000e+09
6	BRAZORIA	12	2.0008e+09
7	ARANSAS	2	1.9500e+09
8	ORANGE	2	1.5000e+09
9	NUECES	2	1.3000e+09
10	WALKER	4	1.2000e+09
11	LIBERTY	4	1.0000e+09
12	SAN JACINTO	3	700000000
13	HARDIN	1	600000000
14	POLK	2	600000000
15	SAN PATRI...	2	502000000
16	MATAGORDA	5	500500000
17	JACKSON	3	500200000
18	REFUGIO	3	500020000
19	WALLER	4	350700000
20	CALHOUN	4	281010000
21	WHARTON	5	200350000
22	VICTORIA	3	160000000
23	WASHINGTON	2	150000000
24	JASPER	2	85005000
25	MADISON	2	80000000
26	TYLER	1	60000000
27	FAYETTE	4	50000000
28	GRIMES	3	50000000
29	NEWTON	1	45000000
30	BURLESON	1	20000000
31	BRAZOS	2	15000000
32	CALDWELL	7	12850000
33	DE WITT	2	3100000
34	BASTROP	9	1500000
35	CHAMBERS	8	1000000
36	COMAL	1	1000000

	CZ_Name	GroupCount	sum_Property_Cost
37	GOLIAD	1	1000000
38	LEE	2	350000
39	AUSTIN	3	100000
40	BEXAR	1	100000
41	GONZALES	2	100000
42	HAYS	2	100000
43	LAVACA	1	100000
44	GUADALUPE	1	50000
45	HOCKLEY	3	42000
46	BEE	1	10000
47	BRISCOE	1	10000
48	KLEBERG	1	10000
49	LIVE OAK	1	10000
50	ECTOR	1	8000
51	JIM WELLS	1	1000
52	LUBBOCK	2	500
53	ANGELINA	12	0
54	BOWIE	1	0
55	CASS	1	0
56	CLAY	1	0
57	COLEMAN	1	0
58	COLLIN	2	0
59	COLORADO	1	0
60	CROCKETT	1	0
61	DALLAM	1	0
62	DALLAS	2	0
63	DENTON	1	0
64	EL PASO	3	0
65	GRAYSON	2	0
66	GREGG	1	0
67	HALE	1	0
68	HARRISON	1	0
69	HARTLEY	1	0
70	HEMPHILL	1	0

	CZ_Name	GroupCount	sum_Property_Cost
71	HUNT	1	0
72	HUTCHINSON	1	0
73	KARNES	1	0
74	KAUFMAN	1	0
75	KENEDY	1	0
76	LYNN	1	0
77	MARION	1	0
78	MIDLAND	1	0
79	MOORE	1	0
80	MOTLEY	1	0
81	NACOGDOCHES	2	0
82	OCHILTREE	2	0
83	OLDHAM	1	0
84	PANOLA	1	0
85	RANDALL	1	0
86	RUSK	1	0
87	SABINE	12	0
88	SAN AUGUS...	3	0
89	SHELBY	3	0
90	SHERMAN	1	0
91	SWISHER	3	0
92	TAYLOR	3	0
93	TOM GREEN	1	0
94	WILLIAMSON	2	0
95	WILSON	1	0

```
% Highest Property Cost - GALVESTON, FORT BEND and MONTGOMERY
```

Highest Property Cost:

- GALVESTON
- FORT BEND
- MONTGOMERY

Three Counties with Highest Property Cost in State 2

Either type out, show in a table, or show in a clear visualization the three counties with the highest property damage in state 2. *Be sure to include the dollar amount*.

```
LousPropertyCost = groupsummary(Louisiana,"CZ_Name","sum","Property_Cost");
LousPropertyCost = sortrows(LousPropertyCost,'sum_Property_Cost','descend')
```

LousPropertyCost = 30×3 table

	CZ_Name	GroupCount	sum_Property_Cost
1	CALCASIEU	1	60000000
2	BEAUREGARD	1	15000000
3	ACADIA	1	200000
4	CAMERON	3	72000
5	VERMILION	4	5000
6	BIENVILLE	1	0
7	BOSSIER	1	0
8	CADDO	1	0
9	CALDWELL	1	0
10	CLAIBORNE	1	0
11	DE SOTO	3	0
12	EAST CAME...	1	0
13	GRANT	1	0
14	IBERIA	1	0
15	JACKSON	1	0
16	LA SALLE	1	0
17	LAFAYETTE	1	0
18	LAFOURCHE	1	0
19	LINCOLN	1	0
20	NATCHITOC...	21	0
21	OUACHITA	1	0
22	RED RIVER	9	0
23	SABINE	15	0
24	ST. CHARLES	1	0
25	ST. JAMES	1	0
26	ST. MARY	1	0
27	UNION	2	0
28	WEBSTER	1	0
29	WEST CAME...	1	0

	CZ_Name	GroupCount	sum_Property_Cost
30	WINN	6	0

```
% Highest Property Cost - CALCASIEU, BEAURGARD and ACADIA
```

Highest Property Cost:

- CALCASIEU
- BEAURGARD
- ACADIA

Conclusions and Recommendations

According to the analysis done in 'Two States Most Impacted by Harvey' it is found that **Texas** and **Louisiana** are the most impcated states by Hurricane Harvey.

In Texas, the insurance company should send their people to *GALVESTON, FORT BEND and MONTGOMERY* where highest property cost occured. They should also consider counties *HARRIS, GALVESTON and FORT BEND* where most most events happend by Harvey.

On the other hand, **in Louisiana**, counties *CALCASIEU, BEAURGARD and ACADIA* faced highest property cost. So the insurance company should pay their attention there. They should also consider *NATCHITOCHES, SABINE and RED RIVER* where most events happened by the hurricane.