C-1. AIR QUALITY

POLICIES

MTP Reference #	Air Quality
AQ3-001	Pursue successful transportation Conformity determinations of the Metropolitan Transportation Plan and Transportation Improvement Program consistent with federal and state guidelines.
AQ3-002	Provide technical assistance and analysis to attain and maintain National Ambient Air Quality Standards and reduce negative impacts of other air pollutants.
AQ3-003	Support and implement educational, operational, technological, and other innovative strategies that improve air quality in North Central Texas, including participation in collaborative efforts with local, regional, state, federal, and private sector stakeholders.
AQ3-004	Adopt and implement an idling restriction ordinance, or any other idling restriction measure, to reduce idling within local government jurisdictions as consistent with Regional Transportation Council Resolution R21-06.
AQ3-005	Promote adoption and implementation of an ordinance or guidelines similar to an ordinance that promote sustainable tire disposal practices, including recycling.
AQ3-006	Revise the Dallas-Fort Worth Air Quality Improvement Plan and implement measures to support the attainment and maintenance of the National Ambient Air Quality Standards and reduce greenhouse gases. Includes pursuing funding for implementation as needed.
AQ3-007	Adopt and implement various measures in the Dallas-Fort Worth Air Quality Improvement Plan to reduce greenhouse gases and attain and maintain the National Ambient Air Quality Standards.
AQ3-008	Pursue and partner with local governments and other stakeholders to secure funding for the purchase and installation of additional non-regulatory monitors. The focus is on addressing air quality community impacts and public health and providing information about the current air quality status in each monitor's respective area.
CF3-001	Participate in initiatives to support improved energy integration and resiliency, and increased energy efficiency.
CF3-002	Required for clean fleet funding as contained in Regional Transportation Council Resolution R14-10 or subsequent updated resolution. Establish a framework for reducing emissions, transitioning to alternative fuel and lower-emitting vehicles, reducing fuel consumption, participating as a stakeholder in Dallas-Fort Worth Clean Cities, and training staff.
CF3-003	Support and implement strategies that promote alternative fuel infrastructure development, including adoption of best practices in regulatory approaches (e.g., codes and ordinances) and participation in collaborative efforts with local and regional stakeholders.
CF3-004	Participate in initiatives to support community readiness for the safe deployment of zero-emission and advanced transportation technologies.

PROGRAMS

Air Quality Initiatives: Conventional Vehicle and Equipment Emissions Reduction	
Reference	AQ2-001
Background	Initiatives to reduce emissions from conventionally fueled (diesel, gasoline, others) consumer and commercial vehicles. Provide technical assistance, education, and best practices, and/or share and collect data to support local governments, state and federal entities, businesses, and other community stakeholders to facilitate deploying, operating, and maintaining lowest-emissions and efficient vehicles and technologies.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles.
Related Policies	CF3-001; CF3-002; AQ3-003; AQ3-004; AQ3-005
Implementation	Implement initiatives and strategies to increase the efficiency and reduce the emissions impacts of local fleets. Efforts may target light-, medium, and heavy-duty on-road vehicles and non-road equipment and involve conventional fuel types. Staff identifies and pursues opportunities to improve efficiency, reduce emissions, and increase consumer options for the cleanest available technologies, especially zero-emission vehicles. These consumer efforts are often educational in nature, either by educating consumers or educating organizations that directly interact with consumers (e.g., car dealerships or repair facilities). Strategies to increase enforcement of vehicle emissions-related offenses, programs, and policies to improve overall air quality. Example efforts include the North Central Texas Council of Governments Emissions Database, Regional Emissions Enforcement Program, Regional Smoking Vehicle Program, Car Care Awareness, Engine off North Texas, Saving Money and Reducing Truck Emissions, etc.
Performance Dimensions	• Number of fleets adopting a policy consistent with the Regional Transportation Council-recommended idle restriction measures • Number of entities and local governments adopting best practices like idle restrictions, tire disposal programs, or clean fleets • Number of technical and planning assistance requests • Number of meetings and webinars hosted • Number of participants in webinars and trainings • Number of projects conducted and/or reports written • Number of educational and awareness events attended
Cost Estimate	Approximately $38.7 million

Air Quality Initiatives: Grants Program	
Reference	AQ2-002
Background	Pursue competitive grants and provide financial support to local stakeholders in transitioning to the cleanest available transportation technologies.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles.
Related Policies	CF3-001; AQ3-003
Implementation	Staff identify and pursue opportunities to improve efficiency, reduce emissions, and increase consumer options for the cleanest available technologies, including conventionally fueled vehicles and alternatively fueled vehicles. Provide fleets with technical support and assistance, as well as educational webinars on advanced clean vehicle technologies. Provide financial support (e.g., grants or rebates) when resources allow, and provide application assistance to fleets seeking funding from programs offered by other agencies.
Performance Dimensions	• Number of grant applications submitted to secure additional funding • Number of technical and planning assistance requests • Number of meetings and webinars hosted • Number of participants in webinars and trainings • Number of funding opportunities offered • Number of clean technology activities funded (e.g., diesel truck replacements)
Cost Estimate	Approximately $48.2 million

Air Quality Technical Planning and Analysis	
Reference	AQ2-003
Background	Responsibility for air quality planning of Transportation Conformity, detailed forecasted emission inventories for inclusion into the State Implementation Plan, and technical air quality analyses to support emission reductions within the region. Efforts also include collaborations with local governments to provide data and peer exchange related to air quality issues to help them make decisions about appropriate action steps to take within their jurisdictions. Includes pursuing funding as needed.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles.
Related Policies	AQ3-001; AQ3-002; in response to applicable federal requirements, conduct necessary emissions analysis and provide technical assistance in air quality planning and control strategy evaluation.
Implementation	Provide general air quality technical assistance locally to the general public and regional governments; statewide to other nonattainment areas, the Texas Department of Transportation, and the Texas Commission on Environmental Quality; and nationally to the Federal Highway Administration, the Federal Transit Administration, and the Environmental Protection Agency. Monitor, review, and respond accordingly to federal and statewide air quality rules impacting North Central Texas. Support the state air quality planning process by developing accurate estimates of emissions through the completion of mobile emission inventories and other technical studies applicable for the region's State Implementation Plan for the 8-Hour Ozone National Ambient Air Quality Standards. Ensure, through the Transportation Conformity process, transportation plans, programs, and projects implemented in the Dallas-Fort Worth ozone nonattainment area meet federal and state air quality requirements. Ensure project and program modifications to the Transportation Improvement Program meet Transportation Conformity requirements.
Performance Dimensions	• Receipt of favorable conformity determinations • Environmental Protection Agency approval of State Implementation Plan revisions • Actively responding to federal and statewide proposed rules
Cost Estimate	N/A – Program costs associated with planning elements only

Performance Measurement Frameworks Program	
Reference	AQ2-004
Background	Support and implement new performance measurement frameworks that further the implementation of performance-based transportation planning processes.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles.
Related Policies	AQ3-006, AQ3-007; in response to applicable federal requirements, conduct necessary emissions analysis and provide technical assistance in air quality planning and control strategy evaluation.
Implementation	Implementation will include the following: establishment of reliable sources of data for calculating metrics and processes to ensure data is continuously updated, accurate, and accessible; defining goals and objectives, aligning them with specific measurable objectives and establishing targets for each performance measure; analyzing and assessing performance by reviewing data metrics, summarizing current performance relative to targets, and evaluating effectiveness of existing projects in meeting regional goals; integrating with project selection and prioritization by identifying projects that best contribute to achieving the defined goals and objectives and incorporating performance targets into funding decisions, ensuring resources are allocated toward projects with high potential to meet established goals; communicating performance outcomes regularly to maintain transparency and build support for the program, including annual reports and public dashboards displaying progress toward goals and highlight areas of success or improvement; and ongoing monitoring of performance data to address progress and, if needed, adjustment to respond to evolving transportation needs, technological advances, and emerging data sources.
Performance Dimensions	• Data update frequency and accessibility • Percentage of goals with measurable objectives and milestone completion • Target attainment rates and performance assessment frequency • Funding allocation toward priority projects • Report frequency and website/dashboard engagement analytics • Rate of adaptive improvements
Cost Estimate	N/A – Program costs associated with planning elements only

Regional Air Quality Monitoring Program	
Reference	AQ2-005
Background	Pursue federal, state and local funding opportunities, including grants; develop collaboration that includes local governments, technology companies, and industry leaders; create recommended regional monitoring technology standards; and build/maintain public-facing online platform to display real-time air quality data collected from monitors.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles. Pursue long-term sustainable revenue sources to address regional transportation system needs.
Related Policies	AQ3-003, AQ3-008
Implementation	Implement program that provides regional funding, technology recommendations, and best practices for installation of non-regulatory air quality monitors. Staff will identify and pursue federal, state, and local funding opportunities, including grants, for the purchase and installation of monitors with approved technological standards by a task force or committee, which will be a collaboration with local governments, technology companies, health officials, academic representatives, and industry leaders. Staff will work with technical experts to select and procure high-quality monitors and ensure proper installation and maintenance of the monitors to guarantee accurate and reliable data collection. Staff will work with a task force to build and maintain a public-facing online platform to display real-time air quality data collected from monitors. These monitors will improve spatial coverage and provide insight into the origin of air pollutants.
Performance Dimensions	• Number of approved non-regulatory monitors installed across region • Number of local government and stakeholder partnerships • Number of meetings hosted • Amount of grant funds received
Cost Estimate	Approximately $10 million

Regional Scrap Tire Abatement Program	
Reference	AQ2-006
Background	Program to mitigate scrap tire issue by developing measures to prevent illegal dumping and promote clean-up: to include collaboration with local governments, agencies, and private partners to facilitate the proper disposal of waste tires, educate on proper tire disposal practices, and assist in waste tire cleanup efforts; support local governments in collecting and properly disposing of old tires, educate the public on scrap tire waste, and promote the proper disposal of waste tires; engage with local governments to determine the current size and scope of the issue, including an assessment of current scrap tire waste policies and efforts across the region and the health implications associated with waste tires; host a regional scrap tire task force to encourage regional collaboration; legislative review and recommendations; partnerships with stakeholders to determine preventative and proactive waste tire measures; public outreach and education campaign; work with local tire shops to determine best course of action and streamline the tire disposal process; fundraising events.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles.
Related Policies	AQ3-005
Implementation	Engage with local governments to determine the current size and scope of the issue, including an assessment of current scrap tire waste policies and efforts across the region and the health implications associated with waste tires; hosting a regional scrap tire task force to encourage regional collaboration; legislative review and recommendations; partnerships with stakeholders to determine preventive and proactive waste tire measures; carry out scrap tire collection events; public outreach and education campaign; work with local tire shops to determine best course of action and streamline the tire disposal process; fundraising events.
Performance Dimensions	• Number of scrap tires collected and events conducted • Number of local government and stakeholder partnerships • Number of meetings and webinars hosted • Number of participants at education events • Number of pledges from tire shops to reduce tire waste • Number of local governments adopting and/or updating policies addressing tire waste reduction • Number of projects conducted
Cost Estimate	Approximately $10 million

Alternative Fuel Infrastructure Development Program	
Reference	CF2-001
Background	Planning and deployment of alternative fuel refueling or recharging infrastructure enables adoption of lower-emitting alternative fuel vehicles by increasing availability of fueling infrastructure. Emphasis is placed on the fuel types that most enable reduced emissions, particularly hydrogen and electric charging, as those fuels enable zero-emissions vehicles. Includes collaboration with local governments, utilities, and businesses, regional planning, project implementation, and pursuit of funding opportunities to support infrastructure development.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles. Encourage livable communities which support sustainability and economic vitality.
Related Policies	CF3-003; CF3-004; AQ3-003; AQ3-006
Implementation	Staff works with community members, including public agencies, businesses, and utilities to facilitate best practices, peer sharing, and coordinated planning to support development of alternative fueling or electric vehicle charging infrastructure. This program can encompass sites that are publicly accessible, that support fleets (particularly medium- and heavy-duty fleets), that serve workplaces or multifamily properties, or that provide fueling or charging services in areas that lack alternative fuel infrastructure access. Planning efforts are informed by key national and state guidance such as the National Zero-Emission Freight Corridor Strategy, the Texas Electric Vehicle (EV) Charging Plan, and other blueprints, roadmaps, or similar documents that provide strategic direction for impactful infrastructure build-out. Both near-term and long-term planning priorities are informed by feedback received from public engagement efforts with residents throughout the region. A goal of this program is to ensure there is sufficient infrastructure to support alternative fuel vehicle adoption at a rate that exceeds the national average, as guided by tools such as the National Renewable Energy Lab's Electric Vehicle Infrastructure – Projection or others that may become available that present estimates of the amount of infrastructure needed. Work also includes support to the Texas Department of Transportation in implementation of the Texas Electric Vehicle (EV) Charging Plan/National EV Infrastructure Formula Program and collaboration on development of alternative fuel corridor nominations under the Federal Highway Administration Alternative Fuel Corridor Program, as appropriate. Staff also manage implementation and deployment of infrastructure projects when funding is available, including through the Charging and Fueling Infrastructure (CFI) Community Program, CFI Corridor Program, and Electric Vehicle Charger Reliability and Accessibility Accelerator Program. Includes the pursuit of funding as needed.
Performance Dimensions	• Number of technical and planning assistance requests • Number of meetings and webinars hosted • Amount of public input collected related to public-access infrastructure • Number of private or publicly accessible alternative fueling stations that support fleet transition from conventional fuels • Number of light-duty public and private EV charging stations, including those funded through federal programs such as the CFI Program, National Electric Vehicle Infrastructure Program, and Electric Vehicle Charger Reliability and Accessibility Accelerator Program • Number of medium-/heavy-duty public and private hydrogen fueling or EV charging infrastructure, including those funded through federal programs such as the CFI Corridor Program or National Electric Vehicle Infrastructure Program • Number of publicly accessible EV charging station projects that support increased resiliency and emergency preparedness of the regional EV charging station network • Percent of population living within a walkable distance of electric vehicle charging stations • Number of communities adopting a goal for long-range zero-emission infrastructure deployment
Cost Estimate	Approximately $264.6 million

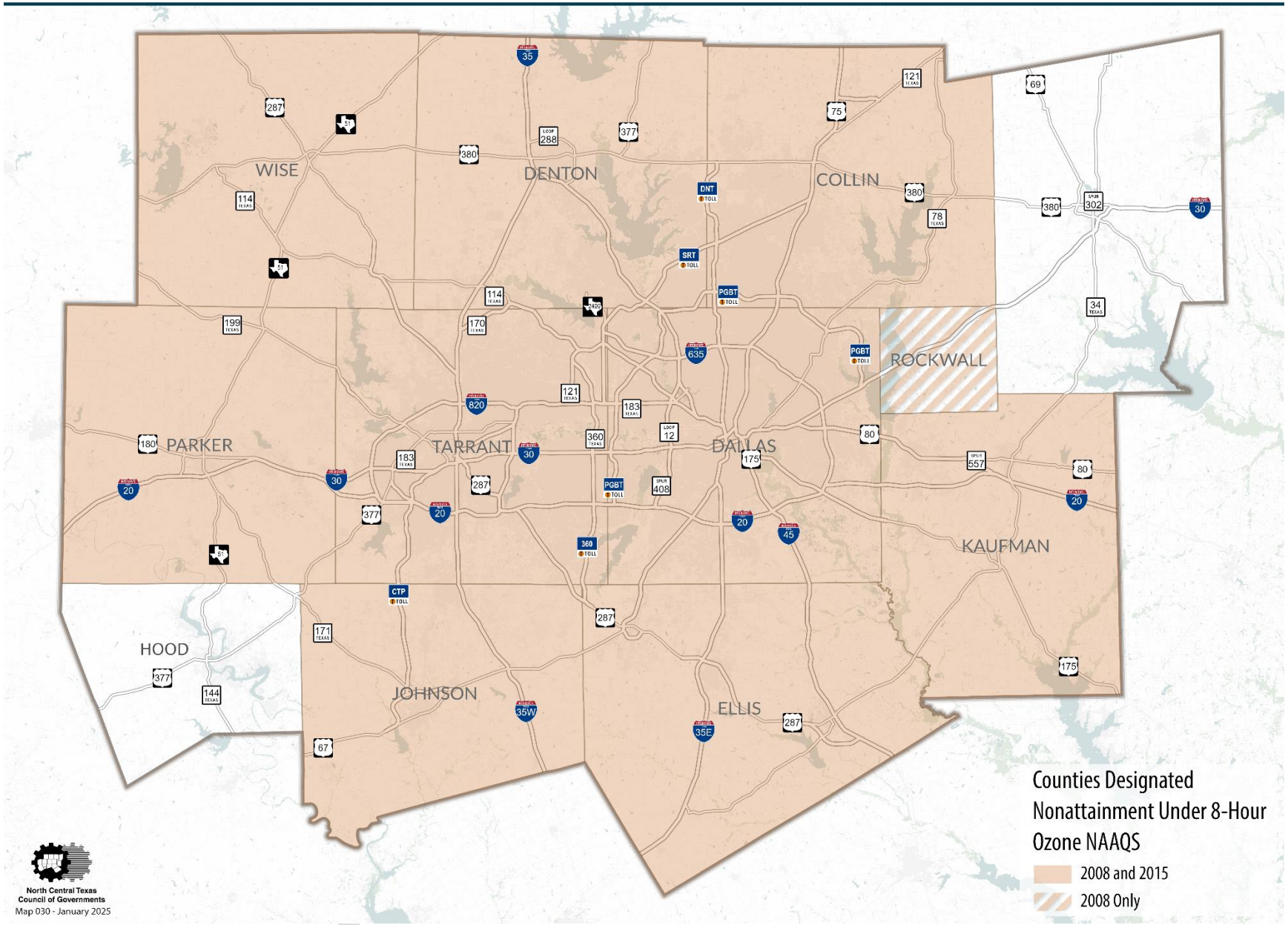
Dallas-Fort Worth Clean Cities Coalition	
Reference	CF2-002
Background	Reduce transportation energy use and improve air quality through providing guidance to fleets, drivers, and other stakeholders on alternative fuel and low-emitting vehicles/technologies, clean vehicle refueling infrastructure, and best practices around transportation-energy integration. Efforts include hosting educational events, ride-and-drives, facilitating working groups, supporting fleets in alternative fuel transition planning, and monitoring alternative fuel vehicle usage through an annual survey. Includes pursuit of funding as needed.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles.
Related Policies	CF3-001; CF3-002; CF3-003; CF3-004; AQ3-003; AQ3-006
Implementation	Staff provide guidance, best practices, and technical support and assistance to local fleets and consumers on alternative fuel and low-emitting vehicles/technologies and refueling infrastructure. This includes implementing initiatives and strategies to increase efficiency and reduce the emissions and energy impacts of local fleets. Implementation efforts may target light-, medium-, and heavy-duty on-road vehicles and non-road equipment and involve multiple fuel types. Additionally, staff will communicate relevant alternative fuel and transportation energy-related educational events and funding opportunities through regular emails, the Dallas-Fort Worth Clean Cities Coalition website, and a comprehensive funding website. Staff will host educational webinars, ride-and-drives, and facilitate working groups and meet with fleets and provide technical assistance as needed in support of fleets' efforts in alternative fuel transition planning. Conduct an annual survey to monitor alternative fuel vehicle usage in the region. Includes the pursuit of funding as needed to provide financial support (e.g., grants or rebates) and provide application assistance to fleets seeking funding from programs offered by other agencies.
Performance Dimensions	• Number of fleets adopting a policy consistent with the Regional Transportation Council-recommended Clean Fleet Policy • Recognition from formal partners in the form of Fleet Recognition Awards or a related program • Number of grant applications submitted to secure additional funding • Number of technical and planning assistance requests fulfilled • Number of meetings and webinars hosted • Number of participants in webinars and trainings • Number of fleets participating in the Dallas-Fort Worth Clean Cities Annual Survey • Increase in gasoline gallon equivalents, criteria pollutants, and greenhouse gases reductions year over year based on Dallas-Fort Worth Clean Cities Annual Survey • Number of funding opportunities offered or promoted • Number of clean technology activities funded (e.g., diesel/gasoline vehicle replacements)
Cost Estimate	Approximately $19.2 million

Technology Demonstration and Deployment	
Reference	CF2-003
Background	Support the demonstration and/or implementation of alternative fuel and low-emitting vehicles, infrastructure, and other emerging transportation technologies to improve local air quality, including participation with local, regional, state, and private stakeholders. Includes pursuit of funding as needed.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles
Related Policies	CF3-001; CF3-002; CF3- 003; CF3-004; AQ3-003; AQ3-006
Implementation	Staff support or lead the demonstration and/or implementation of alternative fuel and low-emitting vehicles/equipment/other emerging transportation technologies. Support can include partnering with local, regional, state, and private stakeholders. Includes the pursuit of funding as needed.
Performance Dimensions	• Successful demonstration of delivery of food with aerial drones and autonomous ground-robots through the Multimodal Drone Delivery Project • Number of grant applications submitted to secure funding for demonstration of new technologies • Number of new technologies deployed in the region • Number of technical and planning assistance requests fulfilled • Number of local projects supported • Number of funding opportunities offered or promoted
Cost Estimate	Approximately $42.6 million

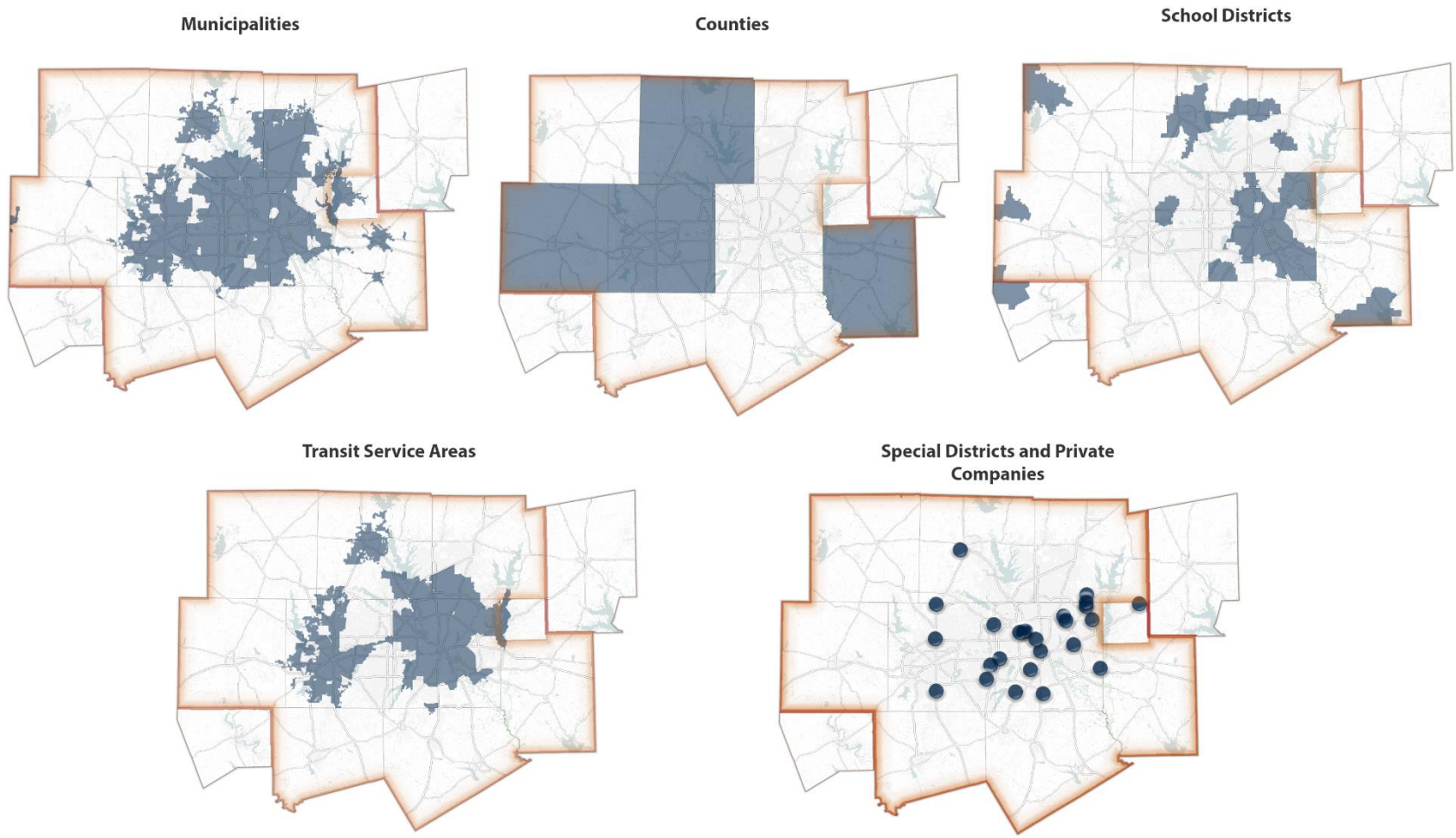
Energy Efficiency and Resilience Planning	
Reference	CF2-004
Background	Increasing energy efficiency and resilience related to transportation fuels, particularly regarding transportation electrification. Includes efforts to reduce energy consumption, support development of transportation fuels from renewable or waste feedstocks, and work to minimize negative electric grid impacts associated with transportation electrification. Involves coordination with a variety of community stakeholders, including local governments, utilities, and businesses. Includes pursuit of funding as needed.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles.
Related Policies	CF3-001; CF3-003; CF3-004; AQ3-003; AQ3-006
Implementation	Staff provide information on the importance of planning for grid outages and the various electric vehicle (EV) charging resiliency technologies to local governments and other stakeholders. Efforts include the hosting of webinars/workshops/whitepapers, the development of educational materials (flyers, websites, etc.), and the creation of a regional EV charging resiliency plan to ensure continuity of critical operations during grid outages. Efforts also include supporting local fleets in projects that expand the use of transportation fuels from renewable or waste feedstocks (i.e., renewable natural gas, renewable diesel/gasoline, biodiesel, ethanol, etc.). Includes the pursuit of funding as needed.
Performance Dimensions	• Development of regional EV charging resiliency plan to ensure continuity of critical operations during grid outages • Number of webinars and educational materials on the importance of planning for grid outages and the various EV charging resiliency technologies • Number of technical and planning assistance requests fulfilled • Number of local fleets using transportation fuels from renewable or waste feedstocks • Number of entities adopting renewable or energy efficiency strategies • Number of responses to the Local Government Energy Report
Cost Estimate	Approximately $27.1 million

Community-Readiness for Clean Transportation Technologies	
Reference	CF2-005
Background	Implementation of initiatives that can influence deployment of and readiness for adoption of the lowest emissions and highest efficiency technologies through measures such as policies, contractual or regulatory measures, training, or workforce development activities. Involves collaboration with various stakeholders, including local governments, utilities, colleges, technical schools, and businesses. Includes pursuing funding as needed.
Related Goals	Preserve and enhance the natural environment, improve air quality, and promote active lifestyles.
Related Policies	CF3-001; CF3-003; CF3-004; AQ3-003; AQ3-006
Implementation	Facilitating local government/stakeholder (i.e., utilities, colleges, technical schools, and businesses) best practices, peer sharing, and development of initiatives that support adoption of emissions-reducing technologies by consumers and fleets served by that local government/stakeholder. Efforts include encouraging local regulations that can facilitate build-out of infrastructure to support zero-emission vehicles (e.g., parking standards or codes related to electric vehicle-ready construction), including community participation in the Charging Smart Program, working with local businesses to install workplace charging, and supporting workforce development and first responder training to support clean transportation technologies, including college and technical school participation in the GUMBO Program. Peer exchange efforts include the Regional Integration of Sustainability Efforts Coalition and the Air Quality Health Task Force, and other similar initiatives or working groups. Includes the pursuit of funding as needed.
Performance Dimensions	• Number of technical and planning assistance requests • Number of meetings and webinars hosted • Number of communities participating in the North Central Texas Council of Governments Air Quality Health Task Force • Number of communities participating in the Regional Integration of Sustainability Efforts Coalition • Number of communities participating in the Charging Smart Program • Number of colleges or technical training facilities that implemented the GUMBO curriculum • Number of first responder trainings specific to alternative fuel vehicles • Number of communities adopting policies, ordinances, or other local measures recommended by the North Central Texas Council of Governments and/or the Regional Transportation Council
Cost Estimate	Approximately $17.3 million

8-Hour Ozone NAAQS Nonattainment Areas



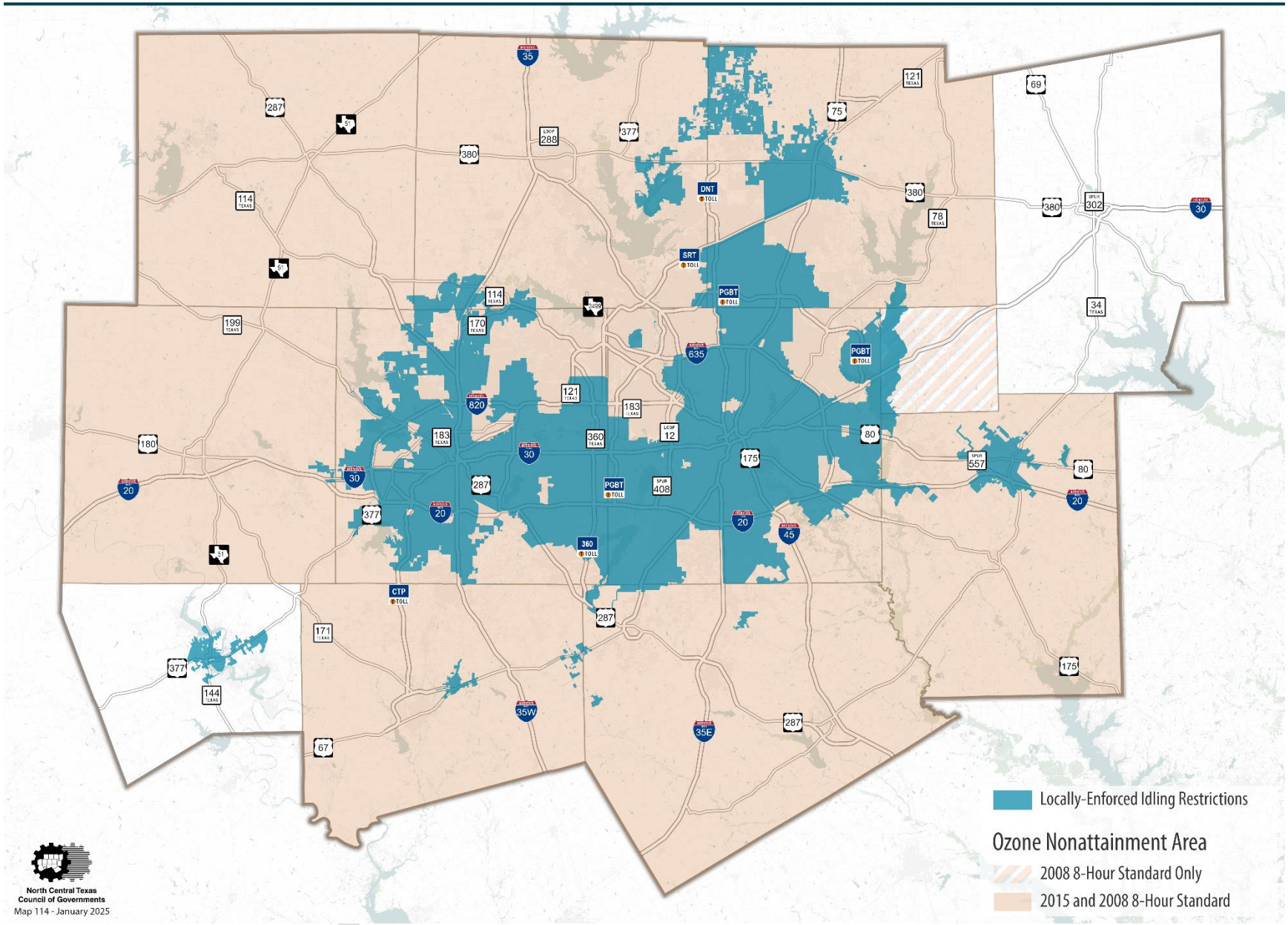
Clean Fleet Policy Adoptees



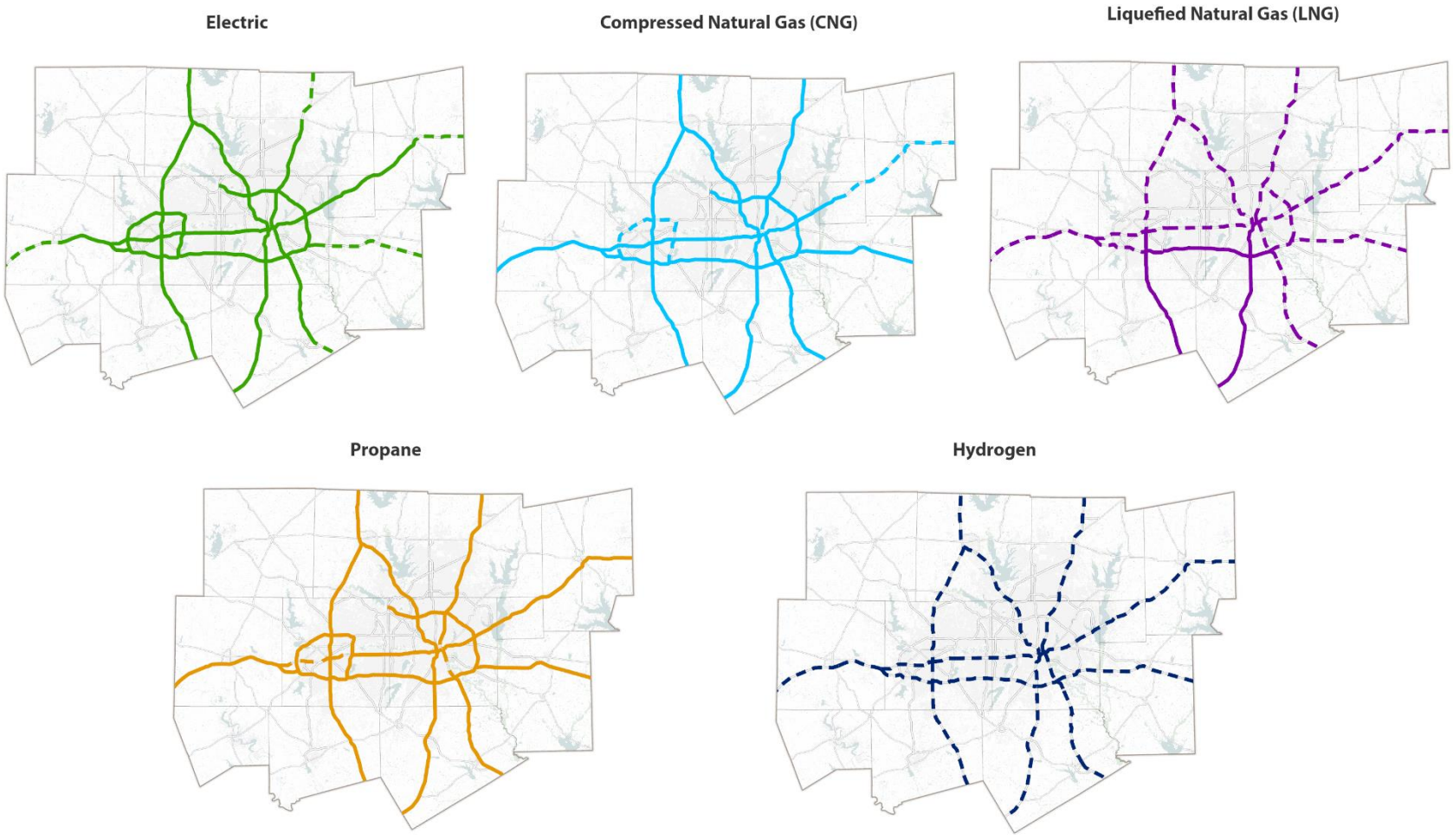
North Central Texas Council of Governments
Map 113 - March 2025

Locally Enforced Idling Restrictions

MOBILITY 2050



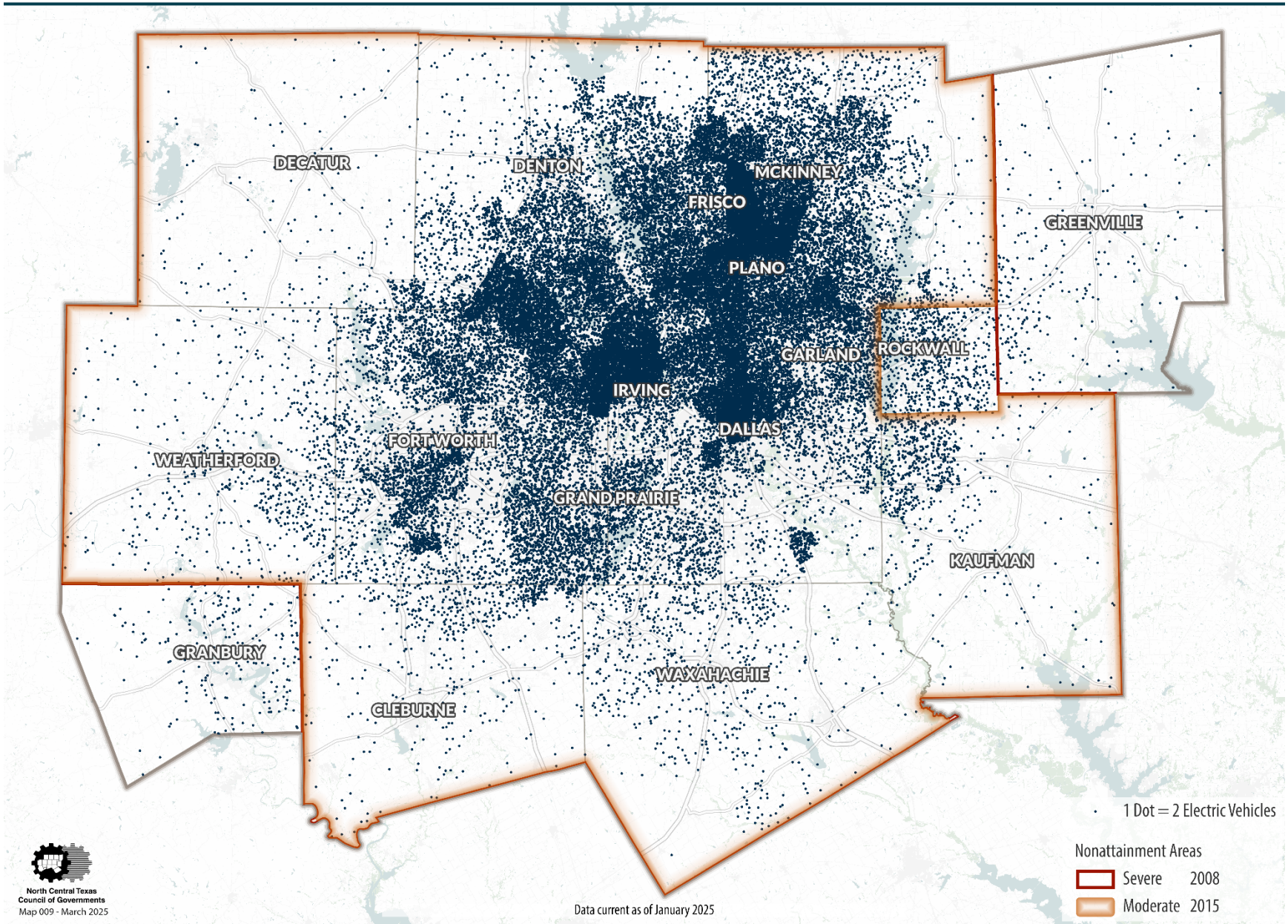
Currently Designated Alternative Fuel Corridors



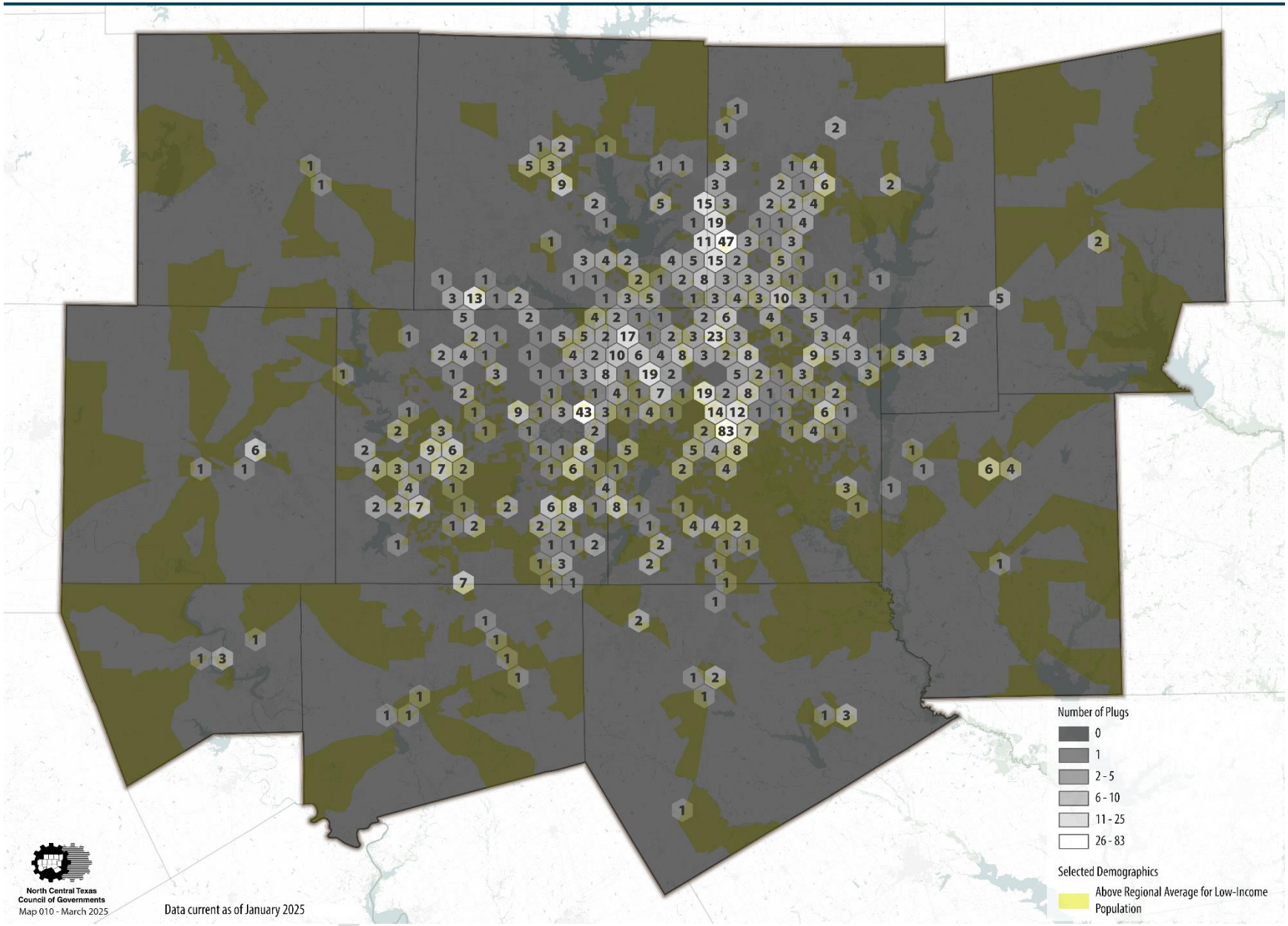
North Central Texas Council of Governments
Map 113 - January 2025

Electric Vehicle Registration by Zip Code

MOBILITY 2050



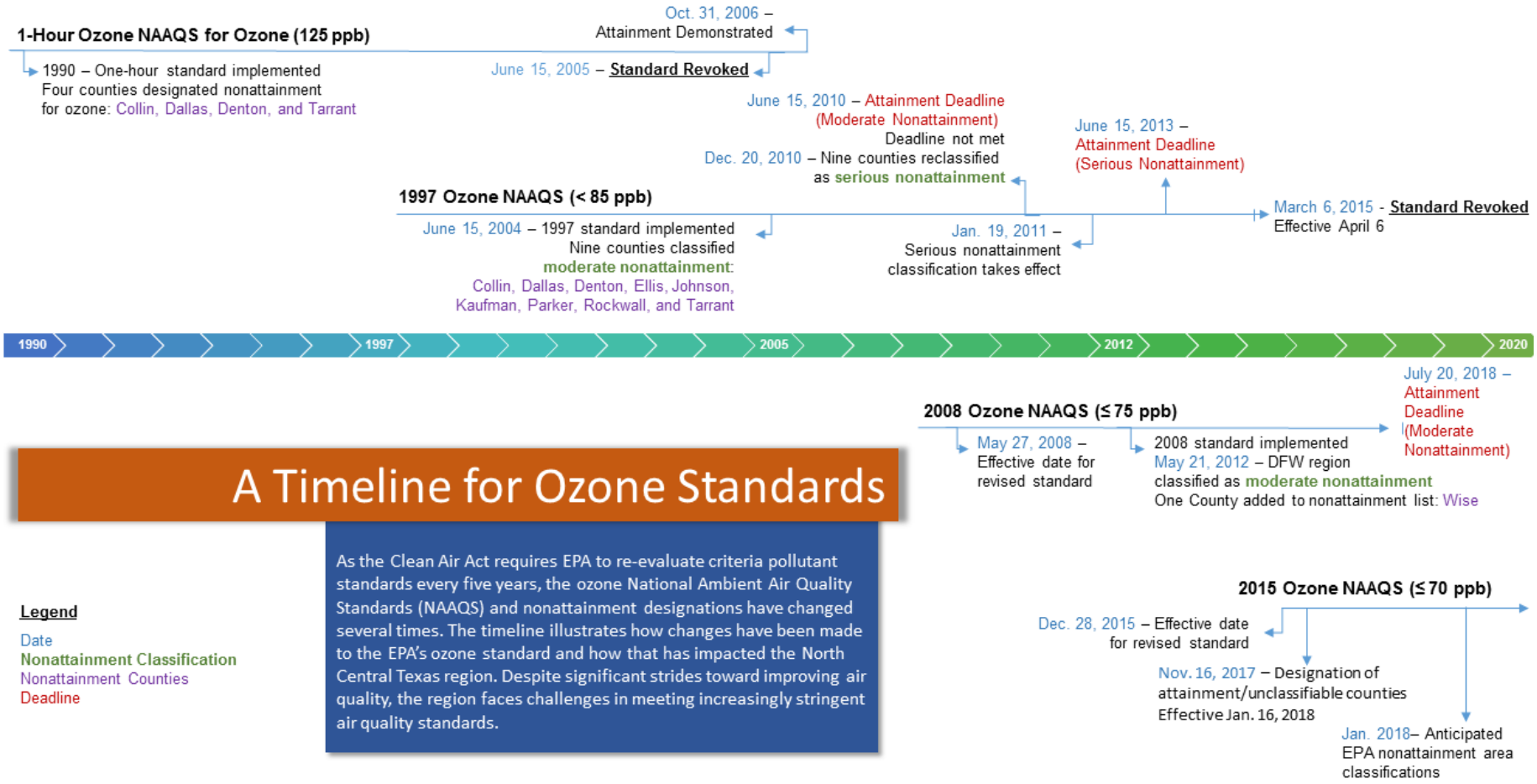
EV Charging Station Access



EV Charging Station Gap Analysis

A Timeline for Ozone Standards

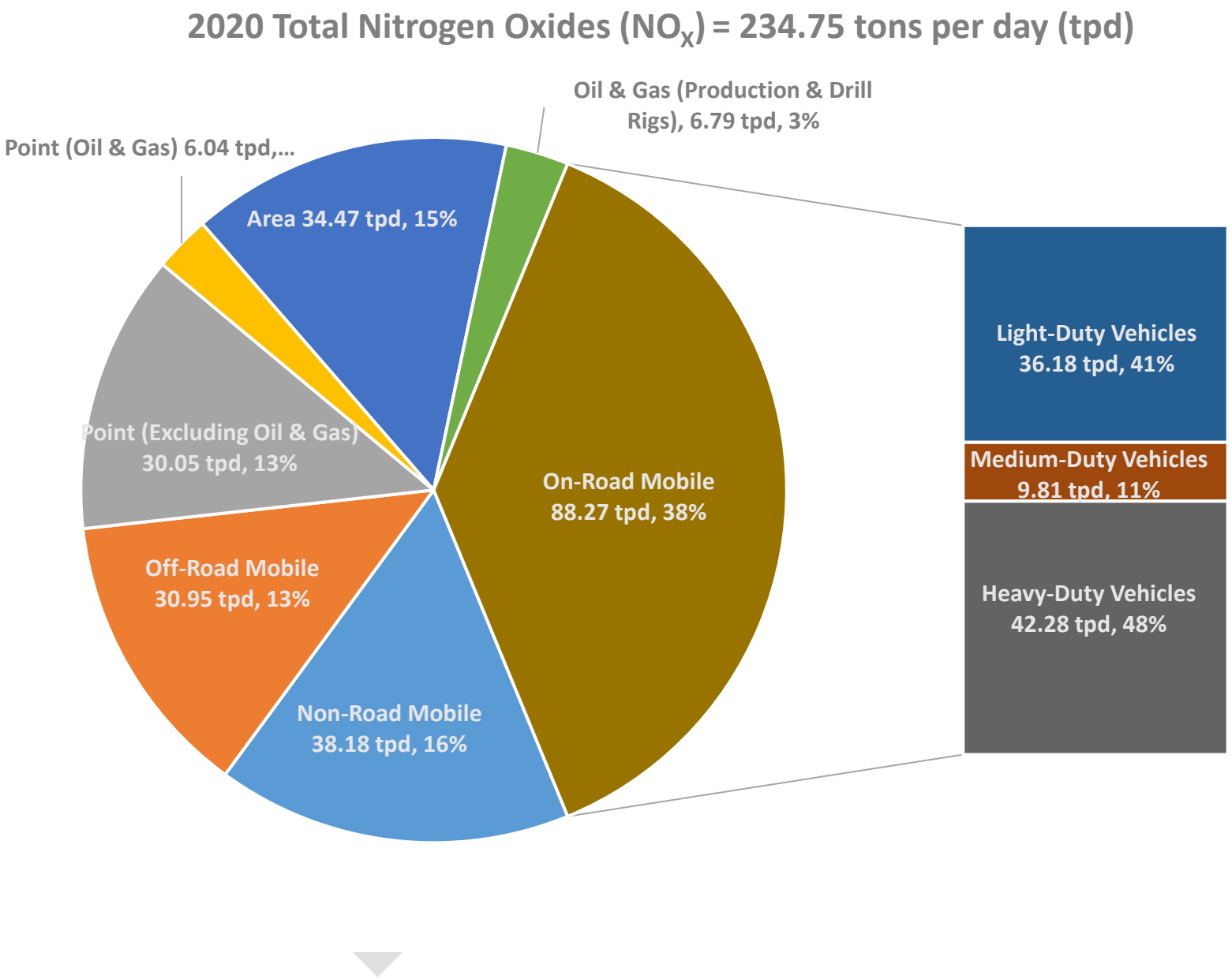
As the Clean Air Act requires EPA to re-evaluate criteria pollutant standards every five years, the ozone National Ambient Air Quality Standards (NAAQS) and nonattainment designations have changed several times. The timeline illustrates how changes have been made to the EPA's ozone standard and how that has impacted the North Central Texas region. Despite significant strides toward improving air quality, the region faces challenges in meeting increasingly stringent air quality standards.



Legend

Date
Nonattainment Classification
Nonattainment Counties
Deadline

PLACEHOLDER: will be updated with final Transportation Conformity analysis results.



Dallas-Fort Worth Clean Cities Trends in Annual Energy Impacts

Impacts Over Calendar Year 2023

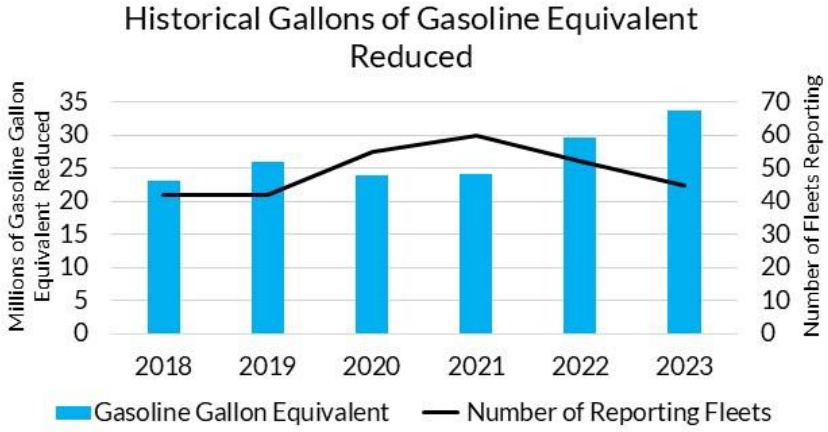
45 Reporting Fleets

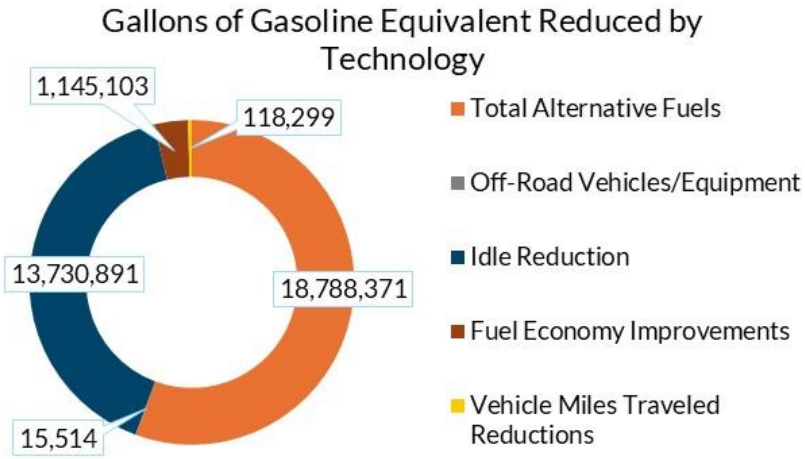
6,953 Alternative Fuel Vehicles & Equipment

59 Tons Ozone-Forming Nitrogen Oxides (NO_X) Reduced

3.4 Tons Fine Particulate Matter ($PM_{2.5}$) Reduced

228,968 Tons Greenhouse Gas Emissions Reduced





C-2. ENVIRONMENTAL EFFECTS, MITIGATION, AND STEWARDSHIP

POLICIES

MTP Reference #	Environmental Resources
ER3-001	Enhance quality of life by protecting, retaining, restoring/mitigating, or enhancing the region's environmental quality during planning and implementation of transportation programs and projects.
ER3-002	Work cooperatively with regulatory and conservation partners to develop innovative approaches that meet their conservation priorities and facilitate the delivery of transportation projects.
ER3-003	Promote transportation programs and projects that encourage healthy lifestyles, including, but not limited to, providing appropriate access to the natural environment.
ER3-004	Facilitate federally recognized tribal nations' meaningful participation through Regional Transportation Council Policy P19-01, Policy Position to Support Communication with Tribal Nations.
F3-002	Incorporate sustainability and livability options during the project selection process. Include additional weighting or emphasis as appropriate and consistent with Regional Transportation Council policy objectives, including, but not limited to, demand management, air quality, natural environment preservation, social equity, or consideration of transportation options and accessibility to other modes (such as freight, aviation, bicycle, and pedestrian). *(While this is listed as a financial policy, it has specific implications for the environmental considerations portion of the plan.)*

COORDINATION WITH ENVIRONMENTAL RESOURCE AND REGULATORY AGENCIES

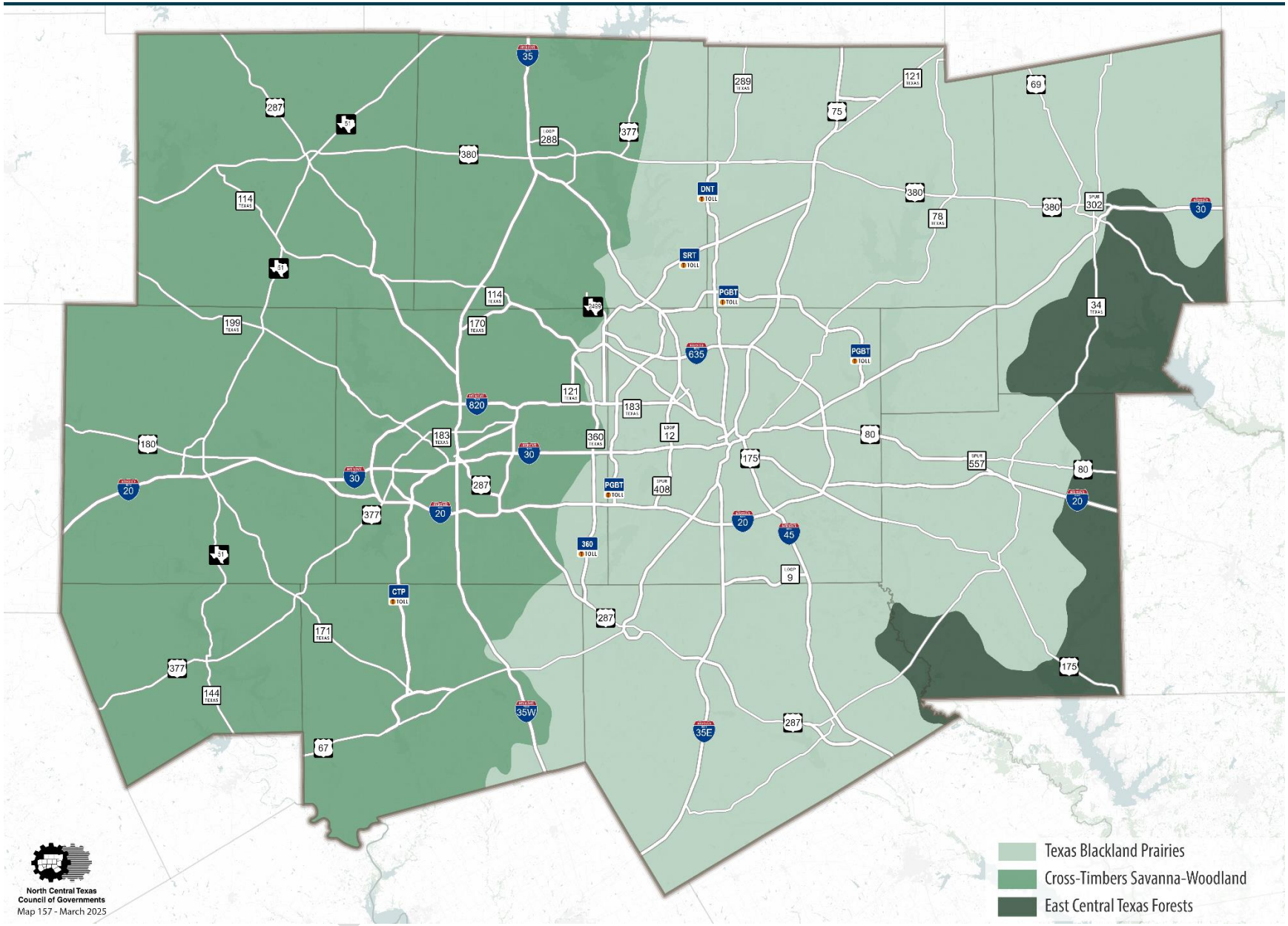
Metropolitan Planning Organizations must compare transportation plans to state agencies' plans, inventories, or maps of environmental resources. Some of this information, such as the locations of habitat for threatened and endangered species, is not publicly available to protect the environmental resource. In those cases, descriptions of agencies' priorities are included. The Natural Environment Screening results also compare the long-range plan's projects to mapped data of environmental resources.

Texas Parks & Wildlife Department – Texas Conservation Action Plan

Priority Habitat Types: Ecoregions are geographic areas defined by their type, quality, and quantity of environmental resources. The North Central Texas 12-county Metropolitan Planning Area (MPA) includes three ecoregions: 1) Texas Blackland Prairie, 2) Cross Timbers and Prairies, and 3) East Central Texas Plains, as shown in the map below.

North Central Texas Ecoregions

MOBILITY 2050



These ecoregions include habitats that the Texas Parks & Wildlife Department (TPWD) has identified as high priorities for conservation because they support a high number of rare species or threatened resources.[1] These habitats include:

- Native grasslands
- Surface water
- Groundwater
- Riparian areas and floodplains
- Corridors that allow animals to travel daily or seasonally
- Habitats that serve as breeding, feeding, and/or sheltering areas

Indian grass at The Nature Conservancy's Clymer Meadow Preserve. The preserve is a remnant of native Texas Blackland Prairie in Hunt County (Source: NCTCOG)

Native grasslands have been greatly diminished and fragmented as land is converted for agriculture, pasture, and urban development. The grasslands also face threats from non-native species and from native species that encroach on and degrade the grasslands.

Surface water provides drinking water and recreation for humans, but it also serves as habitat for many freshwater species, including migratory waterfowl, fish, mussels, and insects. These waters can be affected by increased urbanization; by conversion of natural areas to agricultural land; and by pollution, including runoff from roads. The mitigation assessment for Mobility 2050 compares roadway projects to streams and rivers that may face transportation impacts. The results are found in **Exhibit 4-1** in the **Environmental Effects, Mitigation, and Stewardship** chapter section.

Groundwater sources are replenished when precipitation infiltrates and percolates through the ground. Impervious surfaces such as roads and parking lots can prevent water from infiltrating the ground and instead create water runoff that flows into lakes, rivers, and streams.

Riparian areas and floodplains provide habitat to plants and animals that depend on streams that border these areas. The vegetation present in intact riparian areas protects water quality by preventing erosion, providing habitat for animals, and maintaining appropriate water temperature. Riparian areas can be damaged by flood management when stream banks are cleared for recreation, and when bridges and reservoirs are built.

Corridors that allow animals to travel daily or seasonally provide habitat for birds waiting out the winter months. They promote the birds' migration across the United States and between South and North America. Some of these birds are TPWD Species of Greatest Conservation Need. Habitat that provides areas for animals to congregate also serves as feeding and breeding grounds; however, the presence of humans can threaten these areas.

TPWD identifies priority ecosystems and species in its Texas Conservation Action Plan Ecoregion Handbooks.

Texas Blackland Prairies Ecoregion: Texas Blackland Prairies may be more endangered than any other ecoregion in the state. Agriculture and urban and suburban development have reduced the original Blackland prairies to less than one-tenth of a percent of their original area. The estimated 5,000 remaining acres exist as small areas

[1] TPWD, Texas Conservation Action Plan State/Multi-Region Handbook, September 2012, https://tpwd.texas.gov/landwater/land/tcap/documents/tcap_statewide_multiregion_handbook.pdf

scattered across the ecoregion. This ecoregion, which earned its name because of the prairie's dark, rich soil, is far from homogenous. The ecoregion also includes woodlands, bottomland hardwoods, and isolated wetlands. TPWD considers the most threatened habitats in this ecoregion to be prairies and the wetlands that are geographically isolated from protected waterbodies.[2]

The Texas Blackland Prairie covers almost half of the MPA, including large portions or all of Collin, Dallas, Ellis, Hunt, Kaufman, and Rockwall counties, and smaller portions of Denton, Tarrant, and Johnson counties. The TPWD Conservation Action Plan identifies the large transportation plans designed to serve the booming Dallas-Fort Worth region as a priority conservation issue in the Texas Blackland Prairies ecoregion.

Cross Timbers Ecoregion: The Cross Timbers includes about 890,000 acres of old-growth forest featuring post oak and blackjack oak. The ecoregion supports a high degree of biodiversity because of the great variety of habitats found in the area. Some plant species are endemic to the ecoregion, meaning they live nowhere outside of the Cross Timbers. However, this ecoregion contains little conserved land compared with other ecoregions in Texas.[3] This ecoregion covers much or all of Denton, Hood, Johnson, Parker, Tarrant, and Wise counties. TPWD identifies transportation plans as a priority conservation issue in the Cross Timbers ecoregion.

East Central Texas Plains Ecoregion: This ecoregion, also known as Post Oak Savannah, includes woodlands interspersed with small prairies, streams, and unique wetlands. The remaining prairies are remnants of what may have been the original ecosystem of this area. Development, agriculture, and wildfire suppression may have allowed trees and shrubs to overtake the prairies. The ecoregion's unique wetlands include bogs and swamps where endemic plants thrive. However, fewer than 1,000 acres of these unique wetlands are under conservation. Ecologically important streams in this ecoregion provide important habitat for rare wildlife.[4] This ecoregion includes portions of Kaufman, Hunt, and Ellis counties. The TPWD Conservation Action Plan identifies the expansion of agriculture, introduction of non-native grasses used for pasture, and development—including plans for new reservoirs—as the primary threats to the East Central Texas Plains.

Threatened and Endangered Species: TPWD's Rare, Threatened, and Endangered Species of Texas by County website[5] lists state- or federal-listed threatened or endangered species that may occur in Texas counties. The website also provides information on the agency's Species of Greatest Conservation Need. TPWD regulates state-listed species, while the US Fish & Wildlife Service oversees federal-listed species under the Endangered Species Act of 1973, aimed at preventing extinction and preserving habitats. A comparison of transportation projects to potential habitat for state- and federal-listed threatened or endangered species is incorporated into the Natural Environment Screening, which is a preliminary screening tool. Planners should still seek legally required biological or environmental opinions.

Texas Parks & Wildlife Department – Wetlands Conservation Strategies

Less than 5 percent of Texas' total land area is wetlands, yet Texas has the fourth-greatest wetland acreage in the lower 48 states. Wetlands

[2] Texas Parks & Wildlife Department's Texas Conservation Action Plan 2012-2016: Texas Blackland Prairies Handbook
[3] Texas Parks & Wildlife Department's Texas Conservation Action Plan 2012-2016: Cross Timbers Handbook
[4] Texas Parks & Wildlife Department's Texas Conservation Action Plan 2012-2016: East Central Texas Plains Handbook
[5] Texas Parks & Wildlife Department's Rare, Threatened, and Endangered Species of Texas by County, http://tpwd.texas.gov/gis/rtest/

provide habitat and protect environmental quality. While wetlands provide many ecosystem services or benefits to society, approximately half of the historic wetland acreage in Texas has been converted to cropland or urban development.

TPWD identifies several conservation strategies. These include:

- Wetland restoration
- Wetland enhancement
- Wetland creation

The North Central Texas Council of Governments (NCTCOG) supports these conservation strategies through projects and programs, including the Section 214 Program with the US Army Corps of Engineers Regulatory Division, the Environmental Stewardship Program, and the Wetland and Stream Mitigation Assessment.

In the mitigation assessment for Mobility 2050, roadway projects were compared to wetlands identified by three data sources: TPWD's Ecological Mapping Systems, US Fish & Wildlife Services' National Wetlands Inventory, and the US Geological Survey-supported National Land Conservation Database.

Texas Forest Service – Texas Forest Action Plan

The Texas Forest Action Plan[6] identifies the issues that will affect Texas forests. The five issues and their priority areas within the MPA are:

1. **Wildfire and Public Safety:** The risk of wildfire is growing in Texas due to population growth, land use change, and an increase in drought frequency. What was historically an issue isolated to rural regions has become a threat statewide for both small towns and urban areas. Within the MPA, Wise, Parker, Hood, and Johnson counties are priority counties.
2. **Sustainability of Forest Resources in East Texas:** Sustainability of the forests of East Texas, which have traditionally provided important economic, social, and environmental benefits, is a growing concern due to increasing population and land use change. This issue does not apply to MPA counties.
3. **Central Texas Woodlands Conservation:** Conservation of this area is under threat, with increasing pressures from population growth, fragmentation, land use changes, wildfires, oak wilt, and invasive species. Within the MPA, Parker County is a high priority and Wise and Hood counties are a moderate priority.
4. **Urban Forest Sustainability:** Urban forests benefit people by removing air pollution, reducing stormwater runoff, reducing energy costs, and sequestering carbon. However, urban trees are threatened by rapid population growth, land use changes, and natural disasters. Eight of the top 10 priority areas are within the MPA: Arlington, Irving, Grand Prairie, Frisco, McKinney, Mesquite, Carrollton, and Richardson.
5. **Water Resource Protection:** Forests and woodlands are an important component to meeting the water needs in Texas. Threats to the forests' ability to contribute to clean water include an increase in population, frequency of extreme and persistent drought, and conversion of forests to impervious surfaces. Within the MPA, Wise, Parker, and Hood counties are areas of very high priority.

[6] Texas Forest Action Plan is available at: https://tfsweb.tamu.edu/ForestActionPlan

Texas Historical Commission – Statewide Historic Preservation Plan

The Statewide Historic Preservation Plan[7] is developed every 10 years and serves as a basis for the development of individual action plans for other agencies. The plan seeks to preserve the historic and cultural objects, places, buildings, and landscapes in Texas through a process of identification, protection, and enhancement. The Texas Historical Commission vision and values for the plan include valuing historic places, including a strategy to create economic, social, and environmentally healthy communities and enhance general well-being. The plan also emphasizes the value of working across disciplines and interests to achieve mutually beneficial goals. NCTCOG's environmental policies support these visions and values.

The NCTCOG Regional Ecosystem Framework Interactive Viewer website[8] provides data relevant to cultural, historic, and archeological sites in the region. This information is available for planners during the development of transportation projects. Regional maps of historic sites, national register districts and properties, and historic cemeteries are included in this appendix, as well as the Texas Department of Transportation's Potential Archeological Liability maps, which model the relative likelihood of the presence of archeological sites. One map illustrates the likelihood of archeological sites near the surface and another map illustrates the likelihood at deeper levels.[9] Because roadway and transit recommendations in Mobility 2050 do not include specific alignments or routes for transportation infrastructure, cultural, historic, and archeological sites must be considered in greater detail during later development phases of transportation projects.

Texas Water Development Board – Regional and State Water Plan

Regional water plans are created for each of the 16 water planning regions in Texas.[10] The goal of the plans is to ensure affordable and adequate water supplies for Texas through a 50-year planning period, even in times of severe drought. The regional plans propose water management strategies to be considered in the state plan, which is recommended to the state legislature. Recommendations relevant to transportation include major water management strategies, recommendation of ecologically significant stream segments, and identification of areas uniquely eligible for reservoir construction. Major water management strategies that may impact transportation projects could include pipelines, new reservoirs, reservoir changes, and construction of new infrastructure. These strategies should be considered in the transportation planning process as they could become future recommendations.

Texas Commission on Environmental Quality – Strategic Plan, Texas Groundwater Protection Strategy

The Texas Commission on Environmental Quality (TCEQ) Strategic Plan[11] outlines the agency's goals and action plans for a five-year period. Each goal aims to protect public health and the environment.

[7] Texas Historical Commission, Texas' Statewide Historic Preservation Plan 2022-2032 Updated 2022, https://thc.texas.gov/sites/default/files/2023-11/Texas_Statewide_Historic_Preservation_Plan_2022_2032.pdf

[8] NCTCOG, Regional Ecosystem Framework Interactive Viewer, www.nctcog.org/REF

[9] Texas Department of Transportation, Potential Archeological Liability Maps, https://www.txdot.gov/inside-txdot/division/environmental/compliance-toolkits/toolkit/archeological-map.html

[10] North Central Texas includes counties in Regions C, D, and G. 2021 *Regional Water Plans*, https://www.twdb.texas.gov/waterplanning/rwp/plans/2021/index.asp and *Water for Texas: 2022 State Water Plans*, https://www.twdb.texas.gov/waterplanning/swp/2022/index.asp

[11] TCEQ Strategic Plan Fiscal Years 2025-2029: https://www.tceq.texas.gov/publications/sfr/strategic-plan

This aligns with NCTCOG policies to protect the region's environmental assets through the planning process.

TCEQ's Texas Groundwater Protection Strategy[12] outlines plans for groundwater conservation and protection in the state. Groundwater can provide drinking water and is ecologically important to the flow of water bodies. TCEQ prioritizes groundwater management areas that have been designated by the Texas Water Development Board. The following North Central Texas counties are identified as both priority groundwater management areas and groundwater conservation districts: Collin, Denton, Ellis, Hood, Johnson, Parker, Tarrant, and Wise.[13] Because a majority of the counties in the MPA are designated as priority areas, the transportation planning process should consider the effects of transportation on groundwater. NCTCOG's Transportation integrated Stormwater Management framework, described in the **Environmental Considerations** chapter, provides strategies to protect water quality. TCEQ designates impaired stream segments in their Texas Integrated Report Index of Water Quality Impairments. A comparison to these segments is made in the Natural Environment Screening section of this appendix.

TCEQ also monitors air quality. The **Air Quality** section of the **Environmental Considerations** chapter and appendix address this topic.

Texas A&M Natural Resources Institute – Texas Land Trends

The Texas A&M Natural Resources Institute's latest Texas Land Trends Report: Status Update and Trends of Texas Working Lands[14] describes Texas' growing population and its relationship with changing rural land ownership. Several changes to rural land ownership are of interest to transportation planners:

- The increase in transfer of property ownership
- Small acreage operations
- New operations near urban regions

The increasing age of current landowners could lead to a shift in property ownership to younger generations, who may lack the experience to operate businesses. An increase in smaller-acreage operations could increase land fragmentation and the risk for lower profitability and operational challenges. Lack of knowledge and small acreage size could result in financial strain for operators, which, combined with the pressure of a growing urban population, could lead to a willingness to convert land to other more profitable uses such as residential. This change in land use could reduce natural resource services and increase development and the need for transportation facilities.

New transportation infrastructure can have a direct or indirect impact on open space and undeveloped land. NCTCOG's Environmental Stewardship Program and Quantifying the Benefits of Environmental Stewardship provide opportunities for voluntary mitigation of effects such as habitat fragmentation and the reduction of open space.

Technology also could have an impact on land-use trends. The potential widespread deployment of automated vehicles could affect the demand to expand the urbanized area in the region. To date, the region has accommodated increasing population by building transportation infrastructure to accommodate relatively low-density outward growth.

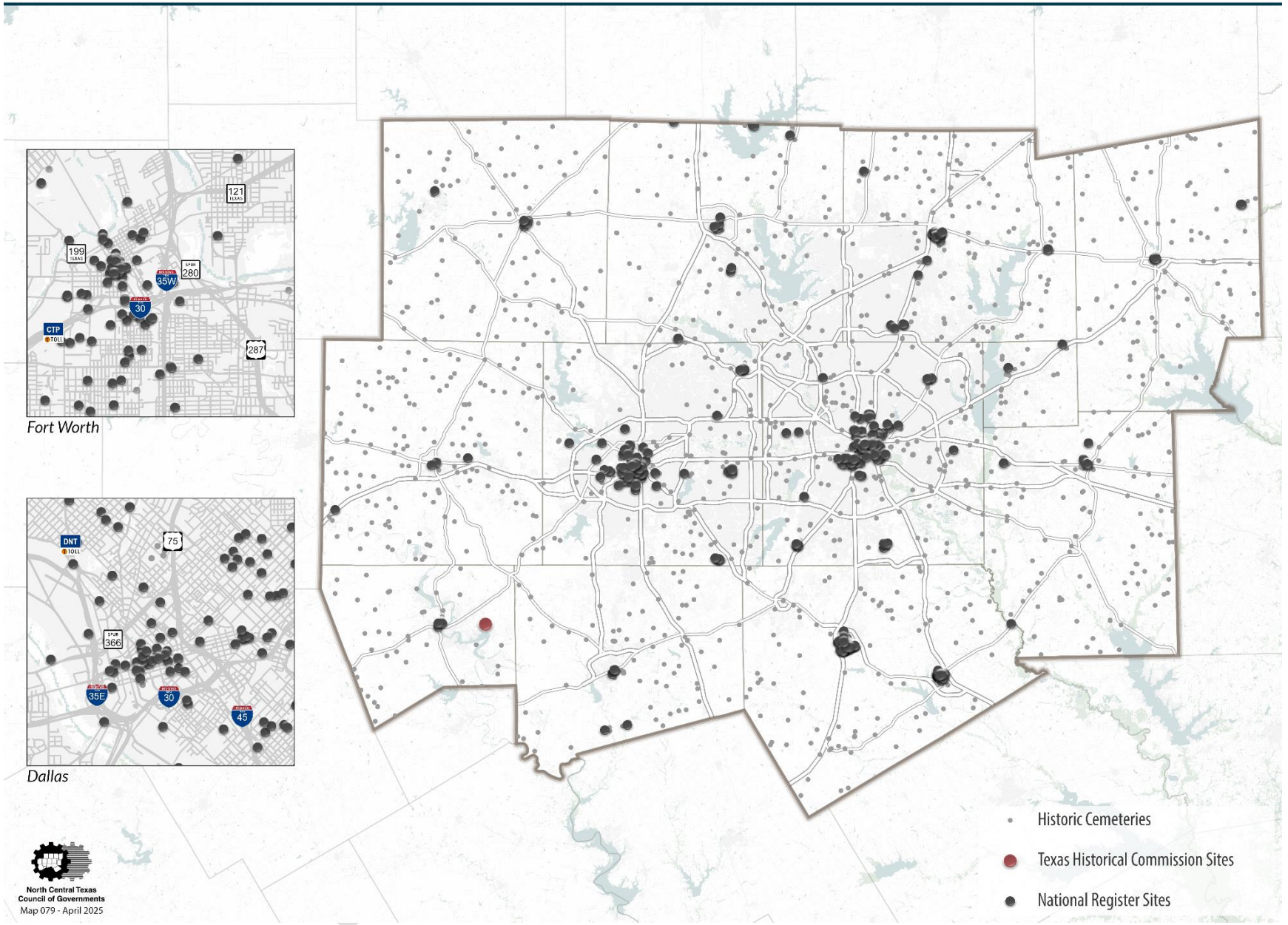
[12] TCEQ, Texas Groundwater Protection Strategy, https://www.tceq.texas.gov/groundwater/groundwater-planning-assessment/prot_prog.html

[13] TCEQ, Texas Priority Groundwater Management Areas, https://www.tceq.texas.gov/downloads/groundwater/maps/pgma-areas.pdf

[14] Texas A&M Natural Resources Institute, Texas Land Trends Report: Status Update and Trends of Texas Working Lands 1997-2022, https://nri.tamu.edu/media/tb4einwc/status-update-and-trends-of-texas-working-lands-1997-2022.pdf

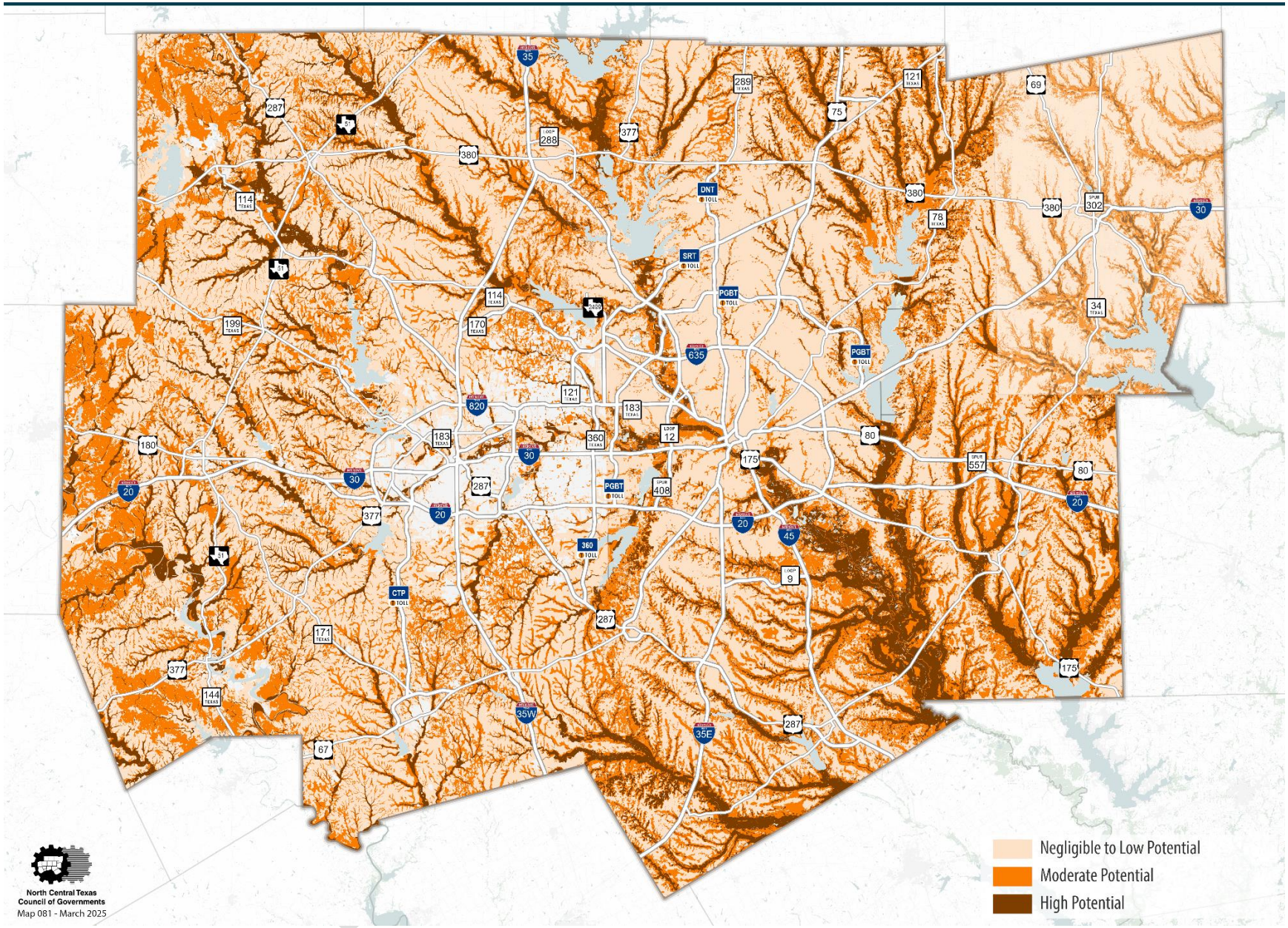
It has relied upon privately owned vehicles that sit unused for over 90 percent of the time. Large amounts of land are used to provide roads and parking spaces. If automated vehicles are deployed in shared mobility fleets, especially using vehicles carrying multiple passengers (e.g., microtransit), then the region's mobility needs can be satisfied using fewer vehicles that park less than would be utilized under current approaches. This would reduce the demand for parking and allow property owners to repurpose parking facilities for high valued uses, including new residential facilities in areas that are developed already. This infill development could reduce the pressure to expand the metropolitan region outward and reduce the need to invest in new transportation infrastructure.

Historic Resources



Potential Archaeological Liability

MOBILITY 2050



Environmental Coordination Stakeholders

The following table represents a sampling of the Tribal, federal, and state agencies NCTCOG seeks to coordinate with during transportation planning and the development of transportation projects.

Environmental Stakeholder	Description and Area of Expertise
Federally Recognized Tribal Nations	These tribes have areas of interest located within the MPA boundary: Absentee Shawnee Tribe of Oklahoma Apache Tribe of Oklahoma Caddo Nation Cherokee Nation Comanche Nation of Oklahoma Delaware Nation Jena Band of Choctaw Indians Kialegee Tribal Town Kickapoo Traditional Tribe of Texas Kickapoo Tribe of Oklahoma Kiowa Tribe Mescalero Apache Tribe Muscogee Nation Poarch Band of Creek Indians Shawnee Tribe Thlopthlocco Tribal Town Tonkawa Tribe of Oklahoma Wichita and Affiliated Tribes Comment on transportation plans is sought from these tribes.
Federal Agencies	
US Environmental Protection Agency (EPA) www.epa.gov	The EPA is a multidisciplinary agency that offers resources, including data sets, research, and expertise in programs such as air, pesticides, pollution prevention, toxics and chemicals, water, and wastes and recycling. The EPA has expertise in the Clean Water Act, Clean Air Act, Environmental Data Registry, and Pollution Prevention Act.
US Department of Energy (DOE) www.energy.gov	The DOE addresses the nation's policies regarding energy, and its responsibilities include energy conservation and energy-related research. The DOE's area of expertise includes energy efficiency, renewable energy, sustainable transportation, and vehicle technologies.
(Department of the Interior (USDOI) www.doi.gov	The USDOI manages the nation's resources, including water, wildlife, and energy, and upholds the country's relationship with Tribal nations. The department is a cabinet-level agency that includes the bureaus and offices that protect the nation's natural and cultural resources.
Department of the Interior – US Fish and Wildlife Service (USFWS) www.fws.gov	USFWS administers the Endangered Species Act and provides technical assistance associated with Section 404 of the Clean Water Act as it relates to sensitive species. The National Wetlands Inventory is also maintained by USFWS. UFSWS encourages the design of transportation projects that provide the greatest value to the greatest number of people while avoiding or minimizing impacts to habitat and the disruption of the ecological processes that naturally sustain these areas.
Department of the Interior – US Geological Survey (USGS) www.usgs.gov/	The mission of the USGS is to provide reliable scientific information to describe and understand the Earth; minimize loss of life and property from natural disasters; assist others in managing water, biological, and other natural resources; and enhance and protect quality of life. The USGS provides technical expertise and datasets in geography, geology, hydrology, and biology.
Department of Defense – US Army Corps of Engineers (USACE) www.usace.army.mil/	The USACE Regulatory Program implements Sections 404 and 408 of the Clean Water Act and Sections 9, 10, and 14 of the Rivers and Harbors Act of 1899 through regulations that serve to protect that nation's valuable aquatic resources and civil works projects. USACE has expertise in the process for Section 401 of the Clean Water Act and Section 214 of the Water Resources Development Act. Additional programs within USACE are responsible for flood protection, lake master plan revisions, and recreation.
Department of Homeland Security – Federal Emergency Management Agency (FEMA) www.fema.gov	The mission of FEMA is to lead the effort to prepare the nation for all hazards and effectively manage federal response and recovery efforts following any national incident. FEMA administers the National Flood Insurance Program.

Environmental Stakeholder	Description and Area of Expertise
Department of Commerce – Coast Guard (USCG) www.uscg.mil/	The mission of USCG is to protect the public, the environment, and US economic interests in the nation's ports and waterways, along the coast, on international waters, or in any maritime region as required. USCG administers Section 9 of the Rivers and Harbors Act.
US Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) www.nrcs.usda.gov/	NRCS provides leadership in a partnership effort to help people conserve, maintain, improve, and protect natural resources and the environment. They provide technical assistance to land owners, local governments, communities, and federal agencies in planning and implementing conservation systems. NRCS also provides services related to watershed rehabilitation, watershed protection and flood prevention, and watershed surveys and planning, all within the guidance of the Watershed Protection and Flood Prevention Act of 1954. The implementation of the Farmland Protection Policy Act is also the responsibility of the NRCS. The Natural Resources Inventory, state and national soil surveys, and other farmland data are also maintained by the NRCS.
National Park Service – National Register of Historic Places (NRHP) https://www.nps.gov/subjects/nationalregister/index.htm	NRHP is the nation's official list of cultural resources and historic places worthy of preservation. The National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archaeological resources.
US Department of Transportation – Federal Highway Administration (FHWA) www.fhwa.dot.gov/	The core mission of FHWA is to improve mobility on the nation's highways through national leadership, innovation, and program delivery. The primary focus of FHWA strategies is improving highway system performance—particularly its safety, reliability, effectiveness, and sustainability. Initiatives such as Every Day Counts and Planning and Environment Linkages, in addition to other FHWA programs, are aimed at shortening project delivery time, enhancing the safety of roads, protecting the environment, and improving mobility and livability. FHWA provides guidance and technical expertise to state and local agencies.
US Department of Transportation – Federal Transit Administration (FTA) www.transit.dot.gov/	The FTA supports locally planned and operated public transit systems, including buses, subways, light rail, commuter rail, trolleys, and ferries, through financial and technical assistance.
US Department of Transportation – Federal Aviation Administration (FAA) www.faa.gov/	The FAA is responsible for the safety, efficiency, and environmental responsibility of civil aviation.
State Agencies	
Texas Commission on Environmental Quality (TCEQ) www.tceq.texas.gov/	TCEQ is a regulatory agency that aims to protect public health and conserve natural resources through monitoring impacts to water, air, and regulated materials. TCEQ provides expertise on the Clean Air Act, National Flood Insurance Program, and Section 401 of the Clean Water Act. TCEQ is responsible for administering the State Superfund Program, Texas Pollutant Discharge Elimination System, Municipal Separate Storm Sewer System, and reviewing Stormwater Prevention Pollution Plans.
Texas Department of Transportation (TxDOT) www.txdot.gov	TxDOT, in cooperation with local and regional officials, is responsible for planning, designing, building, operating, and maintaining the state's transportation system. One of TxDOT's visions is to be a progressive state transportation agency recognized and respected by the citizens of Texas by providing comfortable, safe, durable, cost-effective, environmentally sensitive, and aesthetically appealing transportation systems. TxDOT provides expertise on the National Environmental Policy Act.
Texas Forest Service (TFS) https://tfsweb.tamu.ed	The mission of TFS is to provide statewide leadership to ensure the state's forests, trees, and related natural resources are wisely used, nurtured, protected, and perpetuated for the benefit of all Texans.
Texas General Land Office (GLO) www.glo.texas.gov	The core functions of the Texas GLO are tied to the protection and preservation of the natural- and human-made resources of the state. GLO manages state lands and mineral rights, including sales and leases. As it relates to transportation projects, a GLO easement may be required if the project crosses or disturbs any state-owned streambeds.
Texas Historical Commission (THC) www.thc.texas.gov/	THC is the state agency for historic preservation. Projects that include the disturbance of existing features should include a search of the THC database to screen for potential historic significance. Projects that include ground disturbance should include an assessment of the potential for disturbance of archeological or other culturally significant sites. THC oversees the State Archeological Designation and the Texas Historic Sites Atlas.

Environmental Stakeholder	Description and Area of Expertise
Texas Parks & Wildlife Department (TPWD) https://tpwdtexas.gov	TPWD is a state agency with a mission to manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing, and outdoor recreation opportunities for the use and enjoyment of present and future generations. TPWD can offer services to local municipalities such as habitat assessments, habitat restoration assistance, erosion control techniques, and ecologically sensitive landscaping. TPWD oversees the Texas Conservation Action Plan, which focuses on habitat and Species of Greatest Conservation Need. Species listed as threatened or endangered at the state or federal level are included as Species of Greatest Conservation Need.
Texas Railroad Commission (RRC) www.rrc.state.tx.us/	Texas RRC has regulatory divisions that oversee the Texas oil and gas industry, gas utilities, pipeline safety, safety in the liquefied petroleum gas industry, and the surface mining of coal. Texas RRC has authority of pollution of surface waters associated with oil and gas exploration under Section 404 of the Clean Water Act. The Public Geographical Information System Map Viewer is also maintained by Texas RRC.
State Energy Conservation Office (Texas SECO) https://comptroller.texas.gov/programs/seco/index.php	As the state energy office, SECO assists local governments in developing energy efficiency and renewable energy programs and offers financial assistance for improving or retrofitting buildings.
Texas Water Development Board (TWDB) www.twdb.texas.gov	The mission of TWDB is "to provide leadership, planning, financial assistance, information, and education for the conservation and responsible development of water in Texas." TWDB produces information and data on ground water, population projections, water demand, flooding, water conservation, and water-related maps. The agency provides guidance and expertise on water-related financial assistance and planning.

PROGRAMS AND PROJECTS: A CLOSER LOOK AT THE REGIONAL ECOSYSTEM FRAMEWORK

In 2011, NCTCOG developed the Regional Ecosystem Framework (REF), a tool that provides a foundation for using the watershed approach when considering conservation- and ecosystem-based priorities during development of infrastructure projects.

The foundational concepts for the REF include "*Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects.*"[15] Nine resource and regulatory agencies participated in preparing this eco-Logical report in 2006.

The REF is a geographic information systems-based tool that consists of 10 layers focused on three central ecological parameters. NCTCOG coordinated with resource and regulatory agency stakeholders to determine what was included in each of the categories:

Green Infrastructure*	Water Considerations	Ecosystem Value
• Wildlife habitat • Natural areas • Agricultural land	• Impaired water segments • Flood zones • Surface water quantity • Wetlands	• Rarity • Diversity • Ecosystem sustainability

* Green Infrastructure in this context refers to open spaces, including natural and working lands. Green infrastructure is typically referenced as opposite to gray infrastructure, which refers to the urban built environment.

Scoring Methodology

For scoring purposes, the North Central Texas region was divided into ¼ km² grid cells. For each of the 10 REF layers, NCTCOG assigned a score of 1 to 5 to each grid based on the presence of the layer. For example, if more than 50 percent of the area of a grid cell contained wetlands, it received a high score of 5 for its wetlands layer. Subwatersheds were assigned a score for each of the REF layers based on the average scores of the grids that fall within the subwatershed.

The resulting subwatershed maps indicate areas of relative ecological importance in the region. However, it is important to note that the majority of the REF layers represent quantity of a resource, not quality. The following maps show the subwatershed scores for each of the 10 layers. Additional information about the underlying data sources for each of the REF layers can be found at www.nctcog.org/ref.

Corridor Application

Beyond the regional application, the REF data has been applied to corridor-specific projects to determine potential impacts to the natural environment. This application utilizes the subwatershed grid-level data and determines impacts based on a set distance from the project or potential corridors/alignments. The data gathered through this approach can provide feasibility-level information for the natural environment and can help planners and project engineers avoid potential impacts or locate potential impacts that may require further studies or mitigation. The information produced in corridor applications supports the linkage between the planning and environmental process and supports pre-National Environmental Policy Act decisions.

[15] Federal Highway Administration, Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects, https://www.environment.fhwa.dot.gov/env_initiatives/eco-logical.aspx

REF Definitions and Data Sources

Agricultural Lands: The Agricultural Lands score represents a subwatershed's quantity of agricultural lands classified as 2011 National Land Cover Database Pasture/Hay and Cultivated Crops.

Diversity: The REF Diversity score is based on aggregate data from the Environmental Protection Agency's Region 6 Regional Ecological Assessment Protocol (REAP) database. The four sub-layers used to calculate the REAP Diversity include: 1) Appropriateness of Land Cover, 2) Contiguous Size of Undeveloped Area, 3) Shannon Land Cover Diversity, and 4) Ecologically Significant Stream Segments.

Ecosystem Sustainability: The REF Ecosystem Sustainability score is based on aggregate data from the REAP database. The Ecosystem Sustainability layer consists of 11 measures that can be loosely grouped into fragmentors and stressors. Fragmentors include contiguous land cover type, regularity of ecosystem boundary, appropriateness of land cover, waterway obstruction, and road density. Stressors include airport noise, Superfund National Priority List and State Superfund Sites, water quality, air quality, Resource Conservation and Recovery Act, Treatment-Storage-Disposal Sites, Corrective Action and State Voluntary Cleanup Program Sites, and urban/agricultural disturbance.

Flood Zones: The REF Flood Zones score is based on the percentage of a subwatershed that falls inside a 100-year or 500-year floodplain identified by the Federal Emergency Management Agency's Digital Flood Insurance Rate maps.

Impaired Water Segments: The REF Impaired Water Segment score is based on Clean Water Act 303(d) Segments State Priority Data from the Texas Commission on Environmental Quality.

Natural Areas: The REF Natural Areas score is based on areas *North Texas 2050*[16] describes that "generally reflect floodplains, major public parks and open spaces, shores along major lakes, and potential connections between these natural assets."

Rarity: The REF Rarity score is based on aggregate data from the REAP database. The four sub-layers used to calculate the REAP Rarity layer include: 1) Vegetation Rarity, 2) Natural Heritage Rank, 3) Taxonomic Richness, and 4) Rare Species Richness.

Surface Water Quantity: The REF Surface Water Quantity score is based on the quantity of surface waters present in a subwatershed. The data source is the US Geological Survey National Hydrography Dataset.

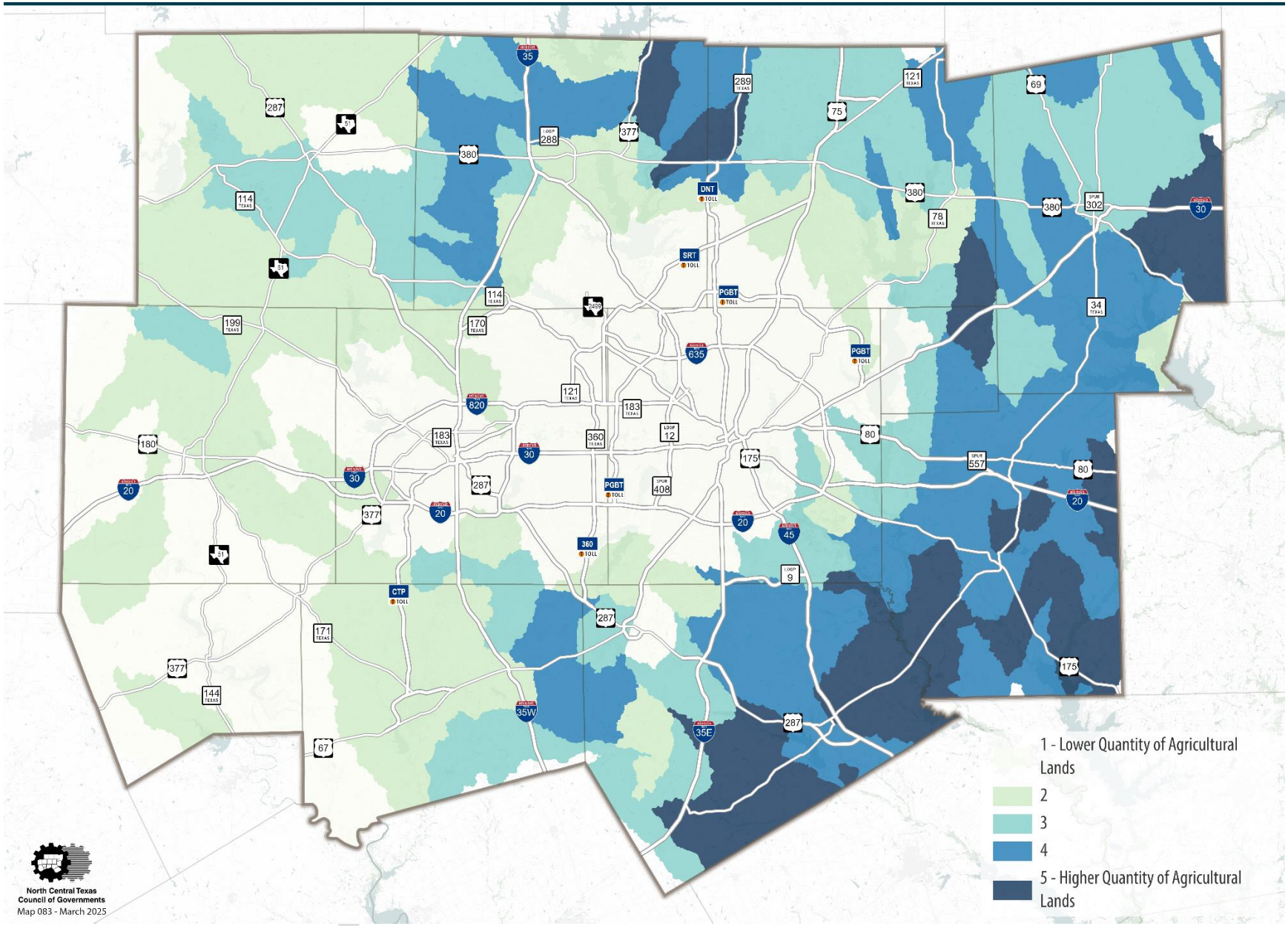
Wetlands: The REF Wetlands score represents a subwatershed's quantity of wetlands classified as 2011 National Land Cover Database Woody Wetlands or Emergent Herbaceous Wetlands.

Wildlife Habitat: The REF Wildlife Habitat score represents a subwatershed's quantity of lands classified by the 2011 National Land Cover Database as Forestlands, Shrublands, Grasslands, Wetlands, or Open Water.

[16] Vision North Texas, 2010, *North Texas 2050*, http://www.visionnorthtexas.org/regional_summit/North_Texas_2050.pdf

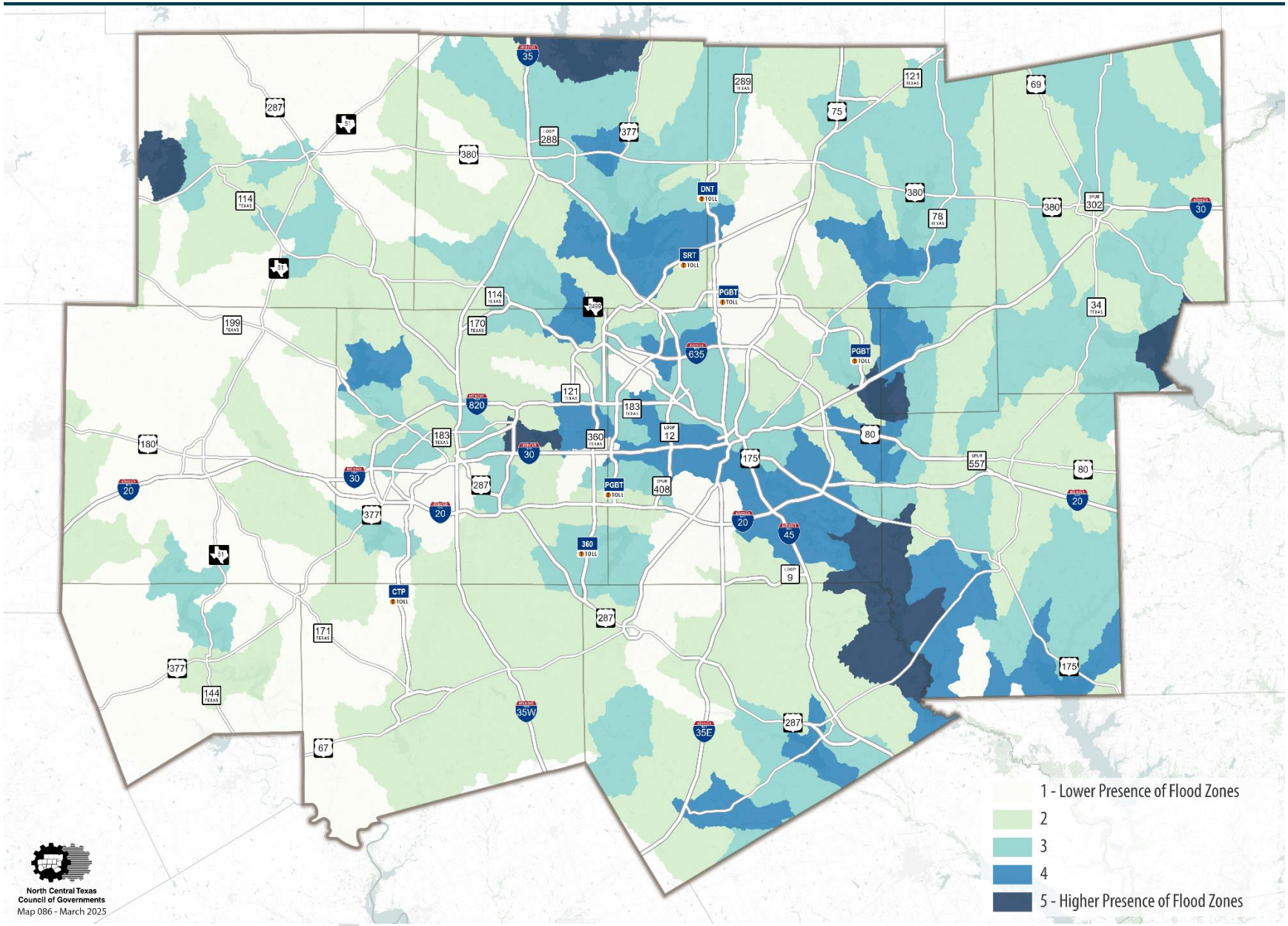
Regional Ecosystem Framework - Agricultural Lands

MOBILITY 2050



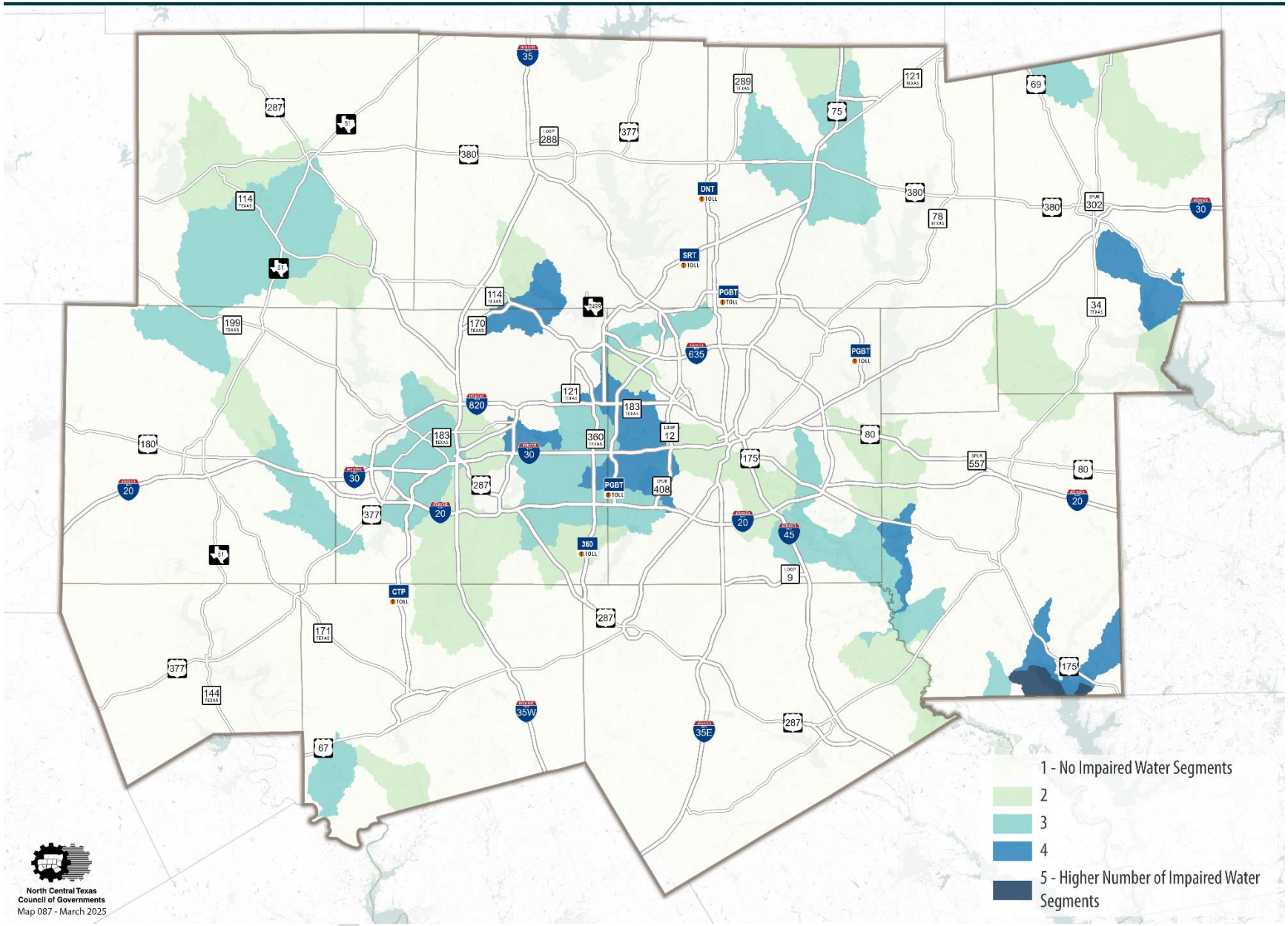
Regional Ecosystem Framework - Flood Zones

MOBILITY 2050



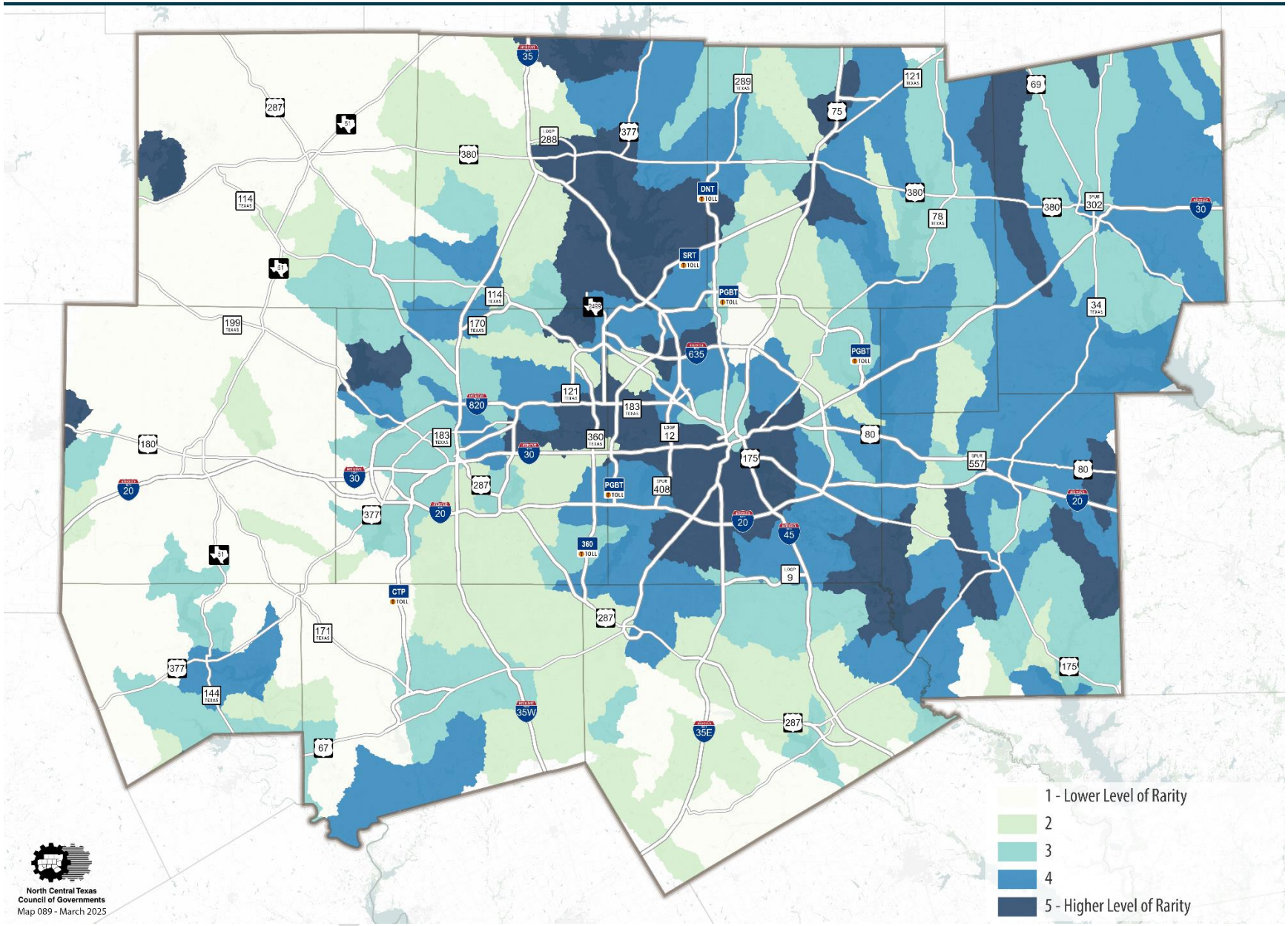
Regional Ecosystem Framework - Impaired Water Segments

MOBILITY 2050



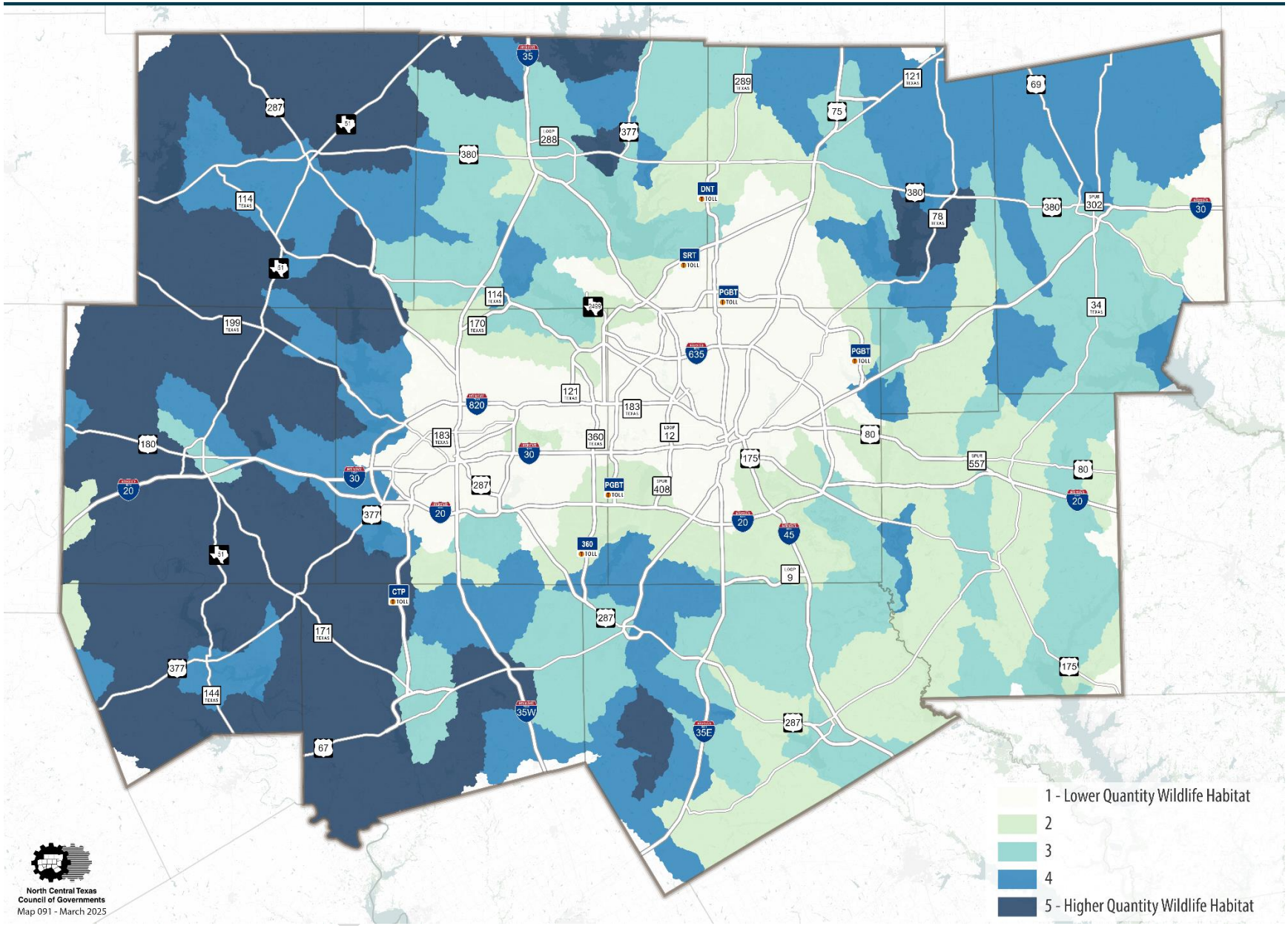
Regional Ecosystem Framework - Rarity

MOBILITY 2050



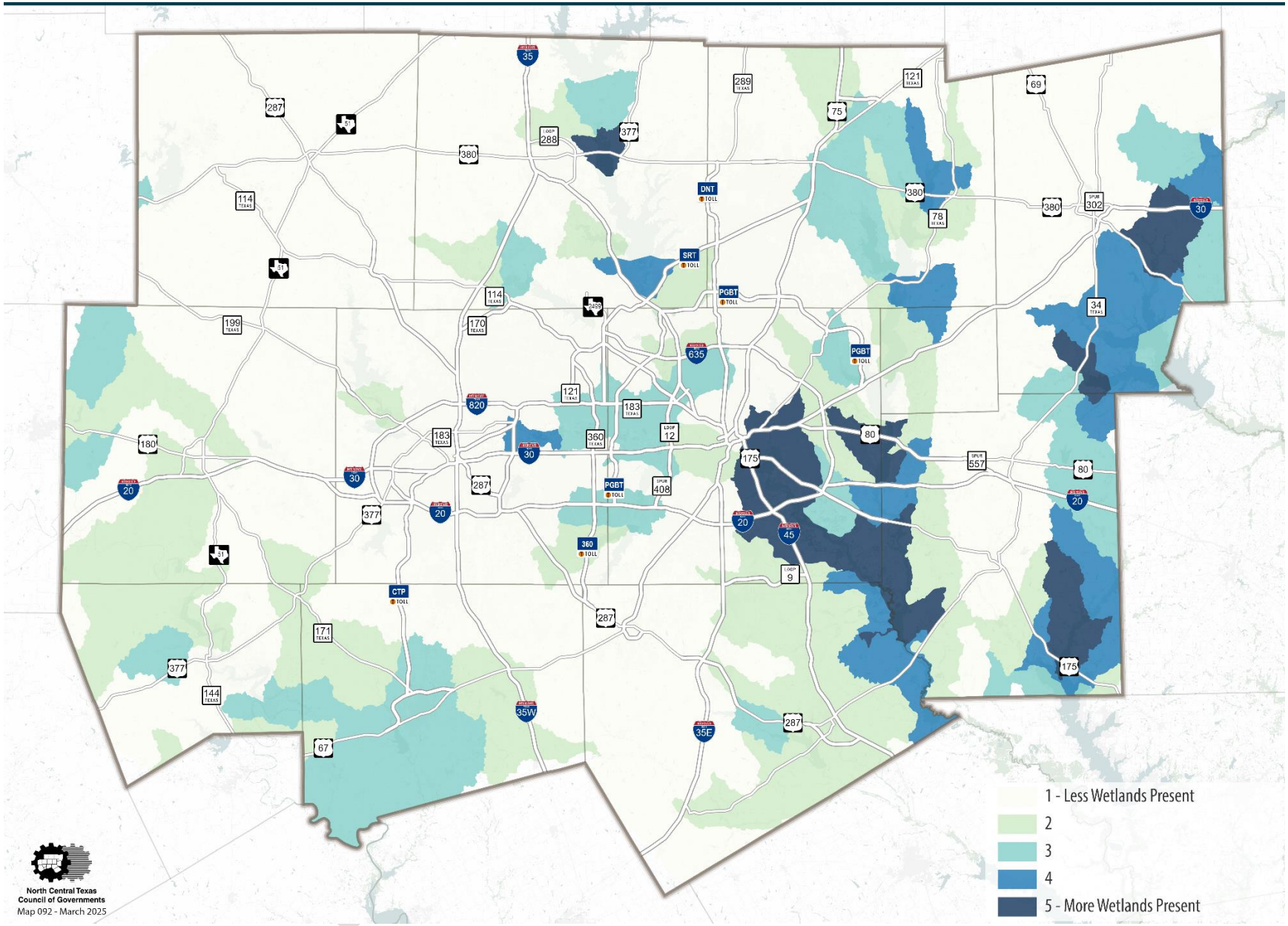
Regional Ecosystem Framework - Wildlife Habitat

MOBILITY 2050



Regional Ecosystem Framework - Wetlands

MOBILITY 2050



POTENTIAL MITIGATION ACTIVITIES AND LOCATIONS

Wetland and Stream Mitigation Assessment

NCTCOG's Mitigation Assessment identified potential locations for mitigation of impacts to wetlands and streams in accordance with the Clean Water Act. With feedback from stakeholders at federal, state, and local environmental agencies, environmental factors were used to model wetland acreage and stream segments whose protection could provide the greatest ecological benefit. Potential locations for wetland enhancement, wetland restoration, and stream enhancement are identified below.

NCTCOG has modeled the potential demand for wetland and stream mitigation credits generated by roadway recommendations in Mobility 2050 (please see results in the Mitigation Assessment section of the **Environmental Considerations** chapter).

The **Council on Environmental Quality** regulations define mitigation as:

AVOIDING the impact altogether by not taking a certain action or parts of an action.

MINIMIZING impacts by limiting the degree or magnitude of the action and its implementation.

RECTIFYING the impact by repairing, rehabilitating, or restoring the affected environment.

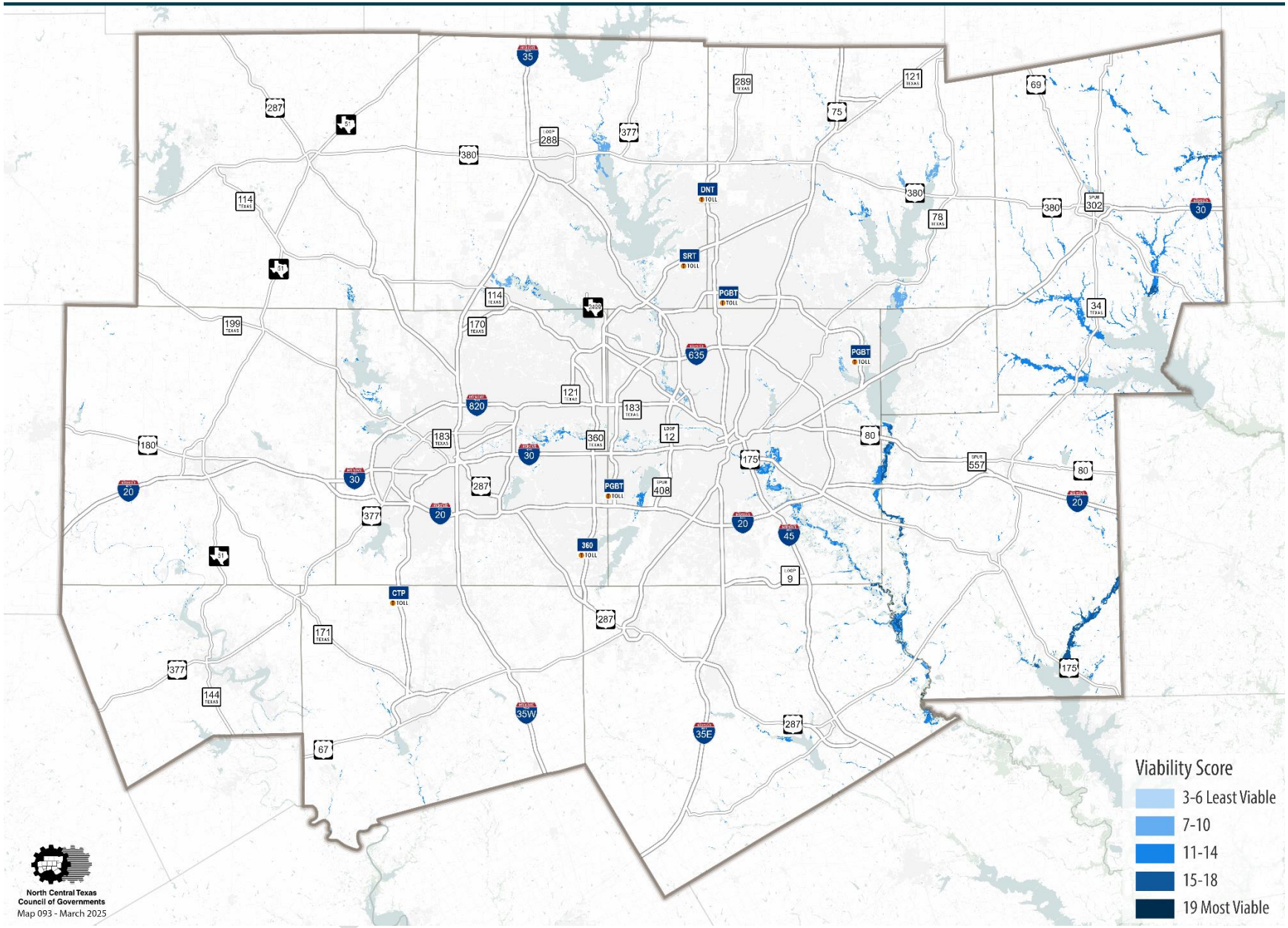
REDUCING or eliminating the impact over time by preservation and maintenance operations during the life of the action.

COMPENSATING for the impact by replacing or providing substitute resources or environments.

Ecosystem-Based Mitigation: The process of restoring, creating, enhancing, and preserving habitat and other ecosystem features in conjunction with or in advance of projects in areas where environmental needs and the potential environmental contributions have been determined to be greatest.

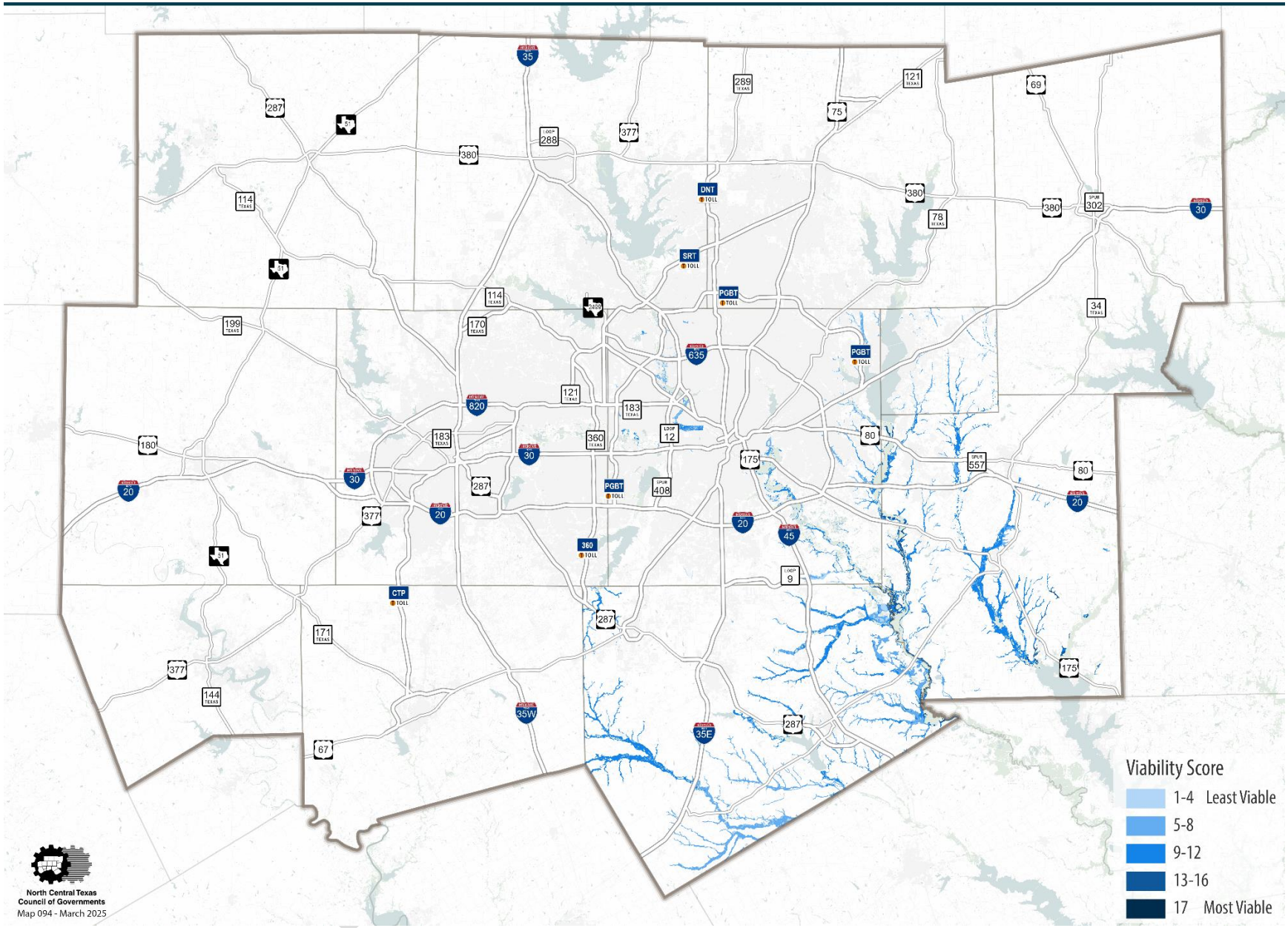
Viability of Sites for Potential Wetland Enhancement

MOBILITY 2050



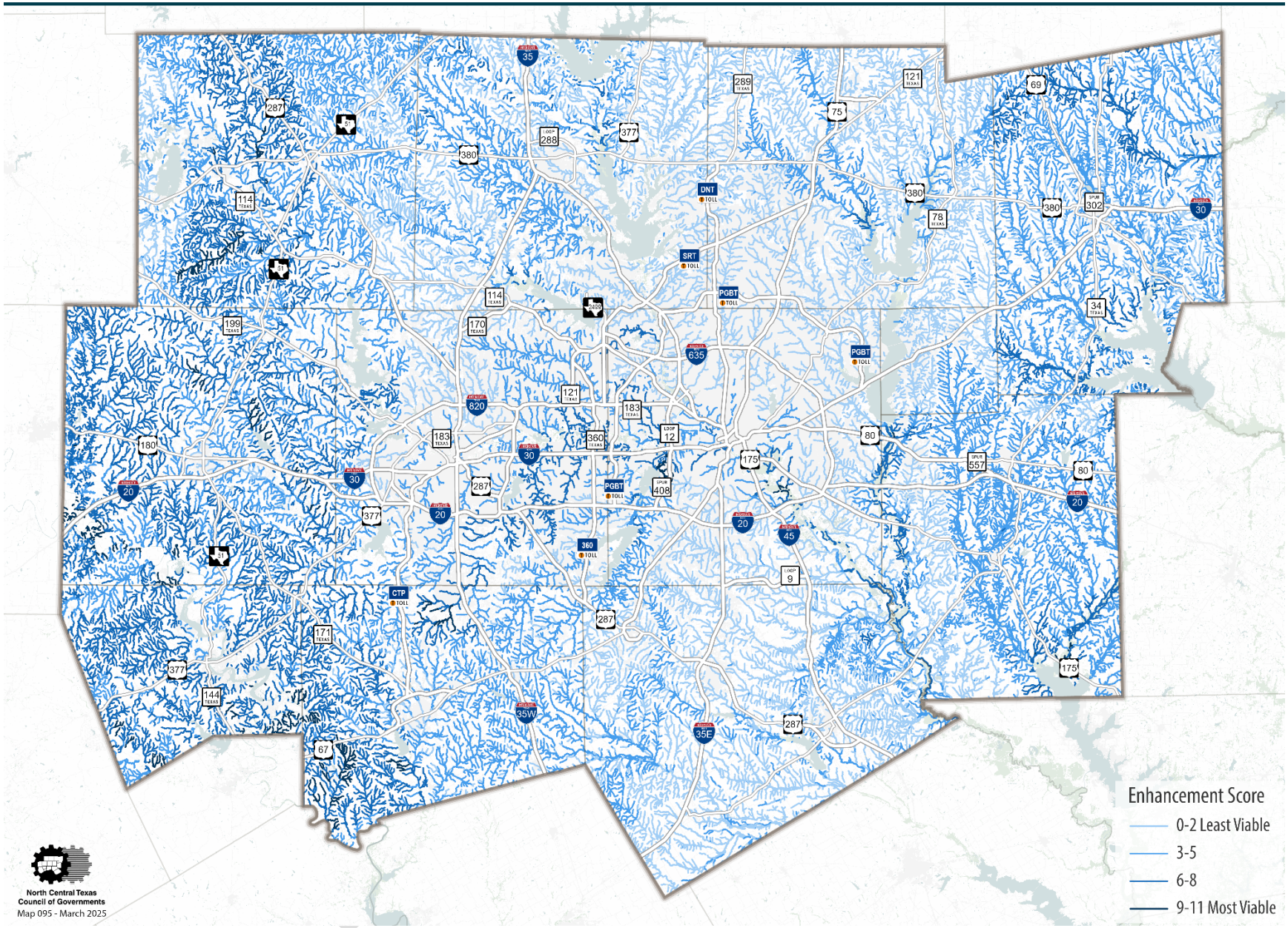
Viability of Sites for Potential Wetland Restoration

MOBILITY 2050



Viability of Sites for Potential Stream Enhancement

MOBILITY 2050



IMPACT TYPES AND MITIGATION STRATEGIES

Resources within the natural and built environments are generally impacted by transportation projects as a result of construction, increased traffic, and stormwater runoff from paved surfaces. Effects can occur directly, indirectly, or cumulatively. Mitigation for these effects can focus on the following resources and areas:

- Neighborhoods and communities, homes and businesses
- Traffic operations, traffic noise
- Cultural resources (historic properties or archaeological sites)
- Parks and recreation areas
- Wetlands and water resources
- Vegetation other natural areas
- Agricultural areas
- Endangered and threatened species
- Lighting and visual impacts
- Socio-economic impacts
- Environmental justice
- Air quality

Direct Effects: Caused by the action, occurring at the same time and place as the action.

Indirect Effects: Caused by the action, occurring later in time or farther removed in distance from the action; however, they are reasonably foreseeable.

Cumulative Effects: Effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency or person undertakes such other actions.

The potential environmental impacts are listed in the table below with corresponding mitigation activities that could be considered to have potential to restore and maintain the environmental functions in areas affected by the projects recommended in Mobility 2050. This list should not be considered an exhaustive list of all resources, potential impacts, or potential mitigation activities that could be found or implemented in a project or regional area. Furthermore, once projects are past the preliminary planning phases, there may be additional federal, state, and/or local mitigation required as a part of the environmental review process. NCTCOG's Natural Environment Screening may help to identify potential mitigation activities that may be relevant to the roadway and public transportation recommendations in Mobility 2050 and are included in this appendix.

Resource	Potential Effects	Potential Mitigation Activities	Potentially Relevant Resources from the Mobility 2050 Natural Environment Screening
Wetlands and Water Resources	• Loss of natural habitat • Erosion • Sedimentation • Stormwater runoff and pollutants • Nutrient loading • Alteration of hydrological flows • Loss of wetlands and impacts to streams • Floodplain impacts such as reduced flood storage capacity, increased erosive water velocities, or raised flood water levels	• Replace or restore wetlands. • Bridge sensitive areas. • Use erosion control measures. • Utilize environmentally sustainable stormwater management and Best Management Practices. Approaches may reduce the volume or pollutant load in stormwater runoff or reduce the impact to water resources. Examples may include porous pavement, bio swales, bioretention, and bottomless culverts. • Replace or restore natural areas, utilizing species native to individual ecoregions where appropriate. • Coordinate with federal, state, and private organizations to promote or incentivize preserving, restoring, or protecting wetlands and water resources by using policies such as conservation easements, conservation developments, or infill policies. • In floodplains, maintain valley storage and flood capacity, and reduce construction and development.	• Ecologically Significant Stream Segments • Impaired Water Segments • Surface Water Density • Wetlands • Flood Zones • Diversity • Rarity • Wildlife Habitat
Natural Areas such as Forests, Prairies	• Removal or fragmentation of key habitats, conservation areas, parks, and open space • Farmland • Priority prairies and habitats	• Use selective cutting and clearing. • Replace or restore natural areas, utilizing species native to individual ecoregions where appropriate. • Preserve existing vegetation and/or specialized mowing regimes. • Reduce the use of non-native species. • Coordinate with federal, state, and private organizations to promote or incentivize preserving, restoring, or protecting natural areas using policies such as conservation easements, conservation developments, or infill policies. • Address visual, light, and noise impacts using methods such as quiet zones, sound walls, and directional lighting. • Compensate for impacts through actions such as investing in a mitigation bank, defining a conservation easement, or creating a habitat conservation plan.	• Natural Areas • Wildlife Habitat • Diversity • Rarity

Resource	Potential Effects	Potential Mitigation Activities	Potentially Relevant Resources from the Mobility 2050 Natural Environment Screening
Endangered and Threatened Species and other Wildlife	• Removal or fragmentation of endangered species habitat • Disturbance of endangered or threatened species nesting regimes • Disturbance of habitats or nests for wildlife and migratory birds	• Use selective cutting and clearing. • Bridge sensitive areas. • Replace or restore natural areas, utilizing species native to individual ecoregions where appropriate. • Avoid nesting season or prevent nesting during construction projects when possible. • Compensate for impacts through on- and off-site mitigation such as a conservation easement, a habitat conservation plan, or wildlife bridges/crossings/culverts/tunnels, or creating habitat corridors.	Wildlife Habitat
Air Quality	• Project construction • Increased traffic and emissions • Congestion	• Control dust during construction. • Minimize idling of heavy construction vehicles. • Maintain construction equipment. • Use congestion management strategies such as Intelligent Transportation Systems, Travel Demand Management, and Transportation Systems Management strategies and programs.	
Neighborhoods and Communities	• Displacement of residents/businesses • Noise • Vibration • Visual and lighting • Increased traffic and change in travel patterns • Air quality/dust control • Historic structure removal • Archeological remains • Project construction	• Provide relocation assistance. • Minimize noise impact (sound walls, sound insulation, quiet zones). • Provide shielding/direct lighting. • Prevent the spread of hazardous materials with soil testing and treatment. • Document historic/archaeological sites. • Relocate historic buildings. • Use alternate hours for construction to minimize additional peak hour congestion.	

COORDINATION WITH ENVIRONMENTAL RESOURCE AND REGULATORY AGENCIES

Natural Environment Screening

The Natural Environment Screening was conducted to assist in achieving federal goals to sustain and restore the health of ecosystems through an ecosystem-based approach[17] and to promote environmental stewardship in the transportation system.[18] The Natural Environment Screening provides a preliminary tool to identify potential effects on natural environment resources that may result from the roadway and public transportation recommendations in Mobility 2050. These potential effects may warrant early coordination with resource agencies during the planning and project development process. Applicable resource agencies are identified for each recommendation. Potential opportunities for stewardship or mitigation activities may also be identified through the screening.

The screening identified the potential for effects on the natural environment on three levels:

- Roadway and public transportation recommendations
- Subwatersheds
- The North Central Texas region

The methodology and results for the three levels of screening are described below. Interpretation of the results should consider that the data used in the Natural Environment Screening represents quantity, not quality, of natural environment resources. Recommendations, subwatersheds, and resources identified as facing relatively high effects may require additional review, documentation, and coordination with the applicable regulatory or planning agencies to confirm the potential effects and stewardship or mitigation needs.

The Natural Environment Screening includes data from the REF and supplemental sources. Some of the REF data was updated for the Mobility 2050 Natural Environment Screening. Data sources are listed below.

Natural Environment Screening Data Sources

Natural Environment Screening Resource	Data Source
REF Diversity	Environmental Protection Agency Region 6 Regional Ecosystem Assessment Protocol
Ecologically Significant Stream Segments	Texas Parks & Wildlife
REF Flood Zones	Federal Emergency Management Agency, Digital Flood Insurance Maps
Impaired Water Segments	Texas Commission on Environmental Quality Index of Water Quality Impairments, and Regional Watershed Protection Plans
REF Rarity	Environmental Protection Agency Region 6 Regional Ecosystem Assessment Protocol
REF Surface Water Density	US Geological Survey National Hydrological Dataset
Threatened and Endangered Species	US Fish and Wildlife Service Information for Planning and Consultation and Texas Parks & Wildlife Department

[17] An ecosystem approach integrates social, ecological, and economic factors with the goal to "restore and sustain the health, productivity, and biological diversity of ecosystems and the overall quality of life." Federal Highway Administration, Environmental Review Toolkit, "Eco-Logical: An Ecosystem Approach to Developing Infrastructure Projects Appendix A – 1995 Memorandum of Understanding to Foster the Ecosystem Approach." https://www.environment.fhwa.dot.gov/env_initiatives/eco-logical/report/eco_app_a.aspx

[18] Federal Register Vol. 67, No. 184 Executive Order 13274: Environmental Stewardship and Transportation Infrastructure Project Reviews. Agencies "shall take appropriate actions, to the extent consistent with applicable law and available resources, to promote environmental stewardship in the Nation's transportation system and expedite environmental reviews of high-priority transportation infrastructure projects." 2002, https://www.transportation.gov/office-policy/transportation-policy/environmental-stewardship-and-transportation-infrastructure

Natural Environment Screening Resource	Data Source
Wetlands	National Land Cover Database, US Fish and Wildlife Service National Wetlands Inventory, and Texas Parks & Wildlife Department Ecological Mapping Systems of Texas
Wildlife Habitat	National Land Cover Database, Texas Parks & Wildlife Department Wildlife Management Areas, Environmental Protection Agency National Ecological Framework, and US Geological Survey Protected Area Database

Methodology: Roadway and Public Transportation Recommendations

The Natural Environment Screening assessed the potential environmental effects of each corridor recommended in Mobility 2050. For each recommendation, a half-mile buffer from the centerline was used to determine the natural environment resources that could be affected. A half mile was chosen because the majority of Mobility 2050 recommendations are improvements to existing facilities. For each resource, grid cells measuring 1 km^2 received a score of 1 to 5, depending on the quantity of the resource within the grid cell, with 5 indicating the highest quantity of a resource. Scores from the grid cells within the buffer were then averaged for each resource, resulting in low, medium, or high designations based on percentile groupings. Results are found in the tables below.

Results: Natural Environment Screening for Roadway Recommendations

Chisholm Trail Parkway	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Medium
Wetlands	Low
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Brazos Heelsplitter, Texas Fawnsfoot, Brazos Water Snake, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department	

Dallas North Tollway Extension	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Medium
Wetlands	Low
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency	

IH 20 (Parker County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	High
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Medium
Wetlands	Medium
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Brazos Heelsplitter, Texas Fawnsfoot, Brazos Water Snake, Texas Horned Lizard, Earth Fruit	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department	

IH 20 (East Tarrant County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Low
Wetlands	Low
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

IH 20 (Dallas County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	Low
Wetlands	High
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency	

IH 30 West Freeway	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Low
Wetlands	Low
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers	

IH 30 (East Tarrant County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	Medium
Wetlands	Medium
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers	

IH 30 Canyon	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	Low
Wetlands	Medium
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Texas Commission on Environmental Quality	

IH 30 East Corridor	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Low
Wetlands	Medium
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Texas Commission on Environmental Quality	

IH 30 (Rockwall County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	High
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Wood Stork, Louisiana Pigtoe, Texas Fawnsfoot, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency	

IH 30 (Hunt County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	High
Wetlands	High
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Black Bear, Louisiana Pigtoe, Southern Hickorynut, Texas Heelsplitter, Texas Pigtoe, Alligator Snapping Turtle, Northern Scarlet Snake, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers	

IH 345	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Low
Wetlands	Low
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
Texas Commission on Environmental Quality	

IH 35	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	High
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Low
Surface Water Density	High
Wetlands	Low
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Louisiana Pigtoe, Sanbank Pocketbook, Texas Heelsplitter, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department	

IH 35E (North)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	High
Rarity	High
Surface Water Density	High
Wetlands	Medium
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Golden-Cheeked Warbler, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency	

IH 35E (Stemmons)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	High
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Federal Emergency Management Agency	

IH 35E (Lower Stemmons)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	High
Wetlands	Low
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency, Texas Commission on Environmental Quality	

IH 35E (Lowest Stemmons)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	High
Wetlands	Medium
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency, Texas Commission on Environmental Quality	

IH 35W (North)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Medium
Surface Water Density	Medium
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Louisiana Pigtoe, Sanbank Pocketbook, Texas Heelsplitter, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers	

IH 35W (South)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Low
Surface Water Density	Medium
Wetlands	Low
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Golden-Cheeked Warbler, Piping Plover, Rufa Red Knot, White-Face Ibis, Whooping Crane, Black Bear, Brazos Heelsplitter, Louisiana Pigtoe, Texas Fawnsfoot, Brazos Water Snake, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

IH 820 (Northwest)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Medium
Surface Water Density	High
Wetlands	Low
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department	

North Tarrant Express (3)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Low
Wetlands	Medium
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
Federal Emergency Management Agency, US Army Corps of Engineers	

North Tarrant Express (1 & 2)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Medium
Wetlands	Medium
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Army Corps of Engineers, Federal Emergency Management Agency	

Midtown Express	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Medium
Wetlands	Medium
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Army Corps of Engineers, Federal Emergency Management Agency	

Outer Loop (North)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	High
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Medium
Surface Water Density	Medium
Wetlands	Medium
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Texas Heelsplitter, Sandbank Pocketbook, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency, Texas Commission on Environmental Quality	

Outer Loop (East)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Medium
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Texas Fawnsfoot, Trinity Pigtoe, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency	

PGBT (Northeast)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	High
Rarity	Medium
Surface Water Density	High
Wetlands	High
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Federal Emergency Management Agency	

SE Dallas Y-Connector	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Low
Wetlands	Medium
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

SH 114 (Denton County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Medium
Wetlands	Medium
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Louisiana Pigtoe, Sanbank Pocketbook, Texas Heelsplitter, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency, US Army Corps of Engineers	

SH 114 (Tarrant County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Medium
Wetlands	Low
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department	

SH 161/SH 360 Toll Connector	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Low
Wetlands	Low
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
Texas Commission on Environmental Quality	

SH 170	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Low
Wetlands	Low
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife	

PGBT (East Branch)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	High
Wetlands	High
Wildlife Habitat	High
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
US Fish and Wildlife Service, Texas Parks & Wildlife, US Army Corps of Engineers, Federal Emergency Management Agency	

SH 360 (North)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	High
Wetlands	Medium
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency, US Army Corps of Engineers, Texas Commission on Environmental Quality	

SH 360 Toll Road	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	High
Rarity	Low
Surface Water Density	Medium
Wetlands	Medium
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Hellsplitter, Trinity Pigtoe, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

SH 360 Toll Road Extension	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Low
Surface Water Density	Medium
Wetlands	Low
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Trinity Pigtoe, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency, Texas Commission on Environmental Quality	

Southeast Connector (Tarrant)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	High
Rarity	Low
Surface Water Density	Low
Wetlands	Medium
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

Spur 399	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	High
Rarity	High
Surface Water Density	Medium
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Army Corps of Engineers, Federal Emergency Management Agency, Texas Commission on Environmental Quality	

State Loop 12	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	High
Wetlands	High
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Army Corps of Engineers, Federal Emergency Management Agency, Texas Commission on Environmental Quality	

State Loop 288 (East)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	High
Rarity	Low
Surface Water Density	Low
Wetlands	Low
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Louisiana Pigtoe, Sanbank Pocketbook, Texas Heelsplitter, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department	

State Loop 288 (West)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	High
Rarity	Low
Surface Water Density	High
Wetlands	Medium
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Louisiana Pigtoe, Sanbank Pocketbook, Texas Heelsplitter, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department	

State Loop 9	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	Medium
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Federal Emergency Management Agency	

US 175 (Dallas County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	High
Wetlands	High
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

US 175 (Kaufman County)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Medium
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

US 287 (North)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	Low
Wetlands	Low
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish & Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

US 287 (South)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	High
Rarity	Medium
Surface Water Density	High
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Trinity Pigtoe, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
Texas Commission on Environmental Quality, Federal Emergency Management Agency	

US 380 Freeway	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Medium
Surface Water Density	High
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Texas Heelsplitter, Sandbank Pocketbook, Alligator Snapping Turtle, Texas Horned Lizard, Southern Hickorynut, Northern Scarlet Snake	
Resource Agencies of Greatest Interest	
US Fish & Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency, US Army Corps of Engineers	

US 75 (North)	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	High
Rarity	High
Surface Water Density	Low
Wetlands	Medium
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Golden-Cheeked Warbler, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish & Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

US 80	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Low
Wetlands	High
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Golden-Cheeked Warbler, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish & Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers	

Results: Natural Environment Screening for Public Transportation Recommendations

Project 1: Southwest TEXRail	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	Low
Wetlands	Low
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers	

Project 2: A-train South Extension	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	Medium
Wetlands	High
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Federal Emergency Management Agency	

Project 3: Frisco Line	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	High
Wetlands	Medium
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black rail, Golden-cheeked warbler, Sandbank pocketbook, Piping plover, Rufa red knot, White-face ibis, Whooping crane, Texas Fawnsfoot, Trinity pigtoe, Interior least tern, Texas heelsplitter, Texas horned lizard, Wood stork, Alligator snapping turtle, Louisiana pigtoe	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Federal Emergency Management Agency, US Army Corps of Engineers	

Project 4: McKinney Line	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Medium
Surface Water Density	High
Wetlands	Medium
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality, US Army Corps of Engineers	

Project 5: Silver Line East Extension	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Medium
Surface Water Density	Medium
Wetlands	Medium
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality, US Army Corps of Engineers, Federal Emergency Management Agency	

Project 6: Scyene Line	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	Medium
Rarity	Medium
Surface Water Density	Medium
Wetlands	High
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers	

Project 7: Green Line - Southeast Extension	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	Low
Surface Water Density	High
Wetlands	Low
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Wood Stork, Louisiana Pigtoe, Sandbank Pocketbook, Texas Fawnsfoot, Trinity Pigtoe, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Federal Emergency Management Agency	

Project 8: Waxahachie Line	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	High
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	High
Wetlands	High
Wildlife Habitat	Medium
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, Sandbank Pocketbook, White-Faced Ibis, Whooping Crane, Texas Fawnsfoot, Trinity Pigtoe, Alligator Snapping Turtle, Texas Heelsplitter, Wood Stork, Texas Horned Lizard, Louisiana Pigtoe	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Federal Emergency Management Agency	

Project 9: Midlothian Line	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	Medium
Wetlands	Low
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Golden-Cheeked Warbler, Interior Least Tern, Piping Plover, Rufa Red Knot, Sandbank Pocketbook, White-Faced Ibis, Whooping Crane, Texas Fawnsfoot, Trinity Pigtoe, Alligator Snapping Turtle, Texas Heelsplitter, Wood Stork, Texas Horned Lizard, Louisiana Pigtoe	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department	

Project 10: Mansfield Line	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	Medium
Impaired Water Segments	High
Rarity	Low
Surface Water Density	Low
Wetlands	Medium
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Wood Stork, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, Texas Commission on Environmental Quality	

Project 11: Cleburne Line	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Low
Ecologically Significant Stream Segments	Low
Flood Zones	Low
Impaired Water Segments	High
Rarity	Low
Surface Water Density	Low
Wetlands	Low
Wildlife Habitat	High
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Louisiana Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard, Brazos Heelsplitter, Brazos Water Snake	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Texas Commission on Environmental Quality	

Project 12: High-Speed Rail Corridor	
Natural Environmental Screening Resource	**Level of Prevalence**
Diversity	Medium
Ecologically Significant Stream Segments	Low
Flood Zones	High
Impaired Water Segments	Medium
Rarity	High
Surface Water Density	Low
Wetlands	High
Wildlife Habitat	Low
Potential Threatened or Endangered Species	
Federal: Golden-cheeked Warbler, Piping Plover, Rufa Red Knot, Whooping Crane, Texas Fawnsfoot, Tricolored Bat, Alligator Snapping Turtle, Texas Heelsplitter, Monarch Butterfly	
State: Black Rail, Interior Least Tern, Golden-Cheeked Warbler, Piping Plover, Rufa Red Knot, White-Faced Ibis, Whooping Crane, Black Bear, Texas Fawnsfoot, Wood Stork, Louisiana Pigtoe, Trinity Pigtoe, Sandbank Pocketbook, Texas Heelsplitter, Alligator Snapping Turtle, Texas Horned Lizard	
Resource Agencies of Greatest Interest	
US Fish and Wildlife Service, Texas Parks & Wildlife Department, US Army Corps of Engineers, Federal Emergency Management Agency, Texas Commission on Environmental Quality	

Methodology: Subwatersheds

Subwatersheds are relatively small drainage basins that provide a geographic unit for environmental analysis and management. The Natural Environment Screening identified subwatersheds where the natural environment may be most affected by recommendations in Mobility 2050. The subwatershed method used the buffers and grid cell scores generated by the method for analyzing roadway and public transportation recommendations described above. For each subwatershed, a total was generated for the number of grid cells within a buffer and with a high score of 4 or 5 for any natural environment resource. Subwatersheds were then ranked based on the number of affected, high-scoring grid cells. The Natural Environment Screening identified subwatersheds with more than 400 high-scoring grid cells. This includes approximately the top 13 percent of impacted subwatersheds that may be most affected by Mobility 2050 roadway recommendations. The same threshold identified approximately the top 14 percent of impacted subwatersheds that may be most affected by public transportation recommendations. Results are found below.

Results: Natural Environment Screening for Subwatersheds

Name of Watershed	Number of High-Scoring Grid Cells	Corridor Number	Corridor Name
ROADWAY			
Quil Miller Creek-Village Creek	552	20	IH 35W (South)
Village Creek-Lake Arlington	434	20	IH 35W (South)
		37	Southeast Connector (Tarrant)
Wildcat Branch-Lake Arlington	562	8	IH 30 (East Tarrant County)
		37	Southeast Connector (Tarrant)
Sycamore Creek-West Fork Trinity River	411	8	IH 30 (East Tarrant County)
		21	IH 820 (Northwest)
		22	North Tarrant Express (3)
		23	North Tarrant Express (1 & 2)
		37	Southeast Connector (Tarrant)
Headwaters Mountain Creek	777	35	SH 360 Toll Road
		36	SH 360 Toll Road Extension
		46	US 287 (South)
Culp Branch-Elm Fork Trinity River	477	26	Outer Loop (North)
Upper Hickory Creek	823	14	IH 35
		15	IH 35E (North)
		19	IH 35W (North)
		40	State Loop 288 (East)
		41	State Loop 288 (West)

Name of Watershed	Number of High-Scoring Grid Cells	Corridor Number	Corridor Name
Bachman Branch-Elm Fork Trinity River	700	15	IH 35E (North)
		16	IH 35E (Stemmons)
		24	Midtown Express
		39	State Loop 12
Headwaters Turtle Creek	613	9	IH 30 Canyon
		10	IH 30 East Corridor
		13	IH 345
		16	IH 35E (Stemmons)
		17	IH 35E (Lower Stemmons)
		18	IH 35E (Lowest Stemmons)
		24	Midtown Express
City of Dallas-White Rock Creek	558	9	IH 30 Canyon
		10	IH 30 East Corridor
		13	IH 345
		43	US 175 (Dallas County)
		49	US 80
Throckmorton Creek-East Fork Trinity River	675	26	Outer Loop (North)
		47	US 380 Freeway
		48	US 75 (North)
Honey Creek	608	26	Outer Loop (North)
		47	US 380 Freeway
Clemons Creek-East Fork Trinity River	1,007	26	Outer Loop (North)
		38	Spur 399
		47	US 380 Freeway
Upper Wilson Creek	729	26	Outer Loop (North)
		47	US 380 Freeway
Lower Wilson Creek	529	38	Spur 399
Stiff Creek-Sister Grove Creek	553	26	Outer Loop (North)
		47	US 380 Freeway
North Mesquite Creek-East Fork Trinity River	949	3	East Branch
		10	IH 30 East Corridor
		42	State Loop 9
		49	US 80

Name of Watershed	Number of High-Scoring Grid Cells	Corridor Number	Corridor Name
Mustang Creek-East Fork Trinity River	658	3	East Branch
		42	State Loop 9
		44	US 175 (Kaufman County)
		49	US 80
TRANSIT			
Quil Miller Creek-Village Creek	449	11	Cleburne Line
Low Branch-Mountain Creek	918	9	Midlothian Line
		10	Mansfield Line
Delaware Creek-West Fork Trinity River	498	3	Frisco Line
		12	High-Speed Rail Corridor
Turtle Creek-Trinity River	449	8	Waxahachie Line
		9	Midlothian Line
		12	High-Speed Rail Corridor
Five Mile Creek-Trinity River	648	8	Waxahachie Line
		7	Green Line - Southeast Extension
		6	Scyene Line
Brown Branch Rowlett Creek	584	5	Silver Line East Extension
		4	McKinney Line
Clemons Creek-East Fork Trinity River	542	4	McKinney Line
Lower Wilson Creek	407	4	McKinney Line

Methodology: North Central Texas Region

Natural environment resources were analyzed at the regional scale to identify which resources may most be affected by roadway and public transportation recommendations in Mobility 2050. For each natural resource, a total was generated for the number of grid cells within a buffer and with a high score of 4 or 5. Results are found below.

Results: Natural Environment Screening for Resources

Natural Environment Screening Resource (Roadway)	Number of High-Scoring Cells Affected by Mobility 2050 Roadway Recommendations
1 Impaired Water	6,303
2 Rarity	13,066
3 Flood Zones	7,342
4 Surface Water Density	4,441
5 Wildlife Habitat	3,241
6 Wetland	1,295
7 Diversity	1,498
8 Ecologically Significant Stream Segments	59

Natural Environment Screening Resource (Transit)	Number of High-Scoring Cells Affected by Mobility 2050 Transit Recommendations
1 Impaired Water	2,886
2 Rarity	5,093
3 Flood Zones	2,526
4 Surface Water Density	1,568
5 Wildlife Habitat	504
6 Wetland	273
7 Diversity	210
8 Ecologically Significant Stream Segments	0

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C-3. HAZARD VULNERABILITY AND RESILIENCE

POLICIES

MTP Reference #	Transportation System Security and Resiliency
SPD3-001	Increase resiliency of ancillary infrastructure included within or immediately adjacent to the transportation system's right-of-way or easement, including improving stormwater management.

PROGRAMS

Hazard Vulnerability and Resilience Strategies	
Reference	SPD2-001
Background	Incorporate resilience into the transportation planning and asset management processes through resilience studies, workshops, plans, and coordination.
Policy Position	SPD3-001
Implementation	Increased transportation system resiliency for critical facilities and vulnerable locations.
Performance Dimensions	• Percentage of regional land developed • National highway system lane miles in flood zones
Cost Estimate	N/A – Program costs associated with planning elements only

STRATEGIES

Resilience strategies conducted by the North Central Texas Council of Governments are consistent with guidance from the Federal Highway Administration's (FWHA) *Vulnerability Assessment and Adaptation Framework* (3rd Edition, December 2017)[19] and *Integrating Resilience Concepts and Strategies into Transportation Planning (2023): A Guide* from the National Cooperative Highway Research Program's Research Report #1052, as well as other products and initiatives derived from participation in the following activities and groups:

- FHWA Pilot Program: Climate Change/Extreme Weather Vulnerability and Risk Assessment for Transportation Infrastructure in Dallas and Tarrant Counties (2013-2015)
- FHWA Peer Exchange: Climate Resilience and Planning (October 2016 – Atlanta, GA)
- FHWA Workshop: Resilience in the Transportation Planning Process Under the Fixing America's Surface Transportation Act (June 2017 – Austin, TX)
- Texas Association of Metropolitan Planning Organizations Summer Meeting and Transportation Asset Management Workshop (July 2017 – Harlingen, TX)
- FHWA Transportation Asset Management Expert Task Group (2018 – Present)
- Transportation Resilience Innovations Summit and Exchange (October 2018 – Denver, CO)
- American Association of State Highway and Transportation Officials Center for Environmental Excellence Technical Work Group (2019 – Present)
- Texas A&M Transportation Institute Resiliency Workshop (June 2019 – Arlington, TX)
- 2nd International Conference on Transportation Resilience to Natural Hazards and Extreme Weather (November 2019 – Washington, DC)
- Transportation Research Board Asset Management Committee – AJE30 (2020 – Present)
- Association of Metropolitan Planning Organizations Technical Committee (2020 – 2024)
- Texas Association of Metropolitan Organizations Statewide Resiliency Technical Work Group (2020 – Present)
- Texas Department of Transportation Statewide Resiliency Plan – Stakeholder (2023 – Present)
- 3rd International Conference on Extreme Weather and Climate Change Challenges to Transportation Resilience (November 2023 – Washington, DC)

Incorporate resilience in transportation planning using the Infrastructure Voluntary Evaluation Sustainability Tool, a self-evaluation tool developed by FHWA to assist agencies in evaluating the sustainability performance of projects and programs based on sets of criteria, including infrastructure resilience.

Integrate transportation infrastructure vulnerability and criticality assessment parameters into the project development process and prioritization for subsequent Metropolitan Transportation Plan (MTP) updates.

Improve the use of forecasting tools (including climate, hydraulic, and hydrologic models) **and data collection** for the monitoring, recording, and analysis of extreme weather impacts on the region's transportation infrastructure.

[19] *Vulnerability Assessment and Adaptation Framework*, Federal Highway Administration Office of Planning, Environmental, and Realty, 3rd Edition, December 2017

Coordinate with officials responsible for disaster risk reduction, including, but not limited to, the United States Army Corps of Engineers, Federal Emergency Management Agency, the Texas Division of Emergency Management, the Texas Commission on Environmental Quality, the Texas Water/Wastewater Agency Response Network, the Texas Water Development Board, Tarrant Regional Water District, municipal emergency management and response agencies, and other agencies responsible for hazard mitigation planning and implementation.

Partner with the Texas Department of Transportation (TxDOT), municipalities, resource agencies, other metropolitan planning organizations (MPOs), consultants, universities, utilities, and the private sector to help identify funding resources and technical capacities for the consistent and continuous collection and evaluation of climate, watershed flooding, soil moisture retention, and other environmental data; provide expertise on vulnerabilities in the region; and strategize potential resilience options.

Use corridor studies to identify vulnerable transportation infrastructure, designate critical facilities, and develop adaptation strategies in those study areas.

Conduct evacuation route planning and develop alternative routes or capacity redundancy for identified vulnerable areas.

Utilize the results of vulnerability assessments to inform infrastructure design such as bridge or roadbed elevation, design, and the use of materials in construction that are more sustainable to natural disasters. Initiatives could also include integration of innovative stormwater management assets, as well as applications of natural infrastructure elements, where appropriate.

FEDERAL GUIDELINES AND ORDERS

Infrastructure Investment and Jobs Act (2021)

The National Highway Performance Program (NHPP) is amended to include the purpose of providing support for activities to increase the resiliency of the National Highway System (NHS) to mitigate the cost of damages from sea level rise, extreme weather events, flooding, wildfires, or other natural disasters.[20] Federal funds may, therefore, be used for "protective features" to mitigate the risk of recurring damage from extreme weather events, including Surface Transportation Block Grant Program funds, and up to 15 percent of the NHPP annual apportionment may be used for resiliency of highways and bridges that are not part of the NHS.[21] Additionally, Transportation Asset Management Plans, required by State Departments of Transportation and informed through the NHS pavement and bridge condition targets obtained for the NHPP, must include consideration of extreme weather and resiliency in lifecycle cost calculations and risk management analyses.

State DOTs, in consultation with designated research centers and other stakeholders (including MPOs), are mandated through the Infrastructure Investment and Jobs Act (IIJA) to develop quantitative measures of resilience and annual risk affecting transportation infrastructure. Furthermore, as part of enhancing infrastructure resilience to severe weather impacts, state DOTs must assist in

[20] 23 USC 119 (b)(4) – Infrastructure Investment and Jobs Act, Section 11105, https://www.congress.gov/117/bills/hr3684/BILLS-117hr3684enr.pdf, pgs. 29-30

[21] 23 USC 119 (k)(1) and 23 USC 133 (b)(1) – Infrastructure Investment and Jobs Act, Sections 11105 and 11109, https://www.congress.gov/117/bills/hr3684/BILLS-117hr3684enr.pdf, ps. 29-30, 33-40

improving statistics to inform transportation policy and in implementing any new relevant analytical methods and capabilities.[22] Support for these initiatives will be provided through resilience research and development coordinated through establishment of the Advanced Research Projects Agency–Infrastructure within the USDOT. They will additionally be augmented through a $500 million IIJA authorization (subject to appropriation) for the creation of up to 10 regional Centers of Excellence for Resilience and Adaptation. Activities supported by such centers may include the development of standards for design, operations, and maintenance of climate-resilient transportation infrastructure, as well as stakeholder engagements to increase technical capacity for risk assessments.[23] This enhancement of available data, tools, and proficiencies will be critical among all agencies to collectively improve transportation resiliency conditions and performance.

Among many other potential products/outputs, a major IIJA benefactor of those new resources will be the new Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program.[24] With a total of $8.7 billion in Fiscal Year 2022-2026 Contract Authority from the Highway Trust Fund, $7.3 billion will be apportioned to State DOTs by formula, and $1.4 billion will be made available through competitive discretionary grants for multiple eligible entities, including MPOs. PROTECT formula funds will be apportioned to highway, public transit facilities/services, intercity passenger rail, or port facility projects that can improve transportation system resilience, including use of natural infrastructure protection or ecosystem restoration elements, which may be functionally connected to transportation improvements. PROTECT competitive funds will also be applied to similar resiliency-based project types, but they will additionally be used as planning grants for the development of state/MPO resilience improvement plans, vulnerability assessments, technical capacity building, and evacuation planning/preparation efforts. For both allotments, no more than 40 percent of funds may be used for construction of new capacity, and no more than 10 percent may be used for development phase activities. PROTECT competitive funds will have set-asides of at least 25 percent for projects in rural areas, no more than 25 percent for intercity passenger rail projects, and at least 2 percent for projects in tribal lands. The maximum federal cost share is 80 percent for construction projects and 100 percent for planning grants. Eligible entities will have the ability to increase the maximum federal cost share by 7 percent if a project is prioritized within that entity's resilience improvement plan, and by an additional 3 percent if the entity's resilience improvement plan is incorporated within a MPO's MTP or a state DOT's long-range transportation plan. Any future amendments to this MTP, along with any future new MTPs, and efforts to optimize the region's accessibility to PROTECT funds and maximize federal cost share eligibility for relevant projects, will formally address this incorporation process.

The IIJA also establishes a new Carbon Reduction Program for projects to support the lowering of transportation emissions that can exacerbate changes in weather patterns and its effects on extreme weather events.[25] Eligible projects include establishment of congestion management facilities/programs, vehicle electrification infrastructure,

[22] Infrastructure Investment and Jobs Act (Title III – Research, Technology, and Education), Sections 13003-13006, https://www.congress.gov/117/bills/hr3684/BILLS-117hr3684enr.pdf, pgs. 200-211

[23] Infrastructure Investment and Jobs Act (Title III – Research, Technology, and Education), Section 13009, https://www.congress.gov/117/bills/hr3684/BILLS-117hr3684enr.pdf, pgs. 214-216

[24] Infrastructure Investment and Jobs Act, Section 11405, https://www.congress.gov/117/bills/hr3684/BILLS-117hr3684enr.pdf, pgs. 133-147

[25] Infrastructure Investment and Jobs Act, Section 11403, https://www.congress.gov/117/bills/hr3684/BILLS-117hr3684enr.pdf, pgs. 127-130

alternate fuel or electric vehicle deployments, public transit facilities/services, on-/off-road bicycle and pedestrian (or other nonmotorized) accommodations, Intelligent Transportation System deployments, energy-efficient street lighting and traffic control device alternatives, travel demand or congestion management strategies (including pricing options), and efforts to reduce environmental and community impacts of freight movements and port facilities. Within two years of IIJA enactment, state DOTs, in consultation with all MPOs within the state, must develop a "carbon reduction strategy" highlighting support efforts to reduce transportation emissions, identify associated projects/strategies to accomplish emission reductions, quantify the total carbon emissions derived from transportation facility construction within the state, and assess appropriateness of outcomes in relation to the context and population density of the state. The "carbon reduction strategy" must be updated at least once every four years. Sixty-five percent of apportioned funds for each state shall be obligated, in proportion to their relative population shares, across all urbanized area classifications. The remaining 35 percent of the apportioned funds may be obligated in any area of the state.

Fixing America's Surface Transportation Act (2015)

The metropolitan planning process should consider resiliency needs as a planning factor, and its scope should provide consideration of projects and strategies that will improve the resiliency and reliability of the transportation system, as well as reduce or mitigate stormwater impacts of surface transportation.[26] MTPs should contain capital investment and other strategies to preserve the existing and projected future metropolitan transportation infrastructure, which may be accomplished, in part, by reducing the vulnerability of current/planned assets to natural disasters.[27] Additionally, such initiatives should be included within discussions of locations and types of potential environmental mitigation activities that would have the greatest likelihood to restore, maintain, and/or enhance environmental functions affected by the MTP.[28]

Federal Highway Administration Order 5520 (2014)

In compliance with FHWA policy, partnering agencies should venture together to identify changes in weather patterns and extreme weather event risks to current and planned transportation systems, and integrate consideration of those risks into planning, operations, policies, and programs aimed to promote preparedness, asset protection, and ensure continued network safety, reliability, and sustainability.[29]

Moving Ahead for Progress in the 21st Century Act (2012)

This act required each state DOT to prepare and implement a risk-based asset management plan, through a development process to be reviewed and certified at least every four years, to improve or preserve asset condition and performance of NHS facilities.[30] Moving Ahead for Progress in the 21st Century also instituted the NHPP as a resource mechanism for improving NHS condition and performance, constructing new NHS facilities, and ensuring federal-aid highway construction investments are directed to support progress toward achievement of targets established in a state's required asset

[26] 23 USC 134(a)(1) and (h)(1)(I)
[27] 23 USC 134(i)(2)(G) and 23 CFR 450.324(f)(7)
[28] 23 CFR 450.324(f)(10)
[29] www.fhwa.dot.gov/legsregs/directives/orders/5520.cfm
[30] 23 USC 119(e)(1), MAP-21 Section 1106

management plan. Most importantly, MAP-21 mandated that development of those targets be conducted to the maximum extent practicable through coordination with MPOs and all non-state NHS owners, along with abilities for MPOs to set their own targets for NHS facilities within their designated planning areas. Similar planning and target-setting provisions were also authorized regarding the condition/performance of transit assets and services, and a new framework to update Metropolitan Planning Agreements enabled opportunities for MPOs, DOTs, and transit providers to formalize roles and responsibilities for developing and sharing performance data, and determining collaborative processes for the setting, reporting, and progress tracking of condition targets.[31] Though most MPOs neither own nor operate these various assets, these new regulations certainly promulgated a favorable environment for the convergence of planning, asset management, and resilience, and created an innovative, inclusive, silo-busting, and accountable formula for optimizing increasingly limited financial resources.

All the reforms above were carried forward into the Fixing America's Surface Transportation (FAST) Act and formal rulemaking was codified by 2017 for each mode concerning asset condition performance measures, target-setting processes, progress reporting, asset management plan requirements, and DOT/MPO long-range and programming plan incorporation. Essential details and exhibits regarding these characteristics, including specific regional asset condition data, proposed targets, and analyses within each mode, are described in the **Regional Performance** chapter and appendix. The FAST Act included additional provisions to further integrate resilience and asset management. First, it enabled states to use NHPP funds for the reconstruction, resurfacing, restoration, rehabilitation, or preservation of a non-NHS bridge if the asset is located on a federal-aid eligible roadway. Second, it created an Emergency Relief Program to assist all branches of government, including those of tribal nations, with the expense of repairing severe damage to federal-aid, tribal, and federal lands roadways resulting from natural disasters or catastrophic failures. Third, it enabled new rulemaking to separate asset management plan regulations from those governing periodic evaluations of reasonable alternatives for roads, highways, and bridges requiring repeated repair and reconstruction due to emergency events. This increased availability of funds, plus a two-tiered approach to implementation giving priority for evaluations on NHS facilities, is expected to lessen the extent and severity of damage from future disasters by proactively dealing with or adapting to risks and reducing the frequency of repeated impacts.

[31] 49 USC 5326, MAP-21 Section 20019