

# QUANTIFYING RECOVERY COSTS AND POTENTIAL PROACTIVE ADAPTATION COSTS FOR TRANSPORTATION CORRIDORS OR WHOLE SYSTEMS FOR STATE DOT

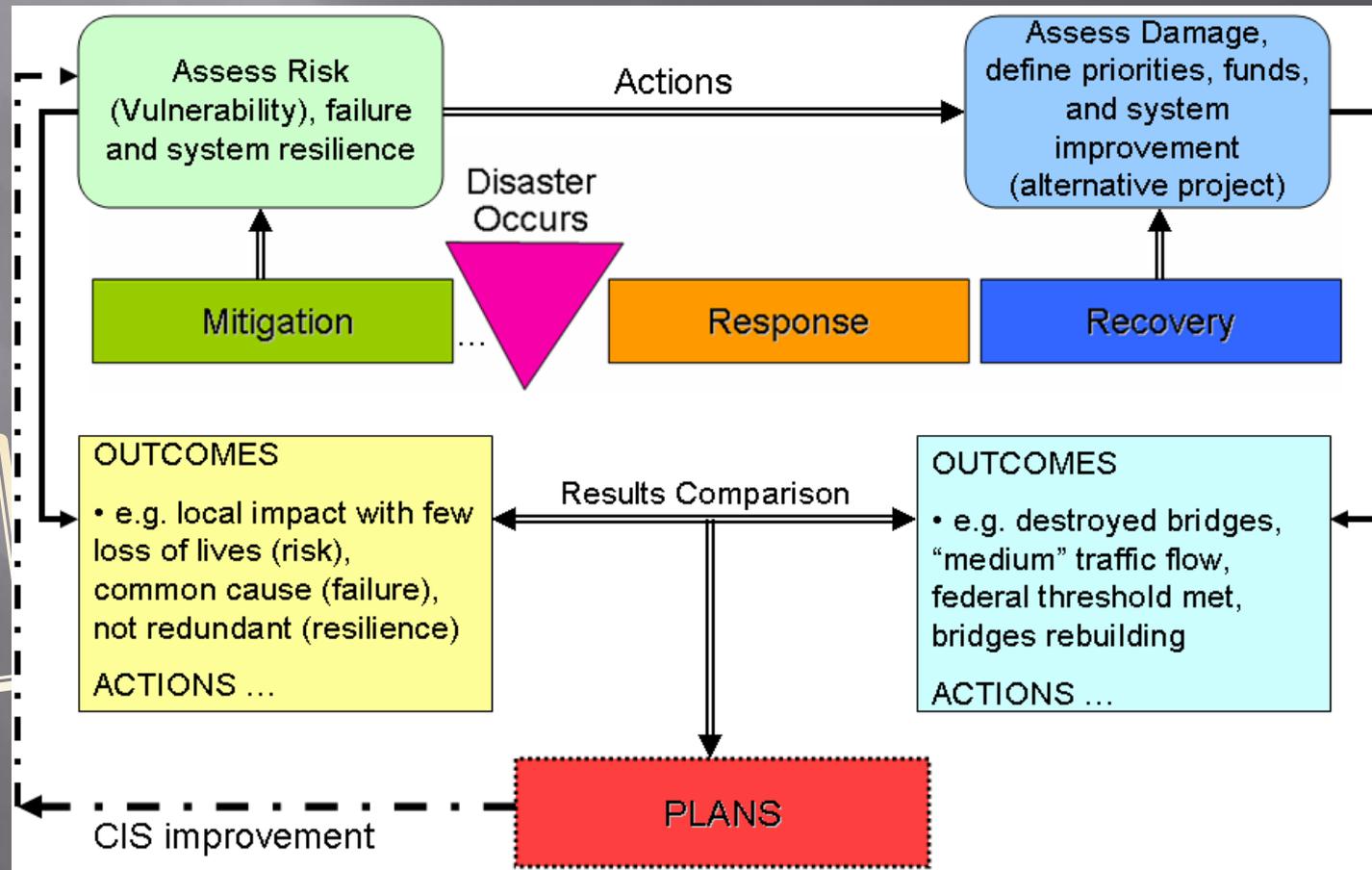
TRANSPORTATION AND CLIMATE CHANGE  
ADAPTATION: RISK-BASED DECISION-MAKING TO  
REDUCE CLIMATE-CHANGE-RELATED COSTS AND RISKS  
THROUGH PREPAREDNESS AND ADAPTATION –  
WORKSHOP

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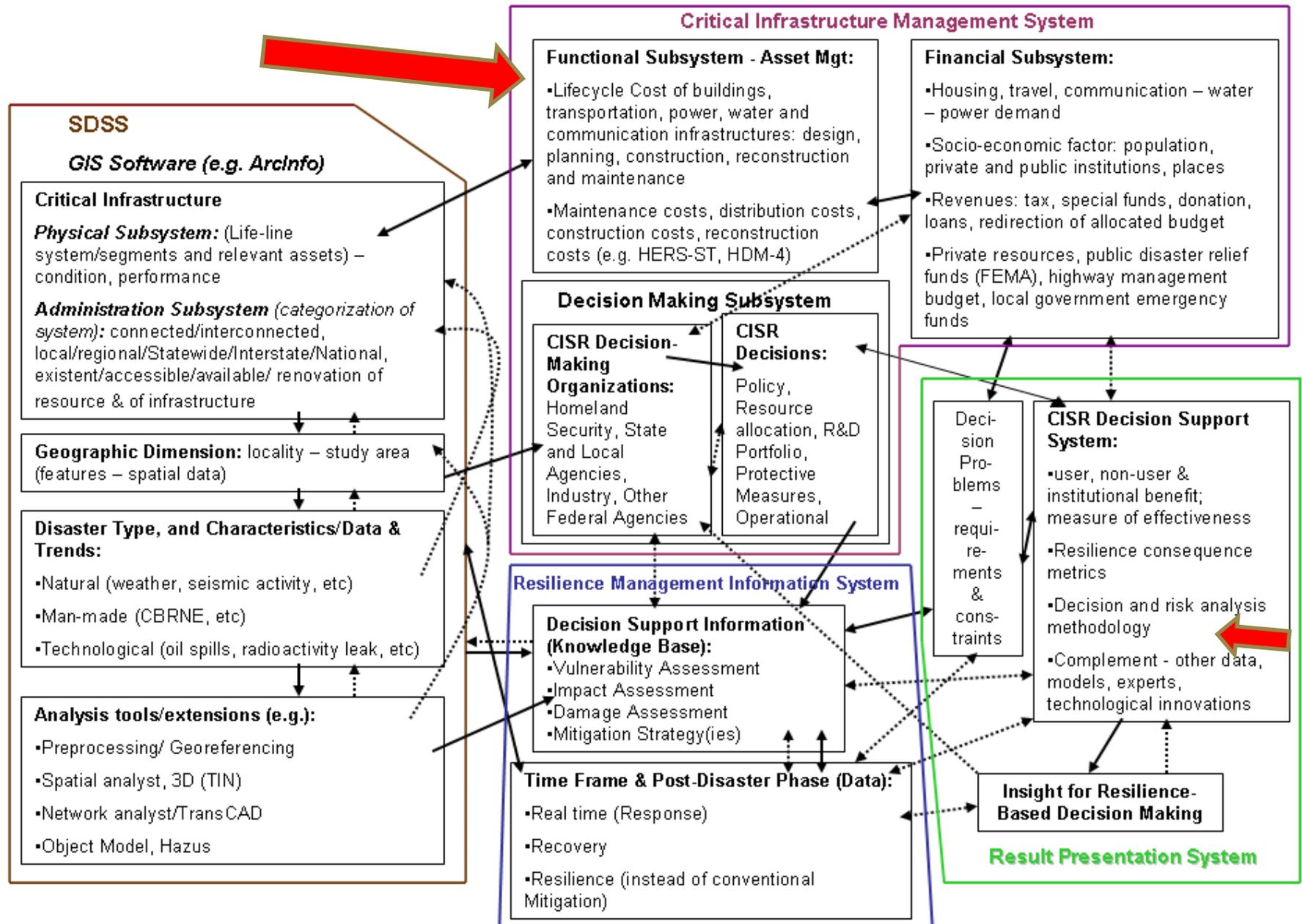
# Managing Critical Infrastructure Systems for Disaster Resilience: a Challenge

- Resilience metrics - performance indicators, safety measures, and/or based in rating systems to capture systems behavior
- CIR-DSS Framework – “what if scenario”

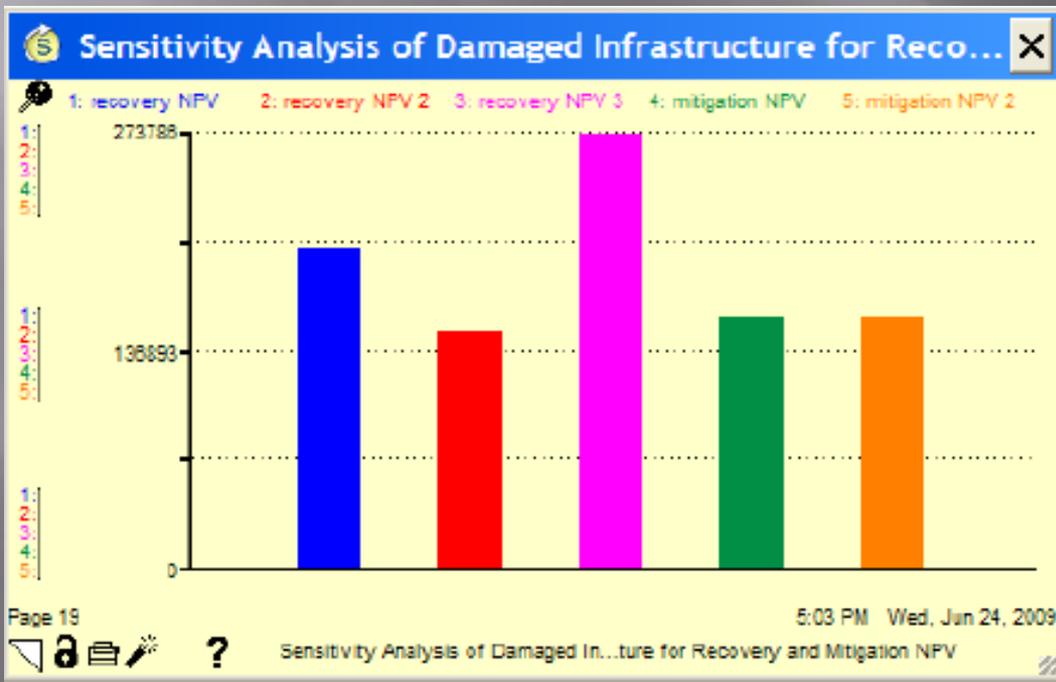


**TERMINOLOGY:**  
Mitigation (FEMA)  
= Adaptation  
(FHWA)

# System Dynamics Diagram of Decision Support System for Critical Infrastructure System Resilience (CISR)



Probability of a 100-year storm event in the case study area	Result of: (Recovery projects - Mitigation projects)
1%	-9809 recovery cost less than mitigation
4%	44065 recovery cost more than mitigation
8%	115896 recovery cost more than mitigation



↑ frequency of the 100-year storm event

↑ worthwhile investments in mitigation projects

# Scalability of Methodology

## INITIAL RESEARCH APPROACH

1. Extension of damage compared to study area (\$ and %)
2. Mitigation project useful time (FEMA: road mitigation = 50 years)
3. Event probabilities and impact on projects costs and benefits
4. Infrastructure disaster impact proportional size (miles) to corridors or road network
5. Difference between mitigated areas to not mitigated areas
6. New disaster occurrence and improvements to or adaptation of infrastructure
7. Number of times projects are conducted to improve the road network (assume impact to different locations) - free timeframe and no budget limits

## APPROACH FOR STRATEGIC INVESTMENT PLAN

1. Transportation - high frequency impact and vulnerable
2. Adaptation/mitigation approaches, cost, benefit
3. Known disasters and future events probability
4. Enterprise risk assessment – focus on funding and technical resources
5. Recovery and mitigation trade-off analysis (project costs and event probabilities)
6. Time-frame and budget limitation
7. Criticality and prioritization analysis for investments

# Challenges

Results = possible better decisions



When is “enough truly enough” to move into action?

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