

Oct 28th, 10:00 AM - 12:00 PM

Coastal Resilience Activities: Overview and Lessons Learned

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Coastal Resilience Activities Overview and Lessons Learned

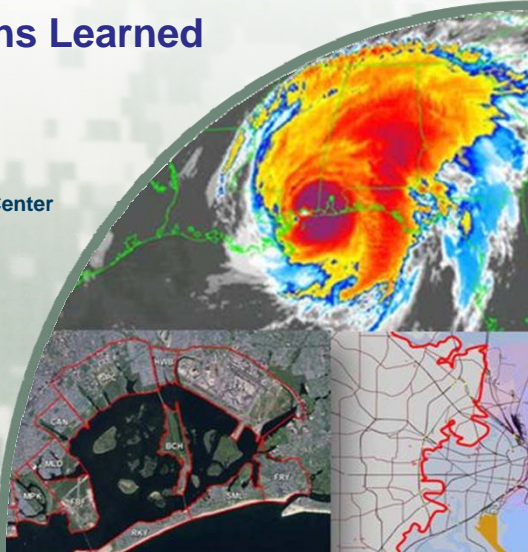
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US Army Corps of Engineers

28 October 2015



**US Army Corps
of Engineers**



US Army / US Army Corps of Engineers, Engineer Research and Development Center

2500 Employees
Over 1000 engineers and scientists
28% PhDs; 43% MS degrees

**Research Laboratories
of the
Corps of Engineers**

★ Laboratories

● Field Offices

Cold Regions Research
Engineering Laboratory
(Hanover, NH)

Geospatial Research
Laboratory
(Alexandria, VA)

Construction Engineering
Research Laboratory
(Champaign, IL)

Headquarters (Vicksburg, MS)

Coastal & Hydraulics Laboratory
Environmental Laboratory
Geotechnical & Structures Laboratory
Information Technology Laboratory

*IWR

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ERDC Research Business Areas



Civil Works/Water Resources





Environmental Quality/Installations







Military Engineering



Geospatial Research & Engineering




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Overview of Activities

- North Atlantic Coast Comprehensive Study (S 2014)
- Charge from Coastal Engineering Research Board (F 2014)
- Demonstrations at Jamaica Bay, NY and Mobile AL (2014-15)
- Resilience Community of Practice (S 2015)

- Engineering with Nature
 - River training structures
 - Multiple lines of defense
- Adaptive Management
 - Monitoring decision indicators



Working Definition

Prepare, resist, recover, and adapt

Cycle of Resilience

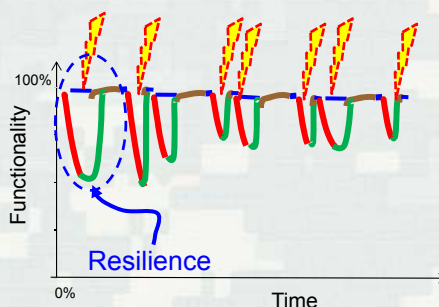
Actions found in most definitions



Resilience Timeline

Future resilience is increased:

- Less disruption
- Faster recovery



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Proposed Tiered Assessment

Tier 1 – Community System-Scale

Assess overall coastal system resilience, community priorities and needs

➤ Planning (3x3x3)

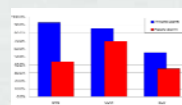
	Prep	Abs	Rec	Adapt
Phys				
Info				
Cog				
Soc				

↓ Values / priorities / context

Tier 2 – Coastal System Infrastructure

Quantify coastal system capacity to resist damage and recover from specific coastal hazards for coastal infrastructure

➤ Operations & Maintenance



↓ Infrastructure vulnerabilities

Tier 3 – Bayesian Network Analysis

Optimize engineering design/operation
Model response to future scenarios

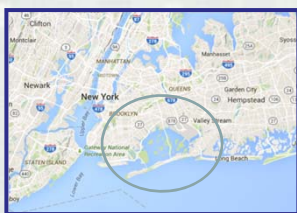
➤ Engineering & Construction



Coastal Storm Resilience Case Studies

Rockaway, New York

April 2014



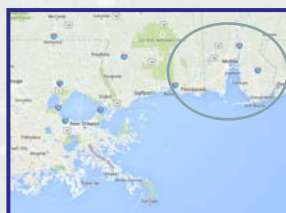
- Post-Sandy documentation
- Influx of recovery funds
- Specific Metrics
- Tiers 1 and 3



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Mobile, Alabama

March 2015



- Katrina-size threat
- Previous resilience work
- Expert / stakeholder scores
- Tiers 1 and 2

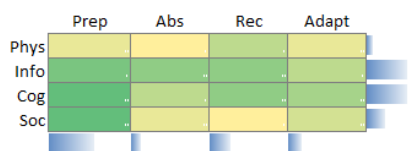


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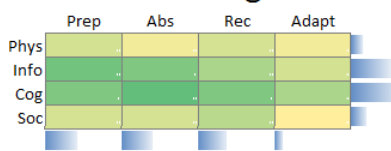
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Tier 1 Example

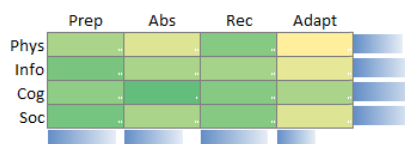
Tourism



Housing



Port



Ecosystem

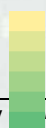


Low Existing Capacity



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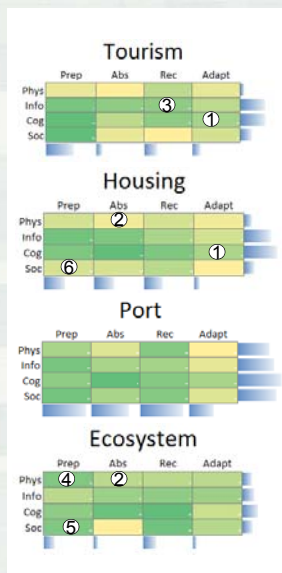
High Existing Capacity



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Tier 1 Example



1. Building code improvements, enforcement
2. Replace bulkheads with natural revetment and living shorelines to mitigate erosion
3. Develop network of licensed contractors for businesses to access to rebuild
4. Reduce impervious surfaces in new upland developments
5. Continuing education on ecosystem services, fragility and human impact on health
6. Continuing education on public safety

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Tier 2 Example

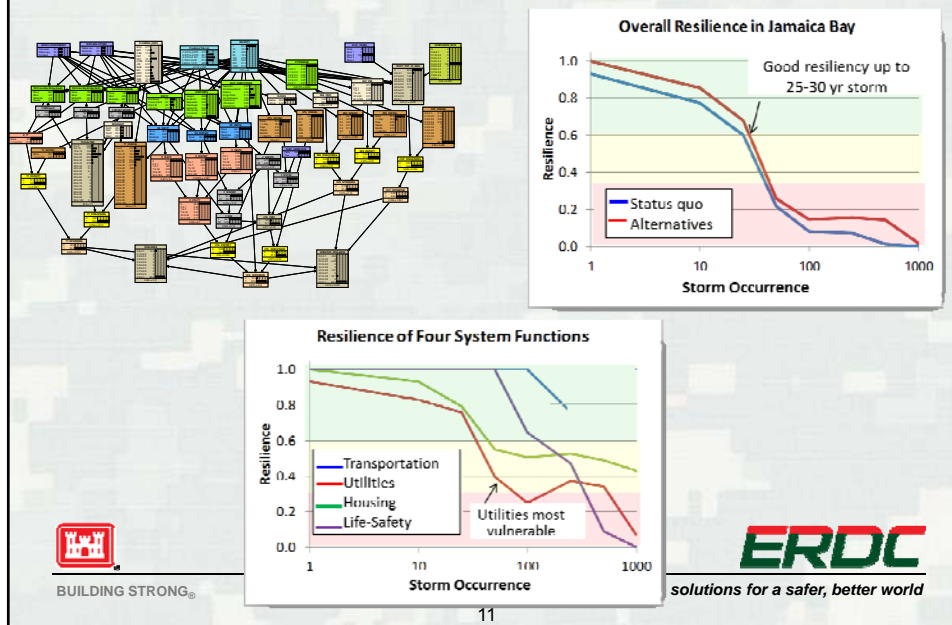
CN=Critical Need	Description	Performance Goal (PG)	Recovery Goal (RG)	PG Met?	RG Met?	Wt	Georges Value
				Yes=1; No=0	Yes=1; No=0		
Communication	Radio transmission towers AND 2 of the following 4: critical cell, satellite comms, internet, 2-way radios	100% radio transmission towers; 2 of 4	Restored within 48-72 hours	1	1	35%	35%
Utilities, Energy, Fuel	Emergency operations	100% utilities for emergency operations	100% restored within 24 hours: power to gasoline pumps & incident command; McD coal terminal; fuel terminals	1	1	26%	26%
Transportation System	Maintain critical interstate, Highways, rail, and navigation: 45-ft channel, highways, rail, 9-ft barge channel	100% transportation system available within 24 hours	100% transportation system available within 48 hours	0	0	39%	0%
Water Resource Engineered Infrastructure Resilience:							61.0%

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Tier 3 Example



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Observations and Lessons Learned

- The Public – values v. solutions, identify stakeholders
- Recovery data – economic, environmental, community
- Utilities – challenges of conversation and data access
- Expert development of scenarios
- Network Science – redundancy v. path switching



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Ways to Collaborate with Us

- Internship program
- Cooperative Agreements
- Assistance to States

Thank You

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References

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