

Smart, Shared and Social: All Hazards Transportation Recovery Plan Training

December 5-6, 2017
Portland, OR





We want to thank the Federal Transit Administration, sponsor of this research and Portland State University, the grantee, project lead, and host of this pilot training course.

Pre-course Questionnaire

Welcome to Portland

Day One Training Agenda

1. Registration and Pre-Training Questionnaire
2. Introductions, Project and Training Overview
3. Break
4. Transportation Recovery
5. Overview of Regional Emergency Plans and Transportation System
6. Lunch
7. Communications
8. Break
9. Roles and Responsibilities

Day Two Agenda

1. Quick Re-Cap Day One
2. Vulnerability Assessment
3. Break
4. Recovery Strategies
5. Lunch
6. Prioritizing Post-Disaster Investments
7. Break
8. Legal, Financial and Contracting Issues
9. Action Plan, Recommendations and Next Steps
10. Course Evaluation and Wrap Up

Introductions

- Name
- Agency
- Do you know everyone here?
- What are two things you hope to get out of this course?

Ground Rules

- Ask questions whenever you'd like
- Refrain from side conversations
- Silence cell phones
- If you need to take a call, step outside
- Contribute fully
- Honor times limits of breaks and group exercises
- Think outside of your agency or role

Module 1 Project Overview

Objectives

- Understand the background and purpose of the project
- Share lessons learned from Portland, case studies, and interviews with participating MPOs

Project Overview

- FTA Research Grant - Application filed in 2013
- February 2017 – Spring 2018
- Develop and test City of Portland All Hazards Recovery Plan that includes transit, Transportation Demand Management (TDM) and Intelligent Transportation Systems (ITS) strategies.
- The plan should include strategies to leverage communications through social media
- Develop training course and pilot test in Portland
- Offer training to six other regions nationwide

Guiding Principles of the Research Project

- **Smart:** Technology optimizes the usefulness of available infrastructure and services
- **Shared:** Recovery is the responsibility of multiple agencies and organizations
- **Social:** Provide and receive feedback quickly and efficiently during the recovery process

Training Participants

- FTA grant provided funding for six regions to host the training
- Solicitation process was announced by the Association of Metropolitan Planning Organizations (AMPO)
- 21 MPOs in 15 states applied
- Six regions and eight MPOs were selected to participate

Training Participants

- Portland, OR (Pilot)
- Strafford Regional Planning Commission, NH and Southern Maine Planning and Development Commission, ME
- Hillsborough MPO and Sarasota/Manatee MPO, Florida
- Broward MPO, Florida
- Coastal Region MPO, Savannah, Georgia
- El Paso MPO, Texas
- Lake Charles MPO, Louisiana

Training Overview

Objectives

- Provide participants with the tools, knowledge, skills and resources to develop an emergency transportation recovery plan that includes coordinated transit, TDM and ITS strategies and leverages social media resources to facilitate recovery.
- Recovery plan in each region must recognize the specific needs, resources and relationships with emergency responders and other agencies involved with recovery in that region.

Training Objectives

- Define all-hazards recovery planning
 - Understand the relationship between hazard mitigation planning, emergency response planning, and transportation recovery planning
 - Understand the role and potential of TDM, ITS, and transit in transportation recovery
 - Understand the potential use of social media in recovery efforts

Training Objectives (cont'd)

- Identify processes to:
 - Identify affected parties and assemble an all-hazards recovery planning team
 - Define a region's transportation system and vulnerabilities
 - Conduct a vulnerability assessment, identifying risk factors and their impacts
 - Prioritize asset repair/replacement during recovery

Training Objectives (cont'd)

- Understand critical role of communications strategies and protocols
- Explore ways to optimize use of social media as part of a communications strategy
- Learn the key elements that should be included in an all-hazards recovery plan
- Develop and implement a strategy for developing, training, and testing the plan

Key Inputs

- Literature Review
- Six case studies
- Stakeholder interviews
- Portland Transportation Recovery Plan development
- Table top exercise (September 2017)
- Survey and discussion with six MPO regions
- Pilot training in Portland

What We've Learned: Literature Review

1. Transportation recovery has emerged as a distinct aspect of the emergency management cycle.



What We've Learned: Literature Review

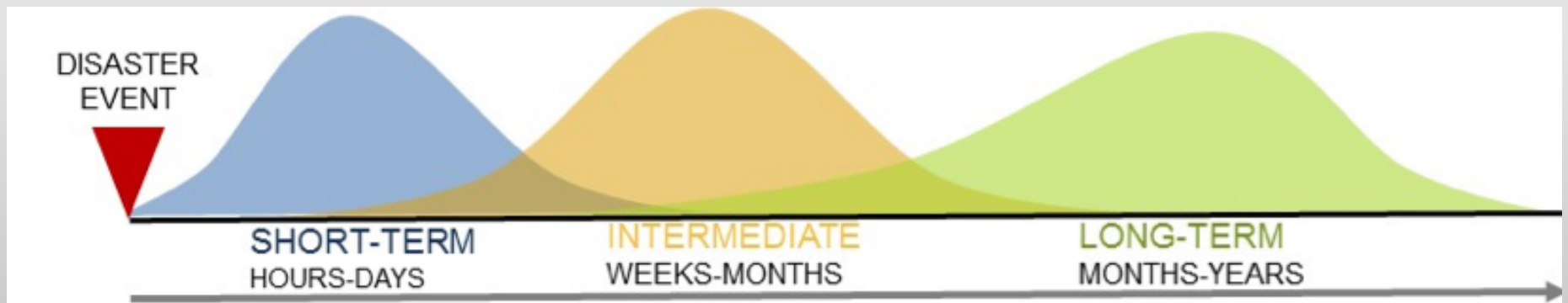
2. There is an official U.S. DOT definition of Transportation Recovery:

“Process that occurs after an adverse incident, and which is comprised of simple restoration of transportation infrastructure, assets, and systems to their conditions prior to the incident”

-USDOT

What We've Learned: Literature Review

3. There is an established framework for understanding recovery



What We've Learned: Literature Review

4. There is some (limited) guidance on transportation recovery protocols and practices.

...But there are key topics every recovery strategy should include:

- Infrastructure Assessment
- Role of transit & paratransit
- TDM/ITS
- Equity
- Communications and social media



What We've Learned: Case studies

- Mitigation Strategies
 - Travel options and alternatives are critical
 - Multi modal choices optimal
- Communication & Coordination
 - Vital to any recovery effort
 - Public agencies with each other
 - Public agencies with the public
 - Public to public through social media
- Resiliency
 - Resiliency of physical infrastructure should be a priority
 - Redundancy of modes and routes facilitates recovery
 - Roles and policies should enable and ensure resiliency

What We've Learned: Stakeholder Interviews

- Establish recovery management structure
- Establish protocols for recovery
- Update Emergency Transportation Route (ETR) maps
- Importance of agency collaboration and communication
- Need means of providing reliable information to the public
- Provide a checklist of recovery plan components
- Plan could assist in promoting the development of more resilient infrastructure

What We've Learned: Portland Table Top Exercise

- State DOT should be part of the conversation since their facilities are central
- Collaboration and communication are key
- Roles and responsibilities need to be documented
- The needs of vulnerable populations will be a challenge for recovery planning
 - Talk to organizations that represent their interests

What We've Learned: MPO Survey

Desired Recovery Elements

- Record of recovery time and costs (including economic impact to being offline)
- Website or actively curated social media presence related to recovery
- Flexible work program policies
- Criteria for recovery project prioritization
- List of existing TDM strategies
- List of disruption scenarios

What We've Learned: MPO Discussion

- Integrate into existing plans and organizational structures
- Recovery plan needs to be developed with all partners
- Leverage social media and ITS
- Consider existing emergency management processes

Summary

- Project purpose – Promote and facilitate recovery planning, encourage knowledge transfer between regions
- Case studies, interviews and MPO discussions informed Portland Plan and training
- Portland plan and table top exercises highlight the need for collaboration and communication, particularly with vulnerable populations
- Pilot training in Portland will inform final training materials



Module 2: Transportation Recovery

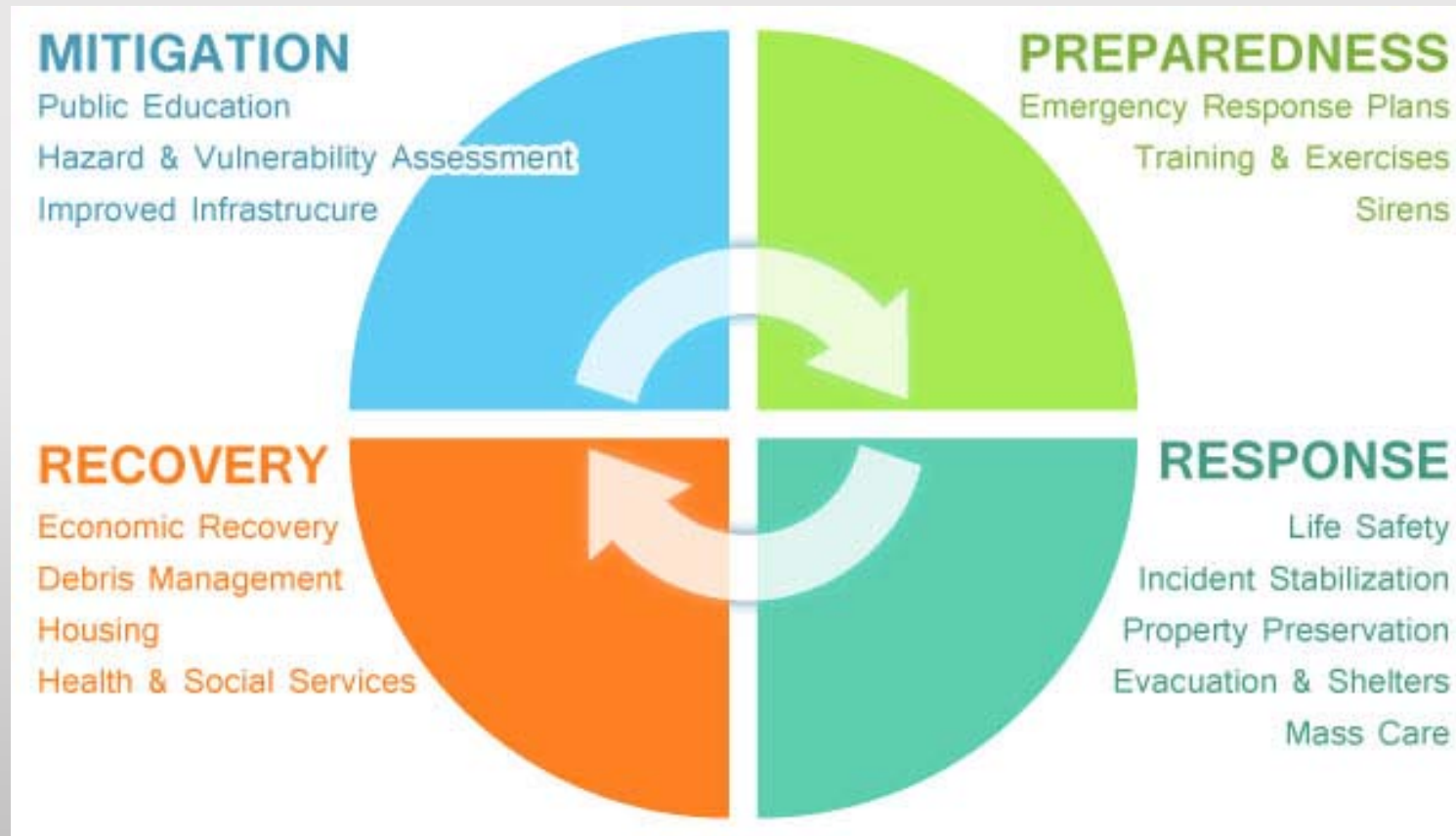
Objectives

- Identify key phases of Emergency Management
- Discuss need for coordination during all phases
- Explain difference between Hazard Mitigation Plan, Emergency Response Plans and All Hazards Transportation Recovery Plans
- Learn from case studies and past events
- Recognize the need for and benefits of recovery planning



Emergency Management

Phases of Emergency Management



Source: FEMA

Hazard Mitigation Plans - Federal Requirement

- The plans are required by FEMA for funding eligibility under FEMA grant programs.
- States, local and tribal governments must
 - Develop plans for FEMA approval
 - Meet plan requirements at 44 CFR §201.6
 - Update plans and submit to FEMA every five years
 - Use Threat Hazard Identification and Risk Assessment (THIRA)

Portland plan (Mitigation Action Plan) approved by City Council in October 2016

<https://www.portlandoregon.gov/pbem/67578>.

Threat Hazard Identification and Risk Assessment (THIRA)

- A 4-step process to identify risks and capability requirements and gaps
- Considers questions such as:
 - What threats and hazards to we need to prepare for in our region?
 - What core capabilities should we build and maintain?
 - What gaps in our capabilities and resources need to be prioritized for funding
- What regionally deployable and/or sharable resources (equipment and/or personnel) are required to be adequately prepared?
- What actions can we take to avoid, divert, lessen, or eliminate threat or hazards?

Portland Phases of Emergency Management



Figure 1-1. Five Phases of Emergency Management

Source: Mitigation Action Plan, Portland, October 2017

Emergency Response vs. Recovery

- Emergency response is a phase of emergency management that consists of immediate actions to save lives, protect property and the environment and meet basic human needs.
- Recovery is a phase of emergency management in which activities are carried out to restore essential services and repair damage caused by a hazard event.
- The goal of an all-hazards transportation recovery plan is to restore the normal functioning of the transportation system as quickly as possible after an event.

Mitigation, Response and Recovery *Planning* are similar, but different

- **Hazard mitigation planning:** "Hazard mitigation is the effort to reduce loss of life and property by lessening the impact of disasters. It is most effective when implemented under a *comprehensive, long-term hazard mitigation plan.*" (Source: FEMA)
- **Emergency response planning** relates to planning for actions that take place in the initial minutes, hours, or days after an emergency (e.g., rescue, life-safety efforts)
- **All-Hazards transportation recovery planning** is preparing for and protecting the transportation infrastructure following a major disaster and getting transportation facilities and services returned to operating condition.

National Disaster Recovery Framework

- Recovery is broadly defined and applies to all aspects of recovery, not just transportation. Recovery is defined as :

"those capabilities necessary to assist communities affected by an incident to recover effectively, including, but not limited to, rebuilding infrastructure systems; providing adequate interim and long-term housing for survivors; restoring health, social, and community services; promoting economic development; and restoring natural and cultural resources."



All-Hazards Transportation Recovery Planning

Introduction to All-Hazards Recovery Planning

- We don't know what type of hazards we will face
- We do know that transportation is critical to all aspects of response and recovery
- We know there will be constraints
- Decisions made during response phase may impact recovery efforts

Types of Hazards Facing Transportation Systems

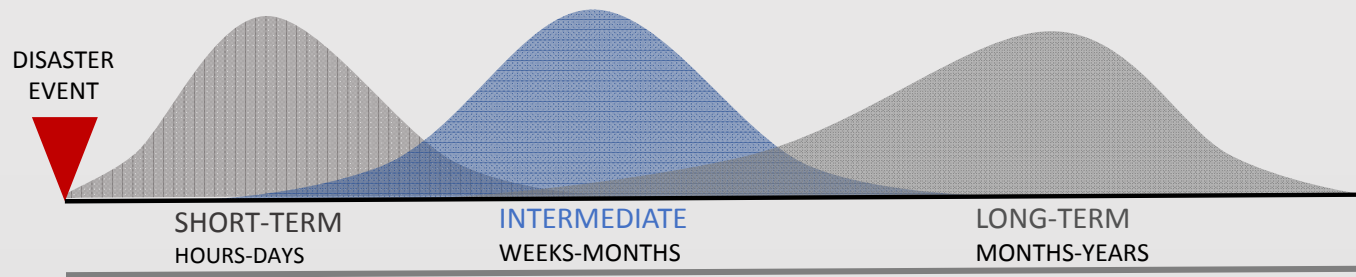
NATURAL	TECHNOLOGICAL/MECHANICAL	HUMAN-CAUSED
Avalanche	Airplane Crash	Biological Attack
Animal Disease Outbreak	Dam Failure	Chemical Attack
Drought	Bridge Failure	Cyber Incident
Earthquake	Levee Failure	Explosives Attack
Epidemic	Material Failure	Radiological Attack
Flood	Mine Accident	Sabotage
Hurricane	Hazardous Materials Release	School and Workplace
Landslide	Power Failure	Violence
Pandemic	Radiological Release	Traffic Accident
Tornado	Train Derailment	
Tsunami	Urban Conflagration	
Volcanic Eruption		
Wildfire		
Winter Storm		

Source: Modified from FEMA, 2010

Guiding Principles to All-Hazards Recovery Planning

- Flexibility is a must – don't know what type of hazards will occur
- Establish relationships and communication channels early
- On-going communication, collaboration and coordination is essential
- Complement existing emergency response efforts and integrate them into recovery planning

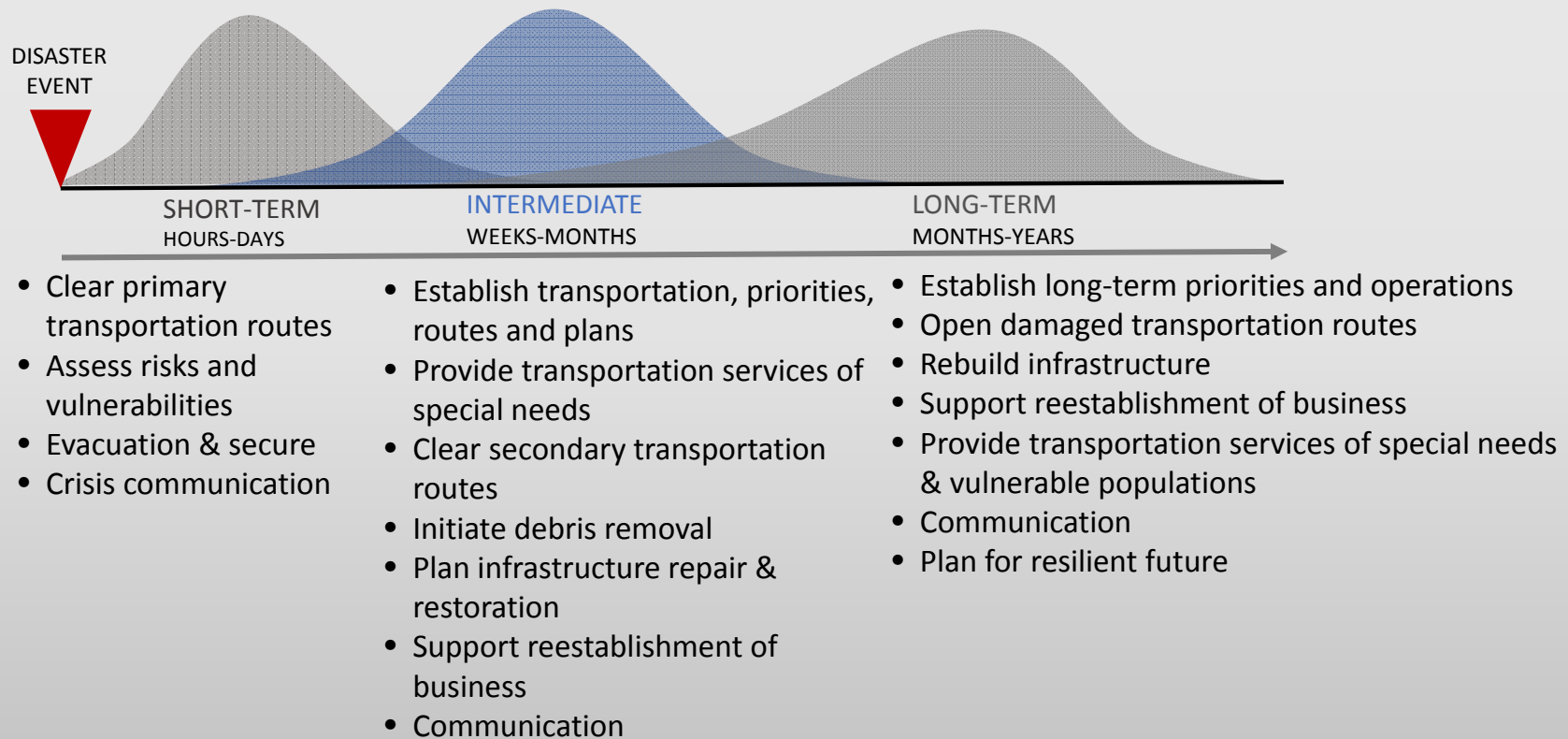
Road to Recovery



- | | | | |
|--|---|--|---|
| <ul style="list-style-type: none"> • Minor traffic incidents • Traffic crashes • Minor spills • Vehicle fires • Minor train/bus accidents • Accidents with injuries • Blackouts • Debris | <ul style="list-style-type: none"> • Train derailment • Major bus/rail transit accidents • Multi-vehicle crashes • Hazmat spills • Some Causalities/fatalities | <ul style="list-style-type: none"> • Train crashes • Airplane crashes • Hazmat Incidents • Multi-vehicle accidents • Tunnel fires • Major casualties and fatalities • Tornadoes • Large fire/explosion • Industrial incidents • Major tunnel closure • Storms | <ul style="list-style-type: none"> • Earthquake • Hurricane • Terrorist attack • Floods, blizzards • Infrastructure collapses • Extended power outage/fuel shortage • Mass casualties • Large social unrest • Pandemic |
|--|---|--|---|

Source: Adapted from National Disaster Recovery Framework

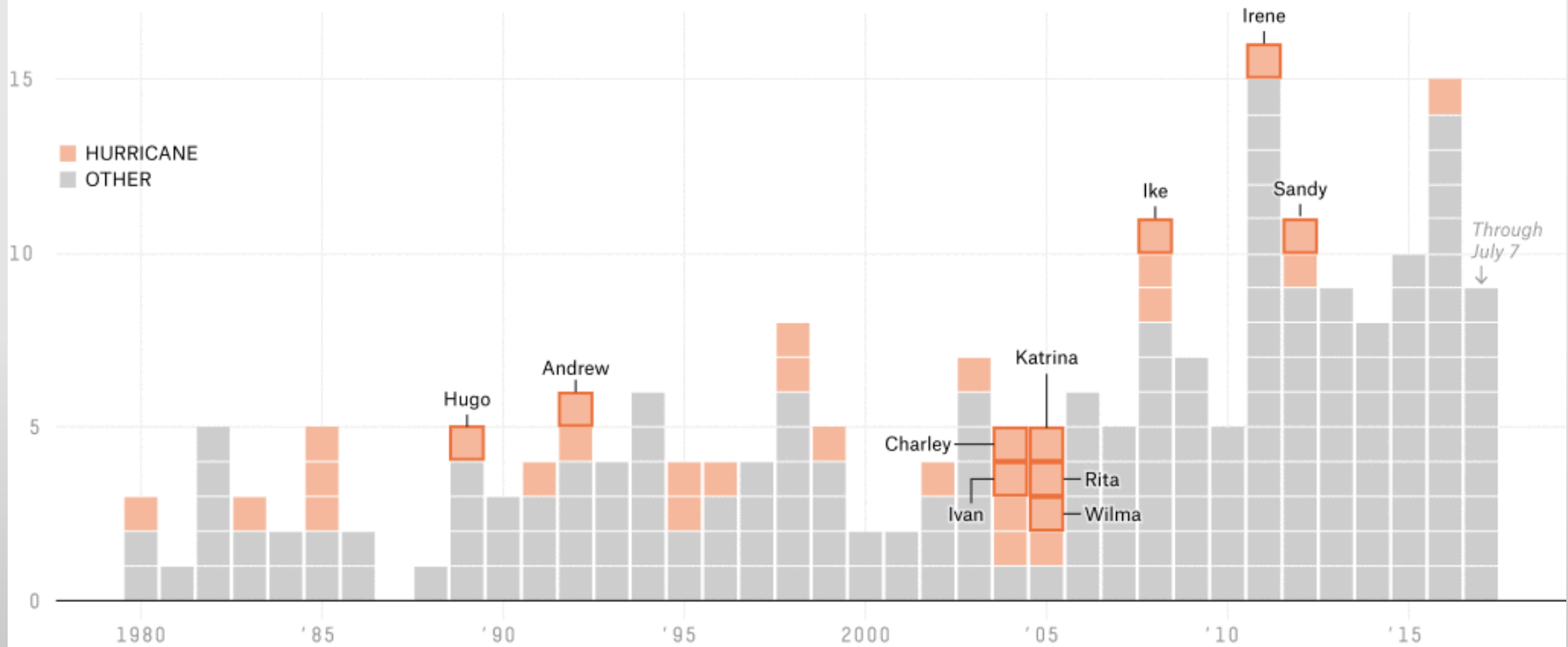
Road to Recovery



Source: Adapted from National Disaster Recovery Framework

Costly disasters are becoming more common

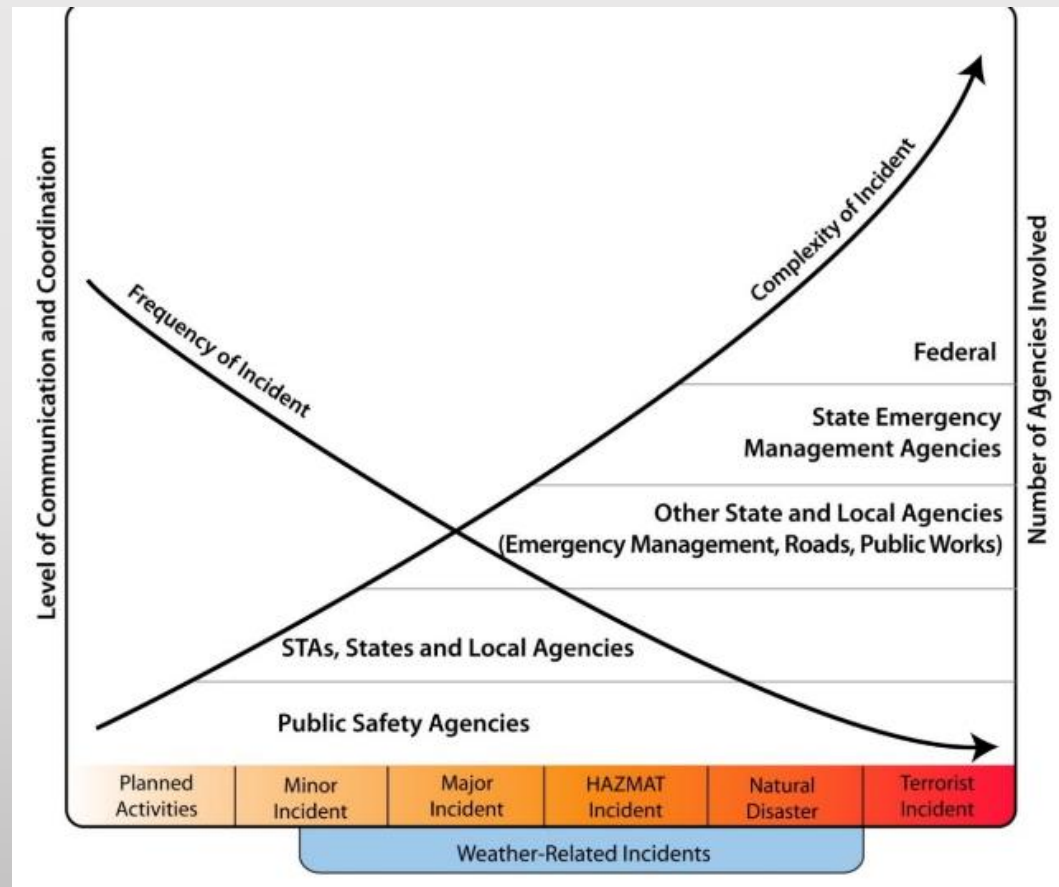
Losses from 212 weather and climate events that caused at least \$1 billion in damage (2017 dollars)



FiveThirtyEight

SOURCE: NOAA'S NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION

Agency Involvement by Incident Level



Source: NCHRP Report 525: Surface Transportation Security
Vol 6: Guide for Emergency Transportation Operations 2005

Transit's Role in Recovery

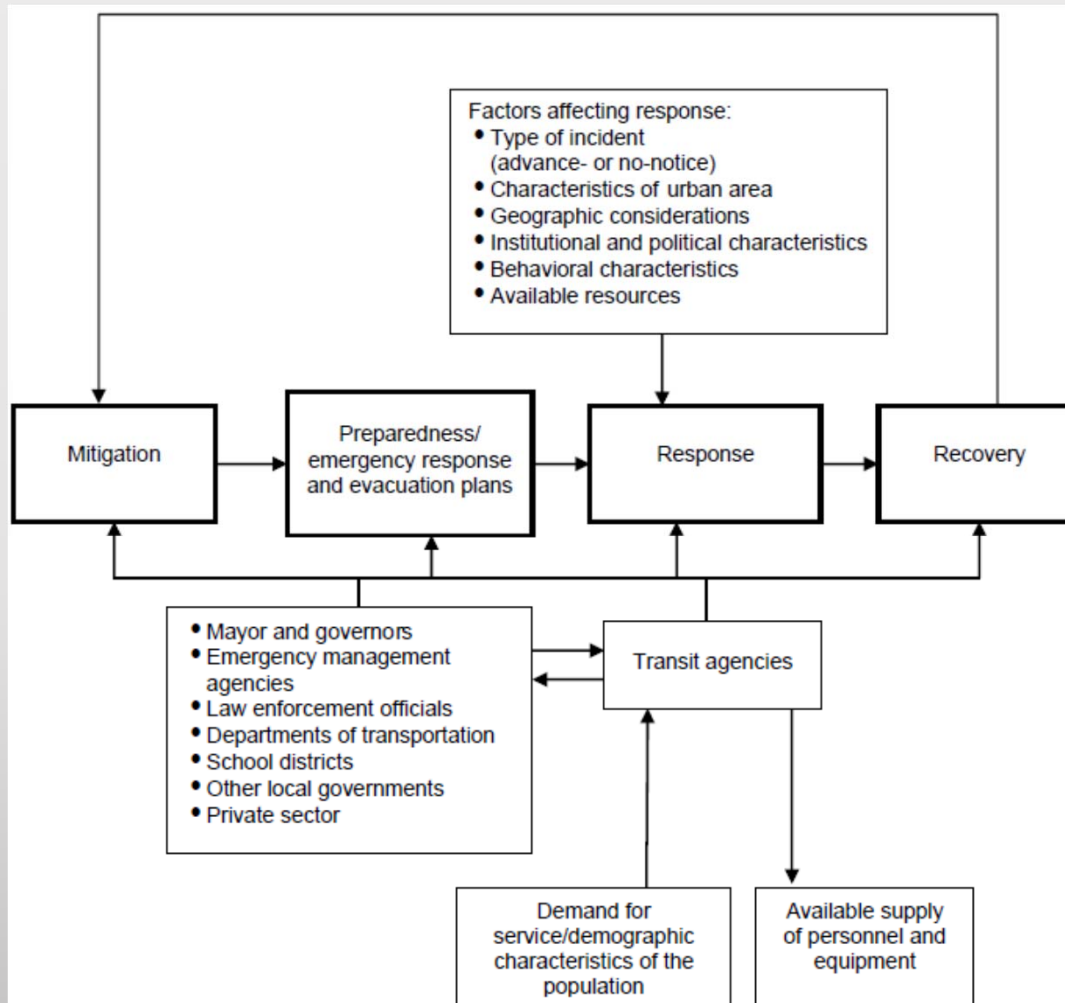


FIGURE 1-2 Factors affecting local emergency response capacity.

Source: Special Report 294: The Role of Transit in Emergency Evacuation

Module 2: Transportation Recovery



Past Disasters and Transportation Impacts

OVERVIEW

- 11 examples
 - two earthquakes
 - five hurricanes/storms
 - two transit fire/strike
 - two terror events
- Occurred between 1994 and 2017
- Review four in detail



- Earthquake

- Northridge, California 1994
- Damaged several highways and portions of Interstate 10, which took many months to repair.



- Rail Tunnel Fire

- Baltimore 2001
- Caused the shutdown parts of downtown and
- Disrupted rail and transit service.



- 9/11 Attack
 - NY & NJ 2001
 - Disrupted the transit system including NYCMTA, PATH, and NJTRANSIT
- Hurricane
 - New Orleans 2005
 - Major damage to **transit system** due to flooding on the light rail line and **in rolling stock storage locations**



Module 2: Transportation Recovery

- Transit Bombing

- London 2005
- A month to restore full service
- Drop in subway ridership for months afterward

- Hurricane (Rita)

- Texas 2005
- Governor directed Houston MPO to lead emergency evacuation plan;
- Due to significant difficulties with evacuation of residents in preparation for the Hurricane.



Module 2: Transportation Recovery

- Earthquake

- Christchurch 2011
- New Zealand's third-largest city
- Massive damage and destruction of critical infrastructure
- Entire central city inaccessible



- Superstorm (Sandy)
 - Eastern seaboard 2012
 - Massive flooding & power outages
 - Damage to transit systems in NY, NJ and elsewhere
- Transit Strike (BART)
 - Bay Area California 2013
 - Two, four-day strikes
 - Highlighted issues with affordability of TNCs (Uber, Lyft)



Module 2: Transportation Recovery

- Snowstorm

- NY & New England 2015
- Blizzard, NYC shut down subway
- Boston cancelled all transit service and flights out of Logan International Airport



- Hurricanes (Harvey, Irma, Maria)

- Texas, Florida, Puerto Rico 2017
- Extensive flooding
- Catastrophic damage to transportation infrastructure in parts of Puerto Rico
- Recovery time and costs unknown



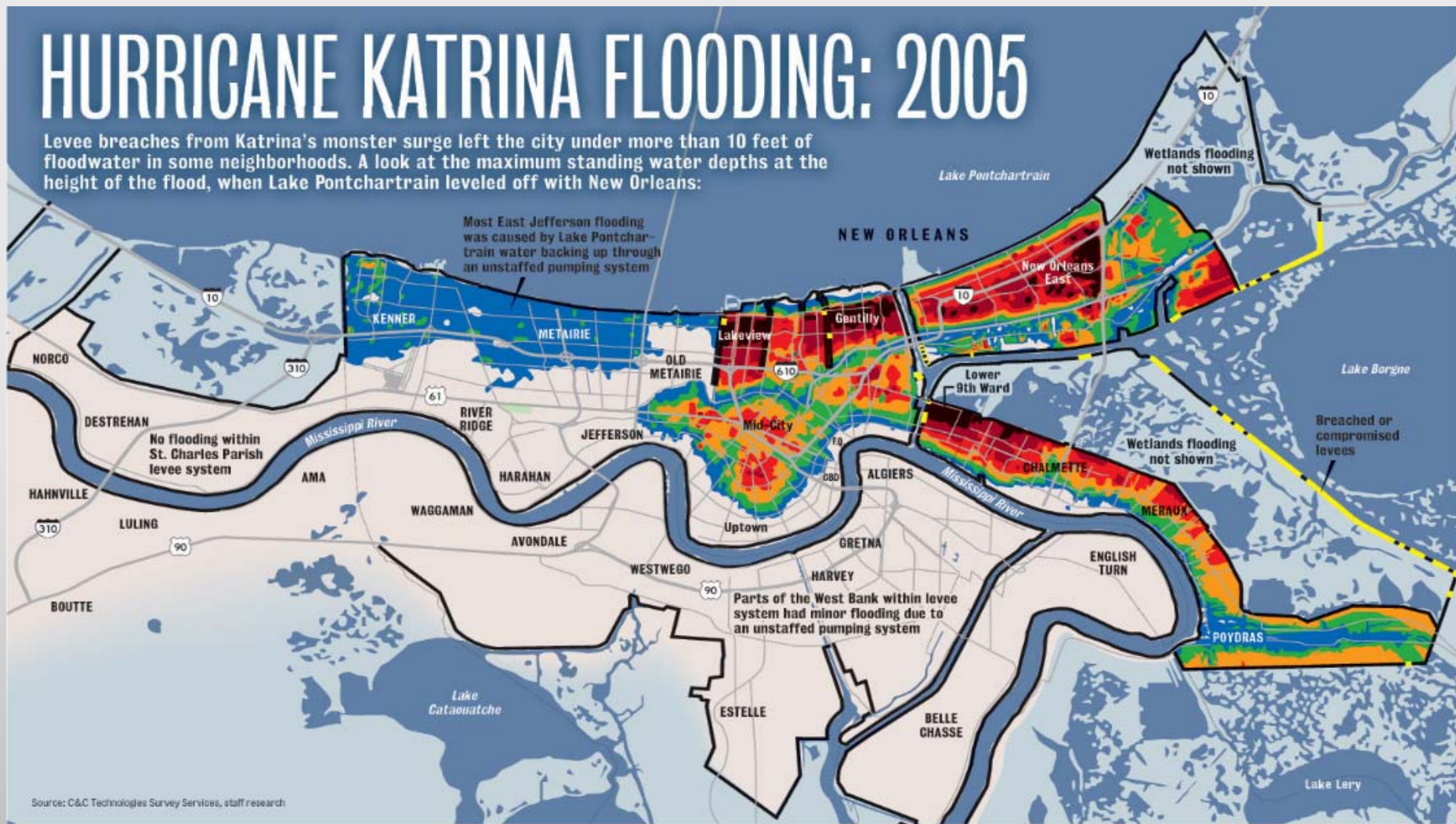
CASE STUDIES

- Hurricane Katrina
- London Tube Bombing
- Superstorm Sandy
- Boston Marathon Bombing



HURRICANE KATRINA FLOODING: 2005

Levee breaches from Katrina's monster surge left the city under more than 10 feet of floodwater in some neighborhoods. A look at the maximum standing water depths at the height of the flood, when Lake Pontchartrain leveled off with New Orleans:



Source: C&C Technologies Survey Services, staff research

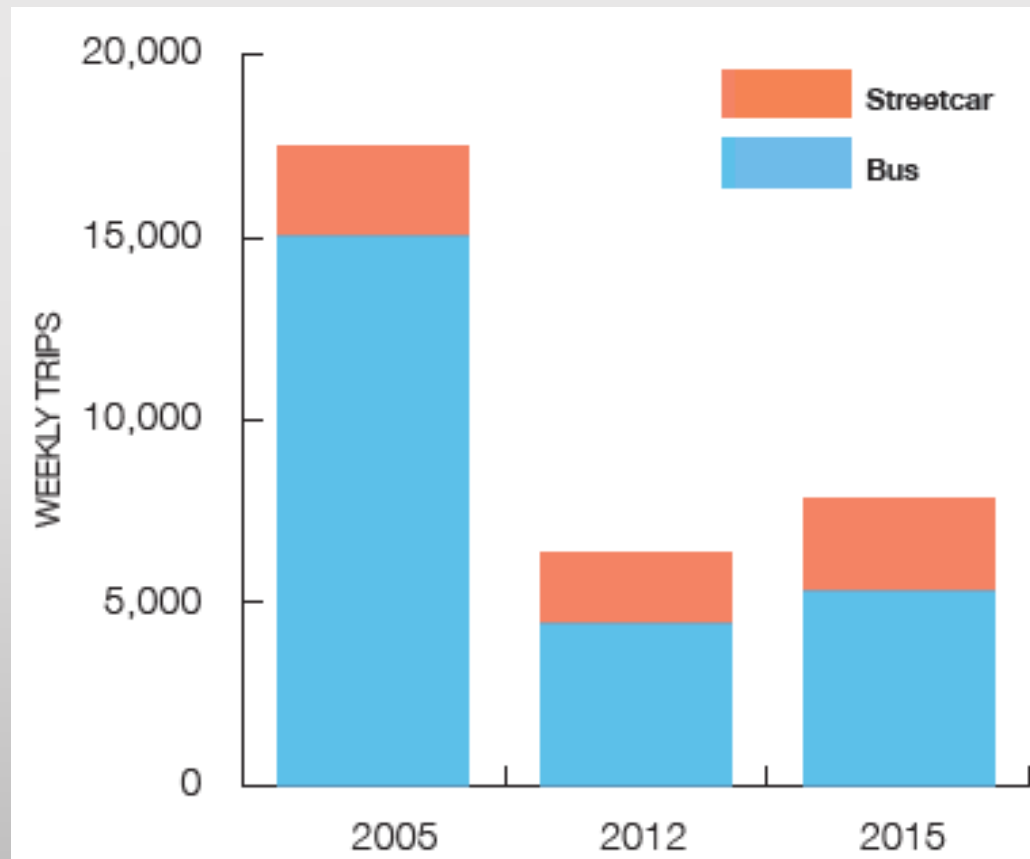
APPROXIMATE STANDING FLOODWATER DEPTHS



Transit Impacts of Katrina

- Prior to Katrina (August 2005):
 - 306 buses at peak service on 82 routes
 - Floodwaters destroyed approximately 200 buses, 66 streetcars, and 115 paratransit vehicles
 - New Orleans Regional Transit Agency (NORTA) left with one third of their fleet.
- Received 83 buses donated from other transit agencies around the country.
- NORTA did not charge passenger fares for nearly a year, instead relying on FEMA loans to cover operating expenses.
- By December 2005, service had resumed on two of the three rail lines, and by June 2008, service was restored on the third rail line.
- By 2013, eight years after Katrina, 35% of bus service had been restored.

NORTA Weekly Transit Trips by Mode



London Tube Bombings - July 7, 2005



London Tube Transportation Impacts

Short-term (during repairs)

- Full subway service was not restored for nearly a month following the attacks
- 18% reduction in overall passenger trips
- London bus network was running at near-normal service levels on the day following the attacks.

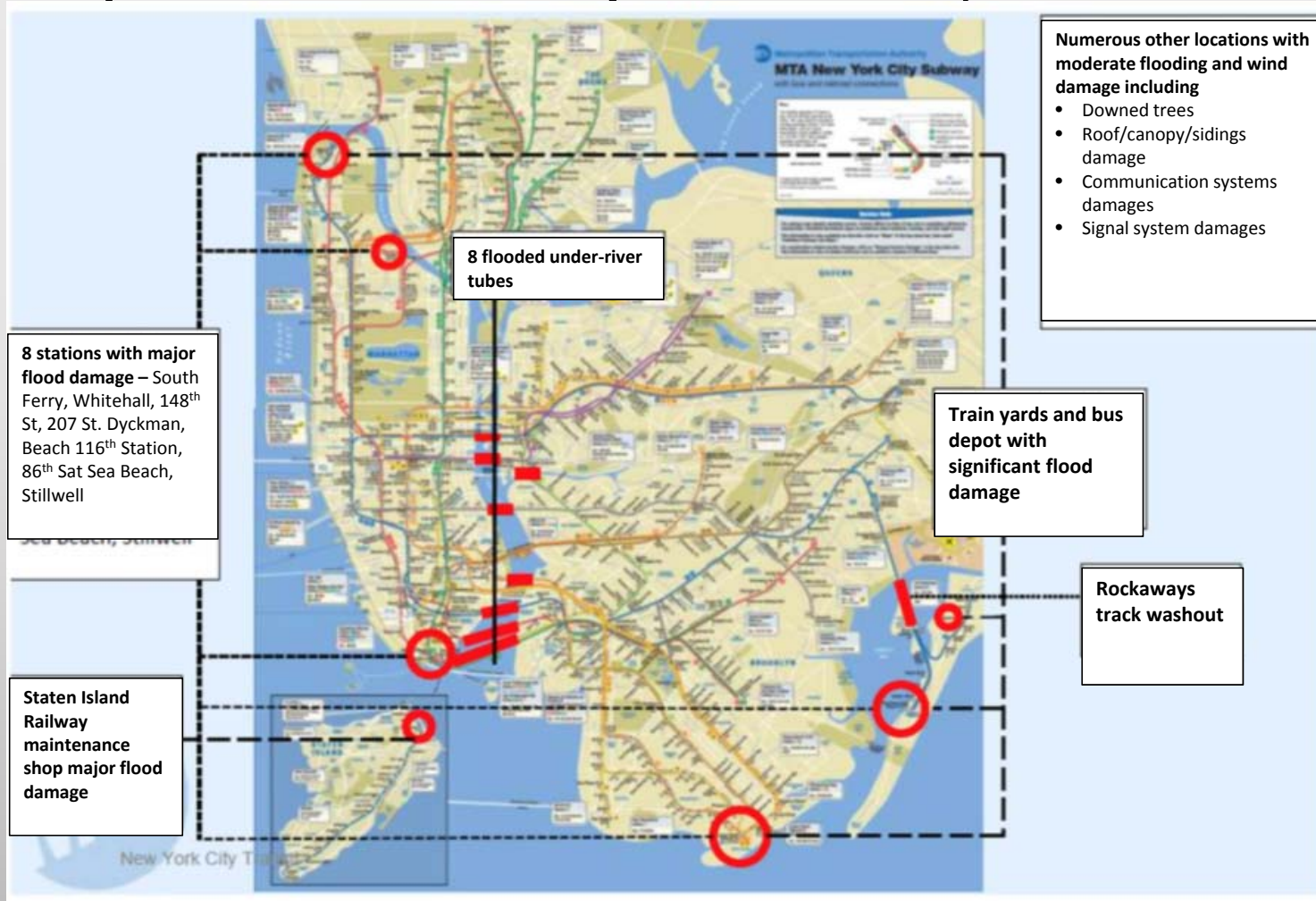
Long-term

- “Fear Factor” - reduction of 22.5 million passenger trips (8.3%) in the four months, especially on impacted lines

Economic Impact

- A month after the attacks, retailers in central London were estimated to have lost \$1.4 billion

Superstorm Sandy – Oct. 29, 2012

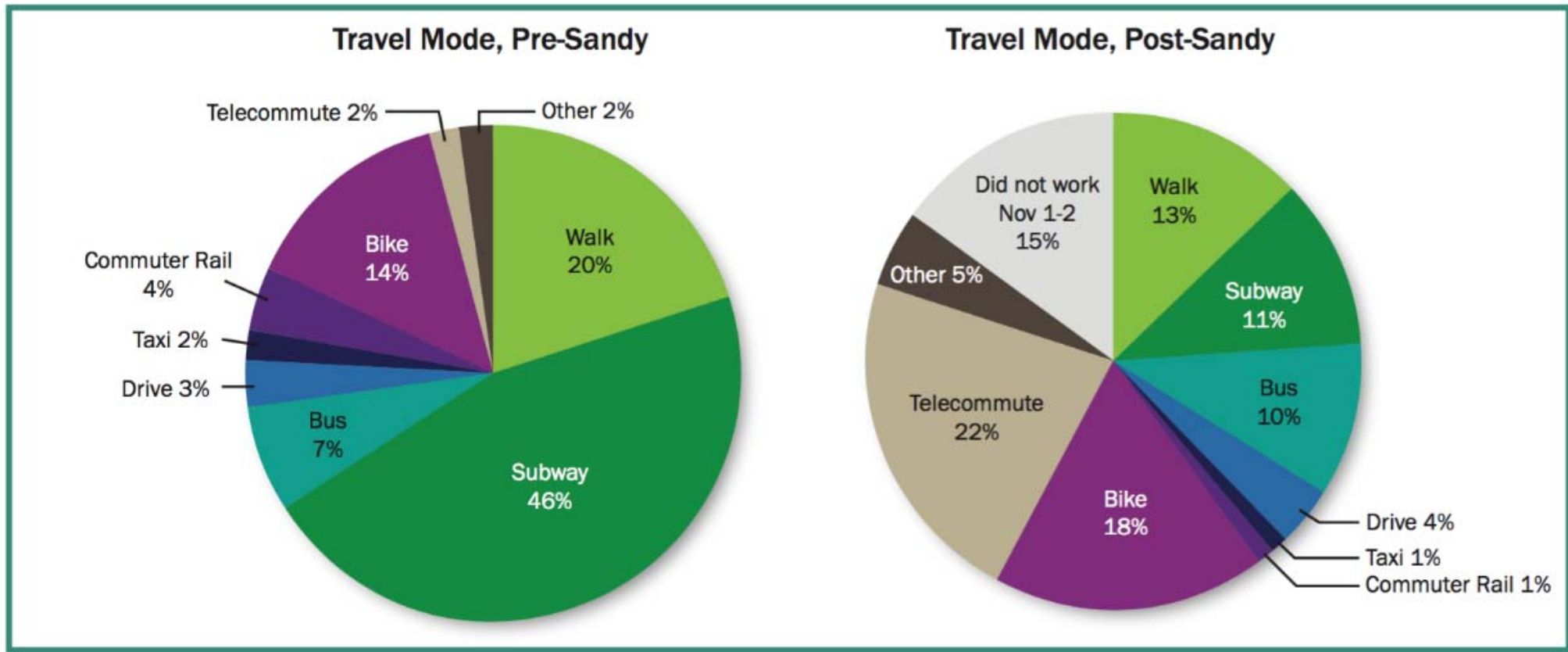


Superstorm Sandy - Nov. 1, 2012



Module 2: Transportation Recovery

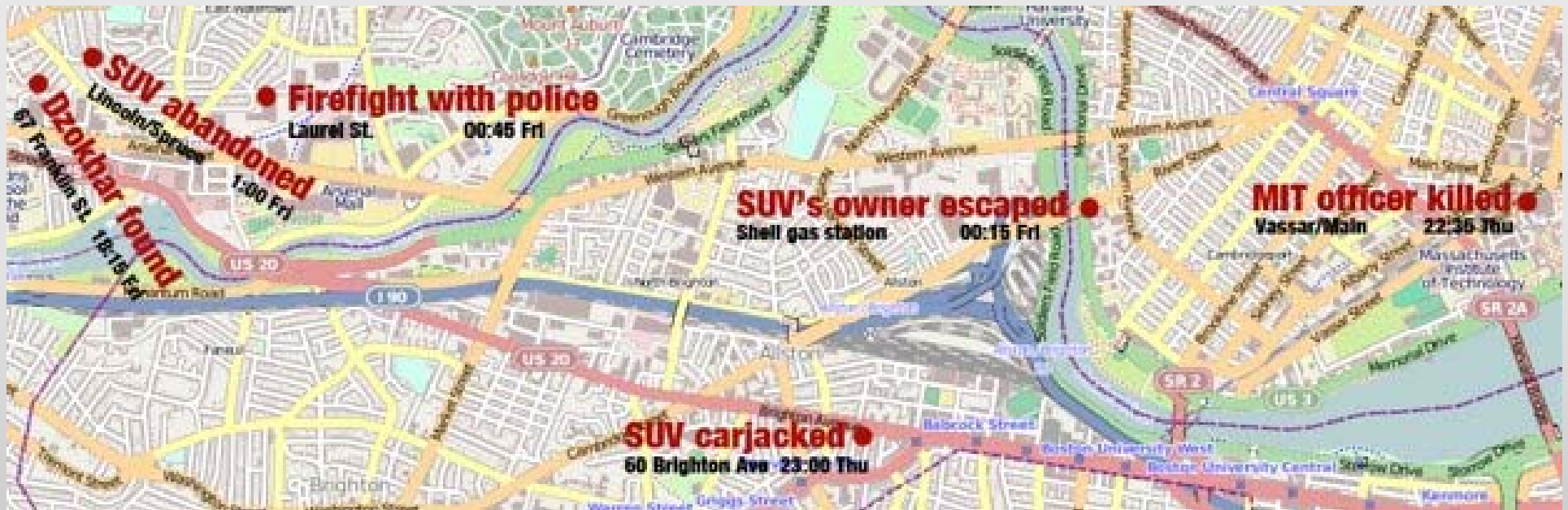
Commuting Before & After Sandy



Source: Transportation During and After Hurricane Sandy , 2012

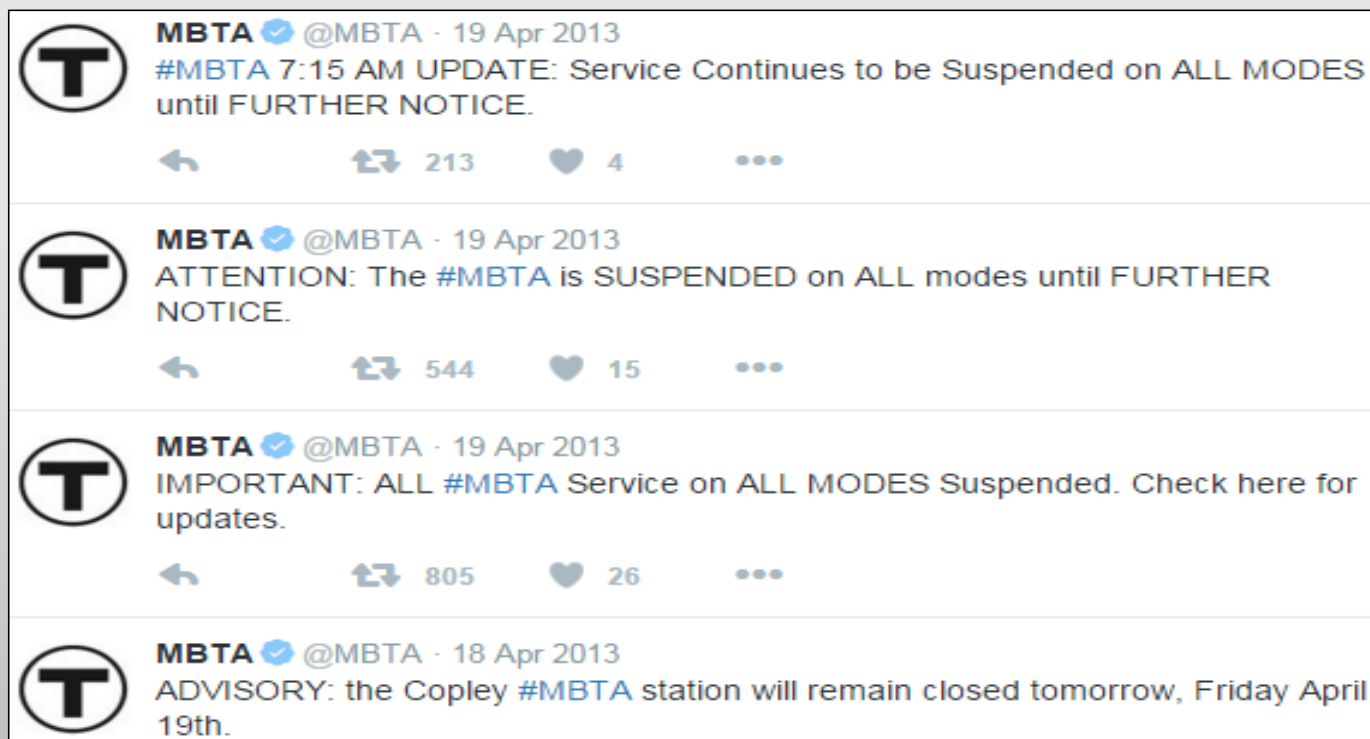
Module 2: Transportation Recovery

Boston Marathon Bombing (4/15/13-4/19/13)



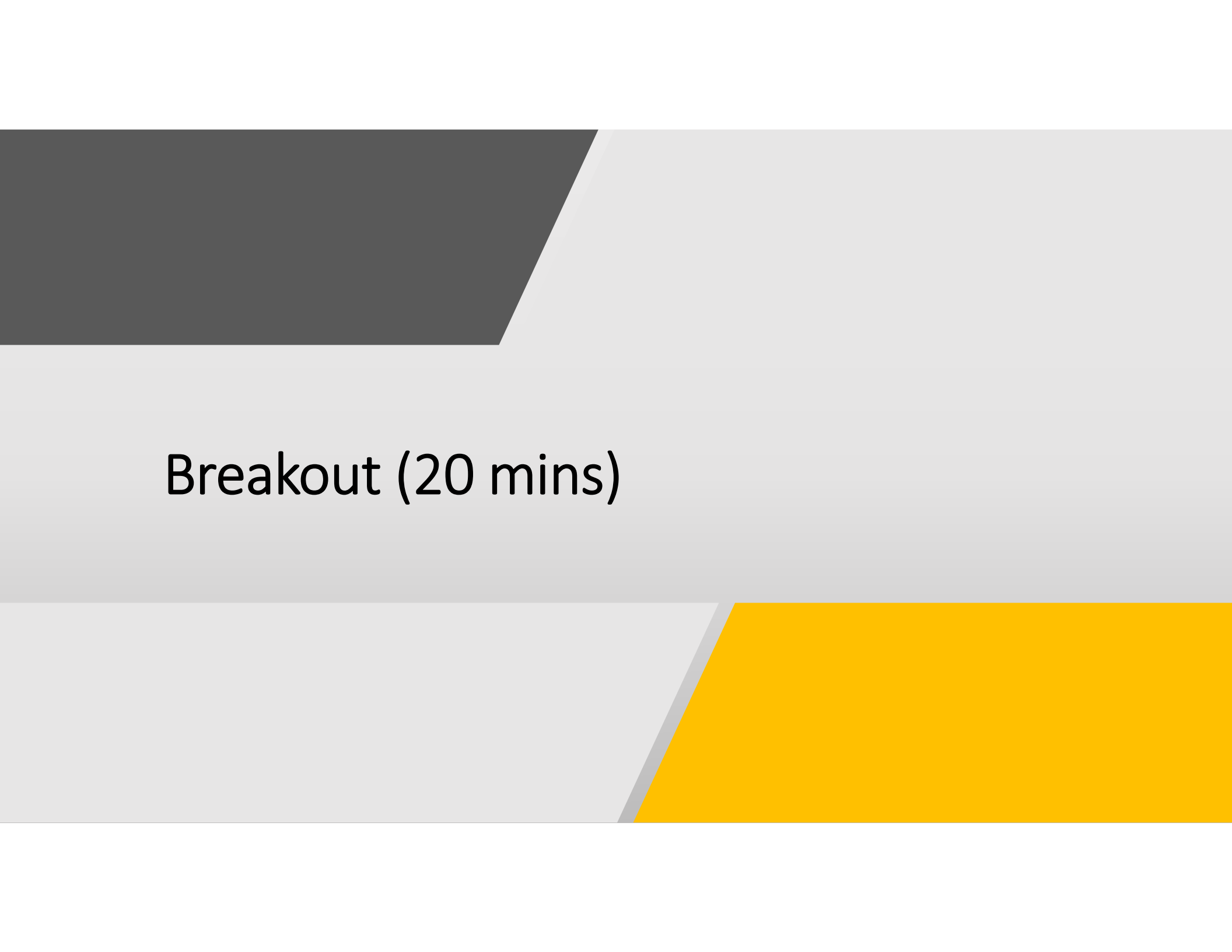
Boston Marathon Bombing - Transit

- During the manhunt, Boston residents were asked to “shelter in place.”



What We've Learned

- Mitigation Strategies
 - Travel options and alternatives are critical
 - Multi modal choices optimal
- Communication & Coordination
 - Vital to any recovery effort
 - Public agencies with each other
 - Public agencies with the public
 - Public to public through social media
- Resiliency
 - Resiliency of physical infrastructure should be a priority
 - Redundancy of modes and routes facilitates recovery
 - Roles and policies should enable and ensure resiliency



Breakout (20 mins)

Breakout questions

- Discuss past events in the region and lessons learned and actions have been taken as a result of past incidents.
- Discuss the hazard types (natural, technological, human-caused) most likely in your region and list what could go wrong with the transportation system as a result of that type of hazard (e.g., half of transit fleet destroyed, etc.)



Report out

Summary

- Disasters have become more frequent and more costly
- The period from initial emergency response to full recovery can vary from weeks to months or even years
- We have learned from previous incidents that recovery planning can help mitigate impacts of disasters
- Different types of hazards may have different impacts on the transportation system



Module 3: Regional Emergency Plans & Transportation Systems

Module 3: Overview of Regional Emergency Response Plans and Transportation System

Objectives

- Describe the basic features of the region's transportation system
- Provide an overview of existing regional planning efforts related to mitigation planning, emergency response and recovery
- Demonstrate that some emergency planning and response efforts may be underway or completed
- Identify how development of a recovery plan can build upon and enhance existing emergency response plans

Briefing on the Regional Disaster Preparedness Organization of the Portland Metropolitan Region

Denise Barrett
RDPO Manager



The RDPO Collaborative Partnership

Public Sector

- Five Counties (and key departments)
- More than a dozen Cities (and key departments/bureaus)
- Special Districts (e.g., fire, communications, water)
- Metro, Port of Portland, and TriMet
- State and Federal Agencies
- Universities (e.g., PCC, PSU)

Private Sector

- Intel Corporation
- PGE, Pacific Power, NW Natural
- Hospitals/Health System

Non-Profit Sector

- Red Cross
- Oregon Food Bank

RDPO Mission

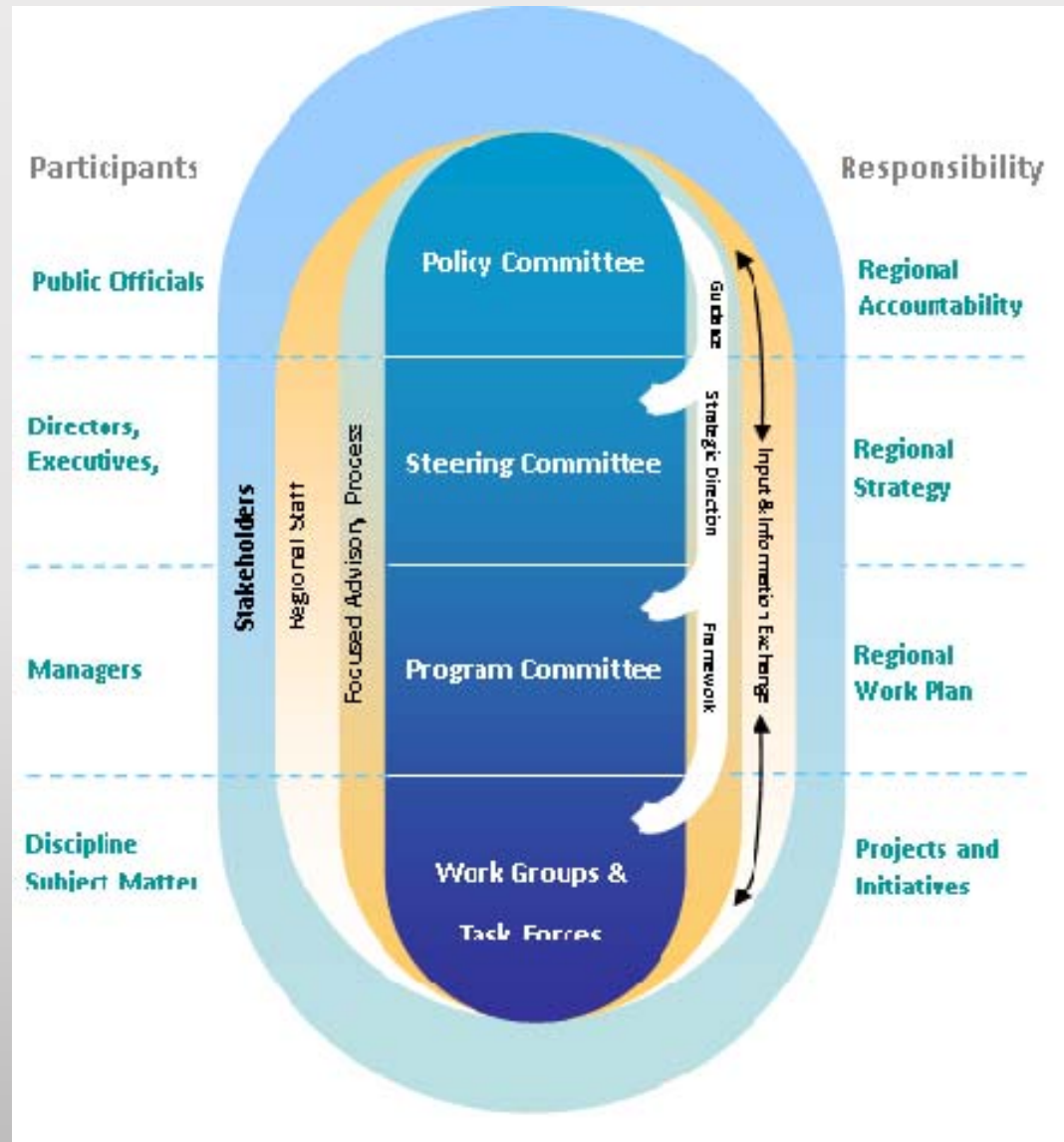
- Build and maintain regional disaster preparedness capabilities in the Portland Metropolitan Region through strategic and coordinated planning, training and exercising, and investment in technology and specialized equipment.



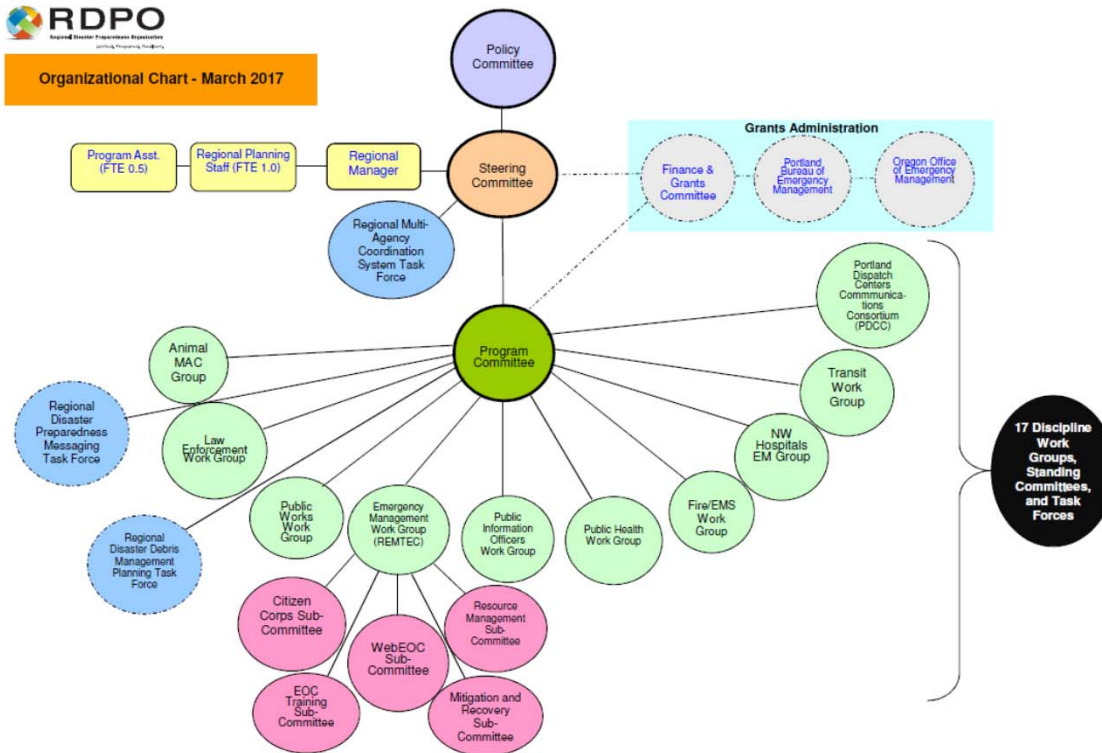
Our Region's Coordination Ethos and RDPO Value Statement



The RDPO Organization



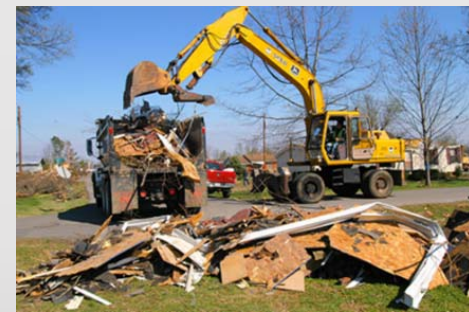
Organizational Chart - March 2017



RDPO Funding

- **Urban Areas Security Initiative (UASI)**
 - FY'15: \$3,000,000 (10/15 – 5/18)
 - FY'16: \$2,962,000 (10/16 – 5/19)
 - FY'17: \$2,837,000 (10/17—5/20)
- [UASI since 2003: >\$80 million]
- **Local Partner Contributions to RDPO Operations and Projects:**
 - Around \$225,000 per annum

Building and Maintaining Capabilities



Advance Equity Efforts in the Region

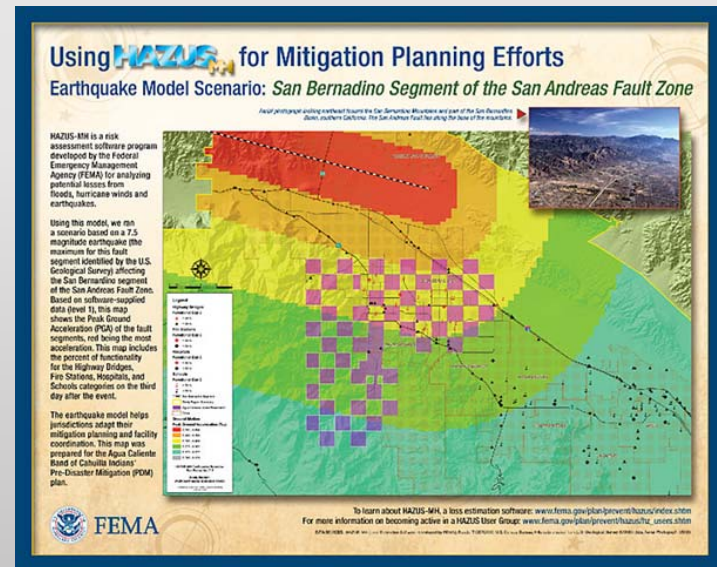


State Agency Partnerships and Projects

ODOE: emergency Fuel Tabletop exercise



DOGAMI: EQ Mapping/Impact Analysis



RDPO Current Strategic Priorities

Critical infrastructure resilience



Community Resilience

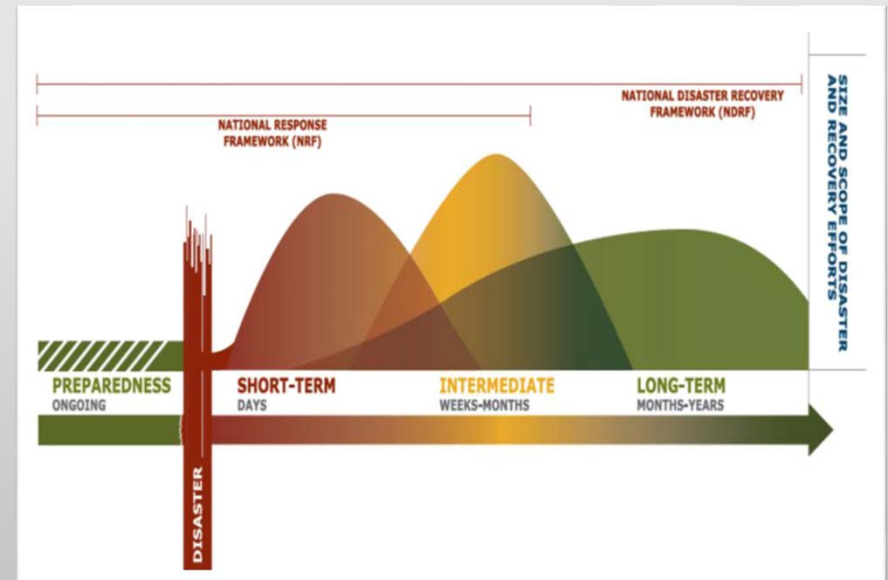


RDPO Current Strategic Priorities

hazard mitigation risk reduction



Regional Recovery Framework

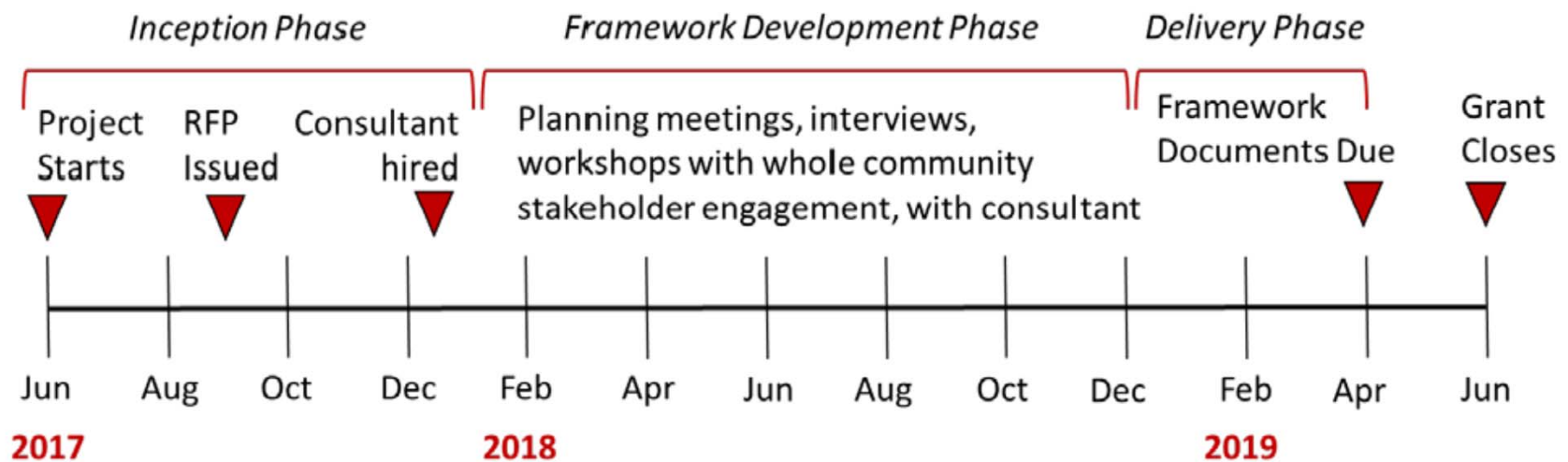


RDPO Regional Recovery Framework

- Establish **consistency** of recovery **approach** and identify shared recovery **priorities**.
- **Leverage knowledge and resources** beyond what an individual county can achieve alone.
- Promote community values of **resilience**.
- **Drive investments** for resilience in the region.
- Applying an **Equity Lens**.

RDPO Regional Recovery Framework

Project Timeline



Thank you!

Comments, Questions?

Portland Regional Transportation Recovery Plan



John MacArthur

Sustainable Transportation Program Manager

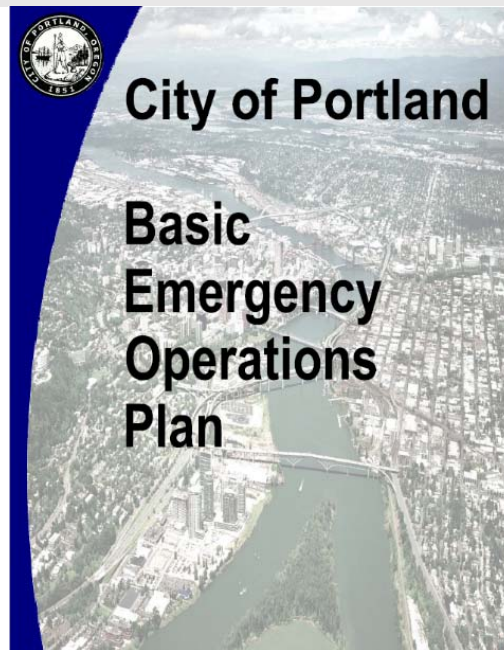
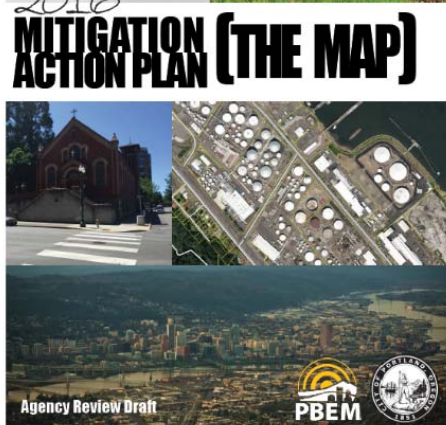
TREC at Portland State University

Portland Metropolitan Statistical Area



and Transportation System

Examples of Related Oregon Plans



The Oregon Resilience Plan

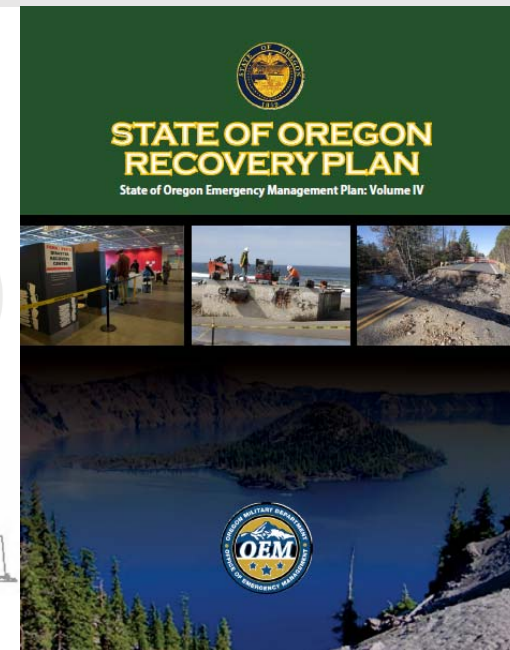
Reducing Risk and Improving Recovery
for the Next Cascadia Earthquake and Tsunami

Report to the
77th Legislative Assembly

from
Oregon Seismic Safety Policy
Advisory Commission (OSSPAC)



Salem, Oregon
February 2013

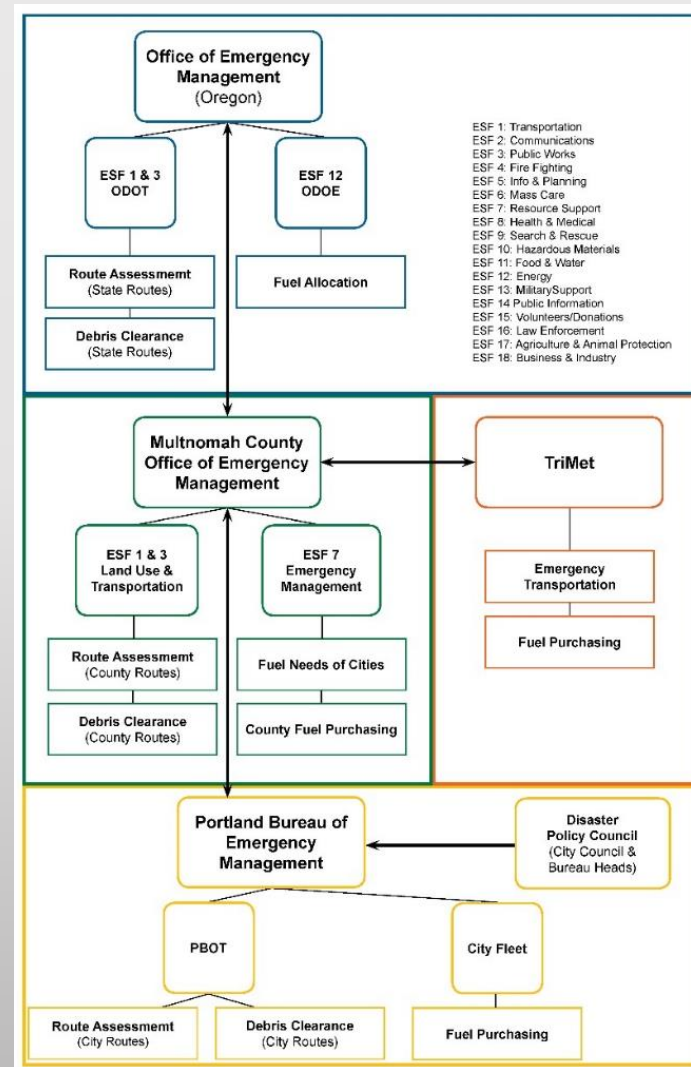
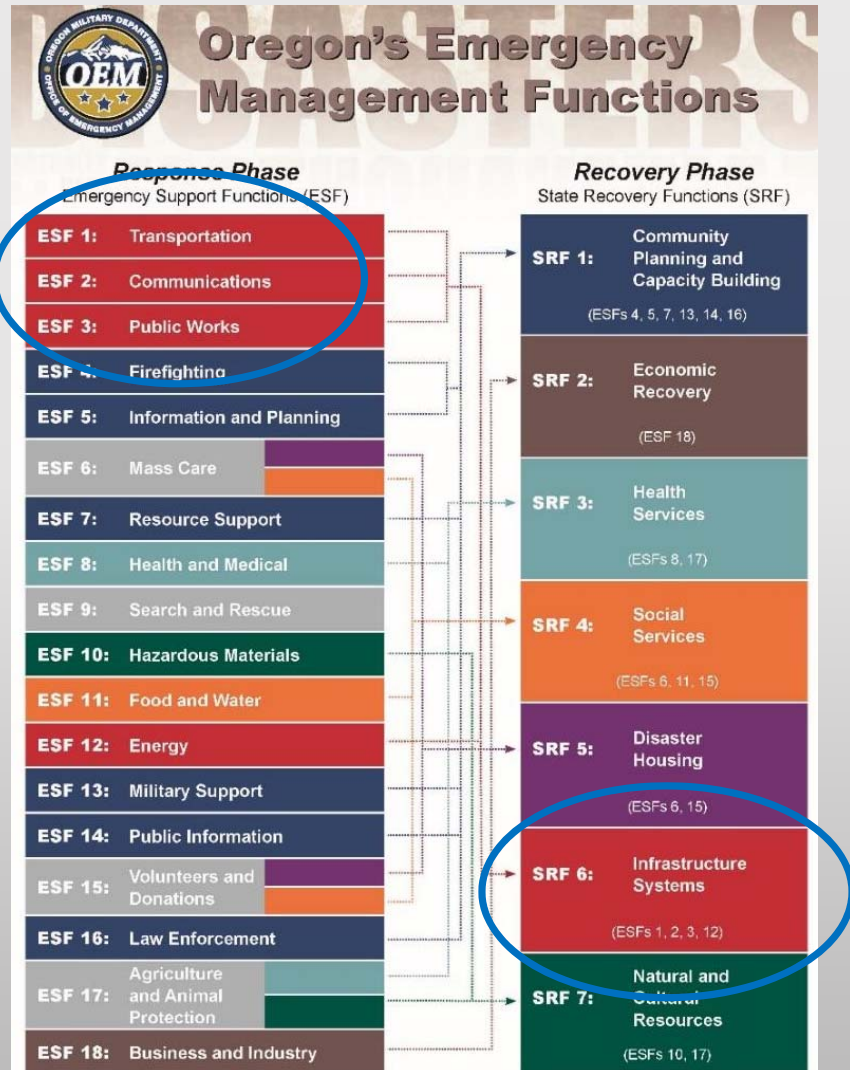


Oregon Emergency Management Plan Structure



Source: State of Oregon Recovery Plan 2014

Emergency Management Structure



tation System

Emergency Response & Recovery Planning Efforts Currently Underway

Planning Efforts	Summary	Lead Agency
Metro Debris Management Plan	Metro is leading a regional effort to enhance debris forecasting for multiple hazard scenarios; which account for the Emergency Transportation Routes.	Metro
Mass Shelter Plan	Multnomah County is developing a mass shelter plan for the aftermath of an earthquake which are estimated to displace as many as 90,000+ residents from their homes.	Multnomah County
Continuity of Operations Plan	All City bureaus, including PBOT, have developed continuity of operations plans (COOP), which define essential functions and establish a plan to continue performance of these functions in the aftermath of a disruption. TriMet is also in the process of developing their own COOP.	PBOT and TriMet
Post-Disaster Facility Assessment, Allocation, & Reporting	This project through the Regional Disaster Preparedness Organization (RDPO) and PBEM will provide a framework for regional emergency managers to identify the best facility sites for various uses after a disaster.	RDPO /PBEM
Regional Fuel Management Tabletop Exercise	Working with the Oregon Department of Energy (ODOE), RDPO is organizing a tabletop exercise to test emergency fuel management protocols between State and County staff in the region, following an earthquake.	RDPO /ODOE
Time-To-Recovery Framework	Working with the City Asset Managers Group, PBEM is developing a time-to-recovery framework for the City of Portland. Building on the work of the Oregon Resilience Plan, this will help bureaus assess interdependencies for critical infrastructure and set citywide time-to-recovery goals.	PBEM/City of Portland
Regional Utility Coordination	Working with NW Natural, Portland General Electric and Pacific Power, the region is updating a decade-old coordination plan to share information during an emergency or major incident; this includes setting criteria for activations and protocols for information sharing.	Utility Providers /RDPO
Metro Regional Transportation Plan	Metro is preparing the 2018 update to Regional Transportation Plan which will contain a section on emergency services preparedness.	Metro

City of Portland Transportation Recovery Plan



Plan Approach

Guiding Principles

- **Response and Recovery are very different** – response deals with immediate events, decisions made during recovery typically have longer-lasting impacts.
- **Flexibility is a must** – a prescriptive plan or one with too many assumptions is less useful than one that provides the appropriate framework and necessary data.
- **Complement don't duplicate** – the relationships built and actions undertaken during the response phase should be maximized during recovery.

Recovery

- Recovery is the process of restoring the reasonably expected economic and social functions of a community following a natural or human-induced hazard event. **The approach and framework for advancing recovery efforts is distinct from those employed in the response** to an incident, which emphasizes actions to reduce loss of life, injuries, and property damage. While this distinction exists, there is some overlap between the later stages of emergency response and initial emergency recovery actions.

Recovery continued

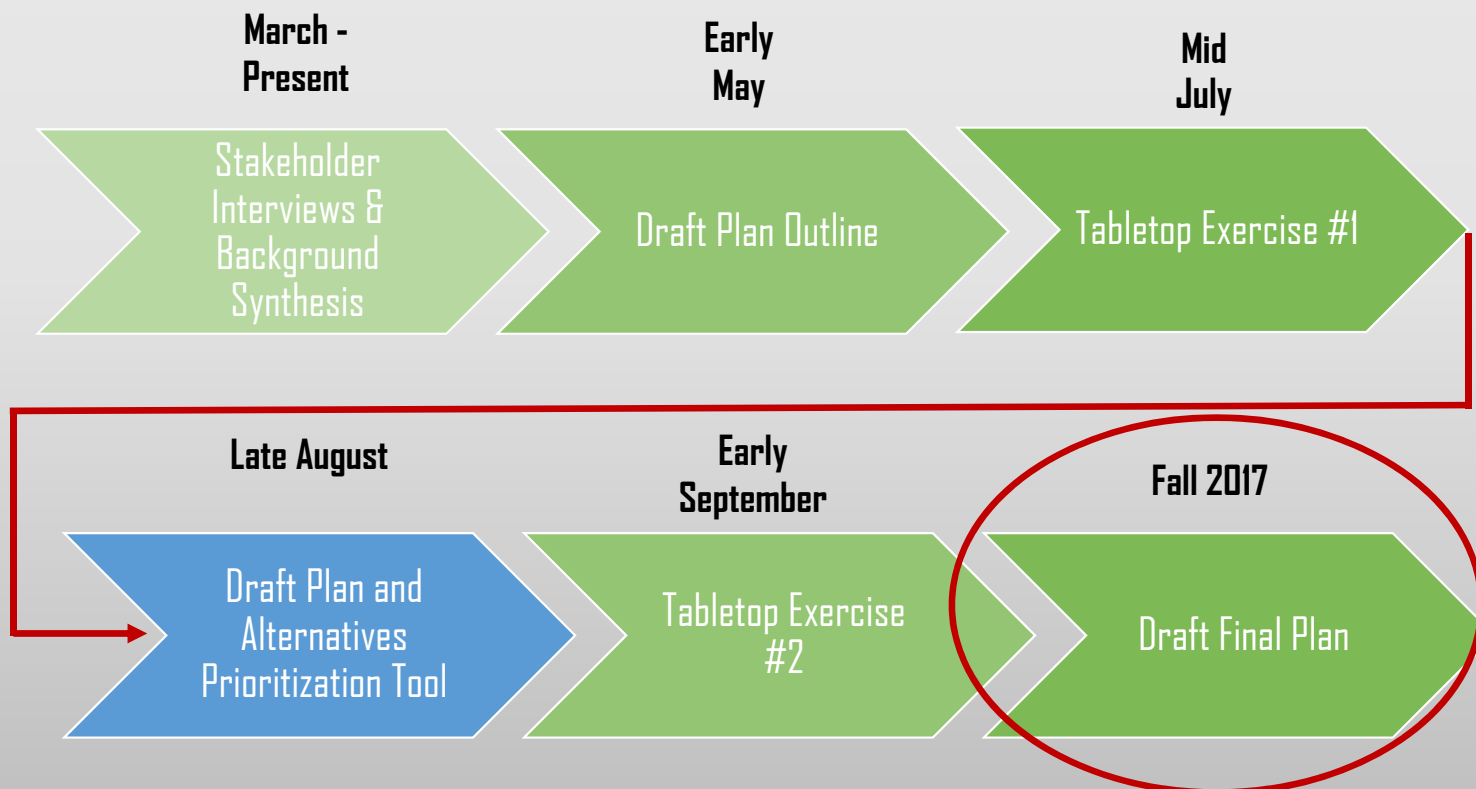
- **Rebuilding Better:**As the City of Portland conducts recovery, an important consideration will be to restore existing elements of the transportation system (infrastructure and services) that functioned as desired prior to the event and implement planned improvements where possible subject to timing and funding constraints. This will ensure that opportunities to increase safety, reliability, efficiency, resiliency, and equity are fully maximized.

Stakeholder Interviews

Findings

- Need to establish protocols for recovery
- Updates to ETR Map
- Agency collaboration and communication
- Means of providing reliable information to the public
- Provide a checklist of recovery plan components
- Plan could assist in developing resilient infrastructure

Plan Timeline



Transportation Recovery Plan Elements

	Recovery Stage 1: Transitioning from Response to Recovery	Recovery Stage 2: Initiating Recovery	Recovery Stage 3: Advancing Recovery	Recovery Stage 4: Restoring Normal Conditions
1. Communications Framework				
2. Infrastructure Assessment/Repairs				
3. Multi-modal Service Planning and Coordination				
4. Transportation Demand Management				
5. Vulnerable Populations				
6. Legal Framework Contracting Options and Agreements				
7. Plan Evaluation, Updates and Training				

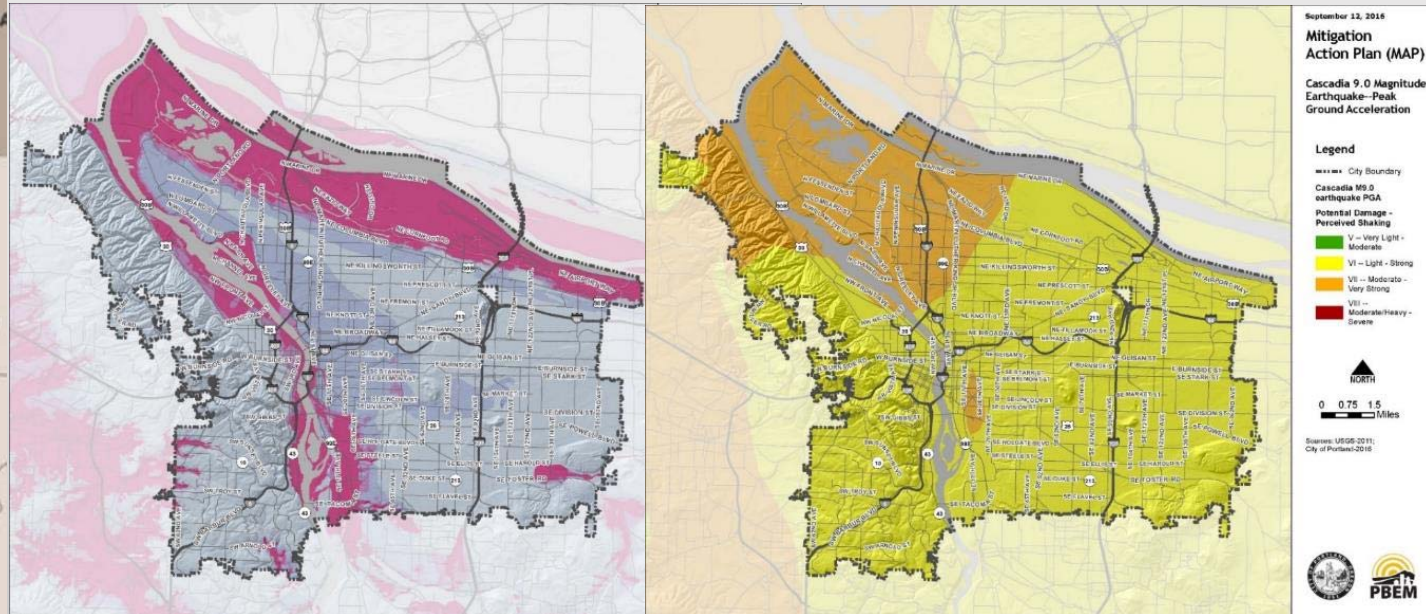
	Continuous Recovery Actions
	Initiate Recovery Actions
	Expand Recovery Actions

Examples of Hazards with the Transportation System Impacts

NATURAL	TECHNOLOGICAL/MECHNICAL	HUMAN-CAUSED
Avalanche	Airplane Crash	Biological Attack
Animal Disease Outbreak	Dam Failure	Chemical Attack
Drought	Bridge Failure	Cyber Incident
Earthquake	Levee Failure	Explosives Attack
Epidemic	Material Failure	Radiological Attack
Flood	Mine Accident	Sabotage
Hurricane	Hazardous Materials Release	School and Workplace Violence
Landslide	Power Failure	Traffic Accident
Pandemic	Radiological Release	
Tornado	Train Derailment	
Tsunami	Urban Conflagration	
Volcanic Eruption		
Wildfire		
Winter Storm		

Source: modified from FEMA, 2010

Cascadia Subduction Zone



Citywide Impacts

- 20,000 households are damaged beyond repair and 9,000 people will require short-term shelter. Many of these individuals have been moved in semi-temporary shelters and hotels in east Multnomah County.
- 2,500 businesses are damaged with many structures beyond repair but mostly in areas of high liquefaction potential areas but are starting to bring back employees.
- \$7.4 billion in economic losses
- Roughly 4 million tons of debris need to be removed with an estimate of 160,000 truckloads.

Impacts to Highway Structures



ion System

Neighborhood Streets



al Plans and Transportation System

Landslides



f Regional Plans and Transportation System

Critical Energy Infrastructure Hub



Unreinforced Masonry Buildings




Oregon Seismic Lifeline Route Designations

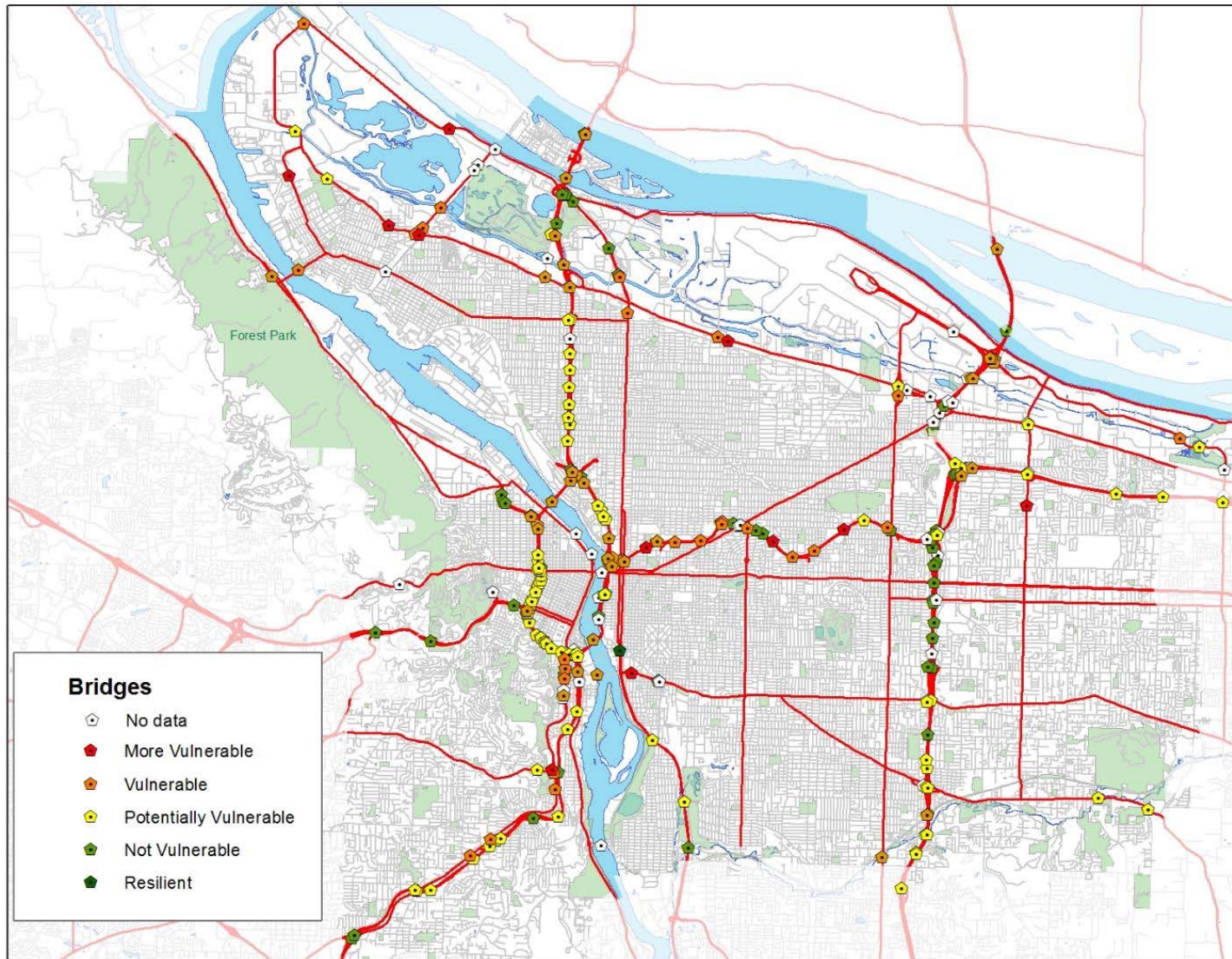


ans and Transportation System
Source: Oregon Highways Seismic Plus Report (Oct 2014)

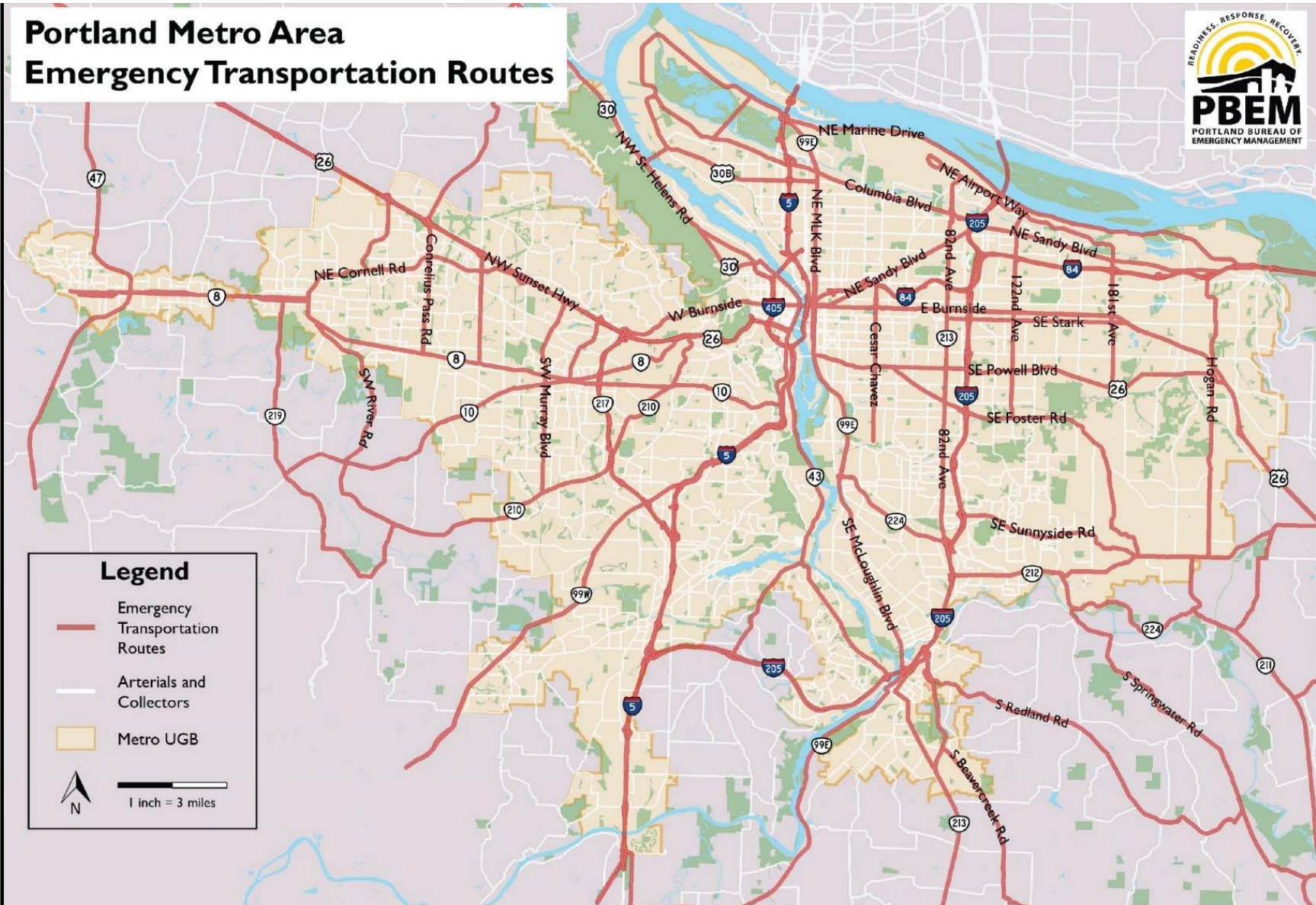
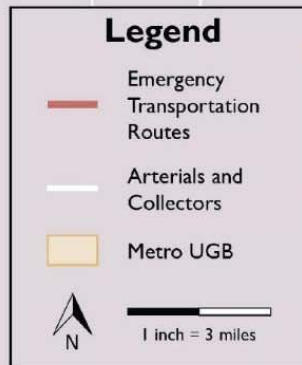
Oregon Transportation Resiliency Status – Time to Recovery

Infrastructure Facilities	Event Occurs	0 – 24 hours	1 – 3 days	3 – 7 days	1 – 4 weeks	1 – 3 months	3 – 6 months	6 – 12 months	1 – 3 years	3+ years
Willamette Valley Zone										
► OREGON STATE HIGHWAY SYSTEM										
State Highway System - Tier 1 SLR ¹⁾			R	Y	G			S	X	
Roadways			R	Y	G		S	X		
Bridges			R	Y	G			S	X	
Landslides			R	Y	G			S	X	
State Highway System - Tier 2 SLR			R		Y	G			S	X
Roadways			R		Y	G	S	X		
Bridges			R		Y	G			S	X
Landslides			R		Y	G			S	X
State Highway System - Tier 3 SLR				R		Y	G		S	X
Roadways				R		Y	G	S	X	
Bridges				R		Y	G		S	X
Landslides				R		Y	G		S	X
State Highway System - Other Routes					R		Y	G	S	X
Roadways					R		Y	G	S	X
Bridges					R		Y	G	S	X
Landslides					R		Y	G	S	X
► OREGON PUBLIC TRANSIT										
Admin & Maintenance Facilities ²⁾						R	Y	G	S	X
Local Area Paratransit On-Demand Service (critical)					R	Y	S	G	X	
Local Area Paratransit On-Demand Service (full)						R	Y	G	S	X
Local Roadway Fixed Route Service (emergency)				R	Y	S	G	X		
Local Roadway Fixed Route Service (regular)						R	Y	G	S	X
Intercity & Commuter Bus ⁴⁾						R	Y	G	S	X

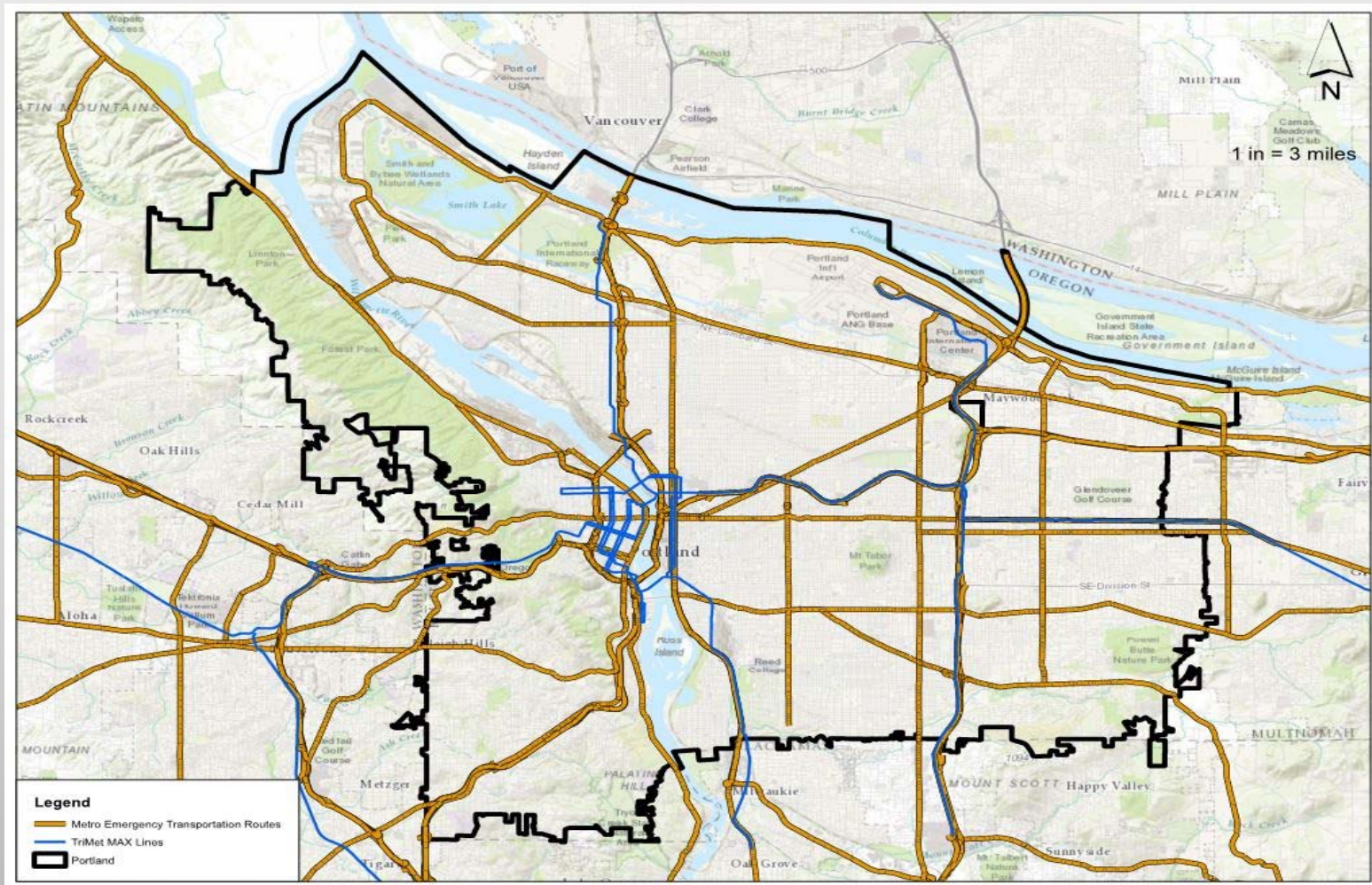
R	Minimal (A minimum LOS is restored, primarily for use of emergency responders, repair crews, critical suppliers)
Y	Functional (Although service is not yet restored to full capacity)
G	Operational (Restoration is up to 90% of capacity and LOS is restored)
S	Estimated time for recovery to 60% operational given current conditions
X	Estimated time for recovery to 90% operational given current conditions



Portland Metro Area Emergency Transportation Routes

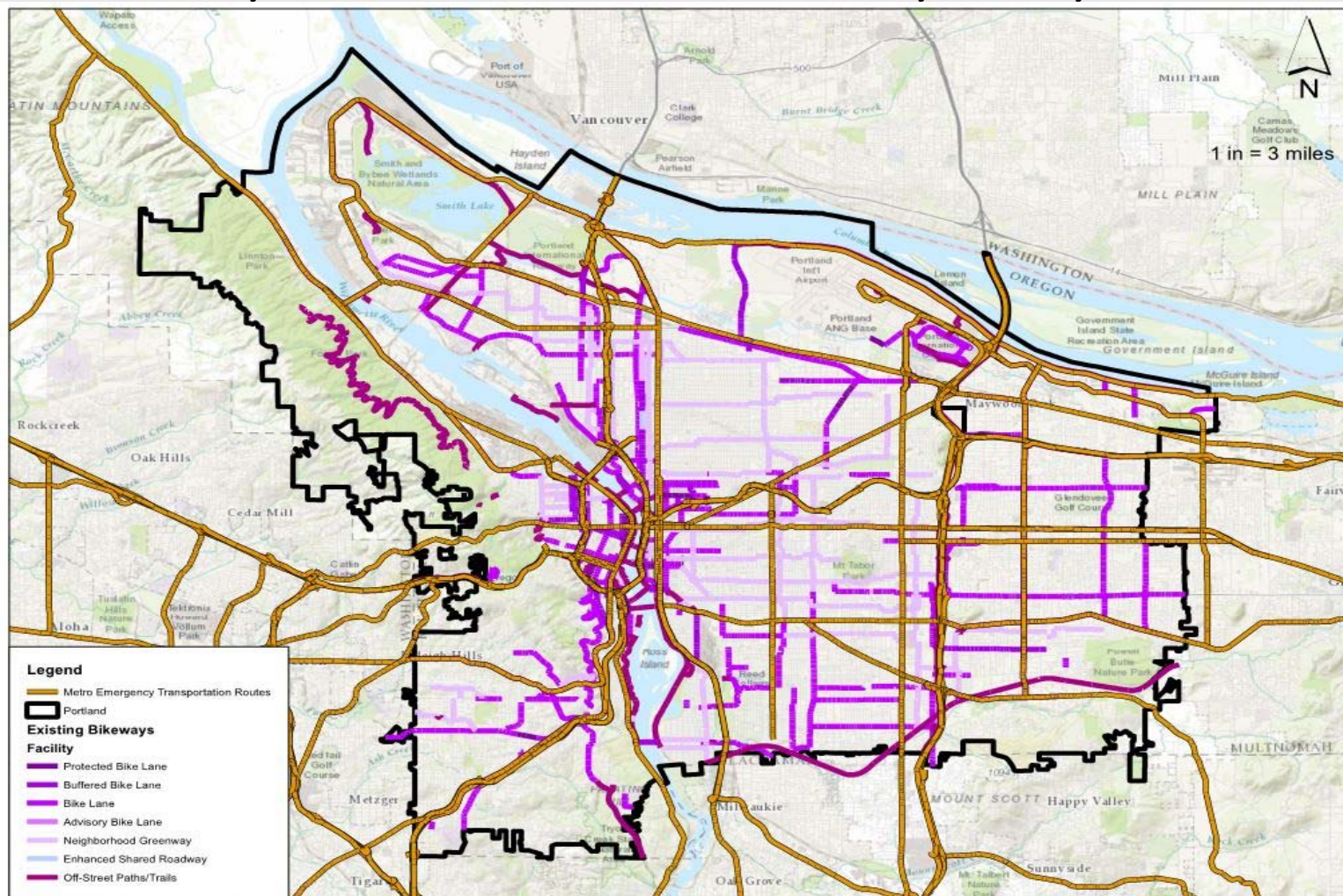


ETRs and TriMet MAX Lines

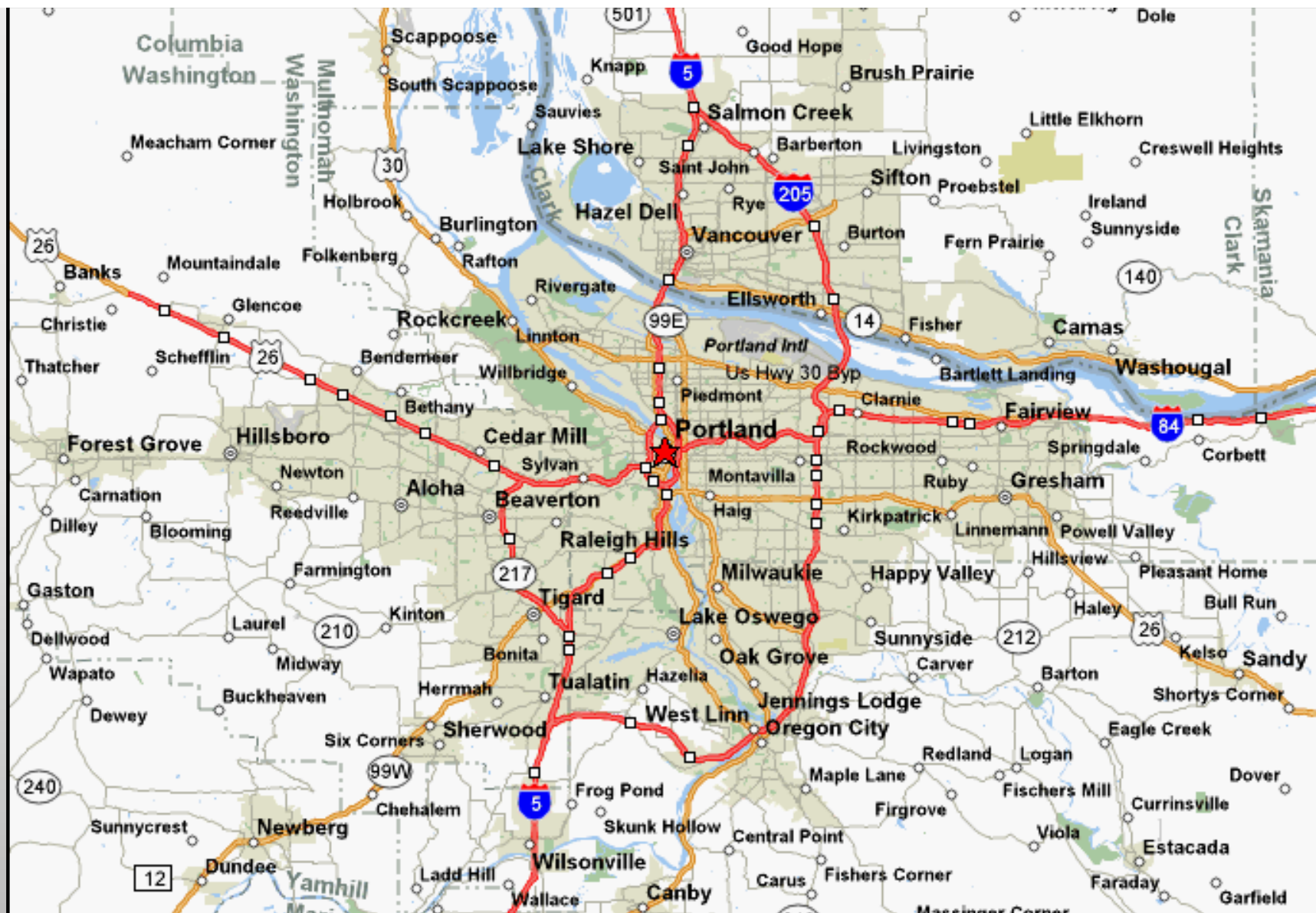


tion System

ETRs and City of Portland Priority Bicycle Network

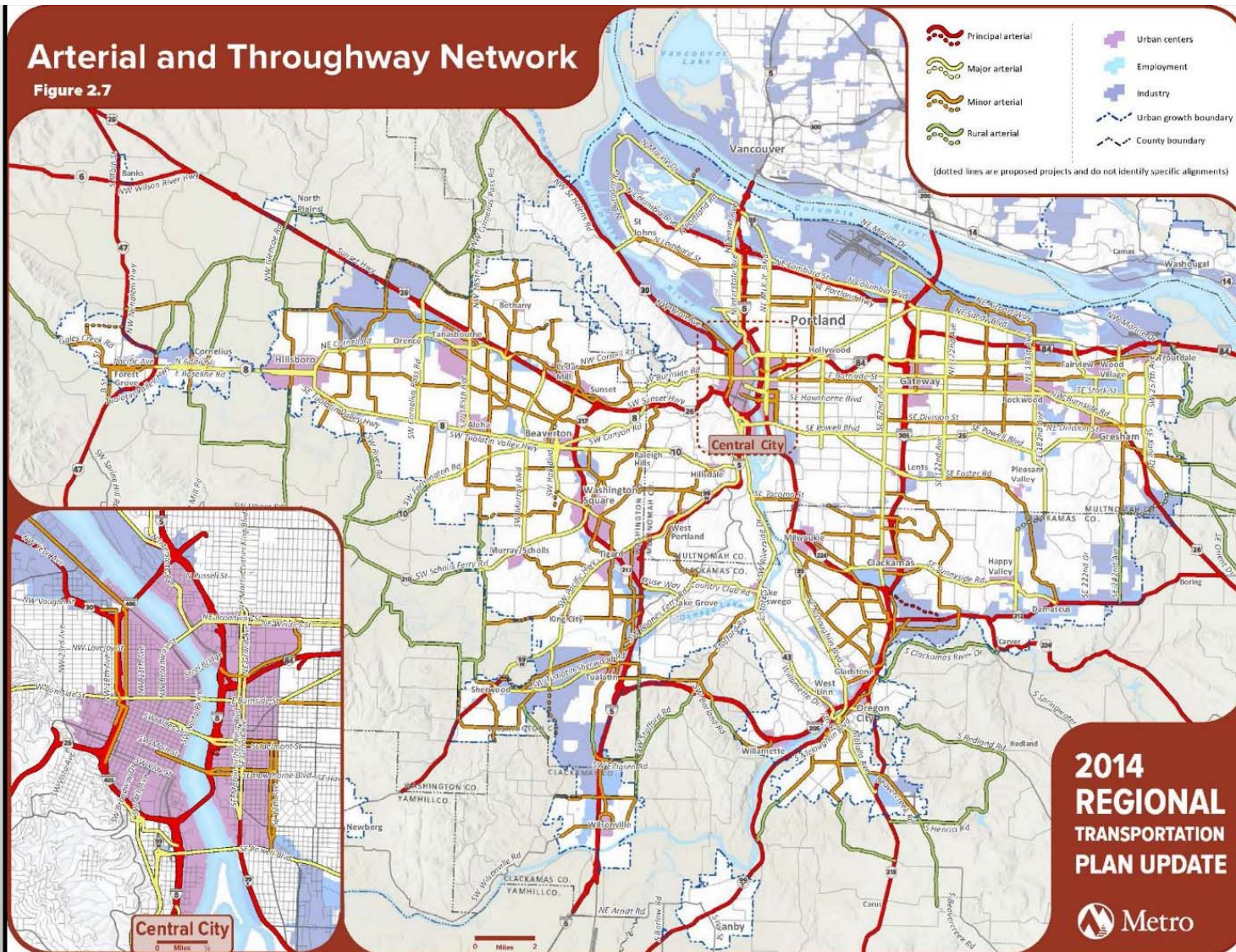


on System

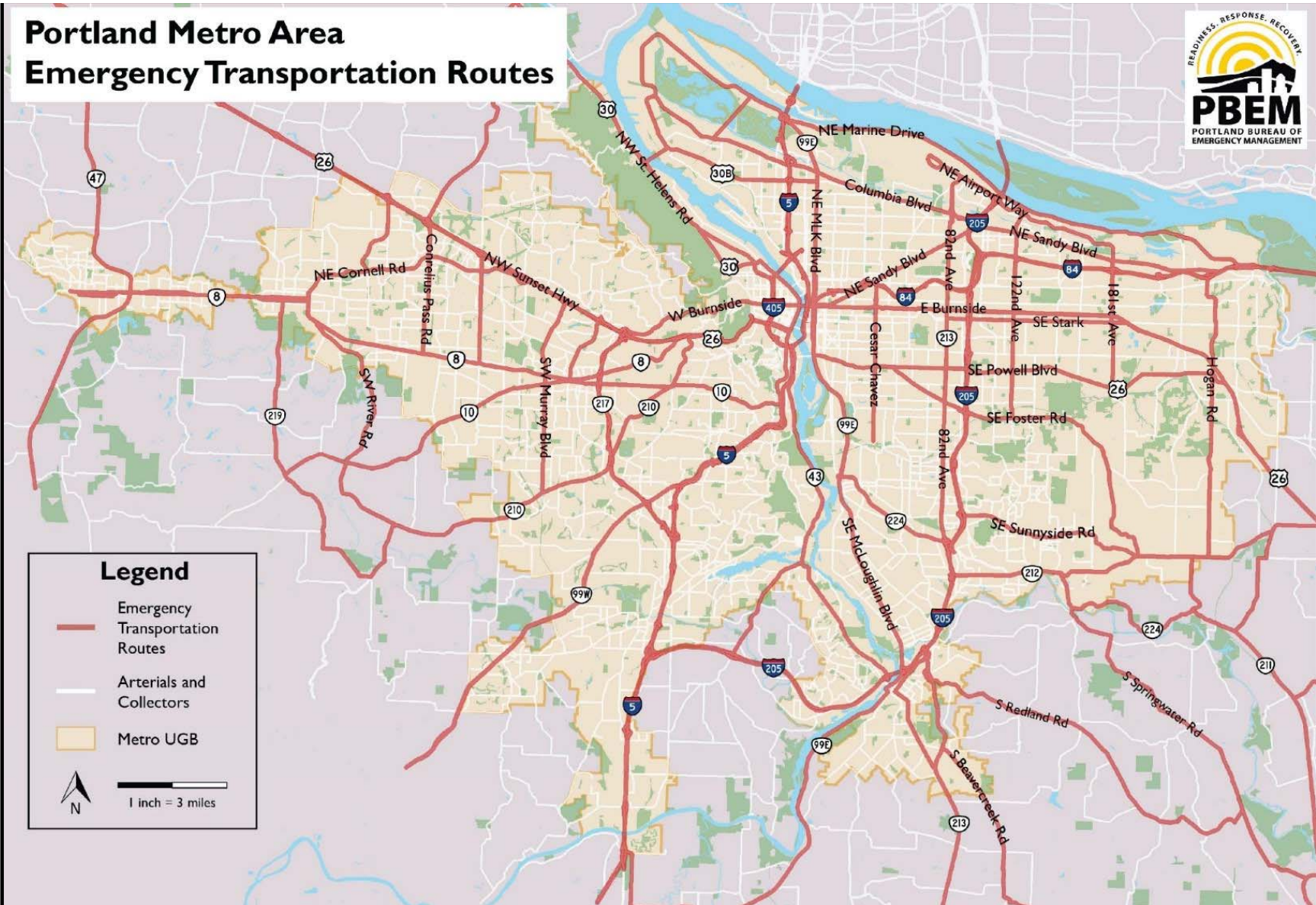
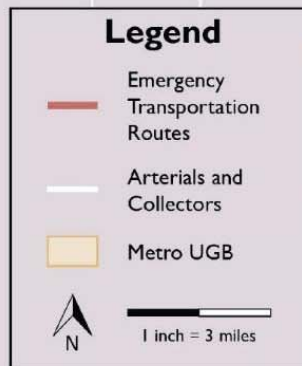


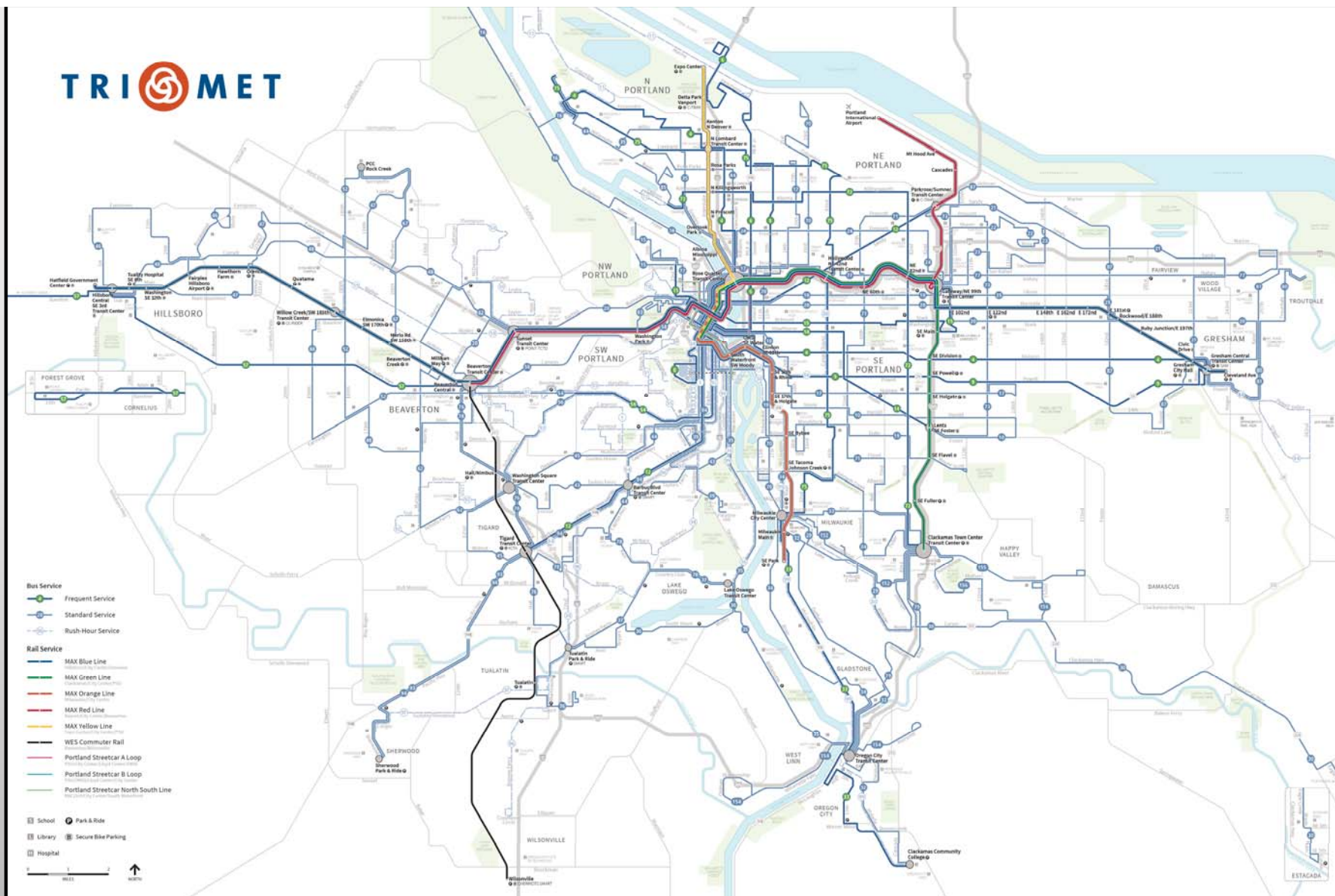
Arterial and Throughway Network

Figure 2.7

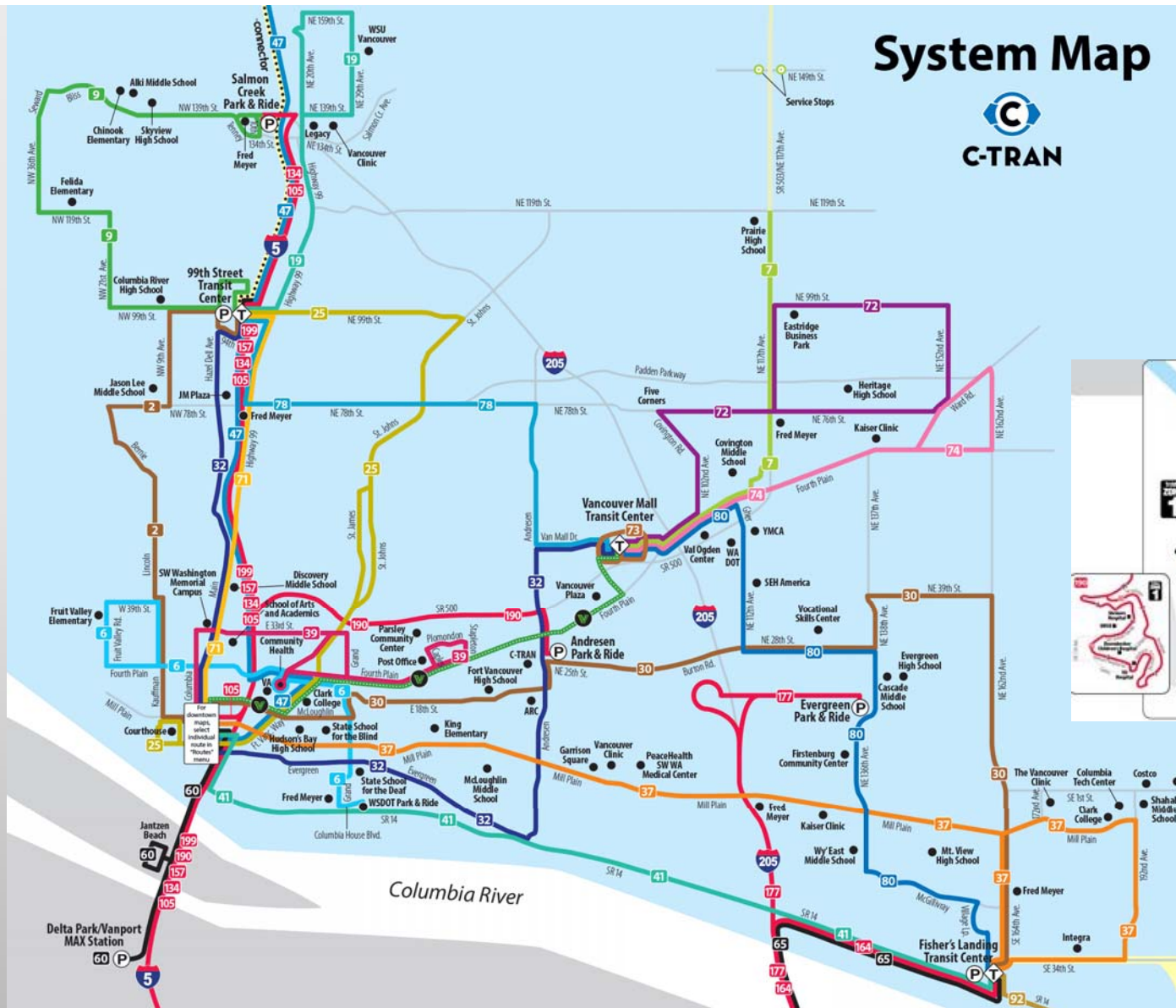


Portland Metro Area Emergency Transportation Routes





System Map



TriMet Current Operations – Weekday Ridership

On ETRs Currently: 423 buses		
	Weekday ridership	% total trips
FS Bus (10 routes)	69,470	22%
Bus (17)	35,390	11%
Total	104,860	33%

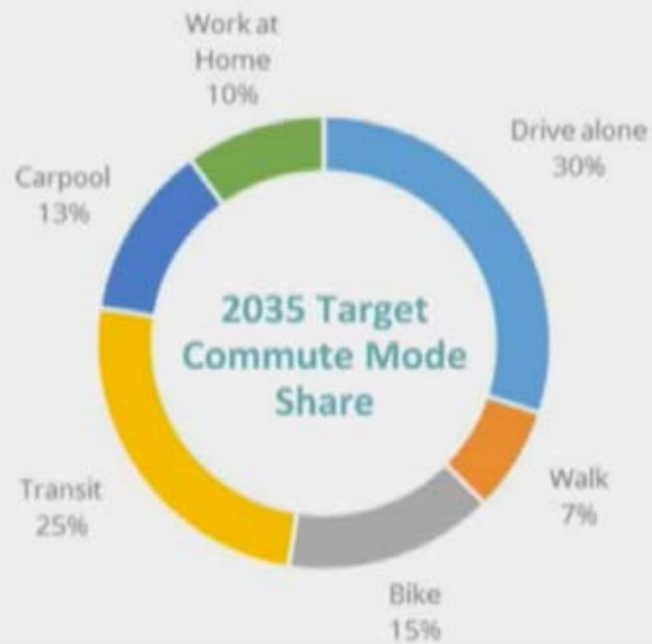
Not on ETRs Currently: 413 buses		
	Weekday ridership	% total trips
MAX	124,610	39%
FS Bus (3)	31,230	10%
Bus (50)	55,330	10%
Total	211,170	59%

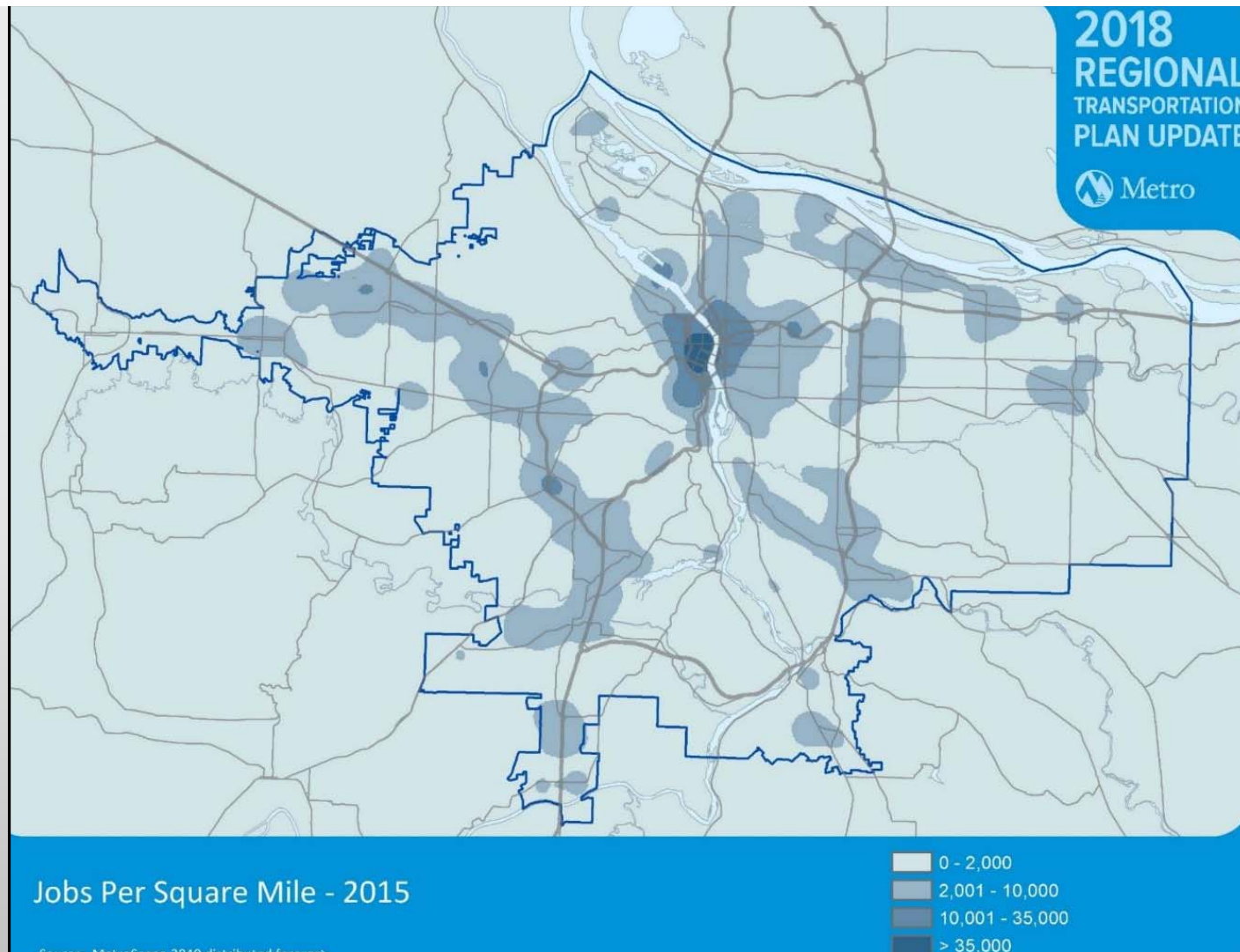
TriMet Operations

VEHICLE CAPACITY							
Type	Achievable				Design		
	Seated	Standing	Total	% of Design	Seated	Standing	Total
30' LFB	28	2	30	79%	28	10	38
40' LFB	39	12	51	80%	39	25	64
LRV Type 1	76	57	133	80%	76	90	166
LRV Type 2 or 3	64	69	133	80%	64	102	166
LRV Type 4	68	70	138	80%	68	104	172
SC	30	62	92	80%	30	85	115
WES DMU	76	19	95	56%	76	93	169
WES trailer	82	21	103	58%	82	97	179
LRVs/YARD (these numbers change frequently)				BUSES/GARAGE (includes 40' & 30' coaches, cont. fleet)			
Ruby Junction:	87				Center:	283	
Elmonica:	58				Merlo:	141	
Total:	145				Powell:	234	
					Total:	658	

Portland Commute Modal Split

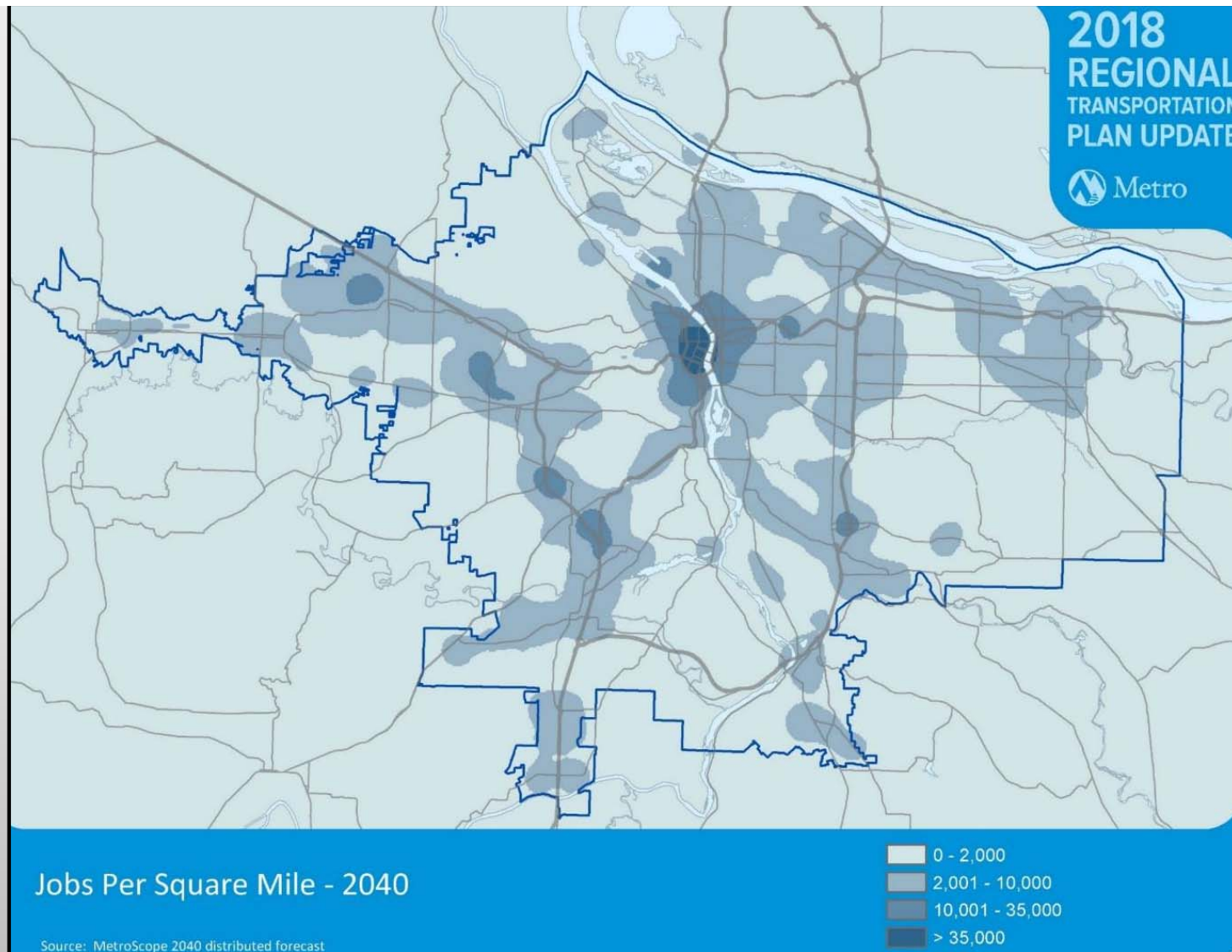
Commute Mode Share



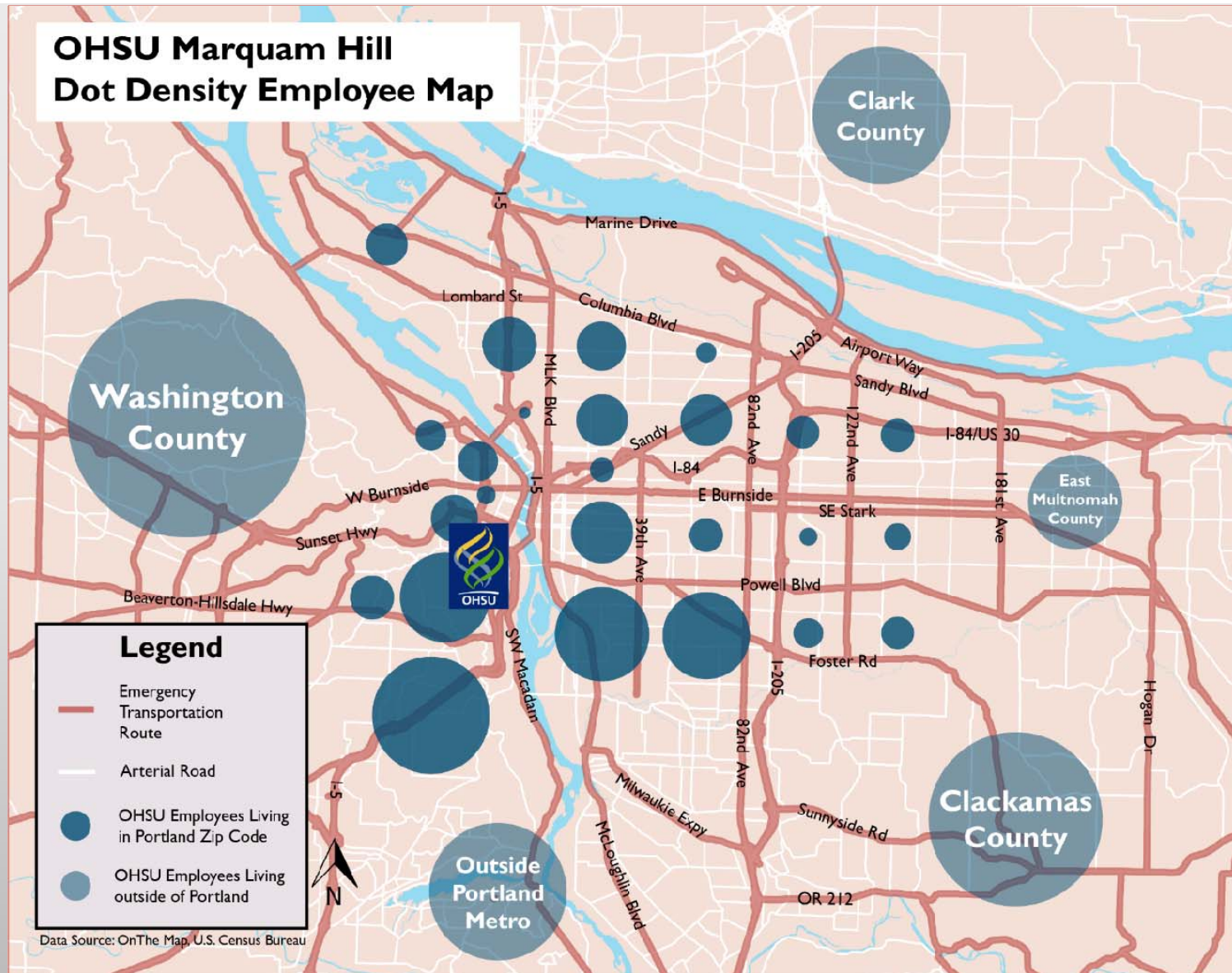


Module 3: Overview of Regional Plans and Transportation System

<https://www.oregonmetro.gov/public-projects/rtp>

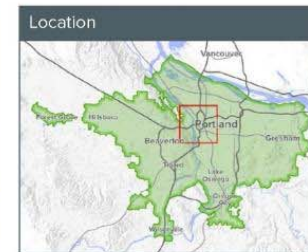
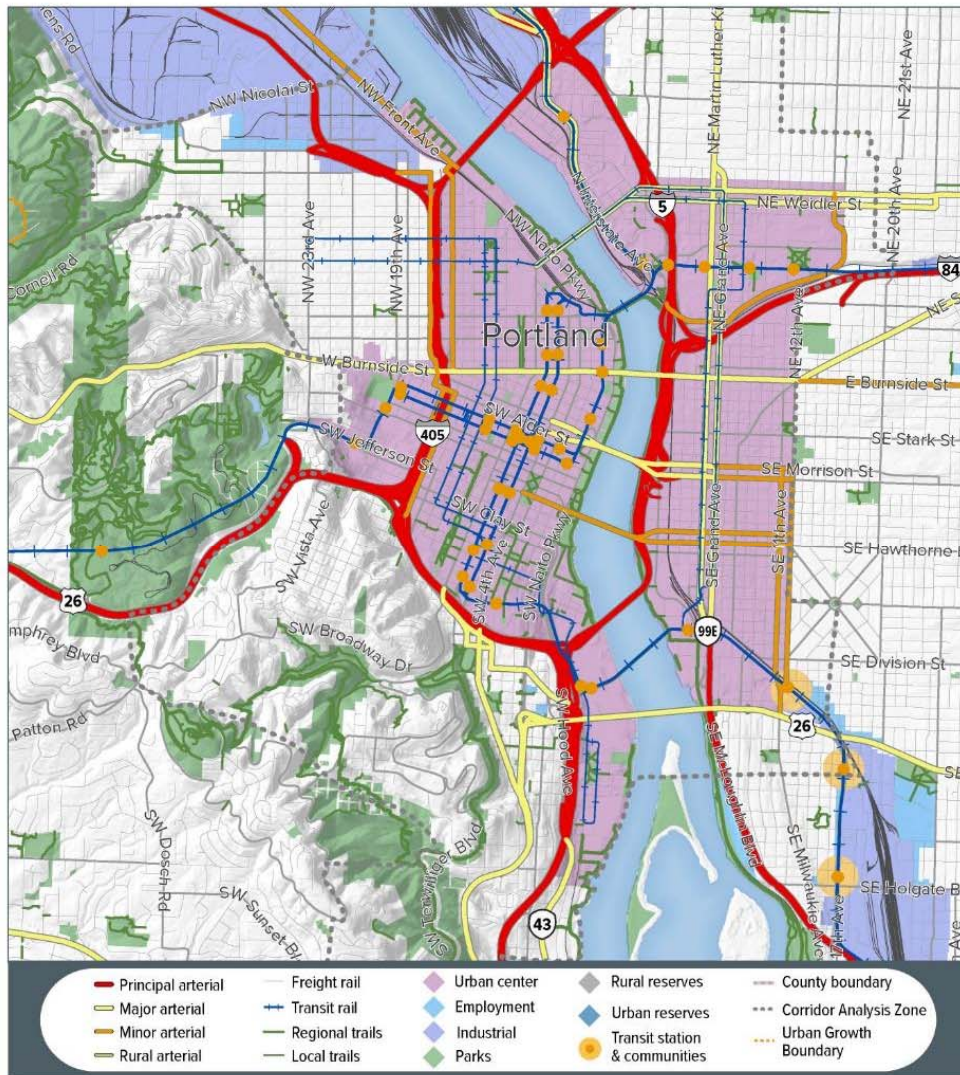


OHSU Marquam Hill Dot Density Employee Map



Data Source: OnThe Map, U.S. Census Bureau

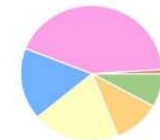
ion System



4

Portland Central City Loop

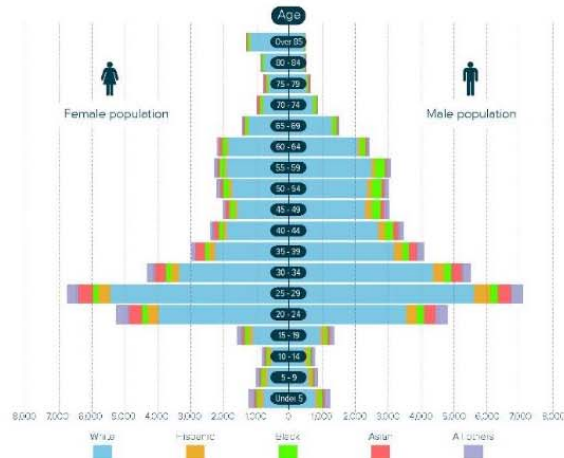
The Portland Central City Loop mobility corridor encompasses I-5 and I-405, key throughway interchanges with I-84, US 26, and US 30, MAX light rail, parallel arterials, as well as bus service and bicycle routes that support movement in and through the corridor. I-5 supports interstate, interregional, and intraregional travel for people and goods. I-405 facilitates travel between the US 26 and US 30 corridors and access to downtown Portland. The corridor is a central hub for MAX light rail service. Streetcar connects between NW Portland, South Waterfront district and the Central Eastside. NW Front/SW Naito Parkway and NE/SE Grand Ave/Martin Luther King (MLK) Jr. Blvd are key parallel streets. Portland central city is the region's urban heart, with high-density office development surrounded by mid-rise residential and mixed use commercial on the west side and inner city warehouse/commercial uses on the east side. A compact local street network facilitates multi-modal access for the majority of the corridor.



Corridor analysis zone (CAZ)	Percentage
Commercial	1%
Mixed-use commercial	43%
Industrial	17%
Single-family residential	20%
Multi-family residential	11%
Parks and open spaces	8%
Rural	0%
Public facilities	0%

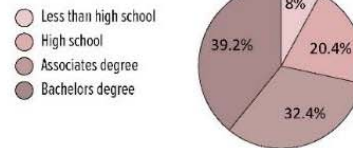
Sources: Metro RLIS Q4 2013, RTP

75,191 Residents

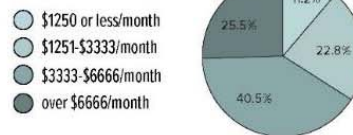


Community statistics

Education of residents



Household income



Source: 2008-13 American Community Survey

47,887 Dwelling Units
11% Vacancy

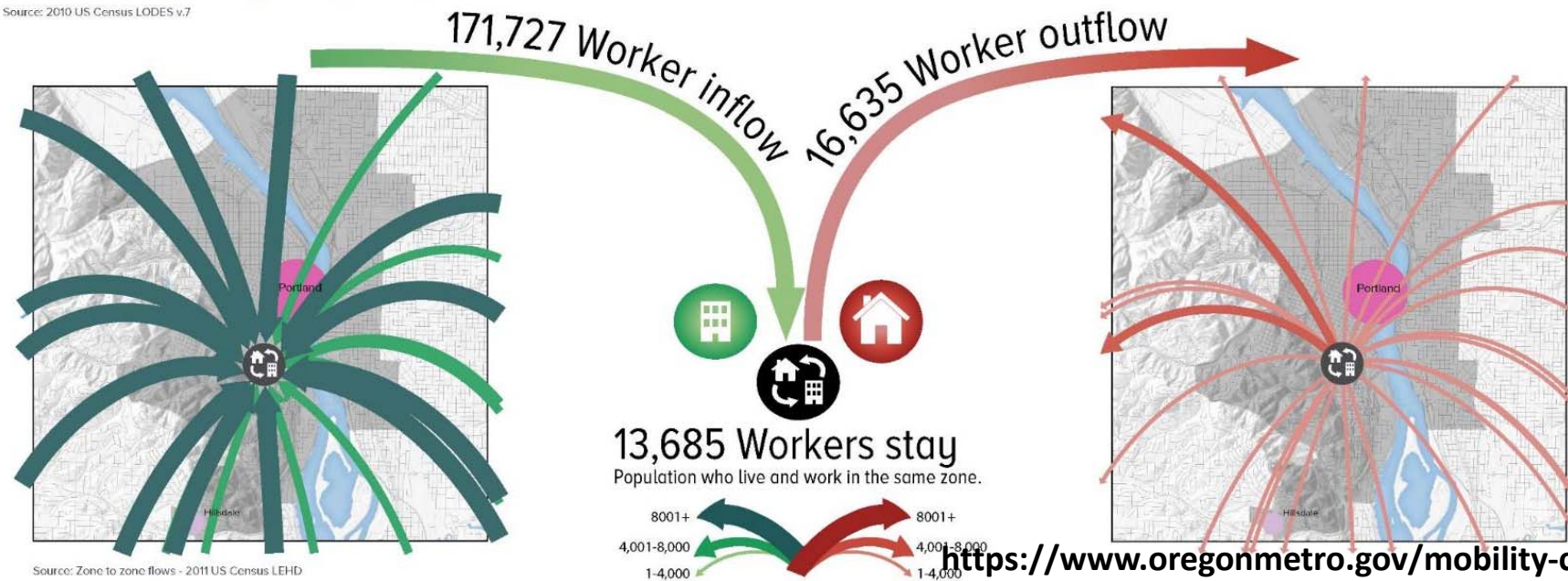
11.9 People/Acre

87.3% Multi-Family

Sources: 2010 US Decennial Census, Metro RLIS Q2 2015

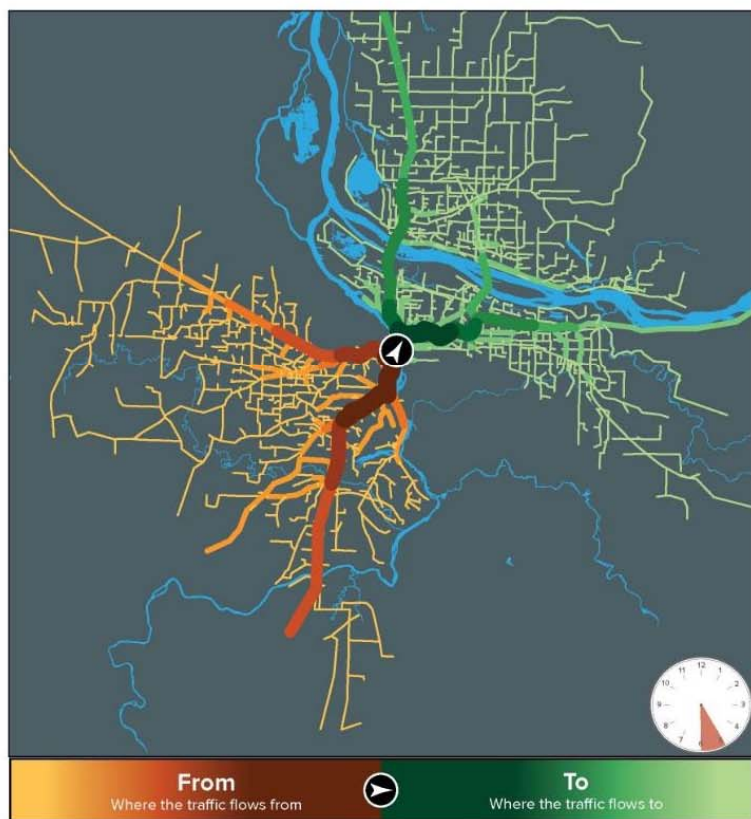


4



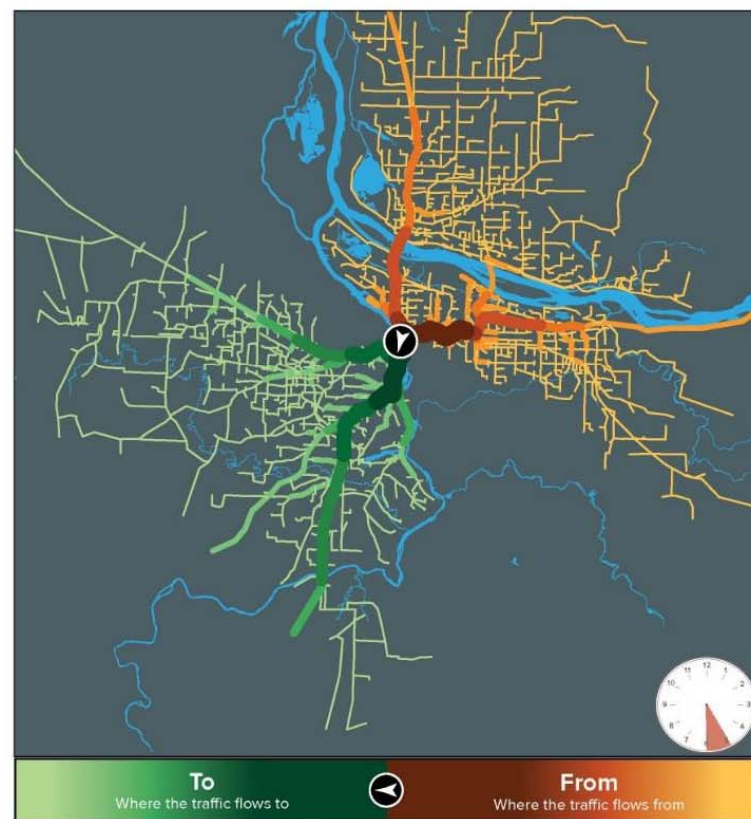
<https://www.oregonmetro.gov/mobility-corridors-atlas>

Transportation Flowsheds



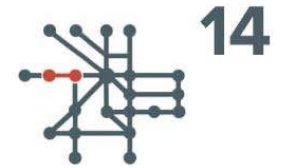
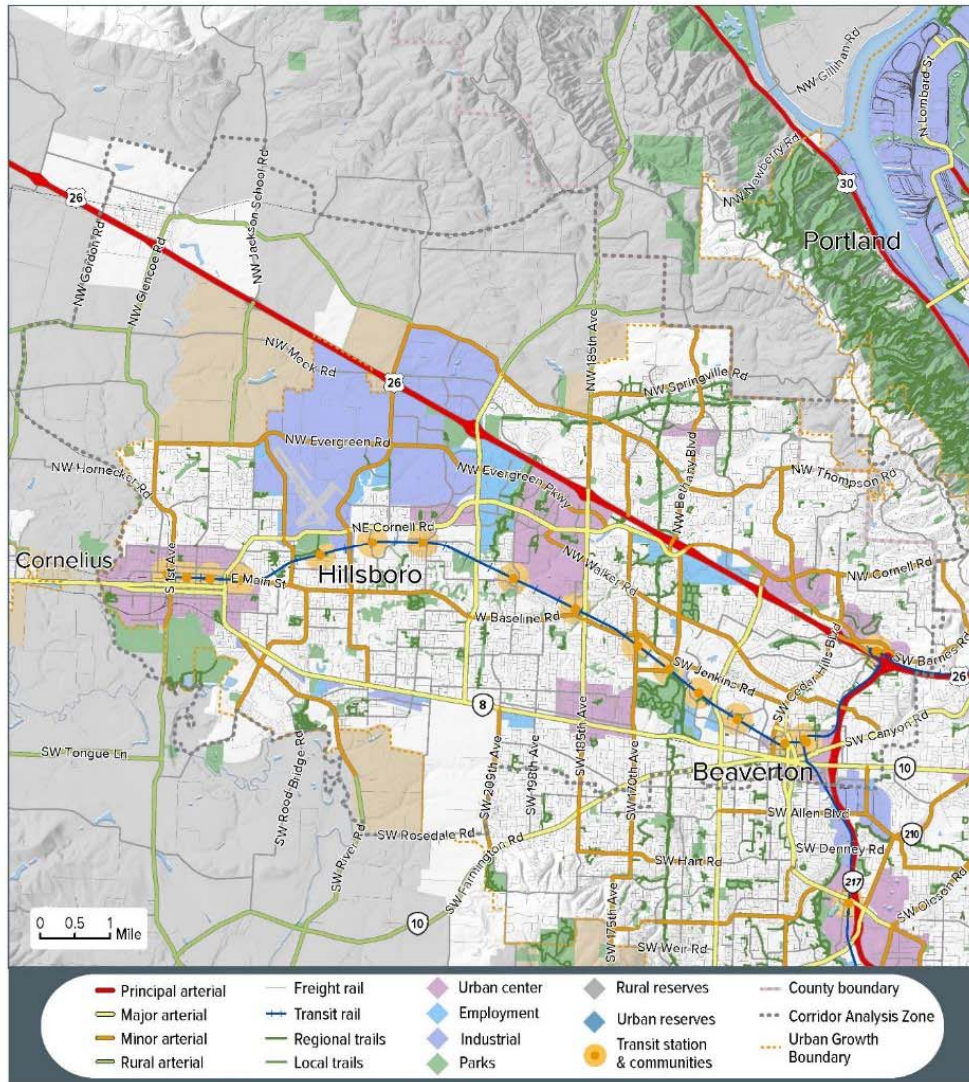
Traffic flow, northbound p.m. 1-hour peak, 5:00-6:00 PM

Source: 2010 Metro Modeling Services Network



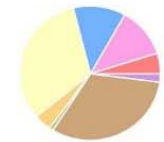
Traffic flow, southbound p.m. 1-hour peak, 5:00-6:00 PM

Source: 2010 Metro Modeling Services Network



Beaverton to Hillsboro

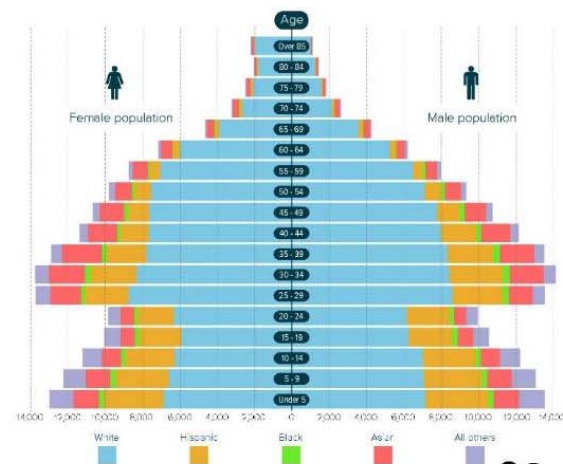
The Beaverton to Hillsboro mobility corridor includes Highway 8 (the main connection between Beaverton and Hillsboro), US 26, MAX light rail, parallel arterial streets as well as transit service and bicycle routes that support movement in and through the corridor. US 26 supports intraregional travel between Beaverton, Gresham, Hillsboro and Portland. NW Cornell, NW Evergreen, NW Walker Rd, NW West Union and W Baseline are parallel streets in this corridor. The corridor is a diverse mix of urban and rural land uses, with several regional and town centers, station communities, employment and industrial areas in the urbanized sections. The local street network is a patchwork of well-connected and discontinuous streets. Farm-to-market roads provide mobility outside the urbanized areas.



- Zoning**
- Corridor analysis zone (CAZ)
 - 5% Commercial
 - 12% Mixed-use commercial
 - 12% Industrial
 - 32% Single-family residential
 - 4% Multi-family residential
 - 1% Parks and open spaces
 - 32% Rural
 - 2% Future urban development

Sources: Metro RLIS Q4 2013, RTP

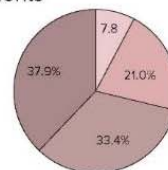
261,326 Residents



Community statistics

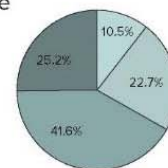
Education of residents

- Less than high school
- High school
- Associates degree
- Bachelors degree



Household income

- \$1250 or less/month
- \$1251-\$3333/month
- \$3333-\$6666/month
- over \$6666/month



Source: 2008-13 American Community Survey



103,883 Dwelling Units
6% Vacancy



4.6 People/Acre



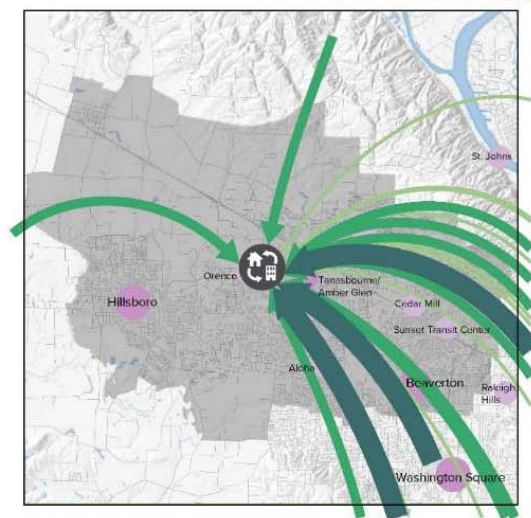
40.9% Multi-Family

Sources: 2010 US Decennial Census, Metro RLIS Q2 2015



14

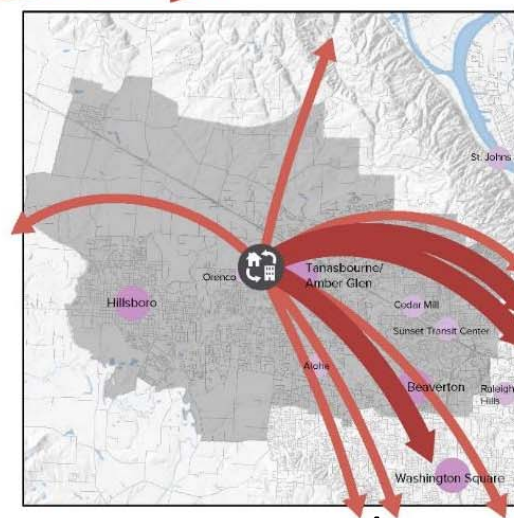
88,698 Worker inflow 68,970 Worker outflow



Source: Zone to zone flows - 2011 US Census LEHD

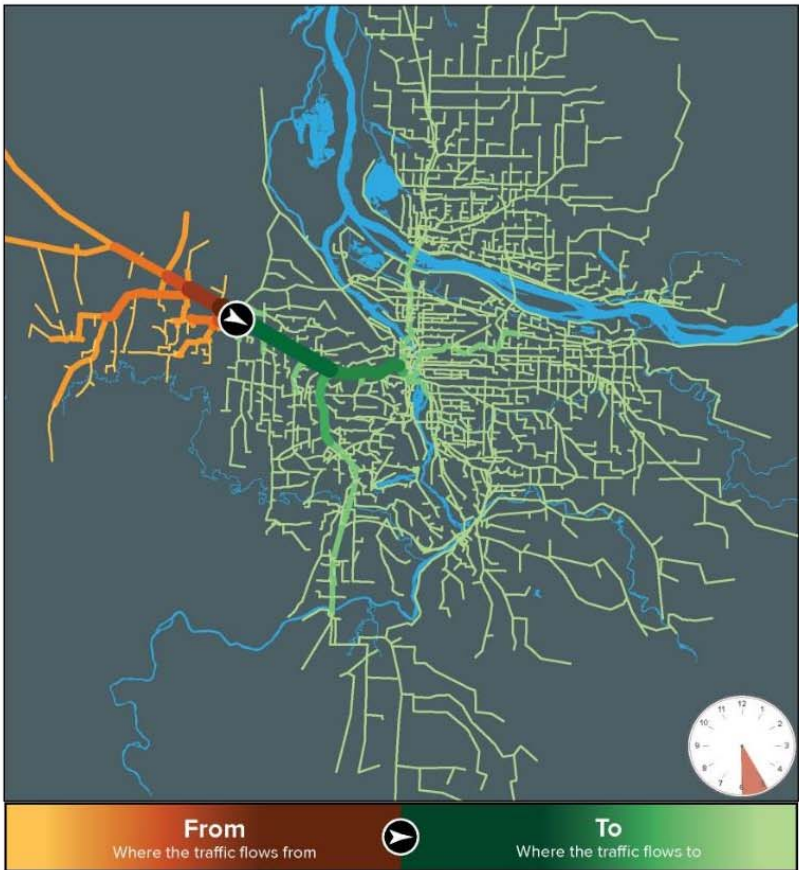
47,212 Workers stay

Population who live and work in the same zone.



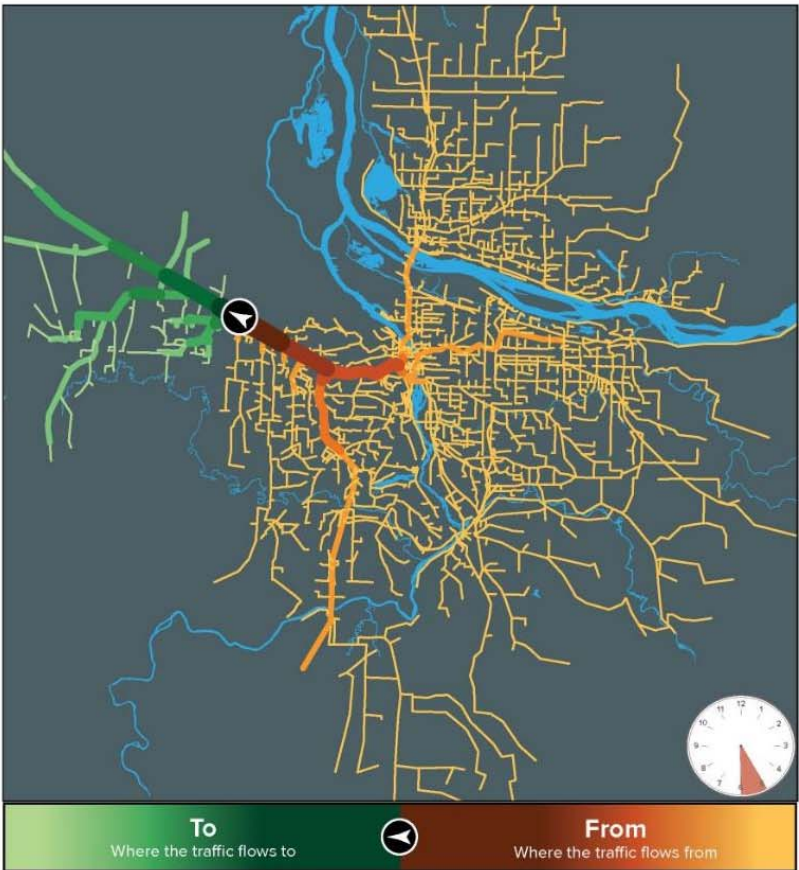
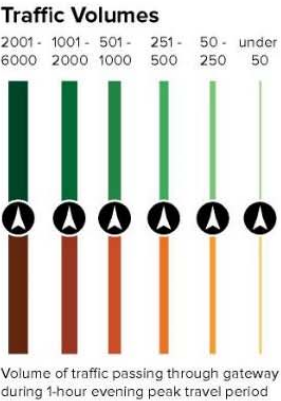
<https://www.oregonmetro.gov/mobility-corridors-atlas>

Transportation Flowsheds



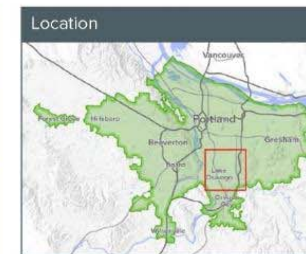
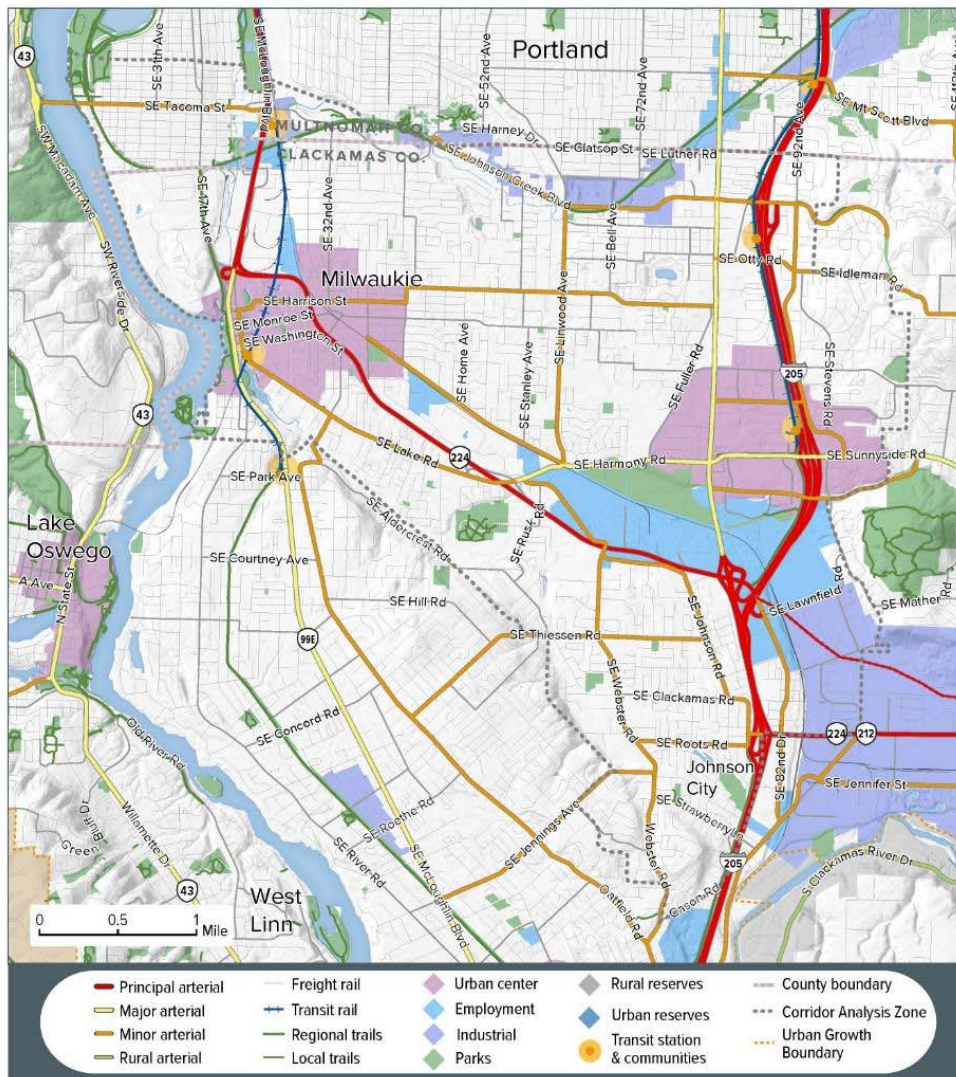
Traffic flow, eastbound p.m. 1-hour peak, 5:00-6:00 PM

Source: 2010 Metro Planning Services Network



Traffic flow, westbound p.m. 1-hour peak, 5:00-6:00 PM

Source: 2010 Metro Planning Services Network



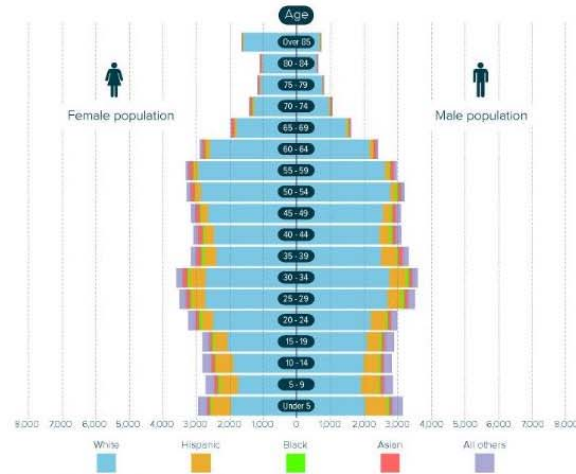
Milwaukie to Clackamas

The Milwaukie to Clackamas mobility corridor is centered on Hwy 224, includes both the Milwaukie Town Center and the Clackamas Regional Center and includes MAX light rail, bus service and bicycle routes. HWY 224 provides intraregional travel for people and goods and connects I-205 with Hwy 99E. Parallel routes such as SE Lake/SE Harmony Road and SE King Road provide additional east west travel while SE 82nd, Hwy 99E and SE Linwood Road provide north south travel options. The area is defined by the traditional Milwaukie downtown, the Clackamas Regional Center commercial node and a significant employment area along Hwy 224 with the remaining area predominantly single family homes.



Sources: Metro RLIS Q4 2013, RTP

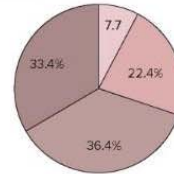
70,223 Residents



Community statistics

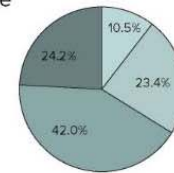
Education of residents

- Less than high school
- High school
- Associates degree
- Bachelors degree



Household income

- \$1250 or less/month
- \$1251-\$3333/month
- \$3333-\$6666/month
- over \$6666/month



Source: 2008-13 American Community Survey



31,728 Dwelling Units
6% Vacancy

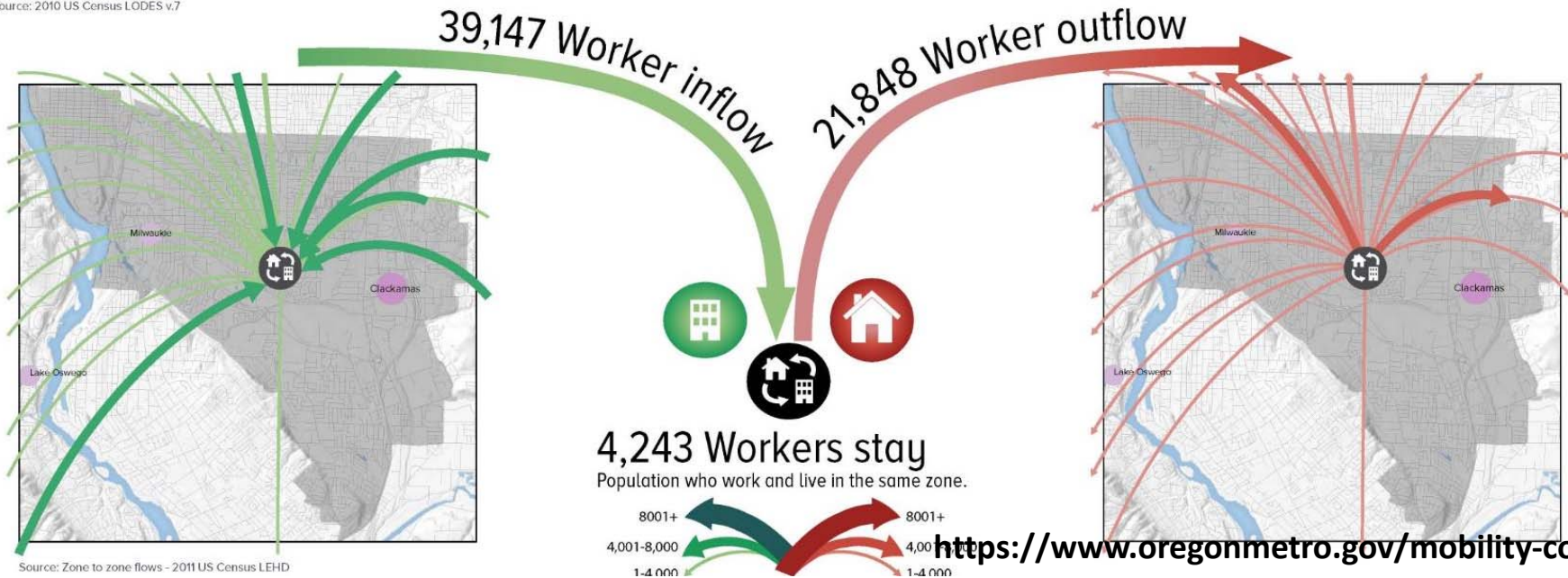


7.3 People/Acre



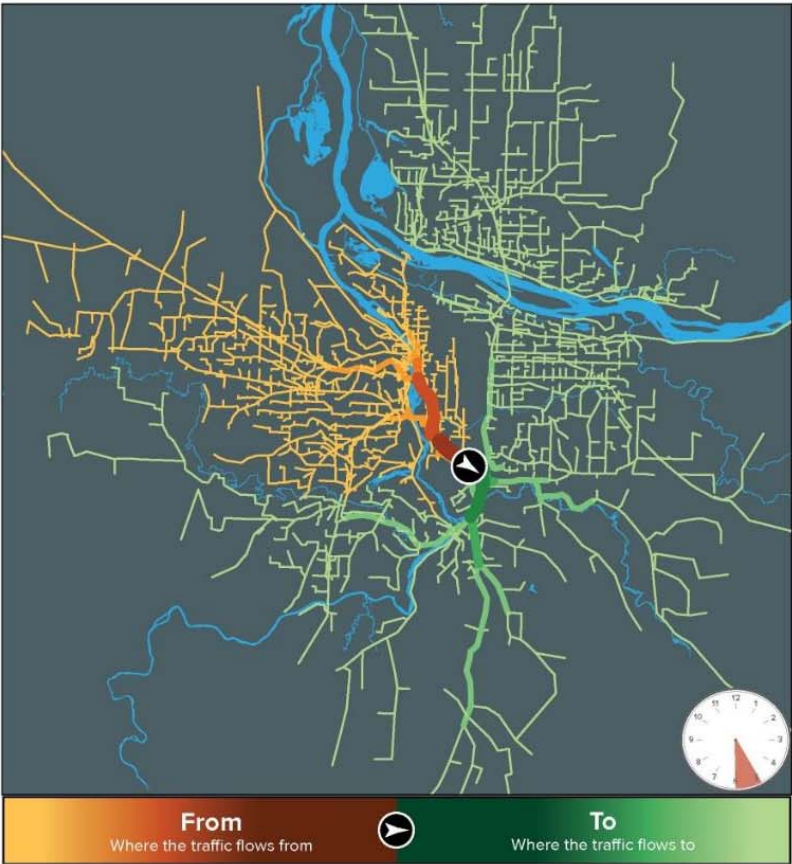
43.3% Multi-Family

Sources: 2010 US Decennial Census, Metro RLIS Q2 2015



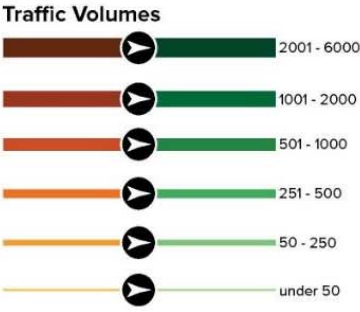
<https://www.oregonmetro.gov/mobility-corridors-atlas>

Transportation Flowsheds

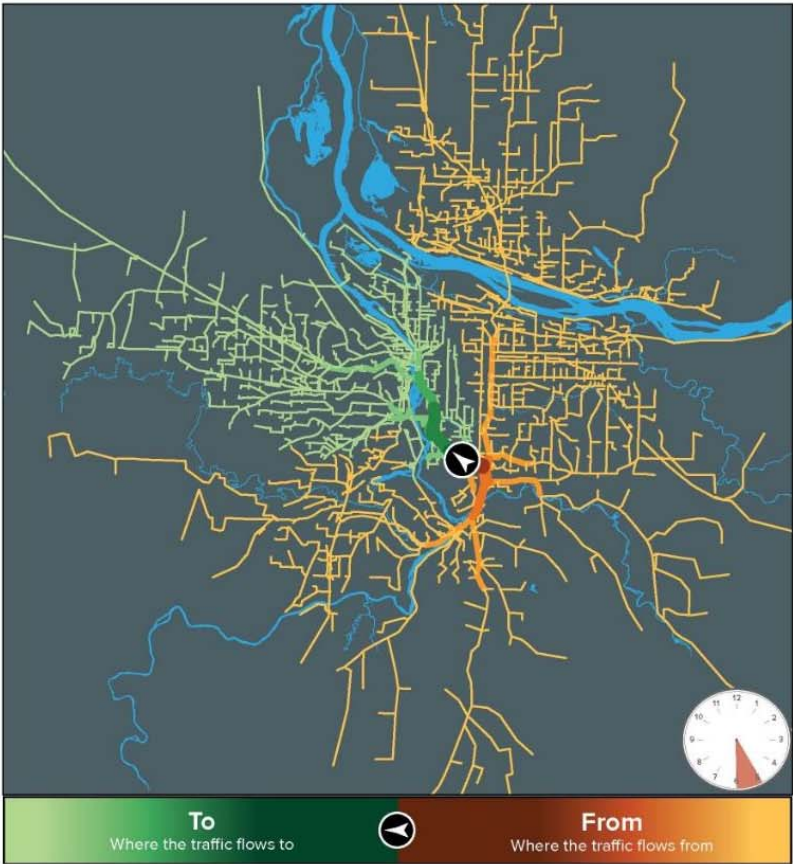


Traffic flow, eastbound p.m. 1-hour peak, 5:00-6:00 PM

Source: 2010 Metro Modeling Services Network



Volume of traffic passing through gateway during 1-hour evening peak travel period



Traffic flow, westbound p.m. 1-hour peak, 5:00-6:00 PM

Source: 2010 Metro Modeling Services Network

<https://www.oregonmetro.gov/mobility-corridors-atlas>

Summary

- Existing emergency response plans and processes should be tapped as a resource for the transportation recovery plan
- Regional transportation plans should integrate and inform recovery planning efforts
- Development of a transportation recovery plan should be integrated into other planning efforts as much as possible
- The regional transportation system includes roads, transit, ports, airports, etc.; in many cases each mode is operated and maintained by a different agency

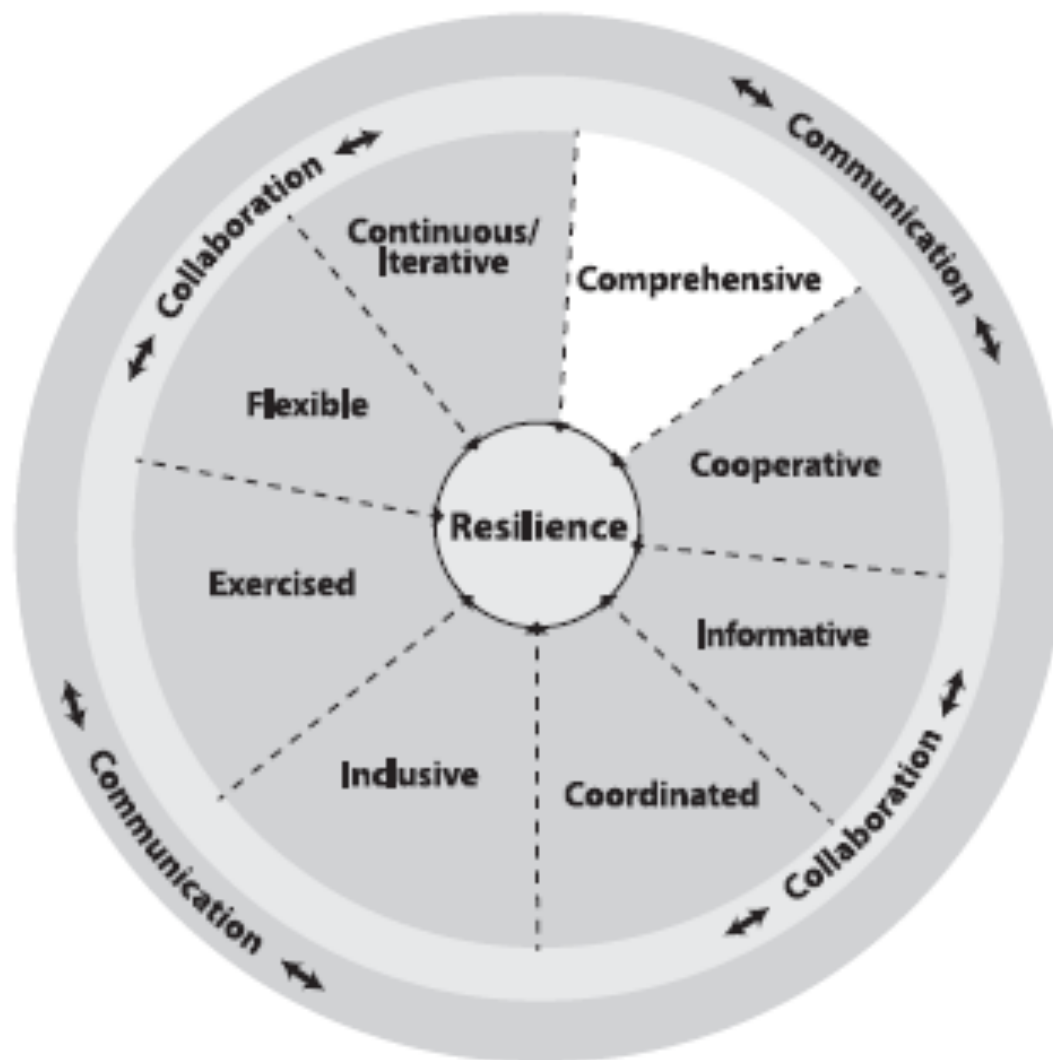


Module 4: Communications

Module 4: Communications

Objectives

- Describe the critical role of communications, collaboration and coordination in all recovery efforts
- Discuss the need for communication strategies to be developed *in advance of* an incident and during response and recovery phases
- Provide an overview of communications technologies and methods
- Demonstrate the need for coordination of messaging between agencies, between agencies and the public, and thru external outlets



The graphic features a light gray background with a dark gray trapezoidal shape in the top-left corner and a yellow trapezoidal shape in the bottom-right corner. The text "COMMUNICATIONS FRAMEWORK" is centered in the middle of the slide.

COMMUNICATIONS FRAMEWORK

Communications Framework

- Communications strategies and agreements are central to
 - Preparedness for an incident – short term
 - During the incident – short to mid-term
 - During early recovery – mid-term
 - Later in recovery – long term
- Agreements should include:
 - single points of contact at each phase,
 - authorized spokesperson,
 - well understood and respected incident command systems and procedures

Communications Framework

- Public agency to public agency
 - What is the current communication structure and protocols during emergency response?
 - Is there a command structure in place?
 - Do public agencies know their roles in communications during and after an incident?
- Public agencies to the public
 - When and how does your agency inform the public of certain information?
 - What agencies have lead role in informing public during response? During recovery?
 - How is quality of information assured? How is information coordinated?
- Private sector to the public via technologies
 - Through social media, information can be provided in real-time; how is this information verified for accuracy?

Phases of Recovery

Examples of Collaboration

Transportation Collaboration in the Short Term

- Share situational awareness.
- Establish alternate transportation modes and routes for freight and passengers.
- Utilize mutual aid for emergency repairs.
- Share public information

Transportation Collaboration in the Mid Term

- Create a coordination committee.
- Develop a common operating picture.
- Prioritize and design interim repairs.
- Manage transportation demand.
- Implement multi-modal solutions.
- Build public support.
- Form long term recovery organizations.
- Seek recovery financing.

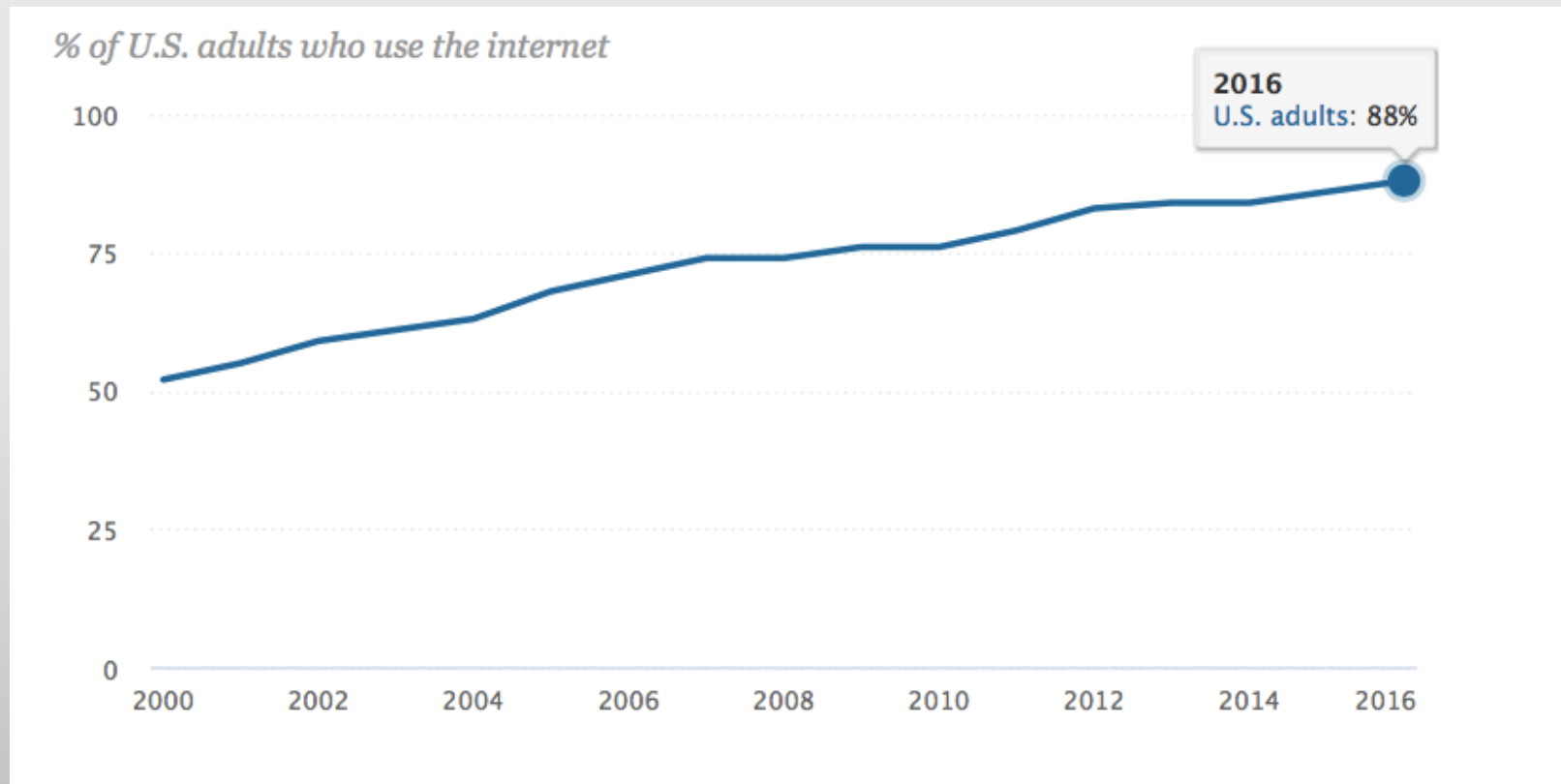
Transportation Collaboration in the Long Term

- Form working groups in support of recovery committees.
- Update common operating picture.
- Prioritize and design permanent repairs.

Source: Puget Sound Regional Council Transportation Recovery Annex, July 2014

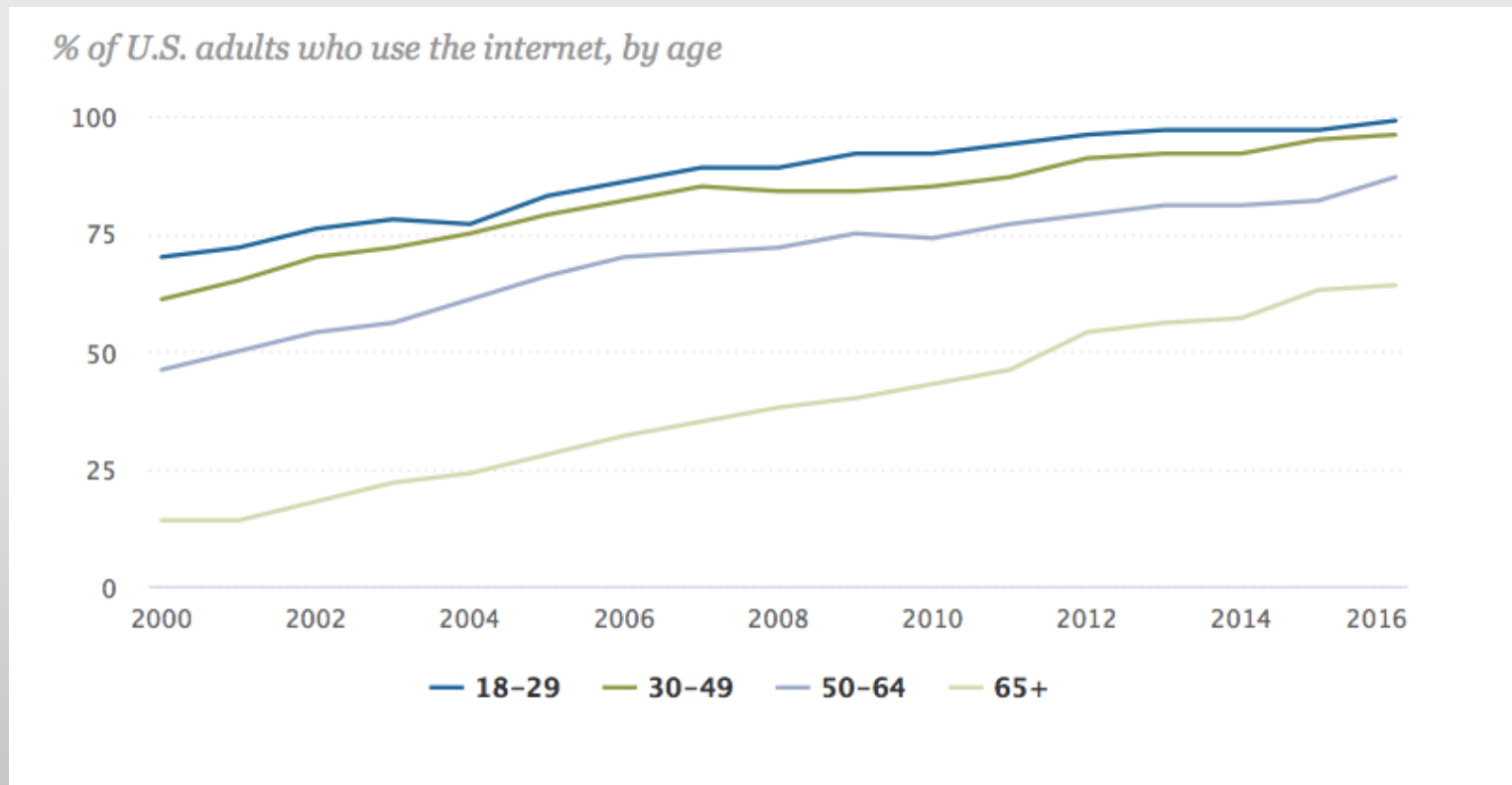
Module 4: Communications

Communications Technologies and Methods



Pew Research Center, Annual Survey 2000 - 2016

Communications Technologies and Methods



Pew Research Center, Annual Survey 2000 - 2016

Communications Technologies and Methods

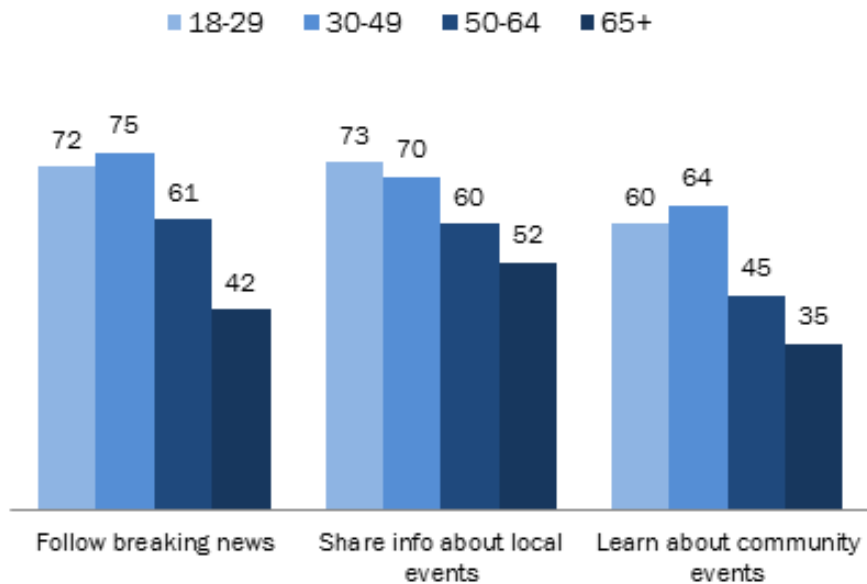
- Smartphone dependent for internet access
- Some smartphone owners – particularly younger adults, minorities and lower-income Americans – *depend on their smartphone for internet access*.
 - 17% 18 to 29 year olds
 - 21% with an annual household income of less than \$30,000/year compared to
 - 5% from households earning more than \$75,000/year
 - 15% of African Americans, 23% Hispanic, 9% White

Source: Pew Research Center, Annual Survey 2000 - 2016

Using Smartphone to Keep Informed & Engaged

Using One's Phone for News and Community Info is Popular Across a Range of Ages

% of smartphone owners in each age group who use their phone frequently/occasionally to...



Pew Research Center, Annual Survey

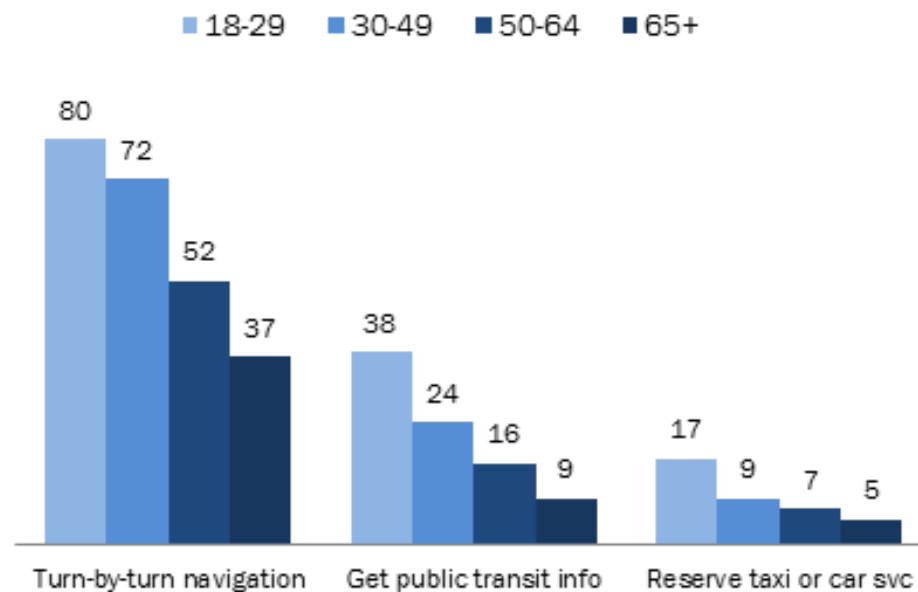


Module 4: Communications

Using Smartphone for Travel Information

Young Adults are Especially Likely to Use Their Phone for Navigation — Either by Car, Public Transit, or Taxi

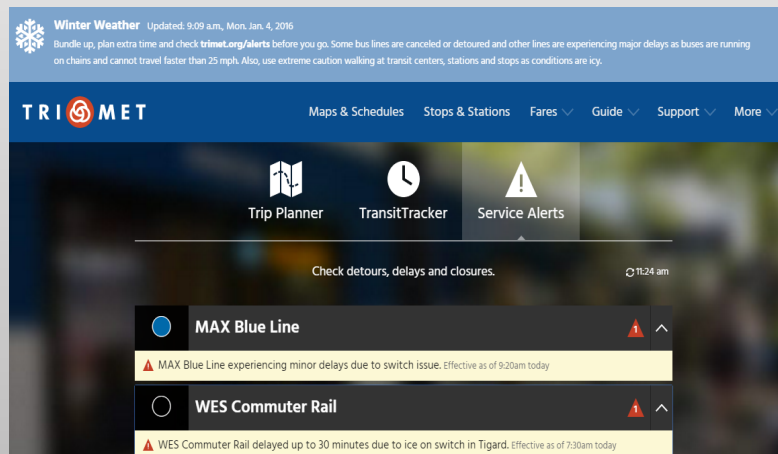
% of smartphone owners in each age group who use their phone frequently/occasionally for...



Pew Research Center, Annual Survey

Module 4: Communications

Transit Alerts



Electronic Billboards

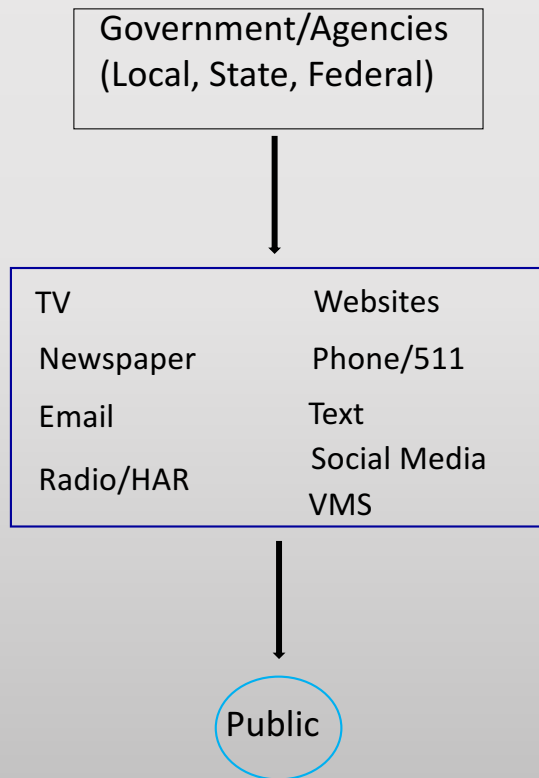


Wireless Emergency Alert (WEA)

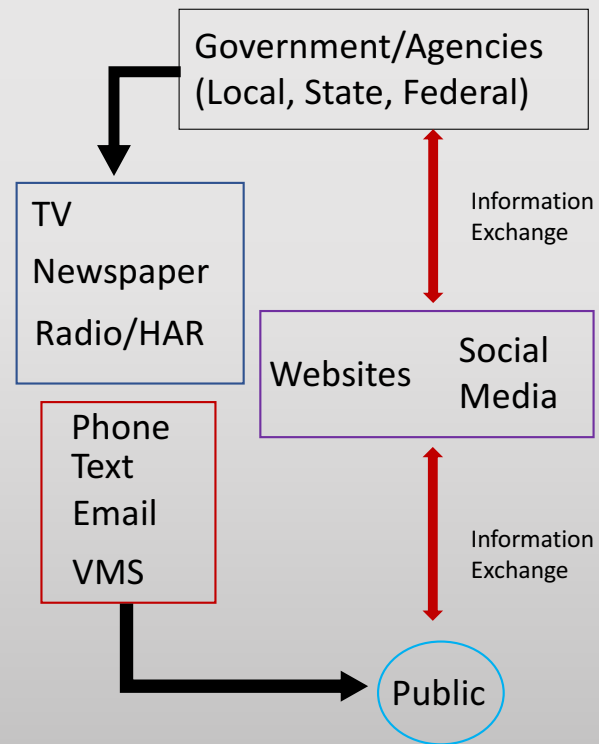


Models for Information Dissemination

Traditional



Dynamic



Information Exchange in a Dynamic Environment

- Availability of real-time information and public access to it calls for a need to ensure protocols and processes for:
 - Information gathering
 - Verification
 - Dissemination
- How does the public know it is getting accurate information???
 - During response and recovery it is essential to have public trust and confidence in information provided by public agencies

SOCIAL MEDIA TOOLS

Working together as ONE TEAM...on the scene and on the world wide web!



facebook	You Tube	twitter		
<p>FACEBOOK: Follow FEMA, NOAA and American Red Cross on Facebook to learn more about hurricanes and the steps you can take to ensure your family or business is prepared.</p> <p>Post comments, share your stories and keep track of the latest information.</p>	<p>YOUTUBE: Watch online video webisodes on topics such as how to prepare a disaster kit, what to do and where to go in an emergency, how to apply for disaster assistance and more.</p> <p>Tune in for informational videos produced by FEMA, NOAA, and American Red Cross.</p>	<p>TWITTER: In 140 characters or less, brief messages (aka "tweets") provide followers with specific information in a timely manner.</p> <p>Those who "tweet" can stay up-to-date and by following on-going developments in a disaster situation via their cell phones.</p>	<p>WIDGETS: Add a badge to your website which allows your audience to find specific hurricane-related information .</p> <p>This predesigned tool is similar to a "box score" which includes direct links such as how to apply for assistance.</p>	<p>MOBILE SITE: Cell phone users with internet connectivity can access a basic easy-to-load webpage designed specifically for fast downloads.</p> <p>Log on for information on what to do before, during and after a disaster by visiting fema.gov on your mobile phone.</p>
<p>www.facebook.com/fema www.facebook.com/redcross www.facebook.com/usnoaagov</p>	<p>www.youtube.com/fema www.youtube.com/usnoaagov www.youtube.com/user/AmRedCross</p>	<p>www.twitter.com/femainfocus www.twitter.com/craigatfema www.twitter.com/usnoaagov www.twitter.com/usoceangov www.twitter.com/redcross</p>	<p>www.fema.gov/help/widgets www.nhc.noaa.gov/widgets</p>	<p>For a complete list of social media links offered by each agency/organization, visit www.fema.gov www.redcross.org/connect www.noaa.gov/socialmedia</p>

Source: FEMA



Communications: What If No Electricity or Cell Towers?

- No power for extended period of time (e.g. Puerto Rico)
 - Electricity not available
 - Water supply systems disabled
- Cell phone towers out
- Access to remote areas difficult
- How do you communicate with no power or cell phones?

Breakout (20 mins)

Breakout Questions

- What communications protocols or processes are in place in your region?
- What agencies and private sector entities should be included in the development of your transportation recovery communications plan?
- How does information get collected, verified before dissemination to the public?
- How are conflicts resolved?
- How can communication functions be best maintained, coordinated and effectively used throughout stages of recovery?

Report Out (10 minutes)

Summary

- Communication strategy is critical to all phases of response and recovery efforts
- A plan needs to be *in place prior to an incident* on how communications will flow between public agencies and to the public
- Ways to optimize the use of social media for enhancing communications should be included and coordinated in the recovery plan
- The communications plan should be flexible and adaptable as technology changes will inevitably occur that can change how we communicate



Module 5: Roles & Responsibilities

Module 5: Roles and Responsibilities

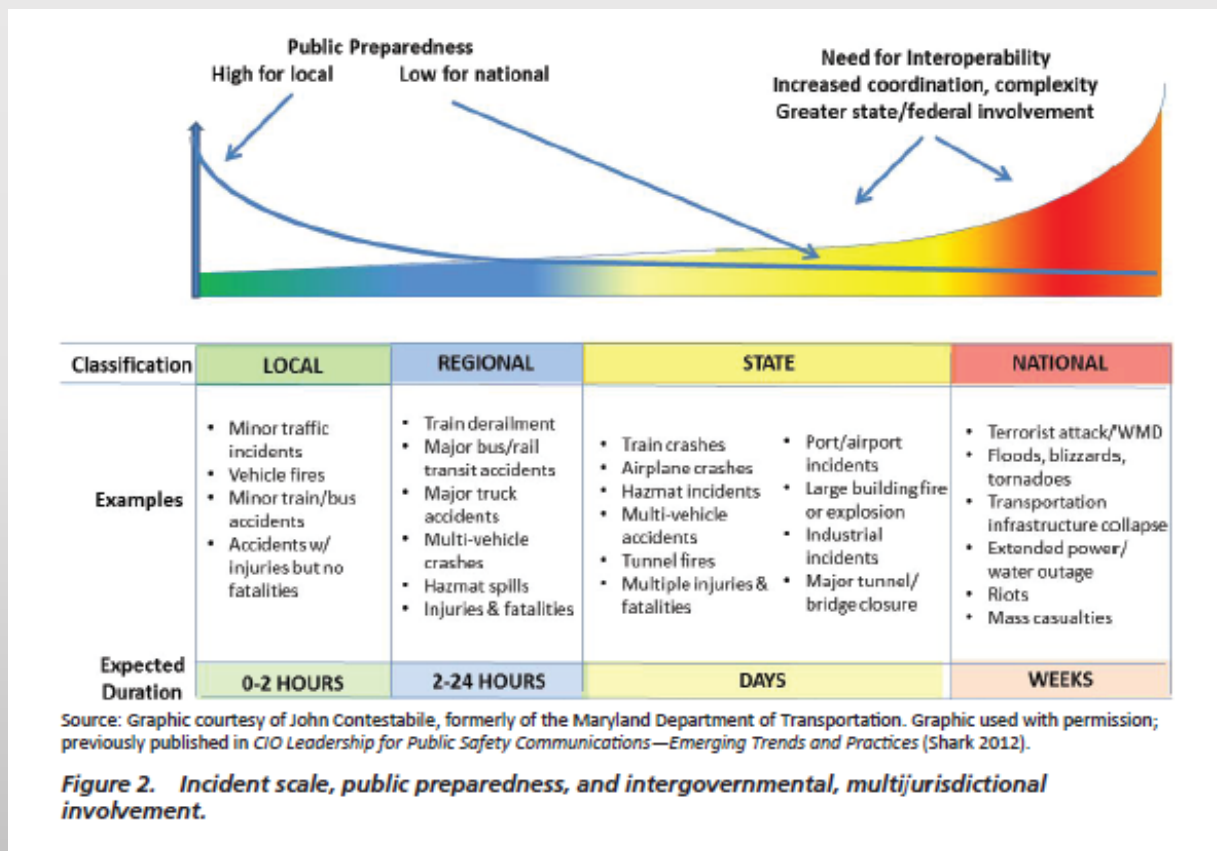
Objectives:

- Provide an overview of key Federal initiatives and requirements for response and recovery planning
- Understand the roles and responsibilities of Federal, State and local agencies in recovery planning
- Identify which agencies in your region are involved in emergency response and recovery efforts
- Discuss roles and responsibilities in recovery planning and implementation for agencies and other stakeholders (e.g., private sector, social media, ride-sharing providers, etc.) in your region

Roles and Responsibilities

- The primary role in response and recovery efforts lies with states, local and tribal governments
- Local officials are the closest to the situation; the need to partner with other agencies in developing coordinated community recovery and restoration plans is critical (e.g., utilities, public works, water plants)
- Where Federal assistance is needed, partnerships between Federal agencies and states and local governments is essential

Intergovernmental-Multijurisdictional Involvement



Source: NCHRP Report 777



Federal Initiatives and Requirements

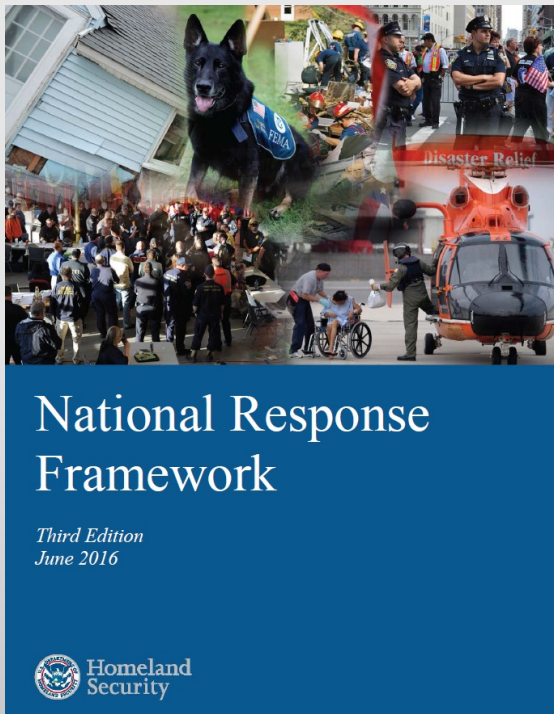
Key Federal Agencies

- U.S. Department of Homeland Security
 - Federal Emergency Management Agency
 - U.S Coast Guard
- U.S. Department of Defense
- U.S. Department of Transportation
 - Federal Highway Administration
 - Federal Transit Administration
 - Federal Aviation Administration
- U.S. Army Corps of Engineers
- U.S. Department of Housing and Urban Development
- U.S. Environmental Protection Agency
- U.S. Department of the Interior
 - U.S. Forest Service

Key Federal Initiatives and Strategies

- National Response Framework (NRF)
- National Incident Management Systems (NIMS)
- National Disaster Recovery Framework (NDRF)
- U.S. DOT Recovery Resource Guide
 - FTA Response and Recovery for Declared Emergencies and Disasters: A Resource for Transit Agencies

National Response Framework (NRF)



Source: National Response Framework

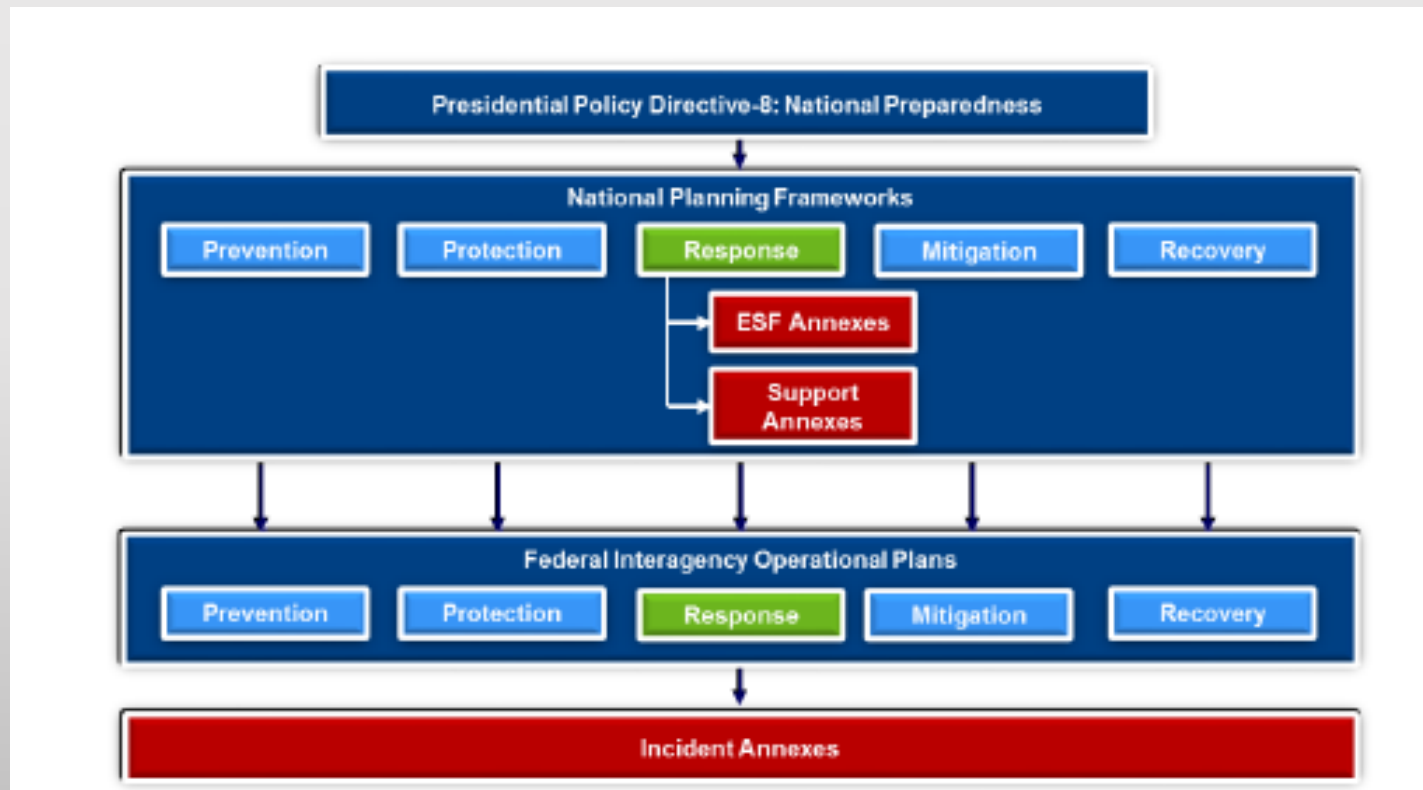
- Presents guiding principles enabling all levels of domestic response partners to prepare for and provide a unified national response to disasters and emergencies.
- Developed and updated by DHS
- A guide to how the Nation responds to all types of hazards and emergencies
- **Recovery: The capabilities necessary to assist communities affected by an incident to recover effectively.**

National Response Framework (NRF)



Figure 1: Organization of the NRF

National Response Framework (NRF)



NRF Emergency Support Functions

- **ESF #1: Transportation**
ESF Coordinator: USDOT
- **ESF #2: Communication**
ESF Coordinator: DHS/Cybersecurity and Communications
- **ESF #3: Public Works and Engineering**
ESF Coordinator: DOD/U.S. Army Corps of Engineers
- **ESF #4: Firefighting**
ESF Coordinator: USDA/U.S. Forest Service and DHS/FEMA/U.S. Fire Administration
- **ESF #5—Information and Planning**
ESF Coordinator: DHS/FEMA
- **ESF #6—Mass Care, Emergency Assistance, Temporary Housing, and Human Services**
ESF Coordinator: DHS/FEMA
- **ESF #7—Logistics**
ESF Coordinator: General Services Administration and DHS/FEMA
- **ESF #8—Public Health and Medical Services**
ESF Coordinator: Department of Health and Human Services
- **ESF #9—Search and Rescue**
ESF Coordinator: DHS/FEMA
- **ESF #10—Oil and Hazardous Materials Response**
ESF Coordinator: Environmental Protection Agency
- **ESF #11—Agriculture and Natural Resources**
ESF Coordinator: Department of Agriculture
- **ESF #12—Energy**
ESF Coordinator: Department of Energy
- **ESF #13—Public Safety and Security**
ESF Coordinator: Department of Justice/ESF Coordinator: Department of Justice/Bureau of Alcohol, Tobacco, Firearms, and Explosives
- **ESF #14—Superseded by National Disaster Recovery Framework**
- **ESF #15—External Affairs**
ESF Coordinator: DHS

National Response Framework

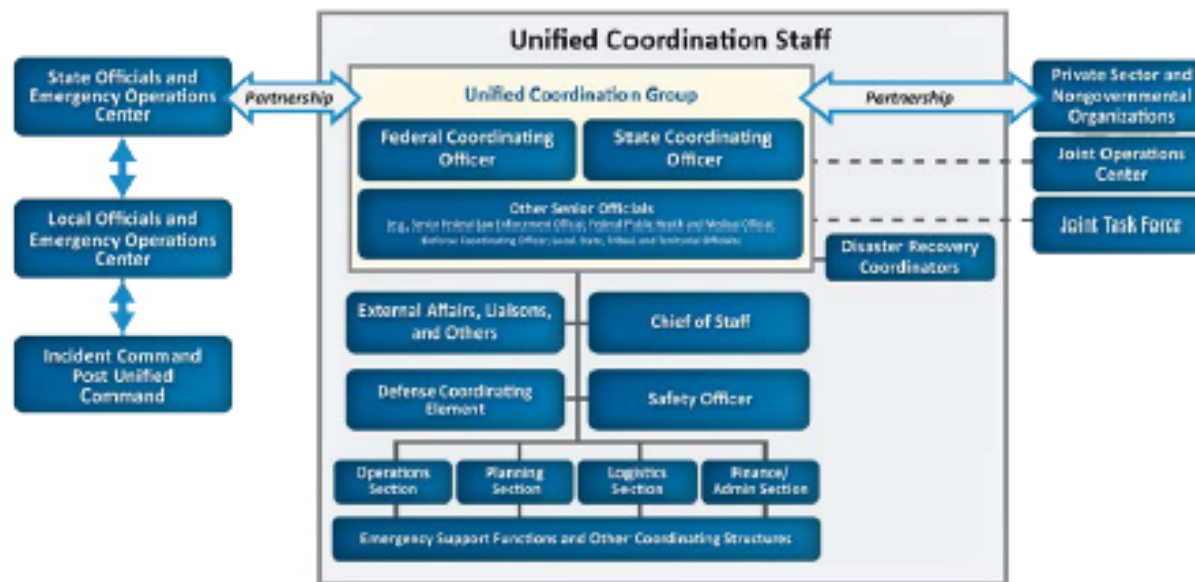
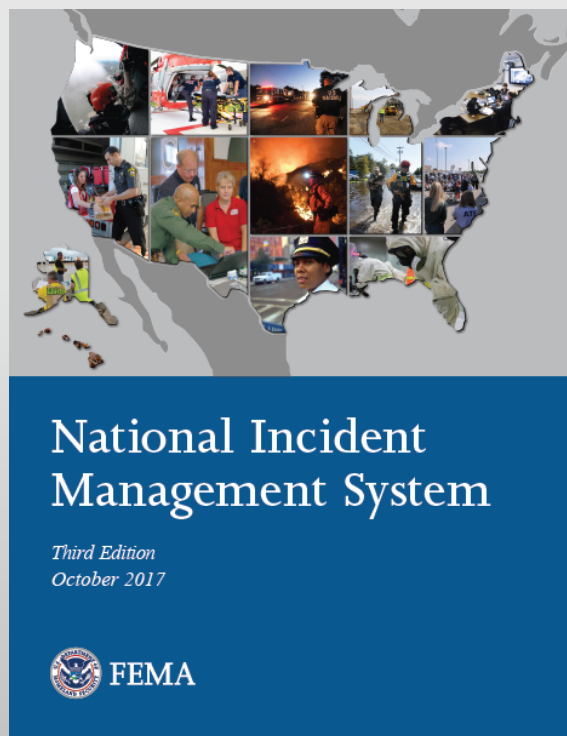


Figure 4: Unified Coordination

National Incident Management System (NIMS)



- Culmination of 40+ years to improve interoperability in incident management
- Post 2001, Homeland Security Presidential Directive 5 (HSPD-5) directed formal establishment of NIMS
- DHS and FEMA led national effort to consolidate, expand and enhance NIMS
- FEMA published first NIMS 2004 with updates in 2008 and 2017
- NIMS works with NRF

National Incident Management System (NIMS)

- NIMS is a comprehensive, national approach to incident management
 - Applicable at all jurisdictional levels and across functional disciplines.
 - Applicable across a full spectrum of potential incidents, hazards, and impacts, regardless of size, location or complexity.
- NIMS Five-Year Training Program
 - NIMS has guidelines for issuing credentials for all trained personnel
 - Specifies FEMA and stakeholder agency responsibilities and activities for developing, maintaining and sustaining NIMS training.

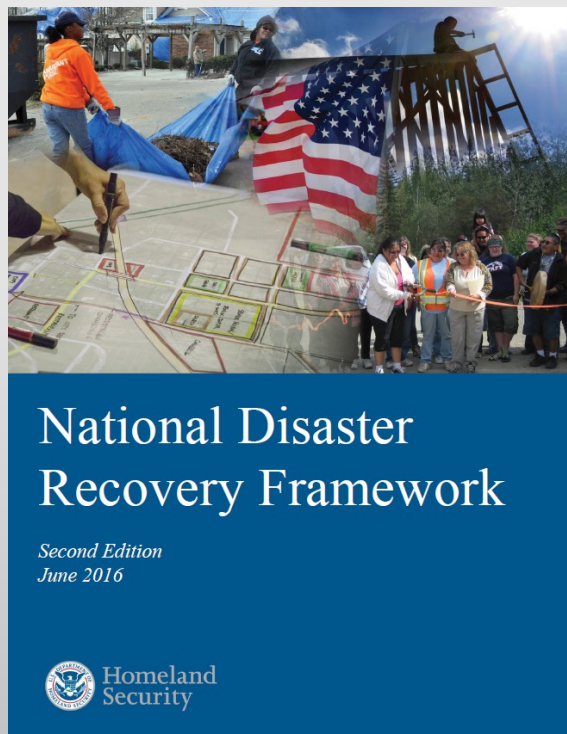
NIMS Guiding Principles

- Flexibility
 - Adaptable to any situation
 - Routine local incidents to events requiring interstate aid or federal assistance
 - Multiagency, multidisciplinary, multijurisdictional
 - Scalable
- Standardization
 - Promotes interoperability among multiple organizations in incident response
 - Standard practices to foster cohesion among agencies
 - Common terminologies
- Unity of Effort
 - Helps all agencies communicate and coordinate
 - Enhances coordinating activities among various agencies to achieve common objectives

Table 1: Overview of NIMS

NIMS Is	NIMS Is Not
<ul style="list-style-type: none"> • A comprehensive, nationwide, systematic approach to incident management, including the command and coordination of incidents, resource management, and information management 	<ul style="list-style-type: none"> • Only the ICS • Only applicable to certain emergency/incident response personnel • A static system
<ul style="list-style-type: none"> • A set of concepts and principles for all threats, hazards, and events across all mission areas (Prevention, Protection, Mitigation, Response, Recovery) 	<ul style="list-style-type: none"> • A response plan
<ul style="list-style-type: none"> • Scalable, flexible, and adaptable; used for all incidents, from day-to-day to large-scale 	<ul style="list-style-type: none"> • Used only during large-scale incidents
<ul style="list-style-type: none"> • Standard resource management procedures that enable coordination among different jurisdictions or organizations 	<ul style="list-style-type: none"> • A resource-ordering system
<ul style="list-style-type: none"> • Essential principles for communications and information management 	<ul style="list-style-type: none"> • A communications plan

National Disaster Recovery Framework (NDRF)



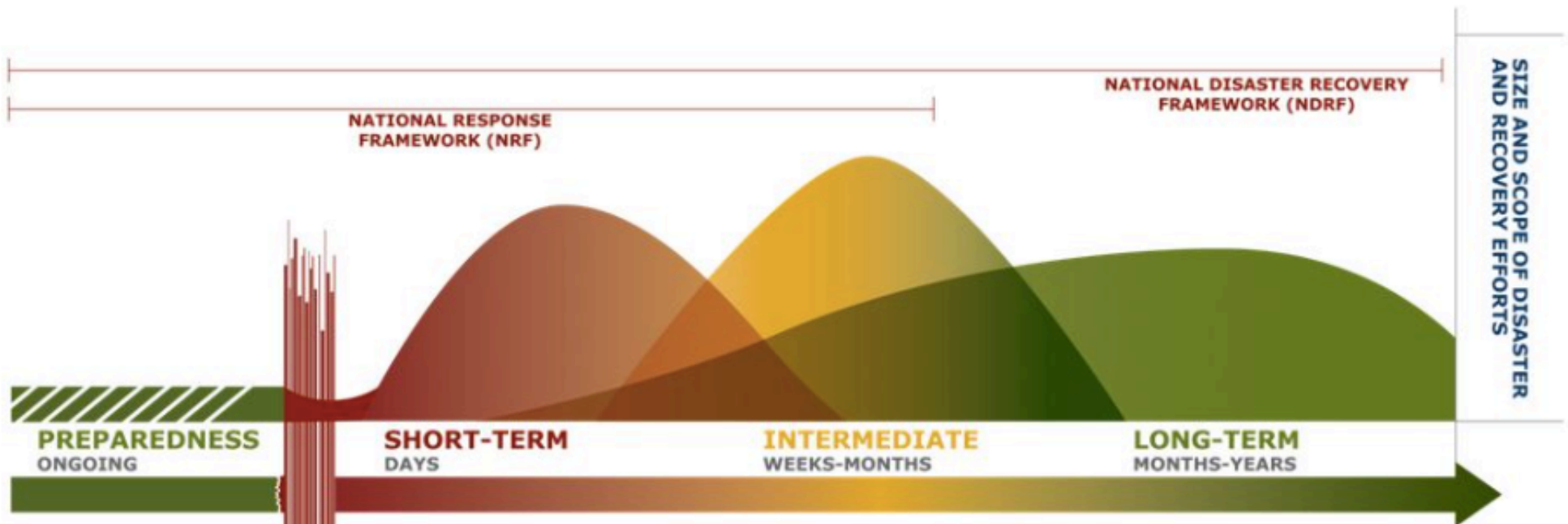
- The National Disaster Recovery Framework (NDRF) is a guide to promote effective recovery, particularly for those incidents that are large- scale or catastrophic.
- The NDRF provides guidance that enables effective recovery support to disaster-impacted States, Tribes and local jurisdictions.

National Disaster Recovery Framework (NDRF)

- One of five documents in suite of National Planning Frameworks
 - Prevention, Protection, Mitigation, Response, **Recovery**
 - The frameworks describe how the "whole community" works together to achieve the National preparedness goal
- Overarching guide for recovery provides direction to enable effective recovery support to disaster impacted states, localities and tribal governments

“Recovery efforts focus on how best to restore, redevelop, and revitalize the health, social, economic, natural and environmental fabric of the community and often begins while response is still occurring.”

NDRF Recovery Continuum



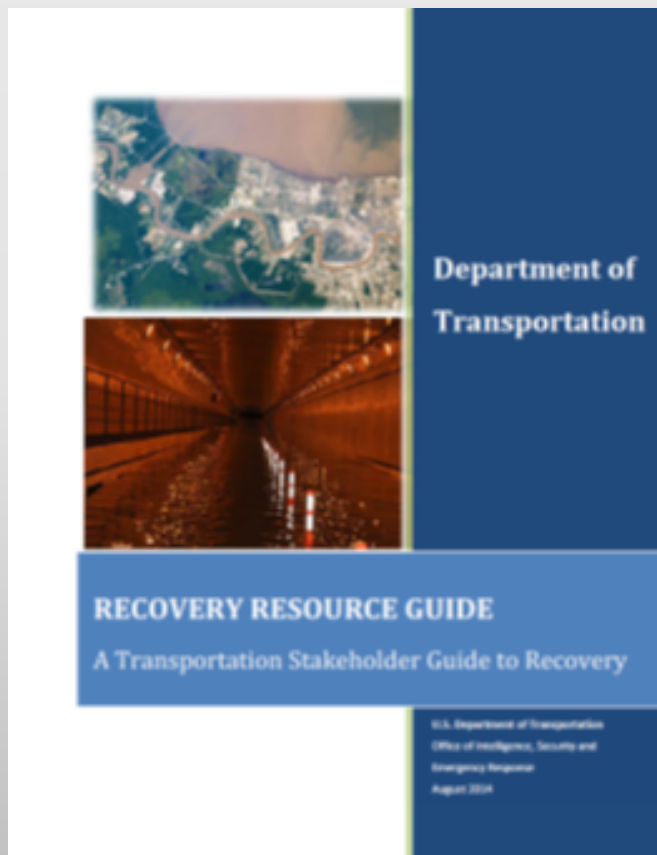
NDRF Guiding Principles

1. Individual and Family Empowerment
2. Leadership and Local Primacy
3. Pre-Disaster Recovery Planning
4. Engaged Partnerships and Inclusiveness
5. Unity of Effort
6. Timeliness and Flexibility
7. Resilience and Sustainability
8. Psychological and Emotional Recovery

Achieving Successful Recovery

- While each community defines recovery differently depending on circumstances, challenges, and priorities, the following factors help ensure an effective recovery process
 - Comprehensive scope
 - Effective decision-making and coordination
 - Integration of community recovery planning processes
 - Well-managed recovery
 - Proactive community engagement, public participation, and public awareness
 - Effective financial and program management
 - Organizational flexibility
 - Resilient rebuilding
 - Health integration

U.S. DOT Recovery Resource Guide



- “To increase knowledge and help communities make the best use of available resources for recovery efforts” and,
- “To improve the resilience of the nation’s transportation infrastructure through better understanding of the roles and responsibilities of Federal, state, local and tribal governments as a means to that end.”

U.S. DOT Recovery Resource Guide

- Links transportation recovery process with other Federal guidance documents including:
 - Presidential Policy Directive 8: National Preparedness (PPD-8)
 - Presidential Policy Directive-21: Critical Infrastructure Security and Resilience (PPD-21)
 - National Preparedness Goals, Mission areas, and Core capabilities
 - National Planning Framework
 - ESF Annexes – Annex #1 –Transportation
 - National Mitigation Framework – Hazard Mitigation Plans due every 5 years
 - National Response Framework
 - National Prevention Framework

U.S. DOT Recovery Resource Guide

- U.S.DOT Guide supersedes the 2009 the National Transportation Recovery Strategy (NTRS)
 - incorporates the guiding principles in National Disaster Recovery Framework (NDRF).
- Purpose is to help transportation industry stakeholders and local, tribal, or State government officials, prepare for or manage the transportation recovery process following a major disaster.

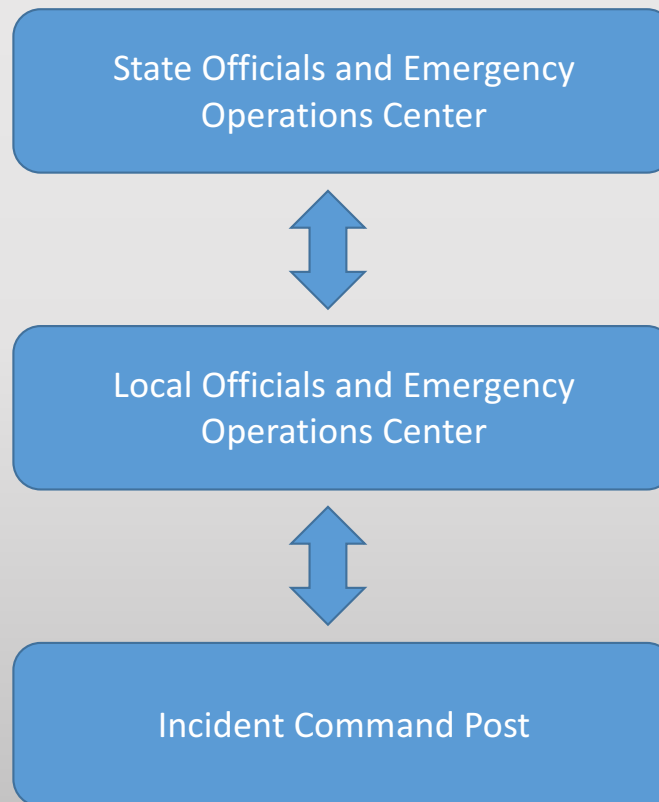
FTA: Response and Recovery - Resource Guide

- Guidance for transit agencies
- Memorandum of Understanding with DHS
 - Roles and responsibilities of DHS, USDOT, etc.
- Memorandum of Agreement with FEMA
 - Roles and responsibilities of DOT/FTA
- Information on resources for preparing for disasters
- Federal funding programs are discussed later in this course



State and Local Agencies

State and Local Response Structure



State Agencies

- Governor's Office
- Department of Environmental Protections
- Emergency Operations Center
- Other state, territorial, and tribal agencies
- Department of Health
- Law Enforcement/Emergency Services
- Emergency Management Offices
- Emergency Operations Centers
- State Department of Transportation
 - Traffic operations offices/ITS sections
 - Maintenance offices
 - Planning (statewide, metro, rural)
 - Safety Offices
 - Finance
- Transportation agencies (airport, transit, freight, maritime, rail)

Regional and Local Agencies

- Metropolitan Planning Organizations (MPOs),
- Regional Planning Commissions (RPCs)
- Rural Planning Organizations (RPOs)
- Tribal Planning Organizations
- Transit agencies, public and private
- Traffic Management Centers (TMCs)
- Transportation Management Associations (TMAs)
- ITS Operators
- Vanpool Providers
- County and/or City
 - Bureau of Emergency Management
 - Public works/transportation departments
 - Traffic engineering departments
 - Planning departments
 - School buses
 - Law Enforcement/Emergency Services
 - Fire and rescue
 - Emergency medical services
 - Hazmat services
 - Emergency Operations Centers (regional and/or local)

Other Key Participants

- Utilities
 - Water
 - Wastewater
 - Gas and electric power companies
 - Communications companies
- Rail freight operators
- Major employers
- United We Ride (UWR)
- Community-based organizations (food banks, community centers)
- Sports Venues
- Ride-share companies (TNCs)
- Private Sector
- Towing and recovery operators
- Heavy equipment owners
- Hazmat contractors
- Motor carrier companies
- Insurance companies
- Traffic media
- Paratransit service providers
- Community Emergency Response teams
- School bus providers

Breakout (35 minutes)

- What agencies should be involved with developing a regional Transportation Recovery Plan?
- What does the structure look like?
- What is the specific role of each participating agency or stakeholder group?
 - What specific responsibilities does each agency/department within each agency have?
- Do you have current procedures your organization would rely on during recovery, such as debris management, inspections, etc.? If not, what do you need to do to get these procedures in place?

Report Out (10 minutes)

Summary

- Federal, state, regional and local agencies all have roles in response and recovery planning; the number of involved agencies can be a challenge
- Federal government has developed National Response Framework (NRF) that guides many efforts, especially at state level; NIMS is also key to coordinated recovery efforts; U.S. DOT Recovery Resource Guide and FTA Guide resources
- In recovery phases some agencies will phase out of lead roles while others take leading roles
- Putting together a regional team requires thoughtful effort; there may be "players" that you have not considered as partners that could play important roles in facilitating recovery effort.



Module 6: Vulnerability Assessment

Module 6: Vulnerability Assessment

Objectives

- Define vulnerability assessment
- Discuss the linkage between vulnerability assessment, risk factors and development of mitigation measures
- Provide examples of data and tools that are available to assess transportation system vulnerabilities and risks
- Provide examples of vulnerability assessments



Defining Vulnerability Assessment

Definition

- Vulnerability Assessment – identifying, quantifying, and prioritizing (or ranking) the [vulnerabilities](#) in a system
- Vulnerability from the perspective of [disaster management](#) means assessing the threats from potential hazards to the population and to infrastructure.

Definition

- Vulnerability assessment has many things in common with [risk assessment](#) and typically includes:
 - Cataloging assets and capabilities (resources) in a system.
 - Assigning quantifiable value (or at least rank order) and importance to those resources
 - Identifying the vulnerabilities or potential threats to each resource
 - Mitigating or eliminating the most serious vulnerabilities for the most valuable resources

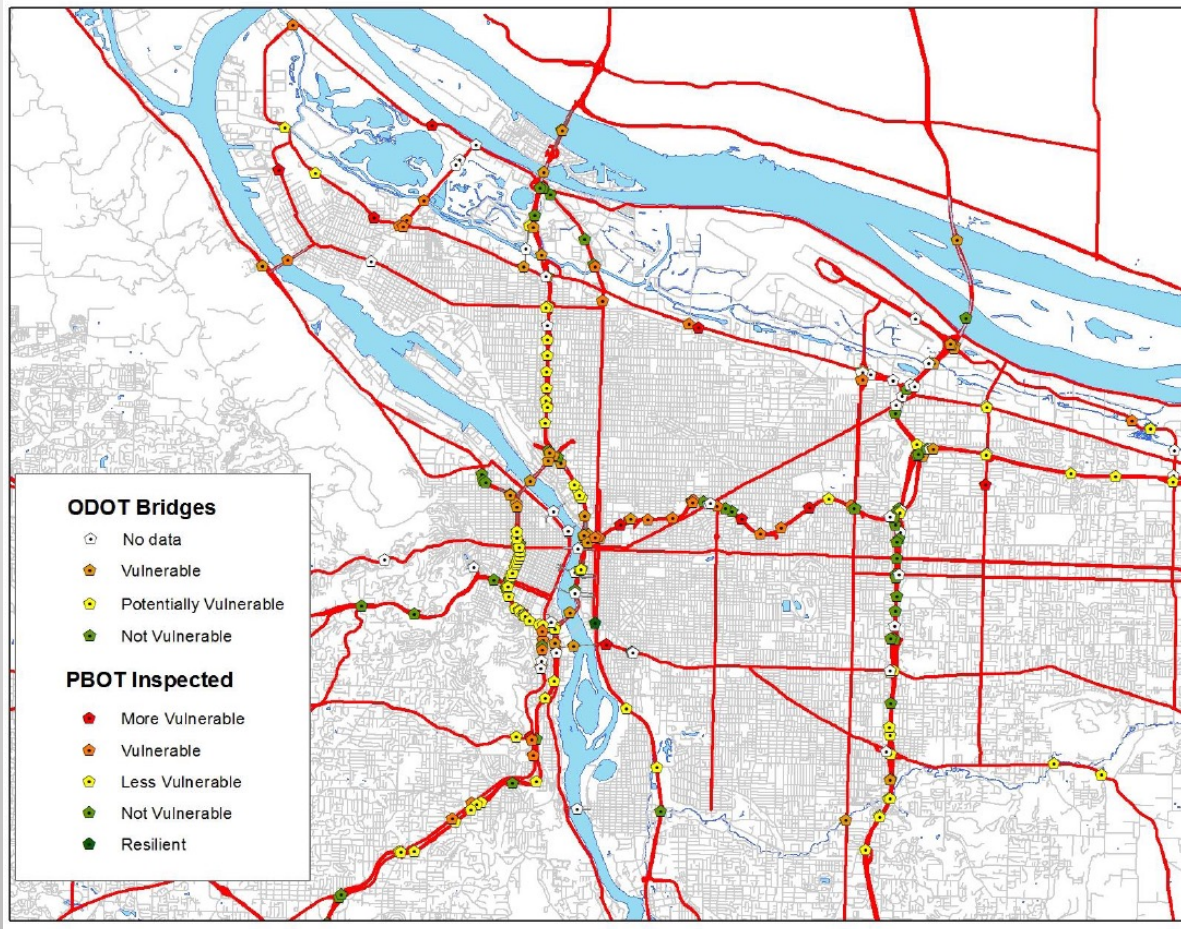
The slide features a light gray background with a dark gray geometric shape in the top-left corner and a yellow geometric shape in the bottom-right corner. The title "Vulnerability Assessment" is centered in a bold, black, sans-serif font.

Vulnerability Assessment

Hazard Mitigation Planning includes Vulnerability Assessments

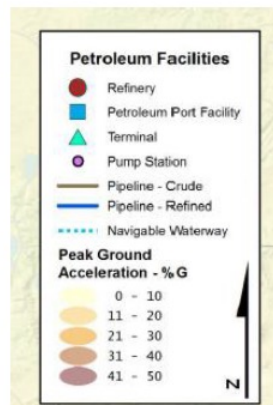
- Build off of hazard assessments that have been done in your region
- Look at the transportation assets that may be impacted
- Be sure to consider entire regional transportation network
- Once we know the vulnerabilities, we can focus on developing mitigation strategies and recovery under various scenarios

Vulnerable Bridges – Portland



Portland – Vulnerability of Fuel System

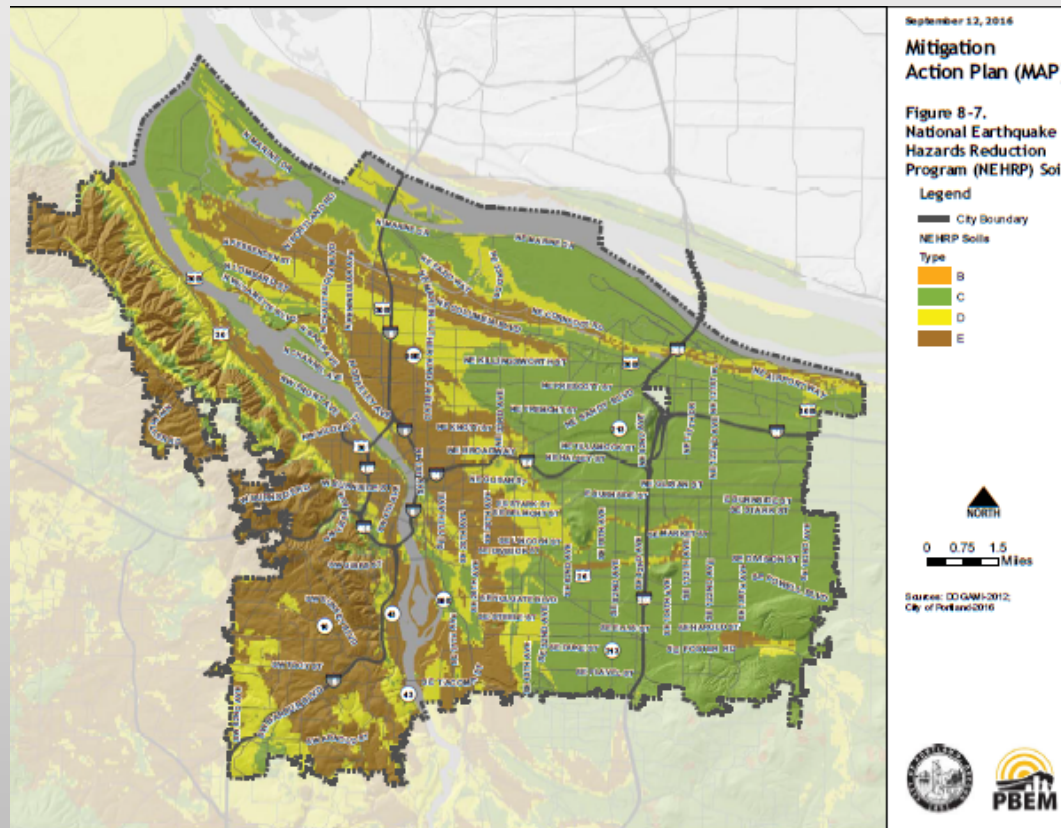
Office of Cyber and
Infrastructure
Analysis (2016)



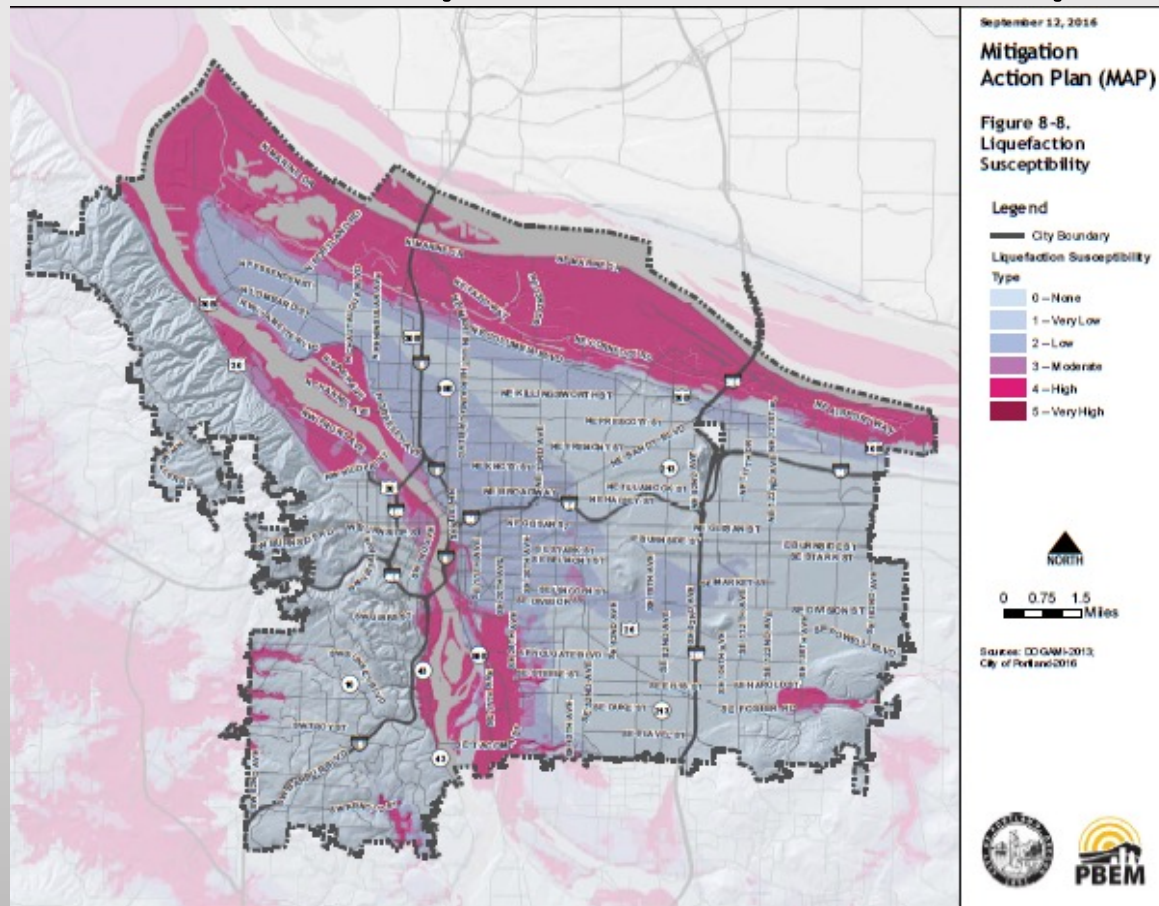
Portland – Vulnerability of Fuel System

- 8 Fuel stations – only one on west side of river
- 4 mobile fuel trucks, 2 can pump out of underground tanks
- 2 portable fuel generators, 3 stations run off building back up power
- Expected City of Portland fuel use in a disaster is 21,000 gals/day
 - Fuel storage at 8 days at disaster usage rates
 - Fuel storage at 21 days at normal usage rates 8,000 gals/day

Portland Mitigation Action Plan – Earthquake



Portland Liquefaction Susceptibility





Methods and Tools

Methods and Tools

- GIS
- Travel demand modeling
- Performance-based planning tools such as asset management plans, bridge asset conditions, transit asset management plans, etc.

Geographic Information Systems (GIS)

- Roadways and physical characteristics
- Bridges and any limitations
- Transit routes, schedules and ridership and stop/station by time of day
- Bicycle routes and bicyclist volumes
- Sidewalk infrastructure and pedestrian access to transit
- Travel times
- Publicly owned fueling depots
- Traffic signals and ITS instrumentation
- Railroads
- Hazmat spills
- Floodplains and flood zones
- Landslide susceptibility
- Seismic characteristics
- Other natural risk factors
- Socioeconomic and demographic characteristics
- Land uses
- Emergency response facilities
- Dept. Public Works/facilities/fleet centers
- Traffic, transit and emergency operations centers
- Existing detour and/or evacuation routes

Transportation Modeling Data

- Travel Models
 - TAZ structure
 - Trip generation
 - Trip distribution
 - Origin-destination
 - Modal split
 - Trip assignment
- Outputs
 - Travel patterns
 - Volumes and mode share on transportation system
 - Peak period congestion points and major bottleneck identification
 - Long range forecasts that inform transportation plans and investments

Performance-Based Planning Linkages

- The performance planning process can provide linkages to recovery planning and useful data on asset condition and possibly vulnerabilities.
 - Transit Asset Management Plans
 - Asset Management Plans
 - Bridge Asset Conditions

A Word about Data

- It will never be perfect
 - Do best we can with data we have
- We cannot predict the future
- Models do not account for human behavior



Examples of Vulnerability Assessment

Examples of Vulnerability Assessments

- Hillsborough, FL
- San Francisco Bay Area
- Washington State DOT

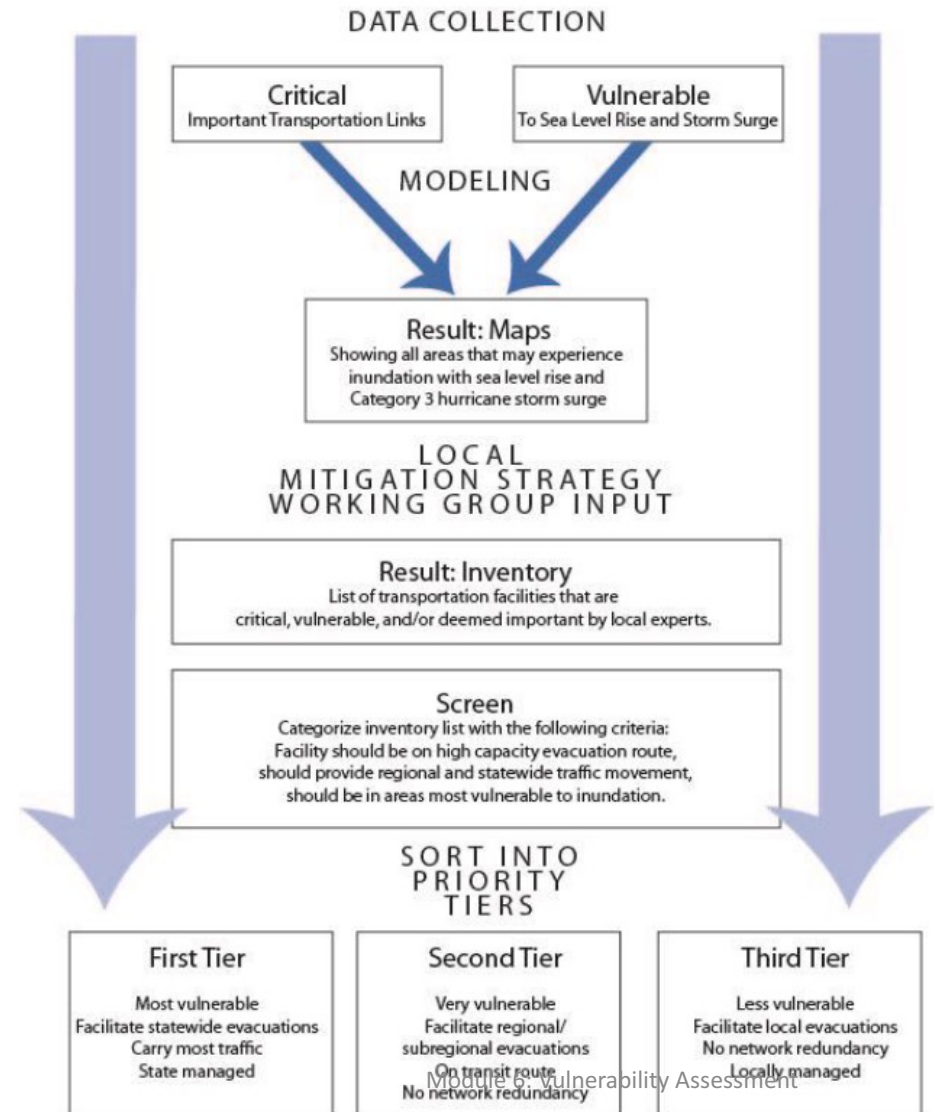
Hillsborough County MPO Vulnerability Assessment

- FHWA Climate Resilience Pilot Program
- MPO has experience extreme weather events in recent years
 - Damage to and deterioration of infrastructure
 - Project assessed surface transportation vulnerabilities to sea level rise, storm surge and flooding
 - Understand these risk factors and consider mitigation measures
- Objectives:
 - Identify cost effective mitigation strategies and manage risks of coastal and inland inundation
 - Incorporate into Long Range Transportation Plan (RTP), County Post-Disaster Redevelopment Plan (PDRP), and other transportation planning and decision making processes

Hillsborough County MPO Vulnerability Assessment

- Phase I: Assemble data and identify assets for further study
 - Collect information on transportation facilities and major activity areas
 - Screen assets for criticality
 - Obtain topographical data – Florida Digital Elevation Model (DEM) and other tools
 - Obtain climate data
- Phase II: Assess vulnerability of critical assets
 - Select transportation assets to assess
 - Screen for vulnerability
 - Exposure
 - Sensitivity
 - Adaptive capability
- Phase III: Estimate general economic losses
 - Assess impacts to regional mobility and regional economy
 - Analyze adaptation options

Facility Risk Analysis Methodology



Jurisdiction (Unincorporated Hillsborough County, Tampa, Plant City, Temple Terrace)

HILLSBOROUGH COUNTY CRITICALITY/VULNERABILITY ANALYSIS

2040 SEA LEVEL RISE (LOW) WITH CATEGORY 1 STORM SURGE

Legend

- Transit Transfer Ctrs 2040 Critical Links
- TECO
- Bridges
- Intermodal Facilities
- SS RAIL
- Flooding Hot Spots
- Roadways
- Low-Medium
- High
- Very High
- SLR (Low) + Cat 1
- Updated Flood Plains
- DFIRM Flood Plains

Location Diagram and Reference Information



DATA SOURCES: Hillsborough County MPO, Canbridge Systems Inc., Hillsborough County GIS and Florida Department of Transportation

MAJOR ROAD: See A Scope MPO Long Range Transportation Plan for specific improvements.

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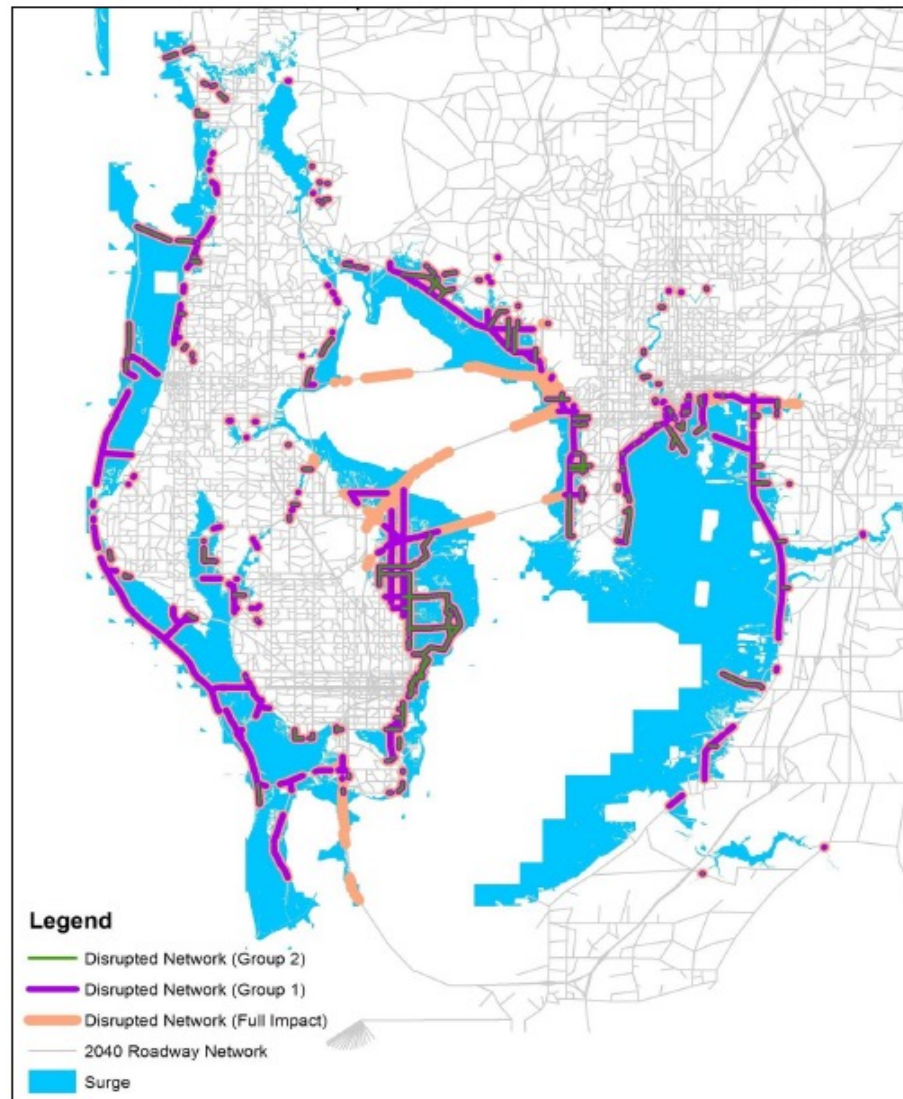
ACCURACY: It is intended that the accuracy of the data map comply with U.S. national map accuracy standards. However, such accuracy is not guaranteed by the Hillsborough County City-County Planning Commission.

This map is for illustrative purposes only for the cities of Tampa, Temple Terrace and Plant City.

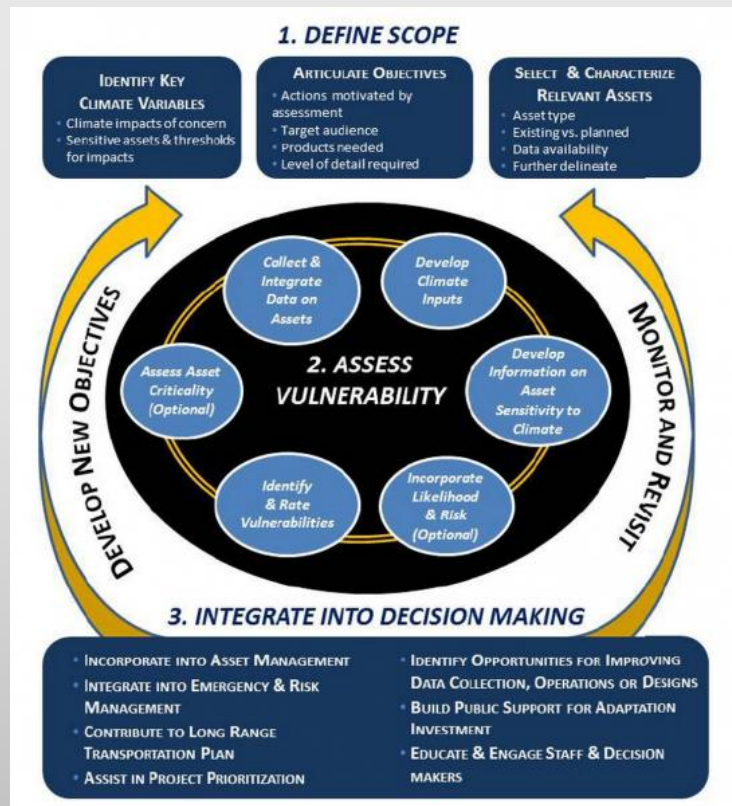
Author: Hillsborough County Metropolitan Planning Organization
Date: 1/31/2014



For more information about our organization visit our website: [www.hillsboroughmop.com](http://hillsboroughmop.com)



FHWA Vulnerability Assessment Framework



- Assessment in context of planning for impacts of climate change
- [FHWA Vulnerability Assessment Framework](#)

FHWA Conceptual Model

Module 1: Articulate Objectives

Module 2: Identify Key Climate Variables

Module 3: Characterize and Select Assets

Module 4: Assess Vulnerabilities

Module 5: Integrate Vulnerabilities into Decision-Making

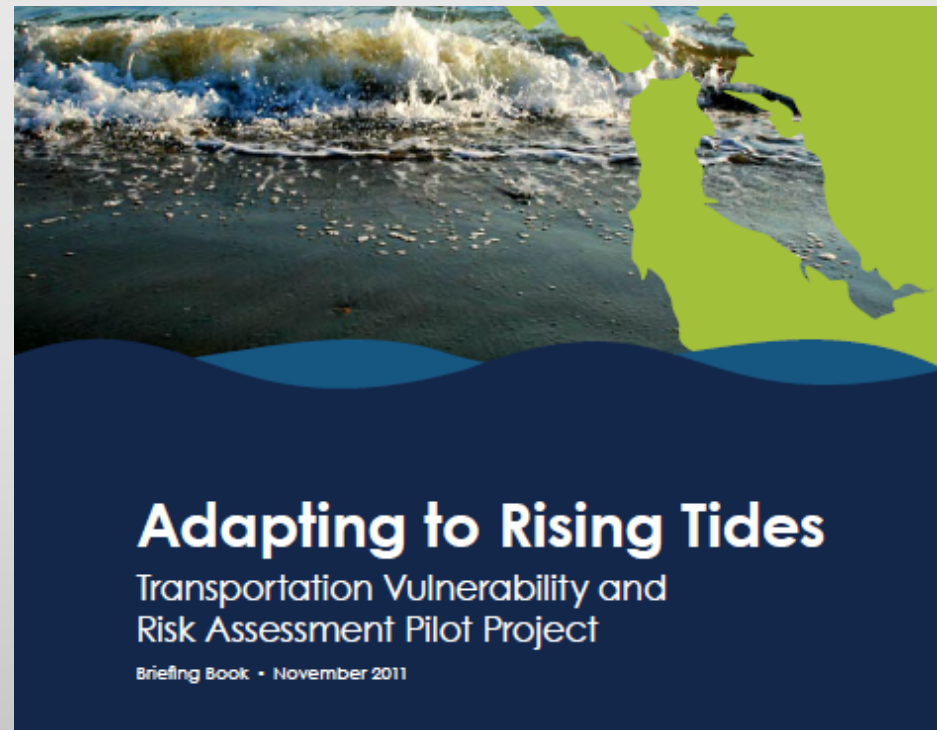
Module 6: Monitor and Revisit

FHWA has extensive information on this and other related efforts at:

<https://www.fhwa.dot.gov/environment/sustainability/resilience/publications/>

San Francisco Bay Area Metropolitan Transportation Commission (MTC)

- Detailed vulnerability assessment of the transportation system
- FHWA Pilot Project
- Used FHWA conceptual model for conducting system-level vulnerability and risk assessments of infrastructure that will be impacted by climate change effects.
- Major climate related vulnerability is sea level rise
- Developed a rating and ranking system for vulnerable assets



Washington State DOT



**Climate Impacts Vulnerability
Assessment**

- Washington State DOT submitted to FHWA, 2011
- FHWA Pilot Project
- Comprehensive process
- Used FHWA Conceptual Methodology
- Provided recommendations on enhancements

Summary

- Vulnerability assessment and identifying risk factors are key to developing a recovery plan
- Work done to date (e.g. hazard mitigation plans, disaster response plans, recovery plans, etc.) should be used in transportation planning and investment decisions
- MPOs have some of the essential tools (e.g., GIS, modelling) and data to conduct a vulnerability assessment



Module 7: Recovery Strategies & Tools

Module 7: Recovery Strategies and Tools

Objectives

- Describe several categories of strategies that can be used to facilitate recovery
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- Identify potential gaps in transportation service and how to address them
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Categories and Examples of Strategies

Recovery Strategies

- Infrastructure Assessment/Repair
- Transit
- Transportation Demand Management (TDM) and social media
- Intelligent Transportation Systems (ITS)
- Vulnerable Populations/Paratransit

Infrastructure/Repairs

- Highways (state, county, city)
- Roads (state, county, city)
- Bridges (state, county, city)
- Access roads and intermodal connections with ports, airports
- Transit facilities including rail yards, garages, maintenance facilities
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 - Develop recommended repair plans, include debris removal
 - Prioritize repairs
 - Identify temporary versus permanent replacements

Infrastructure Assessment/Repairs

- Use readily available data and systems
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 - Bridge Management System
 - Pavement Management System
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Transit Service

- Rail Service
- Rapid Bus Transit
- Bus Transit
- Paratransit services
- Ferry services
- Other?

Examples of Transit Service Strategies

- Bus only lanes
- Restricted access to transit vehicles only
- Feeder services and/or detours to operational rail routes
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- Bus Rapid Transit on major corridors – temporarily take-a-lane
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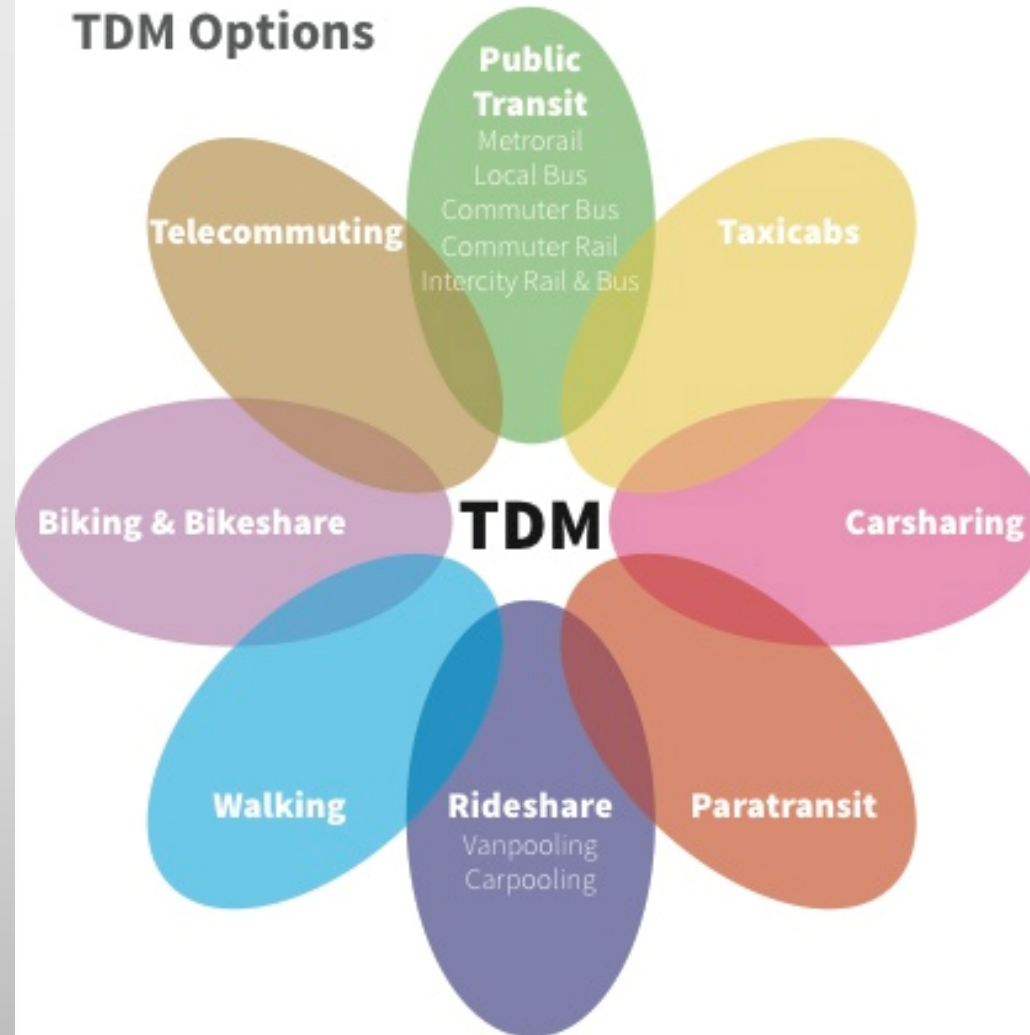
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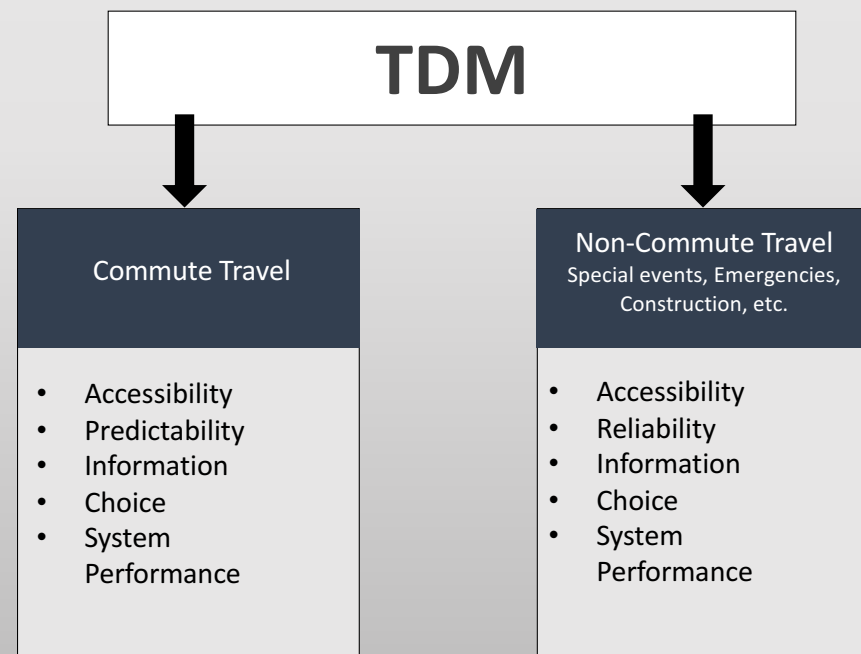
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TDM Options



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Examples of TDM Strategies

- Reduce Travel
 - Pricing
 - Parking pricing
 - Variable road pricing
 - HOV Lanes/HOT Lanes
- Redistribute travel
 - Technology
 - Traveler information services
 - Telework Programs
 - Transportation Network Companies (TNCs)
 - Mobility on Demand (MoD) Programs
 - Crowd-based data sharing (WAZE)

Examples of TDM Strategies

- Incentives to Reduce SOV travel/Behavior change
 - Park and Ride Facilities
 - Shuttle services
 - Guaranteed ride home programs
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 - Vanpools
 - Employer-based Trip Reduction Programs
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 - Commuter Choice Programs

Examples of Mobility on Demand Services

Service	Problems Technology May Solve
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- In advance
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 - Identify service public and private providers and available assets, identify service gaps
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ITS Objectives

- Build traveler confidence
 - Induce behavioral changes to improve safety or enhance system productivity
 - Respond quickly to changing conditions
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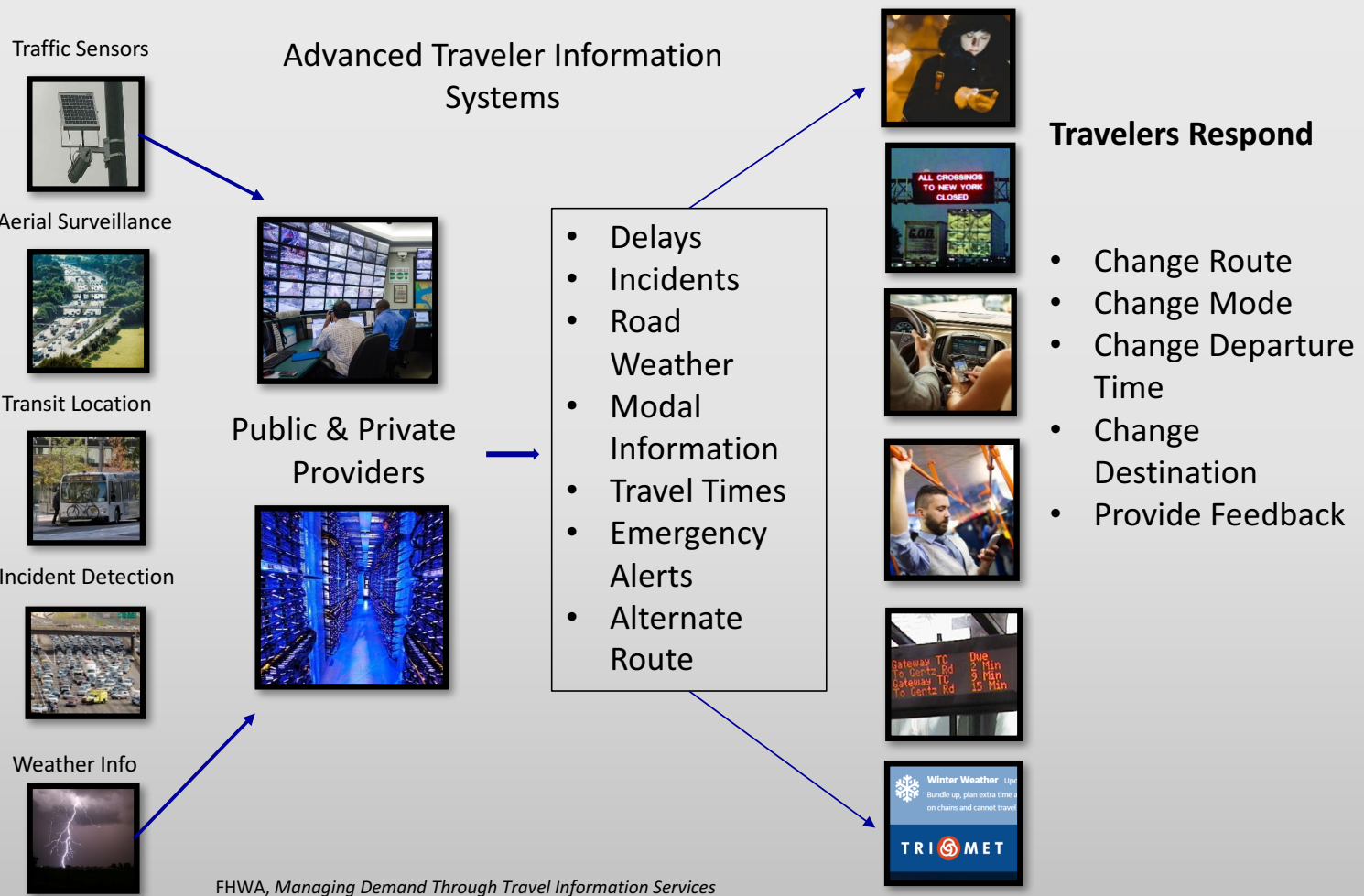
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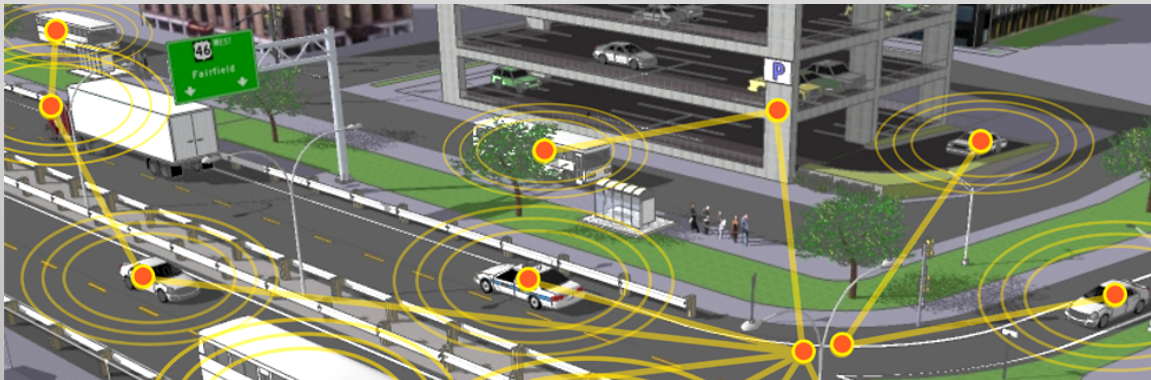
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Today (everything pre-2000 plus...)

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- and more...



Emerging Technologies



ITS Recovery Strategies

In advance inventory Regional Systems

Identify existing TMCs, EOCs, TOCs that coordinate ITS already

Identify systems that can be used effectively in recovery:

- Identify type of system, build database of information on systems
- Determine functional role in action, plan and test in advance.
- Where is it?
- Who owns and operates it?
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ITS Recovery Strategies

In Advance

- Example – Dynamic Message Signs
 - Where are they?
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 - Do outside agencies have access to override? Do interagency agreements/procedures exist?
 - Are messages coordinated with other agencies, web or social media? Can they be viewed on the web?
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ITS Recovery Strategies

- Accuracy is essential to build traveler confidence!
- In advance
 - Get interagency communications agreements in place.
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ITS - Strengths and Limitations

All systems have strengths and limitations; use each to its advantages.

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Vulnerable Populations/Paratransit

In Portland Plan defined as:

- Those under 15 years of age
- Those over 65 years of age
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- People of color
- Families below poverty level
- Households with limited English proficiency
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Vulnerable Populations/Paratransit Strategies

- Communicate to English and non-English speaking population about travel options
- Partner with City, County and State community services agencies to provide services during recovery
- Establish priorities for services during recovery (e.g. medical appointments)
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- Site temporary shelters near Emergency Transportation Routes (ETRs)
 - Pre-test to be sure shelter locations are accessible
- Develop plans to fill gaps in service for underserved population including both elderly and disabled
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- Implement services recommended by partner agencies that serve these populations

Communication

- Effective communication is essential to implementation of all strategies
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- Communication with the public on:
 - Use of existing transportation network resources such as NLETS/Nixle
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 - Communication to major employers and/or TMAs

Breakout (45 minutes)

- Develop a list of strategies that are currently in use
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- List at least three strategies from each of the five categories
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Report Out (15 minutes)

Summary

- Five categories of strategies were discussed
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Module 7: Recovery Strategies & Tools

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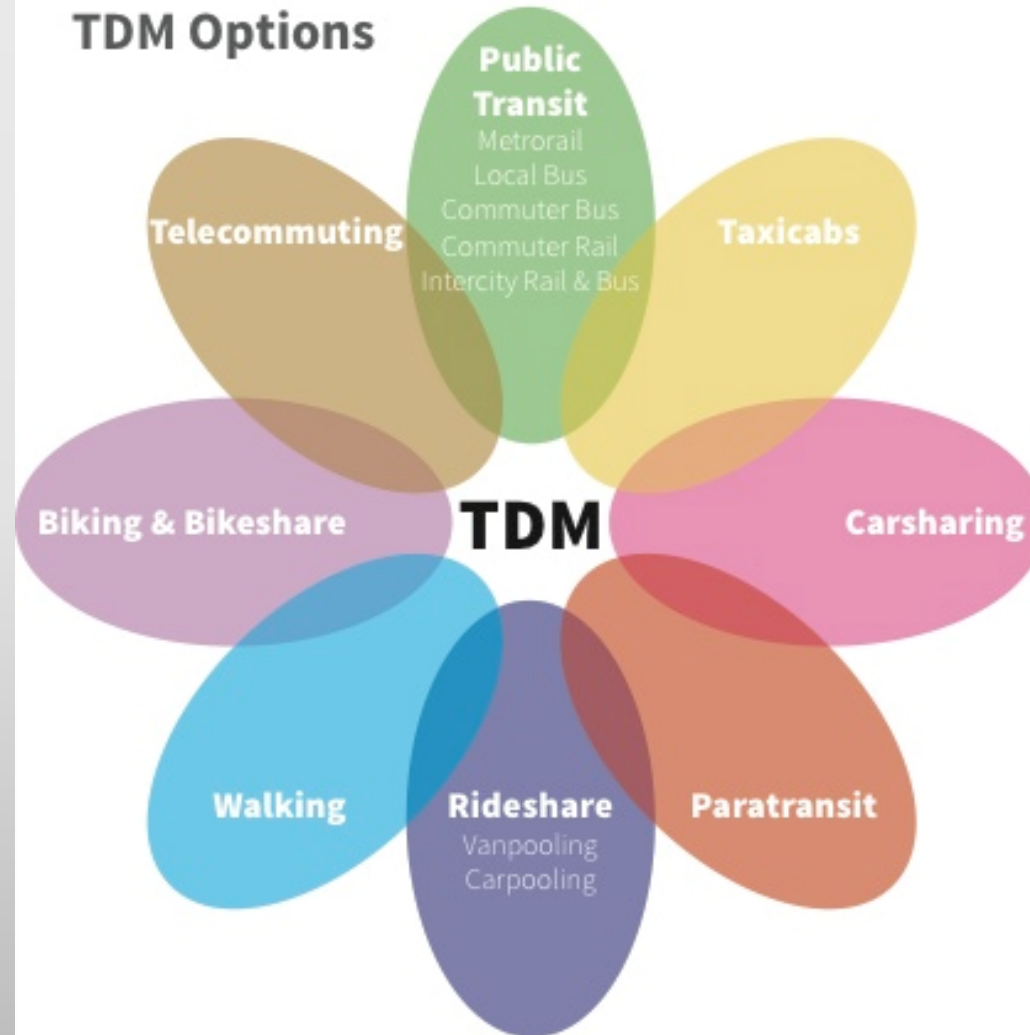
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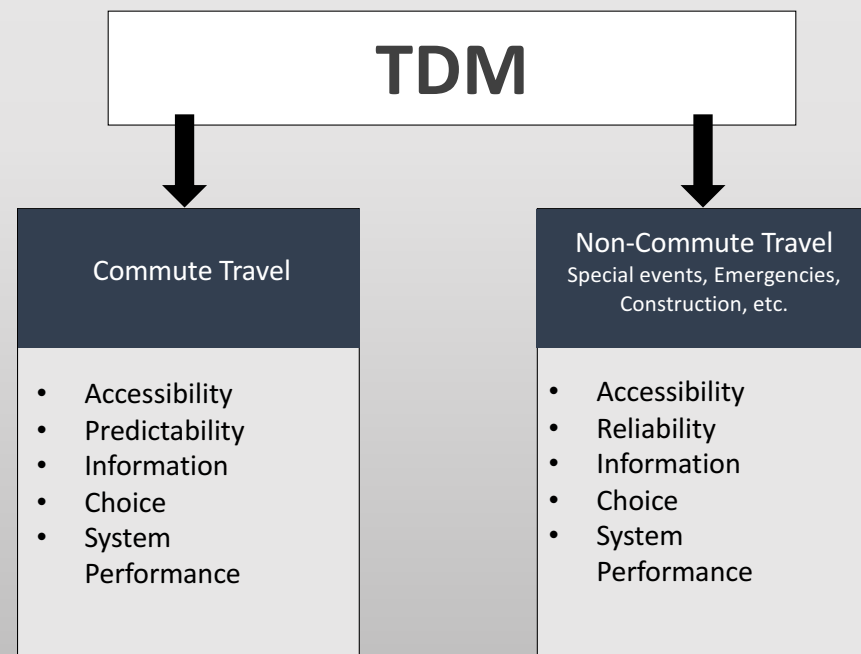
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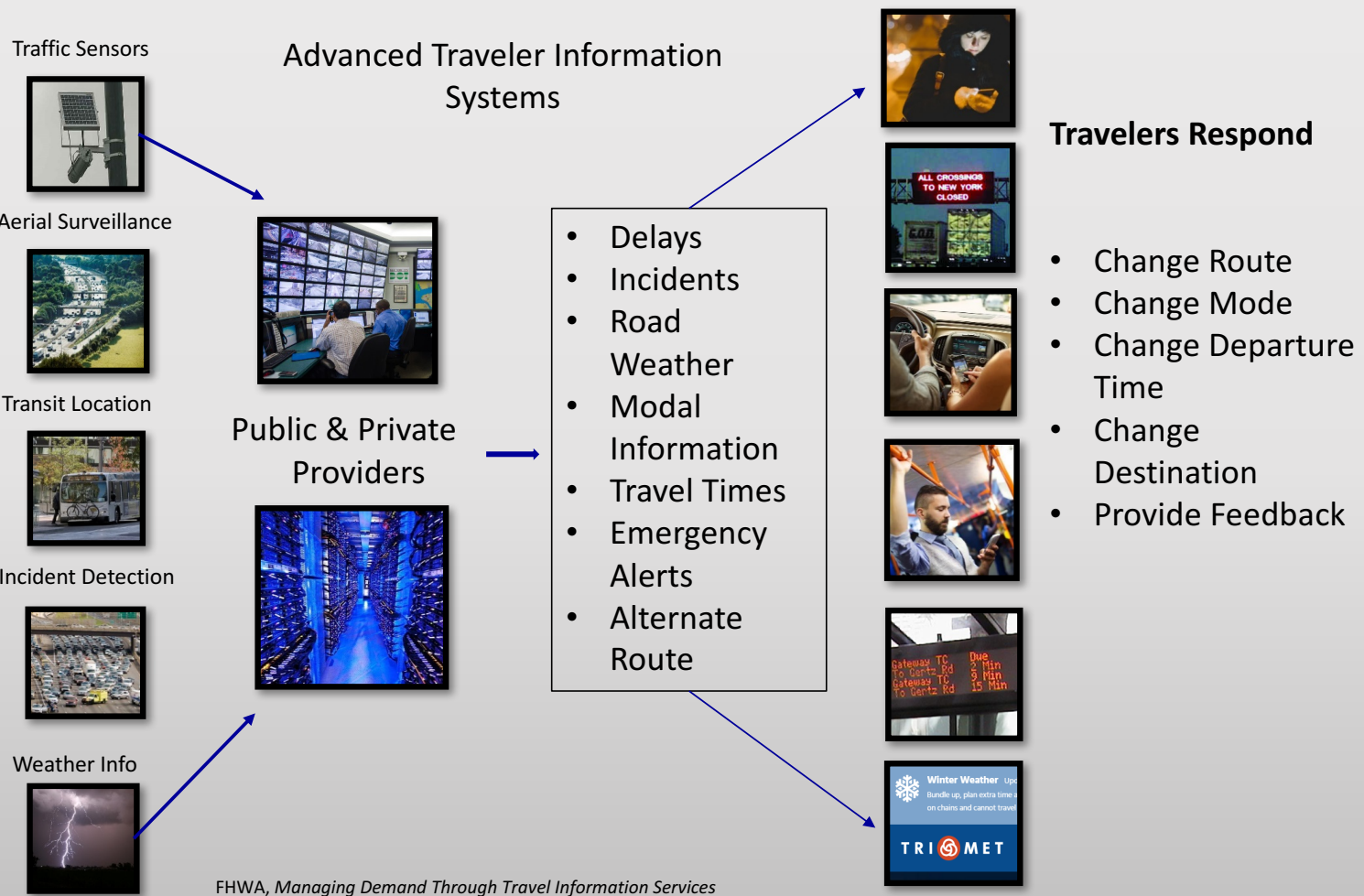
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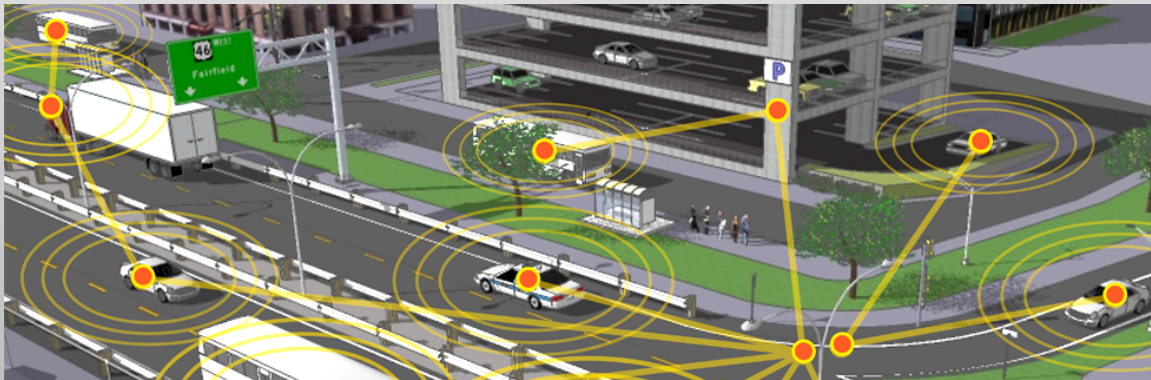
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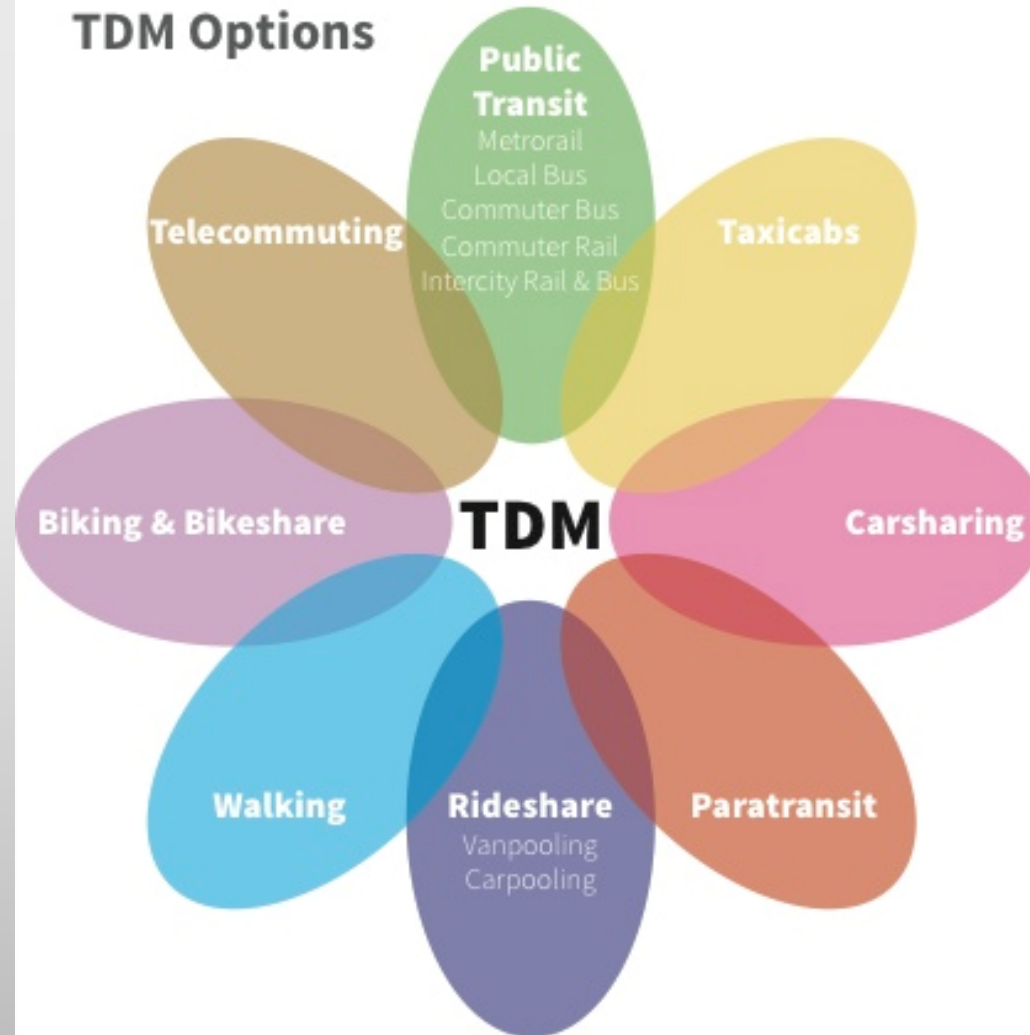
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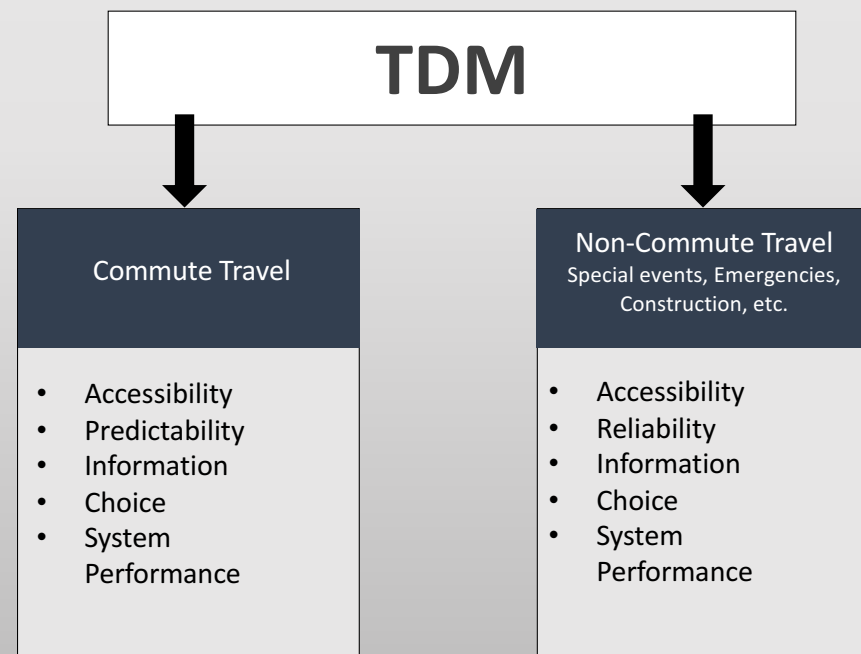
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Microtransit (ex: Bridj, ,Leap, Chariot)	On-board wi-fi and efficient routing to match customer demand; customer tracking of vehicles and wait times reduces uncertainty
Taxi apps	Apps may cover multiple taxi companies and estimate wait time, reducing uncertainty
Carpooling/Vanpooling	Alternatives to driving alone, Online ride matching to find carpool or vanpool.
Trip planning apps (ex: Ride scout, Waze, Google)	Traffic conditions, Trip planning, Transit schedules, route maps, fare information.

Integrating TDM into Recovery Planning

- In advance
 - Know the actors
 - Identify service public and private providers and available assets, identify service gaps
 - Survey current TDM activities
 - Identify needed (internal and external) practices & protocols to make decisions
- During response and recovery
 - Follow communications protocols and agreements
 - Implement strategies and programs agreed to in advance of incident

Intelligent Transportation Systems (ITS)

ITS technologies improve transportation safety and mobility, reduce environmental impacts, and enhance productivity through the integration of advanced communications-based information and electronic technologies into the transportation infrastructure and vehicles.

Source: USDOT's Intelligent Transportation Systems (ITS) ITS Strategic Plan 2015-2019 (FHWA- JPO-14-145)



ITS Objectives

- Build traveler confidence
 - Induce behavioral changes to improve safety or enhance system productivity
 - Respond quickly to changing conditions
 - Ensure consistent messaging and response

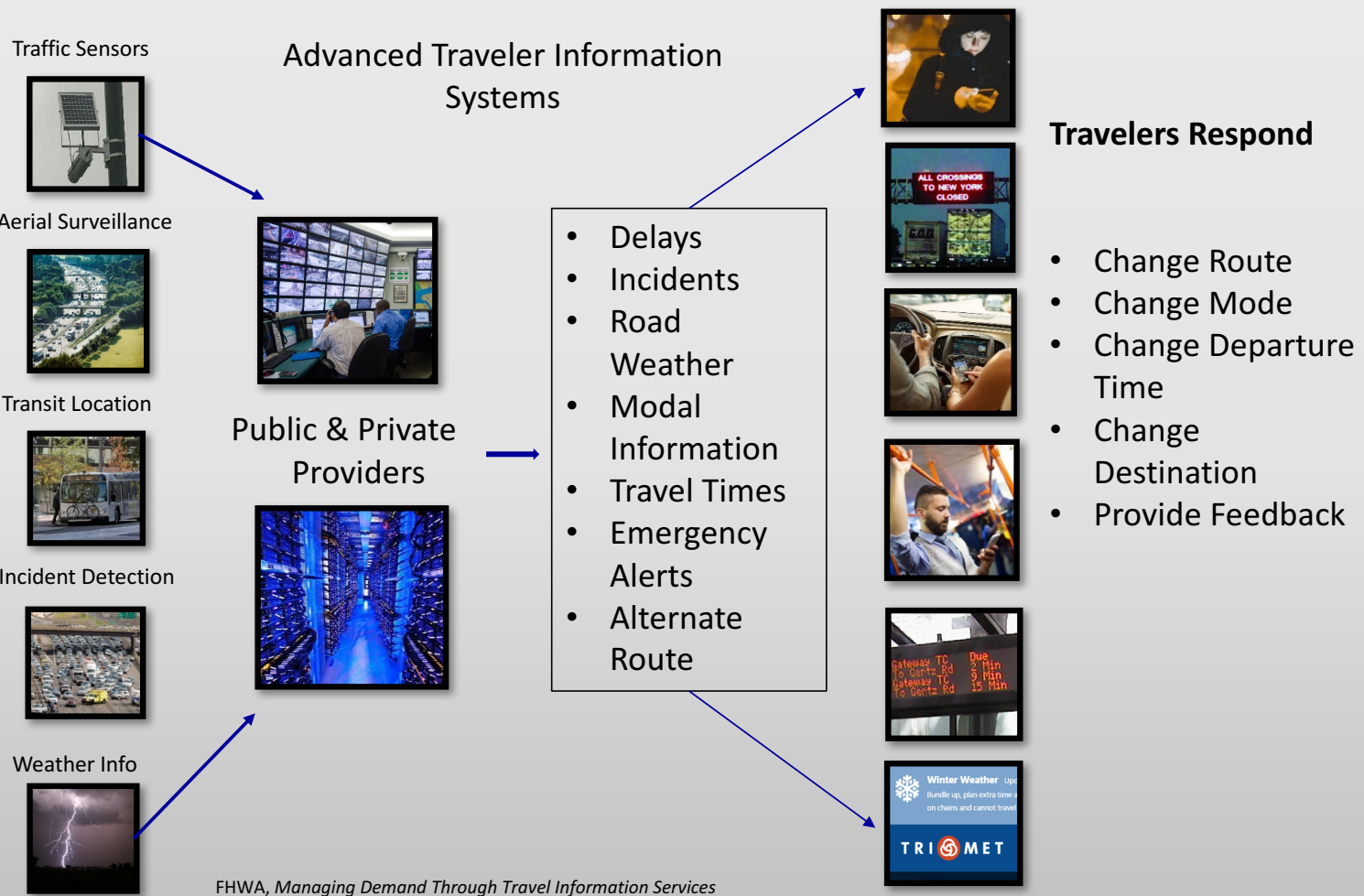
Examples of ITS Strategies

Pre- 2000

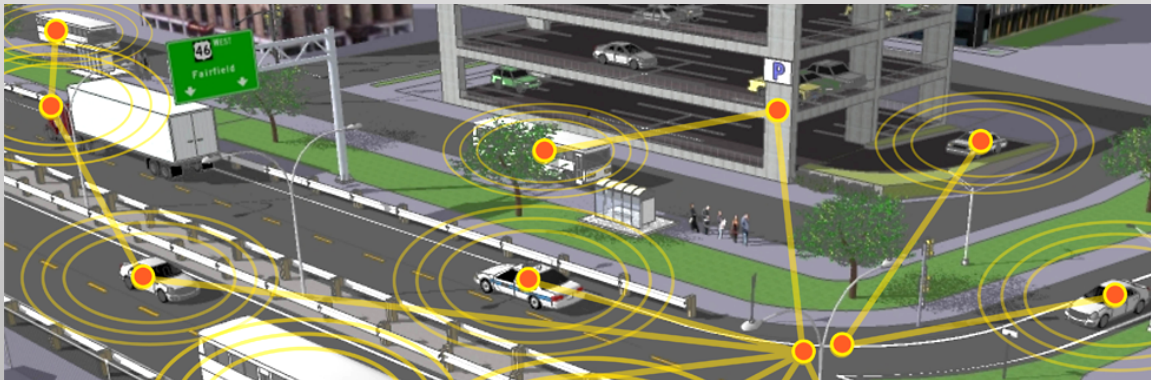
- Changeable/Dynamic Message Signs
- Electronic Toll Collection
- Traffic cameras
- Vehicle counters
- Traffic Signal Management
- Highway Advisory Radio
- Ramp Metering
- Red Light Cameras

Today (everything pre-2000 plus...)

- Automated & connected vehicles (AV/CV)
- Collision Avoidance Systems
- Vehicle Tracking
- Incident Command Systems
- Next Generation 911 and local emergency alert systems
- Integrated Corridor Management Systems
- Electronic Freight Manifests
- Internet of Things
- and more...



Emerging Technologies



ITS Recovery Strategies

In advance inventory Regional Systems

Identify existing TMCs, EOCs, TOCs that coordinate ITS already

Identify systems that can be used effectively in recovery:

- Identify type of system, build database of information on systems
- Determine functional role in action, plan and test in advance.
- Where is it?
- Who owns and operates it?
- Identify unique characteristics and limitations

ITS Recovery Strategies

In Advance

- Example – Dynamic Message Signs
 - Where are they?
 - Are they individually programmed or linked to a broader traffic management system?
 - Do outside agencies have access to override? Do interagency agreements/procedures exist?
 - Are messages coordinated with other agencies, web or social media? Can they be viewed on the web?
 - Is there back-up power available?

ITS Recovery Strategies

- Accuracy is essential to build traveler confidence!
- In advance
 - Get interagency communications agreements in place.
 - Coordinate across jurisdictional and agency lines.
 - Designate points of contact to resolve conflicts

ITS Recovery Strategies

- Accuracy is essential to build traveler confidence!
- During Recovery
 - What is the “refresh rate” of information, electronic or manual?
 - Messages must be consistent with information disseminated elsewhere. Resolve inconsistencies
 - Identify agencies policies on information dissemination (e.g. do agencies have different policies? If so, find ways to address and/or resolve)

ITS Recovery Strategies

- ITS helps managers make bold decisions such as: closing roads, facilities, transit service adjustments
- Pre-deployment, when possible, helps resilience.
- Coordination – pre-plan routes, messages, systems deployment
- Resolve interagency issues in the planning process, utilize Incident Command Systems
- Agree on data sharing and access
- Ensure priority access for first responders and official vehicles

ITS - Strengths and Limitations

All systems have strengths and limitations; use each to its advantages.

- Adopt systems that provide the most flexibility.
 - Plan for current conditions, but beware that some or all systems might not be available.
- Availability may be different between anticipated and unanticipated events.
- Officials do not control information displayed by outside sources.
- Official channels need credibility **ahead of time** to counteract "unofficial" sources of info. This may require courage on the part of agencies to share unfavorable information.

Vulnerable Populations/Paratransit

In Portland Plan defined as:

- Those under 15 years of age
- Those over 65 years of age
- Those living in rental units
- People of color
- Families below poverty level
- Households with limited English proficiency
- Persons with disabilities

Vulnerable Populations/Paratransit Strategies

- Communicate to English and non-English speaking population about travel options
- Partner with City, County and State community services agencies to provide services during recovery
- Establish priorities for services during recovery (e.g. medical appointments)
- Develop necessary MOUs, MOAs to provide needed services via non-traditional providers (e.g., Uber, Lyft, school bus fleets, etc.)

Vulnerable Populations/Paratransit

In Advance

- Site temporary shelters near Emergency Transportation Routes (ETRs)
 - Pre-test to be sure shelter locations are accessible
- Develop plans to fill gaps in service for underserved population including both elderly and disabled
- Partner with social service agencies to identify/prioritize services and system repairs
- Implement services recommended by partner agencies that serve these populations

Communication

- Effective communication is essential to implementation of all strategies
- Clear communication protocols and command structure should be in place prior to an incident
- Communication with the public on:
 - Use of existing transportation network resources such as NLETS/Nixle
 - Use of social media to communicate
 - Crowd-sourced traffic reporting - e.g. WAZE
 - Communication to major employers and/or TMAs

Breakout (45 minutes)

- Develop a list of strategies that are currently in use
- Develop a list of strategies that could be explored as part of the development of a recovery plan
- List at least three strategies from each of the five categories
- Discuss *actions that need to be taken prior* to an event in order to successfully implement the strategies during recovery.
- List lead and support agencies on planning for and implementing each strategy

Report Out (15 minutes)

Summary

- Five categories of strategies were discussed
- For each strategy, actions need to be taken in advance of an incident and during recovery
- Emerging technologies present new communications capabilities and opportunities for interaction between the public and private sectors
- Establishing communication channels and protocols before an event is vital to maintaining public confidence in information they receive



Module 8: Prioritizing Post-Disaster Investments

Module 8: Prioritizing Post-Disaster Investments

Objectives

- Describe several tools and methods to prioritize *investments* after a disaster (i.e., what do we fix in what order?)
- Demonstrate that recovery actions and investments will need to be prioritized and phased in over time
- Discuss existing tools and methods in use by MPOs and transit agencies to prioritize investments in plans and programs



Tools and Methods

Tools and Methods to Prioritize Post Disaster Investments

- Portland Alternatives Prioritization (APT) tool
- 2014 Puget Sound Transportation Recovery Annex - Roadway Restoration and Reconstruction Prioritization Process
- Metro Portland - 2018 Regional Transportation Plan Update (pilot ranking process)

Portland Alternative Prioritization Tool (APT)

- APT is a decision-support tool for planners to help rank and prioritize transportation projects for funding priority *after a disaster*
 - Adaptable
 - Performance-based
 - Defensible
 - User-friendly

APT was developed by TYLin for PBEM as part of this project.

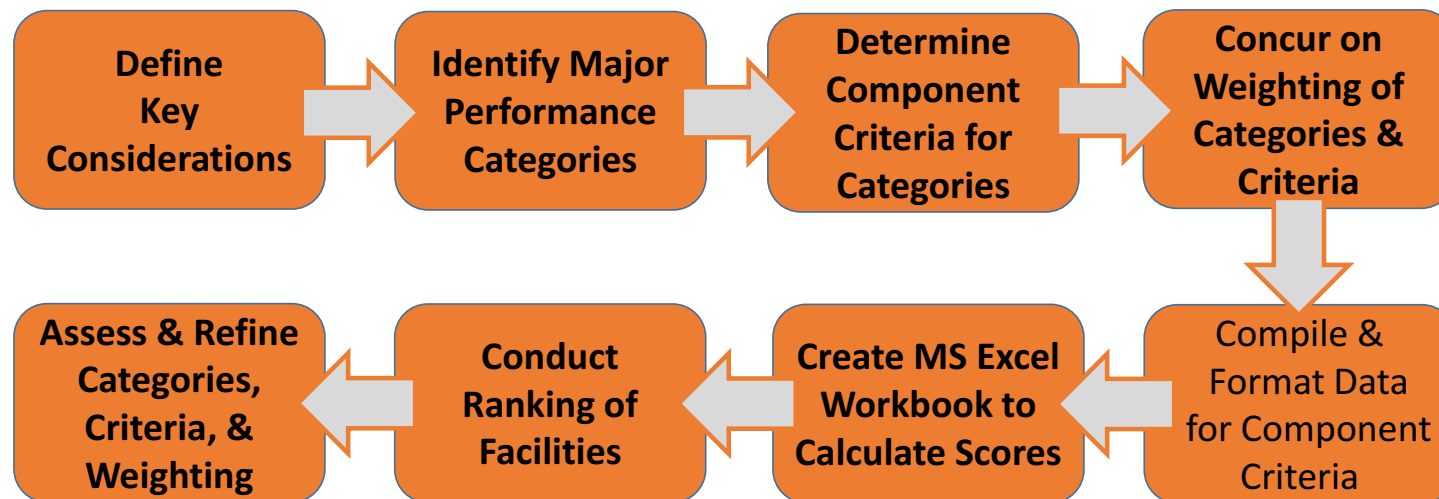
Adaptable and Performance-Based

- Adaptable
 - Can account for impacts to transportation system for all types of potential hazard events
 - Neither predictive or overly prescriptive –users control ranking and priorities
- Performance-Based Criteria
 - Usage – 7 criteria
 - Access – 7 criteria
 - Equity -5 criteria
- Multi-criteria analysis using existing data that MPOs and transit agencies routinely maintain

Defensible and User-Friendly

- Defensible
 - Well-grounded analytical framework
 - Based on solid data from reliable sources – local inputs required
 - Supports rebuilding better whenever possible
- User Friendly
 - Understood by citizens, elected officials, and non-technical stakeholders
 - Easily explainable and comprehensible
 - Microsoft Excel
 - Easily and quickly utilized and adjusted during recovery process

Portland Alternatives Prioritization Tool Workflow



APT Scoring Methodology

- Scoring methodology includes
 - Roadways, transit
 - Three major categories(usage, access, equity) with 19 criteria
 - Total maximum score of 100 points
- Portland participants established scores and criteria
- Purpose: to help agencies post-disaster to prioritize needed investments and phasing strategies

APT Scoring Methodology and Associated Criteria

- Usage (Maximum 50 points)
 - High capacity transit is a priority
 - Roadways are assigned 90 percent of maximum points
 - Remaining 10 percent of maximum points for Emergency Transportation Routes

APT Scoring Methodology and Associated Criteria

- Access (Maximum 35 points)
 - Maximum of 20 points for facilities that serve Centers and Corridors
 - Three points each for facilities that serve hospitals, fire stations, police stations
 - Two points for facilities that serve large employers, communication nodes, etc.
 - Additional priority given to certain facilities in centers/on corridors
 - Not double-counting; intentional to maximize access per dollar invested

APT Scoring Methodology and Associated Criteria

- Equity (Maximum 15 points)
 - Maximum of three points each for facilities that serve five populations of concern
 - Minority/people of color
 - Persons with disabilities
 - Low-income persons
 - Persons with poor vehicle access
 - Persons with limited English Proficiency

Outputs

- Ranking listing of facilities based on scoring methodology
 - Users will assign current capability: closed, restricted use, unrestricted use
 - Results are sortable to remove those with unrestricted use
- Proposed design and cost if currently programmed
 - Long range plans
 - Near-term capital improvement programs

PDX Alternatives Prioritization Tool
Scoring Methodology - Version 3

Category	Criterion	Description	Proposed Scoring Range	Notes	Data Source
Usage (Up to 50 Total Points)	U.1. MAX Light Rail Service or Portland Streetcar	A MAX Light Rail or Portland Streetcar line including bridges and other structures that carry it (in its entirety or a portion thereof) based on ridership (including areas outside City limits) as provided by TriMet in publicly available documents.	MAX Blue Line (~19.0 million annual riders) = 50 MAX Red Line (~7.4 million annual riders) = 45 MAX Green Line (~6.5 million annual riders) = 40 MAX Yellow Line (~4.9 million annual riders) = 35 MAX Orange Line (~4.0 million annual riders) = 35 Portland Streetcar North/South Line (~2.6 million annual riders) = 35 Portland Streetcar A Loop (~1.1 million annual riders) = 30 Portland Streetcar B Loop (~1.1 million annual riders) = 30	Ridership from areas outside City limits are included as high capacity rail has ability to provide greater connectivity to adjoining areas. Repair of ITS elements would be considered part of restoration of rail facilities.	TriMet Ridership Statistics MAX Fact Sheets (https://trimet.org/publications/) Streetcar (https://storage.googleapis.com/streacar/files/Ridership-Counts2017-07.pdf)
	U.2. PBOT Traffic Classification	The roadway including bridges and other structures that carry it (in its entirety or a portion thereof) is classified as a Regional Trafficway, Regional Trafficway and Major City Traffic Street, Major City Traffic Street, District Collector Street, per the PBOT TSP.	Roadway is a Regional Trafficway = 9 Roadway is a Major City Traffic Street = 7 Roadway is a Traffic Access Street = 5 Roadway is a District Collector = 3 Roadway is a Neighborhood Collector = 2 Roadway is a Local Service Traffic Street = 1	Repair of ITS elements would be considered part of restoration of roadway facilities.	Public_PBOT_Transportation_System_Plan_Proposal.lpk ProposedTSPClassChanges.mdb
	U.3. PBOT Transit Classification	The roadway including bridges and other structures that carry it (in its entirety or a portion thereof) is classified as a designated Regional Transitway, Regional Transit/Major Transit Priority, Major Transit Priority, Transit Access Street or connects to Intersecting Passenger Rail per the PBOT TSP.	Roadway is a Regional Transitway = 9 Roadway is a Major Transit Priority = 7 Roadway is a Transit Access Street = 5 Roadway is a Local Service Transit Street = 3 Roadway does serve transit = 0	Repair of ITS elements would be considered part of restoration of roadway facilities.	Public_PBOT_Transportation_System_Plan_Proposal.lpk ProposedTSPClassChanges.mdb
	U.4. PBOT Bikeway Classification	The roadway including bridges and other structures that carry it (in its entirety or a portion thereof) is classified as a Major City Bikeway, City Bikeway, or connects to an Off Street Path/Trail per the PBOT TSP.	Roadway is a Major City Bikeway = 9 Roadway is a City Bikeway = 7 Roadway is a Local Service Bikeway = 3 Bicycling is prohibited on roadway = 0	PBOT TSP only includes Major City Bikeways and City Bikeways. Some City Bikeways do not have bicycle facilities and others do. As an example, in the southeast portion of the City, SE 111th Avenue does not and SE Foster Road does.	Public_PBOT_Transportation_System_Plan_Proposal.lpk ProposedTSPClassChanges.mdb
	U.5. PBOT Pedestrian Classification	The roadway including bridges and other structures that carry it (in its entirety or a portion thereof) is classified as a Central City Transit/Pedestrian Street, City Walkway, or connects to an Off street Path per the PBOT TSP.	Roadway is a Central City Transit/Pedestrian Street = 9 Roadway is a City Walkway = 7 Roadway is a Pedestrian District Walkway/Street = 5 Roadway is a Local Service Walkway = 3 Off-Street Path = 2 Walking is prohibited on roadway = 0	Repair of ITS elements would be considered part of restoration of transit facilities.	Public_PBOT_Transportation_System_Plan_Proposal.lpk ProposedTSPClassChanges.mdb
	U.6. PBOT Freight Classification	The roadway including bridges and other structures that carry it (in its entirety or a portion thereof) is classified as a Regional Truckway, Priority Truck Street, Major Truck Street, or Truck Access Street per the PBOT TSP.	Roadway is a Regional Truckway = 9 Roadway is a Priority Truck Street = 7 Roadway is a Major Truck Street = 5 Roadway is a Truck Access Street = 3 Roadway is a Local Truck Service Street = 1 Trucks are prohibited on roadway = 0	Trucks transport approximately two-thirds of the tonnage and approximately 80% of goods by value in the Portland Region. Rail, water, and air are also important components of the goods movement network (particularly rail and water for intermodal shipments). These should be addressed outside the alternatives prioritization process as their geographical extent is limited (e.g., length, number of facilities, etc.) and ownership includes private and quasi-public interests.	Public_PBOT_Transportation_System_Plan_Proposal.lpk ProposedTSPClassChanges.mdb
	U.7. Emergency Transportation Route	The roadway including bridges and other structures that carry it serves as a City- and Metro-designated Emergency Transportation Route.	Roadway is a Major Emergency Response Route = 5 Roadway is a Secondary Emergency Response Route = 3 Roadway is a Minor Emergency Response Route = 1	In the City of Portland, all city-designated emergency transportation routes are Metro-designated emergency transportation routes per Metro_EmergencyTransportationRoutes.lpk.	Portland Emergency Transportation Routes.lpk
Access (Up to 35 Total Points)	A.1. Centers & Corridors	The facility serves a designated Center or Corridor. This includes roadways that traverse an entire Center or Corridor or a portion of it, including interchanges and ramps.	Traverses two or more entire centers or corridors = 20 Traverses an entire center or corridor = 15 Serves a portion of two or more centers or corridors = 10 Serves a portion of a center or corridor = 5 Does not serve an entire center or corridor or portion thereof = 0	A roadway can serve more than one of the 32 Centers and Corridors included in "centers_defined.lpk" (e.g., Gateway Regional Center and Montview, Central City and Fremont/Williams, Northwest District, Kern, etc.).	centers_defined.lpk
	A.2. Hospitals	The facility provides access to a Hospital.	Roadway does not provide access to a Hospital = 0	None	Hospitals.lpk
	A.3. Fire Stations	The facility provides access to a Fire Station.	Roadway provides access to a Portland Fire Station = 3 Roadway does not provide access to a Portland Fire Station = 0	None	Portland Fire Stations.lpk
	A.4. Police Stations	The facility provides access to a Police Station.	Roadway provides access to a Portland Police Station = 3 Roadway does not provide access to a Portland Police Station = 0	None	Portland Police Facilities.lpk
	A.5. PBEM Tier I Critical Facilities	The facility provides access to a PBEM Tier I Critical Facility.	Roadway provides access to a Critical Facility = 2 Roadway does not provide access to a PBEM Tier I Critical Facility = 0	Some of these 107 PBEM Tier I Critical Facilities are hospitals, police stations, and the facilities that are included in A.2., A.3., and A.4. This is to ensure that roadways that provide access to these buildings receive additional priority.	Tier I Critical Facilities (PBEM).lpk
	A.6. Large Employers	The facility provides access to a Large Employer.	Roadway provides access to a Large Employer = 2 Roadway does not provide access to a Large Employer = 0	Many of these 55 large employers are located in the Centers and Corridors included in A.1. This is to ensure that roadways that provide access to their buildings receive additional priority.	Large Employers.lpk
	A.7. BEECN Location	The facility provides access to a Basic Earthquake Emergency Communication Node, which are neighborhood-based.	Roadway provides access to a BEECN = 2 Roadway does not provide access to a BEECN = 0	The 45 BEECNs will likely be known areas to go in the event there is an emergency after an earthquake.	BEECN Locations.lpk
Equity (Up to 15 Total Points)	E.1. Minority/Persons of Color Served	The facility serves an area with an above average proportion of persons of color.	Facility serves a Census Tract with a minority population greater than 25% above the city average = 3 Facility serves a Census Tract with a minority population between 11.25% above the city average = 2 Facility serves a Census Tract with a minority population between 1.10% above the city average = 1 Facility does not serve a Census Tract with a minority population above the city average = 0	Based on the 2011-2015 American Community Survey 5-Year Estimates, the non-white percent of population in the City is 18% and the Hispanic/Latino is 9.7%. Facilities in Census Tracts exceeding the City average in either or both of these characteristics would receive points per the scale of 1.10% above, 11.25% above, and >25% above the City average.	American Community Survey
	E.2. Low-Income Persons Served	The facility serves an area with an above average proportion of low-income persons.	Facility serves a Census Tract with a low-income population greater than 25% above the city average = 3 Facility serves a Census Tract with a low-income population between 11.25% above the city average = 2 Facility serves a Census Tract with a low-income population between 1.10% above the city average = 1 Facility does not serve a Census Tract with a low-income population above the city average = 0	Based on the 2011-2015 American Community Survey 5-Year Estimates, 18% of City residents' were included in the population for whom poverty status is determined. Facilities in Census Tracts exceeding the City average in this characteristic would receive points per the scale of 1.10% above, 11.25% above, and >25% above the City average.	American Community Survey
	E.3. Persons with Disabilities Served	The facility serves an area with an above average proportion of persons with disabilities.	Facility serves a Census Tract with a disabled population greater than 25% above the city average = 3 Facility serves a Census Tract with a disabled population between 11.25% above the city average = 2 Facility serves a Census Tract with a disabled population between 1.10% above the city average = 1 Facility does not serve a Census Tract with a disabled population above the city average = 0	Based on the 2011-2015 American Community Survey 5-Year Estimates, 12.5% of City residents' reported having a disability. Facilities in Census Tracts exceeding the City average in this characteristic would receive points per the scale of 1.10% above, 11.25% above, and >25% above the City average.	American Community Survey
	E.4. Persons with Poor Vehicle Access Served	The facility serves an area with an above average proportion of persons with poor vehicle access.	Facility serves a Census Tract with zero-vehicle households greater than 25% above the city average = 3 Facility serves a Census Tract with zero-vehicle households between 11.25% above the city average = 2 Facility serves a Census Tract with zero-vehicle households between 1.10% above the city average = 1 Facility does not serve a Census Tract with a percent of zero-vehicle households above the city average = 0	Based on the 2011-2015 American Community Survey 5-Year Estimates, 14.8% of City households do not have a personal vehicle available. Facilities in Census Tracts exceeding the City average in this characteristic would receive points per the scale of 1.10% above, 11.25% above, and >25% above the City average.	American Community Survey
	E.5. Persons with Limited English Proficiency (LEP) Served	The facility serves an area with an above average proportion of persons with LEP.	Facility serves a Census Tract with a LEP population greater than 25% above the city average = 3 Facility serves a Census Tract with a LEP population between 11.25% above the city average = 2 Facility serves a Census Tract with a LEP population between 1.10% above the city average = 1 Facility does not serve a Census Tract with a LEP population above the city average = 0	Based on the 2011-2015 American Community Survey 5-Year Estimates, 8.8% of City residents' speak English less than "very well". Facilities in Census Tracts exceeding the City average in this characteristic would receive points per the scale of 1.10% above, 11.25% above, and >25% above the City average.	American Community Survey

Puget Sound Transportation Recovery Annex

- Puget Sound Regional Catastrophic Disaster Coordination Plan includes nine annexes and toolkits
- Transportation Recovery Annex and Roadway Toolbox includes:
- Roadway Restoration and Reconstruction Prioritization Process
 - Prioritize the restoration of roadways after a major catastrophe
 - Can be applied on a jurisdictional or regional basis
 - Approach can be adapted for use in prioritizing projects for other modes

Roadway Restoration and Reconstruction Prioritization Process

High Priority Asset Factor/Criteria	Max Value	Weight	Description	Scoring Considerations
Benefit to Public Services				
A. Emergency Response Function	3	15%	Does the asset serve an emergency response function and will the action or activity of emergency response be affected	Does route directly serve hospitals, resource points of distribution, etc.? is route a previously identify emergency response route?
B. Government Continuity	3	15%	Is the asset necessary to maintain government continuity?	Does route directly serve city county/state agencies essential for government continuity?
C. Military Importance	3	15%	Is the asset important to military functions?	Does the route directly serve military bases and/or facilitate movement of military resources?
Benefit to the General Public				
D. Available Alternate	3	10%	Is this the only asset than can perform its primary function?	Are there no alternatives that will substitute adequately in lieu of this asset? A max score of 3 translates to no alternatives routes are available.
E. Communication Dependency	3	5%	Is communication dependent upon the asset?	Does this asset support critical communication infrastructure facilities or operations?
F. Economic Impact	3	15%	Will restoration of the asset have a positive effect on the means of living, or the resources and wealth of a region or state?	Does this asset serve major employment or trade centers? Does this asset serve ports?
G. Intermodal Freight Connections	3	15%	Does this route connect to intermodal transportation hubs?	Does this route connect to deep water ports?
H. Transit Service	3	10%	Does the route provide relief to congestion and traffic mitigation?	Is it or will it be a transit route or alternative transit route?

Source: Transportation Recovery Annex. July 2014.

Roadway Restoration and Reconstruction Prioritization Process

- Four Main Steps
 - Information gathering
 - Ranking segment repair
 - Assessing the outcome; and
 - Adjusting the weights in the ranking spreadsheet based upon the situation at the time of a catastrophe

Prioritization through the Metropolitan Planning Process Metro – Portland

- Metro – Portland: On-going update to Regional Transportation Plan
- Summer 2017 Call for Projects
 - Will be used to update RTP in 2018
- Develop and pilot a new evaluation process and criteria
 - Resiliency, vulnerability, asset condition not currently explicit criteria
 - Resiliency would get 5 bonus points under the pilot scoring system
- Test on a small set of projects under existing call for projects
 - Refine and test on larger group of projects

Prioritization through the Metropolitan Planning Process Metro – Portland

Purpose of pilot and testing of criteria and scoring:

- “Provide jurisdictions with information about the impact large-scale projects have on meeting regional goals and addressing needs on the regional transportation system;
- Improve transparency to the public about the return on investment they receive by building regional projects;
- Help identify a pipeline of multi-modal regional transportation projects to address regional needs and public priorities, and maximize progress toward the region’s shared vision and goals for our transportation system.”

Prioritization through the Metropolitan Planning Process Metro – Portland

DRAFT 2018 RTP PROJECT CRITERIA PROPOSED FOR TESTING

1. AIR QUALITY AND CLIMATE
CHANGE | 10 POINTS

2. CONGESTION RELIEF | 10 POINTS

3. ENVIRONMENTAL PROTECTION |
10 POINTS

4. EQUITY AND ACCESS TO
OPPORTUNITY | 10 POINTS

5. FREIGHT AND GOODS
MOVEMENT | 10 POINTS

6. JOBS AND ECONOMIC
DEVELOPMENT | 10 POINTS

7. 2040 CENTERS SUPPORT | 10
POINTS

8. READINESS AND COST-
EFFECTIVENESS | 10 POINTS

9. TRANSPORTATION SAFETY | 10
POINTS

10. TRAVEL OPTIONS | 10 POINTS

**BONUS: TRANSPORTATION
RESILIENCY | 5 POINTS**

Prioritization through the Metropolitan Planning Process Metro – Portland

BONUS: TRANSPORTATION RESILIENCY | 5 points

This measure addresses the extent to which projects improve disaster and emergency response preparedness.

Points	Purpose: Improve and disaster and emergency response preparedness. How well does the project improve disaster preparedness and emergency response?	
	3	The project is located on a designated emergency transportation route (ETRs) ⁴⁴ AND fixes a seismic deficiency to improve the facility's preparedness to evacuate people or to move personnel, supplies, and equipment to heavily damaged areas in the event of a regional emergency.
	2	The project provides alternative route(s) and/or new emergency vehicle access for emergency service providers to use when responding to emergencies.
5 points maximum score		

Prioritization through the Metropolitan Planning Process

Metro – Portland

10. TRAVEL OPTIONS | 10 points

This measure addresses the extent to which projects increase alternatives to driving alone and access to fixed-route transit stops. The measure also addresses the extent to which projects incentivize or facilitate increased biking, walking and use of transit.

Points	Purpose: Increase alternatives to driving alone and their use. How well does the project increase alternatives to driving alone and makes it more convenient to walk, bike and use transit?	
	Choose one	3 The project adds incentives, removes barriers ⁴⁰ or completes a significant regional transit network gap or regional biking and/or walking network gap, (e.g., it crosses a major barrier, such as a freeway, limited-access highway or multi-lane arterial, rail tracks or water feature).
		2 The project completes a regional transit, biking or walking network gap but there are other available routes (no major barriers) OR is designed to create an opportunity for connections between modes.
		1 The project addresses a deficiency on the regional transit, biking or walking network. ⁴¹
	Choose one	3 The project includes 5 or more design elements in bike and/or pedestrian checklist OR physically separates bike and/or pedestrian facility from vehicle traffic.
		2 The project includes 5 or more design elements in bike and/or pedestrian checklist, not physically separated from vehicle traffic.
		1 The project includes 3 or more design elements in bike and/or pedestrian checklist, not physically separated from vehicle traffic.
	Purpose: Improve first mile/last mile biking and walking connections to transit. How well does the project improve connections between modes of travel, especially for bicyclists and pedestrians accessing transit?	
	2	The project completes a gap in the regional bicycle network within 2 miles of a regional fixed-route transit stop. ⁴²
	2	The project completes a gap in the regional pedestrian network within 1/2-mile of a regional fixed-route transit stop. ⁴³
10 points maximum score		

Prioritization through the Metropolitan Planning Process

Metro – Portland

7. ACCESS TO 2040 CENTERS | 10 points

This measure addresses the extent to which projects support existing and new population and employment in designated centers. In addition, the measure addresses the extent to which projects support transit oriented development.

Purpose: Improve access to 2040 centers and corridors.		
How well does the project provide increased multi-modal mobility and accessibility for designated 2040 center(s) – Portland central city and regional centers, town centers, and station communities – and 2040 corridors?		
Choose one	3	The project increases multi-modal mobility and accessibility to, from within the Portland central city or a regional center OR by connecting two or more regional centers OR by connecting a town center to a regional center. ³³
	2	The project increases multi-modal mobility and accessibility to, from or within a town center or station community OR by connecting two or more town centers or station communities.
	1	The project increases multi-modal mobility and accessibility to, from or within a 2040 corridor, 2040 main street or locally identified mixed-use area.
Purpose: Increase access to transit supportive land use. How well is the project supported by the following land use and planning characteristics?		
Choose one	3	Project is located in or connects to an area where existing development densities are transit supportive (have housing and job densities greater than 100 persons per acre). ³⁴
	2	Project is located in or connects to an area where existing development densities are transit supportive (have housing and job densities greater than 60 persons per acre).
	1	Project is located in or connects to an area where existing development densities are transit supportive (have housing and job densities greater than 39 persons per acre).
Points	2	Adopted comprehensive plan or subarea plan specifically identifies the area as a location for additional transit supportive growth (will have housing and job densities greater than 39 persons per acre).
	1	Project is located in an area designated in an adopted plan as a high capacity transit station area (includes light rail, commuter rail, bus rapid transit, passenger/transit intermodal stations).
	1	Zoning in area encourages a mix of uses to provide for housing, jobs, and services. ³⁵
10 points maximum score		

Prioritization through the Metropolitan Planning Process

Metro – Portland

2. CONGESTION RELIEF | 10 points

This measure addresses the extent to which projects reduce congestion and delay through motorized and non-motorized capacity and efficiencies.

Points	Purpose: Reduction of existing congestion. How well does the project address existing congestion?	
	3	The project incorporates congestion relief strategies that will remove vehicle trips and/or improve travel time and reduce delay ⁶ on a facility or intersection identified as an existing bottleneck, chokepoint, or otherwise having an existing congestion issue.
	Purpose: Incorporates congestion relief strategies. How well does the project improve multi-modal capacity and system efficiency to address existing and/or future congestion?	
	1	The project includes Intelligent Transportation Systems (ITS) technologies and other transportation system management and operations strategies ⁷ to better manage the existing system and/or includes geometric changes that increase access management or improve traffic flow.
	2	The project creates new routes for vehicles (e.g., street connectivity), provides new biking and walking facilities, and/or is otherwise supportive of transit. ⁸
	2	The project increases transit capacity or adds high occupancy vehicle lanes.
	2	The project includes congestion pricing, tolling or other pricing strategies.
10 points maximum score		

Breakout (30 minutes)

- Did the APT and the Puget Sound tools seem useful to you given what you know about the transportation system, including transit in your region?
- Could you adapt the Puget Sound tool to address transit assets?
- Are there adjustments you would make to the ranking and scoring process in the APT tool?
- Discuss existing tools at your agency that could be used and/or modified to help prioritize investments post- disaster.

Report Out (10 minutes)

Summary

- There are existing tools and methods to help prioritize investments after a disaster.
- Know existing tools your state DOT, MPO, and transit agencies may use already
- What criteria and tools you would use to prioritize investments after a disaster?
- Think about how you might integrate this into your existing planning processes.



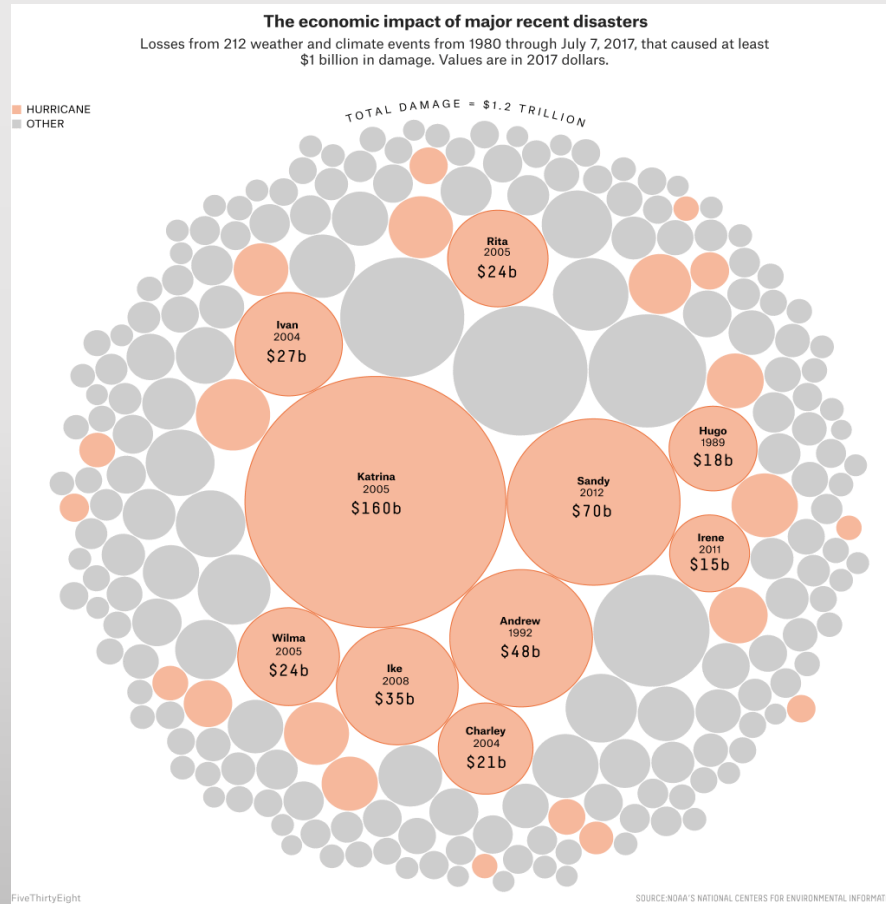
Module 9: Financial, Contracting & Legal Issues

Module 9: Financial, Contracting and Legal Issues

Objectives

- Provide an overview of Federal resources and capabilities for recovery
- Provide an overview of various contracting and legal issues that should be addressed *before* a disaster occurs

Economic Impact of Major Recent Disasters



Economic Impact of Major Recent Disasters

Estimated Inflation-Adjusted Damage in \$Billions

Storm	Date	Damage (\$bn)
Katrina	August 25-30, 2005	\$160.0
Sandy	October 30-31, 2012	\$70.2
Andrew	August 23-27, 1992	\$47.8
Ike	September 12-14, 2008	\$34.8
*Harvey	August 25..., 2017	\$30-\$40
Ivan	September 12-21, 2004	\$27.1
Wilma	October 24, 2005	\$24.3
Rita	September 20-24, 2005	\$23.7
Charley	August 13-14, 2004	\$21.1
Hugo	September 21-22, 1989	\$18.2
Irene	August 26-28, 2011	\$15.0

*Note: * = range of initial media-reported estimates as of August 28, 2017. Source: National Climatic Data Center, Morgan Stanley Research*

- Major hurricanes this year
 - Harvey
 - Irma
 - Maria
- Recovery costs unknown at this time.



Funding and Financial Issues

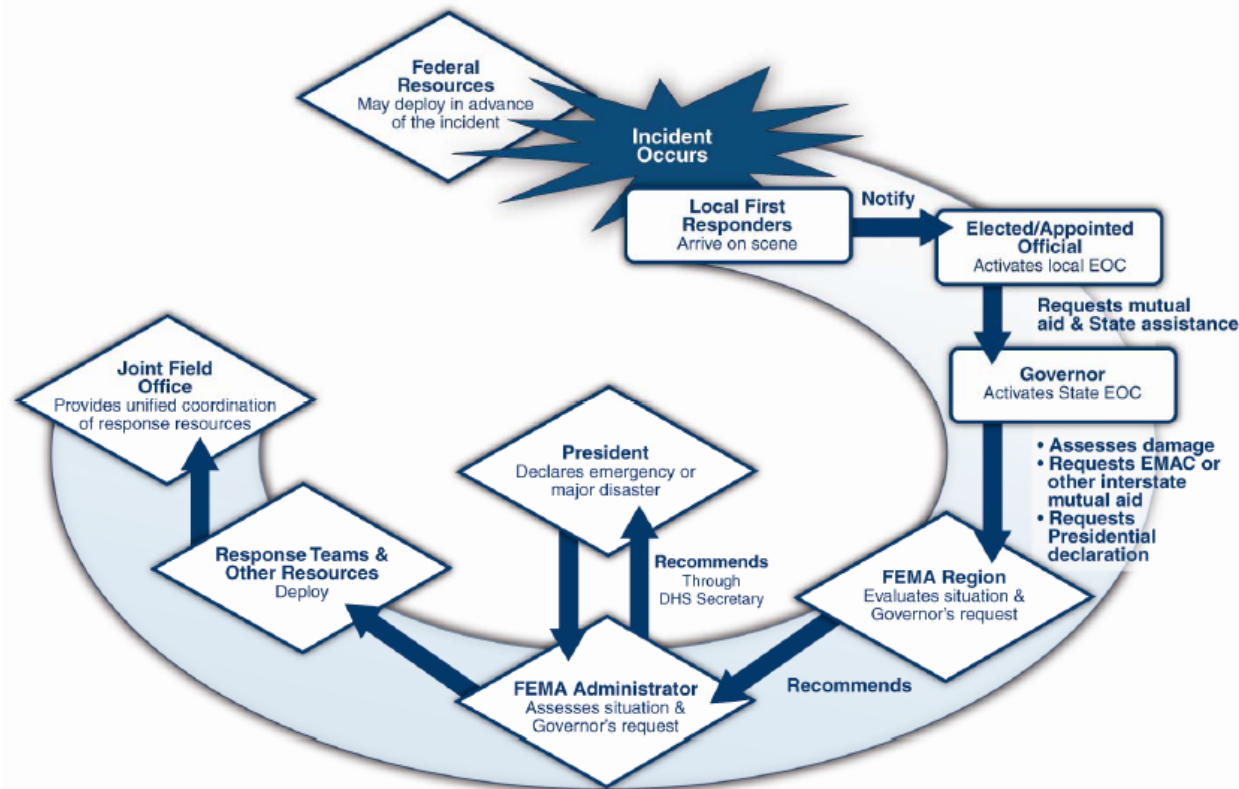
Funding

- Response and Recovery Costs money
- There are several Federal funding programs that may be available for reimbursement of certain costs
- Even with Federal funds, state, local and private sector funding are all needed to help the region return to normalcy.

Stafford Act – Federal Statutory Authority

- Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288)
- Provides the statutory authority for most Federal disaster response activities especially FEMA activities and programs
- *A Presidentially-declared emergency or disaster* under the Stafford Act will trigger FEMA to engage other federal agencies during emergencies and disasters
 - President relies heavily on DHS and FEMA recommendations

Overview of Federal Stafford Act Support to States



Major Federal Funding Programs

- Federal Emergency Management Agency (FEMA) Public Assistance Program
- Federal Emergency Management Agency (FEMA) – Hazard Mitigation Grant Program (HMGP)
- Federal Highway Administration (FHWA) - Emergency Relief (ER) Program
- Federal Transit Administration (FTA) – Emergency Relief Program

Federal Emergency Management Agency (FEMA) Public Assistance Program

- FEMA's largest grant program –provides funds to communities responding to *and recovering from* Presidentially-declared major emergencies or disasters
- Provides emergency assistance to permanently restore community infrastructure
- Eligible entities: states, tribal and local governments, U.S. territories, some non-profits (e.g. those that provide a critical service and are open to the public)
- FEMA Policy Guide: <https://www.fema.gov/media-library/assets/documents/111781>
- FEMA Public Assistance Program Fact Sheets: <https://www.fema.gov/media-library/assets/documents/90743>

FEMA Public Assistance Program (cont'd)

- Eligibility for Reimbursement - Work must be
 - Required as a result of the declared incident,
 - Located in the designated area,
 - The legal responsibility of the applicant, and
 - Undertaken at a reasonable cost.
- Federal Share of Costs
 - Not less than 75 percent of the eligible cost for emergency measures and permanent restoration.
- Application Process
 - After a federal declaration, applicants must then file a Request for Public Assistance *within 30 days* of the federal declaration.

FEMA Public Assistance Program (cont'd)

- Project Categories
 - Emergency
 - Debris Removal – now paid for by FEMA for roads and transportation projects
 - Emergency Protective Measures
 - Permanent Work
 - Road and Bridges
 - Water Control Facilities
 - Public Buildings and Contents
 - Public Utilities
 - Parks, Recreational, and Other Facilities

FEMA Hazard Mitigation Grant Program (HMGP)

- Sustained measures to reduce or eliminate long term risk to people or property from natural hazards and their effects.
- In the long term, mitigation measures reduce personal loss, save lives and reduce the cost to the nation of responding to and recovering from disasters.
- Stafford Act §404 and §406 provides for funding hazard mitigation when a disaster has been declared.
- Federal share up to 75 percent of project cost

Federal Highway Administration (FHWA) - Emergency Relief Program

- \$100 million authorized annually. Administered by FHWA.
- Congress has periodically provided additional funds through supplemental appropriations.
- MAP-21 continued the program and made some key program changes:
 - New FTA Emergency Relief Program
 - Debris removal now paid by FEMA
 - Maintenance and operations of additional Ferry services and transit services are eligible costs
 - Allows for funds to be used to enhance safety, security and resiliency
 - Eliminated the \$100 million per State event cap.

FHWA Emergency Relief Program – (cont'd)

- Emergency repair work accomplished in *the first 180 days* after the disaster occurs, may be reimbursed at 100 percent Federal share.
- The *180 day time period for 100 percent eligibility of emergency repairs may be extended* if a State cannot access a site to evaluate damages and the cost of repair.
- The total ER obligations for U.S. Territories is limited to \$20 million in any fiscal year.
- Federal share is generally *90 percent for Interstate highways. For all other highways, the Federal share is 80 percent.*

FHWA Emergency Relief Program –(cont'd)

- The Federal share for *permanent ER* repairs may amount to 90 percent under certain conditions
- A notice of intent to request ER funds is filed by the State Department of Transportation with the FHWA Division Office to initiate the ER application process.
- States are required to submit an application for ER funding to FHWA within *two calendar years* of the date of the disaster.
- The application must include a comprehensive list of all eligible project sites and repair costs.

Federal Transit Administration (FTA) Public Transportation Emergency Relief Program

- Authorized under MAP-21.
- Enables FTA to provide operating and capital assistance to public transit operators
 - *in preparation for and in response to catastrophic event where Governor has declared an emergency or the President declared a disaster under Stafford Act.*

<https://www.transit.dot.gov/about/regional-offices/region-10/emergency-relief-program-guidance>

FTA Public Transportation Emergency Relief Program

- *Capital projects* to protect, repair, or replace facilities or equipment that are in danger of suffering serious damage, or
 - have suffered serious damage as a result of an emergency including natural disasters such as floods, hurricanes, and tornadoes.
- *Operating costs* of evacuation, rescue operations, temporary public transportation service, or
 - reestablishing, expanding, or relocating service before, during or after an emergency.
- Examples of use of FTA funds: vanpools, shuttle services, mobility management, transit
- TDM activities are eligible for Congestion Mitigation and Air Quality Improvement funds (CMAQ) and Surface transportation block grant (STBG) funds

<https://www.transit.dot.gov/about/regional-offices/region-10/emergency-relief-program-guidance>

FTA Recovery Assistance Information

- FTA resource guide: *Response and Recovery for Declared Emergencies and Disasters- A Resource Document for Transit Agencies*
- Discusses transportation and recovery actions and funding available for all modes of transit use in response to emergencies
- Provides information about types of resources and other assistance available to transit agencies such as:
 - securing waivers of regulations
 - reimbursement for services restoration and system rebuilding

https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/Response_and_Recovery_for_Declared_Emergencies_and_Disasters_062813.pdf



Contracting Considerations

Contracting Considerations - Examples

- Standardize payments to contractors for services (e.g., paratransit)
- Designate one point of contact for plans and blueprints; digitize all plans and store off-site (usually at city, county or state DOT)
- Implement a contractor database
- Secure emergency waivers (e.g., NEPA) and establish a blanket approval process for emergency work
- Select/pre-qualify contractors for emergency work who are familiar with the process and documentation required for reimbursement

Contracting Considerations - Examples

- Arrange for recovery transportation services by ride-sharing companies and TNCs on a pre-agreed to fee-for-service basis
- Partner with agencies involved in transportation, emergency management, economic development on pooled contracts (e.g. fuel, vehicles)
- Obtain/organize information needed for grants and other assistance, distribute information to purchasing staff
- Train staff on emergency funding processes, documentation, and other requirements



Legal Considerations

Legal Considerations - Memoranda of Agreement (MOA)

- *Develop memoranda of agreement (MOA) or mutual aid agreements.*
Transit agencies should develop MOAs or mutual aid agreements with other relevant organizations and agencies in the same or adjoining communities or areas.
- These agreements should formalize and authorize assistance during emergencies, including addressing financial reimbursements to service providers.
- MOA or other legal mechanisms to enforce surge pricing freezes on UBER/LYFT

Legal Considerations – Examples

- Liability issues
 - Insurance
 - Indemnification
 - Related to providing emergency transportation services through non-traditional providers (e.g. Lyft, UBER)
 - Vanpools
 - School buses for transportation of general population
- Incentive payments in contracts for early completion of emergency work
- Assess the risks and rewards of non-traditional procurement methods: (e.g. design/build repair work)

APTA and FEMA Guidance



- FEMA Mutual Aid and Assistance Agreements
- <https://emilms.fema.gov/IS703A/RES0102130text.htm>

Summary

- There are several possible funding sources that may be available to the region during the recovery period
- Be aware of local match requirements, reimbursement rates, eligibility requirements, deadlines for expending funds, etc.
- Importance of pre-incident preparation and contracting cannot be overstated; if you are prepared the recovery process will be much smoother than if not.
- Addressing potential contracting and legal issues in advance will expedite recovery efforts



Module 10: Action Plan, Recommendations, & Next Steps

Module 10: Action Plan, Recommendations, Next Steps

Objectives

- Develop an action plan for development of a regional recovery plan
- Discuss short-term actions that can be implemented at low-cost and that are not resource intensive
- Discuss next steps in plan development
 - which agency will take the lead on which actions
 - how best to integrate into existing planning efforts where possible

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Recovery Plan Development

Organization of Portland Draft Recovery Plan vs. Training Course

Portland Plan Outline

1. Introduction
2. Employment Centers/Major Community Destinations
3. Hazard Events
4. Vulnerable Populations
5. Alternatives Prioritization Tool
6. Strategies/Recommendations
7. Potential Funding/Reimbursement
8. Follow-on Activities

Training Course

- Introduction – Recovery vs. Response
- Region's transportation system
- Vulnerability Assessment
- Prioritizing Post-Disaster Investment
- Recovery Strategies
- Financial, Contracting, Legal Issues
- Action Plan/Recommendations/Next Steps

Living Document



Module 10: Action Plan, Recommendations, Next Steps

Supporting Tools

- Checklists
- Pre-Planning Guidance: The Right Questions to Ask

Breakout Session (45 minutes)

- What have we learned?
- What's missing?
- What are our next steps?

Report Out (15 minutes)

Summary

- Establish next steps for developing a recovery plan
- Integrate this into existing efforts to the extent possible (e.g. update of TIP, LRTP, etc.)
- Implement low-cost, high-return investments
- Identify early successes to build momentum to support plan development
- Seek funding to develop and maintain a recovery plan
- Include periodic updating, training and testing on the plan



Module 11: Course Evaluation & Wrap-Up

Module 11: Course Evaluation and Wrap-Up

- Re-Cap next steps for the region
- Course evaluation
- Wrap-up



Evaluation and Wrap-Up

Thank you!

Sarah Siwek

Sarah J. Siwek & Associates, Inc.

4519 Admiralty Way #140, Marina del Rey, CA 90292

310-963-1395

ssiwek@aol.com

Tanya Mooza Zwahlen and Susan Hopkins

Highland Planning LLC

820 South Clinton Avenue #3 Rochester, NY 14620

585-315-1834 585-

tanya@highland-planning.com susan@highland-planning.com