Scenario-Based Resource Planning

Scenario-based resource planning uses a single, plausible scenario to establish a common framework for evaluation of capabilities across a region and throughout the multiple levels of emergency management. Determining the resource needs of a single scenario is sufficiently challenging, but since real life disasters do not generally follow the plan, the formulas and calculations inherent to an effective decision-making process need to be captured. This captured process converts key steps and skills known to experienced individuals and converts them into accessible institutional knowledge. These formulas and calculations can usually be best expressed in the form of matrices that can be manipulated to provide a means of quickly determining resource needs and shortfalls for various events. In the planning stages, the information provided by the matrices allows the entire emergency management system to be analyzed for gaps. On the ground, the matrices enable rapid, informed decision-making during response. Finally, the development of the matrices highlights policy limitations for official consideration both prior to and during events. The Florida Catastrophic Planning decision matrices are intended to satisfy the requirements of the scenario and to provide a scalable, adaptable tool for emergency managers to use in the field.

The Scenario

South Florida is impacted by a Category 5 hurricane making landfall 35 miles north of Miami, producing upwards of 22 inches of rainfall in and north of Lake Okeechobee. Winds and surge from the storm damage or destroy over 750,000 structures within the 10-county most impacted area. Note that this does not include the impacts to counties northwest of Lake Okeechobee where the storm exits Florida as a Category 2.

Winds from the storm leave large amounts of debris in the canals used by the South Florida Water Management District to control water movement in South Florida, making it difficult or impossible to reduce flood waters impacting public services, the environment, businesses, citizens, and visitors. Flood waters are expected to remain for 22 days or more.

The Process

Step 1: Assess required capabilities based on Catastrophic Scenario

- This step involves analyzing the impacts of the scenario to clarify demands to answer the basic question: *What do we need to do?*
  
- Example: The damage projections indicate that over one million buildings will need to be searched.

Step 2: Develop methods, formulas, or matrices to answer the question: *What do we need to do it?*

- An effective way to quantify/specify scenario-based requirements is through development of scalable and adaptable methods, formulas, or matrices that indicate the quantity and type of assets needed to meet the capability requirement.
Example: Given the need to search 1,005,526 buildings, how would the total number of search teams be determined? What are the key questions that must be asked and how does the information fit together? Can it be organized into a matrix?

**Step 3:** Determine available resources, answering the question: *What do we already have?*

- Within available inventories, beginning with the local and continuing to the regional, State, interstate, and Federal/National inventories, including pre-disaster contracts. Consideration must be given to the likelihood that the catastrophic nature of the event and extreme demand for resources from multiple jurisdictions could overwhelm providers resulting in contact terms going unfulfilled.
- Example: Determine how many local search and rescue personnel could be allocated to this task, given this scenario.

**Step 4:** Identify gaps between available and required resources, answering the question: *Is what we have enough? Are our goals feasible?*

- Utilizing the products of Steps 1-3, this step determines the critical shortfalls that need to be addressed to ensure all levels of emergency management can appropriately respond to and recover from a given event.
- Example: Determine whether currently available search and rescue personnel are sufficient to search the required number of buildings within the desired time. Evaluate whether it is feasible to complete search and rescue within that timeframe.

**Step 5:** Establish protocols and policies that clearly articulate how to meet required capabilities, fill gaps, and identify resource limitations, answering the question: *How do we gain access to the available resources, and how do we get more?*

- Map the process of resource use up the chain until the established requirements are met.
- Example: Establish agreements with other entities to provide the personnel needed to complete search & rescue within this time interval.

**Step 6:** Integrate with other scenario-based resource planning efforts

- Analyze scenario-based resource allocations across functions to identify and resolve resource conflicts and/or shared policy challenges. This step identifies: *What does this mean for the rest of the response and recovery activities?*

**Step 7:** Sustain the planning process to facilitate updates and changes

**Breaking It Down**

The scale of the catastrophe can be intimidating. To help get the planning process started, it will be necessary to break the problem into key decision points. The following outline explains the way the Search and Rescue group approached this process.

- Pick one decision point and break it down:
  - Clearly identify the goal.
Complete primary search and rescue within 24 hours.

- Identify the critical criteria/information needed to formulate a decision.
  - Number of strike teams.
  - Number of hours per day (operational period).
  - Number of structures damaged or destroyed.
- Document what you know from past experience.
  - Cannot safely search at night.
  - How many workers to safely search a structure?
  - How much time to safely search a structure?
  - Deployment time (notification to operational).
- Calculate, adjust, recalculate, and cross check.
- Repeat as necessary.
  - Don’t forget logistical support for your staff, mutual aid assets, and volunteers.

**Sample Search & Rescue Matrix**

Through the development of the matrix below using consequence figures available in February 2007, the Search and Rescue working group discovered that the Hurricane Ono scenario would require almost 54,000 searchers to meet the standard goal of completing primary search and rescue within 24 hours. Since they considered this beyond the national capacity, the matrix also allowed them to play with key factors to come up with a reasonable solution. Through this process, they determined that a catastrophic event such as this one would require revision of the standard goal. When they changed the target time period for completing primary search and rescue as shown below, they faced a more realistic challenge.

This matrix is usually a spreadsheet created in Microsoft Excel. This allows some cells to be open to inputs by the end user. The other cells contain formulas designed to calculate the needed information.

Each matrix should include instructions for use, for example:

This matrix can be used to determine the resources needed to handle search & rescue surrounding a hurricane. To use the matrix, enter the appropriate values in the scenario-specific cells. These inputs generally fall into two categories:

Some, such as the number of structures to be searched, indicate the scale of the disaster. These input values for Hurricane Ono are included in the latest version of the Consequence Projection document, which can be found under 'Other' in the Documents section of http://www.floridadisaster.org/CatastrophicPlanning/
Some of the inputs are factors that determine the capacities of resources. An example might be the number of personnel needed to control an intersection or the number of hours per day a strike team can work. Values have generally been suggested for these factors, which can be used or adjusted based on the user's judgment. Once these factors have been entered into the matrix, the resource requirements, such as the total teams needed, will be automatically calculated and displayed. Once the matrix is complete, it becomes a useful tool that can quickly calculate needed resources based on the data specific to any scenario.

In this figure, the resulting table is shown using sample inputs based on the Hurricane Ono scenario.

<table>
<thead>
<tr>
<th>County</th>
<th>Structures</th>
<th>Strike Teams</th>
<th>Personnel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami-Dade</td>
<td>352,332</td>
<td>257</td>
<td>5,140</td>
</tr>
<tr>
<td>Broward</td>
<td>335,252</td>
<td>244</td>
<td>4,880</td>
</tr>
<tr>
<td>Palm Beach</td>
<td>293,881</td>
<td>214</td>
<td>4,280</td>
</tr>
<tr>
<td>Martin</td>
<td>8,368</td>
<td>7</td>
<td>140</td>
</tr>
<tr>
<td>Okeechobee</td>
<td>6,185</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>Hendry</td>
<td>5,916</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>Glades</td>
<td>3,134</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>Lee</td>
<td>408</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Monroe</td>
<td>50</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,005,526</strong></td>
<td><strong>737</strong></td>
<td><strong>14,740</strong></td>
</tr>
</tbody>
</table>

Total number of structures involved

Total number of strike teams needed.

Total number of personnel needed.