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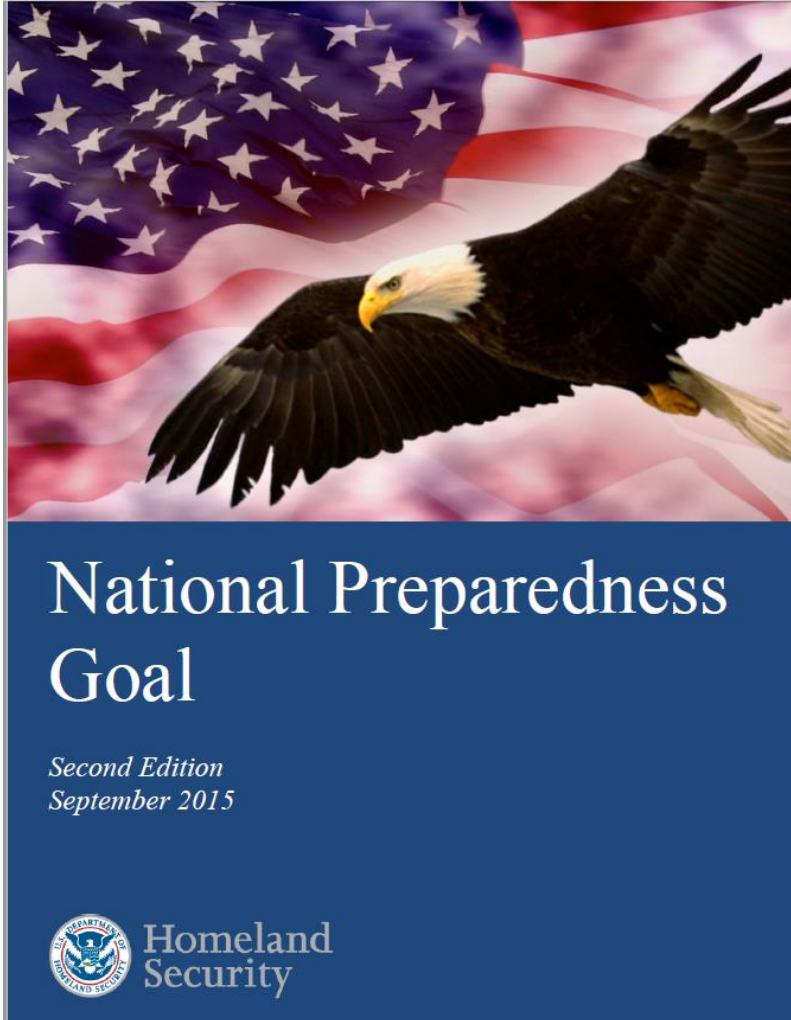
Department of Industrial and Manufacturing Systems Engineering

Capabilities-based Planning for Emergency Preparedness

Cameron MacKenzie, Zach Amenda, Rohit Suresh
Industrial and Manufacturing Systems Engineering

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Capabilities based planning for emergency preparedness



1. **Prevention**: avoid or stop a potential act of terrorism
2. **Protection**: protect people and interests from terrorism and natural disasters
3. **Mitigation**: lessen impact of disasters
4. **Response**: save lives and protect property after incident
5. **Recovery**: assist communities to recover effectively

32 capabilities identified

Mission area	Sample capabilities					
Prevention	Planning	Public info and warning	Intel and info sharing	Forensics and attribution		
Protection				Community resilience	Physical protective measures	Cybersecurity
Mitigation			Infrastructure systems		Risk assessment	Vulnerability reduction
Response					Mass search and rescue	Fire management
Recovery			Economic recovery	Housing		

Funding for local and state emergency preparedness



FEMA

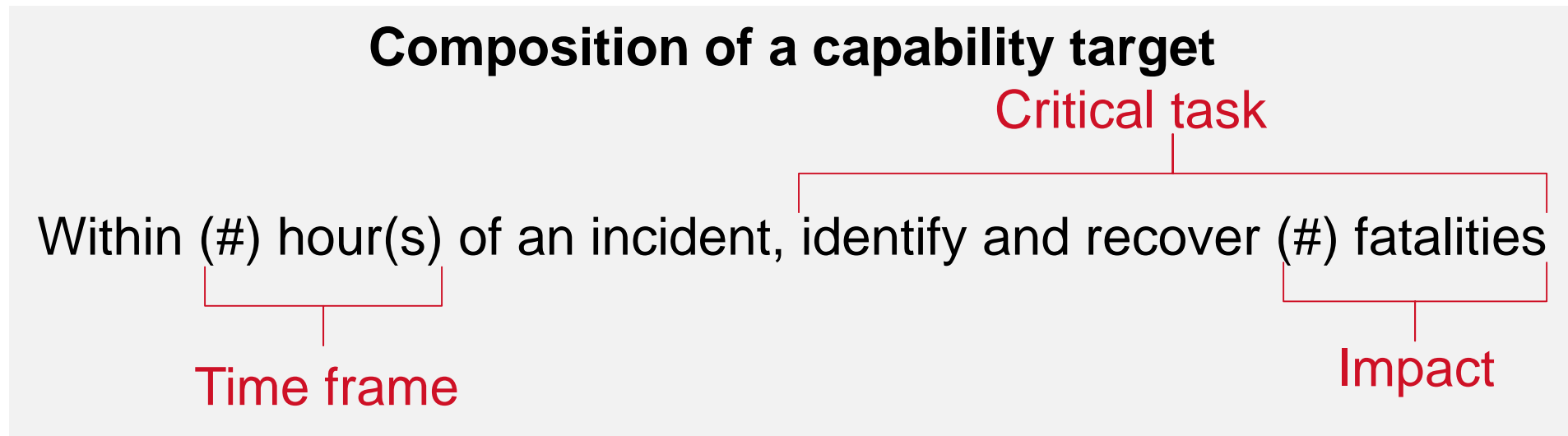


Measurement method 1 (notional numbers)

Capability	Planning	Organization	Equipment	Training	Exercise	Priority
Planning	5	3	2	4	4	High
Public info and warning	4	4	5	3	3	Low
Intel and info sharing	2	2	1	3	3	Medium
Community resilience	4	3	1	2	4	High
Risk assessment	4	5	5	3	2	High
Mass search and rescue	4	4	5	4	3	Medium

Measurement method 2: capability target

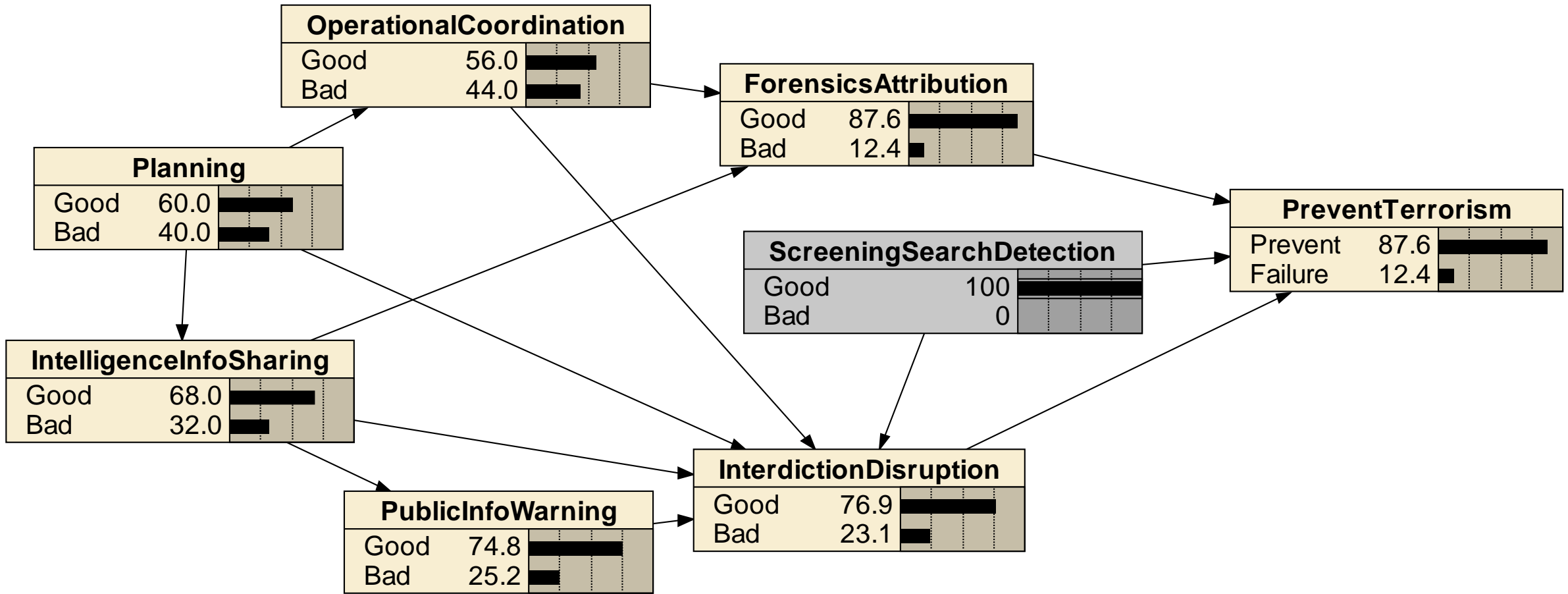
Department of Homeland Security, *Threat and Hazard Identification and Risk Assessment (THIRA) and Stakeholder Preparedness Review (SPR) Guide, Comprehensive Preparedness Guide (CPG) 201*, 3rd edition, May 2018



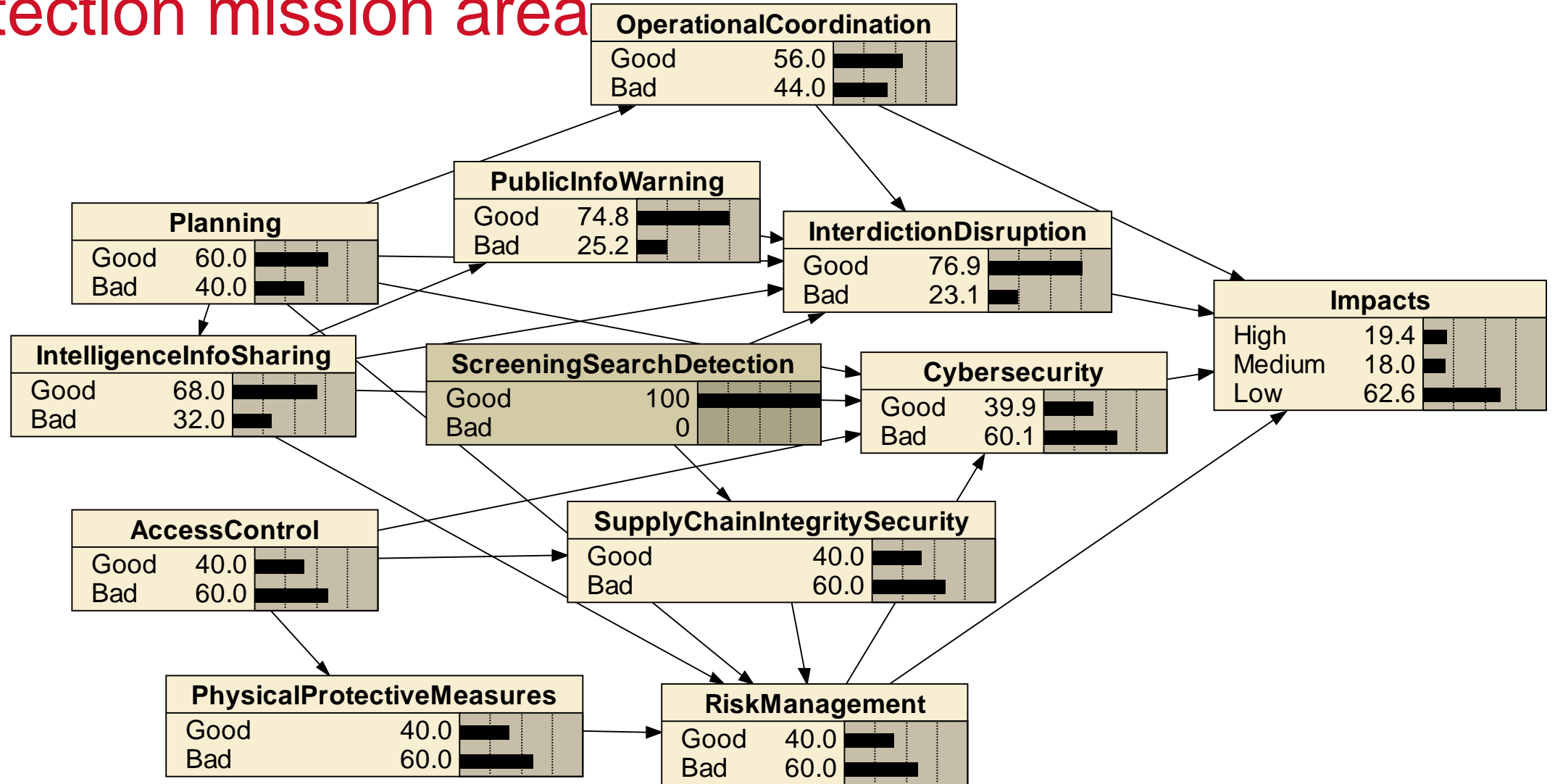
Challenges

- Capability measurement
 - Easier to use the subjective 1-5 scale
 - Time-based capability target relates capability to impacts that decision maker cares about
- Capabilities are related to each other: focusing on improving one capability may also improve another capability
- Overall assessment of capabilities

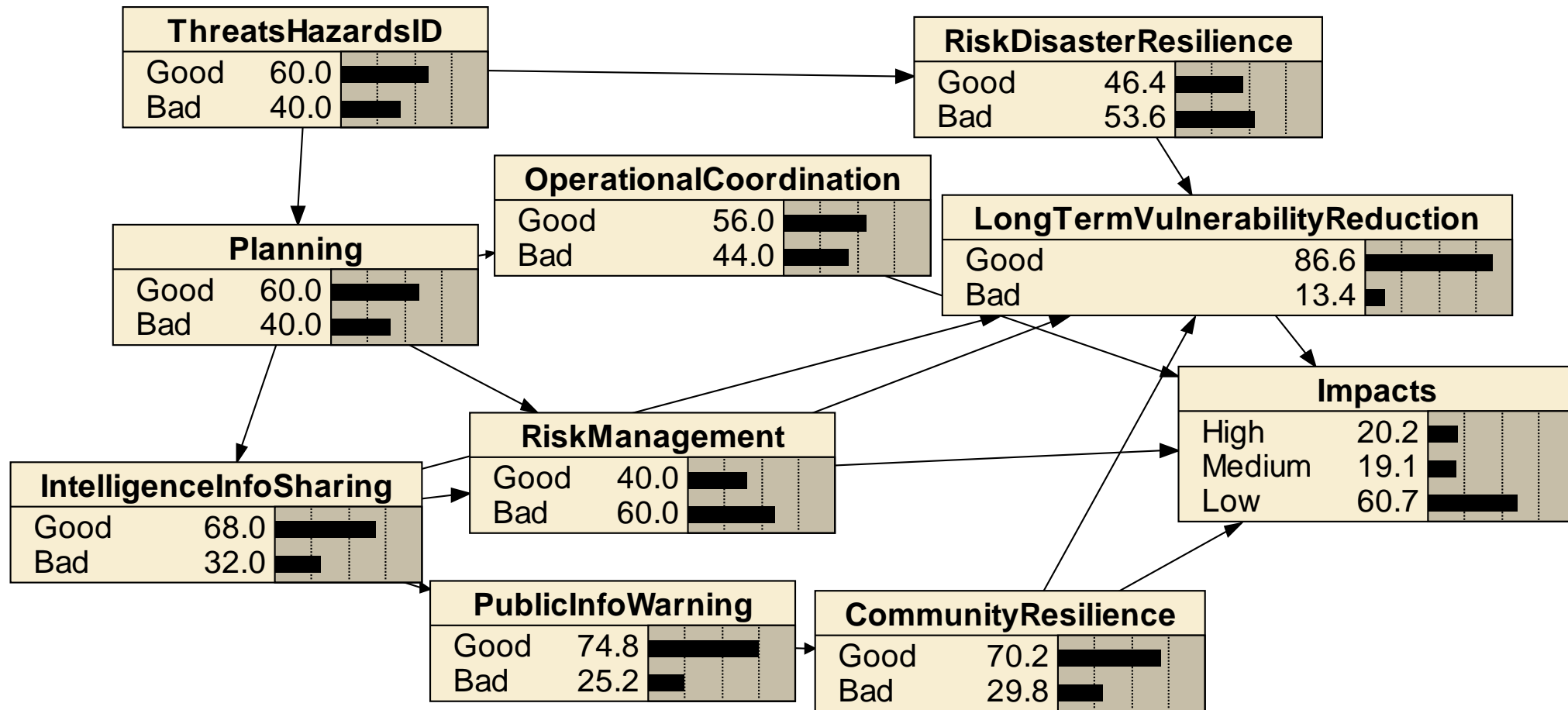
Prevention mission area



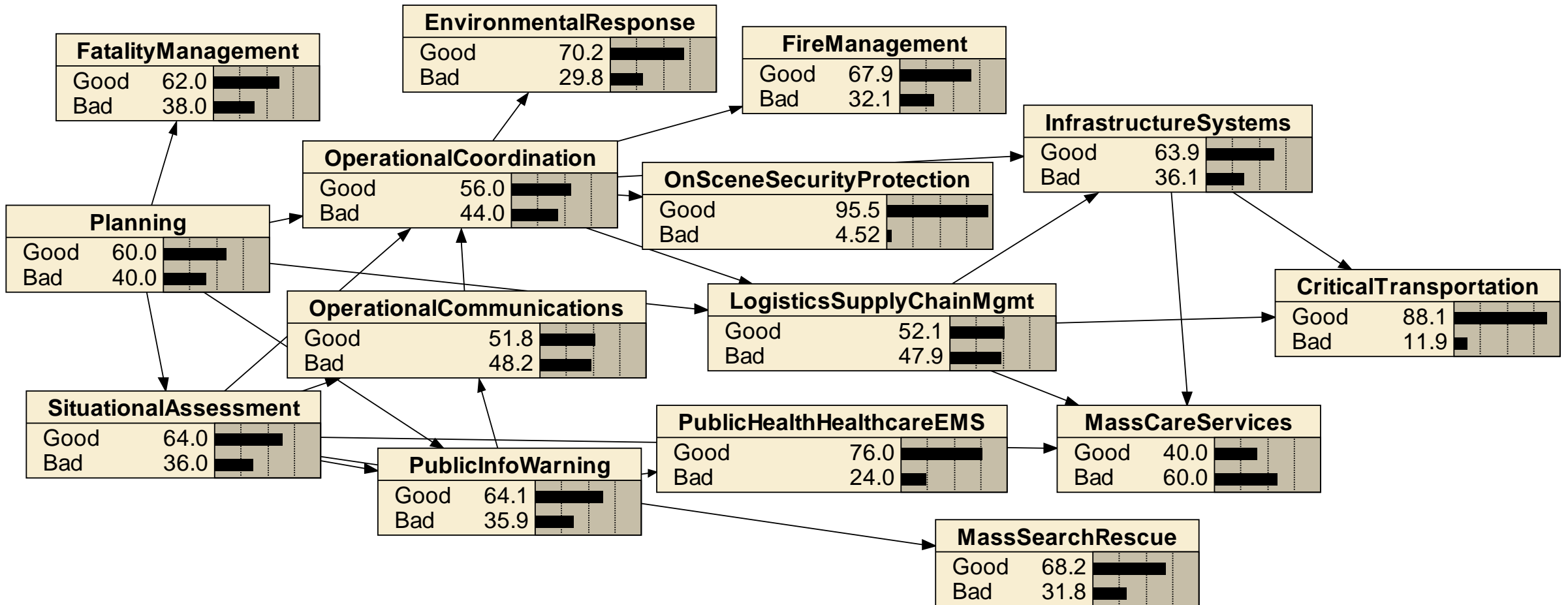
Protection mission area



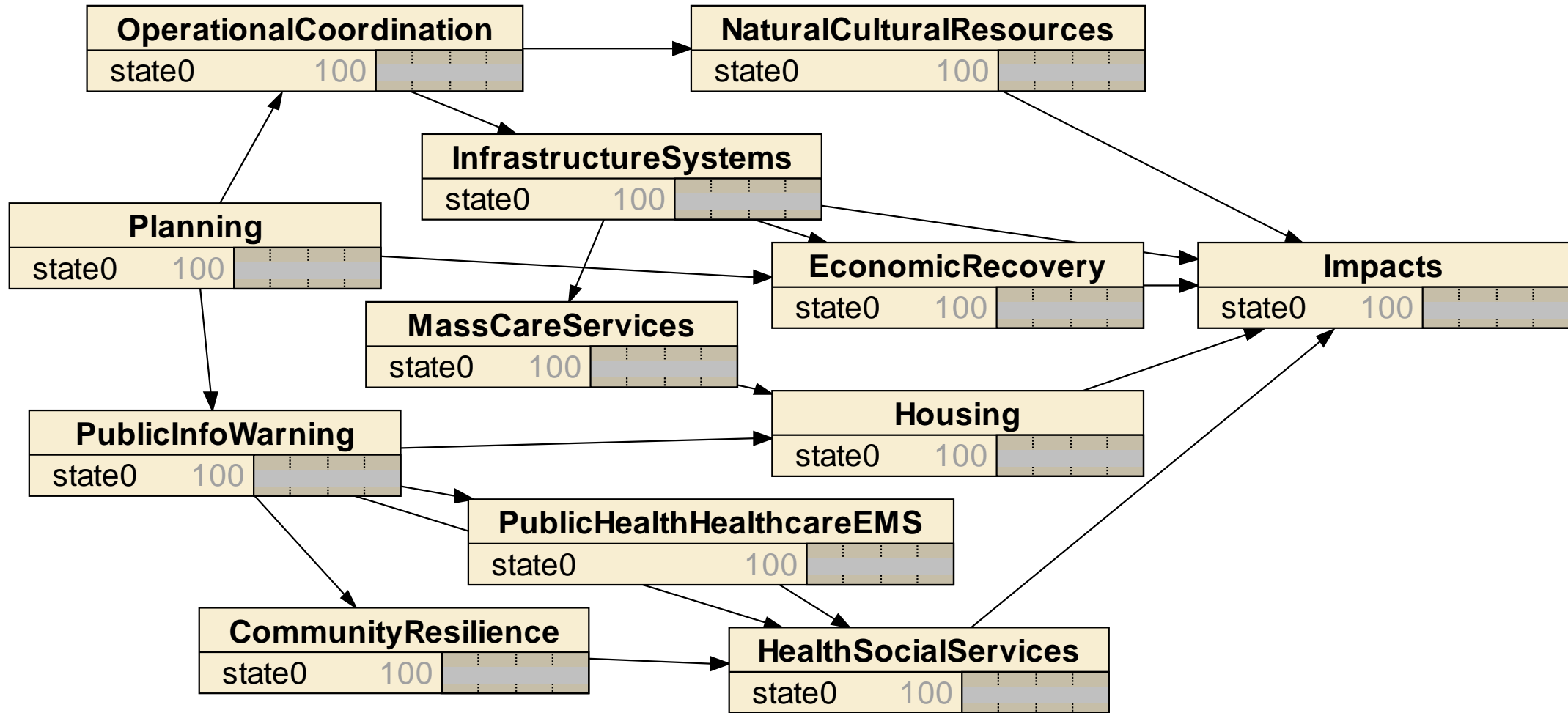
Mitigation mission area



Response mission area



Recovery mission area



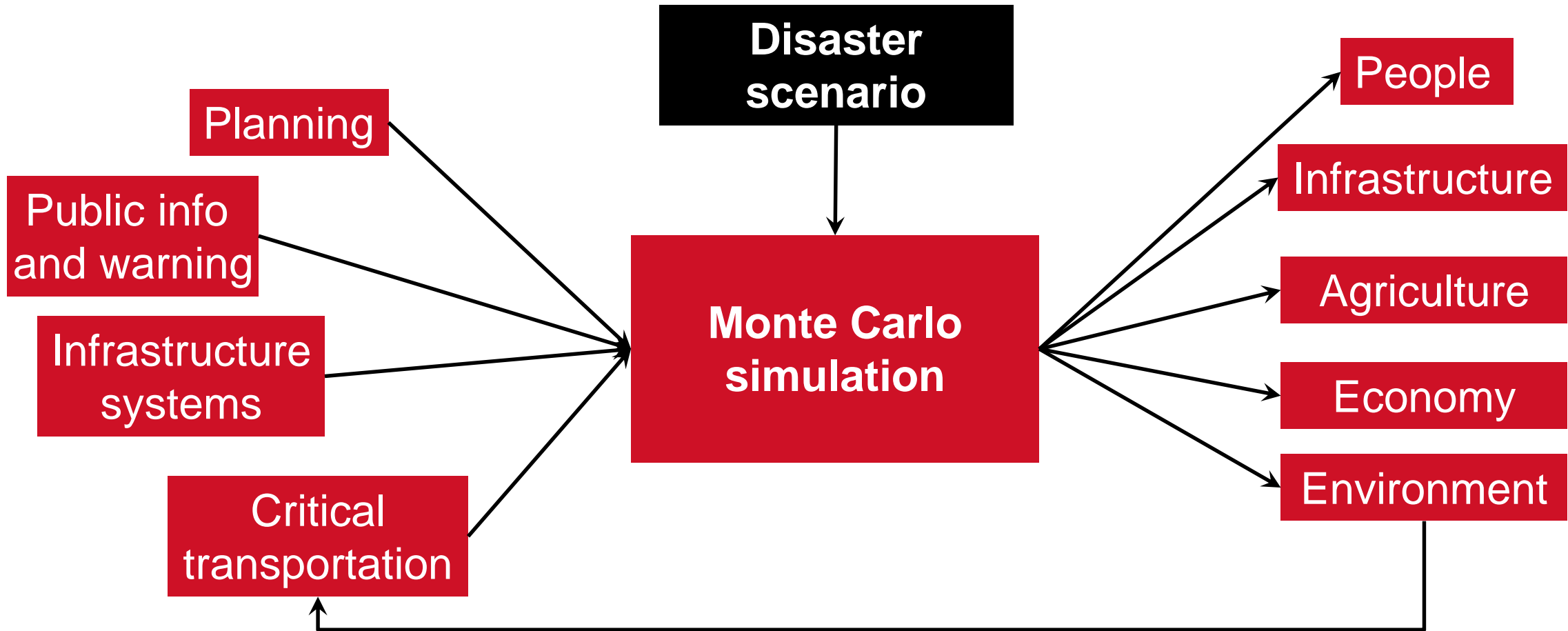
Impacts

- People: fatalities, injuries, shelter
- Infrastructure: transportation, water, electricity, cyber
- Agriculture: livestock, crops
- Economy: business interruption, property damage, cleanup costs
- Environment and natural resources

Capability metrics

Capability	Metric
Planning	<p>Within Y minutes identify appropriate plan</p> <p>Within Y hours, implement X percent of appropriate plan</p>
Public info and warning	<p>Within Y hours make contact with X hours</p>
Operational coordination	<p>Within Y hours set up Incident Management Center</p>
Infrastructure systems	<p>Within Y hours clear X tons of debris</p>
Critical transportation	<p>Within Y hours clear X miles of road</p> <p>Within Y hours allow transportation of X key personnel</p>
Environmental response / health and safety	<p>Within Y hours clear X acres of hazardous material</p> <p>Within Y hours remove X pounds of hazardous material</p>
Mass care services	<p>Within Y hours house X number of people</p> <p>Within Y hours care for X people</p>

Future: integrate capability metrics with simulation



Method to provide more rigorous assessment of capability based planning

- Bayesian belief network
 - Assesses interdependencies among capabilities
 - Maps capabilities to objective and impacts for each mission area
- Capability target metrics
 - More objective method to quantify capabilities
 - But could contain a lot of uncertainty
- Monte Carlo simulation to provide method of measuring impact of uncertainty in capability metrics

Acknowledgement: Iowa Homeland Security and Emergency Management

camacken@iastate.edu