

Environmental Consultation for Mobility 2045

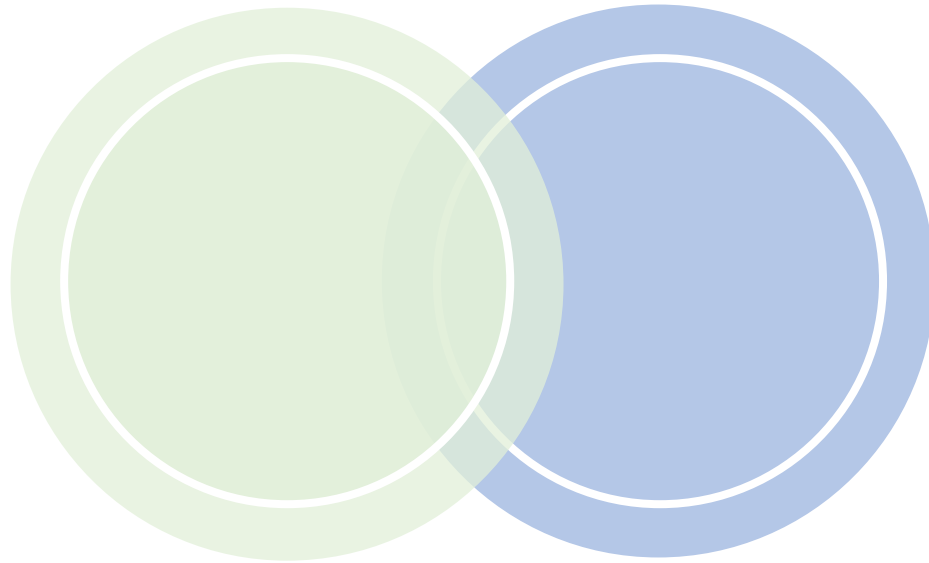
Planning & Environment Linkages



North Central Texas Council of Governments

November 8, 2017

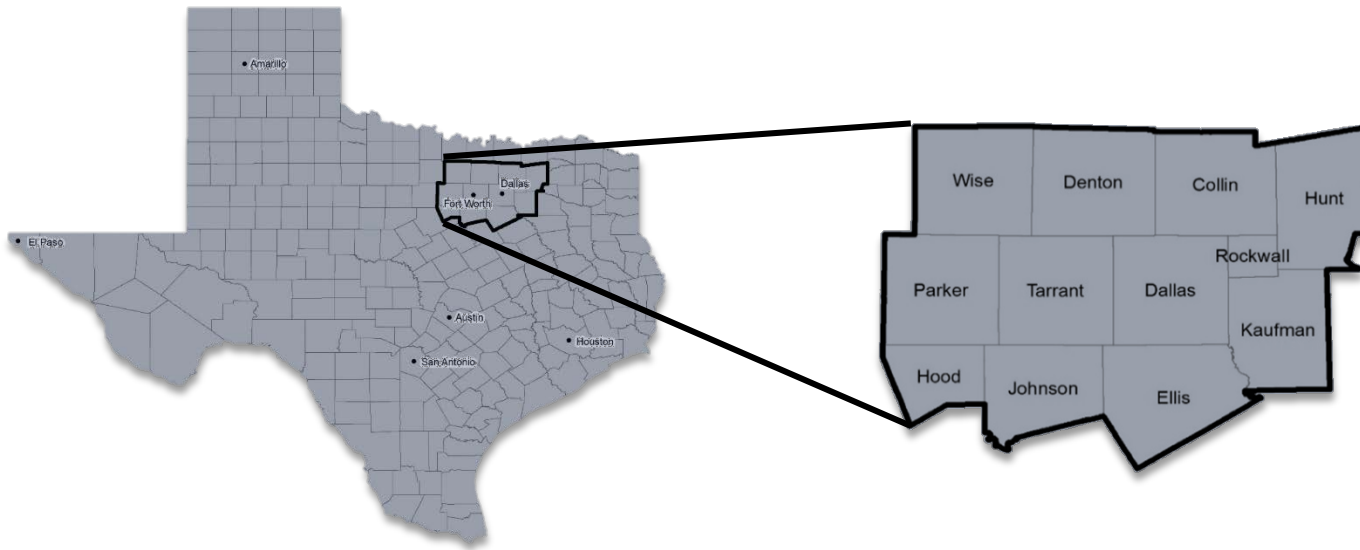
Welcome & Introductions



Sandy Wesch, Project Engineer

NCTCOG Metropolitan Planning Area

- 12 counties covering 9,441 square miles
- 7.2 million population in 2017
- 11.2 million population projected for 2045



Metropolitan Planning Organization

- Transportation planning process in metropolitan areas
- Regional Transportation Council – policy board
- NCTCOG Transportation Department – staff



Long-Range Transportation Planning

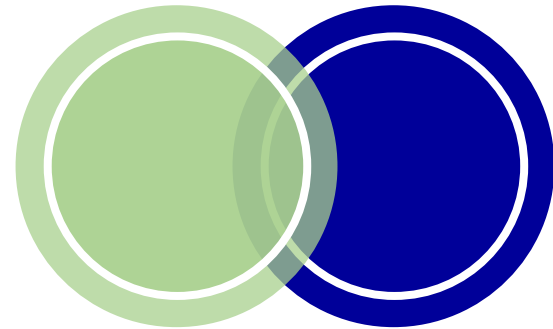
- Fiscally constrained
- Minimum 20-year planning horizon
- Project prioritization
- Performance-based planning
- Continuing, cooperative, comprehensive



All: Getty Images

Planning & Environment Linkages

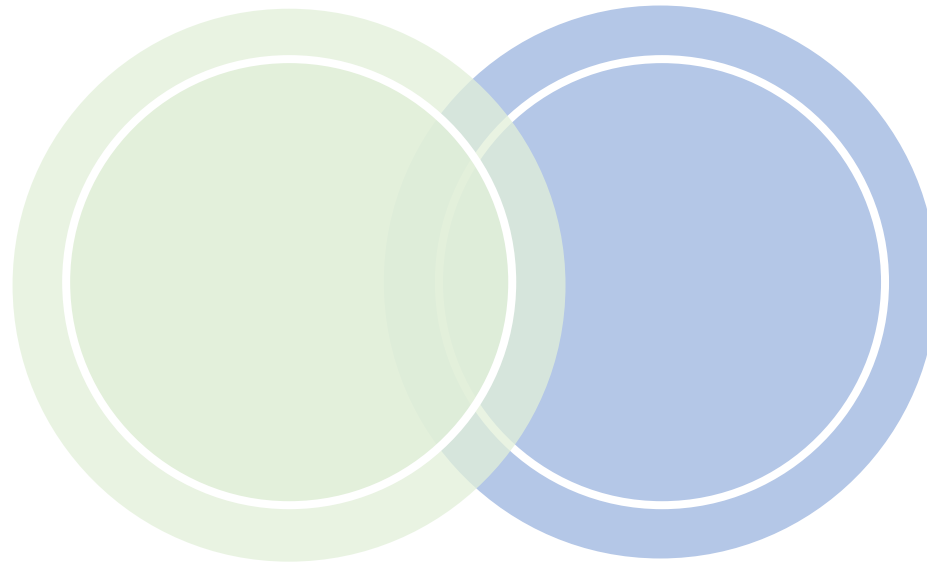
- Environmental, community values
- Early in planning process
- Relationship-building
- Streamlined environmental process
- Needs of the community
- Minimized impacts



www.nctcog.org/pel

Introductions

Mobility 2045 Schedule & Proposed Projects



Kevin Feldt, Program Manager

What Is The Metropolitan Transportation Plan?

Required By Law



Represents a Blueprint for the Region's Multimodal Transportation System



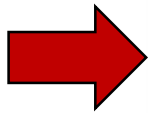
Covers at Least a 20-year Timeframe



Responds to Goals



Identifies Policies, Programs, & Projects for Continued Development



Guides the Expenditure of Federal & State Funds

Regional Perspective

Population

- 12. Virginia – 8,411,808
- 13. Washington – 7,288,000
- ★ **DFW – 7,123,170**
- 14. Arizona – 6,931,071
- 15. Massachusetts – 6,811,779
- 16. Tennessee – 6,651,194

Source: US Census Bureau July 2016 estimate &
NCTCOG DFW Estimate is January 1, 2016

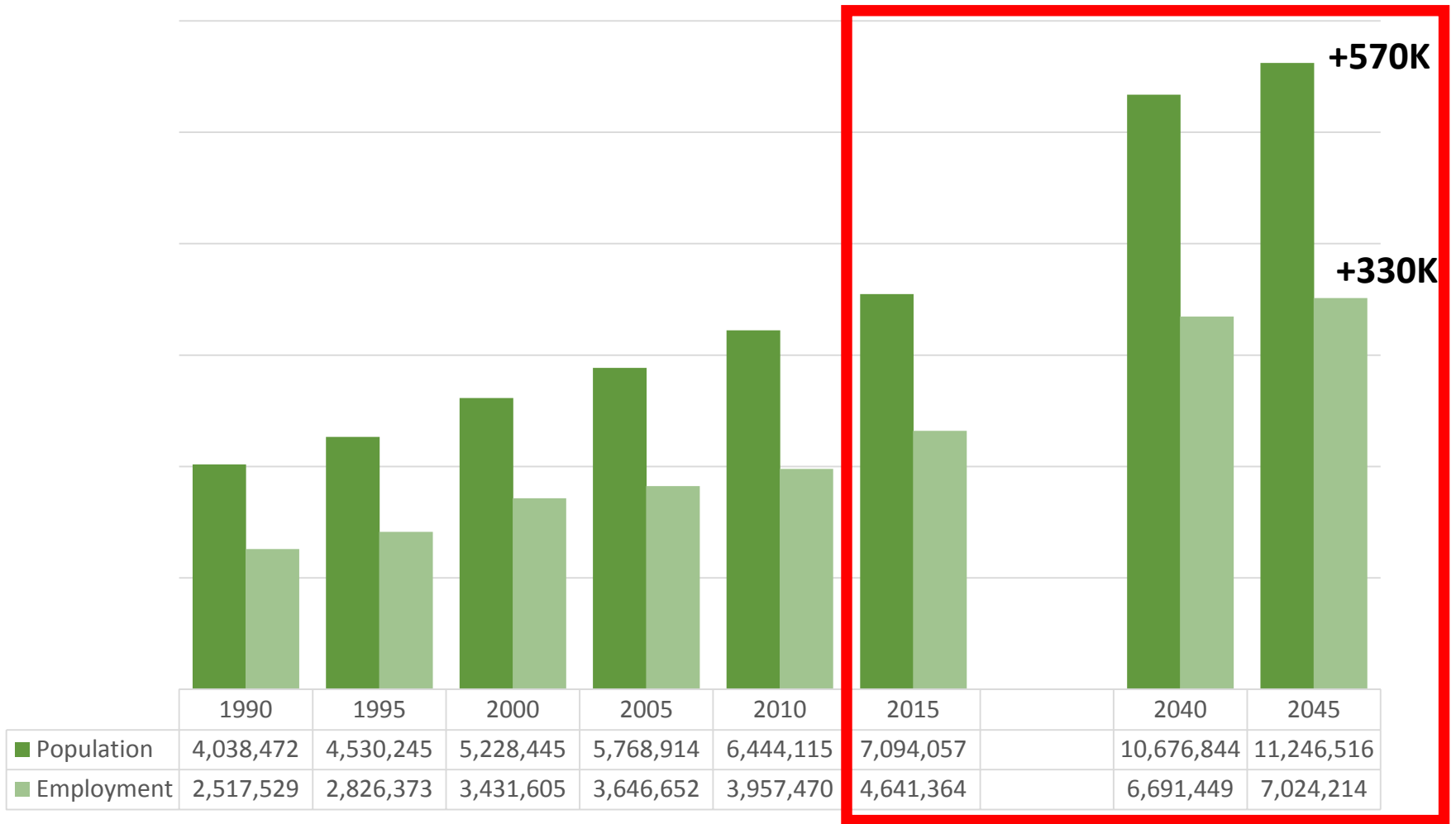
Note:
Lake Erie – 9,910 square miles

Area (square miles)

- 44. Massachusetts – 10,554
- 45. Vermont – 9,616
- ★ **DFW – 9,441**
- 46. New Hampshire – 9,349
- 47. New Jersey – 8,722
- 48. Connecticut – 5,543
- 49. Delaware – 2,448
- 50. Rhode Island – 1,545

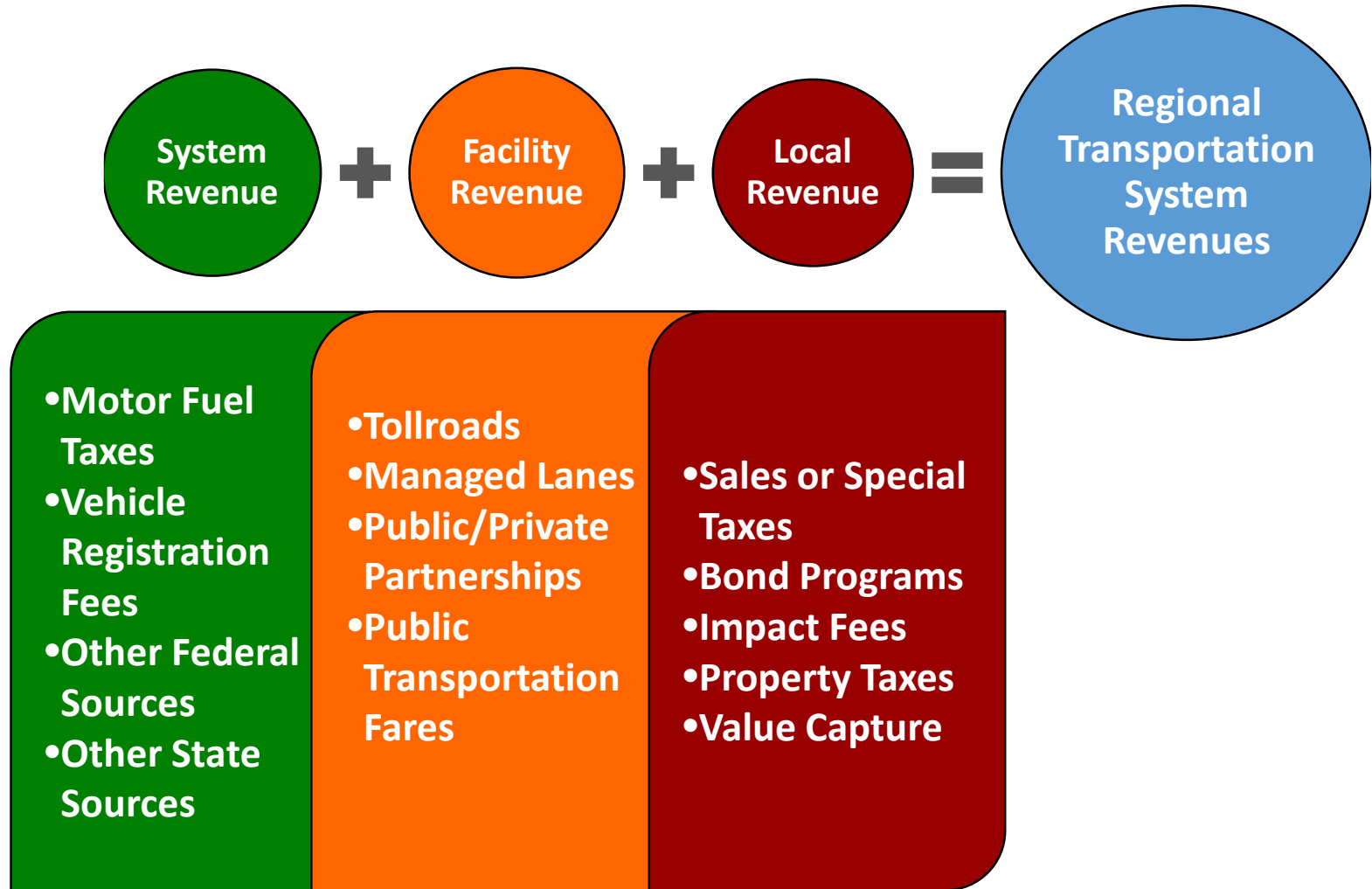
Source: US Census Bureau, 2010 census & NCTCOG

Growth



Note: Historical figures are total population. Projected figures are household population.

Transportation Funding Basics



Prioritization & Expenditures

DRAFT

| | | 2040 | 2045 ¹ |
|-------------------------------------|--|----------------------------|----------------------------|
| Maximize Existing System | Infrastructure Maintenance | \$37.4 | \$41.3 |
| | Management & Operations | \$7.2 | \$7.9 |
| | Growth, Development, & Land Use Strategies | \$3.6 | \$3.9 |
| Strategic Infrastructure Investment | Rail & Bus | \$27.2 | \$30.0 |
| | Managed Lanes | \$43.4 | \$47.9 |
| | Freeways/Tollways & Arterials | \$43.4 | \$47.9 |
| Total Expenditures | | \$118.9² | \$131.0² |

- 1 Preliminary estimates to be refined.
- 2 Actual dollars, in billions. Values may not sum due to independent rounding.

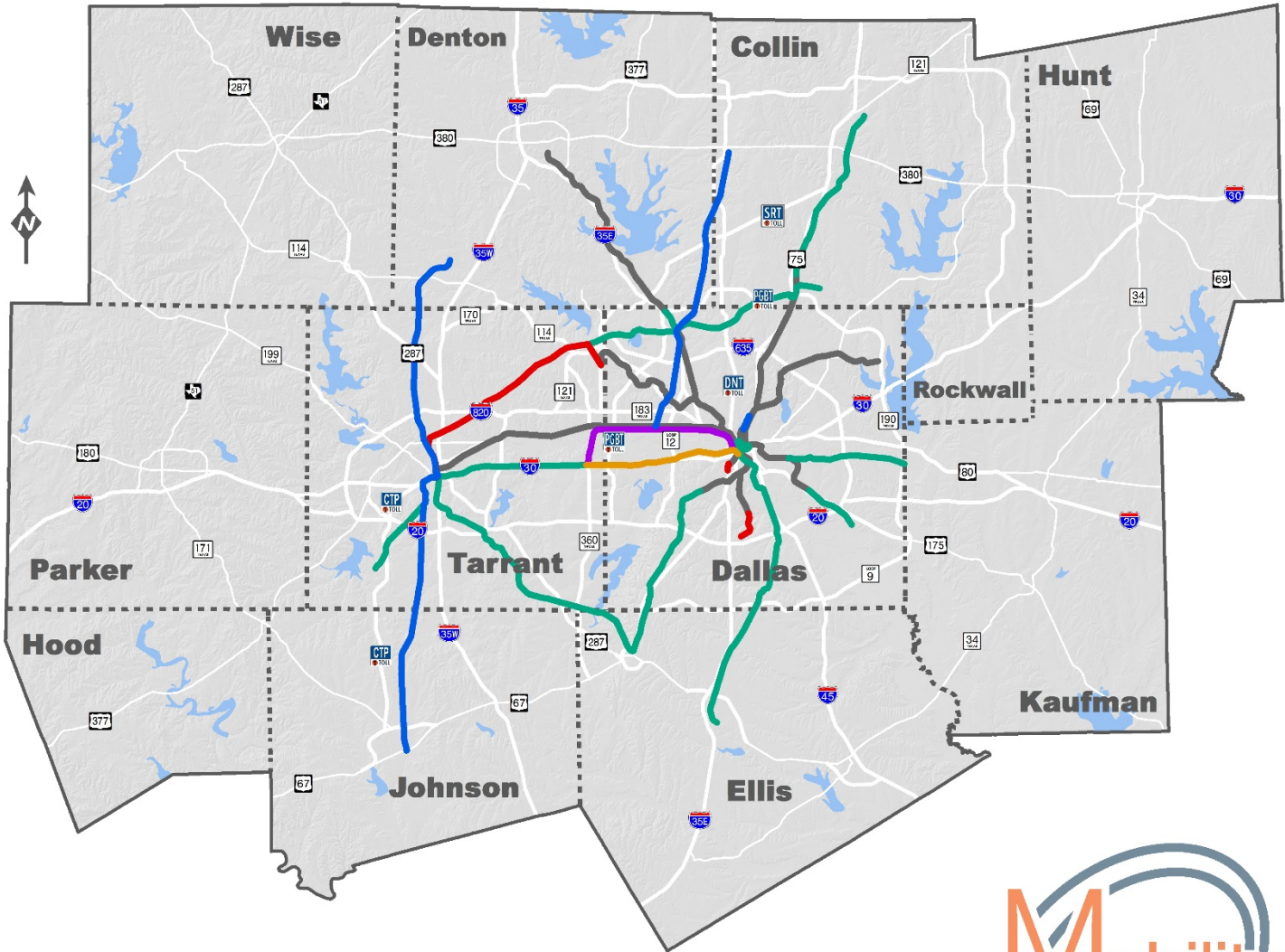
Mobility 2045 Transit Project Status

Projects in Mobility 2045

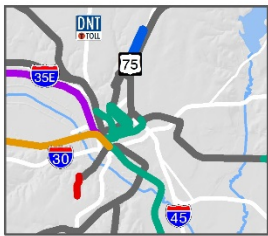
- No Change from 2040
- Alignment Change from 2040
- Add New Project (Under Evaluation)

Projects to be Removed from Mobility 2045

- Under Construction/Complete
- Removal - Local Decision
- Existing Rail



Dallas CBD



Fort Worth CBD



DRAFT



Facility recommendations indicate transportation need. Corridor-specific alignment, design, and operational characteristics will be determined through ongoing project development.

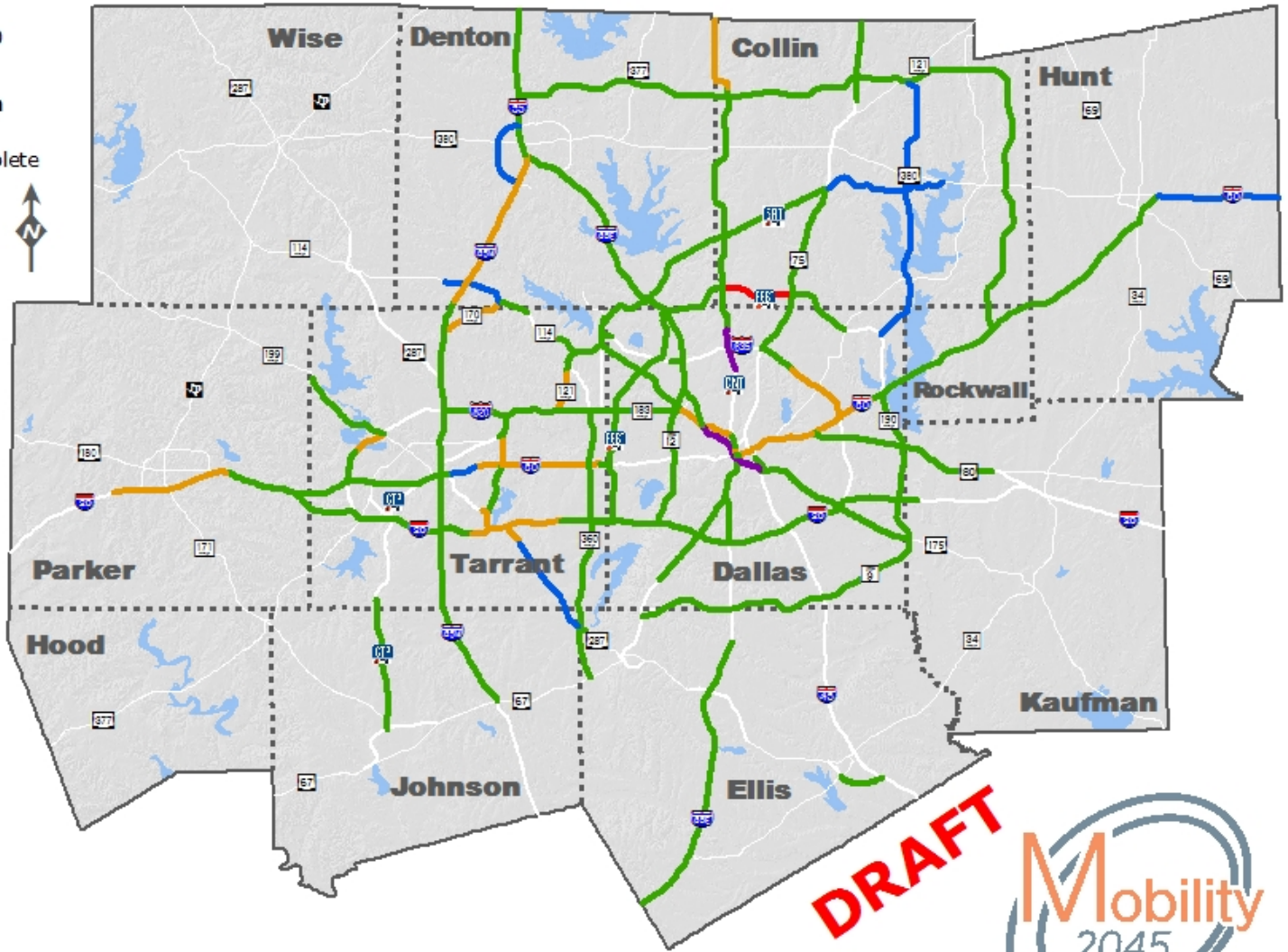
Mobility 2045 Roadway Project Status

Projects in Mobility 2045

- No Change from 2040
- Scope Change from 2040
- Add New Project

Projects to be Removed from Mobility 2045

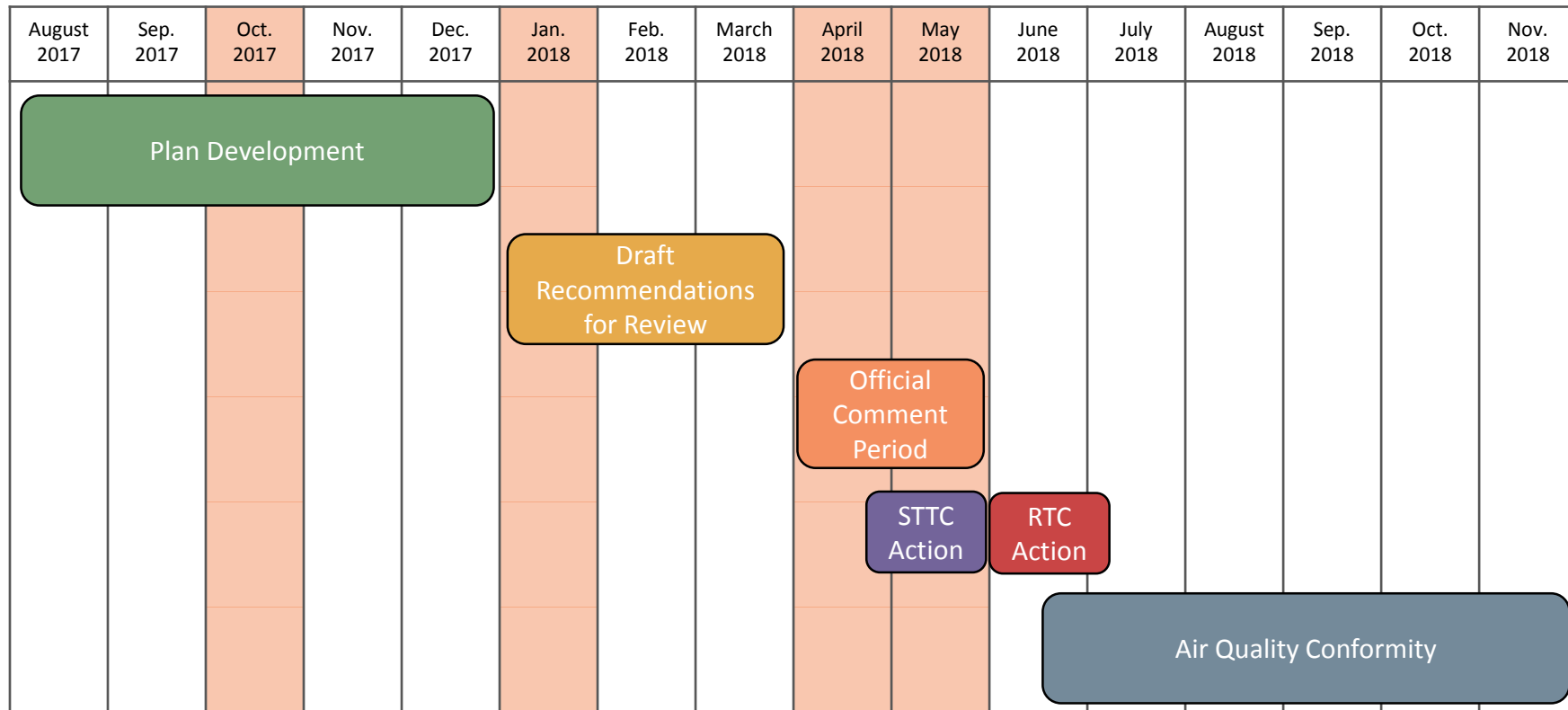
- Under Construction/Complete
- Removal- Local Decision



DRAFT



Schedule

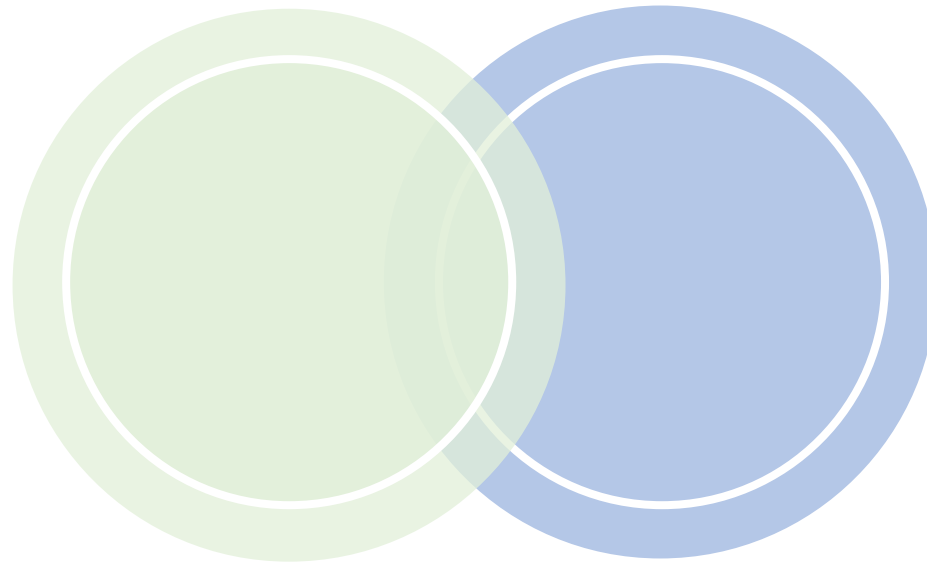


Public meetings held during highlighted months.

Regional Transportation Council plan adoption scheduled for June 14, 2017.

www.nctcog.org/mobility2045

Environmental Policy Review



Sandy Wesch, Project Engineer

Environmental Considerations Policies

ER3-001: Promote livable communities by protecting, retaining, restoring/mitigating, or enhancing the region's built & natural environmental assets during planning & implementation of transportation programs & projects.

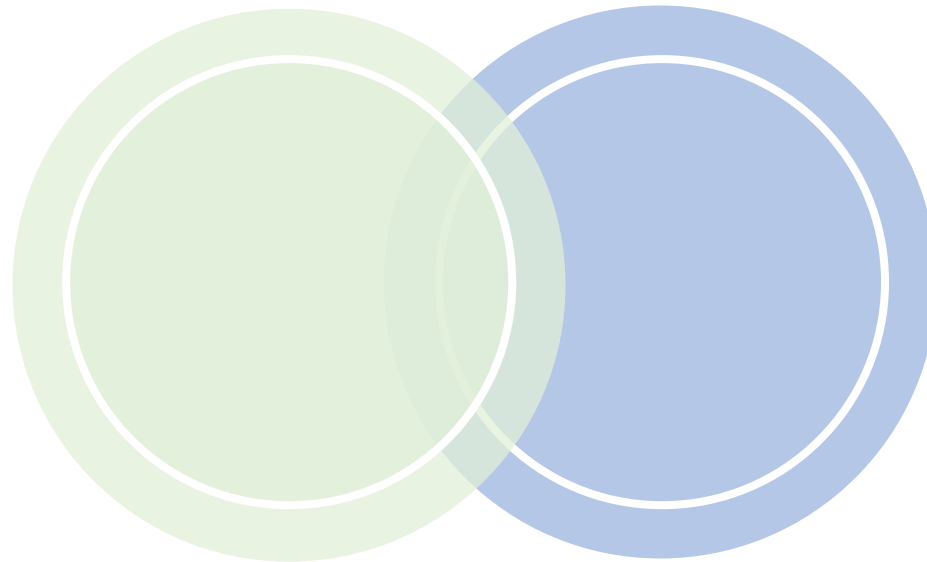
ER3-002: Work cooperatively with regulatory & conservation partners to develop innovative approaches that meet their conservation priorities & facilitate the delivery of transportation projects.

Environmental Considerations Policies

ER3-003: Encourage transportation programs & projects that provide appropriate access to the natural environment to support healthy lifestyles.

F3-002: Incorporate sustainability & livability options during the project selection process. Include additional weighting or emphasis as appropriate & 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 & accessibility to other modes (such as freight, aviation, bicycle, & pedestrian).

Air Quality in Mobility 2045



Lori Clark, Program Manager

CRITERIA POLLUTANTS

Clean Air Act (CAA) Last Amended in 1990

Requires Environmental Protection Agency (EPA) to Set National Ambient Air Quality Standards (NAAQS) for 6 Criteria Pollutants:

Carbon Monoxide (CO)

Lead (Pb)

Nitrogen Oxides (NO_x)

Ozone (O₃)

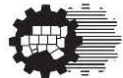
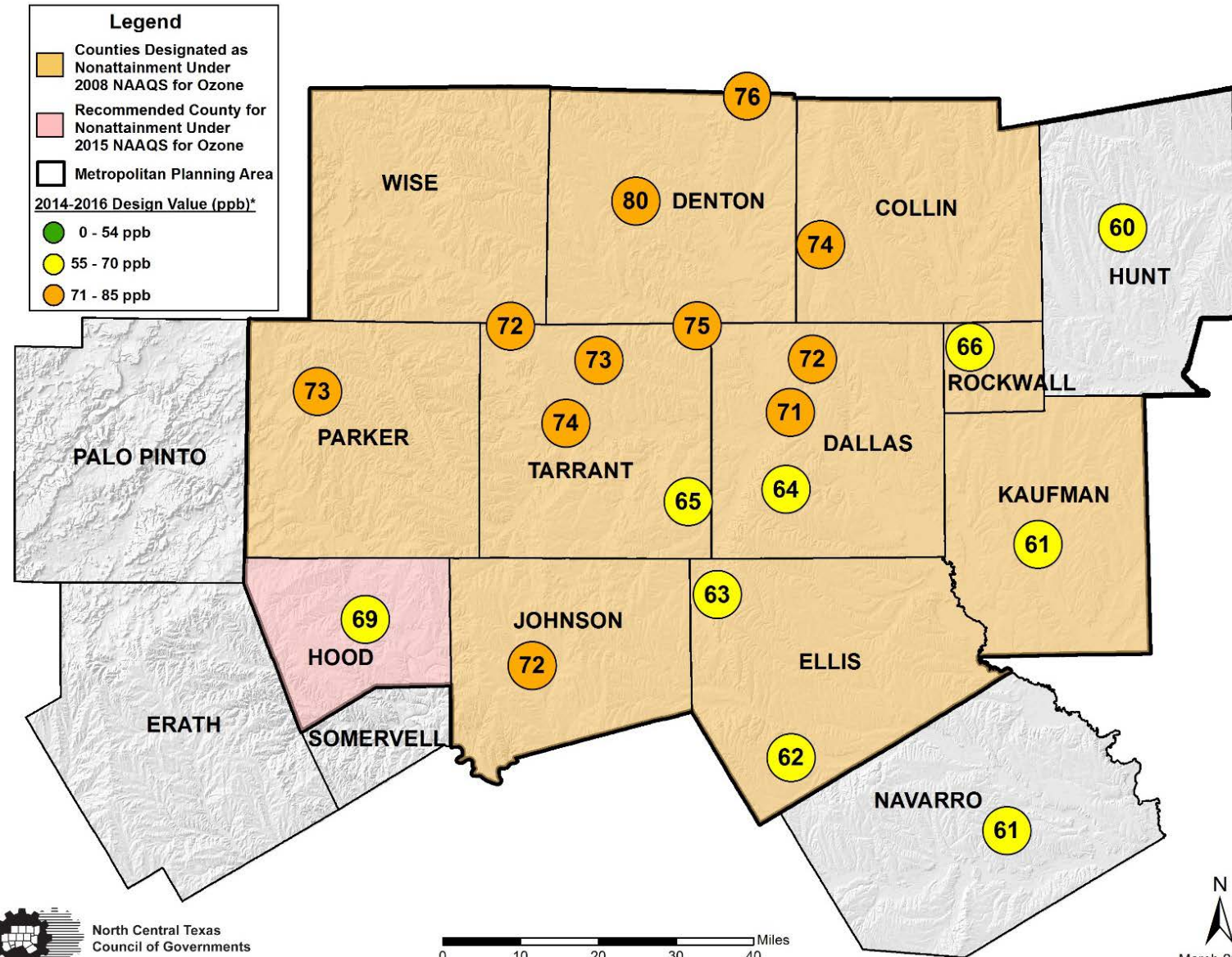
Particulate Matter (PM)

Sulfur Dioxide (SO₂)

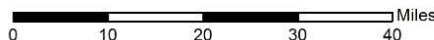
EPA Must Complete a Review of NAAQS Every 5 Years

AIR QUALITY PLANNING AREA

Ozone Nonattainment Area & Regulatory Monitors



North Central Texas
Council of Governments

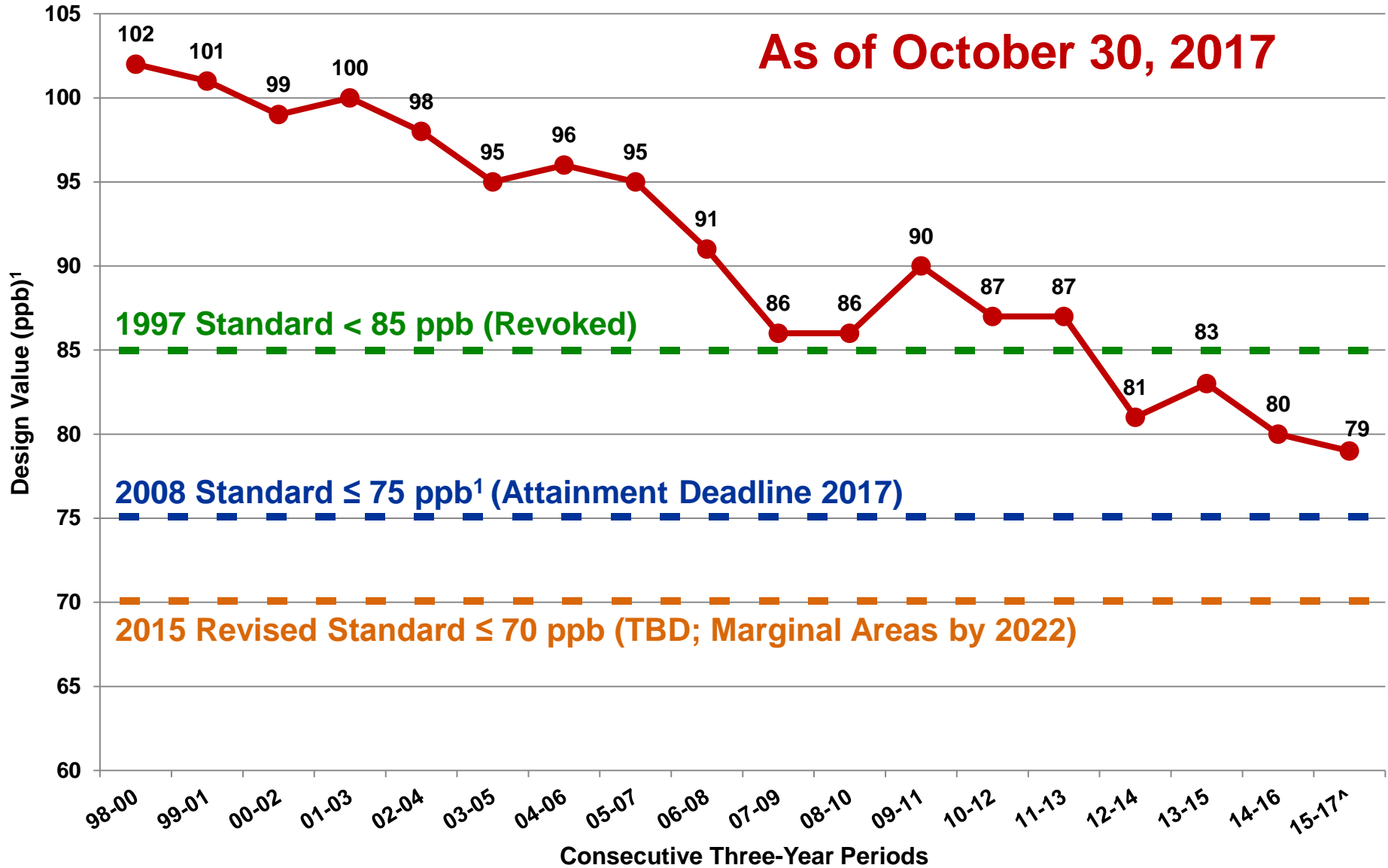


March 2017

*Air Quality Index based on 2015 NAAQS for Ozone, ≤ 70 parts per billion (ppb)

EIGHT-HOUR OZONE HISTORICAL TRENDS

As of October 30, 2017



1997 Standard < 85 ppb (Revoked)

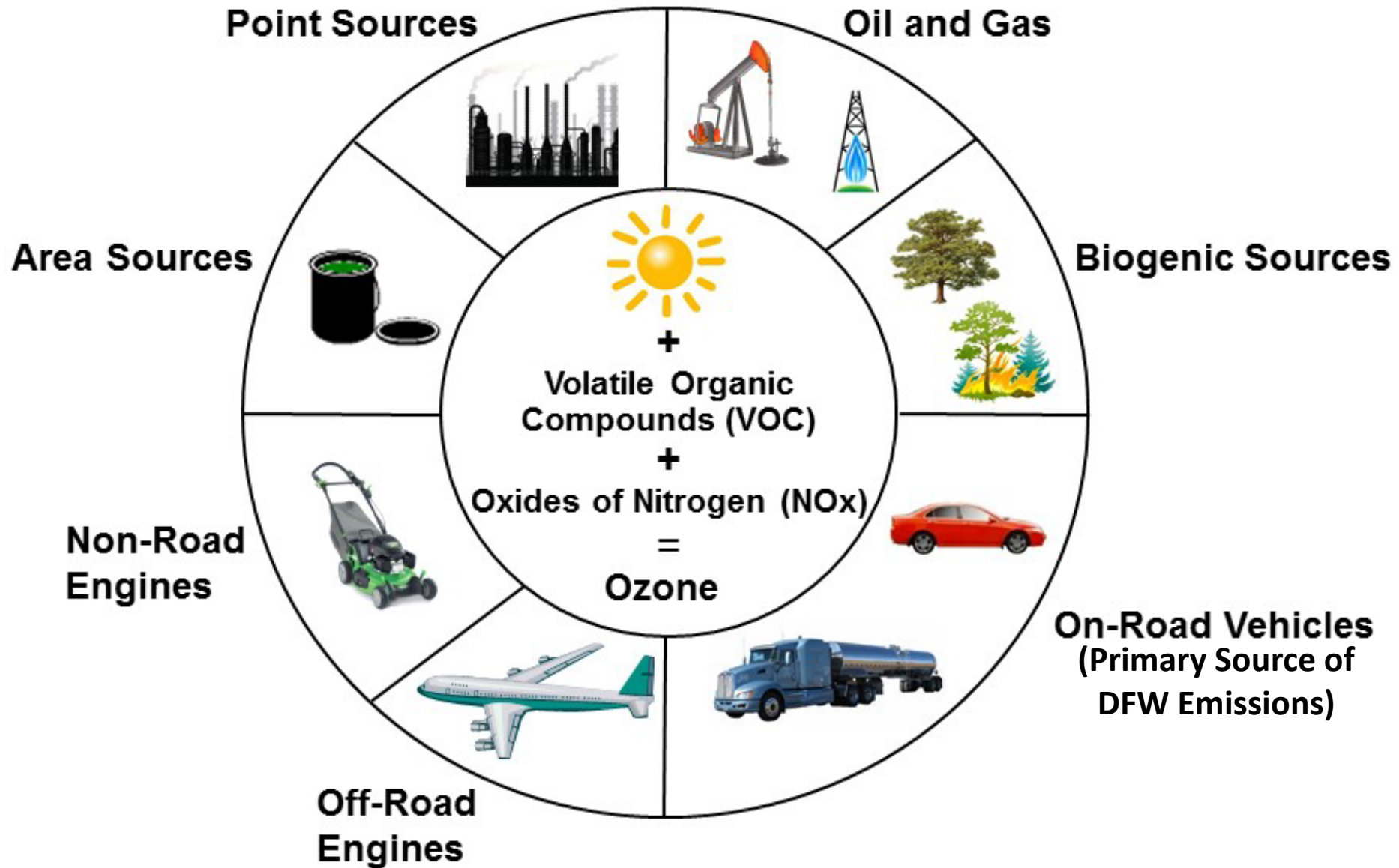
2008 Standard \leq 75 ppb¹ (Attainment Deadline 2017)

2015 Revised Standard \leq 70 ppb (TBD; Marginal Areas by 2022)

¹Attainment Goal - According to the US EPA National Ambient Air Quality Standards, attainment is reached when, at each monitor, the *Design Value* (three-year average of the annual fourth-highest daily maximum eight-hour average ozone concentration) is equal to or less than 70 parts per billion (ppb).

[^]Not a full year of data

OZONE FORMATION



Optimum conditions for the formation of ozone include high temperatures & low winds.
Sections are not to scale & are for illustrative purposes only.

NONATTAINMENT REQUIREMENTS

New Source Review Permit Program

Potential for Pollution Control Requirements or Operational Restrictions on Companies or Businesses

State Implementation Plan (SIP) Required

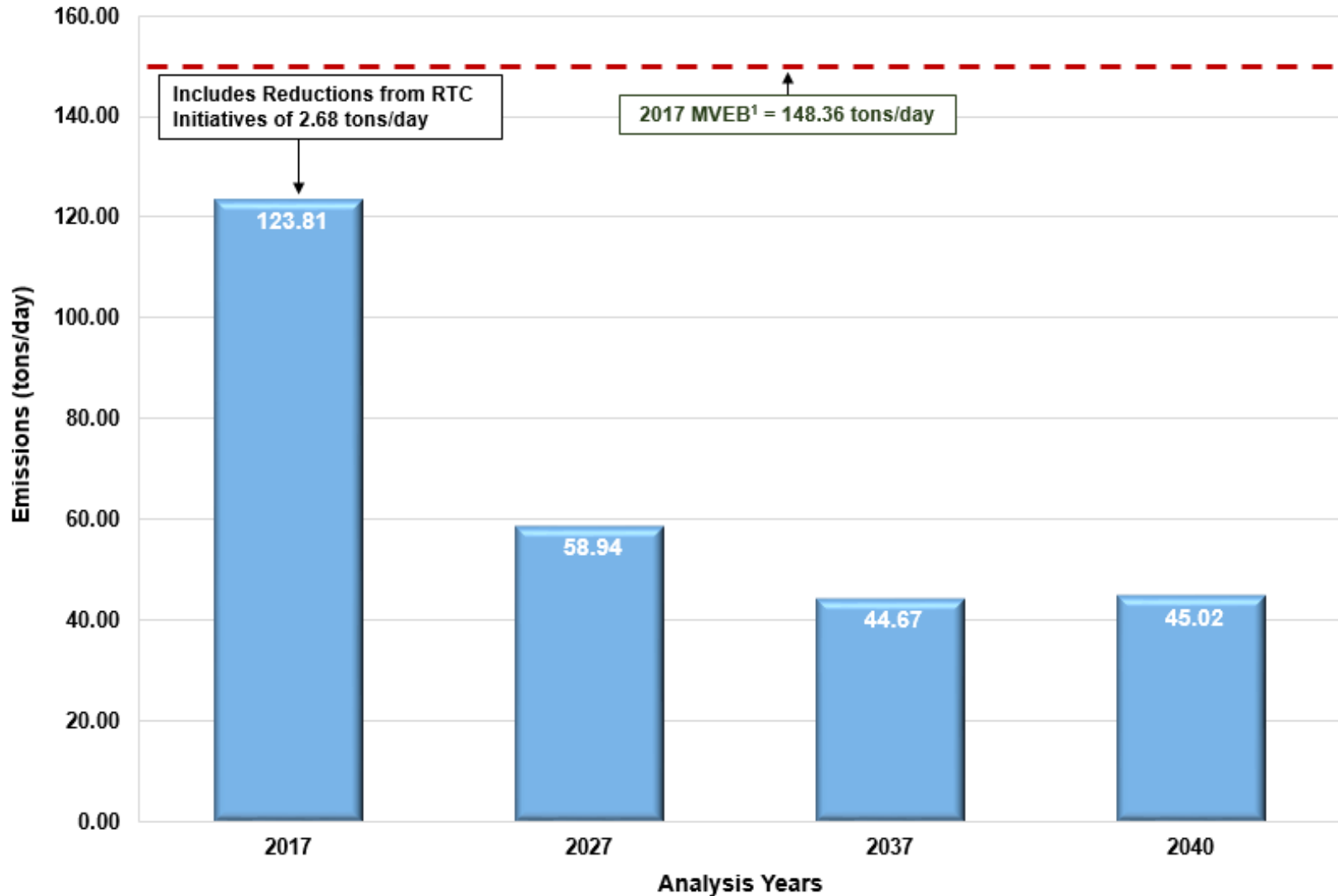
- Develop On-Road Mobile Source Emissions Inventories
- Implement Local Voluntary Emissions-Reduction Projects/Programs

Transportation Conformity Required

- Evaluate Emissions of Future Transportation System Against SIP
- Ensure Federal Funding Available for Transportation

2016 DFW CONFORMITY RESULTS

Oxides of Nitrogen (NO_x) Emission Results`



¹Source: Environmental Protection Agency Notice of Adequacy Status of Dallas-Fort Worth, TX Reasonable Further Progress 8-Hour Ozone Motor Vehicle Emission Budgets for Transportation Conformity Purposes; 81 FR 1184, <https://federalregister.gov/a/2016-339>

SEVEN AIR QUALITY EMPHASIS AREAS

High-Emitting Vehicles/Equipment

Energy & Fuel Use

Idling

Vehicle Miles of Travel

Cold Starts

Hard Accelerations

Low Speeds

Strategies
Designed
for Air
Quality

Strategies
Designed
for
Mobility

Mobility Strategies Include:

Transportation System Management
Travel Demand Management



Rideshare. Record. Reward.



EXISTING AIR QUALITY INITIATIVES

Air Quality Communication Program

Air Quality Demonstration Program

Oversize/Overweight Vehicles Emissions Impact

Idle-Free School Zones

Air Quality Enforcement Program

Air Quality Partnerships & Collaborations

Alternative Fuel Corridors

Air Quality Regional Policies

Air Quality Technology Improvements

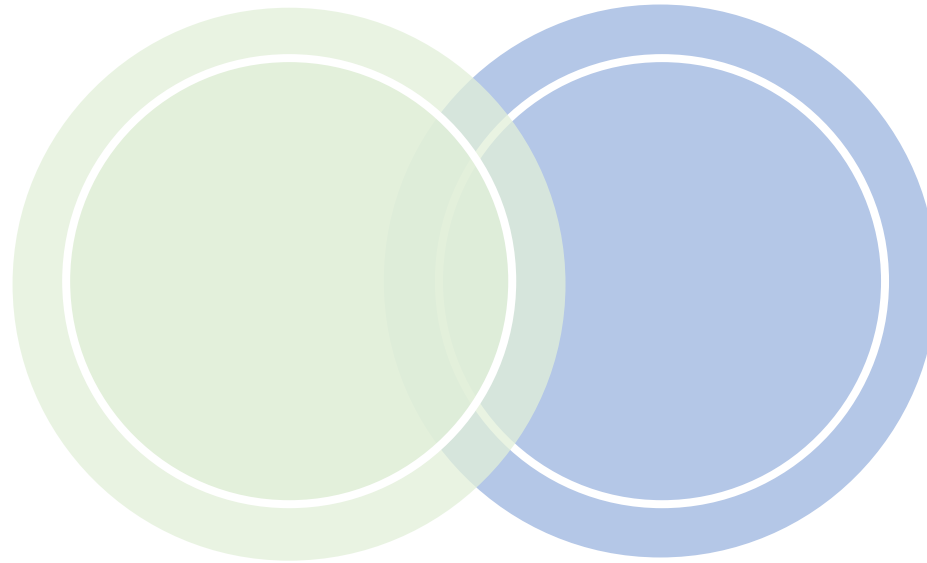
~\$159.2 Million Awarded Since 2006

Clean Technologies Revolving Loan

Volkswagen Settlement????



Natural Environment Screening in Mobility 2045



Kate Zielke, Senior Transportation Planner

Mobility 2040 Method

NEPAssist

NCTCOG

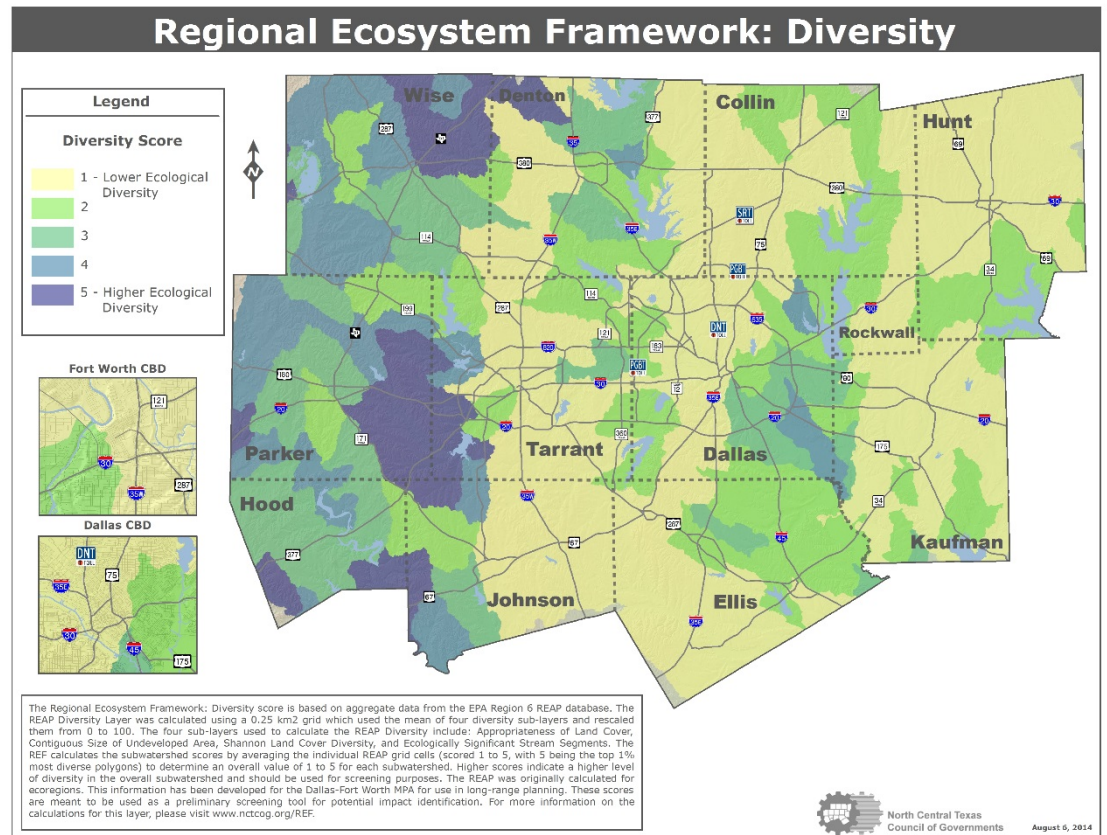
Regional

Ecosystem

Framework

Threatened,
endangered

species; potential
impacts, mitigation
strategies separate



www.nctcog.org/REF

Goals for Revising Method

Identify...

1. Resources facing greatest potential effects
2. Subwatersheds facing greatest potential effects
3. Agencies for environmental coordination – guiding future MPO work

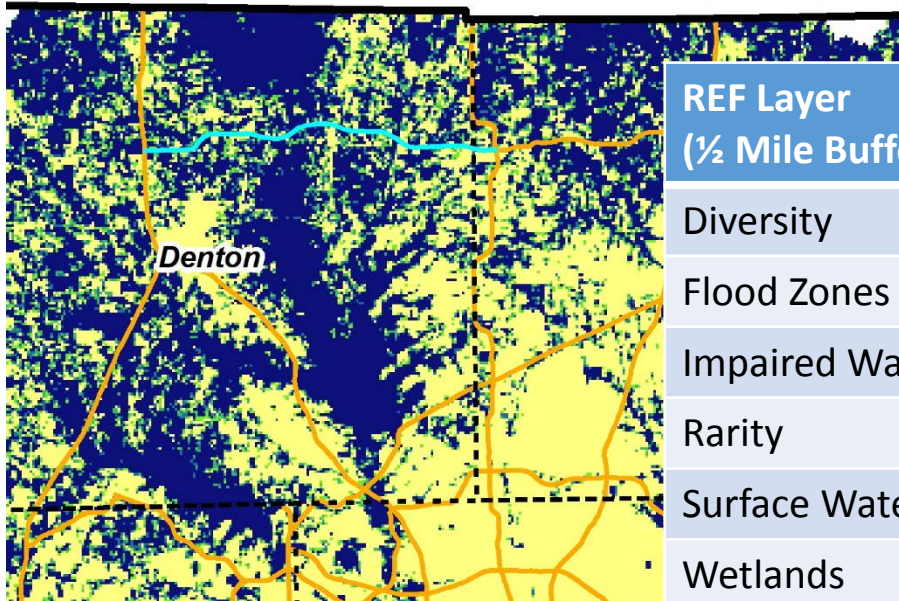
Integrate...

1. Strategies for minimizing, mitigating
2. Threatened & endangered species
(from US Fish & Wildlife Service's IPaC tool)

Proposed REF Method

REF grid-level data

Restricted to natural environment



REF Wildlife Habitat

| REF Layer ($\frac{1}{2}$ Mile Buffer) | Maximum Score | Mean Score |
|---|------------------|---------------|
| Diversity | 5 | 1.33 |
| Flood Zones | 5 | 1.80 |
| Impaired Water Segments | 1 | 1.00 |
| Rarity | 4 | 2.24 |
| Surface Water Density | 5 | 1.40 |
| Wetlands | 3 | 1.01 |
| Wildlife Habitat | 5 | 3.31 |

Ultimately low, medium, high designation

Proposed REF Method

Questions:

Maximum vs. average score?

Buffer size?

Pro:

REF includes data not easily replicated (contiguous size undeveloped area, Shannon land cover diversity, vegetation rarity...)

Con:

Layers that aggregate data limit ability to identify resources affected, agencies with whom to coordinate (Diversity, Wildlife Habitat)

Proposed Multiple Data Source Method

Supplement REF grid-level data with raw data (parks, Ecologically Significant Stream Segments...)

Pro:

Provides ability to tease out potential effects, agencies with whom to consult

Cons:

Actual alignment unknown

Limits ability to identify subwatersheds facing greatest effect

Minimization, Mitigation Strategies

- Loss of habitat
- Fragmentation of habitat
- Erosion
- Sedimentation
- Stormwater runoff, pollutants
- Alteration of hydrological flows
- Removal of wetlands
- Reduced flood storage capacity
- Increased velocities
- Raised flood water levels
- Disturbance of protected species

Natural Environment Screening

Seeking feedback:

Natural Environment Screening method

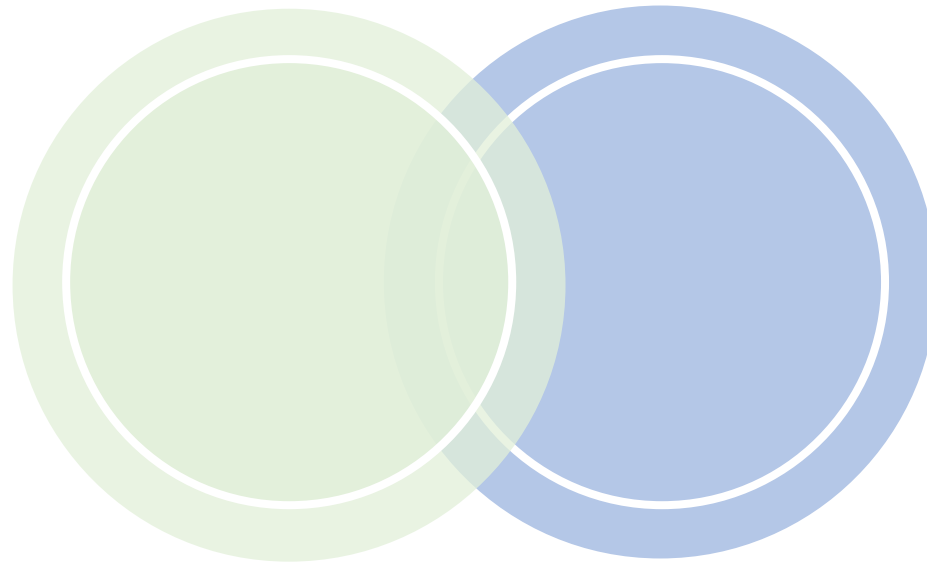
Minimization, mitigation strategies

Environmental Coordination Goal

Seeking partnerships to...

- Create continuity with transportation partners
- Overcome temporal disconnect between planning, construction

Environmental Justice in Mobility 2045



Kate Zielke, Senior Transportation Planner

Environmental Justice in Transportation

- Address any disproportionately high & adverse effect
- Ensure full & fair participation in transportation decision-making
- Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority & low-income populations

www.nctcog.org/ej

Demographic Profile

| Environmental Justice (EJ) Groups | 2000 Decennial Census | | 2006-2010 ACS Estimates* | | 2011-2015 ACS Estimates | |
|-----------------------------------|-----------------------|---------|--------------------------|---------|-------------------------|---------|
| | Number | Percent | Number | Percent | Number | Percent |
| Total Minority | 2,121,346 | 40.82% | 2,988,753 | 48.21% | 3,495,535 | 51.22% |
| Low Income | 549,051 | 10.74% | 817,184 | 13.39% | 982,780 | 14.59% |

*In 2010, the Decennial Census discontinued reporting on low-income populations. This data is now only available through the American Community Survey.

Environmental Justice Policies

EJ3-001: Evaluate the benefits & burdens of transportation policies, programs, & plans to prevent disparate impacts & improve the decision-making process, resulting in a more equitable system.

EJ3-002: Balance transportation investment across the region to provide equitable improvements

PI3-001: Meet federal & state requirements to ensure all individuals have full & fair access to provide input on the transportation decision-making process.

Environmental Justice Policies

PI3-003: Use strategic outreach & communication efforts to seek out & consider the needs of those traditionally underserved by the transportation planning process.

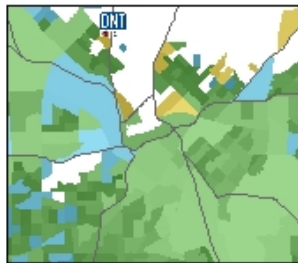
PI3-005: Provide education to the public & encourage input & engagement from all residents on the transportation system & the transportation decision-making process.

EJ-Related Initiatives

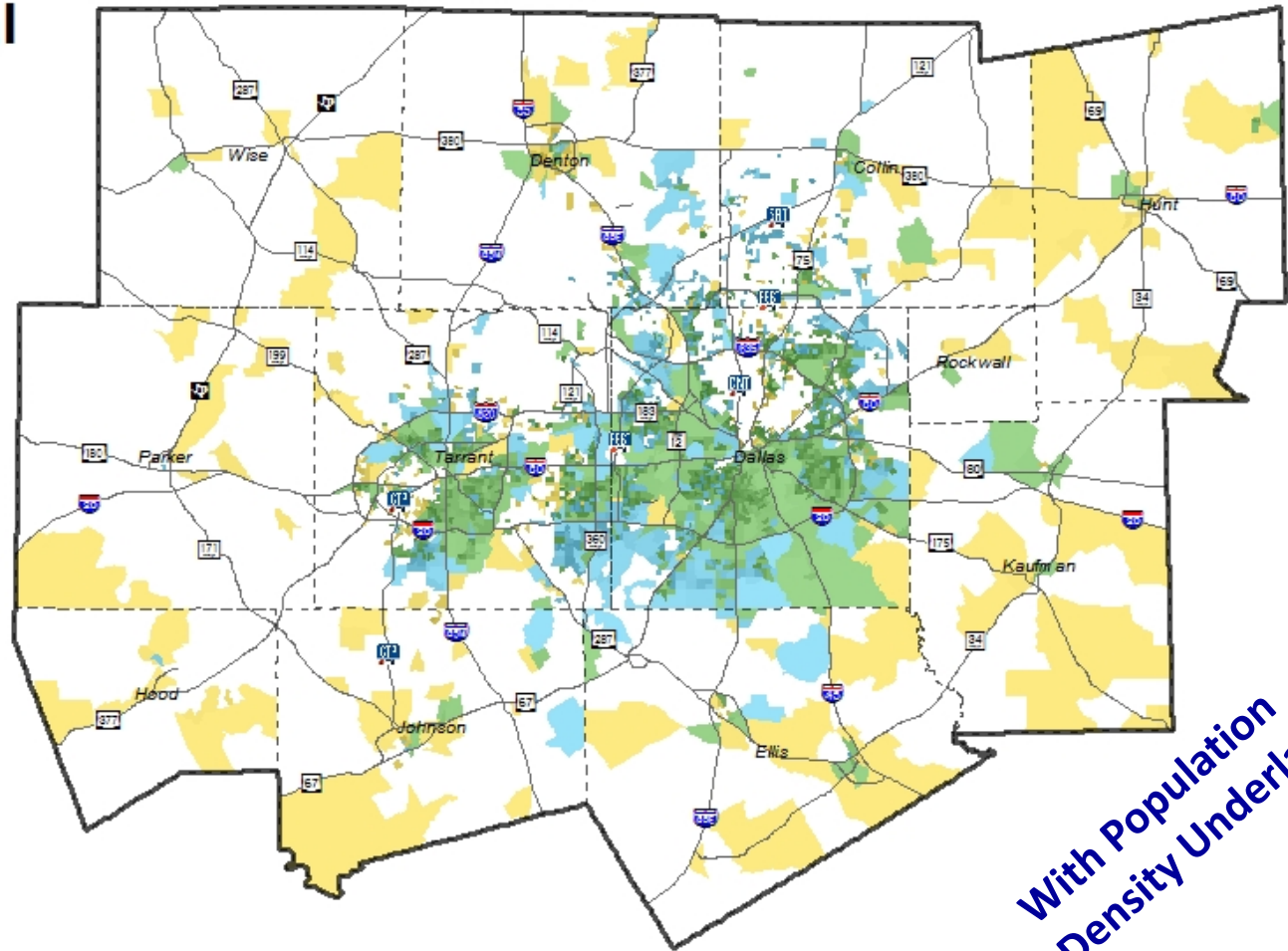
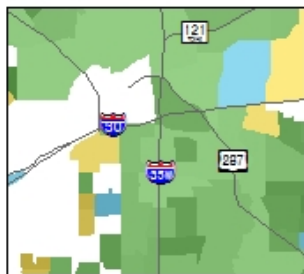
- **Technical support for partners, including Environmental Justice Index**
- MTP EJ analysis
- Tracking demographic trends
- Project prioritization
- Access North Texas
- Regional Toll Analysis
- Education/outreach for air quality programs
- Infrastructure to reduce diesel idling

Environmental Justice Index

Central Business Districts
Dallas

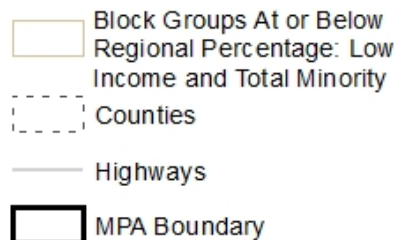
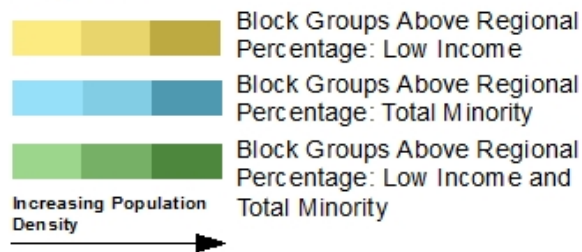


Fort Worth



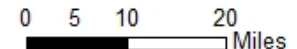
With Population Density Underlay

Legend



North Central Texas Council of Governments

March 27, 2017

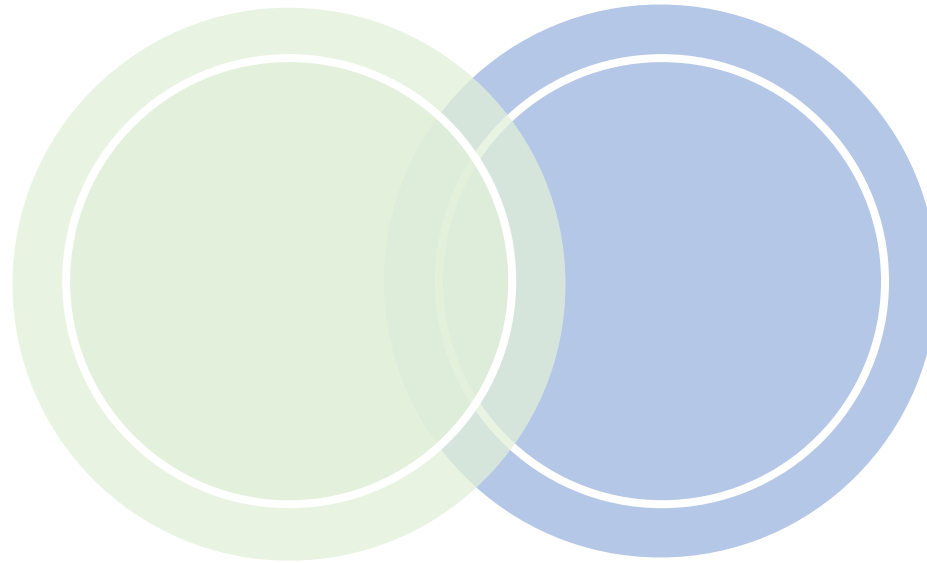


Source: 2015 American Community Survey 5-Year Estimates

MTP EJ Analysis

- Number of jobs accessible by auto
- Number of jobs accessible by transit
- Number of jobs accessible within biking/walking distance
- Percent of lane miles congested
- Average time to travel 20 miles
- Percent of population within 30 minutes of university or shopping
- Percent of population within 15 minutes of hospital

Sustainable Planning in Denton Greenbelt

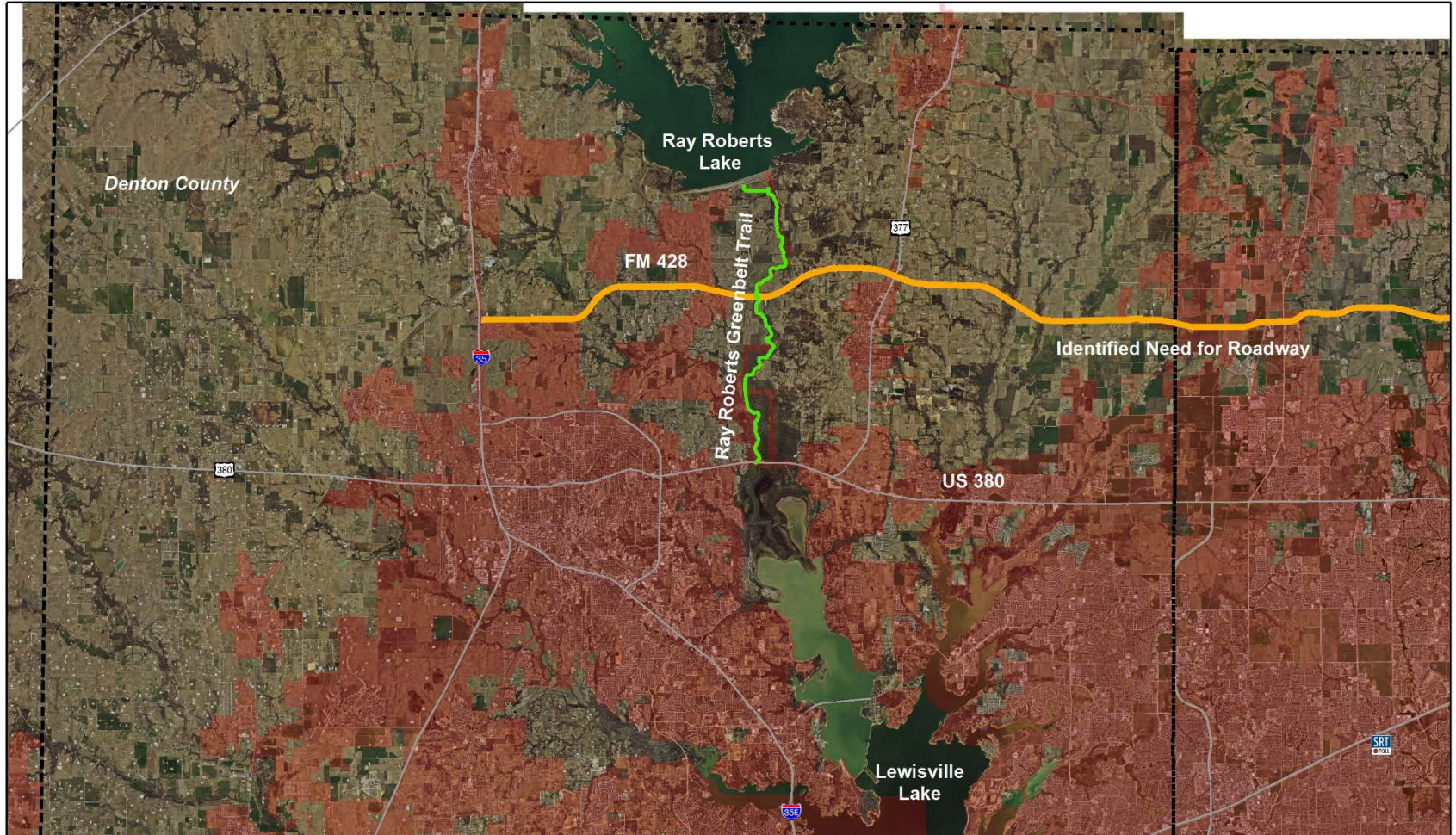


Kate Zielke, Senior Transportation Planner

Identifying Transportation Need

| County | 2000 Population | 2010 Population | 2040 Population (Forecasted) | Percent Increase 2010-2040 |
|---------------|----------------------------|----------------------------|---|---|
| Denton | 432,976 | 662,614 | 1,241,681 | 87.39% |
| Collin | 491,675 | 782,341 | 1,560,421 | 99.46% |
| Dallas | 2,218,899 | 2,368,139 | 3,357,469 | 41.78% |
| Tarrant | 1,446,219 | 1,809,034 | 3,094,649 | 71.07% |
| Region | 5,197,317 | 6,417,724 | 10,676,844 | 66.36% |

Identified Need for Roadway



PEL Feasibility Study

Plans for feasibility study:

- Assess transportation needs
- Identify transportation solutions
- Preliminary-level review of the affected environment
- Incorporate sustainability & environmental stewardship best practices recommended by Federal Highway Administration sustainability tool, INVEST



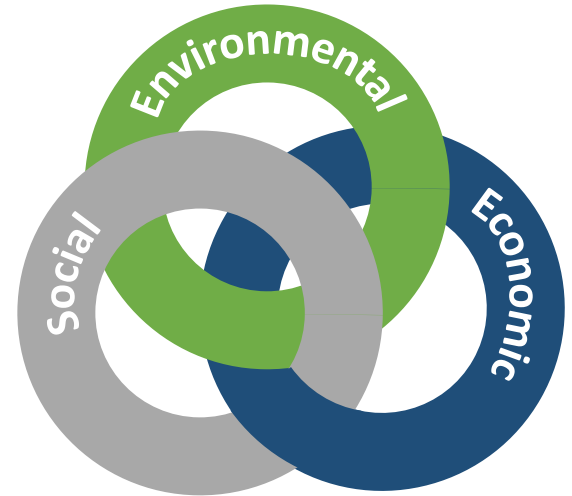
www.sustainablehighways.org/

FHWA INVEST Tool

The INVEST tool is used to address the economic, social, & environmental sustainability of transportation projects.

Goals:

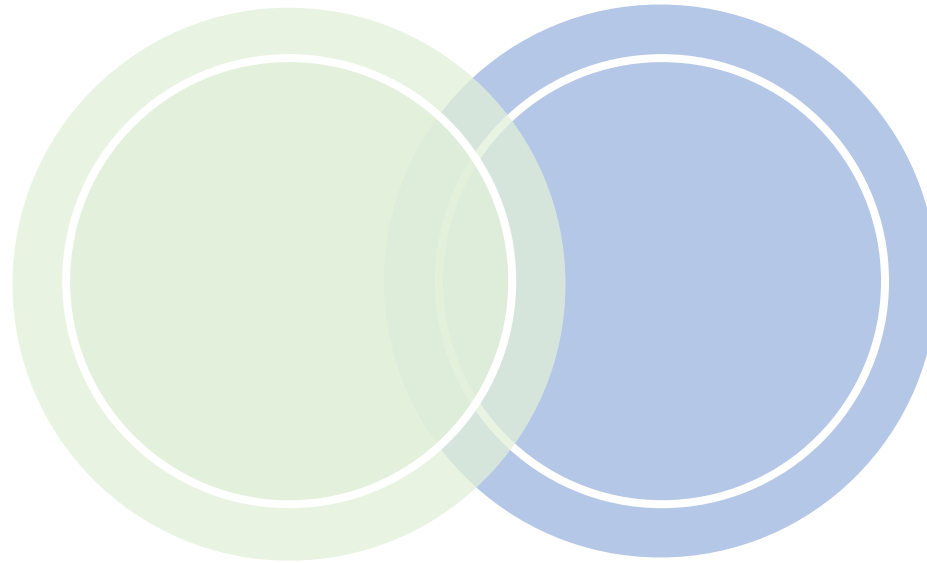
- Reduce impacts to natural environment
- Increase social & economic benefits



Stakeholder Engagement

- Stakeholder meetings to identify sustainability & environmental stewardship needs in the Denton Greenbelt
- Representatives from:
 - City of Dallas
 - City of Denton
 - Cross Timbers Equestrian Trails Association
 - Greenbelt Alliance
 - Lake Ray Roberts Equestrian Trails Association
 - Texas Parks & Wildlife Department
 - Upper Trinity Regional Water District
 - US Army Corps of Engineers
 - Venable Ranch
- **Seeking transportation stakeholders**

Quantifying the Benefits of Environmental Stewardship



Amanda Long-Rodriguez, Transportation Planner

Mitigation of Environmental Impacts

- To avoid, minimize, rectify, reduce, or compensate for the environmental impact
- Necessary as transportation projects can have a negative impact on the environment
- Often seen as a cost
- Benefits are not easily captured
 - Public goods
 - e.g., Trees

Environmental Benefits



Reduce
Stormwater
Runoff

Improve Air
Quality

Wildlife Habitat

Aesthetic Value

Reduce Heat
Island Effect

Quantifying the Benefits of Environmental Stewardship Tool

- What is it

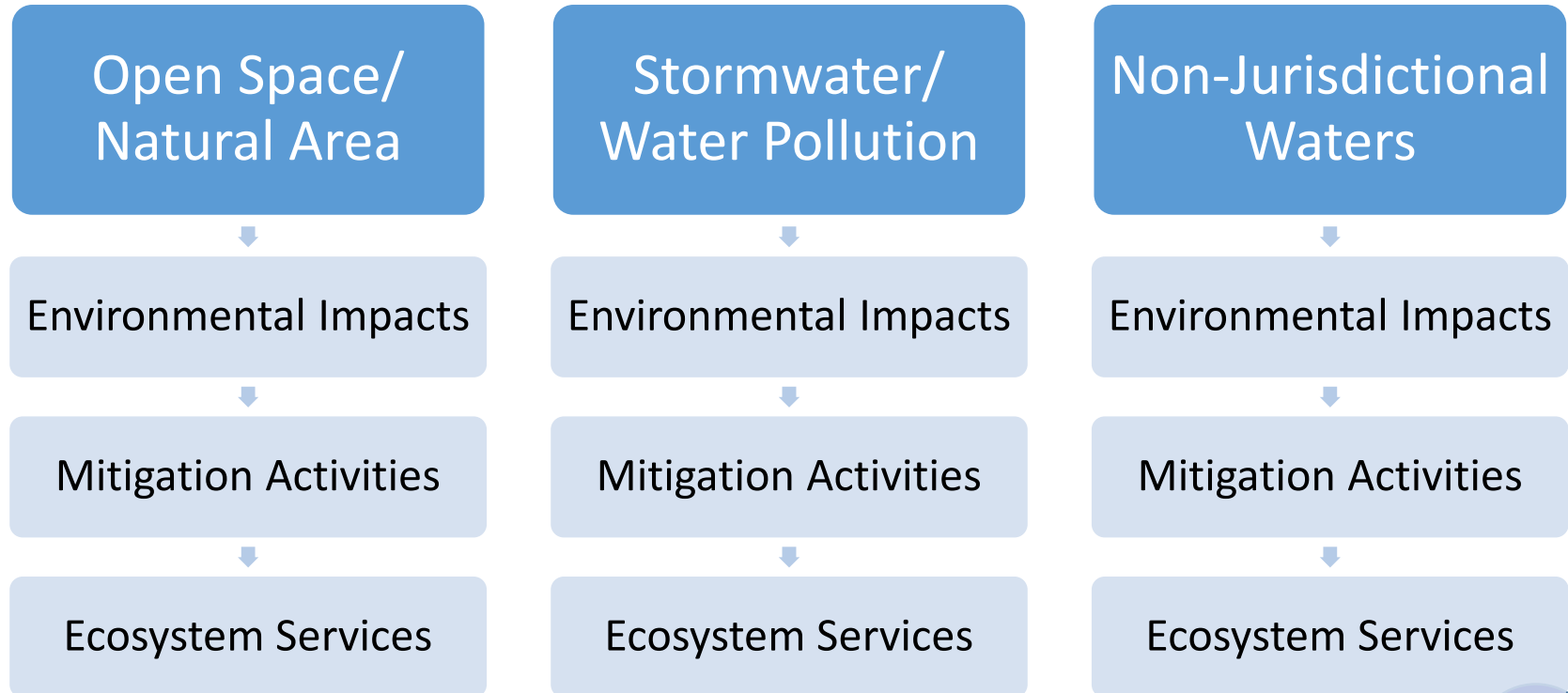
A decision-making tool that identifies the benefits & return on investment that result from engaging in non-regulatory mitigation activities

- Purpose

- Assist political subdivisions in reducing the burden that transportation-related infrastructure places on the environment.
- Help political subdivisions gain benefits from non-regulatory mitigation

Quantifying the Benefits of Environmental Stewardship Tool

Decision Making Tool will identify
Transportation impacts three Environmental
Systems:



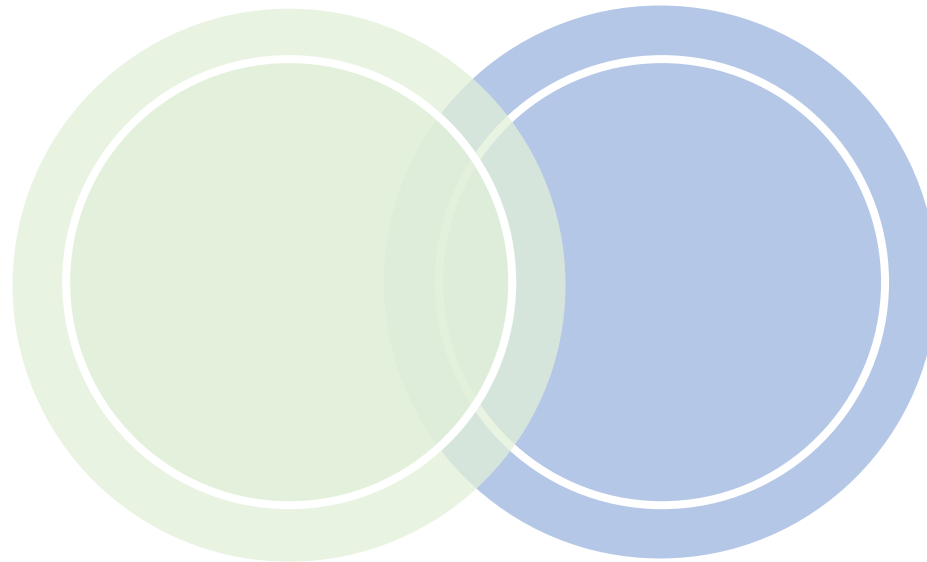
Information on Value of Ecosystem Services

Seeking Committee Members

- Consultant Selection Committee
 - Reviewing & selecting qualified proposals
 - Must be public entities

- Project Review Committee
 - Assist NCTCOG staff with guidance & technical review of the selected firm
 - Can be any entity with expertise in the three environmental systems

Environmental Stewardship Program



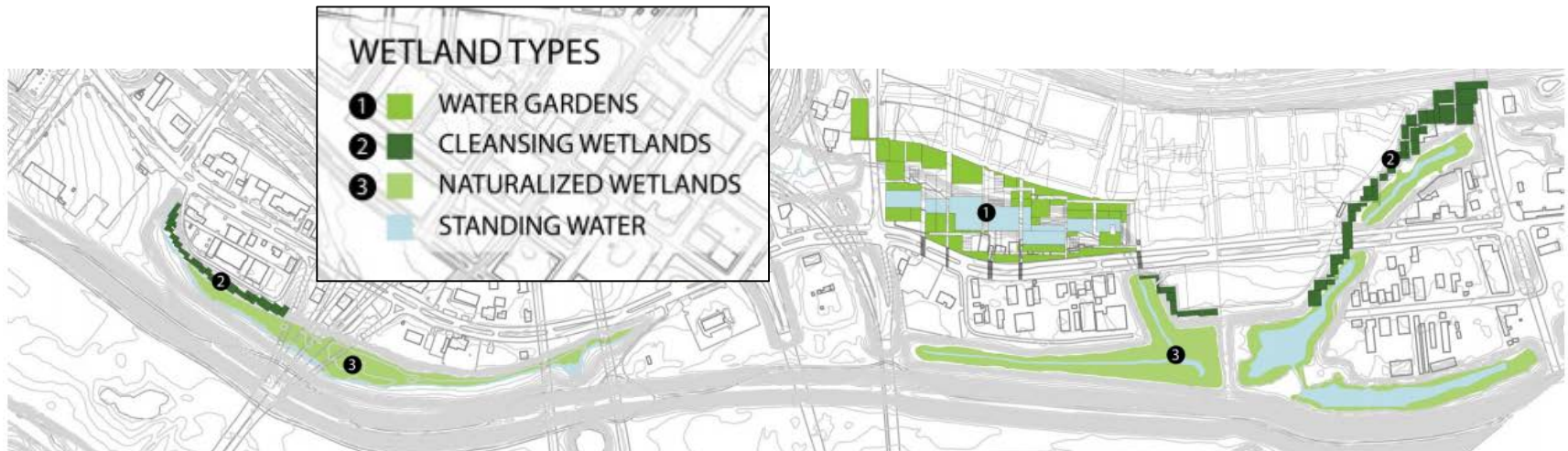
Nathan Drozd, Senior Transportation Planner

RTC-Approved Projects

| Project | Funding | Category |
|---|-----------|-------------|
| Eastern Subregion | | |
| Southwest Water Gardens | \$350,000 | Engineering |
| NeighborWoods | \$300,000 | Trees |
| Western Subregion | | |
| Lancaster/Hemphill-Lamar | \$200,000 | Trees |
| Lake Worth Mitigation (now Zoo Creek Project) | \$200,000 | Engineering |
| Regional | | |
| Education Campaign | \$100,000 | Education |
| GIS-Based Tree Tracker | \$100,000 | Software |

Proposed Dallas Water Gardens

- Preliminary design
- Old Trinity River Channel
- Wetlands & wetland treatments
- Flood control, water quality, public space
- Public access to wetlands, aquatic features, boardwalk



Zoo Creek Project

- Bacteria & sediment reduction program
- Zoo Creek-Clear Fork Trinity River oxbow area
- Engineering design possibilities
 - Sedimentation, trash fore-bay
 - Dredging oxbow
 - Hydraulic infrastructure to manage flows
- In-situ natural treatment, outdoor education, recreation



City of Fort Worth



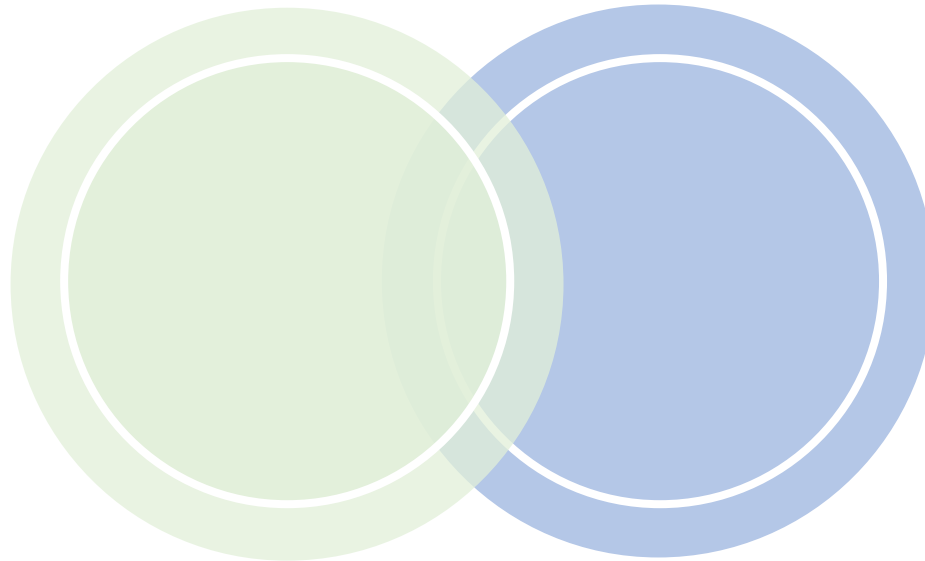
City of Fort Worth

Education Campaign

- Mitigation focus
- Workshop for developers, builders – minimizing impacts to streams, wetlands
- Webinar for mitigation bankers – **seeking transportation partners**

www.nctcog.org/trans/environmentalstewardship/

Follow-Up to Mitigation Assessment



Kate Zielke, Senior Transportation Planner

Wetland & Stream Mitigation Assessment



- Completed 2016
- Supply of Compensatory Mitigation Credits
- Demand for Compensatory Mitigation Credits

Mobility 2040 Estimates




- Potential Mitigation Sites
- Recommendations & Action – Environmental Stewardship Program Education Campaign

www.nctcog.org/traces/documents/WhitePaper.pdf

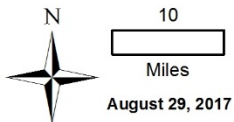
Legend

-  Sub-basin (HUC8)
-  Ecoregions

Number of credits

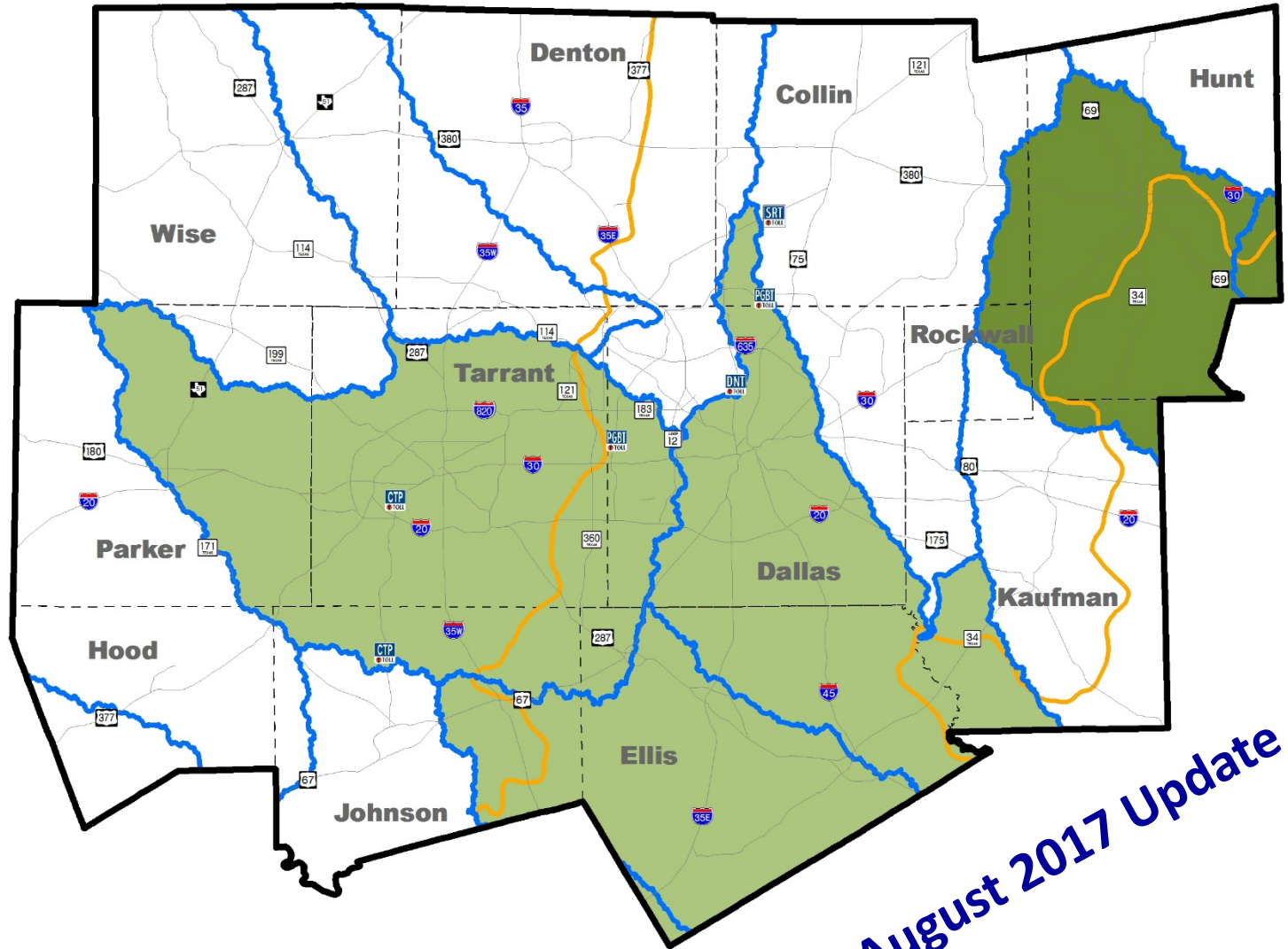
-  0
-  413.82
-  1,050.30

This map does not differentiate between primary, secondary, and tertiary service areas. Perennial in-channel stream credits are those generated by work on channel condition, in-stream condition, and hydrologic condition. Available credits are those that have been released but not yet withdrawn. The numbers on this map do not account for pre-sales of credits that have not been recorded in RIBITS. Data were acquired from the RIBITS database and are current as of August 28, 2017.



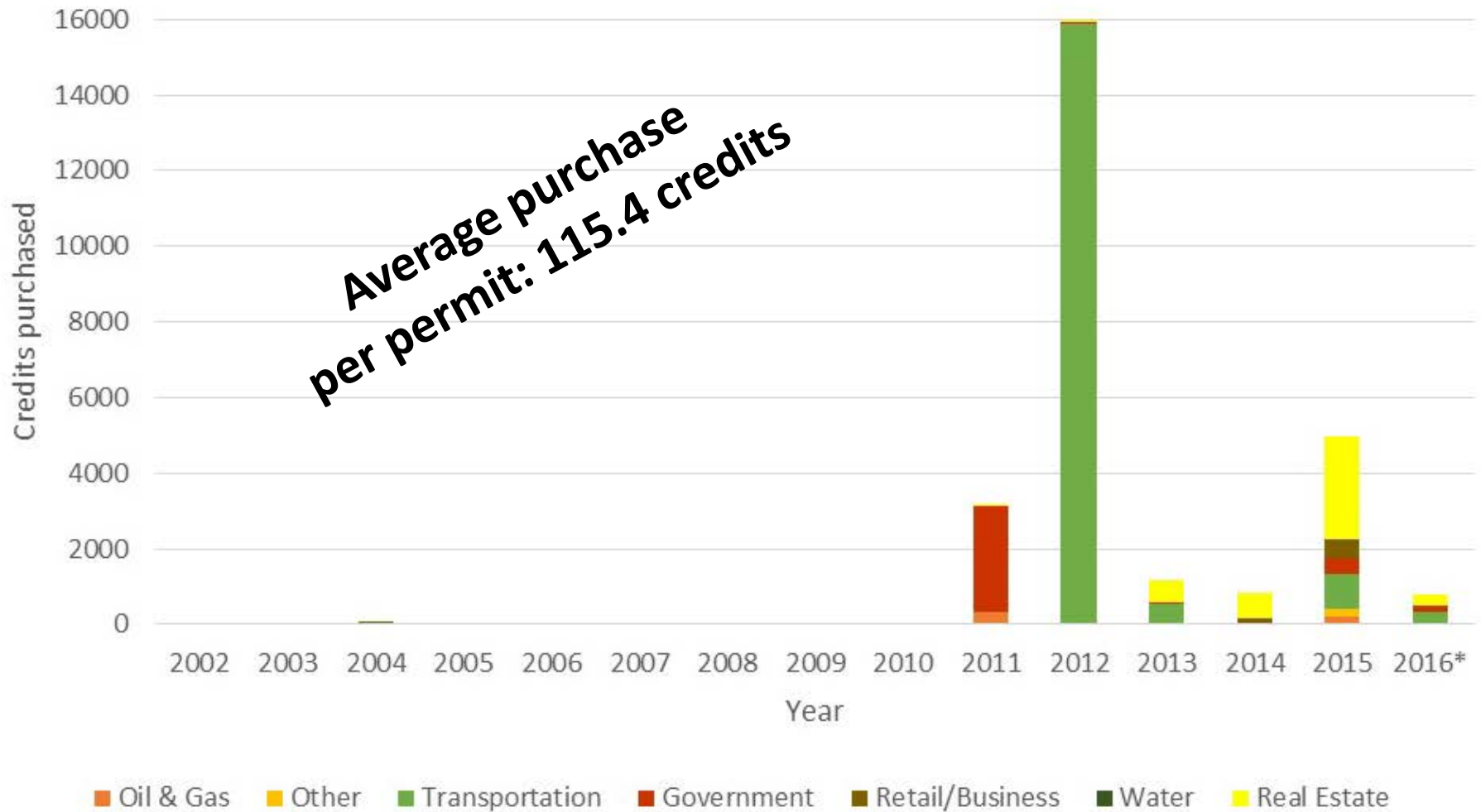
Perennial In-Channel Stream Credits

Estimated Availability



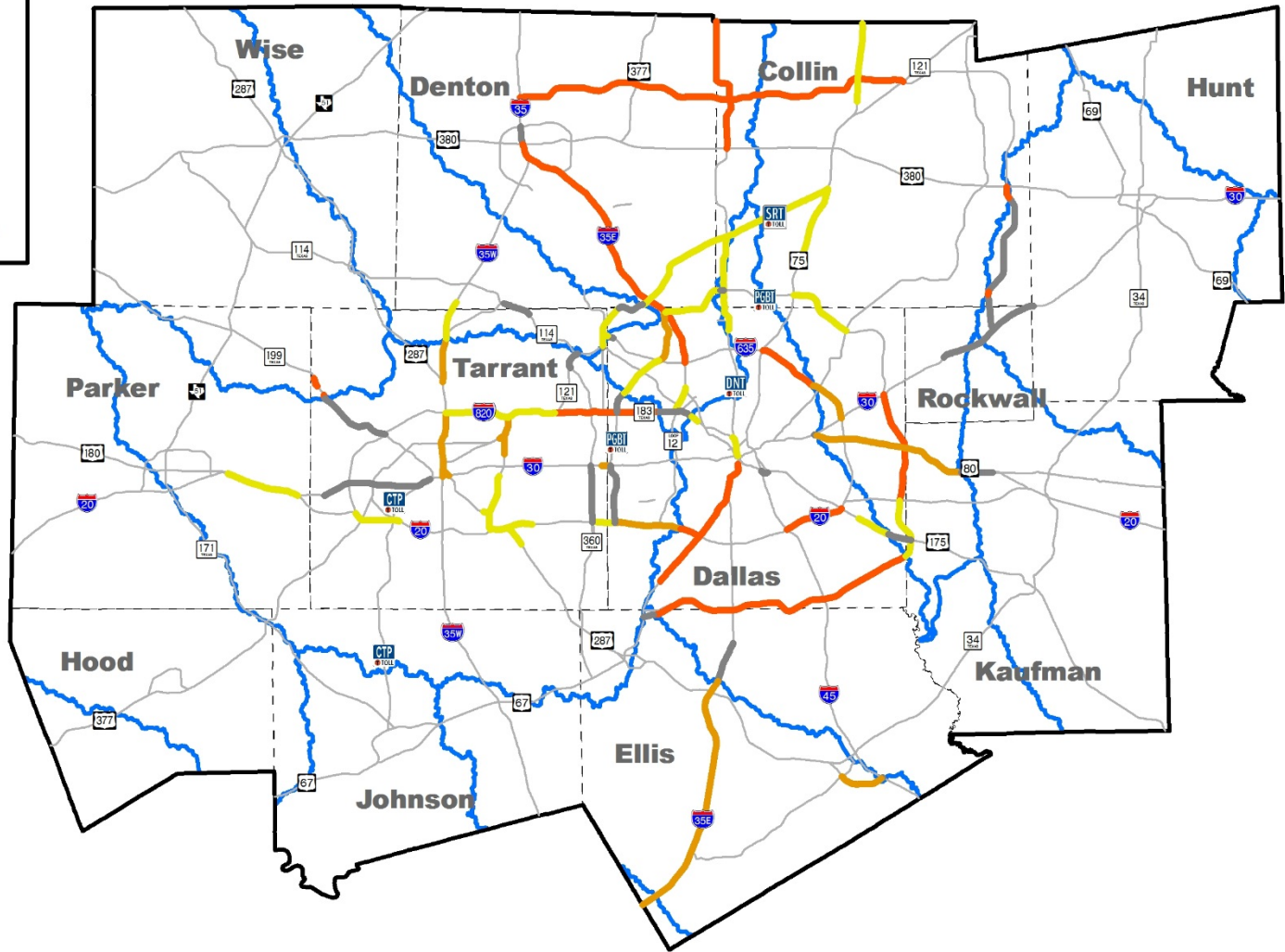
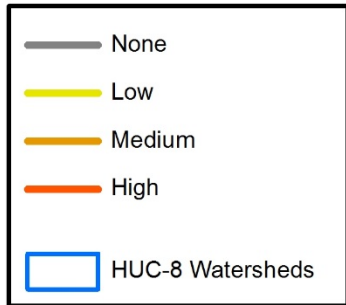
August 2017 Update

Stream Credits Purchased



Data source: USACE Regulatory In-lieu Fee & Bank Information Tracking System

2027 Perennial Stream Impact by HUC-8



0 5 10 20 Miles









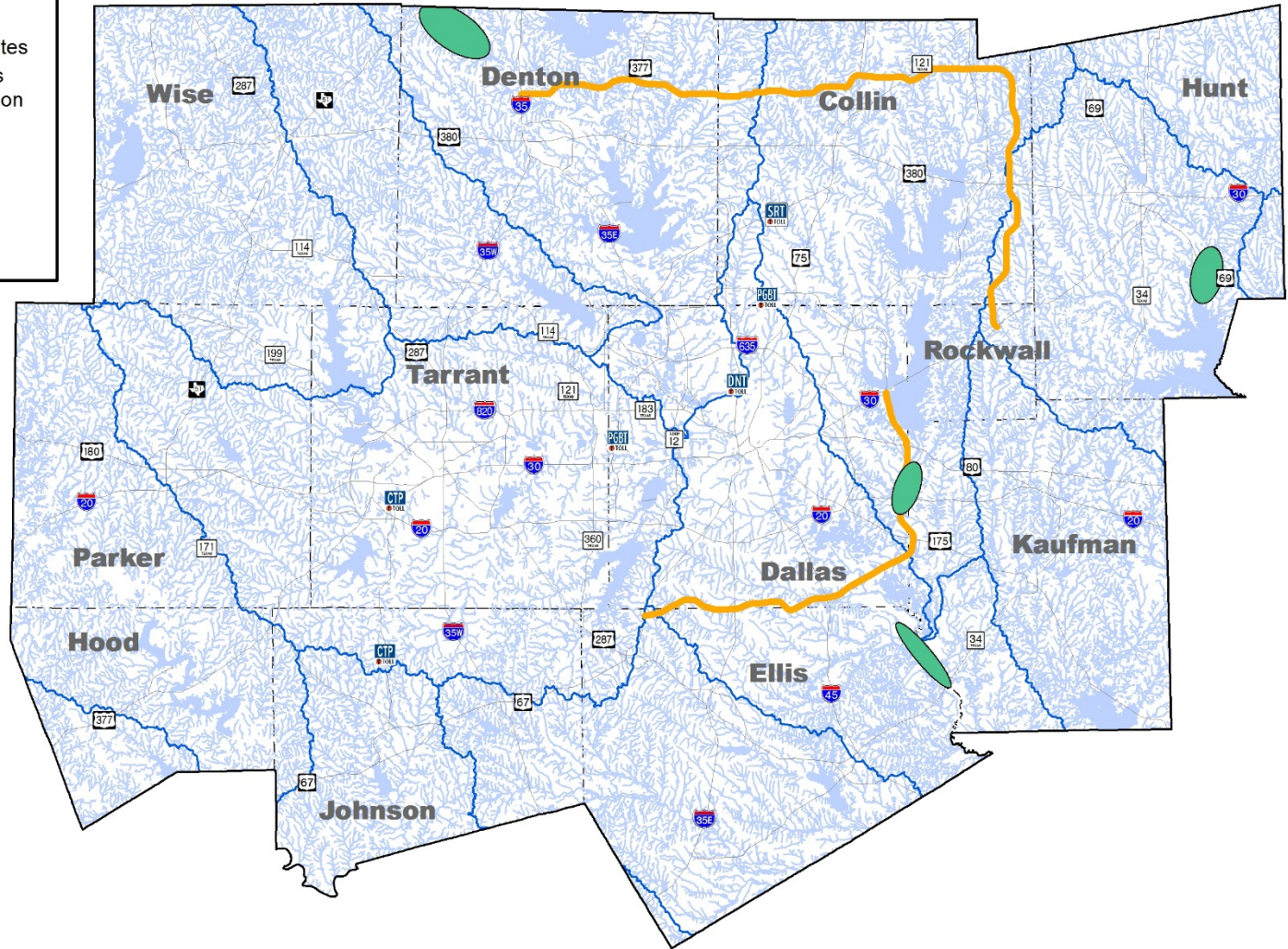
June 8, 2016



Project Level Analysis - Potential Mitigation Sites

Legend

-  Potential Mitigation Sites
-  Mobility 2040 Projects Under Closer Inspection
-  MPA Boundary
-  HUC8
-  Lakes
-  Streams



0 5 10 20 Miles

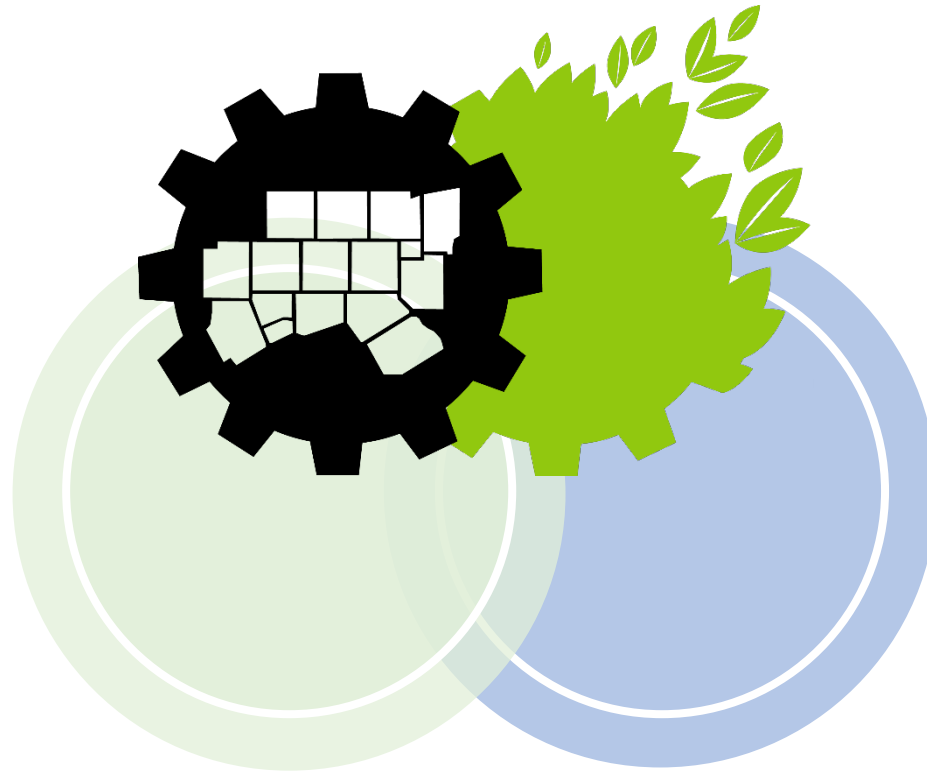
June 2016



Recommendations & Action

| Recommendation | Action | Timing |
|--|--|----------------------------------|
| Address supply/demand | Workshop with developers, builders on how to avoid, minimize impacts | Completed – September 2017 |
| | Webinar with mitigation bankers | Tentatively February 2018 |
| Conduct analysis with each long-range plan | Planning for Mobility 2045 | Plan approval in June 2018 |
| Seek mitigation in primary service area | Impacted by TxDOT method for acquiring mitigation credits | No current plans to address |

Environment & Development Initiatives



Derica Peters, Senior Planner
Tamara Cook, Manager

Environment & Development Department Focus Areas



Materials Management

Regional Landfill Capacity
Recycling
Waste to Energy
Illegal Dumping
Technical Resources

Watershed Management

Stormwater Management
Water Quality
Trinity River Common Vision
Flood Risk Reduction

Natural Resources

Water Supply
Energy
Open Space Planning/
Preservation

Public Works

Construction Standards
Block Grants
Wastewater Roundtable

Development Excellence

Principles of Development Excellence
Building Codes
Technical Tools



Integrated Stormwater Management

Integrated system of development, design, and construction strategies to address:

- Water Quality
- Streambank Protection
- Flood Mitigation and Conveyance

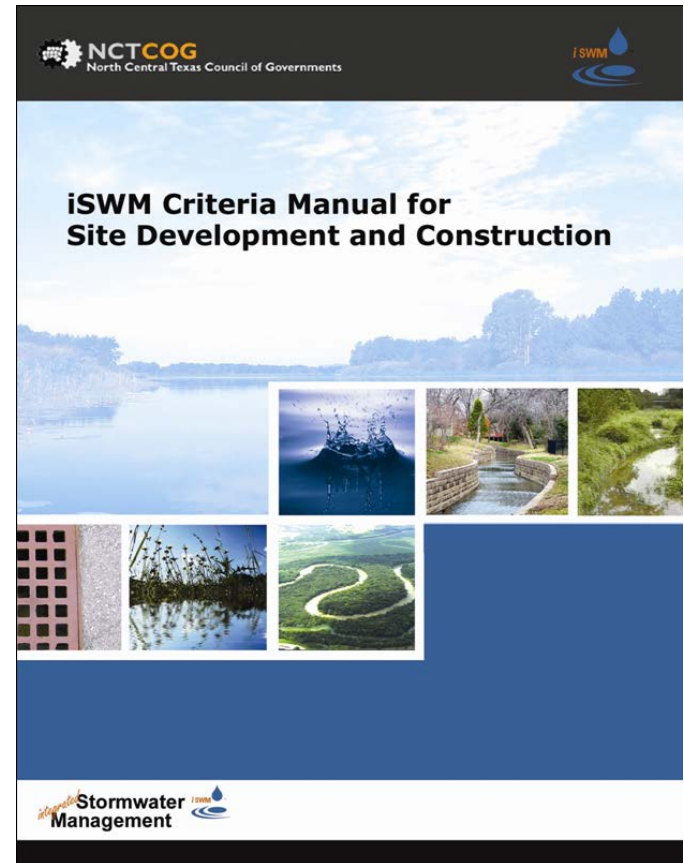


- Comprehensive stormwater management design manual developed by NCTCOG and more than 60 participating public entities
- Relevant for private and public development project sites as well as public rights-of-way
- Seventeen local entities now require iSWM for design
- Some form of low impact design and/or post-construction controls is now required in all 50 states by EPA



Integrated Stormwater Management

- Part of a larger urban design initiative
- Provides a “greener” community and improved water quality
- Addresses regulatory program feedback and helps with permit compliance
- Helps with undersized existing drainage systems
- Provides a consistent framework and NCTCOG training opportunities



Integrated Stormwater Management



TriSWM

Available for use by cities, counties, engineers, private developers, contractors and transportation agencies in the planning and design of stormwater management for streets, roads, and highways.

Provides planning and design guidance and a framework for incorporating effective and environmentally sensitive stormwater management practices into the street and roadway project development process and to encourage a greater uniformity in developing plans for stormwater management systems that meet the following goals:

- Provide safe driving conditions
- Minimize downstream flood risk to people and properties
- Minimize downstream bank and channel erosion
- Reduce pollutants in stormwater runoff to protect water quality

Strategies to aid local governments and the private sector to:

- Design roads and highways with stormwater impacts in mind
- Address and mitigate the adverse impacts of development on runoff
- Implement stormwater controls to meet the TriSWM planning and design approach

Integrated Stormwater Management



Certified iSWM Cities

- Denton (Silver)
- Frisco (Silver)
- Kennedale (Silver)
- Grand Prairie (Silver)
- Fort Worth (Silver)

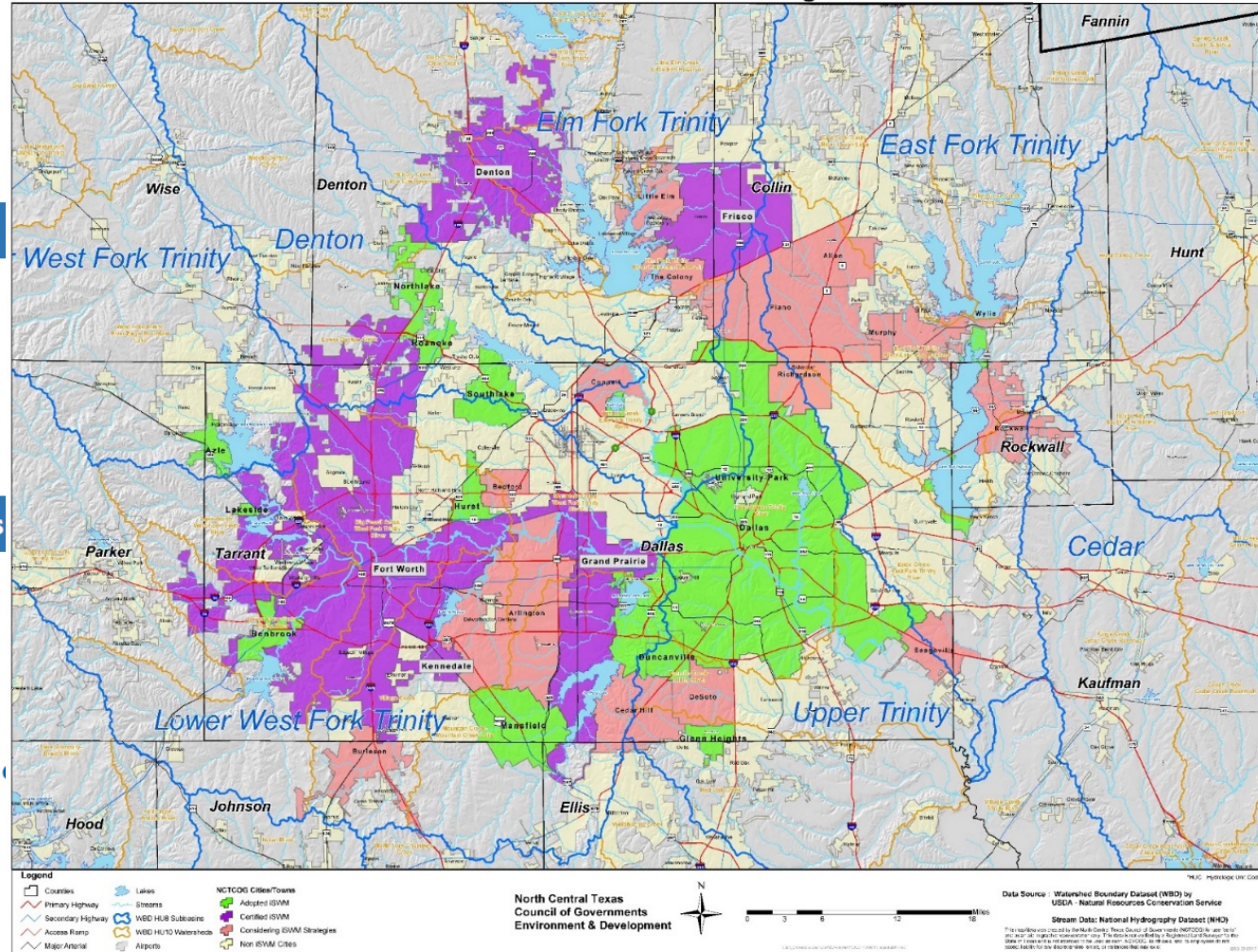
Founding iSWM Communities

- Azle
- Benbrook
- Dallas
- Duncanville
- Fort Worth
- Glenn Heights
- Grand Prairie
- Hurst
- Lakeside
- Mansfield
- Northlake
- Roanoke
- Southlake
- University Park

Cities considering iSWM Strategies

- Allen
- Arlington
- Bedford
- Burleson
- Cedar Hill
- Coppell
- DeSoto
- Little Elm
- Murphy
- Plano
- Richardson
- Rockwall
- Seagoville
- The Colony
- Wylie
- Others?

iSWM In The Dallas - Fort Worth Region



16-County Watershed Initiative

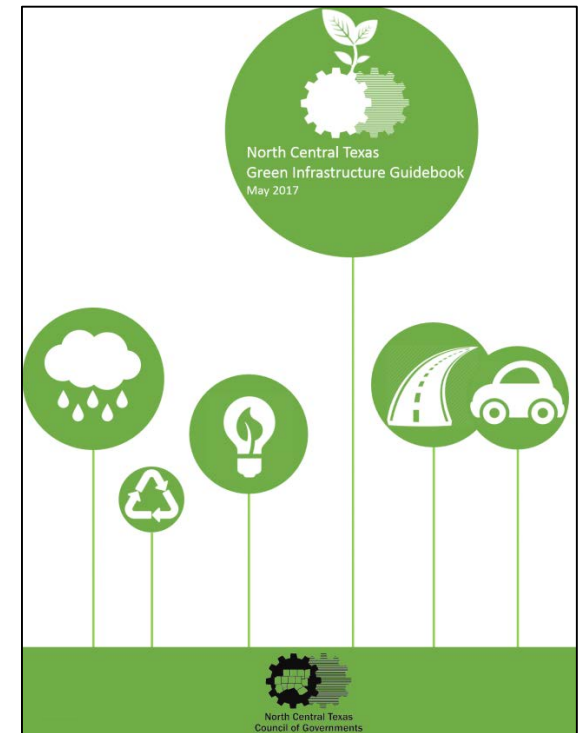
Developed through partnership with Transportation Department, Environment and Development, Texas Floodplain Management Association, & local county governments.

Menu of Regionally Recommended Standards in Watershed Management For New Development Within County Regulated Areas

1. Design infrastructure to fully developed conditions with approved land-use maps if data is available
2. Begin protection at the most upstream end of the watershed above Federal Emergency Management Agency Limit of Detail Study
3. Maintain unfilled valley storage areas
4. Protect against and reduce erosive velocities
5. Match pre-developed site runoffs
6. Verify/require adequate downstream conveyance
7. Require freeboard from fully developed (if data is available) and changing watershed conditions
8. Define written operation and maintenance responsibilities
9. Size conveyance of street and storm systems adequately to safely convey traffic
10. Create stream buffers and preserve open space; limit clearing and grading
11. Consider regional (on or off stream) detention incentives
12. Implement Conservation and/or Cluster Development incentives
13. Encourage low impact development techniques and/or green infrastructure

North Central Texas Green Infrastructure Guidebook

- Made in partnership with Transportation Department
- This guide focuses **transportation-relevant** green infrastructure elements:
 1. Energy-efficient light-emitting diode (LED) and renewable-energy lighting
 2. Recycled construction materials in roadways and trails
 3. Cool pavements
 4. Green trail materials
 5. Green stormwater infrastructure techniques such as permeable pavement and bioretention, and trees



www.nctcog.org/greeninfrastructure

North Central Texas Green Infrastructure Guidebook

Developed local, state, and national case studies to examine:

- Long-term cost effectiveness
- Community improvement
- Environmental impacts



Location of Green Infrastructure Case Studies

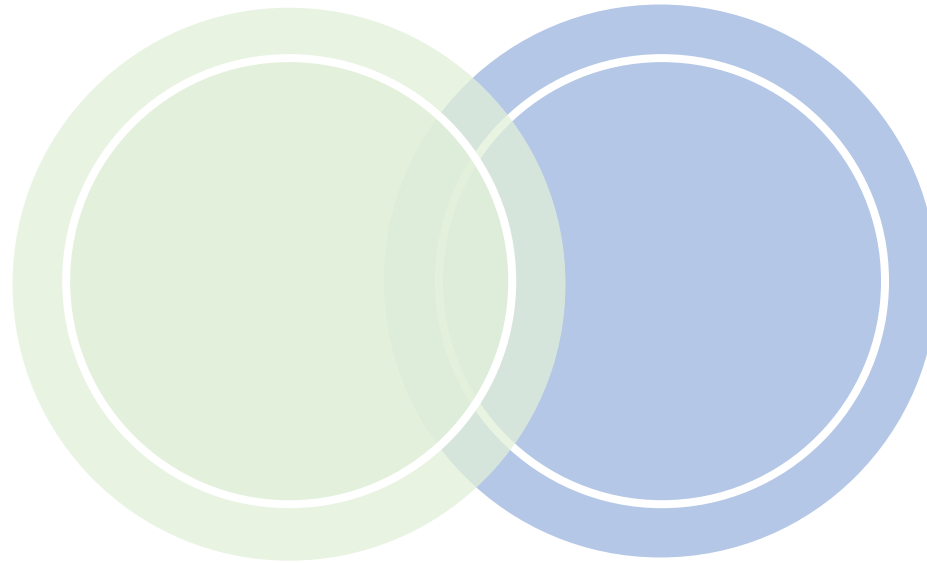
Sustainable Public Right of Ways (SPROW)

Hosts education forums and site visits for engineering and planning professionals

- Next scheduled for December 4, 2017
- Topics will include:
 - Municipal LED Retrofitting, City of Frisco
 - Complete Streets Policy Adoption and Implementation, City of Weatherford
 - Integration of Green Infrastructure in University of Texas Arlington Green at College Park
 - Visiting Various Sites in Dallas



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Air Quality in Mobility 2045

Lori Clark | lclark@nctcog.org | 817-695-9232

Environmental Stewardship Program

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Natural Environment Screening, Sustainable Planning in Denton Greenbelt, Mitigation Assessment, Environmental Justice

Kate Zielke | kzielke@nctcog.org | 817-608-2395

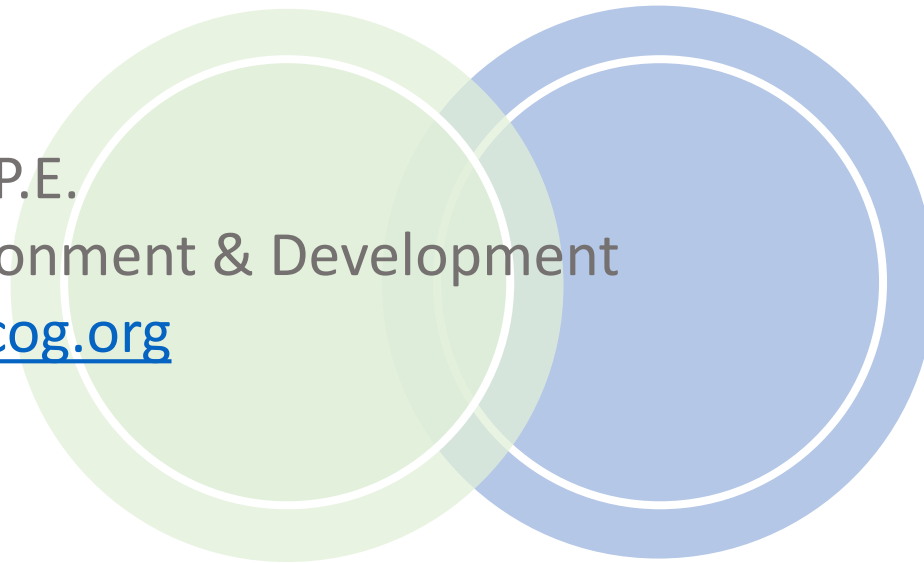
Quantifying Benefits of Environmental Stewardship

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Images on Cover: NCTCOG Photo taken at The Nature Conservancy's Clymer Meadow Preserve; Getty Images