



**TPO Board Meeting**

Marion County Commission Auditorium  
601 SE 25<sup>th</sup> Avenue, Ocala, FL 34471  
February 22, 2022  
4:00 PM

**MINUTES**

**Members Present:**

Councilman Ire Bethea  
Commissioner Kathy Bryant  
Commissioner Craig Curry  
Mayor Kent Guinn  
Councilman James Hilty  
Commissioner Ron Livsey  
Councilmember Barry Mansfield  
Commissioner Michelle Stone  
Mayor Bill White

**Members Not Present:**

Councilmember Kristen Dryer  
Commissioner Jeff Gold  
Commissioner Carl Zalak

**Others Present:**

Rob Balmes, TPO  
Shakayla Irby, TPO  
Liz Mitchell, TPO  
Anna Taylor, FDOT  
David Bottomley  
Other members of the public not signed in.

### **Item 1. Call to Order and Pledge of Allegiance**

Chairman Ire Bethea called the meeting to order at 4:02pm and led the board in the Pledge of Allegiance.

### **Item 2. Roll Call**

Shakayla Irby, Administrative Assistant called the roll and a quorum was present.

### **Item 3. Proof of Publication**

Shakayla Irby, Administrative Assistant stated the meeting was published online at the TPO website and the City of Ocala, Belleview and Dunnellon and Marion County meeting calendars on February 15, 2022. The meeting was also published to the TPO's Facebook and Twitter pages.

### **Item 4. Consent Agenda**

*Ms. Bryant made a motion to approve the Consent Agenda. Ms. Stone seconded, and the motion passed unanimously.*

### **Item 5A. Performance Management Safety Targets**

Mr. Balmes presented and said the Moving Ahead for Progress in the 21st Century Act (MAP-21) required State DOTs and TPOs/MPOs to conduct performance-based planning by tracking performance measures and setting data-driven targets to improve those measures. The first of the performance measures that had become effective in 2016 was assessing the conditions of roadway safety – PM1.

By May 2018, all TPO/MPO's were required to establish safety targets and approve or update on an annual basis. Specifically, the Ocala Marion TPO was required to update and adopt **Targets** for **five** required **Safety Performance Measures** established under MAP-21. This year, the TPO must submit Safety targets to the Florida Department of Transportation (FDOT) no later than February 25, 2022.

Mr. Balmes mentioned the five required safety performance measures.

1. Fatalities - Total number of fatalities involving a motor vehicle crash
2. Fatalities (Rate) - Rate of fatalities per 100 Million Vehicle Miles Traveled (VMT)
3. Serious Injuries - Total number of serious injuries involving a motor vehicle crash
4. Serious Injuries (Rate) - Rate of serious injuries per 100 Million Vehicle Miles Traveled (VMT)
5. Non-Motorized Fatalities & Serious Injuries - Number of non-motorized fatalities and number non-motorized serious injuries involving a motor vehicle crash

On an annual basis, the TPO had the opportunity to select one of two options regarding updating and submission of safety targets.

1. Adopt the state targets established by FDOT.
2. Develop its own quantifiable safety performance targets.

If the TPO adopts state targets, it was required to annually adopt the same targets until changes were made by FDOT. Presently, the FDOT had adopted 0 for each of the five safety targets.

In 2018, when the process became a federal requirement, the TPO Board adopted its own specific safety performance targets to better track progress and reflect more accountability to the public. The targets reflect specific crash data for Marion County. For the past four years, the TPO Board has opted to follow the same approach of reviewing prior year target results, and adopting revised targets tied to a specific methodology involving five-year rolling averages and projected vehicle miles traveled (VMT).

The methodology was explained in more detail in a memo provided to the TPO board.

Following the same methodology used in 2021, the TPO conducted an analysis of the five safety targets for 2022 using data and information provided by FDOT and the University of Florida Signal Four Analytics online database. The methodology of developing targets for 2022 involved calculating the average percent change of three periods of five-year rolling averages for each of the five targets, and projecting VMT based on historic trends. The three five-year rolling averages included 2015 to 2019; 2016 to 2020; and 2017 to 2021. The aggregate percent change of the three rolling averages was then applied to the third rolling average period to calculate the proposed 2022 targets.

Based upon the analysis, the proposed 2022 safety targets (not exceed) were as follows:

Fatalities – **98**

Fatalities per 100 Million VMT – **2.08**

Serious Injuries – **3778**

Serious Injuries per 100 Million VMT – **8.02**

Number of Non-Motorized (bicycle, pedestrian) Fatalities and Serious Injuries - **57**

Two options were provided to the board:

**Option A.** Continue using the methodology for developing annual safety targets.

Recommend to the TPO Board adoption of the proposed safety targets for 2022. As part of the Commitment to Zero Safety Action Plan, staff recommended the consideration of crash reduction factors and corresponding strategies to improve safety in Ocala/Marion County for 2023 target setting.

**Option B.** Adopt 0 for all five safety targets to reflect the statewide/FDOT targets, and the Commitment to Zero Safety Action Plan goal of moving toward 0 Fatalities and 0 Serious Injuries.

The board had discussion on the safety targets and methodology.

Mr. Balmes mentioned that the Ocala Marion TPO had made a choice to set its own targets since mandated to do so in 2018. There was a choice to set the state targets of zero but if the TPO decided to go with the state targets of zero there could not be a change to go back and set targets.

Commissioner Stone shared her concerns of at some point being penalized by the state with dollars that would get allocated. The state has said they would not penalize however she preferred to set targets to be able to see real data numbers.

Commissioner Bryant said that zero was probably an unrealistic goal but everything that could be done to reduce accidents should be done. She agreed with setting realistic goals and remaining consistent with what had already been done.

Ms. Bryant made a motion to adopt Option A for the Performance Management Safety Targets. Mr. Hilty seconded, and the motion passed unanimously.

### **Item 5B. TPO Travel Policy**

Rob Balmes presented to the board and said that the TPO maintained a Travel Policy to establish formal procedures for the reimbursement or payment of expenses incurred when staff and board members were on official TPO business.

Based on a recent internal review of the Travel Policy, the following changes were proposed as updates or clarifications:

- **Page 3: 1.7 Letter of Agreement.** This section was updated to match the current Marion County Human Resources advanced-level training policy and threshold (\$2,000). The prior amount of \$1,000 had corresponded to the City of Ocala Human Resources policy when the TPO was hosted by the City.
- **Page 4: 2.1 General Principles.** An updated reference to the new sub-section 2.4.3 was made, which provides more clarification regarding same-day travel meals.
- **Page 7: 2.4 Meals and Incidentals.** Sub-section 2.4.4 was created to provide clarification regarding General Service Administration (GSA) Allowable Travel Expenses. When a staff or board member is on TPO business, he/she can claim a meal allowance at an event/conference/meeting when a meal(s) is included as part of registration, if special conditions or circumstances are warranted. These conditions are highlighted on page 7.

Ms. Stone made a motion to approve the TPO Travel Policy. Mr. Curry seconded, and the motion passed unanimously.

### **Item 5c. Citizens Advisory Committee (CAC) Application**

Per the Bylaws of the Citizens Advisory Committee (CAC), all membership nominations required TPO Board review and approval.

Mr. Balmes said that TPO staff received an application for membership to the CAC by Matt Fabian. Mr. Fabian was an active member of the community and was currently serving as a professional developer in Ocala. He had expressed an interest in transportation issues in the Ocala/Marion County area, and serving on the CAC.

Ms. Bryant made a motion to approve Matt Fabian as a member of the CAC. Ms. Stone seconded, and the motion passed unanimously.

### **Item 6a. Transportation Resilience Guidance Paper**

The TPO had been supported by Kittelson and Associates to complete the guidance paper on transportation resilience. The main purpose of the paper was to help better educate and inform the TPO about transportation resilience. The paper also provided consideration for how to integrate resilience into future transportation planning, and opportunities at the state and federal levels of government for grants and funding.

Transportation Resiliency was the ability to adapt to changing conditions and recovery from disruptions, such as major weather events. The impacts from both natural and human-related events could have significant and unexpected impacts to the Ocala/Marion transportation system.

Franco Saraceno, Kittelson and Associates, provided a presentation at the meeting to share highlights from the guidance paper and considerations for next steps.

*The presentation that was given is attached to pages 8-27 of this set of minutes for reference.*

Commissioner Stone asked if resiliency was part of any grant funding that would be received.

Mr. Saraceno answered that resiliency was a part of the grants and that the particular grant programs had a focal point of resiliency.

Commissioner Stone asked Mr. Balmes if the TPO was aware of how to access the grants for some of the projects that might be identified.

Mr. Balmes said that was part of the reason of developing the resiliency guidance paper to know the next steps to take and see what opportunities for grant funding that would be available. The TPO would be engaging with staff in the future.

### **Item 7. Comments by FDOT**

Ms. Taylor provided an updated construction report and gave an update on US 441 resurfacing and said that on November 29, 2021 a new contractor was awarded to the project and that work started and was expected to be completed in about three weeks, weather permitting. The project was anticipated to be completed later summer/ early fall.

Ms. Taylor highlighted that Secretary Perdue was in Tallahassee for a session earlier in the month and had great discussions with Representative McClain and Representative Harding specifically talking about the DAB project and Marion County priorities and it was great conversation.

Ms. Taylor also gave a few other updates:

The I-4 express lanes would be open to the general public 10am on Saturday, February 26, 2022.

FDOT Statewide Secretary, Kevin Thibault was selected to become the Executive Director of the Orlando International Airport and would be making a transition into his new position. FDOT would give announcements about leadership roles as they became available.

In the prior week an MPO workshop was hosted at the District Five office and thanked TPO Director, Rob Balmes for participating in the successful workshop and for the continued partnership.

#### **Item 8. Comments by TPO Staff**

Mr. Balmes told the board a Community wide workshop for the Commitment to Zero Safety Action Plan was planned for April 14, 2022 at the College of Central Florida – Klein Center from 5:30pm – 8pm. Electronic and hard copy fliers would be distributed to the board upon completion.

#### **Item 9. Comments by TPO Board Members**

Mayor Bill White gave a report that Inglis had a kick-off meeting with FDOT regarding the improvements of US 19 from the red level area up to Chiefland. With the intension of the Suncoast Parkway hooking into US 19 there was anticipation to improve US 19.

Mayor White said Dunnellon was interested in the project because anything that would attract traffic into US 19 would attract pass-through traffic in Dunnellon. FDOT said that the project was in the planning phase, possibly five years out.

Chairman Bethea gave comments about serious traffic issues in Marion County. He gave thoughts about the City of Ocala, Marion County, TPO, and FDOT have conversations about the traffic congestion and how to work together to make things better for the citizens.

Commissioner Stone mentioned that a workshop was being developed at the request of Marion County with the City to talk about economic development both residential and commercial. She also told the board to study the Transportation Improvement Plan (TIP) where the roadway projects were listed.

Commissioner Bryant said the workshop that the County was developing would be an opportunity for the City and County to discuss the growth currently and the growth to come. Also, identify different corridors that can be expanded to make a difference.

Commissioner Stone mentioned the Congestion Management Plan (CMP) being developed by the TPO.

Mr. Balmes said that the CMP had been adopted in 2021 and would be revisited every one to two years.

Mr. Balmes also mentioned that the TPO looked at projects that were federalized or received state funding so a workshop that included local projects as well would give the TPO a great picture.

Commissioner Bryant said that all municipalities would be invited to the workshop.

Mayor Guinn mentioned that population in the City with business growth was not going to stop.

**Item 10. Public Comment**

Mr. David Bottomley, 305 Woodbury Pines Circle, Orlando, FL 32828 addressed the board with comments about the Silver Springs State Park and the importance of LED lighting. He also gave comments about the importance of preserving Silver Springs and the uniqueness of Marion County parks.

**Item 11. Adjournment**

The meeting was adjourned by Chairman Bethea at 5:13pm.

Respectfully Submitted By:

Shakayla Irby, Administrative Assistant



An aerial photograph of a coastal city, likely Jacksonville, Florida, showing a mix of urban buildings, parking lots, and green spaces. A large blue rectangular overlay box is positioned in the lower-left to center area of the image, containing the title and date in white text. The background shows a dense urban area with various colored buildings (white, yellow, orange, brown), parking lots filled with cars, and some greenery. In the distance, a body of water is visible under a clear blue sky. A tall water tower is visible on the left side of the image.

# TRANSPORTATION RESILIENCY GUIDANCE

FEBRUARY 2022



An aerial photograph of a river meandering through a lush, dense green forest. The river is dark and reflects the surrounding trees. The word "AGENDA" is overlaid in large, white, sans-serif capital letters on the upper left portion of the image.

# AGENDA

- What is Resiliency?
- National guidance
- Funding opportunities
- Vulnerability analysis
- Resiliency strategies
- Next steps



# Transportation Resiliency

Is it relevant to Marion County, FL?

The Federal Highway Administration defines resiliency as:

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





# Sinkhole opens on Baseline Road; southbound lanes closed from Maricamp to Dogwood



**Austin L. Miller**  
Ocala Star-Banner

Published 1:59 p.m. ET Feb. 18, 2022 | Updated 5:16 p.m. ET Feb. 18, 2022

[View Comments](#)



A sinkhole opened Friday afternoon on Baseline Road just south of Maricamp Road. Southbound lanes were closed as of 2 p.m. *Austin L. Miller/Ocala Star-Banner*

## DISRUPTIONS

Disruptions can include natural and man-made disasters

- Flooding
- Wildfires
- Tornadoes
- HazMat incidents
- Sinkholes
- Traffic crashes

# NATIONAL GUIDANCE



## Resiliency Requirements

Resilience planning was first introduced into federal transportation legislation 10 years ago.

2012

Moving Ahead for Progress in the 21<sup>st</sup> Century (MAP-21)

Added eligibility of “protection against extreme events” to funding programs

2015

Fixing America's Surface Transportation Act (FAST Act)

Formalizes resilience consideration into transportation planning

2021

Infrastructure Investment & Jobs Act (II&J)

Allocates \$47 billion to infrastructure resilience

# FUNDING OPPORTUNITIES

In 2021, Governor DeSantis signed the first piece of legislation dedicated to resiliency planning in Florida.



**\$8.7 b**

Promoting Resilient Operations for Transformative, Efficient, & Cost-saving Transportation (PROTECT)



**\$1.0 b**

Building Resilient Infrastructure & Communities (BRIC)

**Federal Infrastructure Investment & Jobs Act**



**\$3.5 b**

Flood Mitigation Assistance (FMA)



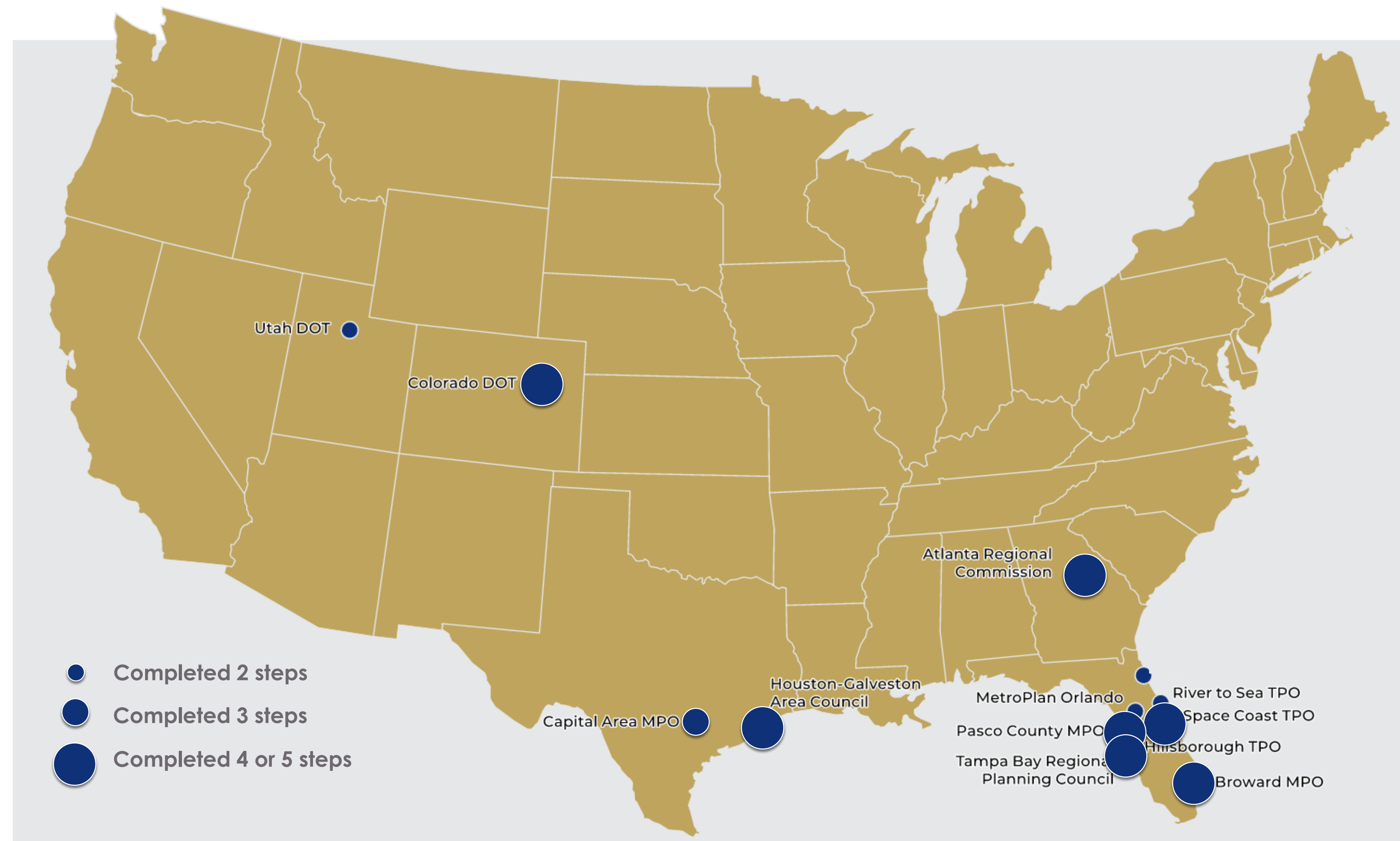
**\$20 m**

Resilient Florida Grant Program

**Statewide Flooding and Sea Level Rise Resilience**

# PEER AREA RESILIENCY EFFORTS

- 1 Define hazards
- 2 Identify critical roadways
- 3 Assess vulnerabilities
- 4 Develop mitigation strategies
- 5 Specify funding sources





# PEER AREA RESILIENCY EFFORTS

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- 3 Assess vulnerabilities
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Agency/ Location	Plan	Description	Resiliency Actions				
			Defines Hazards	Identifies Critical Roadways	Assesses Vulnerabilities/ Exposure	Develops Mitigation Strategies	Specifies Funding Sources
<b>Space Coast TPO Brevard County, FL</b>	Transportation Resiliency Master Plan	Defines six unique shocks/stressors and their impact on roadways critical to the communities in Brevard County; develops mitigation strategies.	●	●	●	●	●
<b>River to Sea TPO</b>	SLR Vulnerability Assessment	Identified exposure/vulnerability to evacuation routes, major roadways, trails, and stormwater storage assets.	●		●		
<b>MetroPlan Orlando</b>	2045 Long Range Transportation Plan	Used scenario planning to identify potential risks and how they can impact the region. MetroPlan Orlando chose six key drivers of change: Population, Economy, Visitation, Development & Land Use, Technology, and Climate. These drivers were used to form four scenarios, to help guide the planning and needs assessment.	●				





## Vulnerability analysis



**Wildfires** – **960** square miles in Marion County are prone to wildfires



**Flooding** – **315** square miles in Marion County are prone to flooding

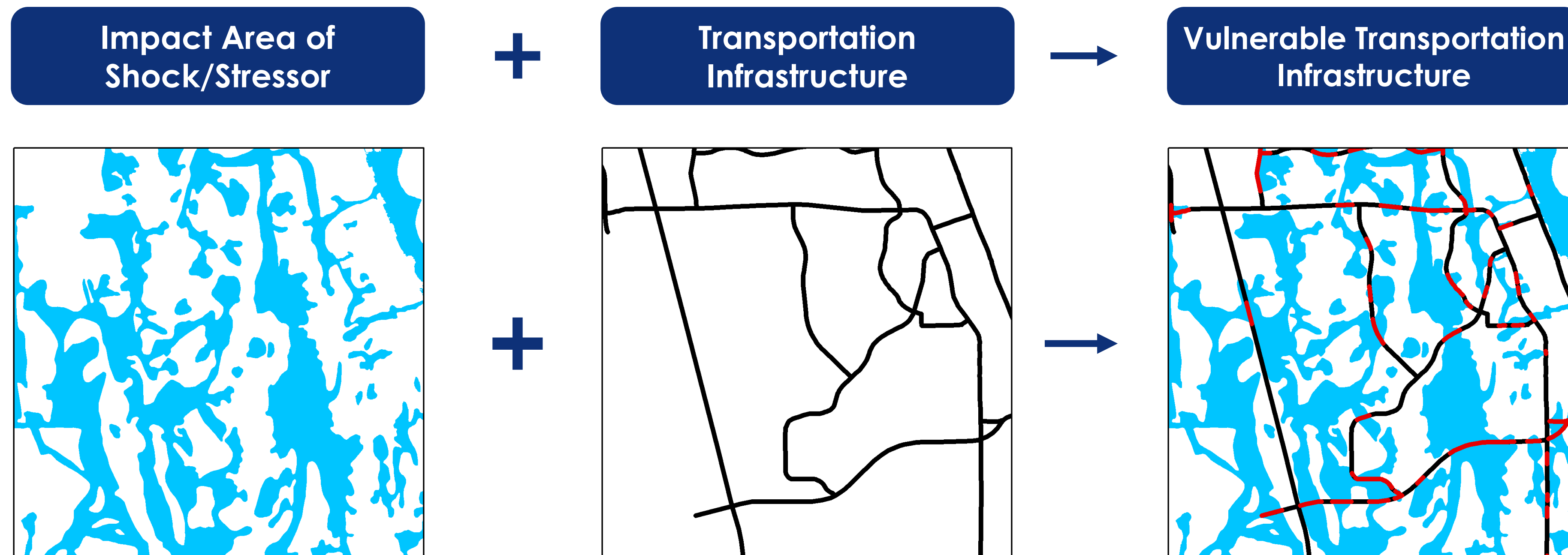


**Sinkholes** – **803** sinkholes in Marion County between 2015 and 2020



# Exposure analysis

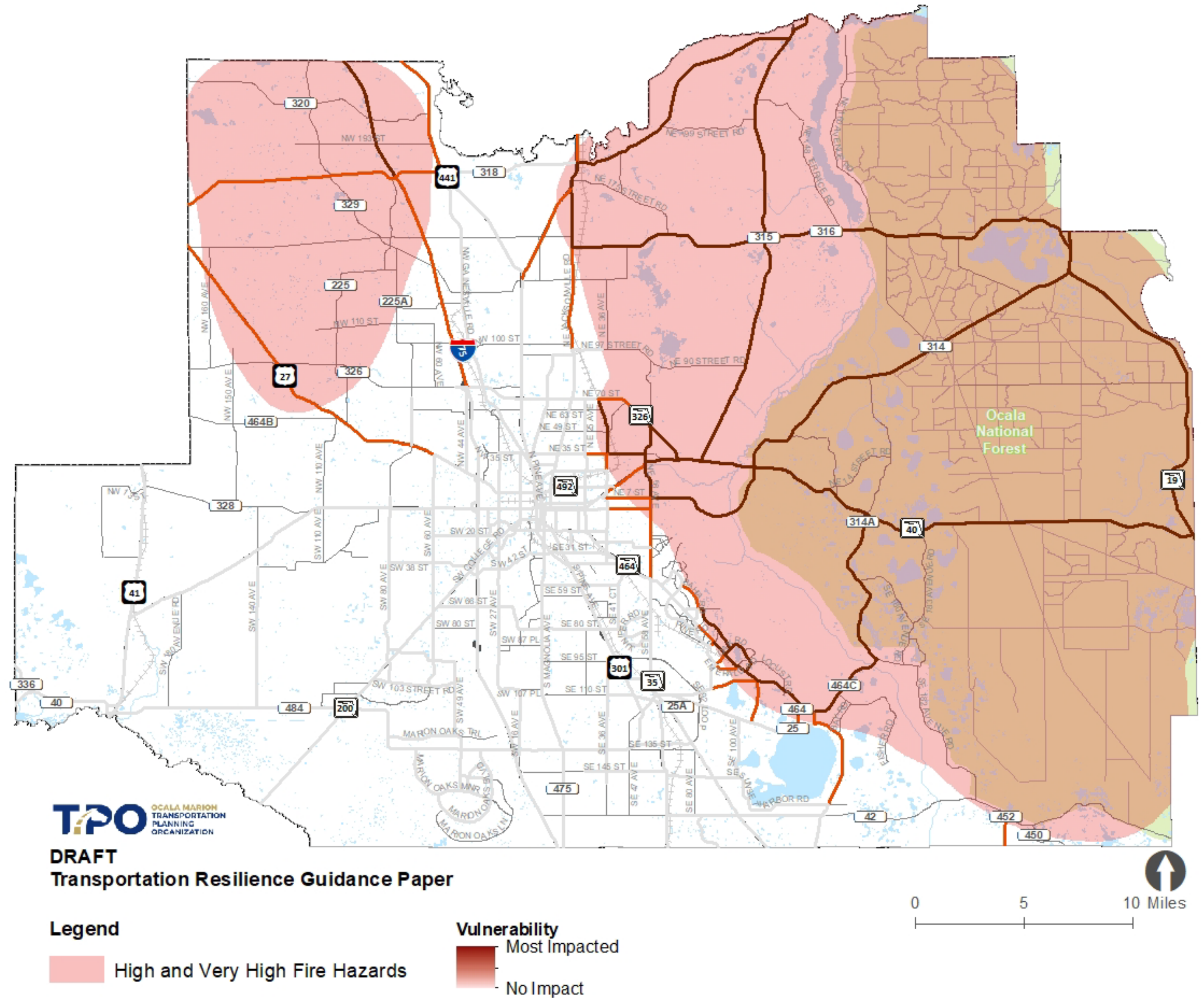
Spatial analysis of the relationship between shock/stressors and federal aid eligible network. Analysis completed separately for evacuation network as well.



# WILDFIRE exposure

## Federal Aid Eligible Road exposure

- 78 miles of principal arterials
- 38 miles of minor arterials
- 116 miles of major collectors
- 23 miles of minor collectors
- 255 total miles of roadways  
35% of system

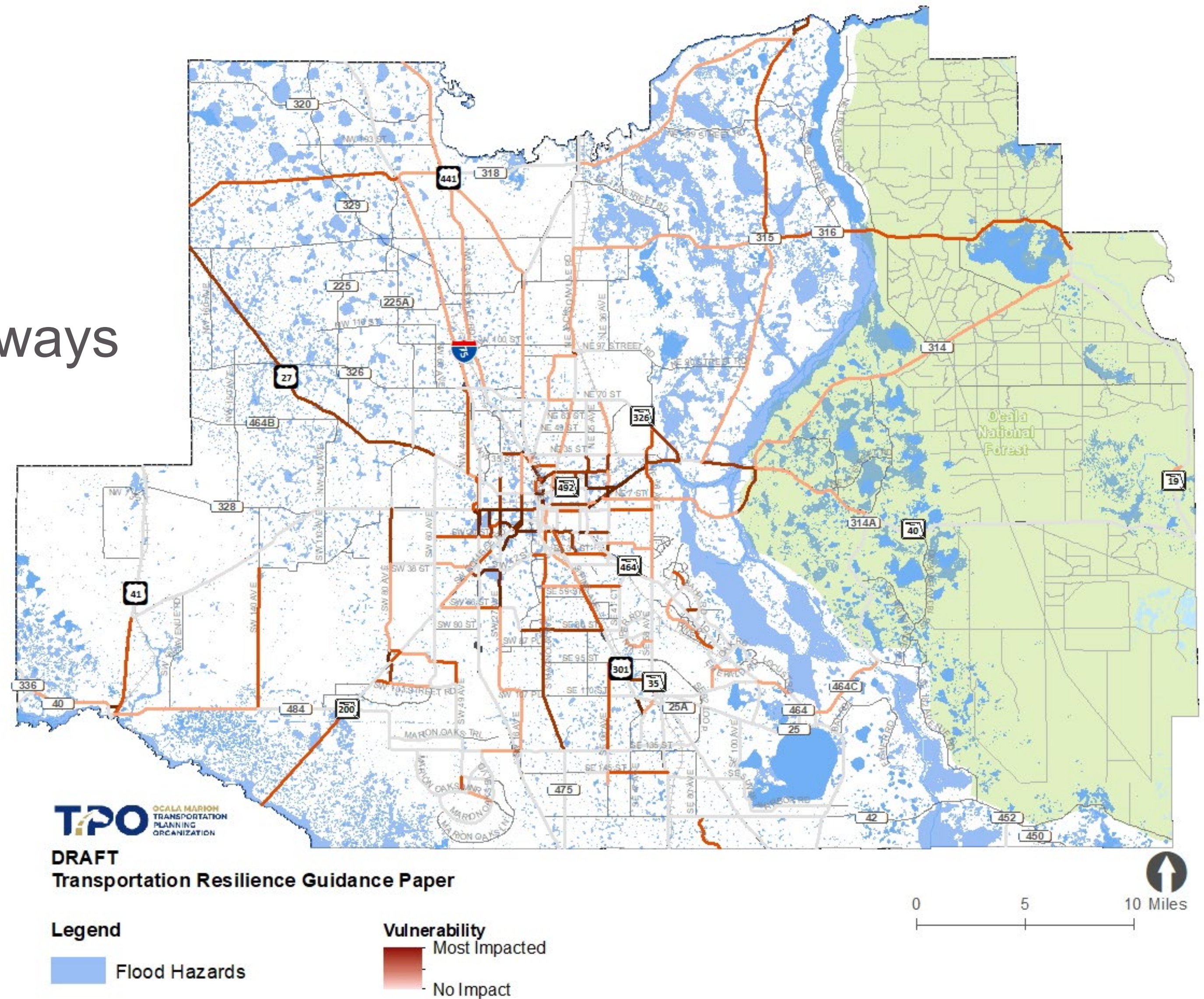




# FLOODING exposure

# Federal Aid Eligible Roadways exposure

- 125 miles of principal arterials
- 56 miles of minor arterials
- 151 miles of major collectors
- 100 miles of minor collectors
- 436 total miles of roadways  
60% of system

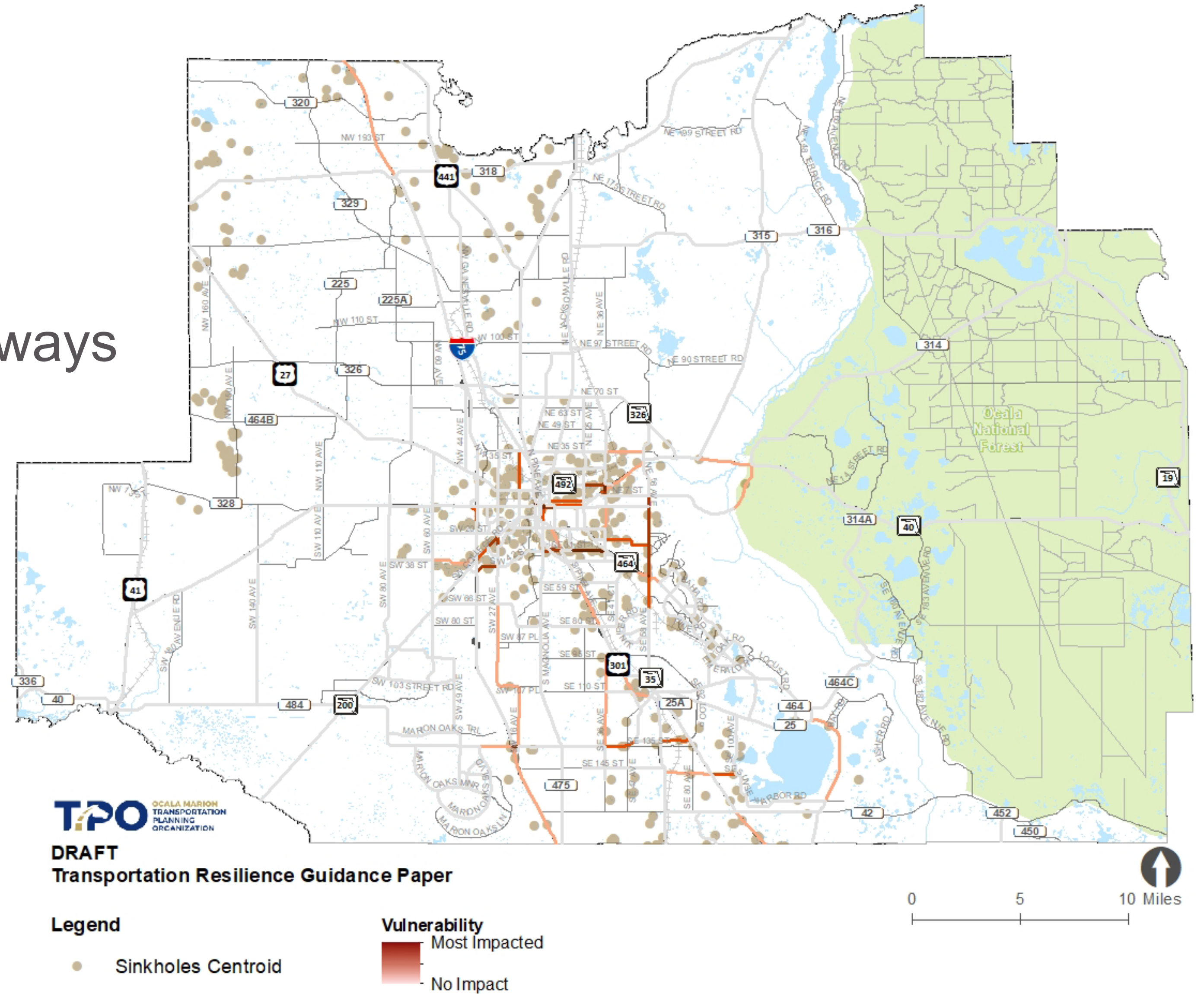




# SINKHOLE exposure

## Federal Aid Eligible Roadways exposure

- 37 miles of principal arterials
- 21 miles of minor arterials
- 6 miles of major collectors
- 21 miles of minor collectors
- 86 total miles of roadways  
12% of system





# MITIGATION STRATEGIES

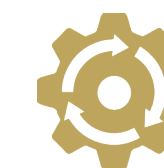
## Types of Strategies



**Prevention** – Improvements that reduce likelihood of impact to the system



**Adaptation** – Improvements that adjust to shocks and stressors to minimize impacts























**Absorption** – Improvements that fortify the system against shocks and stressors



**Restoration** – Improvements that facilitate restoration of normal function after impacts.









# PREVENTION STRATEGIES

Strategy	Description	Hazards	Considerations	Benefits	Cost	Source
Prevention: Strategies that reduce the likelihood of a shock or stressor impacting the system.						
Reduce VMT	Reducing Vehicle Miles Travelled (VMT) reduces the strain on the network associated with rerouting trips or reducing the available route choices.			<ul style="list-style-type: none"> <li>Reduce community reliance on automobile trips</li> <li>Reduce the number of vehicles that must use detour routes</li> </ul>		
Develop a Stormwater Management Plan	Develop a plan to address existing conditions and the required capacity for new facilities.			<ul style="list-style-type: none"> <li>Determine effectiveness of centralized facilities and other regional opportunities</li> </ul>		<ul style="list-style-type: none"> <li>Houston Galveston Resilience Pilot Program</li> </ul>
Construct green roofs	Utilize green roofs that provide shade, reduce surrounding air temperature, and reduce runoff.			<ul style="list-style-type: none"> <li>Reduce runoff</li> <li>Reduce urban heat island effect</li> </ul>		<ul style="list-style-type: none"> <li>USFS Compendium of Adaptation Practices</li> </ul>
Realign or reconnect water courses	Realign waterways away from critical infrastructure. Reconnect waterways to allow natural flood plains to absorb impact of storm events.			<ul style="list-style-type: none"> <li>Allow natural flooding to occur, rather than constraining waterways</li> </ul>		<ul style="list-style-type: none"> <li>World Road Association International Climate Change Adaptation Framework for Road Infrastructure</li> </ul>
Implement fire-use restrictions	Implement policies to reduce the likelihood of wildfire during conditions that are conducive to wildfire ignition.			<ul style="list-style-type: none"> <li>Reduce chances of wildfire</li> </ul>		<ul style="list-style-type: none"> <li>USFS Compendium of Adaptation Practices</li> </ul>
Use forest management techniques such as thinning, prescribed burn, and fuels removal	Reduce the likelihood for an extreme fire, with intermittent fire and other management practices.			<ul style="list-style-type: none"> <li>Maintain ecosystems that require fire</li> </ul>		<ul style="list-style-type: none"> <li>USFS Compendium of Adaptation Practices</li> </ul>
<div> <div>Legend</div> <div>  General            Heat            Wildfire            Flood            Tornado            Low cost            Medium cost            High cost         </div> </div>						

# ADAPTATION STRATEGIES

## Adaptation: Strategies that change the system in anticipation of shocks and stressors to maintain normal functioning.















<b>Discourage development and growth in vulnerable areas</b>	Create zoning requirements that encourage dense development to occur outside of impact areas, for example the flood plain.		<ul style="list-style-type: none"> <li>• Consider impacts to communities living in less vulnerable areas</li> <li>• Consider conservation projects, especially in areas that coincide with environmentally vulnerable/valuable areas</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce the amount of vulnerable infrastructure over time</li> </ul>		<ul style="list-style-type: none"> <li>• FEMA Nature-Based Solutions</li> <li>• Houston Galveston Resilience Pilot Program</li> </ul>
<b>Site new facilities outside of hazard area</b>	When developing new assets or infrastructure, consider locating outside of the hazard area.			<ul style="list-style-type: none"> <li>• Consider hazards during the planning phase to reduce the cost of relocation</li> </ul>		<ul style="list-style-type: none"> <li>• FHWA Adaptation Framework</li> </ul>
<b>Change the nature of access to critical facilities</b>	Provide access to critical facilities under hazards by considering alternative accesses. For example, access through the rear of the building, provide for walking or using a mode other than automobile for a portion of the access trip.			<ul style="list-style-type: none"> <li>• Provides redundant access during normal operations</li> </ul>		<ul style="list-style-type: none"> <li>• USFS Compendium of Adaptation Practices</li> </ul>
<b>Provide redundant routes</b>	Maintain redundant routes in the network that are functional for all modes.		<ul style="list-style-type: none"> <li>• Consider access to critical facilities and critical routes</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces the consequence of segments being impacted by shocks or stressors</li> <li>• Offers traffic management in non-hazard times</li> </ul>		<ul style="list-style-type: none"> <li>• Resilient California</li> </ul>

**Legend**  General  Heat  Wildfire  Flood  Tornado  Low cost  Medium cost  High cost



# ABSORPTION STRATEGIES

**Absorption: Strategies that help the system function normally during events that cause shocks and stressors.**

<b>Conduct regular maintenance of infrastructure</b>	Maintain the working order of infrastructure, for example keeping culverts clear.			<ul style="list-style-type: none"><li>• Proactive measure to maintain flow at critical points</li><li>• Maintain clear of overgrown vegetation which may spread wildfire across the roadway</li></ul>		<ul style="list-style-type: none"><li>• South Florida Climate Pilot</li><li>• Houston Galveston Resilience Pilot Program</li></ul>
<b>Construct hardened shoulders</b>	Widen roadway structure to reduce impact to travel lanes.		<ul style="list-style-type: none"><li>• Requires clearance around roadway</li><li>• Along roadways experiencing strong flows</li></ul>	<ul style="list-style-type: none"><li>• Limit inundation to one side of roadway</li><li>• Reduce erosion from overtopping</li></ul>		<ul style="list-style-type: none"><li>• Resilient Tampa Bay</li></ul>
<b>Use permeable pavements</b>	Slows, filters, and cleans stormwater runoff by installing porous surfaces.		<ul style="list-style-type: none"><li>• Especially relevant in areas with large parking lots</li><li>• Appropriate only for gentle slopes</li><li>• Can become clogged.</li><li>• Appropriate for low traffic volumes, loads, and speed</li></ul>	<ul style="list-style-type: none"><li>• Reduce runoff</li><li>• Allow water to infiltrate</li><li>• Reduced particulates in water</li></ul>		<ul style="list-style-type: none"><li>• Resilient Tampa Bay</li><li>• Houston Galveston Resilience Pilot Program</li></ul>
<b>Construct enhanced road surface</b>	For flooding: Increase the thickness of hot mix asphalt (consider increasing 2”) and binder course using larger aggregate. For heat and wildfire: Design road with materials resistant to fire and heat.			<ul style="list-style-type: none"><li>• Resist water movement and inundation</li><li>• Withstand impacts of prolonged exposure to heat or submersion</li></ul>		<ul style="list-style-type: none"><li>• Resilient Tampa Bay</li><li>• Resilient California</li><li>• Houston Galveston Resilience Pilot Program</li></ul>
<b>Construct enhanced sub-surface</b>	Increase the thickness of subbase layers to provide additional drainage, structural strength, and resistance to flow damages (consider increasing 4-6”).			<ul style="list-style-type: none"><li>• Resist water movement and inundation</li></ul>		<ul style="list-style-type: none"><li>• Resilient Tampa Bay</li><li>• Houston Galveston Resilience Pilot Program</li></ul>
<b>Construct berms or barriers</b>	Construct a barrier to prevent water from flooding the roadway.		<ul style="list-style-type: none"><li>• Consider available right-of-way to construct barrier</li></ul>	<ul style="list-style-type: none"><li>• Prevent water from reaching roadway or flowing across roadway</li></ul>		<ul style="list-style-type: none"><li>• FHWA Adaptation Framework</li></ul>
<b>Construct protected or depressed medians</b>	Separate the roadway and potential effect of inundation with a median between the travel lanes in each direction.		<ul style="list-style-type: none"><li>• Especially effective along roadways in flat areas</li><li>• Requires maintenance of vegetation and keeping drains clear</li></ul>	<ul style="list-style-type: none"><li>• Reduce the occurrence of floods across the full roadway</li><li>• If depressed, serve as a holding area for water</li></ul>		<ul style="list-style-type: none"><li>• Resilient Tampa Bay</li><li>• Houston Galveston Resilience Pilot Program</li></ul>

**Legend**



General



Heat



Wildfire



Flood



Tornado



Low cost

















Medium cost



High cost

# RESTORATION STRATEGIES

## Restoration: Strategies that help the system recover quickly and return to normal functioning.

<b>Install generator connections at traffic signals</b>	Provide built in connections on signal cabinets to connect a generator.		<ul style="list-style-type: none"> <li>• Battery capacity and need for replacement or installation of a generator</li> <li>• Prioritize signals with greatest impact</li> </ul>	<ul style="list-style-type: none"> <li>• Quickly resume operations after shock</li> </ul>		<ul style="list-style-type: none"> <li>• Space Coast TPO Resiliency Master Plan</li> </ul>
<b>Prioritize roadways</b>	Prioritize roadways based upon network effectiveness. In all response activities focus on roadways in priority order, for example send crews to clear debris from priority roadways before non-priority roadways.		<ul style="list-style-type: none"> <li>• Include community input regarding critical routes and facilities</li> </ul>	<ul style="list-style-type: none"> <li>• Clear and defined plan that can be communicated to the community</li> </ul>		<ul style="list-style-type: none"> <li>• Resilient California</li> </ul>
<b>Develop warning systems with resilient communications</b>	Warning system may consist of sensors, cameras, citizen reporting tool, or other means.			<ul style="list-style-type: none"> <li>• Quickly alert of hazard to allow response to occur</li> </ul>		<ul style="list-style-type: none"> <li>• Houston Galveston Resilience Pilot Program</li> </ul>
<b>Develop a coordination plan with other agencies to respond to changes and hazards</b>						<ul style="list-style-type: none"> <li>• FHWA Adaptation Framework</li> </ul>
<b>Coordinate with transit providers to identify alternative routes and stops if normal infrastructure is impacted</b>				<ul style="list-style-type: none"> <li>• Continue to operate transit in a predetermined manner consistent with rider expectations.</li> </ul>		<ul style="list-style-type: none"> <li>• Resilient California</li> </ul>
<b>Establish stand-by contracts for damage response</b>	Establish mechanisms to pay for rapid response to hazards.			<ul style="list-style-type: none"> <li>• Proactive measure to reduce the length of impact.</li> </ul>		<ul style="list-style-type: none"> <li>• FHWA HOP-15-025</li> </ul>
<b>Stockpile materials (culvert pipe, fuel, components) and equipment (generators, traffic control devices) at appropriate locations</b>	Maintain an inventory of critical materials to quickly respond to needs during and after shocks.		<ul style="list-style-type: none"> <li>• Different materials will be needed at different locations to address each hazard</li> <li>• Consider in conjunction with prioritized roadways</li> <li>• Consider cost of storage and potential deterioration of materials over time</li> </ul>	<ul style="list-style-type: none"> <li>• Proactive measure to reduce the length of impact.</li> </ul>		<ul style="list-style-type: none"> <li>• FHWA HOP-15-025</li> </ul>



# NEXT STEPS

## Incorporating Resiliency into planning processes



Project level planning/development



Hazard data collection



Scenario planning analysis



Identification of critical facilities



Identification and prioritization of needed resiliency  
improvements





# Questions?

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