TRANSPORTATION RESILIENCYKC
A Roadmap for Future-Ready Mobility

MARC Resilience Improvement Plan

Steering Committee Meeting #2

presented to

Mid-America Regional Council

presented by

Cambridge Systematics, Inc.

April 21, 2025

Welcome & Introductions

MARC Staff

Consultant Team

Steering Committee Members

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MARC – *together with our local partners* – is embarking on a plan to identify and assess our transportation system RISKS and VULNERABILITIES to extreme weather events and a changing climate.

Purpose of Today's Workshop

Project Team

- Provide updates on Engagement
- Provide updates to PROTECT grant and next steps

Steering Committee

- Understand MARC's approach to PROTECT
- Define priorities
- Identify mechanisms to move forward

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Workshop Agenda

1. Our Work and PROTECT Grant Updates
2. Review key takeaways from Steering Committee #1
3. Review survey and focus group feedback
4. Review Grant Proposal
5. Criticality Determination
6. Next steps

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Updates on Our Work and PROTECT Grant

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Federal Transportation Funding Update

- A full-year Continuing Resolution was passed on March 15th. However, impoundment, recession or lapse of Federal funds could impact a wide range of projects and programs, including transportation resiliency work.
- NOFO for PROTECT funding was removed from Grants.gov on Feb. 11th.
- An executive order (EO #14239) has subsequently been released establishing a National Resiliency Strategy to support state/local to improve resilience to natural hazards and cyber threats.

A Resilient Transportation System is…

Flexible

Users can take a different route or a different mode (such as transit instead of driving) if one is impacted.

Equitable

One group is not overly burdened by climate and weather-related hazards impacting their transportation system such as extreme heat or roadway flooding.

Robust

Roads, bridges, and other infrastructure is designed and maintained to resist extreme weather events and climate hazards.

Proactive

The transportation system utilizes smart technology and community partnerships to better predict and communicate potential transportation disruptors to help mobility rebound more quickly.

Community-Focused

Balances community scale needs with a regional vision of resilience

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Your Goals as Defined in the Last Meeting

- **Secure function of and access to necessities:**
  - Communication
  - Clean water
  - Food
  - Shelter
- **Create a community communication platform**
- Conduct a **comprehensive risk assessment** (extreme weather and critical transportation infrastructure)
- **Prioritize assets** that are critical to the use and function of transportation
- **Identify near-term investments** required for maintenance or design of new components based on findings of priority assets.
- **Create an adaptation strategy that is proactive and adaptive** to time and weather changes.
- **Create a plan that integrates MARC resources and can be utilized by each jurisdiction** to improve funding and perseverance

Engagement Summary

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- Most respondents *(101)* use a **personal or work vehicle** to get around and otherwise **use rideshare or not make the trip** if not available.
- Most respondents have experienced **challenges getting around** their community **during severe winter weather**. Other challenges are can be from severe thunderstorms, flooding, and extreme heat. These challenges are experienced rarely or sometimes, with areas most notably in the **Northland and Kansas City** as **city-wide areas of impact** especially in getting to work, store, or social/family.
- In times of disruptions, most respondents find it **difficult** to find an alternate mode or route and **rated their community** as either **somewhat unprepared** or **somewhat prepared**.
- Respondents find their main mode of transit (likely vehicle) to be prepared for weather disruptions but **want to see better equipped infrastructure and additional travel options and connections.**

Review of Survey Results: Comments

Public Transit: Expand streetcar routes, improve bus frequency/reliability, and provide affordable transit for underserved areas and vulnerable populations.

"More stops for public transportation not on a general route."

Infrastructure: Repair aging roads/bridges, incorporate green infrastructure, improve traffic signals, and enhance snow/ice removal.

"It doesn't seem feasible, long-term, to continue to put money into infrastructure that supports cars. What does seem feasible and sustainable is shifting away from cars, and putting money into quality public transportation, this includes how we access food."

Active Transportation: Increase bike lanes, sidewalks, and tree cover to promote walking, biking, and scootering.

"There needs to be a greater investment in multimodal options and those options in turn should be more prominently considered in disaster preparation and recovery."

Communications: Simplify communication, use accessible platforms, and conduct outreach at community hubs.

"When a call is being made to a ride share company, or we use apps to book rides, the hold times need to be a shorter, and the apps need to be more accessible for people like us with visual impairments."

Emergency Preparedness: Improve accident response and transit options during severe weather, focusing on non-drivers.

"When the weather gets extreme, I wish I could take public transportation, but the system does not allow me to get to work easily"

Equity & Sustainability: Ensure affordable, accessible transit and prioritize green, resilient designs

"More affordable transportation services for older adults and people with disabilities who no longer drive. More options available for residents who live in smaller communities where buses may not be available"

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- Process of selection
  - Started with socially vulnerable census tracts in the MARC region, and after conferring with advisors, we reached out to Community-based organizations that spanned rural, suburban, and urban areas of the region.
- Who we met with:
  - **New Growth Transit** (Cass Co), **The Whole Person** (Cass, Clay, Jackson, Platte, Johnson, Leavenworth, and Wyandotte Counties), **Crosslines Community Outreach** (Wyandotte Co), **BikeWalkKC** (Metro KC), **Heartstrings** (Olathe + Metro KC), **KC Chapter National Federation of Blind** (KCMO)

*These Focus Groups would not have been possible without your input– **THANK YOU!***

New Growth Transit

- **Transit Demand Far Exceeds Capacity** – Demand is 10x higher than available services, especially in Cass County.
- **Grocery & Essential Trips** – Food access is a major issue, but transit focuses mostly on medical/work trips.
- **Disaster Response Weaknesses** – No coordinated plan for getting people to FEMA shelters, cooling centers, warming shelters.
- **Extreme Weather Impacts** – Winter causes more cancellations; heat does not reduce demand, but cooling shelter access is missing.
- **Funding Challenges** – Transit funding focuses on vehicles instead of operations; no money for flexible services.
- **Transit Zone Gaps** – New Census suburban/rural changes left areas without service coverage.
- **On-Demand Solutions Needed** – Expand micro transit, volunteer transit, and Uber/Lyft partnerships.

"There are **severe accessibility gaps for ADA/handicapped riders**. While New Growth Transit can **minimally accommodate individuals with walkers, service dogs, and oxygen tanks**, they **cannot transport individuals in wheelchairs** due to lack of vehicles equipped for this."

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Whole Person

- **Communication barriers in transportation**: Many deaf, deaf-blind, and blind individuals face challenges with transportation services due to reliance on voice calls instead of text, video phone, or email. Automated captions on buses, color coding bus lines, and real-time text notifications would enhance accessibility. “On public transportation, some drivers had communication boards with pictures and text to point at – which was helpful, but I haven’t seen those boards after the pandemic.”

- **Technology and navigation challenges**: Public transportation apps are often difficult for blind and low-vision individuals to use due to complex gestures, small buttons, and overwhelming interfaces. Clear, accessible routing options and a mix of audio and visual cues are needed.

- **Limited service coverage and alternative transportation gaps**: Rural transit options like OATS are underutilized due to unfamiliarity, and service reductions in areas east of Jackson County have further restricted access. Iris and paratransit services present additional challenges with pick-up locations and inconsistent communications.

“The number one challenge is communication and technology. **For deaf-blind/ deaf-low vision individuals, they often use their video phone to call and book a ride. Or app, text message, email, to communicate with transportation services. Often, transportation services will call a voice number, which deaf or deaf-blind individuals cannot answer.** This could be to notify of a delay, schedule change, or cancellation, but because it's not sent to a text or video line, they miss the message.”

National Federation of Blind: KC Chapter

- **Transit Service and Route Cuts**: Concerns about discontinued Metro Flex service south of 298 and reduced access to key locations (such as Walmart) making transportation unreliable and inefficient
- **Limited and Unaffordable Transportation Options**: IRIS and rideshare options are not practical either due to affordability, accessibility, or safety. Paratransit is often unreliable, and bus routes are being cut without sufficient alternatives offered on former lines.
- **Accessibility and Safety Issues**: Difficulty reaching transit stops safely due to lack of pedestrian infrastructure, crossings, and lights. Wheelchair/walker users and guide dog owners face additional barriers with service denial and inconsistent policies.
- **Poor Communication and Last-Minute Changes**: Riders often learn about route changes and cancellations after the fact, with inadequate notifications and a lack of public input in decision-making
- **Inadequate Emergency Preparedness:** Limited support for transportation-dependent residents on a normal day, let alone during extreme weather or hazards. Poor coordination and responsiveness from transit agencies despite community advocacy efforts.
- **Need for Investment and Accountability**: Better routes, improved communication, and collaboration between agencies/jurisdictions are needed instead of shifting the responsibility to others.

> "With the IRIS system, a lot of us don't have the ability to get there in time to catch those– if we can even find it based on the map. **Problematic on a good day. On a bad weather day, it's not even an option.**

Grant Proposal

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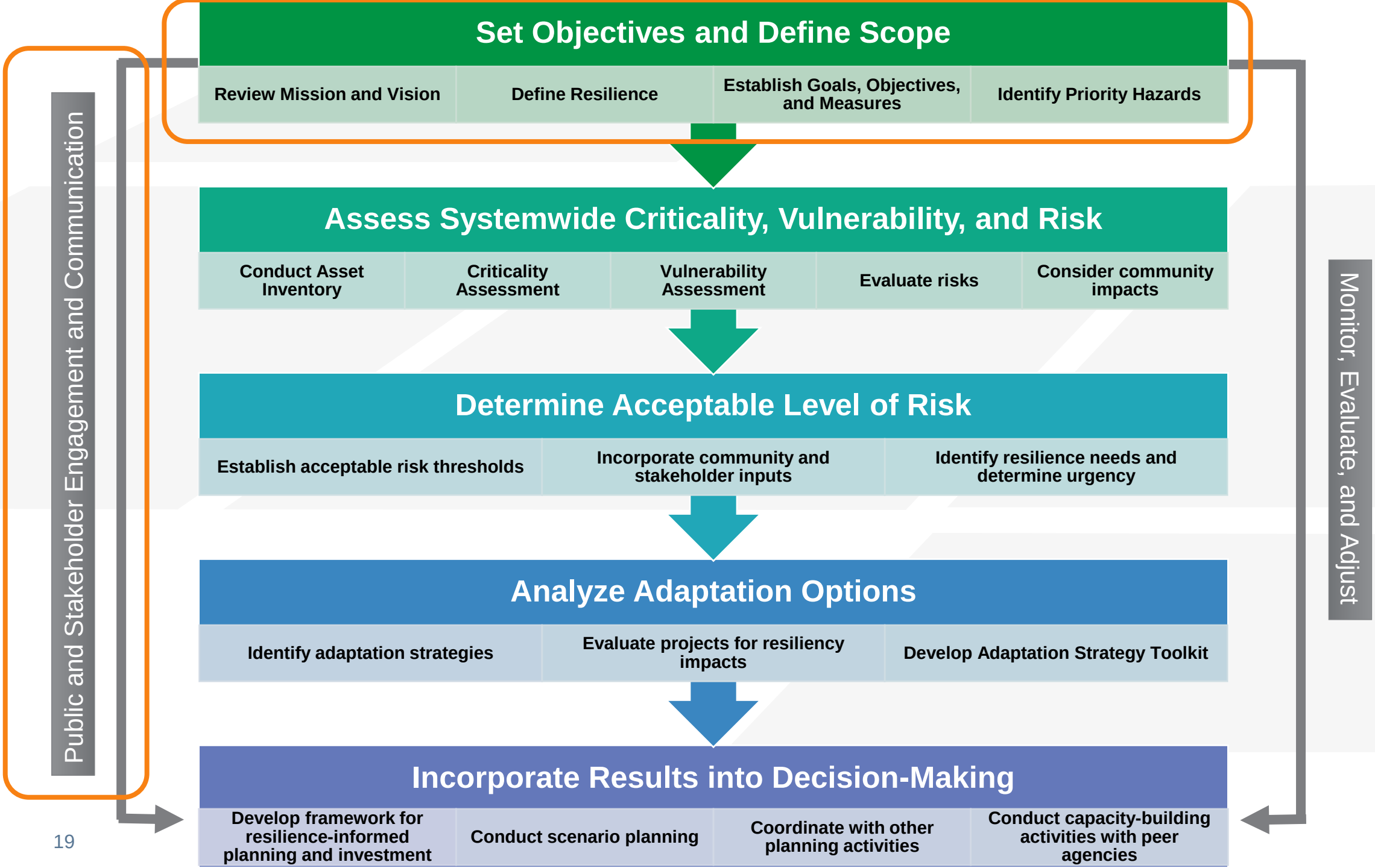
Set Objectives and Define Scope
Review Mission and Vision
Define Resilience
Establish Goals, Objectives, and Measures
Identify Priority Hazards
Assess Systemwide Criticality, Vulnerability, and Risk
Conduct Asset Inventory
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Public and Stakeholder Engagement and Communication
Monitor, Evaluate, and Adjust

Assess Systemwide Criticality, Vulnerability, and Risk

The Steering Committee recommended prioritizing critical infrastructure – bridges, levees, rail lines, airports, and ports– which require a long-term multisector approach to funding, maintenance, and development.

Product	Process
Asset Inventory	Utilize geospatial data t… based on their impact w…
Criticality Assessment	Identify and prioritize assets based on their criticality to the regional transportation network
Vulnerability Assessment	Use Asset Inventory and Hazard Identification data to identify which assets, corridors, and neighborhoods are most vulnerable to extreme weather events
Evaluate Risks	Quantitative and monetized methodologies to estimate the potential economic, operational, and social costs of infrastructure failures; categorize in a tiered system for evaluating the highest priority threats by likelihood, consequence, and vulnerability
Consider Community Impacts	Assess the consequences of how neighborhoods would be impacted by disruptive events by criteria such as socioeconomic vulnerability

Determine Acceptable Level of Risk

Product	Process
Establish Acceptable Risk Thresholds	Use results of Risk Identification an Impacts and community and stakeh priorities in risk mitigation
Identify Resilience Needs and Determine Urgency	Utilize a multi-criteria analysis tailor jurisdictions prioritize resilience investments a policy actions

Residents shared that extremely cold weather made waiting for the bus less comfortable, and biking or walking more dangerous.

Analyze Adaptation Options

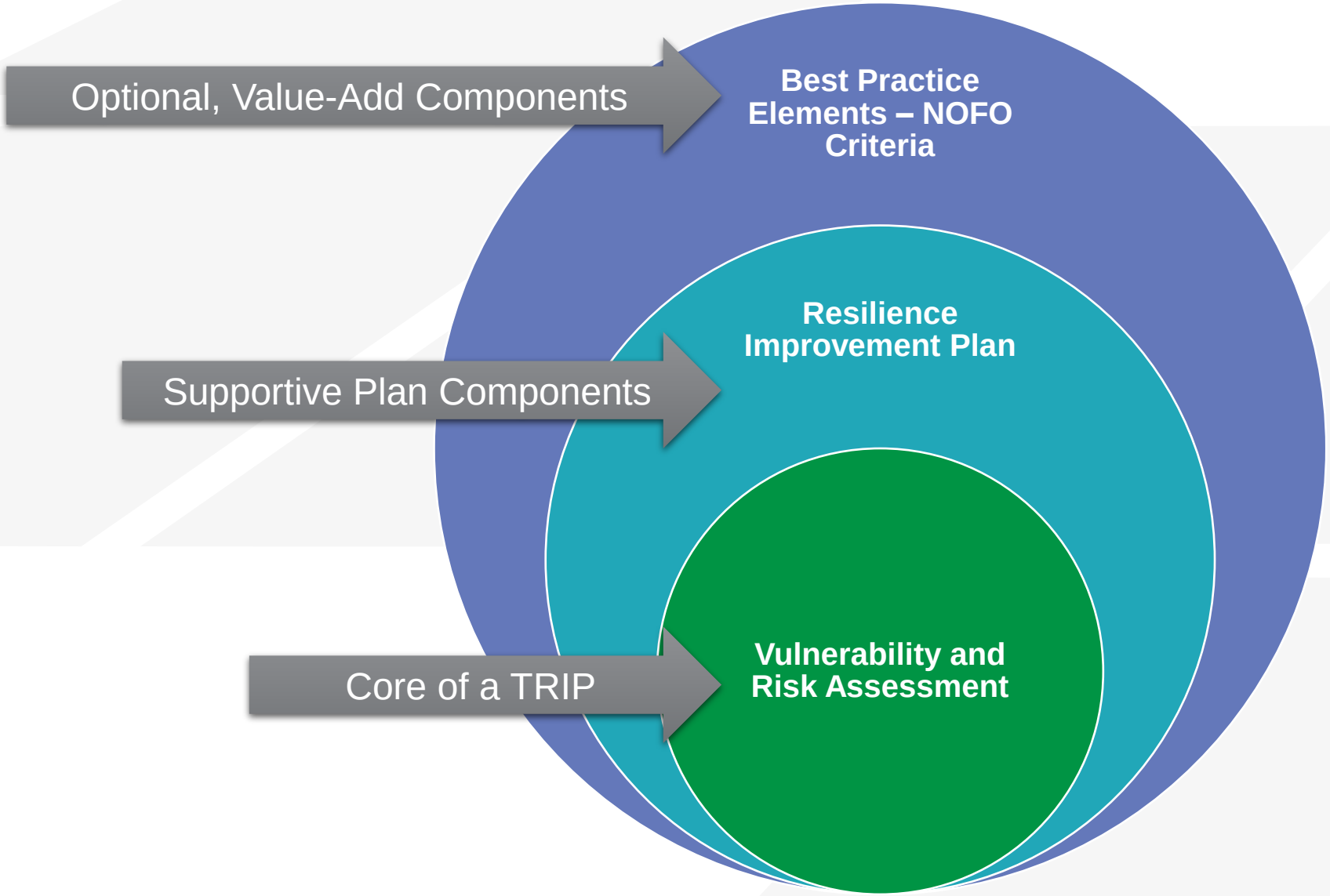
Product	Process
Connections to Regional Planning	Identifies opportunities to improve areas with limited mobility options
Freight Connectivity and Economic Opportunities	Utilize results of MARC's Freight Resilien[illegible] to minimize the supply chain and cascading economic impacts of disruptive events
Adaptation Strategy Toolkit	Outlines potential resilience strategies and how to select the optimal intervention based on the Recommendations; draw upon previous work such as MARC's green stormwater design study
Project Prioritization	Establish clear criteria for prioritizing resilience improvements using both the quantitative outputs from the risk-based vulnerability assessment and multi-criteria evaluation for integrating agency priorities (such as asset criticality)

Many organizations highlighted workforce development needs, emphasizing that inconsistent access to transportation prevented their clients from reaching their jobs.

Incorporate Results into Decision-Making

Product	Process
Framework for Resilience-Informed Planning and Investment	Resiliency flow chart to illustrate how to integrate resilience into MARC's project planning and management process, which includes potential steps to be taken in planning, project development and environmental review, design and engineering, etc.
Disruption Scenarios	Use "big data" to ground truth observed personal travel patterns and usage characteristics of key assets across a variety of dimensions as well as truck flow data
Coordinate with Other Planning Efforts	The Resilience Improvement Plan should complement and build upon previous and ongoing initiatives such as asset management, hazard mitigation, freight planning, carbon reduction, and more
Conduct Capacity-Building Activities with Peer Agencies	Provide training on key resilience concepts through real world examples of resilience-informed investment and project development

Core and Supportive Elements of a Transportation Resilience Improvement Plan (TRIP)



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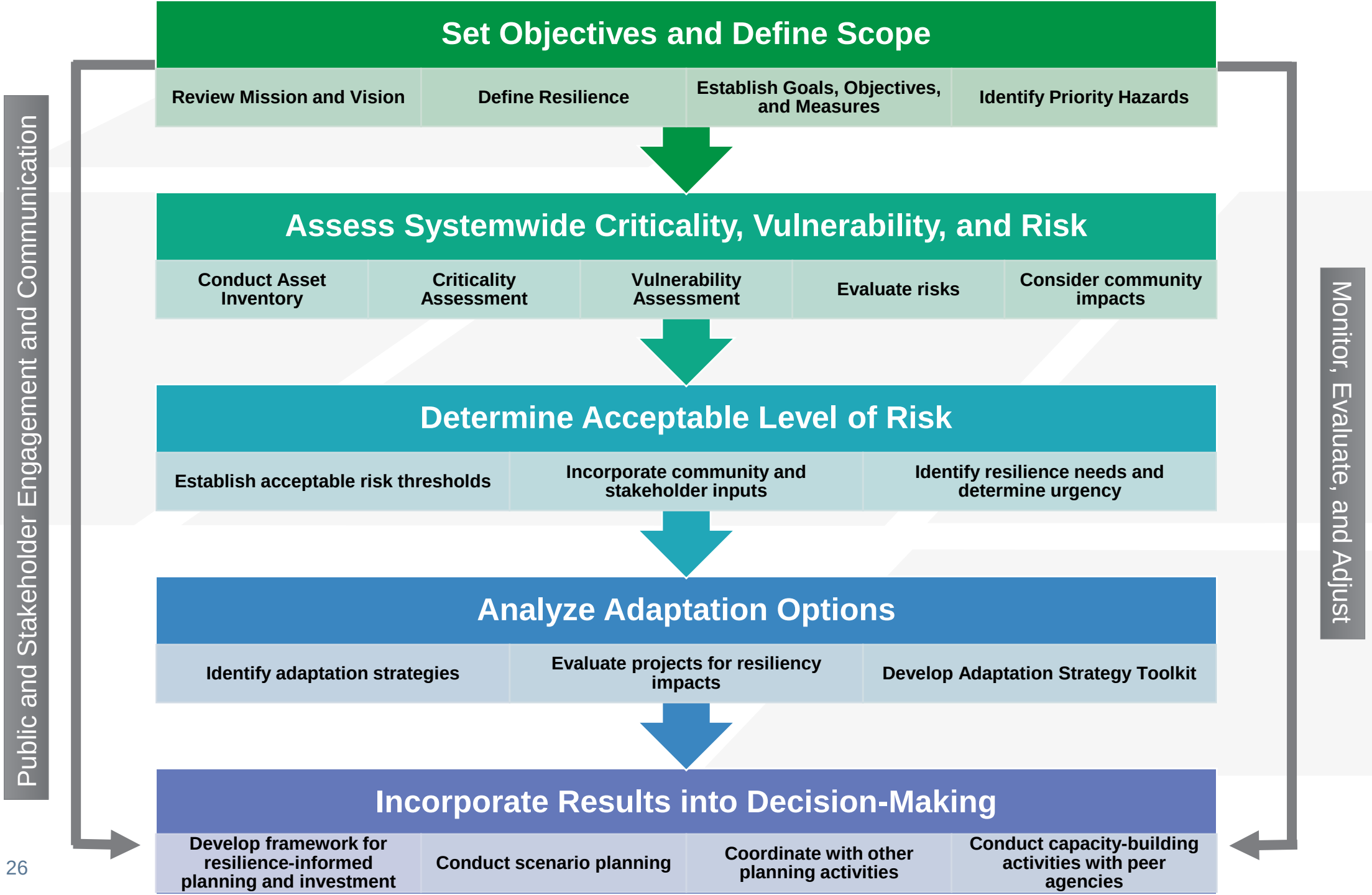
Expanding Resilience Planning through Data, Tools, and Disruption Scenarios

Product	Process
Enhanced Travel Demand Model	Integrate data sets related to climate hazards, historical disaster data, etc. to improve modeling predictions and assess infrastructure risks
Link-Level Disruption Scenarios	Assess recovery sequencing and prioritization of assets at the corridor level to help MARC and partner agencies identify and prioritize high-risk network
Network-Level Disruption Scenarios	Use Trav assets s chokepo
Stranded Zones Analysis	Use mod risk of disruption and severely long detours during an extreme weather event
Resilience Hub Siting	Use data and partner feedback to identify optimal locations for resilience hubs—community-centered facilities that provide essential services, resources, and shelter before, during, and after extreme weather events

Gaps in coordination between transit agencies and persistent safety challenges weaken the reliability of transit, especially during extreme weather events. These issues are further exacerbated in rural areas and for individuals with mobility challenges.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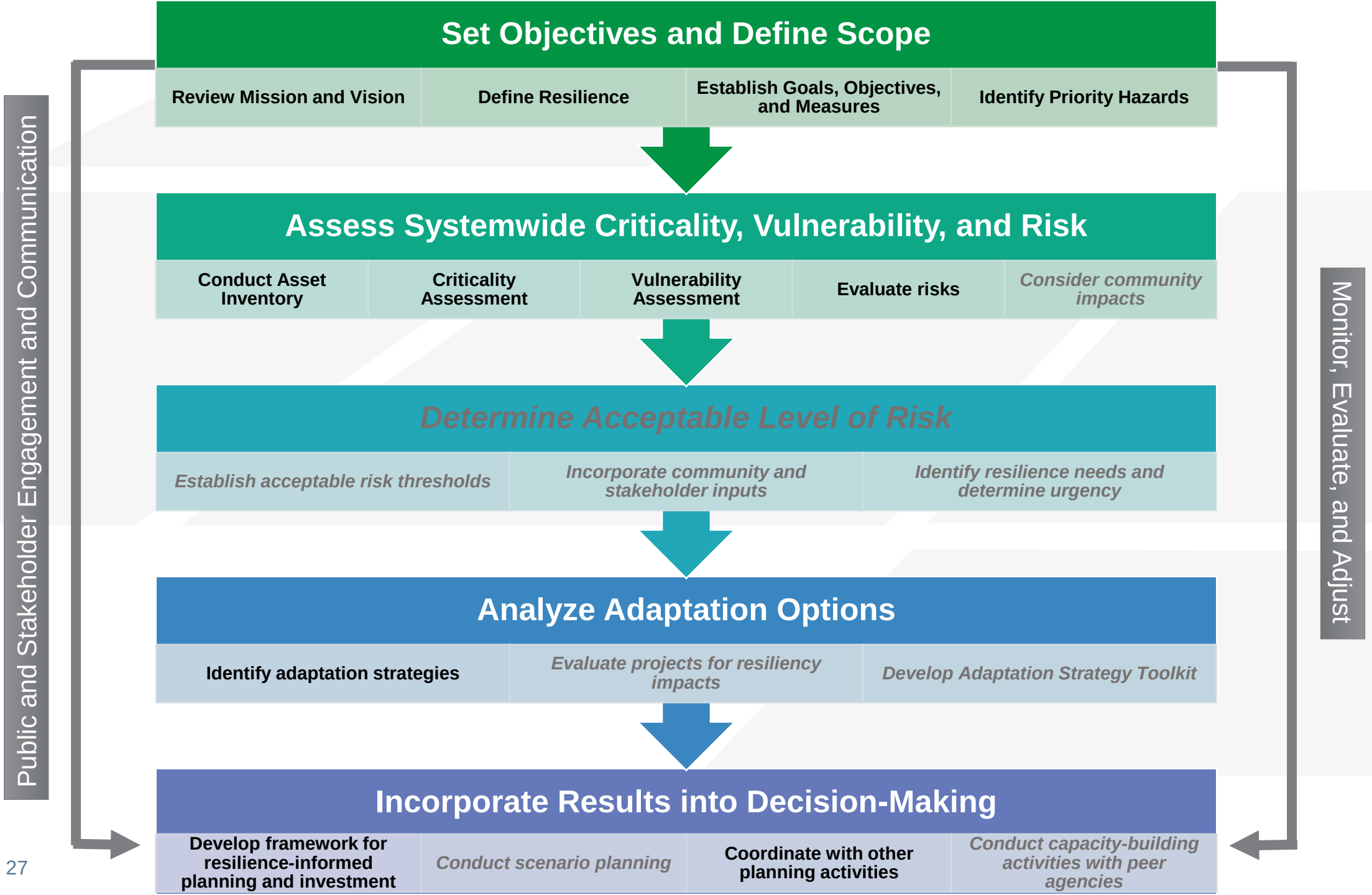
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Dialogue / Questions

- Do you have any feedback on the framework of the proposal?
- Are there specific elements that you think should be prioritized?
  - What optional elements are most impactful to your work and the community you represent?
  - If you're interested in capacity building activities, what workshop topics would be of most interest for you in the Transportation Resilience KC Academy?

Criticality Determination

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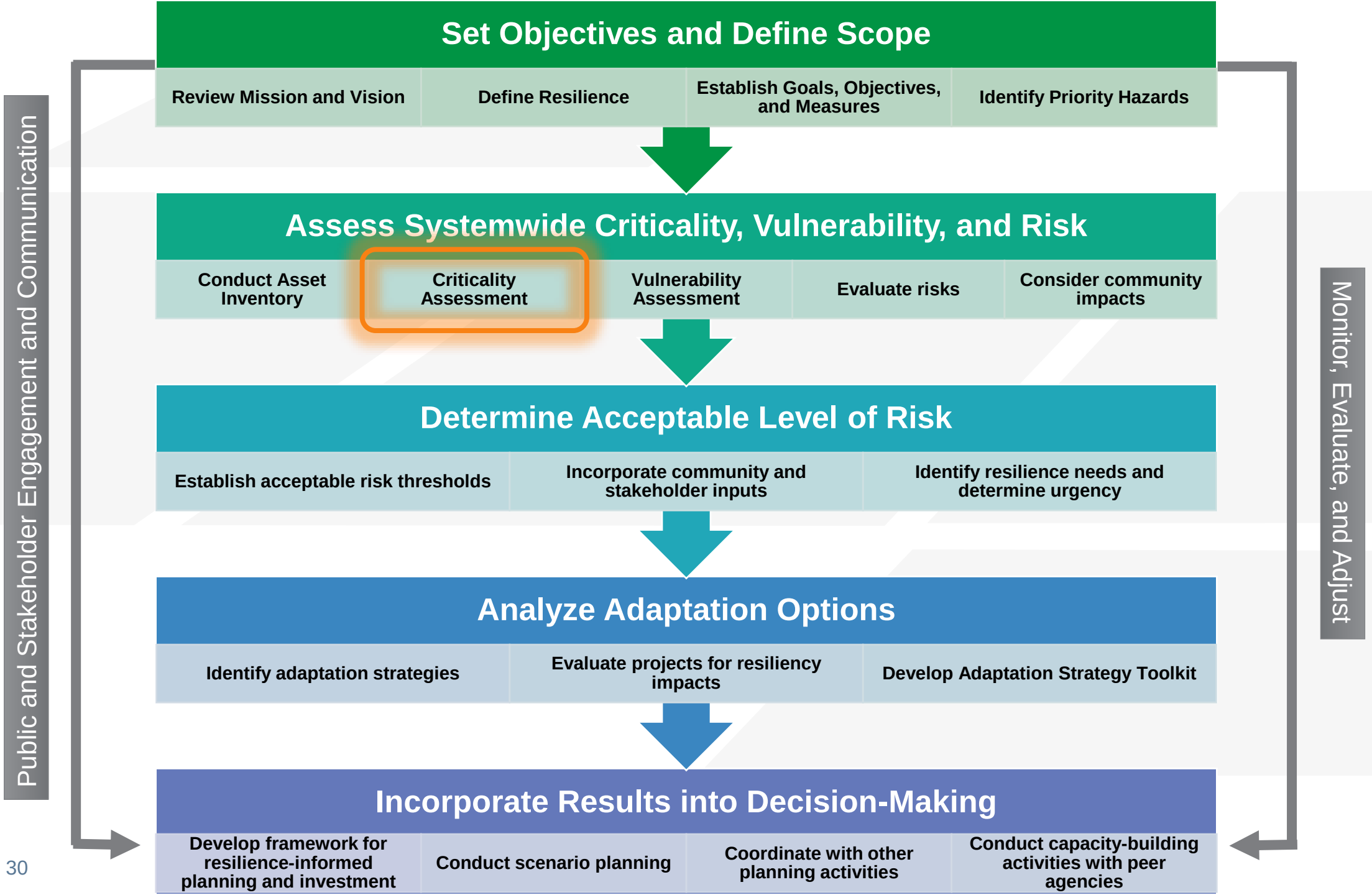
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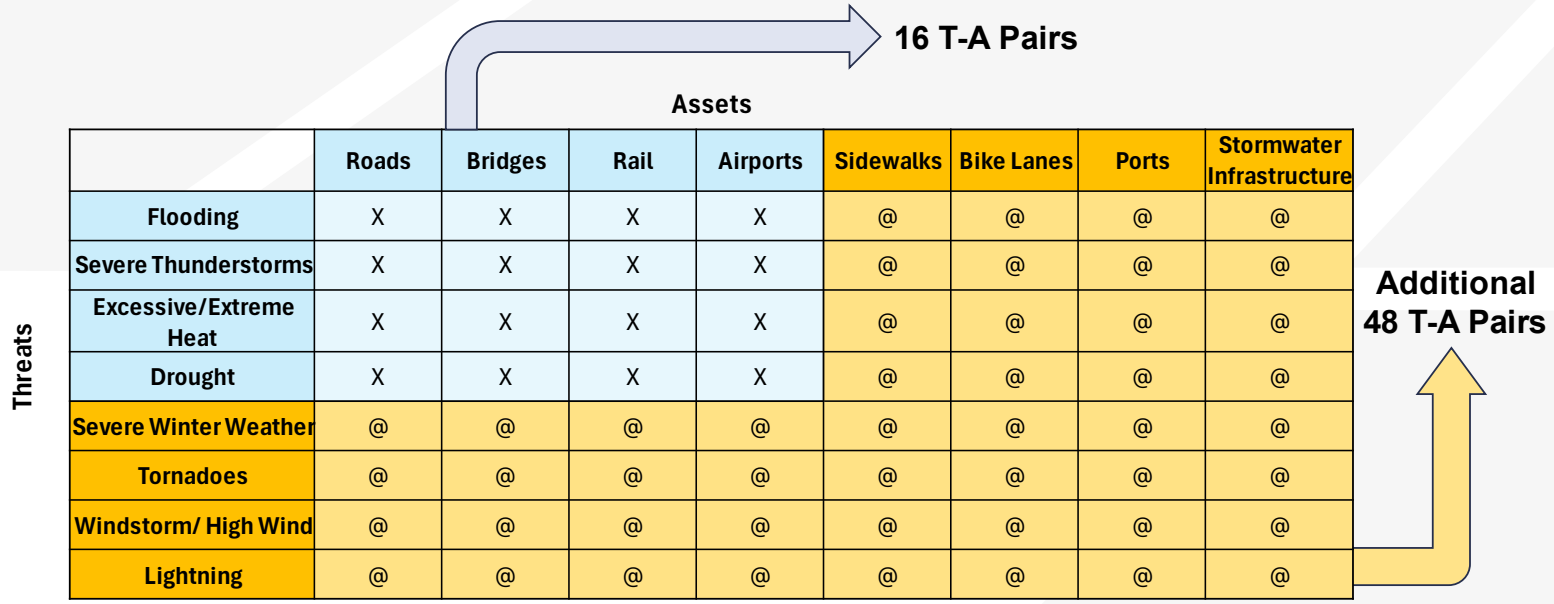
Criticality Determination

What is criticality?

- An essential step in resilience planning to ensure MARC's infrastructure investments are responsive to the needs of its population.
- USDOT definition: the importance of a project in supporting the continued operation or rapid recovery of crucial local, regional, or national surface transportation assets and facilities served by those assets in the community.
- FHWA recommends that agencies limit the asset list at the outset in order to ensure adequate consideration of the assets that are deemed "critical" in subsequent steps
- Criticality factors are custom to each region, address a region's unique priorities, considerations, and strengths.
- Can be used as a screening tool or a prioritization tool.

Example of Screening Tool

- Screening tool: Establish minimum thresholds or benchmarks (e.g., determining whether local roads or shared-use/bike paths should be included), ensuring that all relevant assets are considered in the assessment.



	Roads	Bridges	Rail	Airports	Sidewalks	Bike Lanes	Ports	Stormwater Infrastructure
Flooding	X	X	X	X	@	@	@	@
Severe Thunderstorms	X	X	X	X	@	@	@	@
Excessive/Extreme Heat	X	X	X	X	@	@	@	@
Drought	X	X	X	X	@	@	@	@
Severe Winter Weather	@	@	@	@	@	@	@	@
Tornadoes	@	@	@	@	@	@	@	@
Windstorm/ High Wind	@	@	@	@	@	@	@	@
Lightning	@	@	@	@	@	@	@	@

Potential Scoping Factors: Project Resources, Data Availability/Suitability, Regional Consequences.

Example of Prioritization Tool

- Prioritization tool: Facilitates the comparison and ranking of assets based on their significance.
  - » For example, distinguishing between major arterial roads and connectors, or comparing assets with differing traffic volumes, such as an Average Annual Daily Traffic (AADT) of 5,000 versus 50,000..

Risk	Criticality: Low	Criticality: Moderate	Criticality: High
High	High Risk Low Criticality	High Risk Moderate Criticality	High Risk High Criticality
Moderate	Moderate Risk Low Criticality	Moderate Risk Moderate Criticality	Moderate Risk High Criticality
Low	Low Risk Low Criticality	Low Risk Moderate Criticality	Low Risk High Criticality

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Tiering / Prioritization Example 1

Ulster County Transportation Council MPO

- Tiering approach: Tier 1 Assets, Tier 2 Assets and Essential Facilities.

TIER 1

- **Disruption will cause a regional Impact.**
- **Roads, Bridges and Bus Routes**
- **Exposure, Sensitivity, Adaptive Capacity**

TIER 2

- Disruption impact is localized and minimal
- Railroad Lines, County Trails, Other Transportation Facilities, Dams and Levees, Culverts, Stormwater Infrastructure
- Exposure Only

Essential Facilities

- Integrated into criticality score of Tier 1 assets
- Schools, Shelters, Hospitals, Fire Stations, Police Office, Emergency Response Center, Substations, Other Transportation Facilities

Tiering / Prioritization Example 2

Indianapolis MPO

Mobility and Use: Asset usage and operational importance assessed by considering the volume and type of traffic along each transportation asset.

Equity and People: Socioeconomic importance assessed by considering surrounding population and employment composition and density.

Connectivity: Considers how each transportation asset connects to other transportation options and key destinations, particularly those that contribute to a communities and residents' health and safety and means to travel along non-roadways.

Qualitative and Quantitative Assessment

Hybrid approach to how MARC can apply criticality determination in the Natural Hazard Transportation Risk Assessment

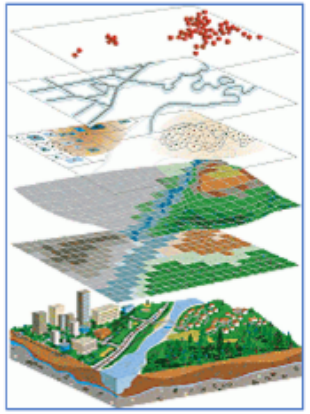
Qualitative Assessment

- Stakeholder and practitioner input.
- Persistent flooding locations
- Leveraging prior planning work (Current LRTP, hazard mitigation and local mitigation strategies)

Incorporating stakeholder input into quantitative assessment

Weighting facilities/locations based on stakeholder input

Quantitative Assessment



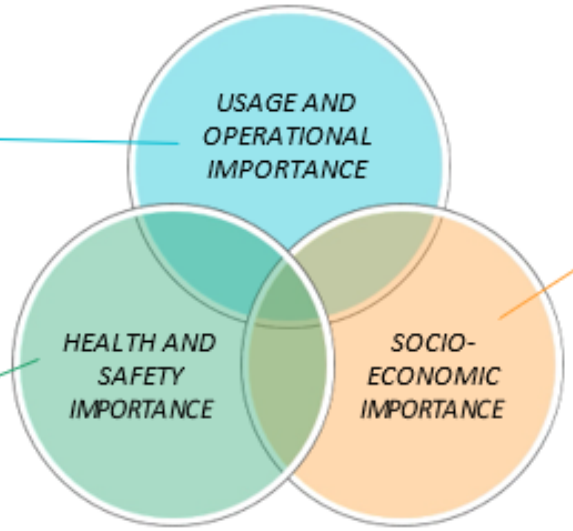
- GIS-based Quantitative Analysis
- Context Sensitive Criticality Construct (Transportation disadvantaged population, tourism, social & economic importance)
- Sensitivity, exposure level and adaptive capacity

Supporting Image Sources: Sustainable Convos, Northern Arizona Healthcare

Proposed Indicators that signify the importance of MARC's transportation assets

The degree of importance that an asset is to the overall function of the transportation system.

The degree of importance that an asset is to providing access to the health and safety facilities.



The degree of importance that an asset is to serving people and businesses, including underserved or disadvantaged communities.

Usage and Operational

- Evacuation Routes / Lifelines
- Functional Class
- AADT
- Freight Network
- Transit Corridor
- Broadband Network

Socioeconomic Importance

- Equity Areas
- Population Density
- Employment Density

Health and Safety Importance

- Access to Dams
- Access to Fire or Police Stations
- Access to Hospitals
- Access to Schools
- Access to Emergency Shelters
- Access to Power plants
- Access to Transit Centers
- Access to Airport
- Access to Grocery Stores
- Connection to bikeways, sidewalks

Dialogue / Questions

- What assets are most critical to your community?
  - Assets may include roadways, bridges, rail, airports, transit lines, bike lanes / sidewalks, seaports or stormwater infrastructure
  - How do you make this determination?
- What factors are most important in prioritizing assets?
  - For example, if an asset is in a low-income community or stranded zone, if it has high levels of freight volume or daily passenger traffic, if it is on an emergency/evacuation route, etc.

Next Steps

- Presently there is no dedicated funding source to continue the development of a complete Resilience Improvement Plan for the region.
- Should there be an effort to move forward with the development of a complete plan? If so, how?
  - » Workshops, local sponsorship, tool development, etc.
- Updates on the advancement of this work will be provided at TTPC

Thank you!

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