Evacuation with Efficiency:
An Inland and Coastal Flood Based Emergency Evacuation Planning Scorecard Proposal

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Mr. Ian P. Newman
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Introduction

• About Me

• General Outline

• Context of Research
  • Research Question
  • Research Mission
Disaster (Management) Cycle

PREPAREDNESS → CRISIS → RESPONSE → RECOVERY → MITIGATION

Image Source: futurelearn.com
Flood Origin Specifications

• Inland Flooding
  • From Severe Precipitation Events

• Hurricane-Induced Flooding

• Nuisance/High-Tide Flooding

• Infrastructure Failure
Image Sources:

Above Baltimore City Nuisance Flood Plan | Event: Nuisance flooding in Fells Point in May 2020.

Below foxbaltimore.com | Event: Nuisance flooding combined with Severe Rain Event in April 2020
Image Sources:

Above www.nbcbayarea.com
Event: Sanford Dam Break in May 2020

Below clickondetroit.com
Event: Edenville Dam Break in May 2020
Contextual Graphs – Records
From 1/1/1960 – 1/1/2020
Contextual Graphs – Fatalities
From 1/1/1960 – 1/1/2020
Contextual Graphs – Property Damage
From 1/1/1960 – 1/1/2020 | (2019 USD Adjusted)

- **Earthquake**
- **Flooding**
- **Hurricane/Tropical Storm**
- **Tornado**
- **Tsunami/Sieche**
- **Wildfire**

![Graph showing property damage from different hazards from 1/1/1960 to 1/1/2020 in 2019 USD Adjusted. The graph highlights the dominance of flooding and hurricane/tropical storm damage.](Image)
Current Scorecards

• National Cooperative Highway Research Program (NCHRP)
  • Maintaining System Resilience Concepts into Transportation Agencies
• National Weather Service (NWS)
  • StormReady
• Federal Emergency Management Agency (FEMA)
  • Community Rating System (CRS)
• Texas A&M University
  • Plan Integration for Resilience Scorecard Guidebook.

Evacuations are an element but not the focus!
Flood Emergency Evacuation Scorecard (FEES) Proposal Elements

• Where is the FEES’s Value?
  • Process NOT the Deliverable
  • 0 External Incentives (Fiscal, PR, Insurance Benefits etc.)

• Less Than 15 Minutes to Complete

• Intuitive, Transferable, Interactive & Novel

• Anonymous Posting for Comparing/Contrasting
Access Site & Methods

- [https://sites.gatech.edu/giscc/fees/](https://sites.gatech.edu/giscc/fees/)

1. Literature Review
2. Interviews
3. InDesign Form Builder + Export to Interactive PDF
4. Send to Case Study Jurisdictions
   A. New Orleans
   B. City of Baltimore
   C. Tulsa County
5. Next Step: Website Publication for Completed Scorecard Upload
Instructions and Context for the Flood Emergency Evacuation Scorecard

The Flood Emergency Evacuation Scorecard is designed to help communities evaluate their current status of mitigation, preparedness, response and recovery (the phases of the Disaster Cycle) efforts, in relation to emergency evacuation planning, in order to highlight areas of opportunity to be better prepared for the next flood event that strikes that community.

Please evaluate each metric on a scale from one (1) to five (5) with one being the weakest score and five being the strongest. There are three (3) metrics per phase of the Disaster Cycle, which are asked in order to best gauge that community’s overall status on emergency evacuation planning in response to floods.

Sum your score across the measures at the end of each phase, and for all phases at the end of the scorecard to determine next steps and where your community’s plan needs addressing. The value of this scorecard is in the planning process of filling out the scorecard honestly, there are zero outside incentives to any score. Please score responsibly.
Community Information

Flood Emergency Evacuation Scorecard (FEES)

1. **County/City/Town:**
   Example county/city/town would be written in here. For example, Cuyahoga County, OH

2. **Population:**
   Cuyahoga County has a population of 1.235 million (2019) people (US Census Bureau)

3. **Primary Contact:** Name, Office, Title, City, State, ZIP, Phone Number, E-Mail Address
   Mr. Ian Newman, Georgia Tech School of City and Regional Planning, Atlanta, GA, 30332, (440) 785-6523, inewman3@gatech.edu

4. **Secondary Contact:** Name, Office, Title, City, State, ZIP, Phone Number, E-Mail Address
   Dr. William J. Drummond, Georgia Tech School of City and Regional Planning, Atlanta, GA, 30332, (404) 894-3880, bill.drummond@design.gatech.edu
Mitigation Measures

Flood Emergency Evacuation Scorecard (FEES)

1. Rank the quality, on a scale of 1-5, of currently existing structural measures that mitigate the flood hazard

   1  2  3  4  5

2. Rank the quality of currently existing non-structural measures that mitigate the flood hazard

   1  2  3  4  5

3. Rank the quality of the jurisdiction's current zoning situation in order to best mitigate the flood hazard

   1  2  3  4  5

Here, the professional filling this scorecard out for Mitigation Measures can make considerations, notes, concerns, comments, and general thoughts based on reflections of the score they attributed to the above three metrics.
Preparedness Measures

1. Rank the quality of the jurisdiction's current flood warning system (warning outlets & lead warning time)

2. Rank the level of preparedness in determining hazardous infrastructure and areas, if a flood strikes

3. Rank the level of consideration the jurisdiction places on evacuating vulnerable populations

Here, the professional filling this scorecard out for Preparedness Measures can make (by typing in this text box, just like in Mitigation Measures) considerations, notes, concerns, comments, and general thoughts based on reflections of the score they attributed to the above three metrics.
Response Measures

1. Rank the quality of the jurisdiction's ability to perform search & rescue operations within 24 hours of the flood

   1  2  3  4  5

2. Rank the level of government agency organization and coordination for flood emergency evacuations

   1  2  3  4  5

3. Rank the quality of the jurisdiction's ability to provide basic needs and resources for evacuated residents

   1  2  3  4  5

Here, the professional filling this scorecard out for Response Measures can make (by typing in this text box, just like in the above measures) considerations, notes, concerns, comments, and general thoughts based on reflections of the score they attributed to the above three metrics.
Recovery Measures

1. Rank the level of consideration the jurisdiction places on applying for FEMA's HMA grant programs

2. Rank the quality of the jurisdiction's current plan in insuring residents' damaged homes and businesses

3. Rank the level of consideration the jurisdiction places on qualitatively & quantitatively documenting the flood

Here, the professional filling this scorecard out for Recovery Measures can make (by typing in this text box, just like in the above measures) considerations, notes, concerns, comments, and general thoughts based on reflections of the score they attributed to the above three metrics.
Final Scoring Measures

Flood Emergency Evacuation Scorecard (FEES)

1. Aggregated Score out of 60 Total Points:

Here the professional filling the FEES would aggregate their four grey “Sum of Points” boxes. Here, in this example, the professional filling this scorecard out for Cuyahoga County, OH would find their aggregated score to be 39 points out of 60. The box below then offers considerations.

2. Scale and Considerations Based on Aggregated Score:

<table>
<thead>
<tr>
<th>Point Score Ranges</th>
<th>Point Score Range Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 15 Points</td>
<td>Plan needs a timely and considerable upgrade across the four stages of the disaster cycle. Policy intervention is strongly encouraged.</td>
</tr>
<tr>
<td>16 - 30 Points</td>
<td>Plan is below average and needs upgrades across low-scoring stages of the disaster cycle for community.</td>
</tr>
<tr>
<td>31 - 45 Points</td>
<td>Plan is average-to-good and needs policy intervention for improvement. Consider intervention on the stages that performed lower than others for timelier needs.</td>
</tr>
<tr>
<td>46 - 60 Points</td>
<td>Plan is good, but can be improved and needs to be maintained at this level of quality or higher.</td>
</tr>
</tbody>
</table>
Conclusion & Final Thoughts

• FEES Design & Mission
• FEES Values
• Next Steps

“Human beings – not nature – are the cause of disaster losses, which stem from choices about where and how human development will proceed” (Mileti, 1999)

Image sources:
Headshot: Natural Hazards Center, 2021
Disasters by Design Book Cover:
Goodreads, Inc., 2021
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Dr. Michael Meyer
Ms. Laura Mellem
Contact Information

• LinkedIn
  • https://www.linkedin.com/in/iannewman216/

• Email:
  • iannewman91@gmail.com

I welcome any questions and comments you have; please do not hesitate to send them my way.

Thank you!