2017 CONFERENCE ON REGIONAL AND METROPOLITAN PLANNING IN WISCONSIN

SESSION TWO PRESENTATIONS

SESSION TWO

11:00 a.m. – 12:00 p.m.

Recent floods and other natural disasters have put a spotlight on resiliency. Though our first thought may be to "harden" infrastructure to resist natural events, resilient infrastructure systems may also provide multiple routes or consider multiple modes between destinations. This session will address recent flooding in Wisconsin and the response to those hazards and extreme weather events. It will also cover planning tools and approaches to consider as we integrate resiliency into our plans.

DISCUSSION QUESTIONS:

- How is your organization planning to incorporate resiliency into the planning process?
- Who are additional partners we should bring into our processes?
- Are there examples and best practices you've found that would be useful to the group?

RESILIENT TRANSPORTATION

Credit: weather.gov

PRESENTATIONS

WISCONSIN 2016 FLOODING AND RECOVERY

Rosie Meer, Wisconsin Department of Transportation

Professional Archaeologist and Skeletal Analyst, Taught college for 10 years and worked for the Wisconsin Historical Society for 7 years

Has worked for DOT for 20+ years as an Environmental Analysis and Review Specialist at Regions and Central Office

RESILIENCY IN THE STATE HIGHWAY PROGRAM

Jeff Gust, Wisconsin Department of Transportation

Jeff has been with WisDOT for the last 28 years, where he currently serves as the Director of the Bureau of State Highway Programs. Jeff has held other roles at WisDOT including construction, planning and design.

Jeff graduated from the University of Wisconsin, Madison with a Bachelor of Science in Civil and Environmental Engineering and is a registered Professional Engineer in the State of Wisconsin.

FHWA RESILIENCE PRIMER

Mitch Batuzich, Federal Highway Administration

Mitch has worked in the transportation field for 27 years, starting with the Texas Department of Transportation and then with FHWA Division Offices in Texas, North Carolina, and now Wisconsin. He started work in the civil rights field and subsequently worked in the local programs, environment, and transportation planning disciplines

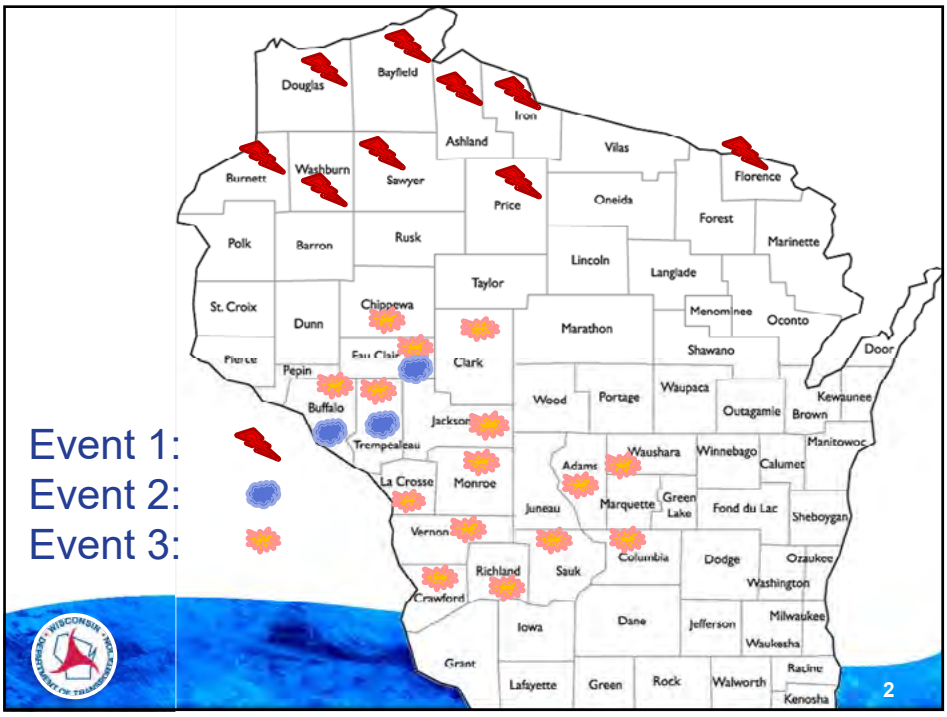
BUILDING RESILIENT TRANSPORTATION NETWORKS IN CHICAGO

Elizabeth Irvin, Chicago Metropolitan Agency for Planning

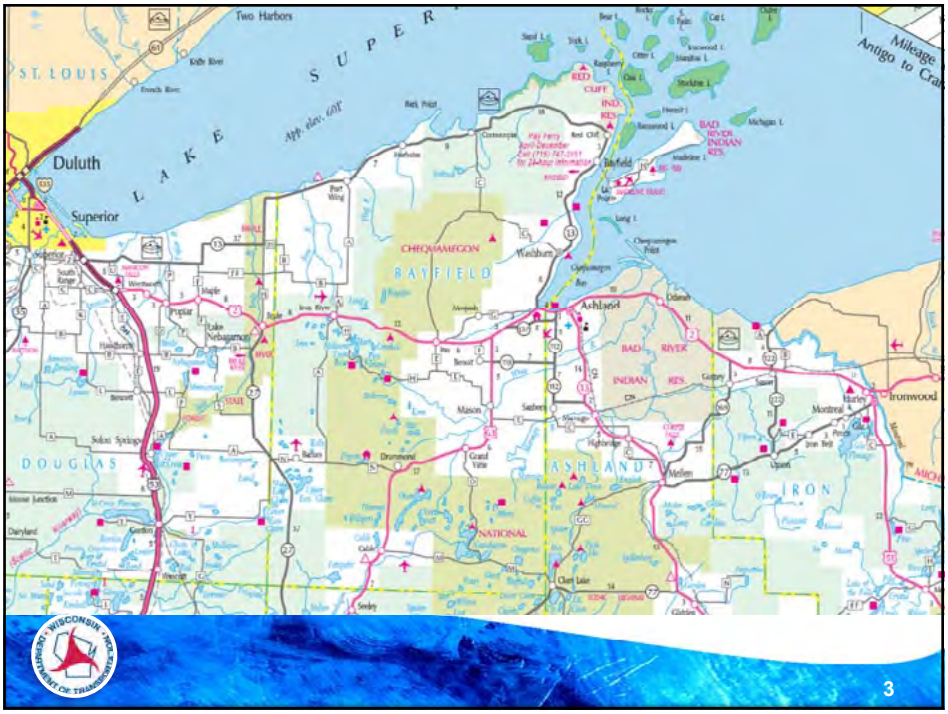
Elizabeth Irvin is a senior planner at the Chicago Metropolitan Agency for Planning. At CMAP, Elizabeth researches and analyzes issues related to transportation, the environment, and inclusive growth. Recently, she has been working on research and strategy development for ON TO 2050, the long-range comprehensive plan for the Chicago region, particularly changing travel behaviors, emerging transportation technologies, and transportation system resilience.

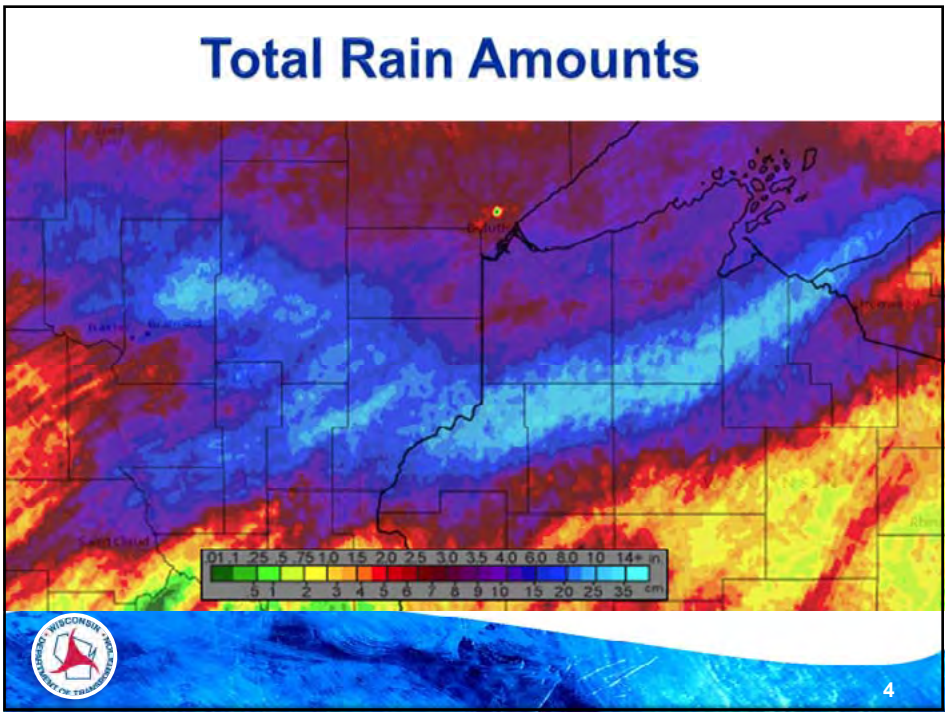
Elizabeth has a Masters in City Planning from MIT and a Bachelor of Arts in English and music from Williams College. She has also worked on federal and regional transportation and environmental policy in Washington, D.C. and Massachusetts. Originally from Cleveland, Ohio, she has enjoyed returning to and working in the Great Lakes region.

WISCONSIN 2016 FLOODING AND RECOVERY



Rosie Meer
Wisconsin Department of Transportation





Rosie Meer
Wisconsin Department of Transportation

WIS 2 – Ashland County

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Wisconsin Department of Transportation

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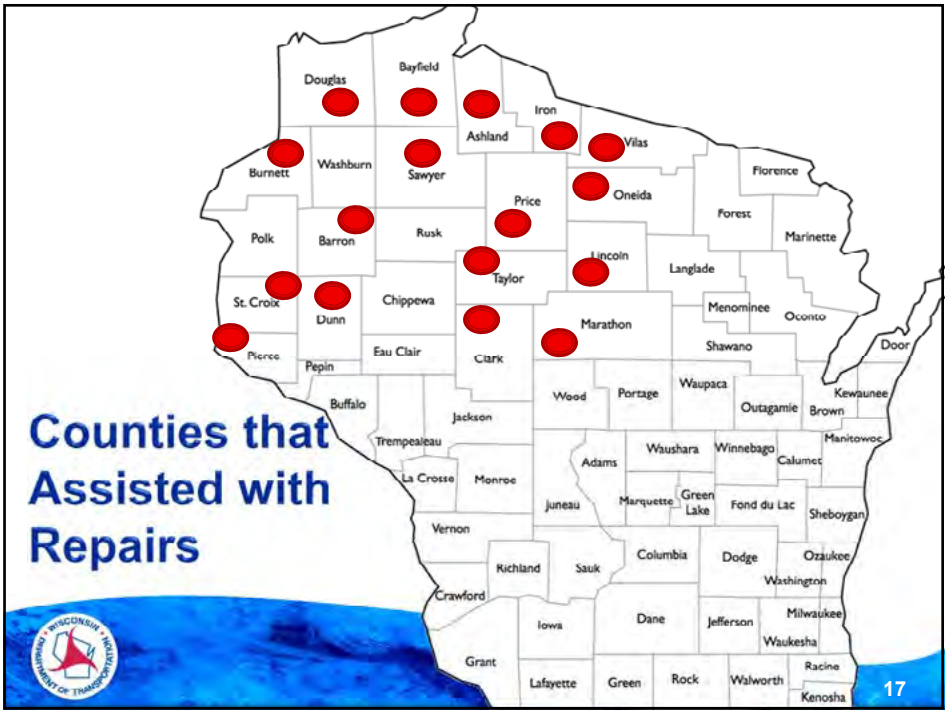

Environmental Staff Involvement

- Section 106 – Cultural Resources Team & SHS
- Tribal Involvement – Heavy involvement in Northern Counties; monitoring of construction
- 404 Permitting - USACE
- 401 Water Quality Certifications – DNR
- Special Waterways in Northern Counties
- Section 7; T&E Species
- Erosion Control – during construction
- Debris Removal
- Document Writing – most after the fact

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Rosie Meer
Wisconsin Department of Transportation

Resiliency in the State System

Jeffrey Gust

Bureau of State Highway Programs

- Disruptions to the transportation system due to extreme weather events have become a very real concern, threatening Wisconsin's transportation infrastructure. Recent flood events in Northern and Western Wisconsin have demonstrated the devastating impact such weather can have and the tremendous financial consequences these events impose

What is Resiliency?

- Resilience can be defined as the ability of a system to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions. As a concept, resiliency is rooted in ecological systems thinking, but has also been utilized in the field of disaster response and emergency management. Recently, the concept has been connected to asset management and risk management frameworks, where risk management helps systems prepare and plan for adverse events, and resilience management goes further by integrating the temporal capacity of a system to absorb and recover from adverse events, and then adapt.

WisDOT has focused on the reactive side of resiliency. The "withstand, respond to, and recover rapidly from disruptions".

Jeff Gust
Wisconsin Department of Transportation

How do we respond

- WisDOT has made great strides in ETO (Emergency Transportation Operations)
  - incident scenario matrix
  - "Chain of Command" for any incident
  - Work with other agencies
  - Many other items

Funding

- We created an overview of Emergency Highway Aid Programs in Wisconsin
- In the next portion of my presentation:
  - overview document
  - Summary of the three main categories

RESILIENCY IN THE STATE HIGHWAY PROGRAM

Overview of Emergency Highway Aid Programs in Wisconsin Revised: 6/20/17

CATEGORY	EMERGENCY RELIEF (ER)	PUBLIC ASSISTANCE (PA)	DISASTER DAMAGE AIDS (DDA)
(1) Administering Agencies	• Federal Highway Administration (FHWA) • WisDOT, DTSD, BHM (admin-lead), Regions (damage assessments, project set-up); DBM BBS (accounting), DTIM BSHP (programming)	• Federal Emergency Management Agency (FEMA) • Wisconsin Emergency Management (WEM) (admin-lead) • WisDOT, DTSD, BHM (admin) and Regions (inspections)	• WisDOT, DTIM Bureau of Transit, Local Roads, Railroads and Harbors (admin-lead) • WisDOT, DTSD, Regions (inspections, claim processing) and BHM (claim review)
(2) Coverage	Roadway or roadway structure damage on **ALL** Federal-aid highways (major collectors and above) resulting from a catastrophic failure or natural disaster. Besides physical damage, ER may include debris removal and emergency protective measures such as traffic control and detour signing.	Damage to any publicly owned or private non-profit facility. This includes damage to parks, schools, buildings, utilities, and roads/structures **NOT** on the Federal-aid system (minor collectors and below). PA also covers debris removal and emergency protective measures on **ALL** roads regardless of functional classification. This includes traffic control, detour signing, police/fire protection, pumping and sandbagging.	Damage caused by a disaster event to any highway that is not on the State Trunk Highway System.
(3) Activation & Eligibility	Governor's State of Emergency Declaration required. Presidential Disaster Declaration is not required. Minimum event damages of $700,000 (Federal share) required to be eligible for ER. FHWA Washington HQ makes final decision on ER eligibility after state division office recommendation.	Presidential Disaster Declaration required for a county to become eligible for PA funds. A Governor's State of Emergency will precede the Presidential Declaration. Joint FEMA/WisDOT team determines eligibility on a site-by-site basis with Local representative concurrence.	A local government authority must submit a DDA petition to the local transportation Region office for damaged roads or structures under its jurisdiction. Region office makes the final decision on eligibility based upon interpretation of statute §88.34.
(4) Payment Coverage	Emergency repairs: 100% if done within 180 days of the event, otherwise they are paid on prorated basis. May also include permanent restoration upon prior approval from FHWA. Permanent restoration projects: 90/10 (Interstate) or 80/20 (non-Interstate). Also includes, if necessary, preliminary engineering on those projects.	Grant-share arrangement where: • FEMA pays 75% • WEM pays 12.5% • Applicant pays 12.5%	1. For claims with final costs, applicant receives 75% of replacement costs plus 50% of improvement costs. 2. For claims ≤ $15,000, applicant may accept payment equal to 75% of WisDOT's estimate for all repairs (replacement and improvement), which may include final costs if available. 3. For claims submitted for damage by any governmental unit in response to the disaster, applicant receives 70% of replacement. 4. If Federal-aid is granted for damage reimbursement, it shall be in lieu of aid otherwise available under DDA.
(5) Time Limits	Emergency repairs are allowed up to 180 days of the event. After that, the work is considered permanent. Permanent restoration projects must be completed within 2 years of the event. The event duration is determined by FHWA.	Damage **MUST** have occurred within the incident (disaster) period as specified by FEMA and WEM. The incident period may cover one day or a series of days.	Petitions must be submitted within 60 days, and final costs submitted within 2 years of the disaster damage event. If federal disaster aid may be forthcoming, the deadline may be extended.
(6) Limitations	Damage must be at least $5,000 per site (Federal share). Heavy maintenance activities (minor shoulder washouts, slides, etc.) are not eligible. Damage must be directly related to disaster. A permanent restoration project needs prior approval from FHWA before commencing unless it is more economical or practical to perform as a related part of emergency repairs.	The costs to repair a damaged site must be at least $1,000. Reimbursement will be made to repair the facility to its pre-disaster condition. Additional improvements may be allowed under certain circumstances such as hazard mitigation or code requirements.	The road **MUST** have been closed OR rendered impassable due to the disaster damage or qualify for damages caused by any governmental unit in response to the event. Debris or water over a road does not automatically make a site eligible. Shoulder damage may not be eligible if non-4WD vehicles could still travel safely on the normal driving lanes. Heavy maintenance items (see FHWA column) are not eligible. Reimbursement will be made to repair a road to its pre-event condition. Improvements may also be done to prevent or minimize future damages to a site.
(7) Documentation	PICTURES of the damage are required. Each site should have: Location of, description of, and estimated cost to repair the damage (labor, equipment and materials). Final costs will be verified thru invoices and/or force account work. Permanent restoration projects require prior concept approval from FHWA.	FEMA and WisDOT inspectors prepare a Project Worksheet (PW) based on applicant cost records of the finished work (labor, equipment and materials), contract work, and rental invoices. Any remaining work will be estimated and a partial payment made. Final payment will be made when final costs are completed and submitted to WEM.	1. Petition forms (available from WisDOT) 2. Site map and pictures 3. Estimated or final costs for labor, equipment and materials, plus any force account or contractual work for each site. 4. Invoices and/or electronic or hand-written records for applicable costs listed in 3.
(8) Contacts	Greg Newhouse, FHWA, 608/829-7521 Mike Finkenbinder, WisDOT, 608/266-1620	Eric Learn, WEM, 608/242-3200 Mike Finkenbinder, WisDOT, 608/266-1620	Lorrie Olson, WisDOT, 608/266-0775 Mike Finkenbinder, WisDOT, 608/266-1620

Public Assistance (PA) - FEMA

Damage to any publicly owned or private non-profit facility. This includes damage to parks, schools, buildings, utilities, and roads/structures NOT on the Federal-aid system (minor collectors and below). PA also covers debris removal and emergency protective measures on ALL roads regardless of functional classification. This includes traffic control, detour signing, police/fire protection, pumping and sandbagging.

Jeff Gust
Wisconsin Department of Transportation

Emergency Relief (ER) - FHWA

Roadway or roadway structure damage on **ALL** Federal-aid highways (major collectors and above) resulting from a catastrophic failure or natural disaster. Besides physical damage, ER also includes debris removal and emergency protective measures such as traffic control and detour signing.

Disaster Damage Aids (DDA) - WisDOT

Damage caused by a disaster event to any highway that is NOT on the State Trunk Highway System

Need more information on funding programs?

- https://www.fhwa.dot.gov/reports/erm/er.pdf

What about the proactive side of resiliency. The "anticipate, prepare for, and adapt to changing conditions."

Some of the things we are doing include:

- Located and mapped low chord and low point locations along all interstate highways, also mapping floodplain locations.
- Completed flood studies of the Portage area
- Completed flood studies of the Rock and Crawfish river basins
- Updating our rainfall data in the WisDOT FDM (Facilities Development Manual)

Jeff Gust
Wisconsin Department of Transportation

RESILIENCY IN THE STATE HIGHWAY PROGRAM

Jeff Gust
Wisconsin Department of Transportation

U.S. Department of Transportation
Federal Highway Administration

FHWA Resilience Primer

Wisconsin Annual Planning Conference
October 30, 2017

Sustainable Transportation and Resilience

Roadmap

- Resilience
  - Definitions
  - Regulations
  - Guidance
- FHWA Resources and Tools
  - INVEST
  - Vulnerability Assessments

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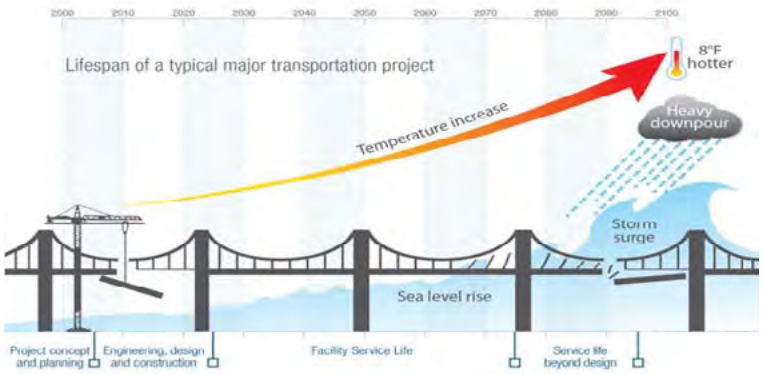
What is Resilience?

- **Resilience =** the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions



Source: FHWA Gulf Coast Study | USGCRP, National Climate Assessment 2014

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Why is resilience important?

Extreme weather events are disrupting transportation systems across the country

Impacts of a changing climate are being felt now, and will accelerate significantly in the future.
–National Academy of Sciences and National Climate Assessment

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FHWA Resilience Related Policy & Regulations

- **Policy** Order 5520 commits FHWA to integrating climate risk considerations into programs
- Climate adaptation activities eligible for FHWA **funding**
- Risk-based **asset management** plans must include climate risks
- Assets requiring repeated repair require **analysis of alternatives** to rebuild-in-kind
- State and metro **transportation plans** should now include resilience as a planning factor
- **Emergency relief** program guidance encourages cost-effective resilience strategies

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What does the planning rule say?

23 CFR 450.200 & 23 CFR 450.300
Take into consideration resiliency needs

23 CFR 450.206(a) & 23 CFR 450.306(b)
Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation

23 CFR 450.316(b)
Consult with agencies and officials responsible for natural disaster risk reduction when developing a MTP and TIP

23 CFR 450.324(f)(7)
Assess capital investment and other strategies that reduce the vulnerability of the existing transportation infrastructure to natural disasters

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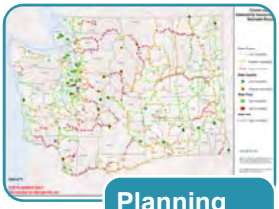
Integrating Resilience

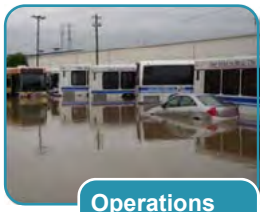
Goal: Mainstream consideration of resilience in transportation decision making

- In support of 23 U.S.C. § 503(b)(3)(B)(viii), which directs the U.S. Department of Transportation "to carry out research and development activities … to study vulnerabilities of the transportation system to … extreme events and methods to reduce those vulnerabilities."



Planning
- Long Range Transportation Plans
- Asset Management Plans

Project Level
- Environmental Processes
- Engineering
- Design



Operations and Maintenance
- Emergency Relief
- Snow Removal Programs

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FHWA RESILIENCE RESEARCH SNAPSHOT

Research

Gulf Coast 2 Study | Vulnerability Pilots | Hurricane Sandy Project | Engineering Assessments Study | Green Infrastructure Pilots





Resources

Vulnerability Assessment Framework | Guidance (HEC-25 & 17) | Synthesis of Approaches for Addressing Resilience in Project Development | Green Infrastructure Techniques for Coastal Highway Resilience




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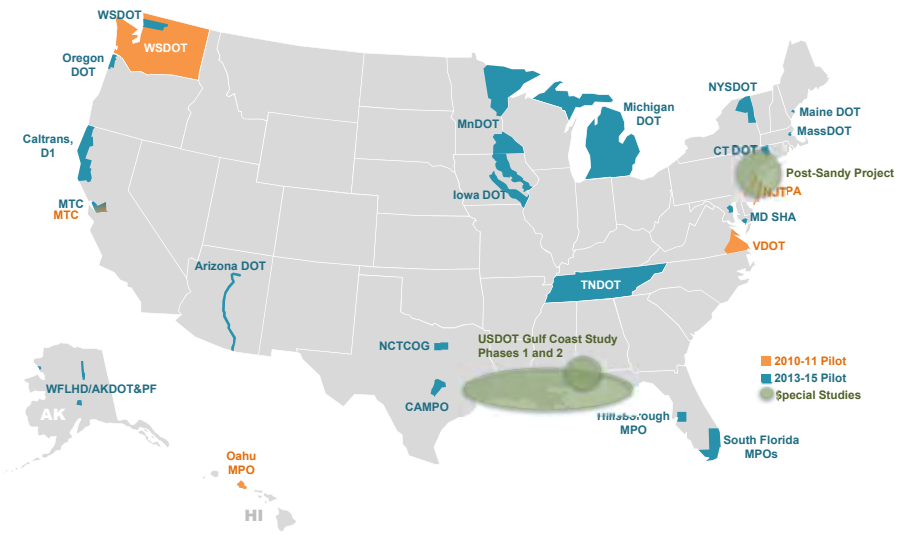
Federal Highway Administration

Research projects with Partners



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Resilience:

FHWA Resources and Tools—INVEST

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INVEST – Sustainability Assessment Tool

- Practical, web-based self-assessment tool
- Helps agencies assess and improve sustainability Triple Bottom Line
- Specific to transportation
- Voluntary, free and easy to use
- *Evaluate, Score, Improve!*

www.sustainablehighways.org

Supporting the Entire Life Cycle

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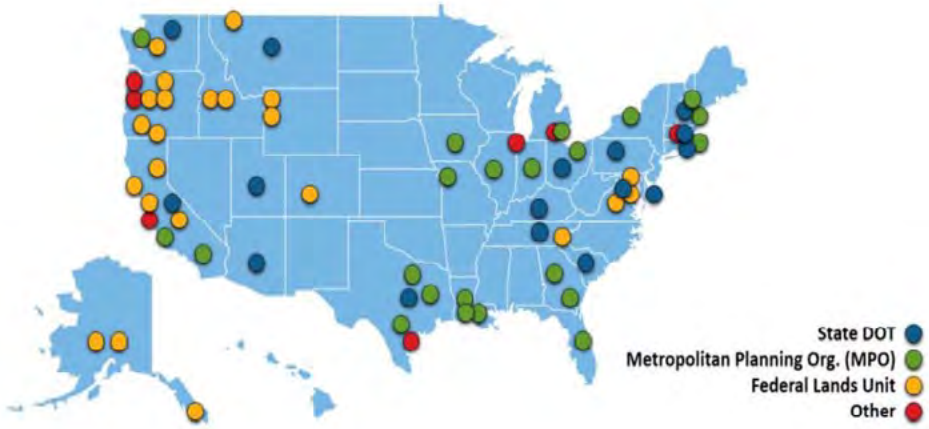
Federal Highway Administration

INVEST Implementation Sites



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INVEST Planning Criteria

- Integration of Transportation with Land Use, Energy and Environmental Planning
- Access and Affordability
- Safety
- Systems Management and Operations
- Multimodal
- Freight
- Travel Demand Management
- Financial
- **Infrastructure Resilience**

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INVEST – One place to start

SPR-16: Infrastructure Resiliency

For Regions

Goal: Anticipate, assess, and plan to respond to vulnerabilities and risks associated with current and future hazards (including those associated with climate change) to ensure multi-modal transportation system reliability and resiliency.

Identify a range of vulnerability and risks to both existing and planned transportation infrastructure.

INVEST SPR-16 Infrastructure Resilience Requirements

1) Develop and adopt goals and objectives
2) Coordinate with partner agencies
3) Integrate vulnerability and risk assessment information into planning documents
4) Develop and implement adaptation and resilience strategies
5) Develop performance measures
6) Demonstrate sustainable outcomes

Adaptation Strategies

1. Planning for Redundancy
2. Build protection for existing facilities
3. Relocate vulnerable transportation facilities, whether existing or planned
4. Consider climate/weather changes in asset management planning
5. Conduct vulnerability and risk assessment to integrate climate change risk.

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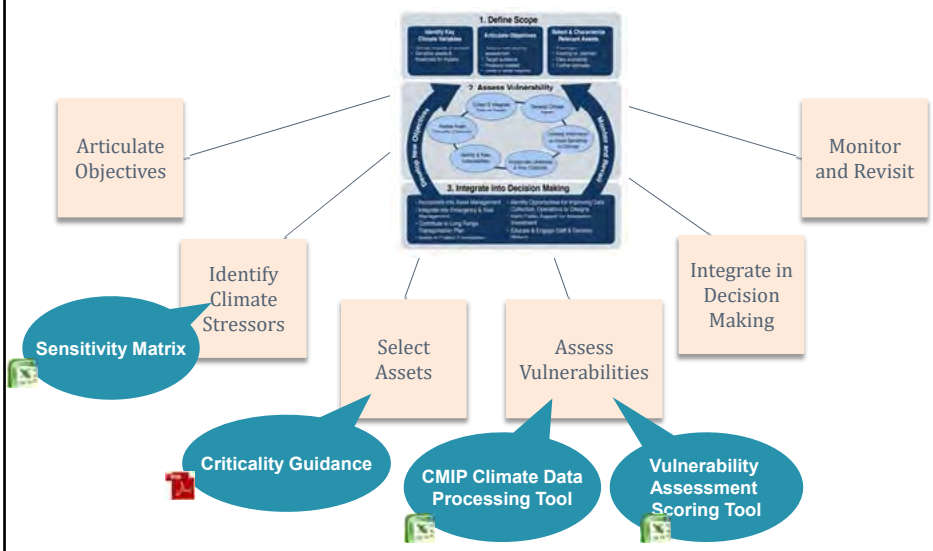
Vulnerability Assessments

- FHWA's Climate Change and Extreme Weather Vulnerability Assessment Framework
- Helps users implement the framework by providing tools, videos, case studies, and related resources

www.fhwa.dot.gov/environment/adaptationframework/

Vulnerability Assessment Framework and Tools



Sensitivity Matrix Content

U.S. Department of Transportation
Federal Highway Administration

	Transportation Assets	Climate Stressors
Physical Infrastructure & Service, Access, Maintenance, and Operations	Airports and Heliports Bridges Oil and Gas Pipelines Ports and Waterways Rail Roads	High Temperatures Precipitation-driven Flooding Sea Level Rise Storm Surge and Waves Wind Drought Dust Storms Wildfires Winter Storms Changes in Freeze/Thaw Permafrost Thaw

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Federal Highway Administration

Transportation Climate Change Sensitivity Matrix

U.S. Department of Transportation
Federal Highway Administration

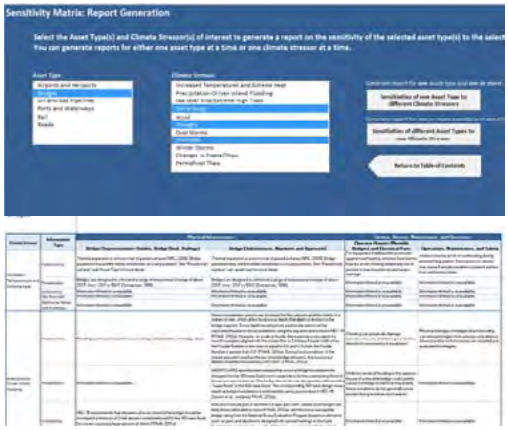
Spreadsheet-based reference tool

Covers relationship between 6 asset types and 11 climate stressors

Answers question: ***What happens when each asset type experiences each stressor?***

For each combination, provides:

- Qualitative relationship
- Thresholds
- Indicators of sensitivity
- Resources



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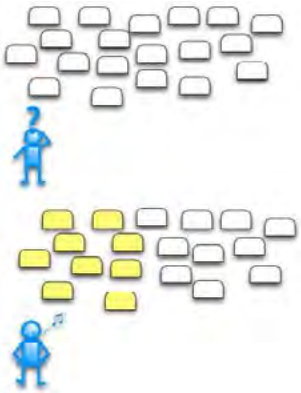
Criticality Guidance

U.S. Department of Transportation
Federal Highway Administration

Guidance Document

- Describes process of identifying which transportation assets are critical
- Provides possible criticality indicators
- Includes examples of criticality assessments



Mitch Batuzich
Federal Highway Administration

Example Criticality Criteria

U.S. Department of Transportation
Federal Highway Administration

Socioeconomic

- Lack of redundancy
- Provides access to school, government buildings
- Serves economic centers
- Provides multi-modal linkage
- Component of national and international commerce system
- Serves transit-dependent populations

Operational

- Functional classification
- Usage

Health & Safety

- Evacuation route
- Component of Disaster Relief and Recovery Plan
- Component of National Defense System
- Provides access to medical, health, and safety facilities
- Provides hazardous waste transport

CMIP Climate Data Processing Tool

U.S. Department of Transportation
Federal Highway Administration

- **What does it do?**
  1. Helps a user find and access downscaled climate data at the local scale (up to 56 mi^2)
  2. Processes the "raw" climate data into more detailed variables

Sample Temperature Outputs

- Annual averages
- Hottest temperature of the year
- 95th and 99th percentile temps
- # of days and consecutive days per year and season above 95, 100, 105, and 110°F

Sample Precipitation Outputs

- 95th and 99th percentile 24-hour precip
- Annual and seasonal precipitation
- Annual maximum 24-hour precipitation (time series)
- Largest seasonal 3-day precip

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Tool Training Resources

U.S. Department of Transportation
Federal Highway Administration

Training Webinars

http://www.fhwa.dot.gov/environment/climate_change/adaptation/webinars/

User Guides

http://www.fhwa.dot.gov/environment/climate_change/adaptation/publications_and_tools/

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Questions?

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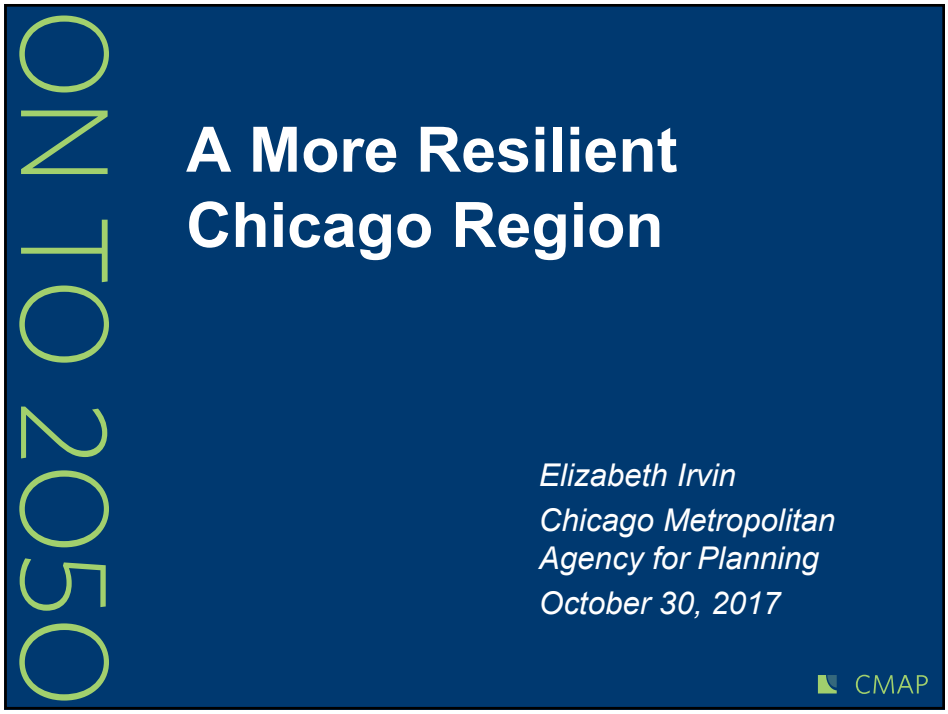
Federal Highway Administration



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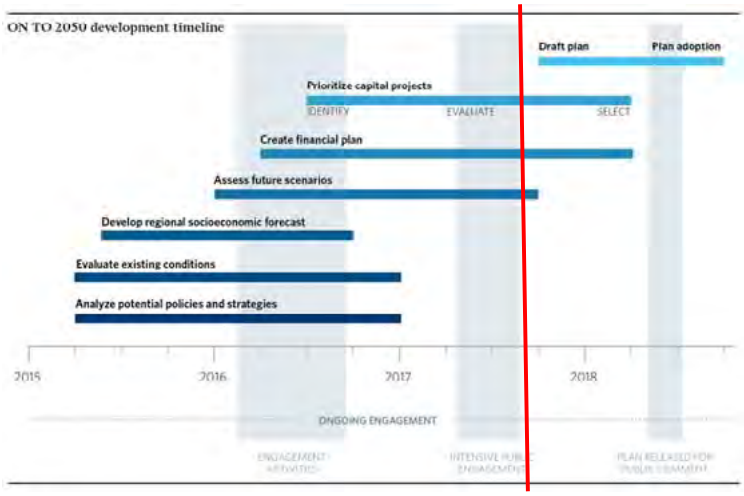
ON TO 2050



ON TO 2050

Three Overarching Principles:

Resilience
Inclusive Growth
Prioritized Investment

CMAP

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Chicago Metropolitan Agency for Planning

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Chicago Metropolitan Agency for Planning

CMAP
ON TO 2050 ALTERNATIVE FUTURES

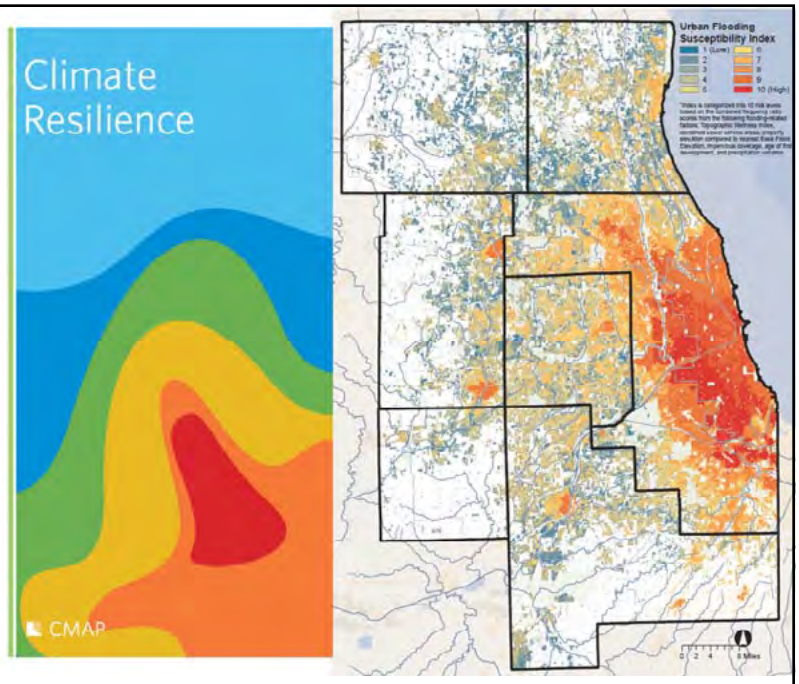
What if by 2050…

- … climate change impacts have intensified?
- … public resources are further constrained?
- … more people choose walkable, mixed-use communities?
- … technological innovations enhance transportation?
- … the economy has been transformed?

Elizabeth Irvin
Chicago Metropolitan Agency for Planning

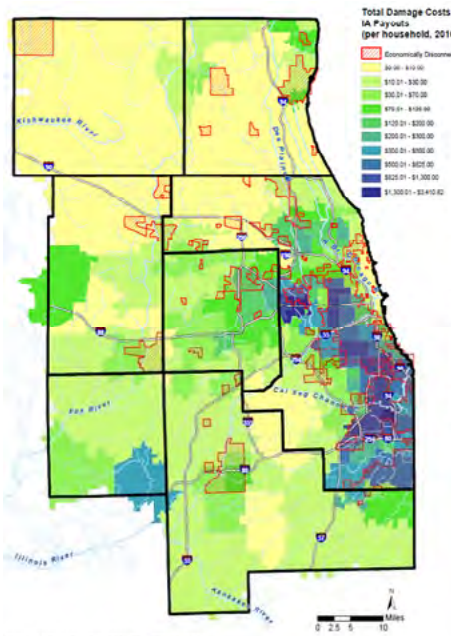
As climate change intensifies, which impact worries you most in our region?

A. Harm to life and property from storms, flooding (24%)
B. Insufficient water supply (24%)
C. Threats to regional agriculture, biodiversity
D. Effect of extreme heat on health
E. More intense impacts for vulnerable residents
F. I'm not worried
G. Other



Elizabeth Irvin
Chicago Metropolitan Agency for Planning

BUILDING RESILIENT TRANSPORTATION NETWORKS IN CHICAGO



Chicago Metropolitan Agency for Planning, 2017.

Table 2. Heat Vulnerability

Socioeconomic Characteristic[49]	Regional Population		Top 10 Percent Hottest Census Tracts Based on Land Surface Temperature	
	Count	Percent	Count	Percent
Total Population	8,459,768	100%	511,171	100%
Elderly Population (over 65 years)	1,013,640	12.0%	45,368	9.2%
People of Color[50]	4,030,135	47.6%	381,249	73.7%
Limited English Proficiency[51]	1,029,670	12.2%	144,993	27.2%
Family Income below Poverty Level[52]	1,100,842	13.7%	101,134	19.7%
No Health Insurance Coverage	1,146,328	13.6%	125,787	23.0%

Source: 2010-14 American Community Survey, 2010 U.S. Census, and CMAP analysis derived from Landsat 8.

RTA, PACE AND CTA KICK OFF FLOODING RESILIENCY PLAN FOR BUS OPERATIONS

August 12, 2016 Executive Director Leanne P. Redden Uncategorized Leave a comment

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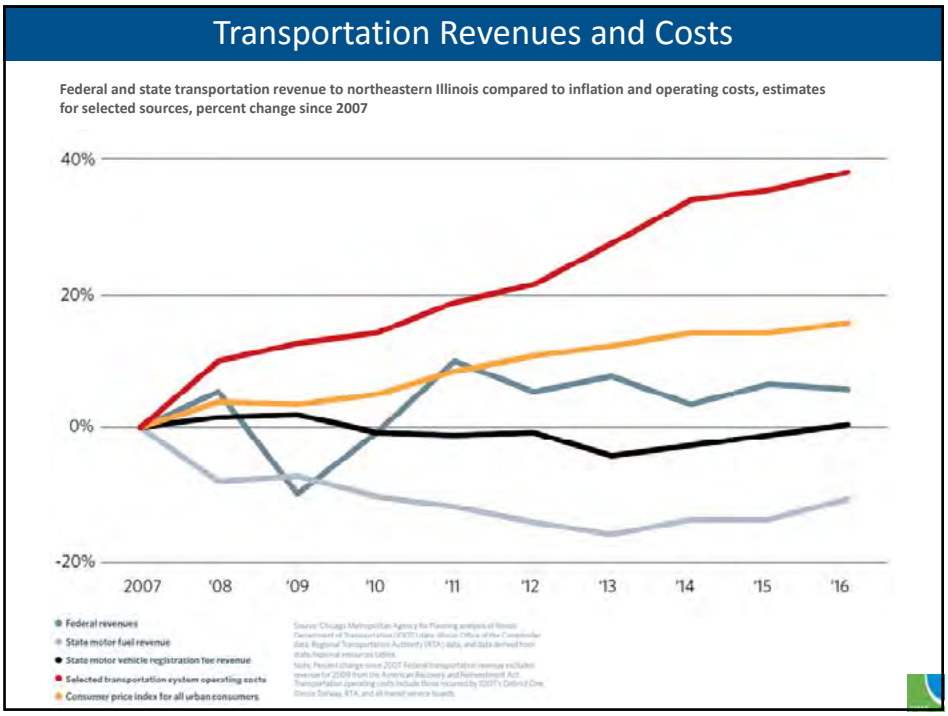
BUILDING RESILIENT TRANSPORTATION NETWORKS IN CHICAGO



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Chicago Metropolitan Agency for Planning

Resilience Recommendations

Increase the capacity of communities to achieve local and regional goals

Address state and local tax policy

Support walkable, mixed-use communities

Plan for population shifts

Incorporate climate change considerations into planning and development

Plan for the regional transportation impacts of major land use change

Coordinate across jurisdictions to promote collaborative action

Elizabeth Irvin
Chicago Metropolitan Agency for Planning

BUILDING RESILIENT TRANSPORTATION NETWORKS IN CHICAGO

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