COMMONWEALTH OF KENTUCKY / LOUISVILLE METRO

CATASTROPHIC URBAN FLOOD PLAN

JP Carsone
Flood Protection Supervisor
Louisville MSD
MANY AGENCIES
ONE SOLUTION
LOUISVILLE METRO FLOOD PROTECTION SYSTEM

• Approximately 29 miles long – 4.6 Miles concrete floodwall
• 16 pumping station – 11,520,000,000 GPD Capacity
• 79 Closures
• 150 flood gates
• 163 process gates
• Directly protects 230,000 lives, 87,000 structures with a value of 24 billion dollars
• Louisville Reach was constructed in the 1940s and 1950s. Southwestern Jefferson County Reach was constructed in the 1980s
LOUISVILLE METRO FLOODING - 1937
TOP TEN FLOODS IN LOUISVILLE METRO

1. 1937  52.15’
2. 1945  42.10’
3. 1884  41.70’
4. 1964  41.20’
5. 1883  39.50’
6. 1913  39.40’
7. 1997  38.76’
8. 1907  36.40’
9. 1948  36.00’
10. 2018  35.64’

• All upper gauge readings
2013 - Funding through a $75K grant from the Silver Jackets was secured for an enhancement to the MSD Flood Protection’s Emergency Preparedness Plan (EPP).

This enhancement included modeling of failures in the flood protection system during a flood event.

An I-Wall failure and a breech in levee were the chosen failures.

USACE performed modeling of the surface flooding. MSD GIS personnel projected where our pipes would convey the flood water.

The need for a closer working relationship between USACE, MSD and Louisville Metro EMA was identified.
LEVEE FAILURE – NEW ORLEANS
EMERGENCY TABLE TOP EXERCISE

- A breech in the levee at the end of Bells Lane during a 0.2% annual chance flood event was used for the table top exercise.
- 19 local, state and federal agencies, as well as, private companies took part in the table top exercise.
- If this scenario occurred, it is believed the devastation to Louisville Metro would be greater than what Hurricane Katrina was to New Orleans
CATASTROPHIC FLOOD
The need for a Catastrophic Urban Flood Plan was identified in the 2013 Commonwealth’s Threat and Hazard Identification and Risk Assessment (THIRA) and Louisville Metro’s Hazard Mitigation Plan.

Working through the newly formed Louisville Metro Silver Jackets Team, a collective of federal, state and local organizations have started work on such a plan.

This plan will be reproducible to allow the framework and tools to be shared with other river cities in the Commonwealth and in the region.
Foot By Foot Analysis

Flood Category: Action Stage
Upper Gauge (in feet): 21

msd
Safe, clean waterways

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### Catastrophic Urban Flood Plan

<table>
<thead>
<tr>
<th>Upper Gauge</th>
<th>Lower Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspect gates 16, 6, 9, 16b, 16c, 59, 62, 63, 64</td>
<td>Parks and riverfront areas in Clarksville and New Albany flood. Some yards along US 31W (Dixie Highway) from Pleasure Ridge Park to West Point, KY flood. Inspect gates 86, 92, 106, 107, 110, 111, 112. Open gate 91.</td>
</tr>
<tr>
<td>21.00</td>
<td>55.00</td>
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<td>22.00</td>
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<td>25.50</td>
<td>59.50</td>
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<tr>
<td>Close gate 33c</td>
<td></td>
</tr>
</tbody>
</table>
“THE NEW NORMAL”

- In 1993 the annual average cost of damage from natural disasters in the United States was 3.3 billion (FEMA).
- In 2017, there were 16 weather and climate disaster events with losses exceeding $1 billion each across the United States. These events included a drought event, 2 flooding events, 8 severe storm events, 3 tropical cyclone event, a wildfire event, and a freeze event (NOAA). Total cost of losses 306.2 Billion.
- The 1980–2017 annual average is 5.8 events (CPI-adjusted); the annual average for the most recent 5 years (2013–2017) is 11.6 events (CPI-adjusted)(NOAA).
CUMBERLAND RIVER FLOODING
NASHVILLE - 2010
CLAY LEVEE BREACH
SAND LEVEE BREACH
Catastrophic Urban Flood Plan is one of twelve projects chosen nationwide for DHS’s FY17RRAP.

Three year process. Eighteen months of assessment and eighteen months of implementation assistance and follow up.

Will provide a deep assessment to impacts to critical or life-line infrastructure, Rubbertown and hospitals for failure in our flood protection system in a .2% annual chance flood event.
INTERDEPENDANCIES
FULL DEPTH INUNDATION
FEMA EVACUATION PLANNING
MITIGATION MATTERS

• According to FEMA, every one dollar spent on planning and mitigation activities equates to a six dollar savings in recovery and economic costs in a natural disaster.

• FEMA’s new policy for reimbursement of funds relating to natural disaster recovery will institute State-by-state “deductible”. Plans like this one will help reduce that deductible.
QUESTIONS