

# ESFLG: Modeling and Data Working Group

## Review of hurricane and earthquake resources

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Brief for the Subcommittee on Disaster Reduction

February, 2015



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# The MDWG project

- Determine what information is needed by whom
- Develop an ontology to categorize the information requirements
- Identify and characterize the data and models used for federal emergency management: hurricanes, earthquakes, and INDs
- Perform network analysis to define gaps and identify linkages between resources and users/producers
- Build an interactive inventory cataloging the resources



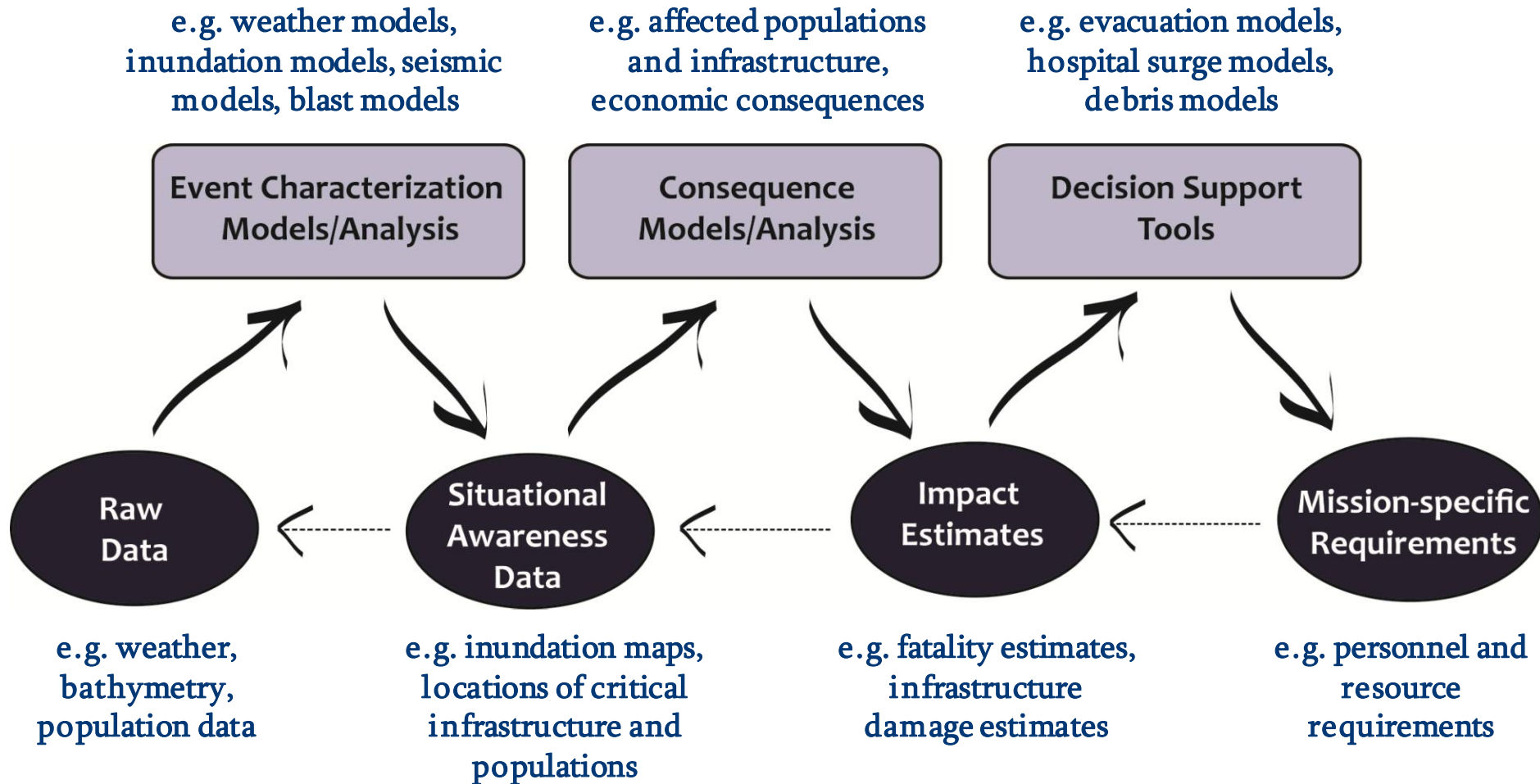
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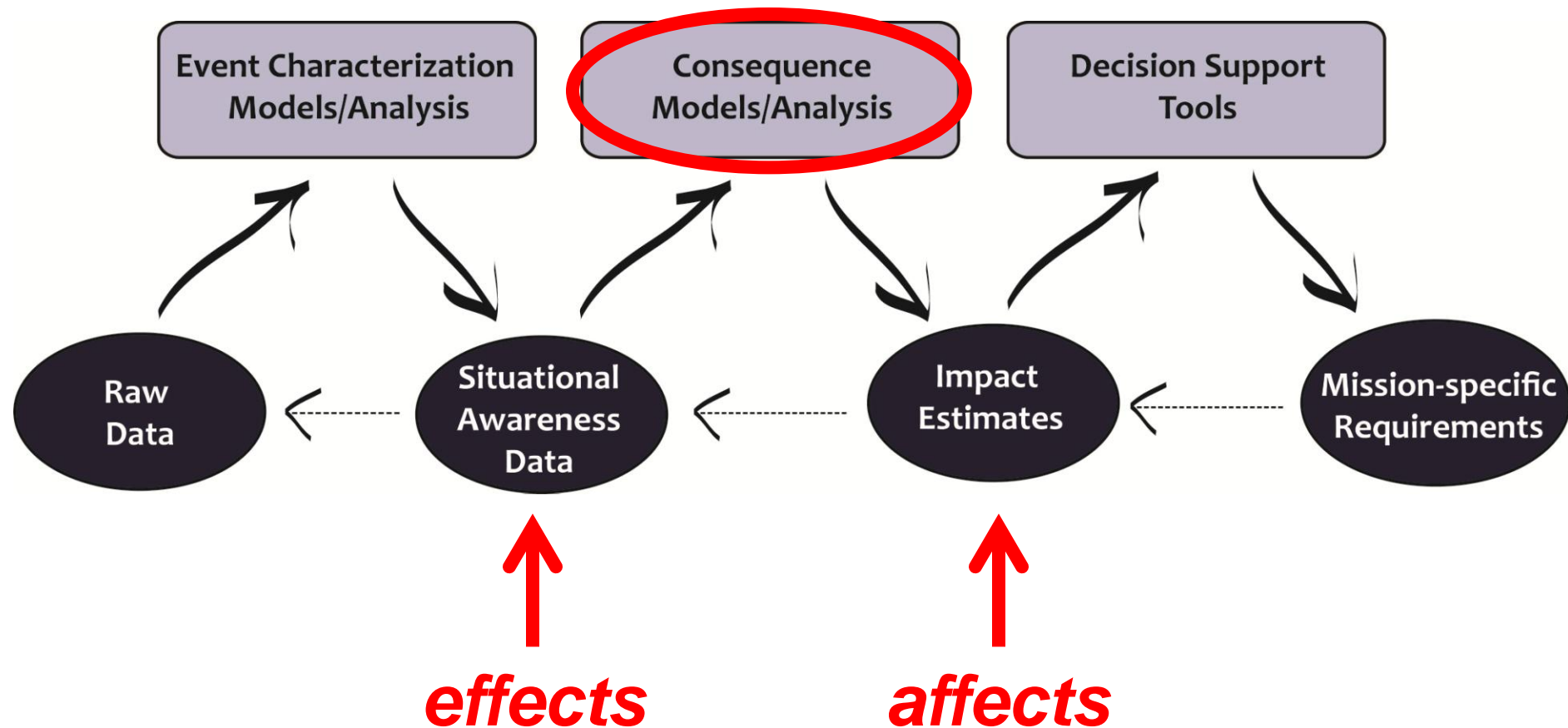
# Organizing the information



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# Scientific analysis to operations



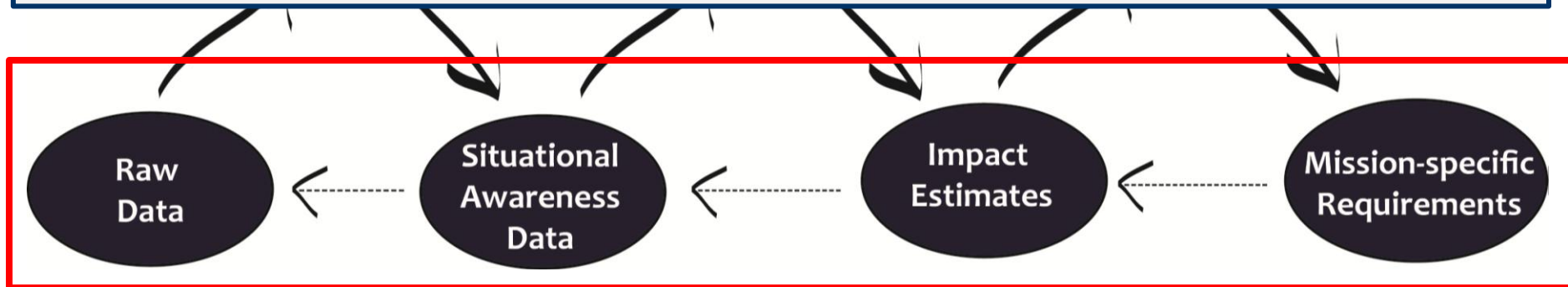
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# Defining "data"

*Defined as repositories of steady-state or event-specific information used for emergency management*

**Includes visualization tools that do not transform the data**



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# Defining “models”

*models or data analysis tools*

Event Characterization  
Models/Analysis

Consequence  
Models

Decision Support  
Tools

*Defined as programs, algorithms, or computational tools that transform or process data to produce new information*

*Analysis capabilities or centers not included*



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# Data Collection

- 200 interviews conducted with 244 people representing 54 federal agencies, divisions, or groups
- 10 interviews completed with 15 individuals representing 6 states
- Resource inventory includes:
  - Over 500 resources identified and vetted
  - 162 included in the inventory of hurricane, earthquake, IND, and all-hazards resources
  - ~20 metadata categories describe each resource



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# Analysis Results: Hurricane Inventory



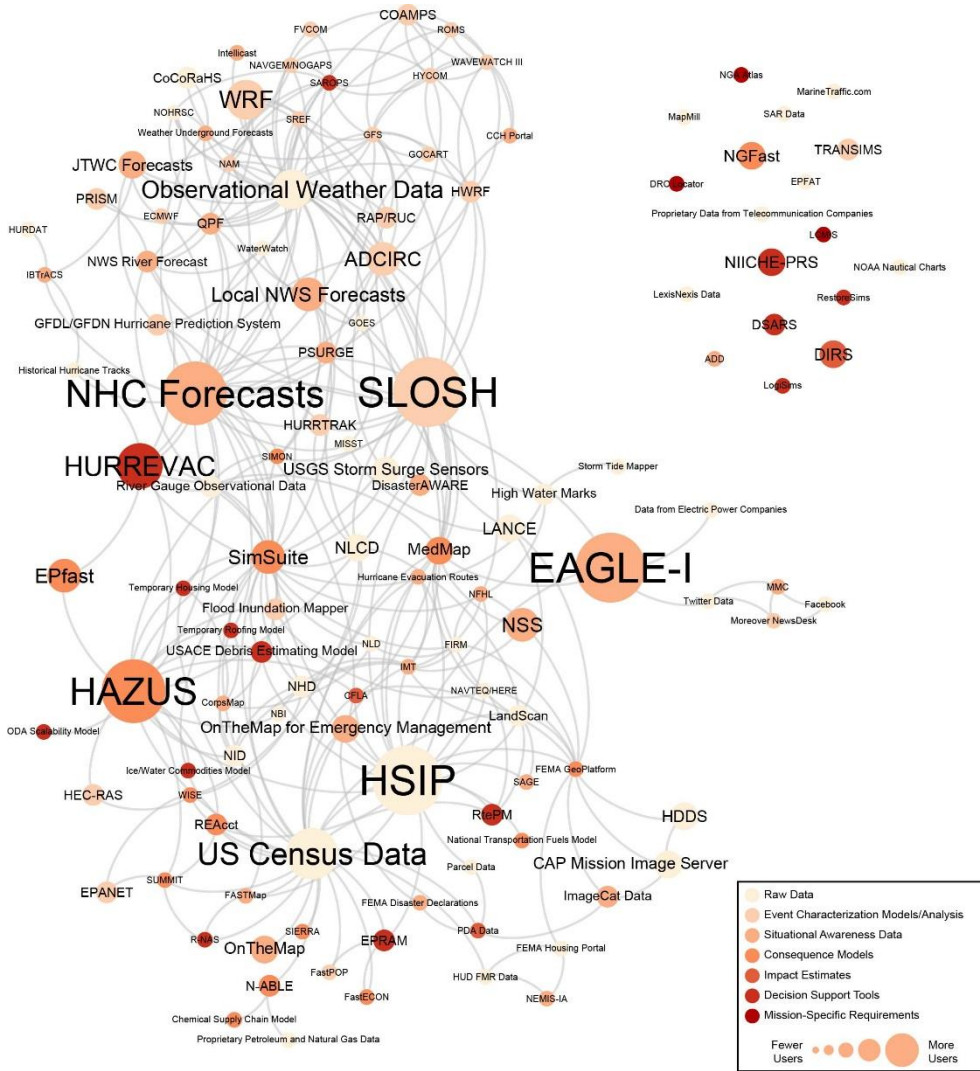
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# Hurricane resource network



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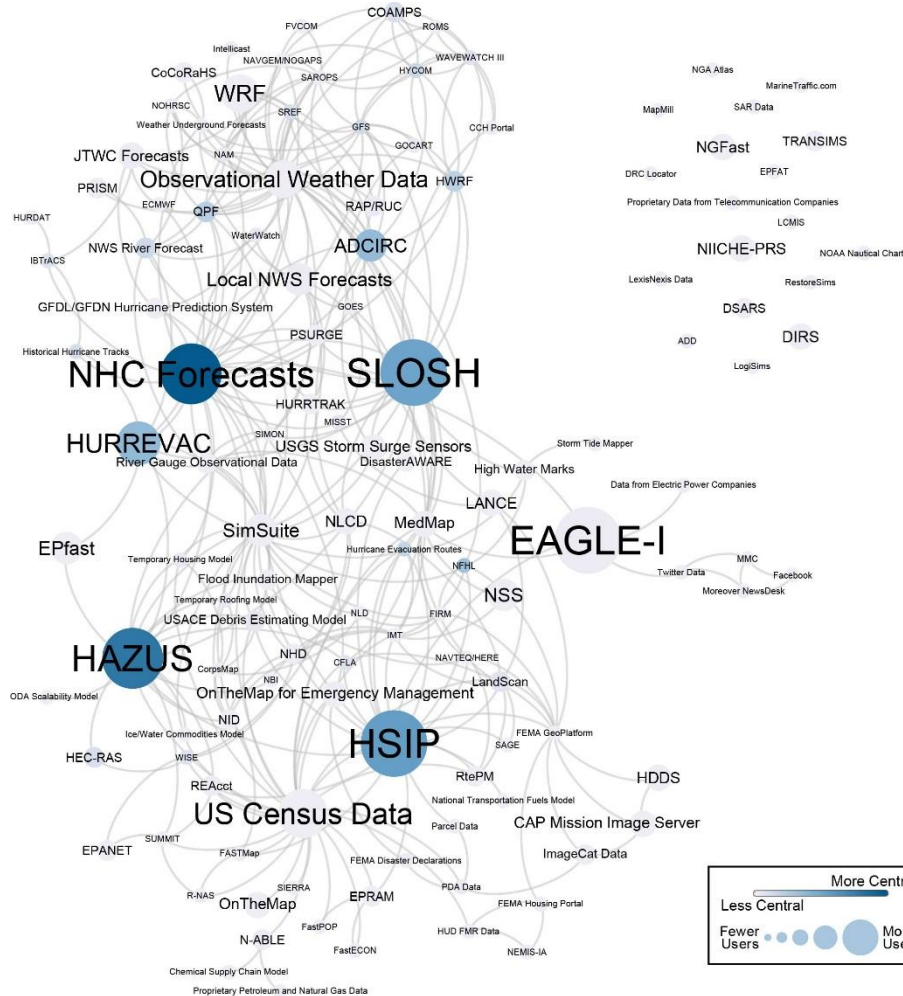
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# Most used resources

## Resources with the most federal agency users

Resources	Users	Hazards	Resource Types	Descriptions
<b>EAGLE-I</b>	10	All-Hazards	situational awareness data	Monitors, aggregates, and displays energy system data
<b>HSIP</b>	10	All-Hazards	raw data	Critical infrastructure and key resource data
<b>SLOSH</b>	10	Hurricane	event characterization models/analysis	Estimates storm surge heights
<b>HAZUS</b>	9	Multi-Hazard	consequence model	Estimates economic impacts of select natural disasters
<b>NHC Forecasts</b>	9	Hurricane	situational awareness data	Predicts hurricane intensity and track
<b>PAGER</b>	7	Earthquake	consequence model	Predicts the economic and health impacts from an earthquake
<b>ShakeMap</b>	7	Earthquake	event characterization models/analysis	Outputs ground-shaking maps
<b>US Census Data</b>	7	All-Hazards	raw data	Regional populations, demographics, and survey items

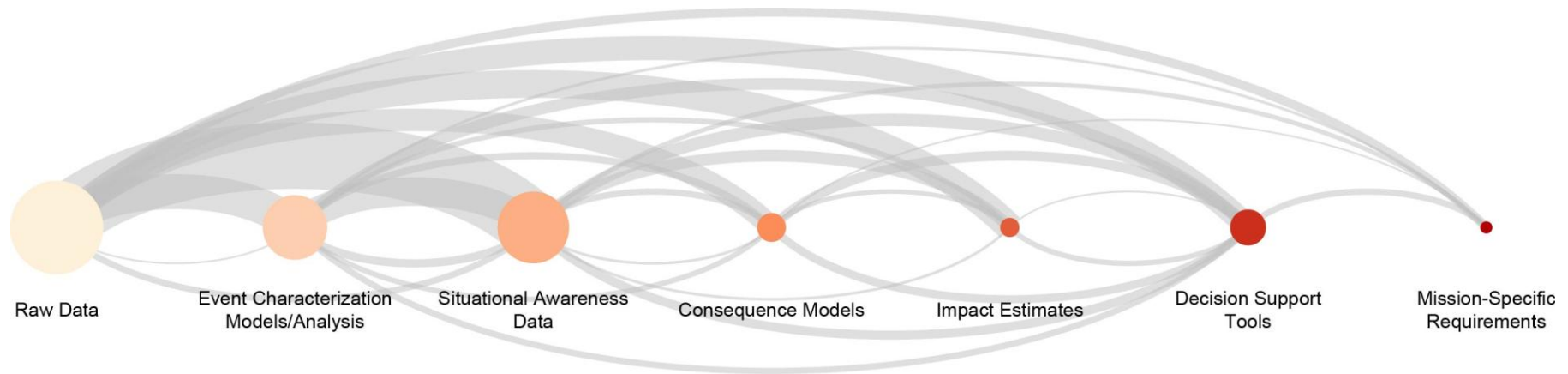
# Bridges in the hurricane network: Centrality



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# Bulk flow of information



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# Conclusions, gaps, and COAs



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# Project findings

## 1. Lack of robust connections between resources

- Orphan resources with no linkages
- Widely-used resources with few linkages
- Linking resources that fill gaps

## 2. Networks rely on a few highly central, widely used resources with varying levels of support

## 3. Unconnected, redundant situational awareness viewers



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# Systems-level gaps

1. Lack of operations-focused resources
  - Consequence modeling output libraries
  - Rapid-run models with outputs designed for operations
    - Would provide decision support and concrete mission specific requirements
2. Operations-focused resources poorly connected to real-time event data
3. Lack of emergency response modeling for operations



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# Courses of action: Disaster Reduction

- Develop real-time operational consequence and response modeling/analysis tools
  - May be available through national labs
  - Involve operations personnel in development
- Develop emergency response models
  - Tools to test response, recovery, and mitigation priorities
- Improve operational information-sharing between ESFs



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# Courses of action: Disaster Reduction

- Utility of the Resource Inventory:
  - Additional scenarios: biological, cyber, flood
  - Robust, on-going hosting and maintenance
  - Use during exercises: Train around the resources available
  - Interagency access



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# Inventory website: *Demonstration*



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# Inventory website

- Currently hosted at FEMA Planning
- Developing a long-term hosting, maintenance, and access plan
- Have developed maintenance and user guides for the inventory and website



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# Questions?



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# Points of contact

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