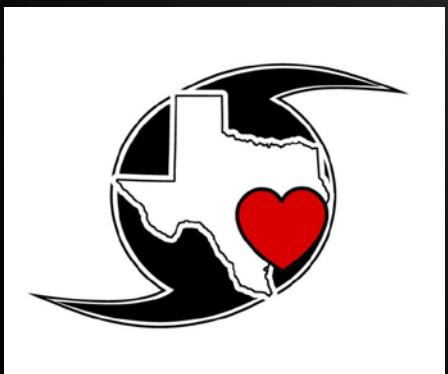




HURRICANE HARVEY

AFTER ACTION REVIEW AND AREAS OF IMPROVEMENT REPORT



OBJECTIVES

- HURRICANE HARVEY RECAP
 - PRE – STORM
 - DURING THE STORM
 - POST – STORM
- AFTER ACTION REVIEW
- AREAS OF IMPROVEMENTS
- MOVING FORWARD

HURRICANE HARVEY RECAP



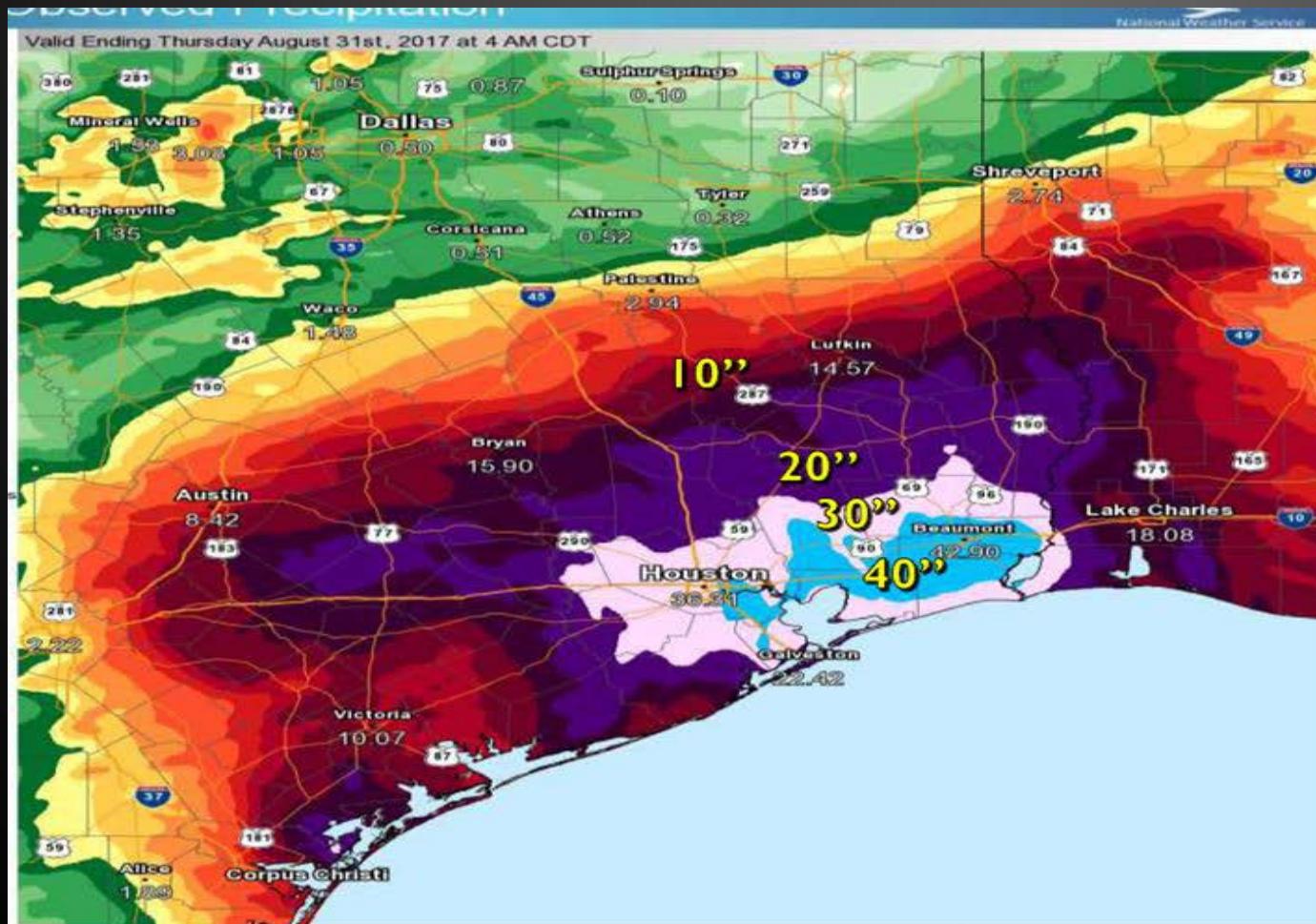
HURRICANE HARVEY RECAP

- PRE-STORM
 - AUGUST 23RD – CONCENTRATED EFFORTS IN CITY PREPARATION / RECALL NOTIFICATION
 - AUGUST 24TH – EOC LEVEL ACTIVATION TO LEVEL III
 - AUGUST 25TH – 6PM – EOC LEVEL ACTIVATION TO LEVEL 1
- DEPARTMENT CHECKLISTS COMPLETED
- PLAN OF ACTION WAS BEING FORMULATED
- EVERYTHING HAPPENED QUICKLY BUT CAME TOGETHER LIKE IT HAD BEEN PLANNED OUT

HURRICANE HARVEY RECAP

- DURING THE STORM
 - 2 – 12 HOUR SHIFTS
 - TASKS FORCES FORMED (PW, FIRE, POLICE)
 - PLAN WAS BEING FORMULATED FOR EACH OPERATIONAL PERIOD
- INCIDENT ON HAND WAS QUICKLY BEYOND OUR MEANS
- CREWS NEVER GAVE UP AND PROVIDED THE BEST
- EOC STAFF STAYED STRONG
- DISPATCH CENTER ACCOMPLISHED A LOT

HURRICANE HARVEY RECAP



Top 10 Point Rainfall Amounts in Inches

Harvey produced record breaking rainfall totals of **40 to over 50 inches**

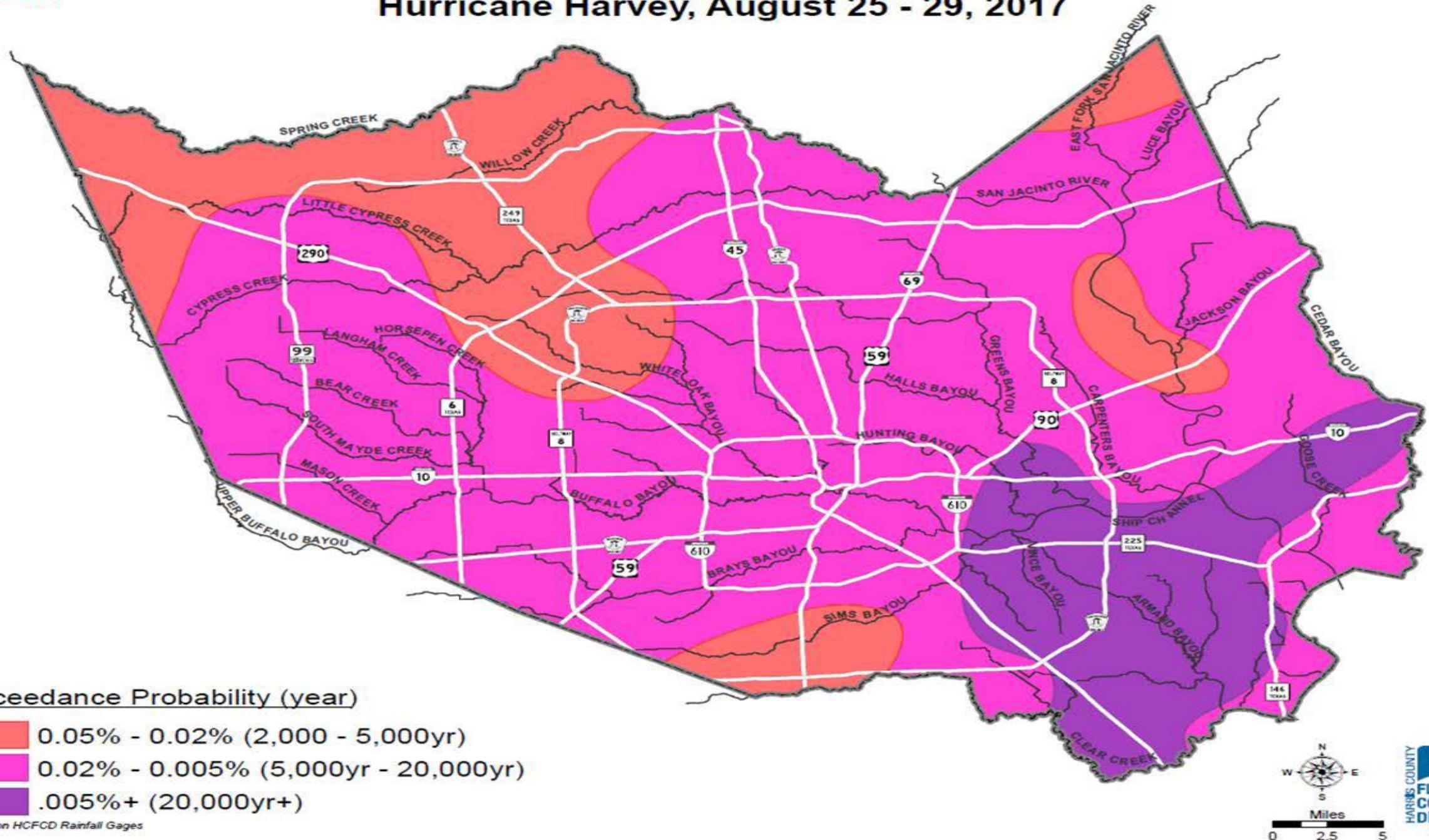
SITE	RAINFALL
Cedar Bayou	51.88
Mary's Creek	50.04
Clear Creek	48.20
Beaumont	47.52
Santa Fe	46.70
Berry Bayou	44.88
Galveston	43.91
Goose Creek	43.87
League City	43.32
Cheek Canal	43.11

 An inset map of the Gulf of Mexico showing the location of the rainfall data.

DRAFT

Four Day Peak Rainfall Frequency

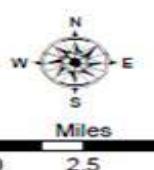
Hurricane Harvey, August 25 - 29, 2017



Exceedance Probability (year)

- 0.05% - 0.02% (2,000 - 5,000yr)
- 0.02% - 0.005% (5,000yr - 20,000yr)
- .005%+ (20,000yr+)

Based on HCECD Rainfall Gages



HARRIS COUNTY
**FLOOD
CONTROL
DISTRICT**
8/18/2017

Time	1-hr	2-hr	3-hr	6-hr	12-hr	24-hr	2-day	4-day
Peak Rainfall (inches)	6.8"	11.9"	14.8"	18.9"	20.9"	25.6"	35.2"	47.4"
Return Interval	1,500					5,000	12,000	50,000

Hurricane Harvey – Storm and Flood Information (10/10/2017)

RAINFALL COMPARISONS

RAINFALL COMPARISONS

Duration	Harvey (2017)	Allison (2001)	Tax Day (2016)	October (1994)
1-hr	6.8"	5.7"	4.7"	3.7"
2-hr	11.9"	9.9"	7.3"	4.7"
3-hr	14.8"	13.5"	8.3"	5.3"
6-hr	18.9"	21.2"	13.9"	7.2"
12-hr	20.9"	28.3"	16.7"	12.0"
1-day	25.6"	28.4"	17.4"	20.9"
2-day	35.2"	28.5"	17.5"	23.1"
4-day	47.4"	38.5"	N/A	28.9"

HURRICANE HARVEY RECAP

- POST-STORM
 - CONTINUED EFFORT TO GETTING THINGS BACK TO AN ACCEPTABLE OPERATIONAL LEVEL
 - EOC WAS DISCONTINUED AND RETURNED TO A LEVEL 4 ON SEPTEMBER 2ND
 - MANY CONTINUOUS DAYS OF WORK
 - 71 OPERATIONAL PERIODS (12 TO 24 HR. OPERATION PERIODS)
 - JOBS OUTSIDE OUR EVERYDAY SCOPE
 - PUBLIC WORKS CONTINUED WITH DEBRIS MANAGEMENT UNTIL NOVEMBER 3RD (ESTIMATED)
 - FINANCE CONTINUES THEIR WORK FOR THE TIME BEING

AFTER ACTION REVIEW

- CITY STAFF
- CITY DEPARTMENTS
- CITY OPERATIONS

AFTER ACTION REVIEW

- CITY DEPARTMENTS
 - EACH DEPARTMENT WAS PREPARED PRE STORM FOLLOWING THEIR RESPECTIVE CHECKLIST

AFTER ACTION REVIEW

- CITY STAFF
 - CAMARADERIE FOR ALL EMPLOYEES - PRE/DURING/POST
 - CITY STEPPED UP, CAME TOGETHER, AND ACCOMPLISHED THE UNTHINKABLE
 - STAFF CAME TOGETHER AND COMPLETED DAILY SCOPE
 - NO LOSS OF LIFE OR INJURIES REPORTED

AFTER ACTION REVIEW

- EOC OPERATIONS
 - ACTIVATED FOR 8 DAYS OF FULL ACTIVATION (AUGUST 25TH – SEPTEMBER 2ND)
 - CAME TOGETHER AND AT TIMES WAS OVERWHELMING
 - FUNCTIONALITY WAS AMAZING BUT HAD ITS FLAWS AS WELL
 - MAINTAINED A SENSE OF CALMNESS WITH A FORWARD LOOKING PERSPECTIVE
 - LOGISTICS STOOD OUT
 - DISPATCH CENTER WAS AMAZING

AREAS OF IMPROVEMENT

- CITY DEPARTMENTS
 - STAFFING HANDLED DIFFERENTLY REGARDING RECALL DURING INCIDENTS
 - REEVALUATE PREPAREDNESS PLAN FOR STAFF
 - SUGGESTED NOT ONLY FOCUS ON DEPARTMENT PREPARATION BUT CITY WIDE AS WELL

AREAS OF IMPROVEMENT

- CITY STAFF
 - TRAINING
 - SPECIFIC TRAINING OUTSIDE OF NIMS
 - FLOOD SPECIFIC
 - SAFETY / SITUATIONAL AWARENESS
 - SPECIALIZED EQUIPMENT
 - ADDRESS NUMBER VISIBILITY
 - CUSTOMER SERVICE
 - ON-SITE RESOURCES AVAILABLE FOR EMPLOYEES TO DECOMPRESS, REDUCE EMOTION STRESS, ETC.

AREAS OF IMPROVEMENT

- EOC OPERATIONS
 - TRAINING
 - MORE SPECIFIC POSITION TRAINING
 - SPECIFIC DOCUMENTATION TRAINING
 - VERY HELPFUL FOR OPERATIONS BUT ALSO FINANCE
 - CONSISTENCY IN OUR OPERATIONS
 - FUNCTIONALITY OF NIMS
- RESOURCES
 - VEHICLES, EQUIPMENT, VOLUNTEERS, CERT TEAMS, ETC
- OPERATIONAL PERIOD CHANGE OUTS

AREAS OF IMPROVEMENT

- EOC OPERATIONS
 - FINANCE
 - DOCUMENTATION IS THE KEY
 - NIMS FORMS
 - WORK FORCE DOCUMENTATION
 - EQUIPMENT USED
 - PAYCOM
 - COMMUNICATE NECESSARY INFORMATION TO STAFF TO START OFF ON THE SAME PAGE

MOVING FORWARD

- WHAT IS THE NEXT STEP
 - TRAIN, TRAIN, TRAIN
 - GATHER A COLLECTION OF CLASSES FOR CITY STAFF
 - PRACTICE
 - TABLE TOPS
 - CITY EVENTS
 - COMMUNICATION
 - BETWEEN STAFF MEMBERS ALONG WITH INFORMATION BEING RELAYED TO DEPARTMENTS FOLLOWING OUR MEETINGS
 - OPERATIONAL BRIEFINGS SHOULD BE DONE AS A WHOLE

MOVING FORWARD

- WHAT IS THE NEXT STEP (CONT.)
 - EDUCATION FOR OUR CITIZENS
 - NATURAL DISASTER PREPARATION (BENEFIT BOTH CITIZENS/EMPLOYEES)
 - EOC OPERATIONS FAMILIARIZATION
 - SOCIAL MEDIA HUBS FOR NOTIFICATION
 - RESOURCES
 - BRAINSTORM
 - WANTS VS NEEDS
 - OBTAIN AGREEMENTS EARLY AS WELL

CONCLUSION

- HURRICANE HARVEY WAS A BIG SUCCESS
 - TAKE A LOT OF POSITIVES FROM THE INCIDENT
 - LEARN A LOT AS WELL
 - TOGETHER WE WILL CONTINUE TO GROW
 - NOT ONLY TRAIN FOR TODAY BUT TRAIN FOR TOMORROW AS WELL
 - SHARE OUR KNOWLEDGE TO OTHERS MAKES US VERSATILE
- GREAT JOB ALL!!! NOW LETS GET READY FOR THE NEXT ONE

