Regional Resilience for Transportation and Economic Development

National Regional Transportation Conference | July 29, 2020
Summertime with the CEDS | Summer 2020
Stronger CEDS, Stronger Regions
CEDS Resource & Training Archive

www.CEDSCentral.com
Resilience: The ability of a region or community to anticipate, withstand, and bounce back from shocks, disruptions, and stresses including:

- Weather-related disasters or hazards / Impacts of climate change
- The closure of a large employer or military base
- The decline of an important industry
- Changes in workforce / effects of automation
- COVID-19 response & recovery
- Much more...
“Another way of looking at resilience is the ability not only to bounce back but also to “bounce forward” - to recover and at the same time to enhance the capacities of the community or organization to better withstand future stresses.”

- Urban Land Institute – After Sandy
Why Regional Resilience?

- Nearby communities often share similar risks/hazards
- Disaster impacts cross jurisdictional boundaries
- Communities are interdependent
  - Vulnerabilities in one community could impact another.
  - Mitigation investments in one community could impact another (positively or negatively).
- Economies are regional in nature
- Communities can accomplish more when they work together
Thanks for Joining the Webinar!

- Questions or comments can be submitted via the chat box on the right side of your screen in drop down menu.

- A recording of the webinar will be made available soon at [www.nado.org](http://www.nado.org) & [www.CEDSCentral.com](http://www.CEDSCentral.com).

- **Upcoming webinars for Summertime with the CEDS:**
  - **August 6** – Economic Development: Considerations for Change
  - **August 11** – So You Want to Hire a Disaster Recovery Coordinator? Lessons Learned and Best Practices for EDDs

- Please contact Brett Schwartz at [bschwartz@nado.org](mailto:bschwartz@nado.org) if you have any general questions about NADO RF or the Stronger CEDS, Stronger Regions program.
Today’s Presenters

Gena McCullough, Assistant Executive Director/Planning Director
Bi-State Regional Commission (IL/IA)

Joshua Owens, Senior Regional Planner
Houston-Galveston Area Council (TX)
Extreme Weather and Infrastructure Resilience

BI-STATE REGIONAL COMMISSION

FHWA PILOT PROJECT

GENA MCCULLOUGH, ASST. EXECUTIVE/PLANNING DIRECTOR
FHWA Resilience and Durability to Extreme Weather Pilot Program

2018 Resilience Pilots
Purpose of the Grant

- Conduct vulnerability assessment
- Determine strategies to mitigate impacts

"Resilience Triangle"
Quad Cities, Iowa/Illinois

- 5 Mississippi River Bridges + Rock River Crossings
- 4 Interstates, 5 U.S. Highways, 10 State Highways
- 3 Railroads – Class I & II
- 24 Barge Terminals
- 2 Locks/Dams
- 3 Public Transit Systems + Multiple On-Demand Private Providers & Taxis Services
- 2 Airports
- 2 National Trails
Vulnerability Assessment

- Structured process
- Ways to use results in practice
- Examples from other similar projects
- Links and references to related resources and tools
Project framework

- Develop an Advisory Committee
- Secure data
- Access vulnerability and adaptation options
- Determine priorities and opportunities to incorporate adaptation
- Integrate assessment
### Stakeholders

#### Environmental/Other
- NOAA-NWS, State Climatologists
- Corps of Engineers, NRCS, DNR/IEPA
- Industry, Health Depts., Universities

#### Transportation
- FHWA, State DOTs, County & City Engineers/Planners, EMAs
- Transit, Railroads, Airports, Trails Interests

#### Policy and Adaptation
- Planning Advisory Group
- Transportation Technical and Policy Committees
Summary of data trends

- FEMA Flood Risk Report
- CMIP Climate Data Processing Tool
- National Climatic Data Center
- FHWA, IL DOT, IA DOT
- Midwest Regional Climate Center
- US Geological Survey
- National Weather Service

- Increased variability
  - Floods, tornadoes, storms
- Increased precipitation
  - Frequency
  - Volume
- Increased disruptions for transportation networks
  - Impacts CAN be reduced through adaptive actions

# of IL Winter Days with Precipitation ≥ 1 inch
Source: MRCC
Variability vs. Trend and Extremes

Trend

Variability

Extremes
Climate Change (Trend)

Need to acknowledge and consider in planning. The rules of the game are changing now.
Billion-Dollar Disasters

1980-2019 Year-to-Date United States Billion-Dollar Disaster Event Frequency (CPI-Adjusted)

Event statistics are added according to the date on which they ended.

Statistics valid as of April 9, 2019.
Future Climate
Hazards today and in the future

Heat

Flood, river and flash

Drought
  ◦ Wildfires (rare)

Winter Storms

Severe weather
  ◦ Tornadoes, hail, damaging wind

Hurricanes? Coastal Flooding?

*These are confounded with an increase in social vulnerability.*
Extreme weather in the Quad Cities

- River flooding
- Flash flooding
- Combined storms
  - Hail
  - Lightning/thunder
  - High winds
- Severe winter storm
- Extreme heat
- Tornadoes
Local Trends 1900-2018
Record Crests
22.70 ft on 5/2/2019 1st
22.63 ft on 7/09/1993 2nd

Records for Consecutive Days above Flood Stage
96 days: 2019 – 3/15 to 6/18
43 days: 2011 – 3/29 to 5/10
Data sharing

- City inundation data?
- Storm surge backup on the Mississippi?
- Late season floods?
- Straight line winds?
- Main routes that have underground power lines?
- Extreme heat?
- Other?

Source: Climate Change Impacts in Iowa: Report to the Governor and Assembly, 2010
Prioritizing Assets

**Criticality assessment** = involves identifying the most critical elements of the transportation system for analysis, using quantitative and qualitative data.

**Vulnerability assessment** = what critical facilities/infrastructure are more vulnerable to disruptions or likely to be impacted by extreme weather, now and in the future?

**Adaptation options** = strategies that can increase resilience of the regional transportation system.
Critical Infrastructure & Facilities

- Evacuation gathering sites
- Public works facilities
- Transit hubs
- Transit transfer points
- Rural transit operations
- Airports
- Port facilities
- Railyard
Stakeholder Survey & Interviews

Transportation Infrastructure Problems

Details
Type (required)
Select...

Structural Impact

Submitted By

Location
Click the map to draw the location.
Enter an address to search

Report It
Cancel
Stakeholder Workshop

• Vulnerability assessment
• Adaptation options
**Criticality Assessment**

**Criticality assessment** = involves identifying the most critical elements of the transportation system for analysis, using quantitative and qualitative data.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of use</td>
<td>Traffic volume</td>
</tr>
<tr>
<td>Risk of flooding</td>
<td>Elevation relative to sea level</td>
</tr>
<tr>
<td>Special route locations</td>
<td>Maintenance priority routes &amp; evacuation routes</td>
</tr>
</tbody>
</table>

Virginia DOT

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of destinations</td>
<td>Jobs and population density</td>
</tr>
<tr>
<td>Magnitude of connections</td>
<td>Traffic volume and ridership</td>
</tr>
<tr>
<td>Emergency routes</td>
<td>Evacuation routes</td>
</tr>
</tbody>
</table>

North Jersey Transportation Planning Authority
Refining Criticality Criteria

Stakeholder & Transportation Technical Committee Input

What is critical to our region’s transportation system?

- High use areas/routes
- Land use/destinations of importance
  - i.e. RI Arsenal, densely populated areas
- Mississippi River crossings
- Medical/emergency routes
  - i.e. hospital access
- Redundancy throughout network
- Economic vitality
  - i.e. access to large employers
Data Input for Weighted Sum Overlay Analysis

**Bridges (AADT)**

- Manual Classification
  - < 1,000: 1
  - 1,001 – 10,000: 2
  - 10,001 – 25,000: 3
  - 25,001 – 40,000: 4
  - > 40,000: 5
  - Pedestrian access bridge: 1

**IL Roadways (AADT)**

- Natural Breaks Classification
  - 500 - 4,250: 1
  - 4,251 – 9,400: 2
  - 9,401 – 17,900: 3
  - 17,901 – 32,600: 4
  - 32,601 – 69,700: 5

**IA Roadways (AADT)**

- Natural Breaks Classification
  - 500 - 3,520: 1
  - 3,521 – 8,900: 2
  - 8,901 – 17,100: 3
  - 17,101 – 30,000: 4
  - 30,001 – 72,000: 5

**Access to Critical Facilities**

- All access road segments: 5

**Access to Major Employers**

- All access road segments: 1

**Bettendorf Transit (Ridership)**

- Natural Breaks Classification of Avg. Weekday Ridership
  - 0 – 76: 1
  - 77 - 95: 2
  - 96 - 111: 3

**Davenport Transit (Ridership)**

- Natural Breaks Classification of Avg. Weekday Ridership
  - 0 – 110: 1
  - 111 - 186: 2
  - 187 - 302: 3

**MetroLink Transit (Ridership)**

- Natural Breaks Classification of Avg. Weekday Ridership
  - 0 – 634: 1
  - 635 – 1,545: 2
  - 1,546 – 2,518: 3
Result of Weighted Multi-criterion Analysis Using Criticality Criteria

Legend
Criticality Weighted Score
- 4 - 7
- 8 - 12
- 13 - 17
- 18 - 21

Source: Esri, HERE, Garmin, Intermap, increment, iGraph, Inc., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Criticality & Stakeholder Identified Vulnerability Areas

Legend
Criticality Weighted Score
- 4 - 7
- 8 - 12
- 13 - 17
- 18 - 21

Stakeholder Input
TYPE:
- Flood
- Freeze/Thaw
- Ice/Snow
- Other
- Wind

Source: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCan, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), © OpenStreetMap contributors, and the GIS User Community
Focus for Adaptation Options Prioritization

• Most at-risk
  • Corridors
  • Hot spots
• Already Planned Projects
• Asset by State or Jurisdiction
• Combination

Priority Segments for Adaptation Options Review
Review Priorities by Potential Solutions

<table>
<thead>
<tr>
<th>Advisory</th>
<th>Control</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intelligent Transportation System (ITS)</td>
<td>Variable speed limits</td>
<td>Green infrastructure</td>
</tr>
<tr>
<td>Motorist alerts</td>
<td>Vehicle restrictions</td>
<td>Levee construction (traditional and living)</td>
</tr>
<tr>
<td>Communication &amp; Outreach Plan</td>
<td>Route restrictions</td>
<td>Culvert sizing</td>
</tr>
<tr>
<td>Road side active warning systems</td>
<td>Road-surface treatments</td>
<td>Road/bridge elevation</td>
</tr>
</tbody>
</table>

(Asam et. al., FHWA, 2015)
Other Policies and Procedures

- Climate and emissions policies
- Emergency Management
- Mitigation Measures
- Disinvestment
- Solutions with co-benefits
- Environmental Justice and Equity
## Incorporating into Transportation Planning Process

<table>
<thead>
<tr>
<th><strong>LRTP</strong></th>
<th>Extreme Weather Resilience Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Develop objective for LRTP – policy statement</td>
<td></td>
</tr>
<tr>
<td>• Incorporate Adaptation Priorities in chapters</td>
<td></td>
</tr>
<tr>
<td>• Consider resilience review for planned projects</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>TIP</strong></th>
<th>Resilience Discussion &amp; Project Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Recognize resilience in TIP – use environmental maps to highlight vulnerabilities</td>
<td></td>
</tr>
<tr>
<td>• Review selection criteria to incorporate resilience</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Technical Asst.</strong></th>
<th>Resilience in Project Development Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Write grants for priority resilience projects</td>
<td></td>
</tr>
<tr>
<td>• Work with local jurisdictions during project development process to incorporate adaptation options into project development</td>
<td></td>
</tr>
</tbody>
</table>
Jun.-Sep. 2020

- Criticality Mapping Analysis - Finalize
- Adaptation Strategies Draft to MPO Technical Committee and Advisory Committee
- Draft Resilience Study Report & Recommendations for the LRTP
- Final Report to FHWA

Lessons Learned – Peer Exchange

- Growing Staff Capacity in Climate
- Data Integration
- Valuing Resilience
- Proactive Collaboration
- Mainstreaming Resilience
- Resilience Informed Planning
Questions?

GENA MCCULLOUGH

GMCCULLOUGH@BISTATEONLINE.ORG
Lessons Learned in Economic Resilience Planning

In the Houston-Galveston Region
Questions

• How well is the 13-county H-GAC Region positioned to withstand and prevent disruptions?
• What are the SWOT’s at the regional and local level for the region’s urban, suburban and rural areas?
• What are the current best practices in the region and elsewhere?
• What resources are available to assist communities?
Planning Process

Economic Resilience Literature Review

Survey of Plans and Initiatives

Vulnerability Analysis

County-Level Workshops
Economic Resilience Literature Review

economic resilience

EDA definition

Economic resilience is the ability to withstand and prevent disruptions to the economy.
Survey of Plans and Initiatives

- Economic Development Strategic Plans
- Comprehensive Plans
- Hazard Mitigation Plans
- Capital Improvement Plans
Vulnerability Analysis

• Past Disasters
• Hazard Mitigation Plan Priorities
• Vulnerable Populations
• Growth/Land Use Forecasts
County-Level Workshops

- Presented Socio-Economic Data
- Hazard Mitigation Plan Priorities
- Economic Development Goals/SWOT
- Areas for Collaboration
Economic Context
Plan Contents

• Big Ideas
• County Level Economic Resilience Profiles
• Case Studies
• Resources
KEEPING WATER WHERE IT BELONGS

DEFENDING GREAT PLACES

FUTURE PROOFING
KEEPING WATER WHERE IT BELONGS
KEEPING WATER WHERE IT BELONGS
DEFENDING GREAT PLACES
DEFENDING GREAT PLACES
LIBERTY COUNTY ECONOMIC RESILIENCE PROFILE

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Introduction

Economic resilience is the ability to withstand and recover from disruptions to the economy. The most common types of disruptions include downturns in the economy or in a key industry, the exit of a major employer, and natural or man-made disasters.

Creating a resilient economy requires the ability to anticipate risk, evaluate how risk can impact economic assets, and build the capacity to respond to disruptions.

This profile is intended to provide an overview of the factors affecting the future growth, development and resilience of Liberty County and its economy by providing key data points on the economy, demographics, and other useful information.

Population Growth Forecast
Liberty County grew by 26% from 2000 to 2015 and is expected to reach 15,000 residents by 2040.

Municipal Populations
- The City of Liberty is Liberty County's largest incorporated municipality.
- Liberty: 9,175
- Cleveland: 8,005
- Dayton: 7,734
- Ames: 1,093
- Dayton Lakes: 1,040
- Hardin City: 885
- Plum Grove: 654
- Kennebeck: 611
- Navasota: 486
- North Cleveland: 267
- Old River Village*: 157
- Dayton Lakes: 100
- Unincorporated

*The municipality spans multiple counties. Only the population residing in Liberty County is shown here.
Leadership in Times of Crisis

A Toolkit for Economic Recovery and Resiliency
Welcome

RestoreYourEconomy.org provides resources and best practice information for public and private stakeholders who are seeking to rebuild their local economies after an economic disruption, be it a natural disaster or man-made crisis, as well as assisting the business.
Questions

Joshua Owens
Wharton Economic Development Corporation
execdirector@whartonedc.com

Cheryl Mergo
Houston-Galveston Area Council
Cheryl.Mergo@h-gac.com