SHRP2 Implementing Eco-Logical Grant

Regional Ecosystem Framework Update and Identification of Regional Focus Areas

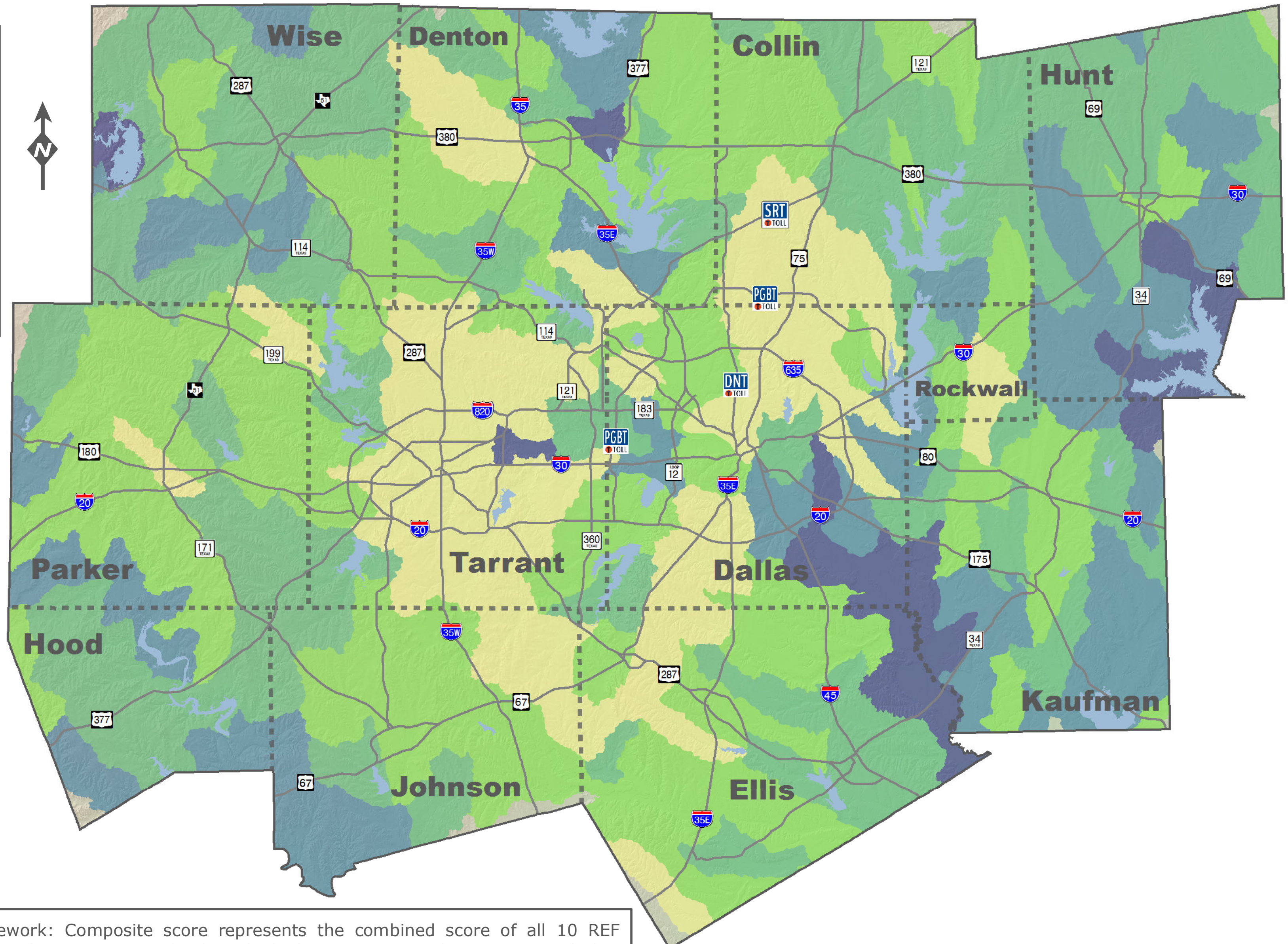
Appendix Table of Contents

Regional Ecosystem Framework: Composite

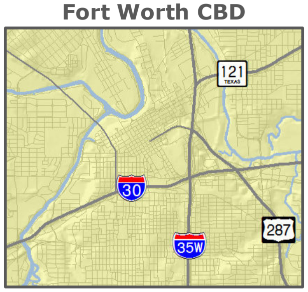
Legend

Composite Score

Score	
12 to 18	Some Resources of Concern
19 to 22	
23 to 26	
27 to 31	Greater Resources of Concern
32 to 40	



Fort Worth CBD



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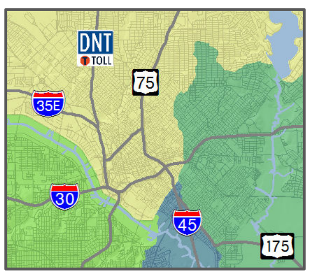


The Regional Ecosystem Framework: Composite score represents the combined score of all 10 REF layers. A higher score indicates that resources of relatively high concern may be present and that additional review, documentation, and consultation with the applicable agency may be needed. The REF layers include: Green Infrastructure (Wildlife Habitat, Natural Areas, Agricultural Land); Water Quality and Flooding (Impaired Water Segments, Flood Zones, Surface Water Quantity, and Wetlands); and Ecosystem Value (Rarity, Diversity, and Ecosystem Sustainability). Data sources include the Texas GRID and EPA Region 6 Regional Ecosystem Assessment Protocol data. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

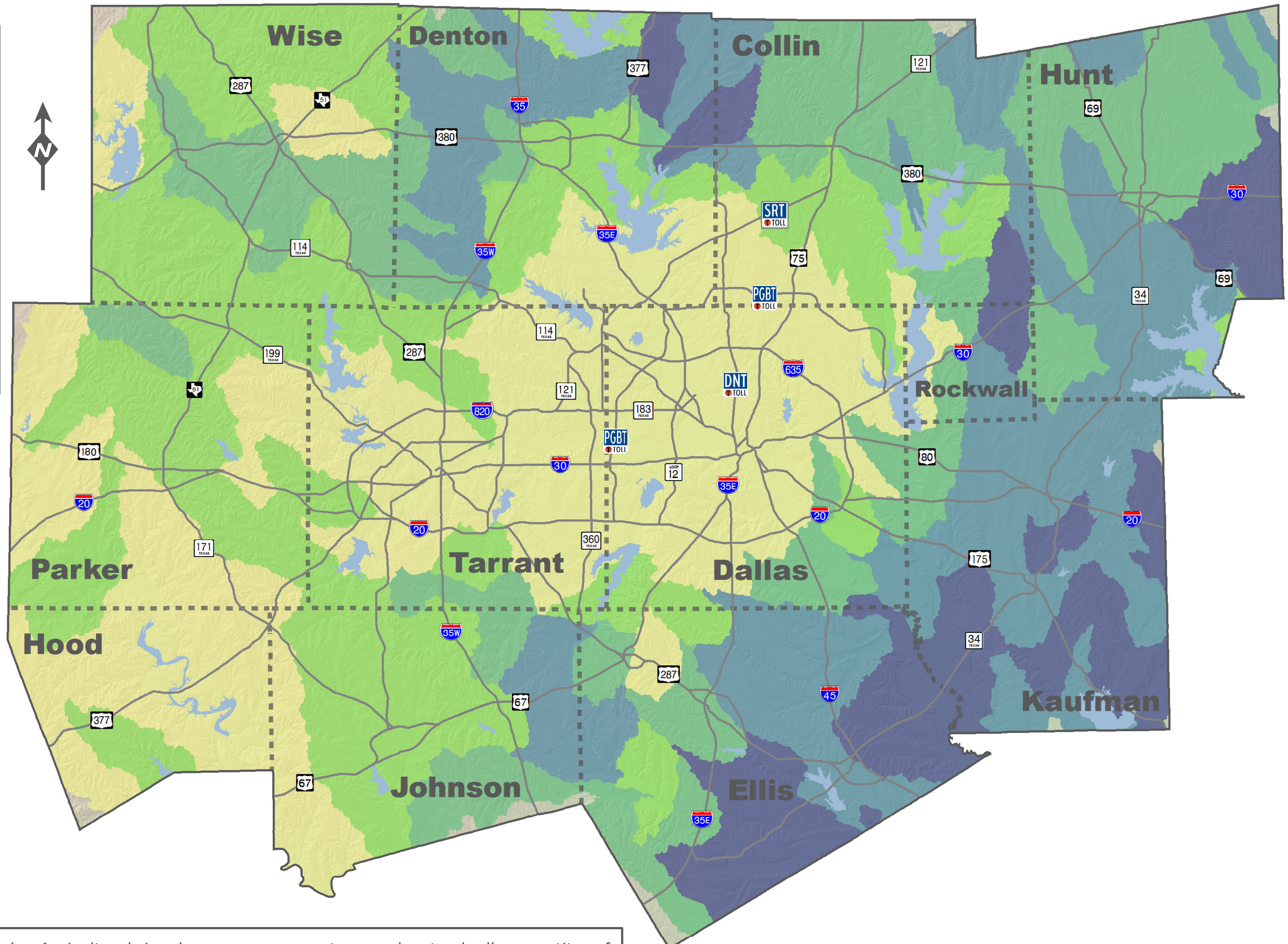
August 6, 2014

Regional Ecosystem Framework: Agricultural Lands

Legend

Agricultural Score

- 1 - Less Quantity of Agricultural Land
- 2
- 3
- 4
- 5 - High Quantity of Agricultural Land



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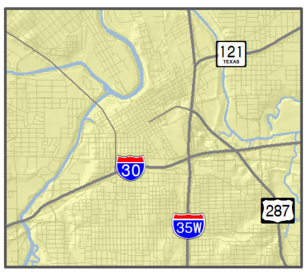
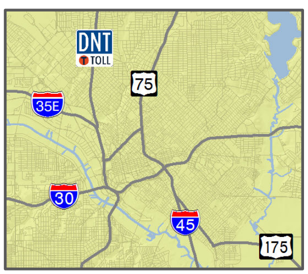


Dallas CBD



The Regional Ecosystem Framework: Agricultural Lands score represents a subwatershed's quantity of agricultural lands classified as 2011 NLCD Pasture/Hay and Cultivated Crops. The data is computed based on the percentage of an individual cell identified as agricultural land and assigned a score of 1 (<20% of grid cell) to 5 (>50% of grid cell). The cell scores in each subwatershed boundary are averaged resulting in a subwatershed value of 1 to 5. A higher percentage of agricultural land cover within an area may indicate a greater potential for concerns under the Prime Farmland Act. Data sources include the Texas GRID data. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

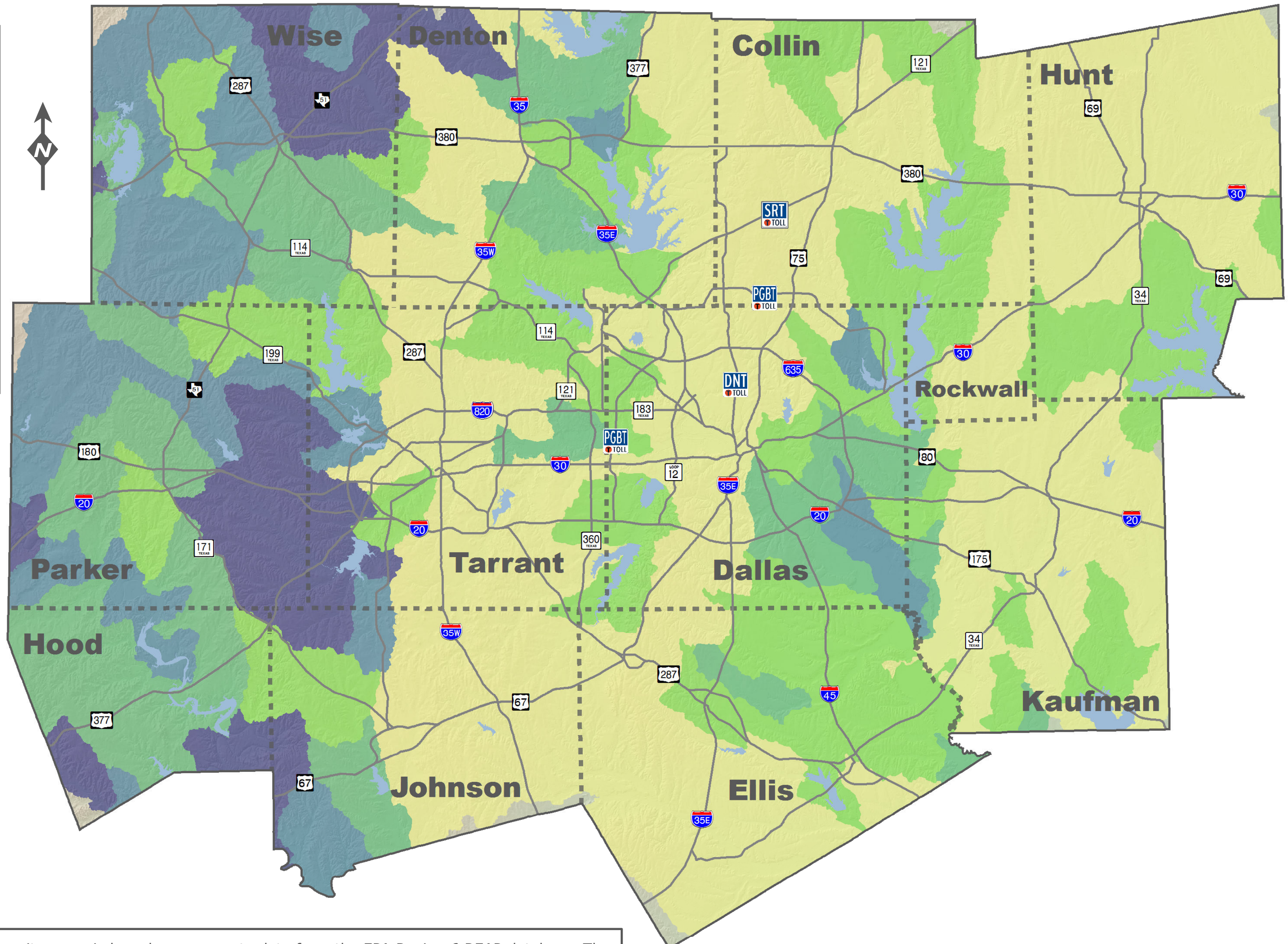
August 6, 2014

Regional Ecosystem Framework: Diversity

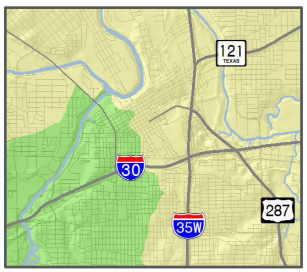
Legend

Diversity Score

- 1 - Lower Ecological Diversity
- 2
- 3
- 4
- 5 - Higher Ecological Diversity



Fort Worth CBD



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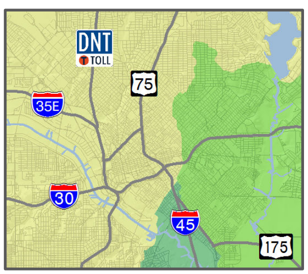

The Regional Ecosystem Framework: Diversity score is based on aggregate data from the EPA Region 6 REAP database. The REAP Diversity Layer was calculated using a 0.25 km2 grid which used the mean of four diversity sub-layers and rescaled them from 0 to 100. The four sub-layers used to calculate the REAP Diversity include: Appropriateness of Land Cover, Contiguous Size of Undeveloped Area, Shannon Land Cover Diversity, and Ecologically Significant Stream Segments. The REF calculates the subwatershed scores by averaging the individual REAP grid cells (scored 1 to 5, with 5 being the top 1% most diverse polygons) to determine an overall value of 1 to 5 for each subwatershed. Higher scores indicate a higher level of diversity in the overall subwatershed and should be used for screening purposes. The REAP was originally calculated for ecoregions. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

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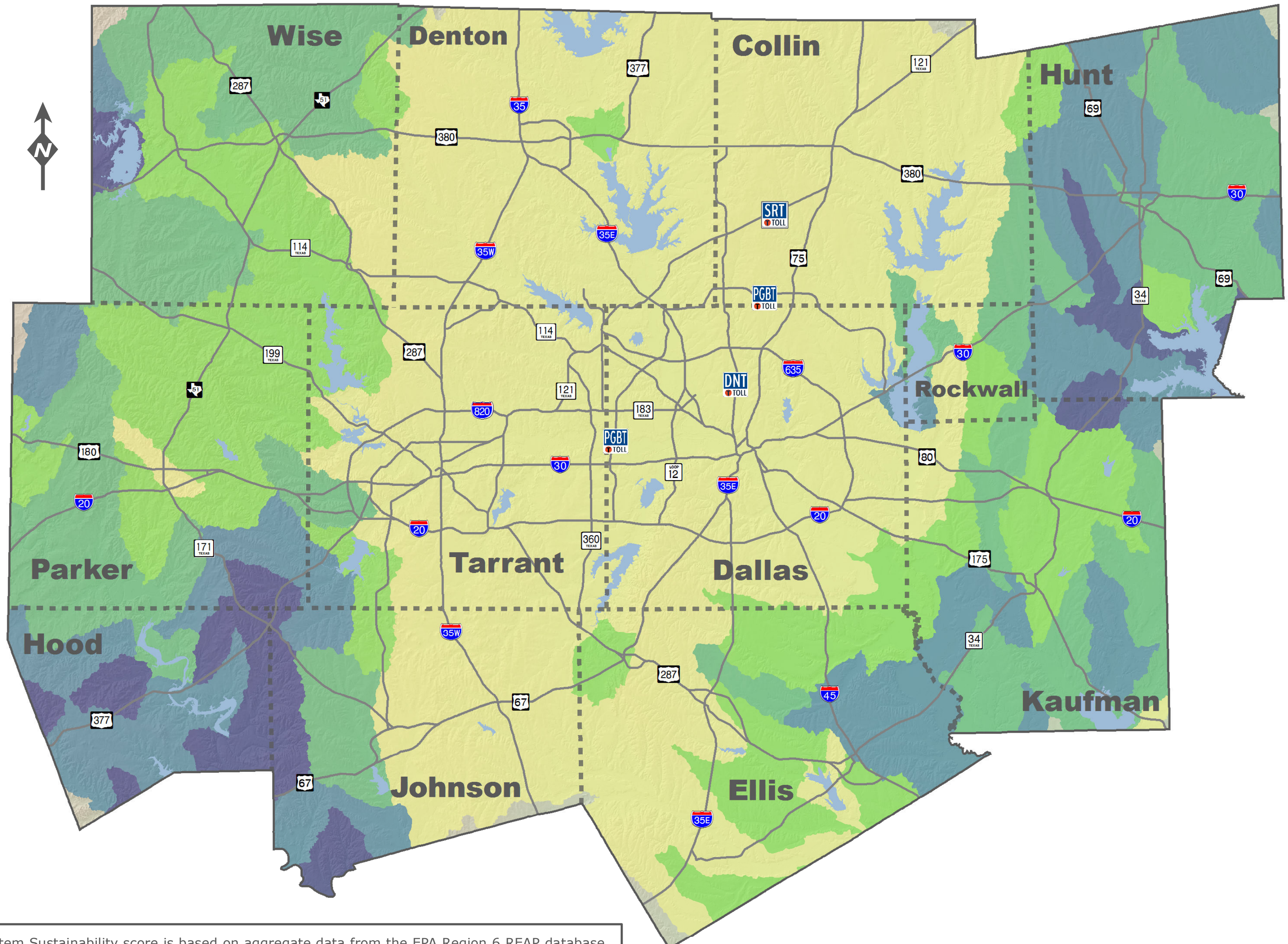
Regional Ecosystem Framework: Ecosystem Sustainability

Legend

Ecosystem Sustainability Score

- 1 - Lower Sustainability
- 2
- 3
- 4
- 5 - Higher Sustainability



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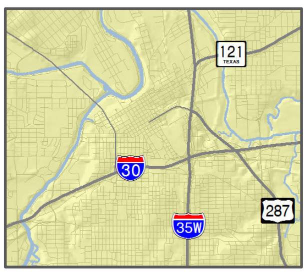

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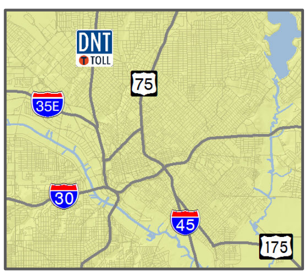


The Regional Ecosystem Framework: Ecosystem Sustainability score is based on aggregate data from the EPA Region 6 REAP database. The REAP Sustainability Layer was calculated using a 0.25 km2 grid which used the mean of 11 Sustainability sub-layers and rescaled them from 0 to 100. The Sustainability Layer 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, RCRA, Treatment-Storage-Disposal sites, Corrective Action and State Voluntary Cleanup Program Sites, and urban/agricultural disturbance. The REF calculates the subwatershed scores by averaging the individual REAP Sustainability grid cells to determine an overall value of 1 to 5 for each subwatershed. Higher scores indicate a higher level of sustainability or resilience. Resilience is the state of the environment in terms of stability and how resistant to disturbance an area is (Begon et al. 1986). The REAP was originally calculated for ecoregions. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

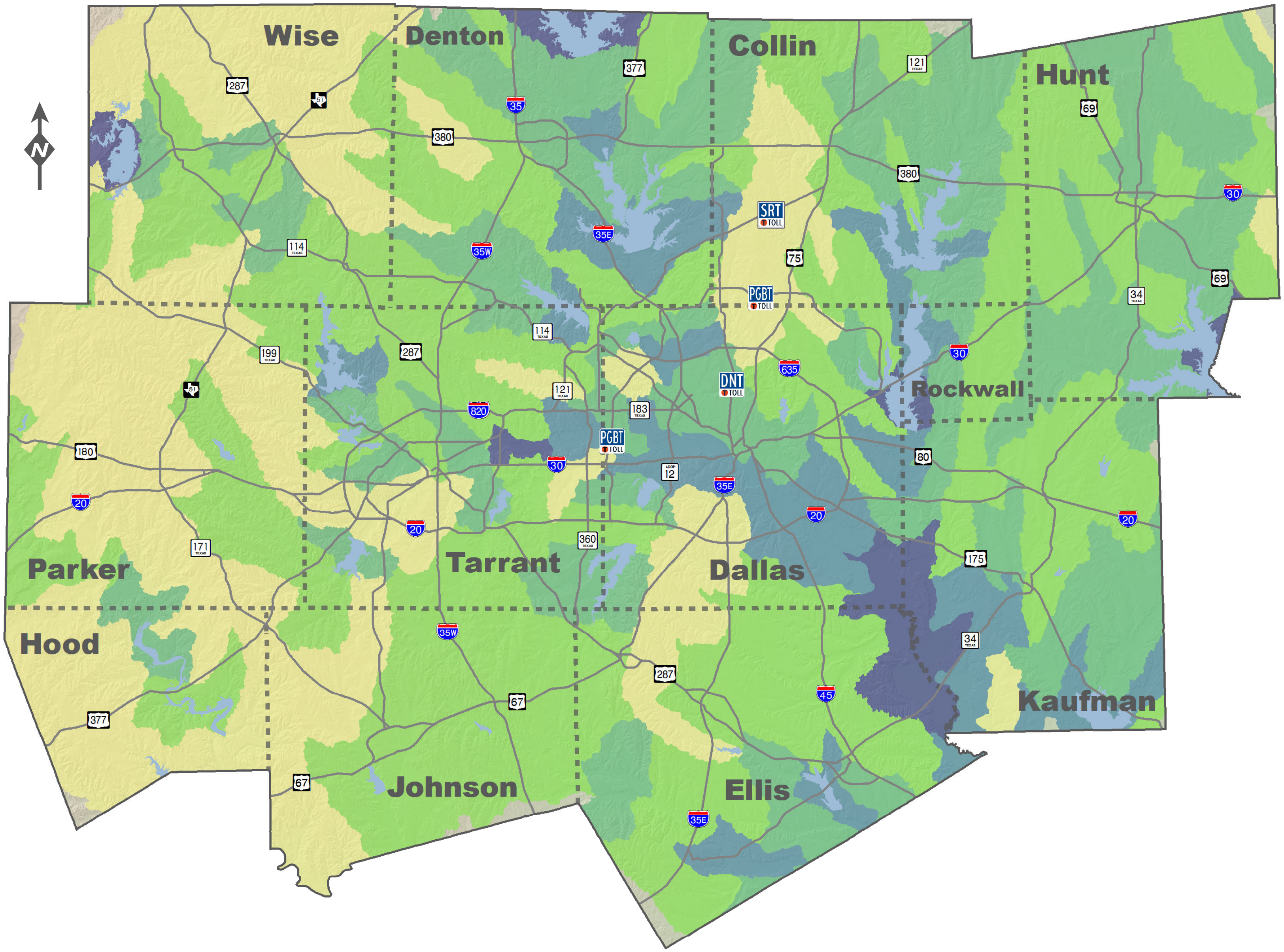
August 6, 2014

Regional Ecosystem Framework: Flood Zones

Legend

Flood Zone Score

- 1 - Low Presence of Flood Zones
- 2
- 3
- 4
- 5 - High Presence of Flood Zones



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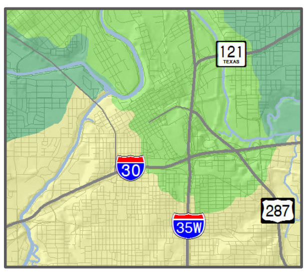
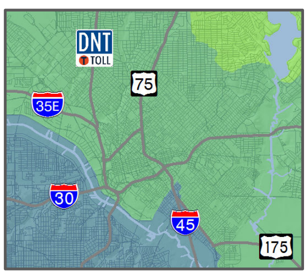


Dallas CBD



The Regional Ecosystem Framework: Flood Zone score includes 100 year and 500 year floodplains. The data is computed based on the percentage of an individual cell within the floodplain and assigned a score of 1 (<20% of the grid cell) to 5 (>50% of the grid cell). The cell scores in each subwatershed boundary are averaged resulting in a subwatershed score of 1 to 5. Data sources include the Texas GRID which used FEMA DFIRM flood data. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

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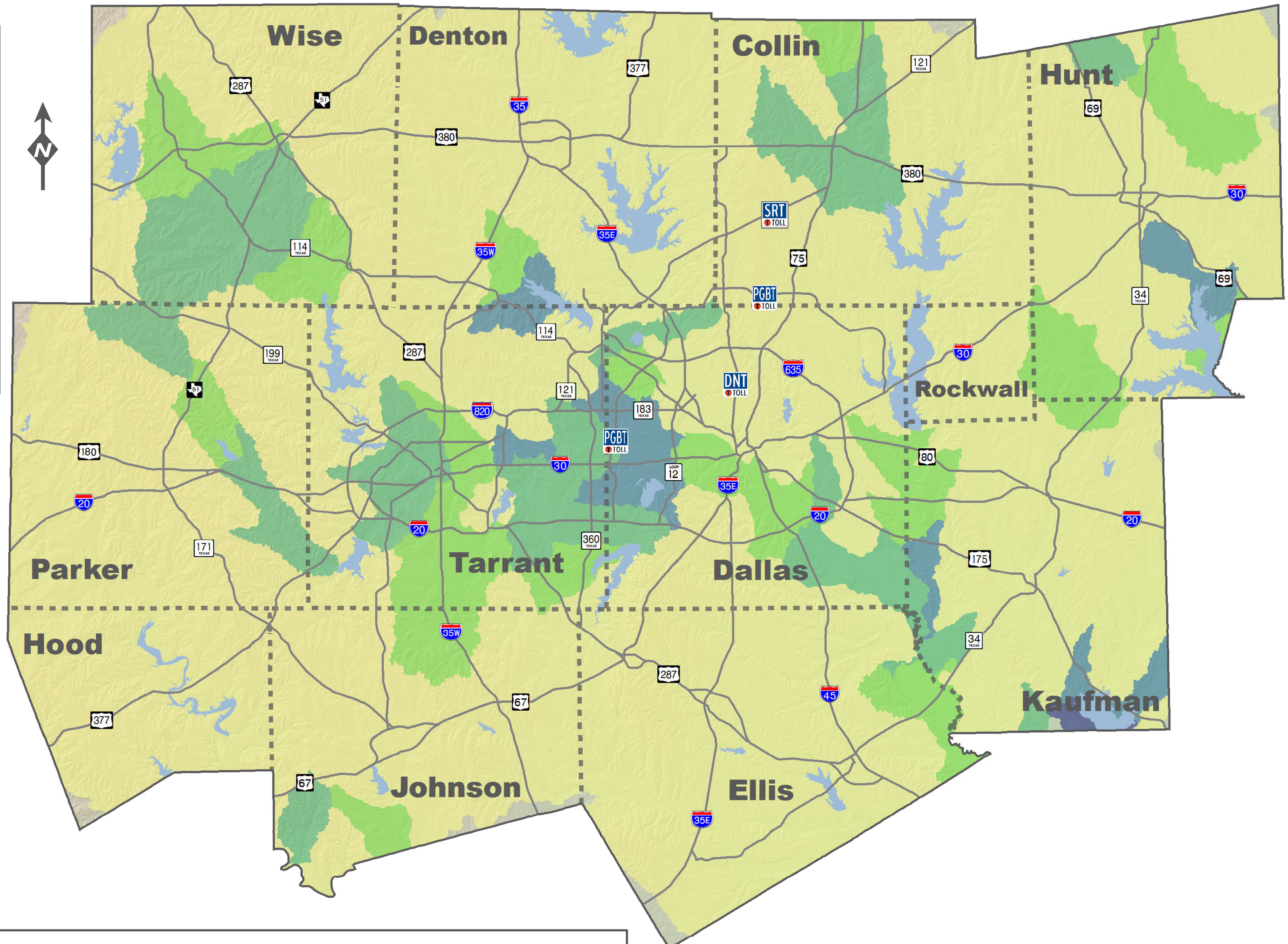
Regional Ecosystem Framework: Impaired Water Segments

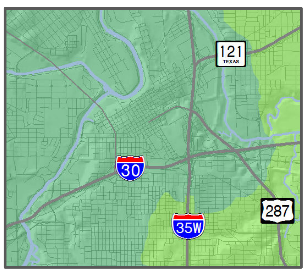
Legend

Impaired Water Segment Score

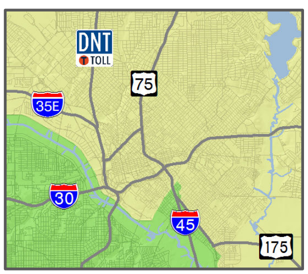
- 1 - No Impaired Water Segments
- 2 - Some Impaired Water Segments
- 3
- 4
- 5 - Many Impaired Water Segments



Fort Worth CBD



Dallas CBD



The Regional Ecosystem Framework: Impaired Water Segment score is based on Clean Water Act 303 (d) Segments State Priority Data. The data is based on whether an individual cell has an impaired water segment (Score = 5) or not (Score = 1). The cell scores in each subwatershed boundary are averaged resulting in a subwatershed score of 1 to 5, which is why there are some subwatersheds that score between 2 to 4. It can be assumed that any subwatershed above a 1 has impaired water segments, but a score closer to 5 indicates a greater quantity of impaired segments in a subwatershed. Data sources include the Texas GRID data. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

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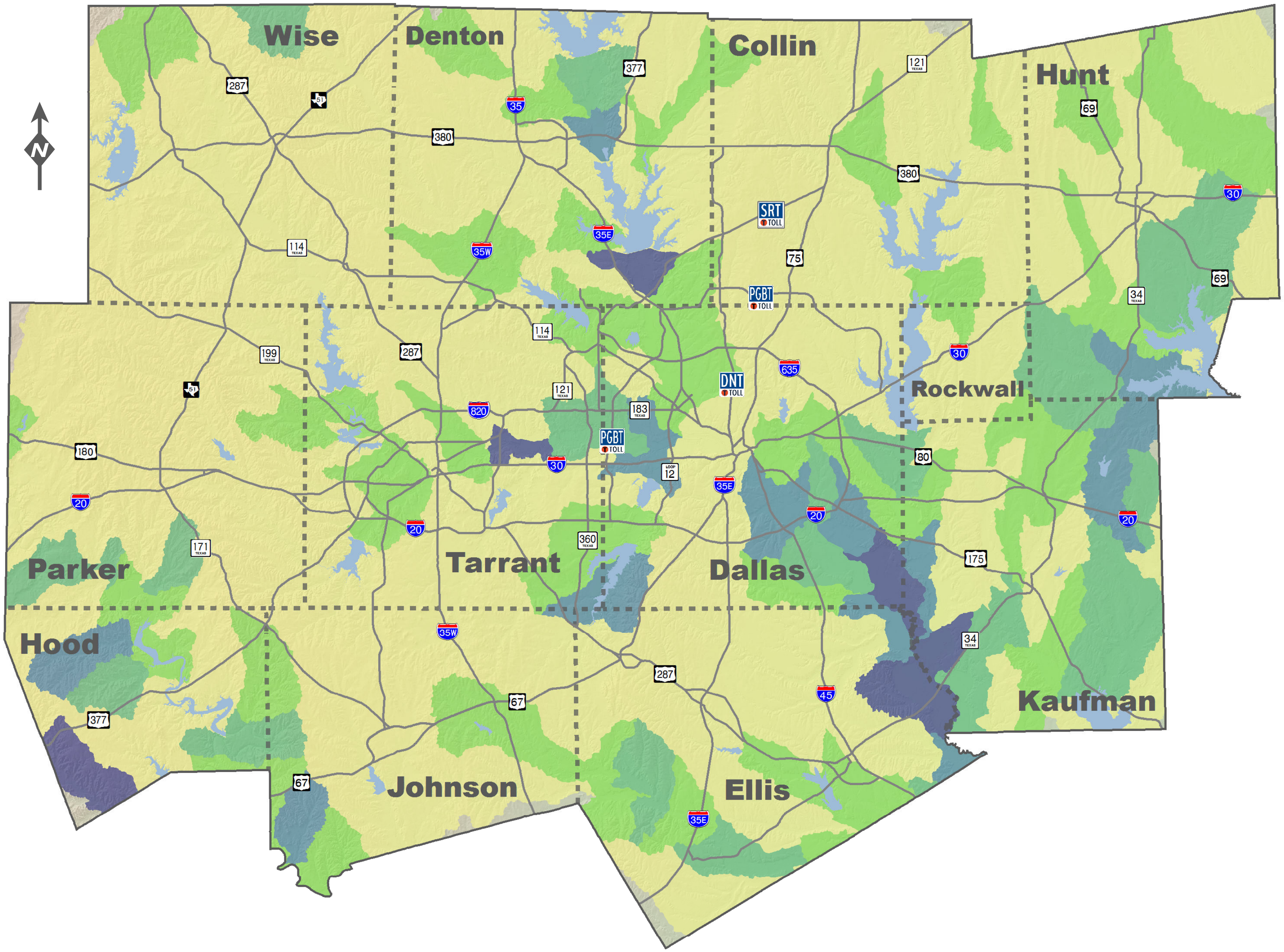
Regional Ecosystem Framework: Natural Areas

Legend

Natural Area Score

- 1 - Lower Quantity of Natural Areas
- 2
- 3
- 4
- 5 - Higher Quantity of Natural Areas



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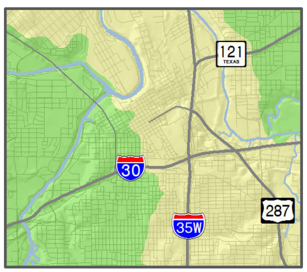
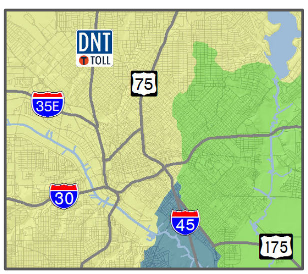


Dallas CBD



The Regional Ecosystem Framework: Natural Areas score as defined by North Texas 2050 "generally reflect floodplains, major public parks and open spaces, shores along major lakes and potential connections between these natural assets." The percentage of natural areas present in a subwatershed is assigned a score of 1 to 5. Data sources include NCTCOG 2007 aerial photography and North Texas 2050. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

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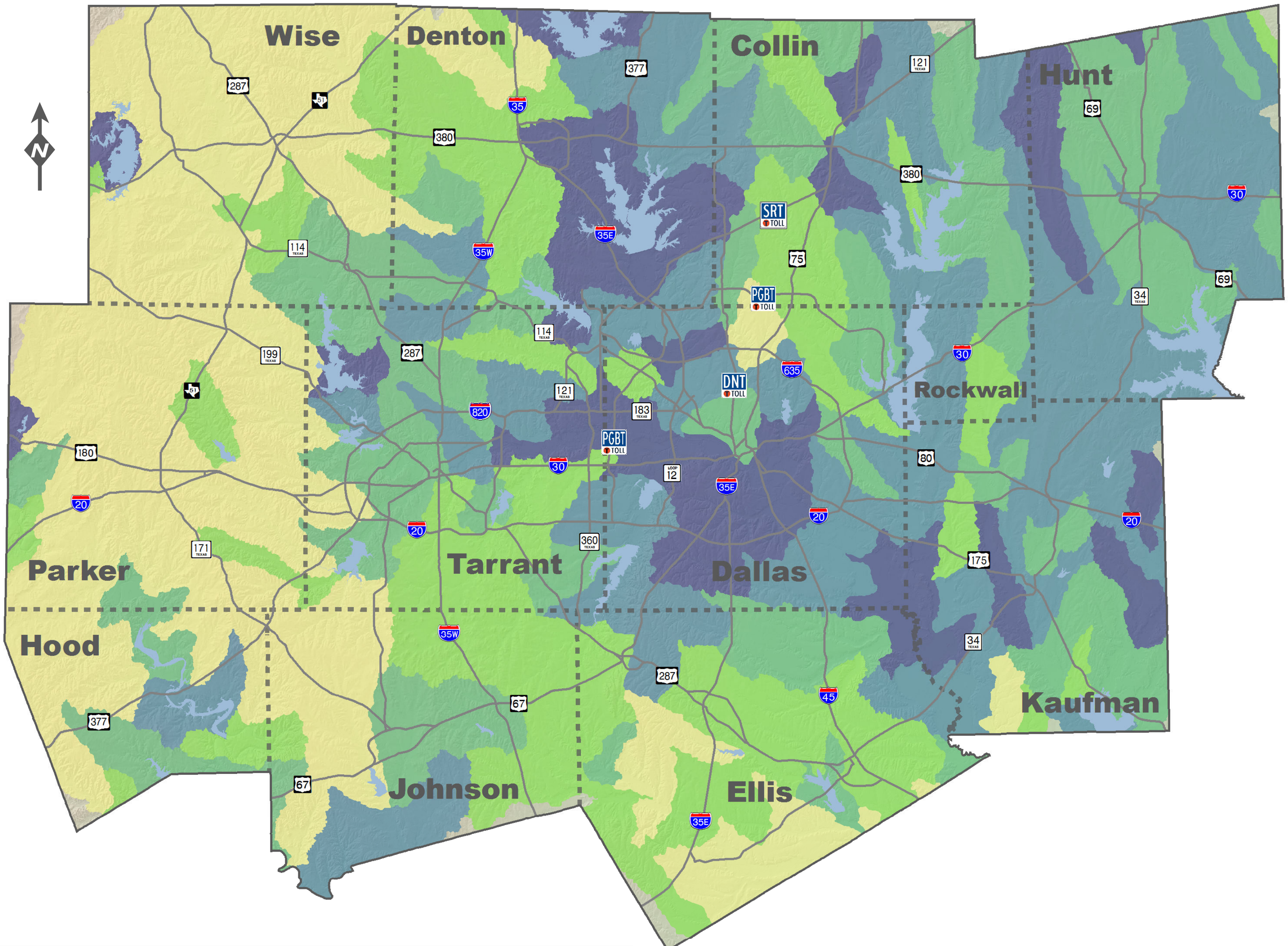
Regional Ecosystem Framework: Rarity

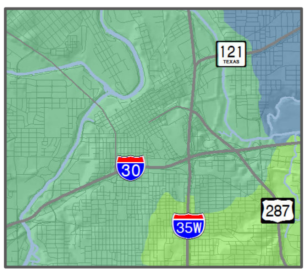
Legend

Rarity Score

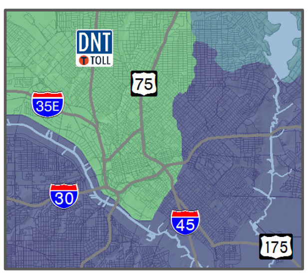
- 1 - Less Rare Areas
- 2
- 3
- 4
- 5 - More Rare Areas



Fort Worth CBD



Dallas CBD



The Regional Ecosystem Framework: Rarity score is based on aggregate data from the EPA Region 6 REAP database. The REAP Rarity Layer was calculated using a 0.25 km2 grid which used the mean of four Rarity sub-layers and rescaled them from 0 to 100. The four sub-layers used to calculate the REAP rarity layer include: Vegetation Rarity, Natural Heritage Rank, Taxonomic Richness, and Rare Species Richness. The REF calculates the subwatershed scores by averaging the individual REAP Rarity grid cells to determine an overall value of 1 to 5 for each subwatershed. Higher scores indicate a higher level of rarity in the overall subwatershed and should be used for screening purposes. The REAP was originally calculated for ecoregions. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

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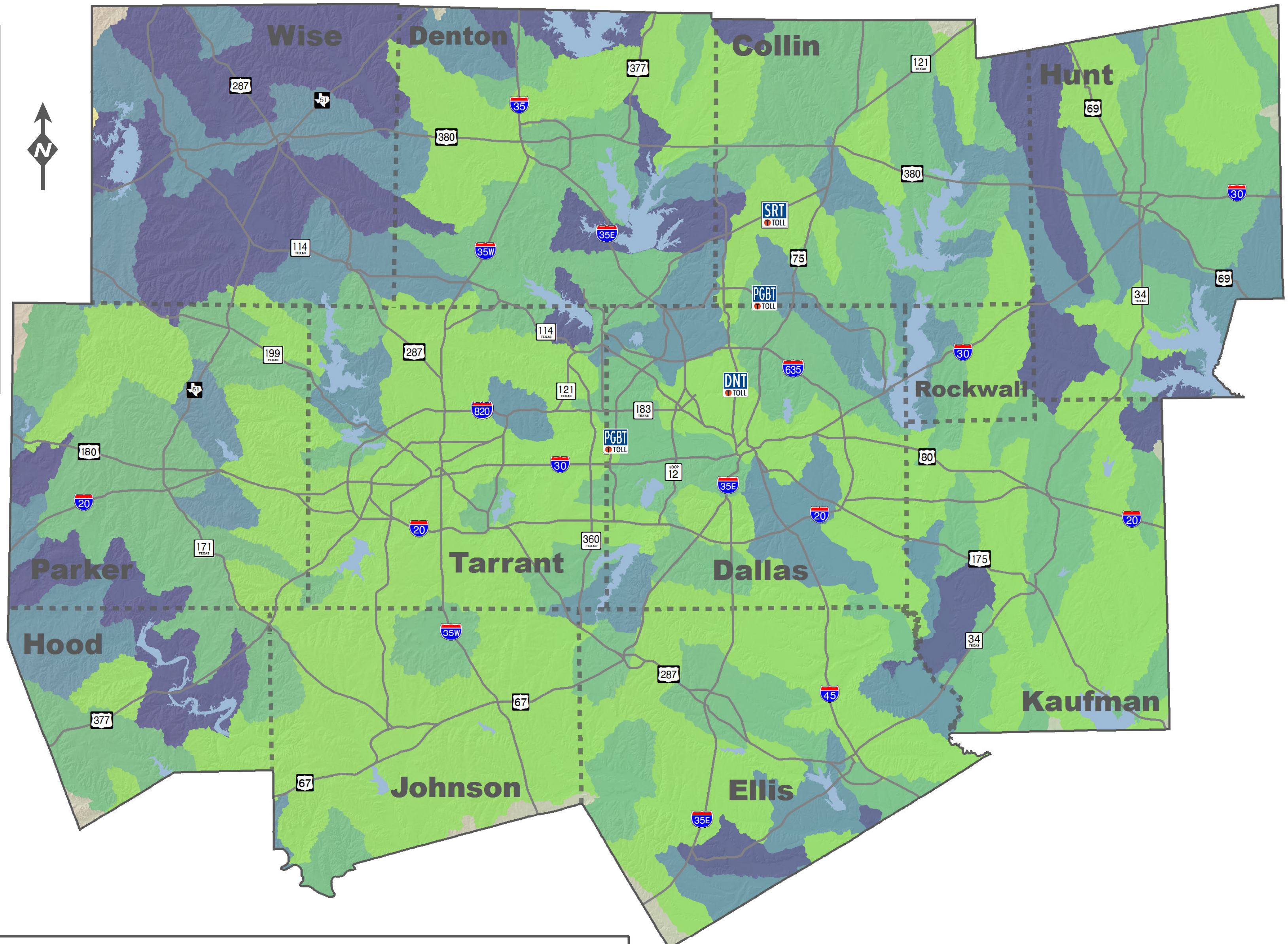
Regional Ecosystem Framework: Surface Water Quantity

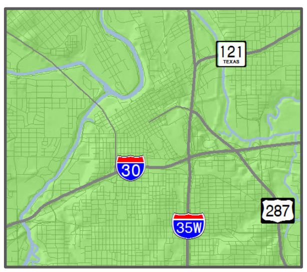
Legend

Surface Water Quantity Score

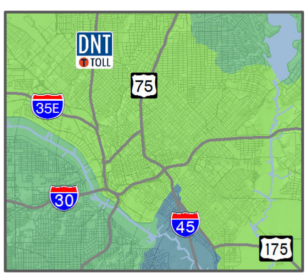
- 1 - Lower Surface Water Quantity
- 2
- 3
- 4
- 5 - Higher Surface Water Quantity



Fort Worth CBD



Dallas CBD



The Regional Ecosystem Framework: Surface Water Quantity score describes the quantity of surface waters present in a subwatershed. The cell scores in each subwatershed boundary are averaged resulting in a subwatershed score of 1 to 5. Surface waters are calculated for segment and shoreline distances for streams, rivers, and lakes. The more surface water areas present, the higher potential for ecological impacts. Data sources include the Texas GRID data. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

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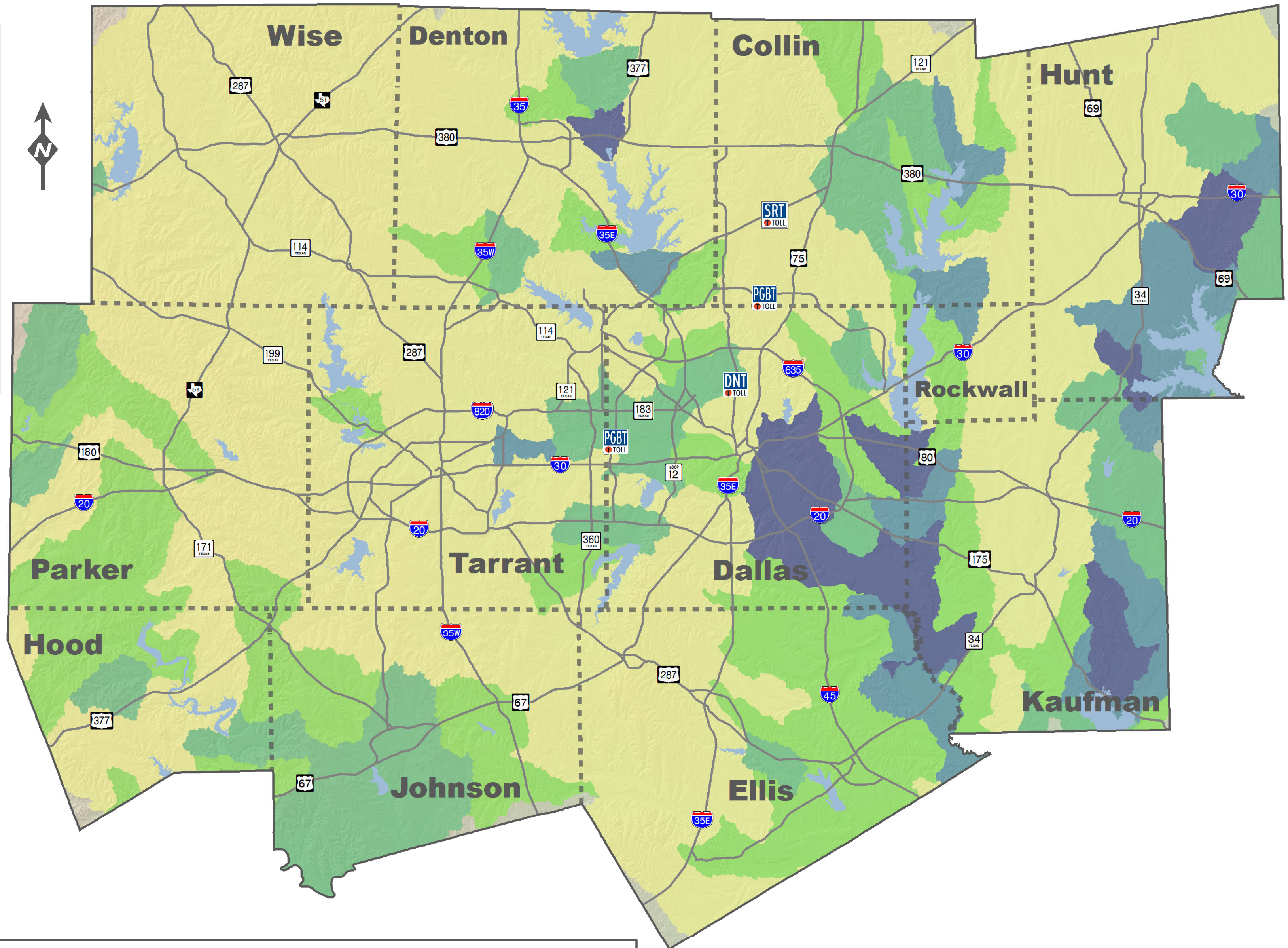
Regional Ecosystem Framework: Wetlands

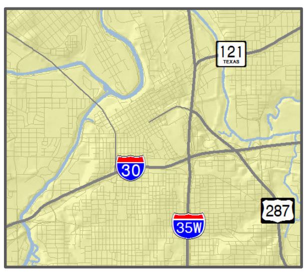
Legend

Wetland Score

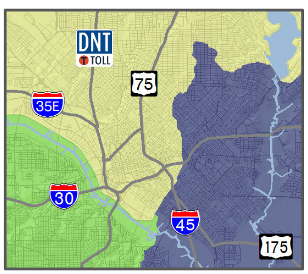
- 1 - Less Wetlands Present
- 2
- 3
- 4
- 5 - More Wetlands Present



Fort Worth CBD



Dallas CBD



The Regional Ecosystem Framework: Wetlands score represents a subwatershed's quantity of 2011 NLCD Woody Wetlands and Emergent Herbaceous Wetlands. The cell scores in each subwatershed boundary are averaged resulting in a subwatershed score of 1 to 5. Data sources include the Texas GRID data. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

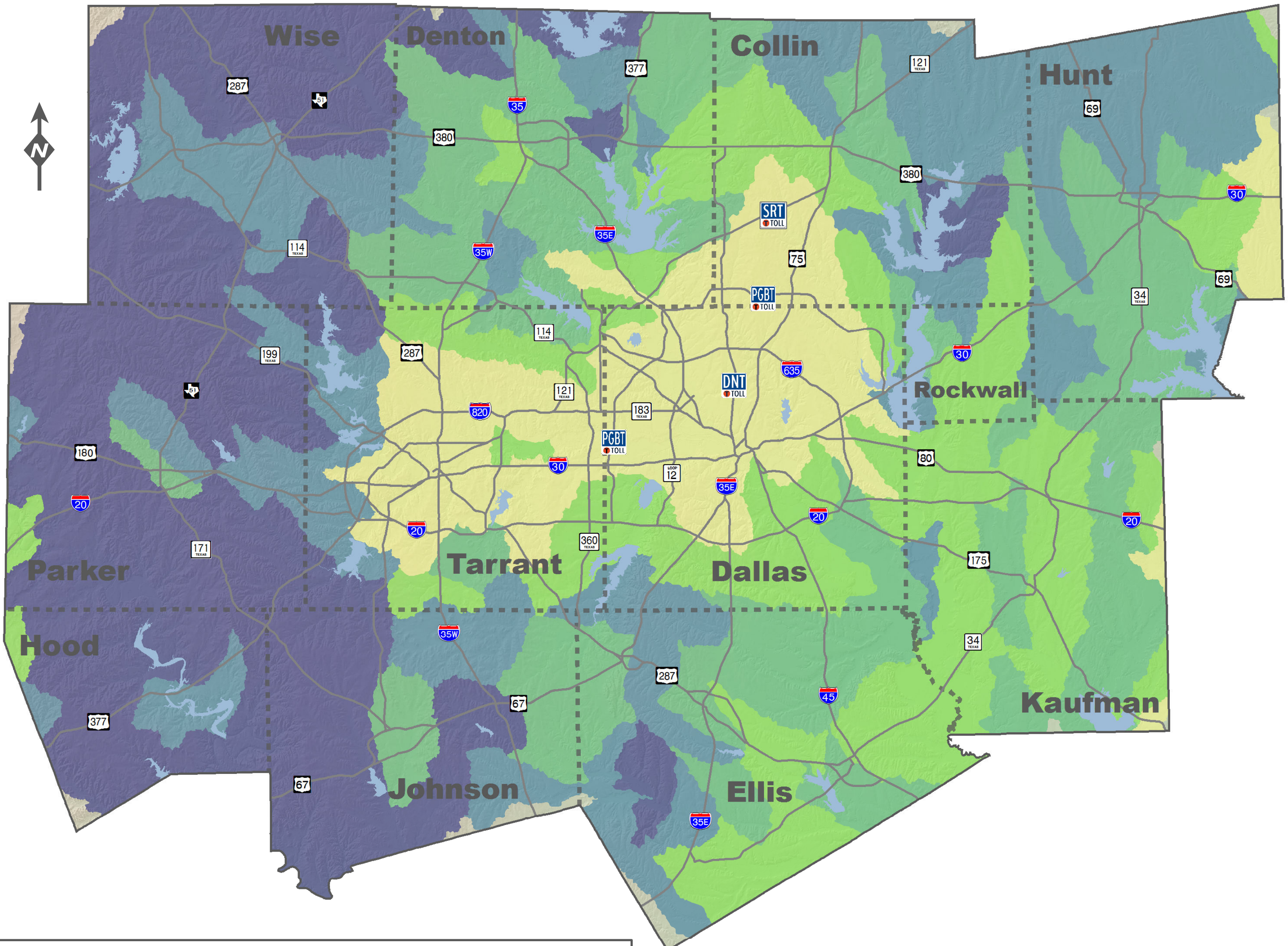
August 6, 2014

Regional Ecosystem Framework: Wildlife Habitat

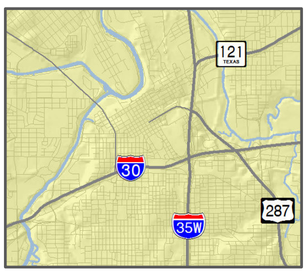
Legend

Wildlife Habitat Score

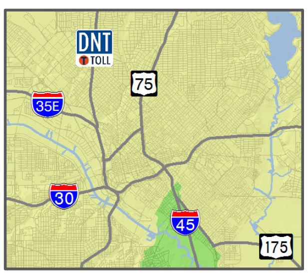
- 1 - Less Quantity Wildlife Habitat
- 2
- 3
- 4
- 5 - High Quantity Wildlife Habitat



Fort Worth CBD



Dallas CBD



The Regional Ecosystem Framework: Wildlife Habitat score is based on wildlife habitat represented by 2011 NLCD Forestlands, Shrublands, Grasslands, Wetlands, and Open Water. The data is based on the percentage of an individual cell identified as wildlife habitat and assigned a score of 1 (<20% of grid cell) to 5 (>50% of grid cell). The cell scores in each subwatershed boundary are averaged resulting in a subwatershed score of 1 to 5. Data sources include the Texas GRID data. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information on the calculations for this layer, please visit www.nctcog.org/REF.

North Central Texas Council of Governments

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Regional Ecosystem Framework
Vital Ecosystem Information Layers Data Descriptions

Water Considerations
This category includes VEIL layers related to quantity of water resources, including: presence of wetlands, flood zones, impaired/polluted water segments, and quantity of surface water.

Wetlands

Databases:
U.S. Geological Survey. 2011 National Land Cover Database.
Compiled from Landsat satellite data (circa 2011) with a spatial resolution of 30 meters.

Definitions, Assumptions, Limitations, Uncertainties:

1. Wetlands are represented by the lands classified as Woody Wetlands (NLCD code 91) and Emergent Herbaceous Wetlands (NLCD Code 92).
2. Percent coverage is quantitative only. No decisions as to wetland quality were made. Major lake areas are included for '% of area' computation.
3. This criterion may be calculated for the most appropriate geographic area and scale (e.g., watershed subunits, transportation corridors, or project areas).
4. It is assumed that wetlands are affected if they are located within the project or geographic boundaries.
5. The wetlands affected reflect the percentage of wetland area within the project or geographic boundary.

Surface Water Quantity

Databases:
U.S. Geological Survey. National Hydrological Dataset, 1999.
U.S. Census Bureau, 2001. TIGER/Line Files, Census 2000. Washington, D.C.
National Resource Conservation Service (NRCS), State Soil Geographic Database (STATSGO), 1/250,000 scale, variable dates for data.

References:

U.S. Army Corps of Engineers, Section 10 Rivers and Harbors Act of 1899.
U.S. EPA. Clean Water Act, Section 401 and 404, Regulations and Guidance.

Definitions, Assumptions, Limitations, Uncertainties:

1. Surface waters are calculated for segment and shoreline distances for streams, rivers, and lakes. Scaling scores (rankings) are derived from total miles in a watershed or project area divided by the area in square miles of associated HUCs.
2. River and lake surface water areas and depths are not considered.
3. The more surface water area present, the higher potential for ecological impacts.
4. Shoreline is of considerable interest because of the sensitivity of associated ecological communities.
5. This criterion may be calculated for the most appropriate geographic area and scale (e.g., watershed subunits, transportation corridors, or project areas).
6. The area of analysis may be broken into 1 km grid cells for GISST criteria computation.

Flood Zones

Databases:

Federal Emergency Management Agency. Digital Flood Insurance Rate Map (2012 data).

References:

Executive Order 11988, 1977. Flood Plain Management.

Definitions, Assumptions, Limitations, Uncertainties:

1. Floodplains are digitized from FEMA DFIRM maps.
2. Percent coverage is quantitative only. No decisions as to floodplain quality were made.
3. Floodplains are defined as the areas where the zone = A (100 year flood plain) or the zone = X500 (500 year flood plain).
4. Changes in upstream hydrology will affect future floodplain extent.
5. This criterion may be calculated for the most appropriate geographic area and scale (e.g., watershed subunits, transportation corridors, or project areas).
6. The area of analysis may be broken into 1 km grid cells for GISST criteria computation.

Impaired Water Segments

Databases:
TCEQ, 2012. Impaired Segments 2012. TCEQ, Austin, TX.
EPA, 2003. Texas Interstate 69 Baseline Analysis Grid. EPA, Region 6, Dallas, TX.

References:

EPA. Clean Water Act 303(d) Regulations & Guidance.
Texas Water Quality standards.

Definitions, Assumptions, Limitations, Uncertainties:

1. CWA 303(d) assessments are done by States and approved by EPA.
2. TMDL= Total Maximum Daily Load.
3. Segments listed as impaired in the file are used in this criteria. Impaired segments receive a score of 5.
4. Stream segments with no data are assumed to be good quality.
5. Designated uses are defined in the State Water Quality Standards.
6. This criterion may be calculated for the most appropriate geographic area and scale (e.g., watershed subunits, transportation corridors, or project areas).
7. The area of analysis may be broken into 1 km grid cells for GISST criteria computation.

Green Infrastructure Considerations

The Green Infrastructure category includes VEIL layers related to the presence of undeveloped areas, including: percentage of the area designated as agricultural lands, wildlife habitat, and natural areas. All of these layers are potential sources of habitat for wildlife.

Agricultural Lands

Databases:

U.S. Geological Survey. 2011 National Land Cover Database. Compiled from Landsat satellite data (circa 2011) with a spatial resolution of 30 meters.

Definitions, Assumptions, Limitations, Uncertainties:

1. Agricultural lands are represented by the lands classified as Hay/Pasture and Cultivated Crops (NLCD Codes 81 and 82).
2. Percent coverage is quantitative only. No decisions as to agricultural land quality were made.
3. A higher percentage of agricultural land cover within an area may indicate a greater potential for concerns under the Prime Farmland Act.
4. For DI, it is assumed that farmlands are affected if they are located within the project or geographic boundaries.
5. For DI, the farmlands affected reflect the percentage of wetland area within the project or geographic boundary.
6. This criterion may be calculated for the most appropriate geographic area and scale (e.g., watershed subunits, transportation corridors, or project areas).
7. The area of analysis may be broken into 1 km grid cells for GISST criteria computation.

Wildlife Habitat

Databases:

U.S. Geological Survey. 2011 National Land Cover Database.
Compiled from Landsat satellite data (circa 2011) with a spatial resolution of 30 meters.

Definitions, Assumptions, Limitations, Uncertainties:

1. Habitats are represented by Forest Lands, Shrublands, Grasslands, Wetlands, and Open Water (NLCD Codes 11, 41-43, 52, 71, 90, 95).
2. Percent coverage is quantitative only. No decisions as to wildlife habitat quality were made.
3. There is no association between this vulnerability score for wildlife habitats and the potential effect, if any, on listed Federal Endangered and Threatened Species, subject to the requirements of the ESA.
4. The EPA will conduct a separate review with the U.S. Army Corps of Engineers and/or the U.S. Natural Resources Conservation Service, as necessary, to document compliance with Section 404 of the Clean Water Act.
5. For DI, it is assumed that wildlife habitat is affected if it is located within project or geographic boundaries.
6. For DI, the wildlife habitat affected reflects the percentage of habitat area within project or geographic boundary.
7. This criterion may be calculated for the most appropriate geographic area and scale (e.g., watershed subunits, transportation corridors, or project areas).
8. The area of analysis may be broken into 1 km grid cells for GISST criteria computation.

Natural Areas

Databases:
NLCD, 2001.
North Texas 2050. NCTCOG, 2010.

Definitions, Assumptions, Limitations, Uncertainties:

1. Natural Areas as defined by North Texas 2050 “generally reflect floodplains, major public parks and open spaces, shores along major lakes and potential connections between these natural assets.”
2. The natural areas were compared to 2007 aerial photography and digitally reproduced to be more accurate based on recent development trends.

Ecosystem Value Considerations

This category includes VEIL layers related to the ability to support diverse and stable ecosystems, including the presence of rare vegetation and species, taxonomic diversity, natural heritage sites, and factors that may fragment or stress ecosystems.

Diversity

Databases:
USGS. 2000. Texas National Land Cover Data Set (circa 1992), http://landcover.usgs.gov/natllandcover.asp.
TPWD. 1995. Ecological Stream Segments of Concern Fire Sciences Laboratory, Rocky Mountain Research Station, 2001, Kuchler’s Potential Natural Vegetation Groups, Version 2000, Missoula, MT.

References:

Osowski, S. L., J. E. Danielson, S. Schwelling, D. German, S. Gilbert, D. Lueckenhoff, D. Parrish, A. K. Ludekeand, J. Bergan. 2004. Texas Environmental Resource Stewards (TERS) Texas Ecological Assessment Protocol (TEAP) Results, Pilot Project Report. Report Number EPA-906-C-05-001. US Environmental Protection Agency Region 6, Dallas, TX.
Küchler, A. W. 1975. Potential natural vegetation of the conterminous United States. 2d ed. Map 1:3,168,000. American Geographical Society.

Definitions, Assumptions, Limitations, Uncertainties:*

1. Because the TEAP was calculated using a 1km2 grid developed by Texas Parks and Wildlife Department, the scores for this criteria may be up to 0.5 km2 off from the original 1km2 grid developed by EPA Region 6 for the GISST calculation for IH69.
2. The diversity layer consists of four sub-layers: appropriateness of land cover, contiguous size of undeveloped area, Shannon land cover diversity, and ecologically significant stream segments.
3. The overall diversity layer was calculated by taking the mean of the four diversity sub-layers and rescaling on a 0-100 scale. Higher scores indicate a higher level of diversity. The values of the 30 m pixels that made up each 1 km2 (one kilometer square) grid cell were averaged to determine the Diversity Index score for each cell.
4. A US EPA program, ATTiLA, was used to calculate Shannon land cover diversity.
5. Further details on TEAP calculations can be found in the TEAP Results Report.

*****These assumptions were provided in the GISST Manual which utilized data from the TEAP, the precursor to the REAP. Updated documentation for the REAP is currently not available but NCTCOG assumes these same Definitions, Assumptions, Limitations, and Uncertainties are warranted for the REAP.

Ecosystem Sustainability

Databases:

USGS, 2000, Texas National Land Cover Data Set, http://landcover.usgs.gov/natllandcover.asp.
Fire Sciences Laboratory, Rocky Mountain Research Station, 2001, Kuchler's Potential Natural Vegetation Groups, Version 2000, Missoula, MT.
U.S. Bureau of the Census, 2000, TIGER/Line Files. Census Bureau, Washington, D.C.
U.S. EPA, 2003, National Priority List Database. EPA Region 6, Dallas, TX.
TCEQ, 2003, State Superfund Sites. Austin, TX.
U.S. EPA, 2003, RCRA TSD database. EPA Region 6, Dallas, TX.
U.S. EPA, 2003, Corrective Action database. EPA Region 6, Dallas, TX.
TCEQ, 2003, Voluntary Cleanup Program database. TCEQ, Austin, TX.
Bureau of Transporation Statistics, 2002, U.S. Airport Database. BTS, Washington, D.C.
U.S. EPA, 2003, Ozone Nonattainment Areas. EPA Region 6, Dallas, TX
TCEQ, 2003, State Near Nonattainment Areas. TCEQ, Austin, TX.
TCEQ, 2002, Dam Dataset. TCEQ, Austin, TX.
TCEQ, 2000, 303d Stream Segments of Concern. TCEQ, Austin, TX.

References:

Osowski, S. L., J. E. Danielson, S. Schwelling, D. German, S. Gilbert, D. Lueckenhoff, D. Parrish, A. K. Ludekeand, J. Bergan. 2004. Texas Environmental Resource Stewards (TERS) Texas Ecological Assessment Protocol (TEAP) Results, Pilot Project Report. Report Number EPA-906-C-05-001. US Environmental Protection Agency Region 6, Dallas, TX.

Definitions, Assumptions, Limitations, Uncertainties:

1. The sustainability layer describes the state of the environment in terms of stability, that is, how resistant to disturbance an area is, and how capable the area is in returning to its predisturbance state, that is, resilience (Begon et al. 1986). Sustainable areas are those that can maintain themselves into the future without human management.
2. Because the TEAP was calculated using a 1km2 grid developed by the Texas Parks and Wildlife Department, the scores for this criteria may be up to 0.5 km2 off from the original 1km2 grid developed by EPA Region 6 for the GISST calculation for IH69.
3. The sustainability layer consists of 11 measures that can be loosely grouped into fragmentors: contiguous land cover type, regularity of ecosystem boundary, appropriateness of land cover, waterway obstruction, road density; and stressors: airport noise, Superfund National Priority List and State Superfund Sites, water quality, air quality, RCRA, Treatment-Storage-Disposal sites, Corrective Action and State Voluntary Cleanup Program Sites, and urban/agricultural disturbance.
4. The overall sustainability layer was calculated by taking the mean of the 11 sub-layers and rescaling on a 0-100 scale. Higher scores indicate a higher level of sustainability. The values of the 30 m pixels that made up each 1 km2 (one kilometer square) grid cell were averaged to determine the Sustainability Index score for each cell.
5. Further details on TEAP calculations can be found in the TEAP Results Draft Report.

Rarity

Databases:

USGS, 2000, Texas National Land Cover Data Set, http://landcover.usgs.gov/natllandcover.asp.
TPWD TXBCD & Natural Heritage data

References:

Osowski, S. L., J. E. Danielson, S. Schwelling, D. German, S. Gilbert, D. Lueckenhoff, D. Parrish, A. K. Ludekeand, J. Bergan. 2004. Texas Environmental Resource Stewards (TERS) Texas Ecological

Assessment Protocol (TEAP) Results, Pilot Project Report. Report Number EPA-906-C-05-001. US Environmental Protection Agency Region 6, Dallas, TX.

Definitions, Assumptions, Limitations, Uncertainties:

1. Because the TEAP was calculated using a 1km2 grid developed by the Texas Parks and Wildlife Department, the scores for this criteria may be up to 0.5 km2 off from the original 1km2 grid developed by EPA Region 6 for the GISST calculation for IH69.
2. The rarity layer consists of four sub-layers: vegetation rarity, natural heritage rank, taxonomic richness, and rare species richness.
3. The overall rarity layer was calculated by taking the mean of the four Rarity layer sub-layers and rescaling on a 0-100 scale. Higher scores indicate a higher level of rarity. The values of the 30 m pixels that made up each 1 km2 grid cell were averaged to determine the Rarity Index score for each cell. Overall rarity was calculated by recoding rarity ranks using an exponential growth function 0-250 to produce a statewide land cover rarity data set. Data were scaled 0-250, due to machine processing of 8-bit data. Because the input data sets for Texas were large, rescaling the data from 1-250 (8-bit) allowed for much faster machine processing without any significant loss of granularity. Exponential scaling was chosen to give appropriate weight to rarer features. The statewide land cover rarity data set and the land cover rarity by ecoregion data set were input into an averaging model to compute the mean value of each grid cell for the combined data sets.
4. Further details on TEAP calculations can be found in the TEAP Results Report.

Implementing Eco-Logical Stakeholder Meeting

June 4, 2014
10:00 a.m. -11:30 a.m.
North Central Texas Council of Governments

Agencies in Attendance: City of Arlington, City of Benbrook, City of Cedar Hill, City of Farmers Branch, City of Grapevine, Tarrant County, Fort Worth Transportation Authority, University of Texas at Arlington, NCTCOG, TxDOT Dallas District, Texas Parks and Wildlife Department, Texas Forest Service, Upper Trinity River Water District, EPA Region VI, U.S. Fish and Wildlife Service, Texas Trees Foundation, Connemara Conservancy, Bowman-Melton Associates, Halff Associates

Agenda:

1. **Regional Transportation & Conservation Planning Integration Efforts**
   Dan Lamers with the NCTCOG Transportation Department described efforts the agency has undergone to increasingly integrate environmental considerations in the transportation planning process. Since 2008, NCTCOG has been awarded two grants from the Federal Highway Administration (FHWA) to introduce and implement the Eco-Logical Program, which is an ecosystem approach to developing infrastructure projects.

2. **Regional Ecosystem Framework Development**
   Tamara Cook with the NCTCOG Environment & Development Department gave a high-level overview of how the Regional Ecosystem Framework (REF) was developed. The REF is a planning tool used to identify natural resources by subwatershed. Through the FHWA Implementing Eco-Logical grant, NCTCOG has begun updating the REF and the next steps are to identify priority resource areas and candidate sites for mitigation or enhancement.

3. **Subwatershed Mapping**
   Kendall Wendling with the NCTCOG Transportation Department described efforts to further prioritize subwatersheds by highest ecosystem needs. Three priority maps were created that show the relative importance of ecosystem value, green infrastructure, and water considerations in each subwatershed. One subwatershed in the Trinity Forest area was selected to further determine critical resources of concern, potential coordination with resource agencies, and possible mitigation and enhancement opportunities.

4. **Next Steps**
   - *Future Initiatives*: Kendall explained that in addition to updating the REF, the two other project emphasis areas are to apply the REF to a pilot corridor and to launch a Regional Shared Value Mitigation pilot program. Sandy Wesch will be leading the Loop 9 corridor effort and Chris Anderson will be leading the Regional Shared Value Mitigation program.

- *Request for Data*: Kendall requested data from partners to help enrich the project analysis. Types of desired data include conservation easements, existing and future conservation areas, future parks, tree cover, mitigation sites, and habitat/species data.

5. Partner Input

Regional Ecosystem Framework (REF) Maps: There was discussion related to the data that is currently included and what could potentially be added to future versions of the REF maps. Suggestions for data to be incorporated in the future are:

- Future land use, including development induced by transportation projects
- Results from NCTCOG/Trust for Public Land Greenprinting initiatives
- Fly zones for migratory birds

Additionally, it was noted that the value of soil conservation needs to be more explicitly addressed in the REF maps. Specifically, the Blackland Prairie should have more weight as a priority ecosystem. Another comment was that non-impaired water segments should be a concern in addition to already impaired segments since the goal is to keep them in good condition. There were several questions about how the sustainability layer was created. The methodology for all of the layers is included in the REF User's Guide, which is posted on www.nctcog.org/traces/Reg_Ecosystem_Framework.asp. For reference, the definition of sustainability is included below.

The Sustainability layer describes the state of the environment in terms of stability (how resistant to disturbance an area is) and resilience (how capable is the area in returning to its predisturbance state). Sustainable areas are those that can maintain themselves into the future without human management. The sustainability layer consists of 11 measures that can be divided into two groups: fragmentors and stressors. The fragmentors include contiguous land cover type, regularity of ecosystem boundary, appropriateness of land cover, waterway obstruction, and road density. The stressors include airport noise, Superfund National Priority List and State Superfund Sites, water quality, air quality, Resource Conservation and Recovery Act (RCRA) Sites, Treatment-Storage-Disposal Sites, Corrective Action and Voluntary Cleanup Program Sites, and urban/agricultural disturbance. Data Source: Texas Ecological Assessment Protocol.

Subwatershed Mapping: One suggestion related to the subwatershed mapping exercise was to include some sort of water component to the green infrastructure category. Additionally, another suggestion was to consider changing the map titles to be more reflective of the data that is shown. Another comment was to show continuity of resources to emphasize existing landscape continuity and to identify potential landscape linkages.

Data and Partner Coordination: Several attendees offered additional data sources that would be helpful for the project. The project team is coordinating with the Research and Information Services (RIS) Department that regularly requests data from local governments to avoid duplication of efforts. NCTCOG will be able to share the REF layers for review to our partners by request.

Additionally, one question was if other Metropolitan Planning Organizations (MPO) in Texas have conducted similar work related to integrating environmental considerations earlier in the transportation project delivery process. The Houston-Galveston Area Council (HGAC) has also been working towards implementing the Eco-Logical approach and NCTCOG has had discussions with them in the past. According to federal transportation authorization legislation, MPOs are encouraged to consider Planning-Environment Linkages (PEL) in their transportation process, but the level of involvement depends on the staff resources at the MPO.

<u>Next Steps</u>: In addition to data, NCTCOG also requested that partners share best practices for mitigation and noted that the development of a regional mitigation bank could be a consideration as part of this project. It was noted that the U.S. Army Corps of Engineers should be involved in these discussions. Finally, attendees stated that it would be helpful to have the REF data layers accessible through a data sharing resource or online; NCTCOG will explore options to share the data.

Regional Ecosystem Framework: Unified Subwatershed Map

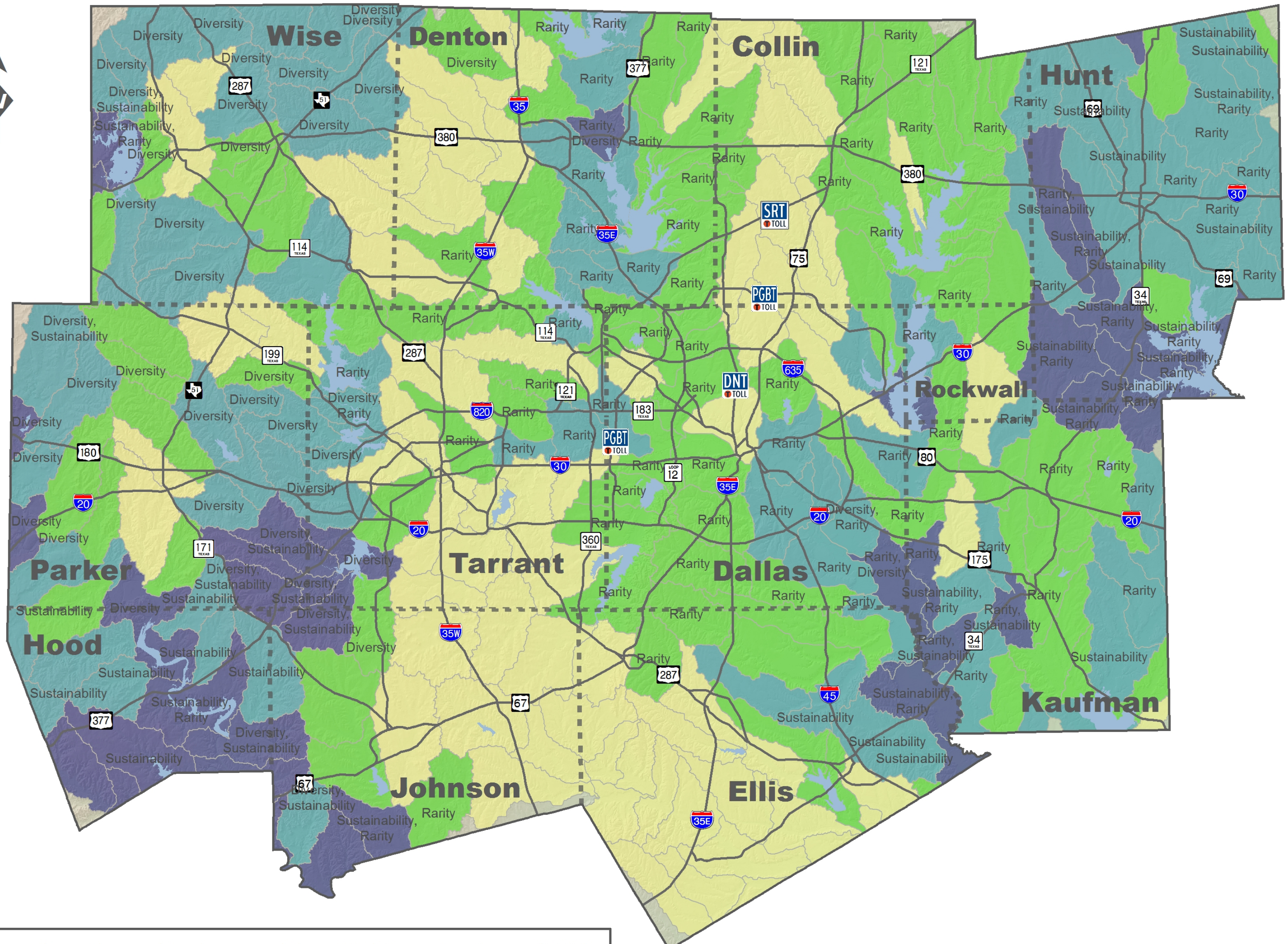
Ecosystem Value

Legend

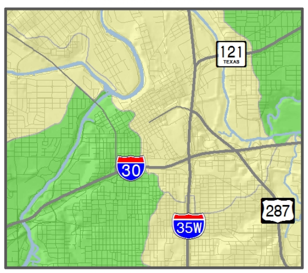
Combined Ecosystem Value Score*

Score	
3 to 5	Some Ecosystem Value
6 to 7	
8 to 9	
10 to 13	Greatest Ecosystem Value

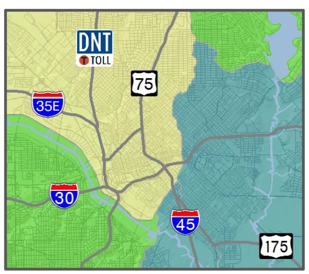
*Includes scores for Diversity, Ecosystem Sustainability, and Rarity layers.



Fort Worth CBD



Dallas CBD



The Subwatersheds by Ecosystem Value map shows the combined scores of three Vital Ecosystem Layers (VEIL): REAP Diversity, Ecosystem Sustainability, and Rarity. The methodology for how the Diversity, Ecosystem Sustainability, and Rarity layers are calculated are described in the respective REF maps. The minimum combined score is 3 and the maximum combined score is 15. The subwatersheds are displayed using natural breaks. Subwatersheds are labeled if the individual VEIL layer has a score of 4 or 5, indicating a higher presence of this particular ecosystem attribute. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information, please visit www.nctcog.org/REF.

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August 6, 2014

Regional Ecosystem Framework: Unified Subwatershed Map

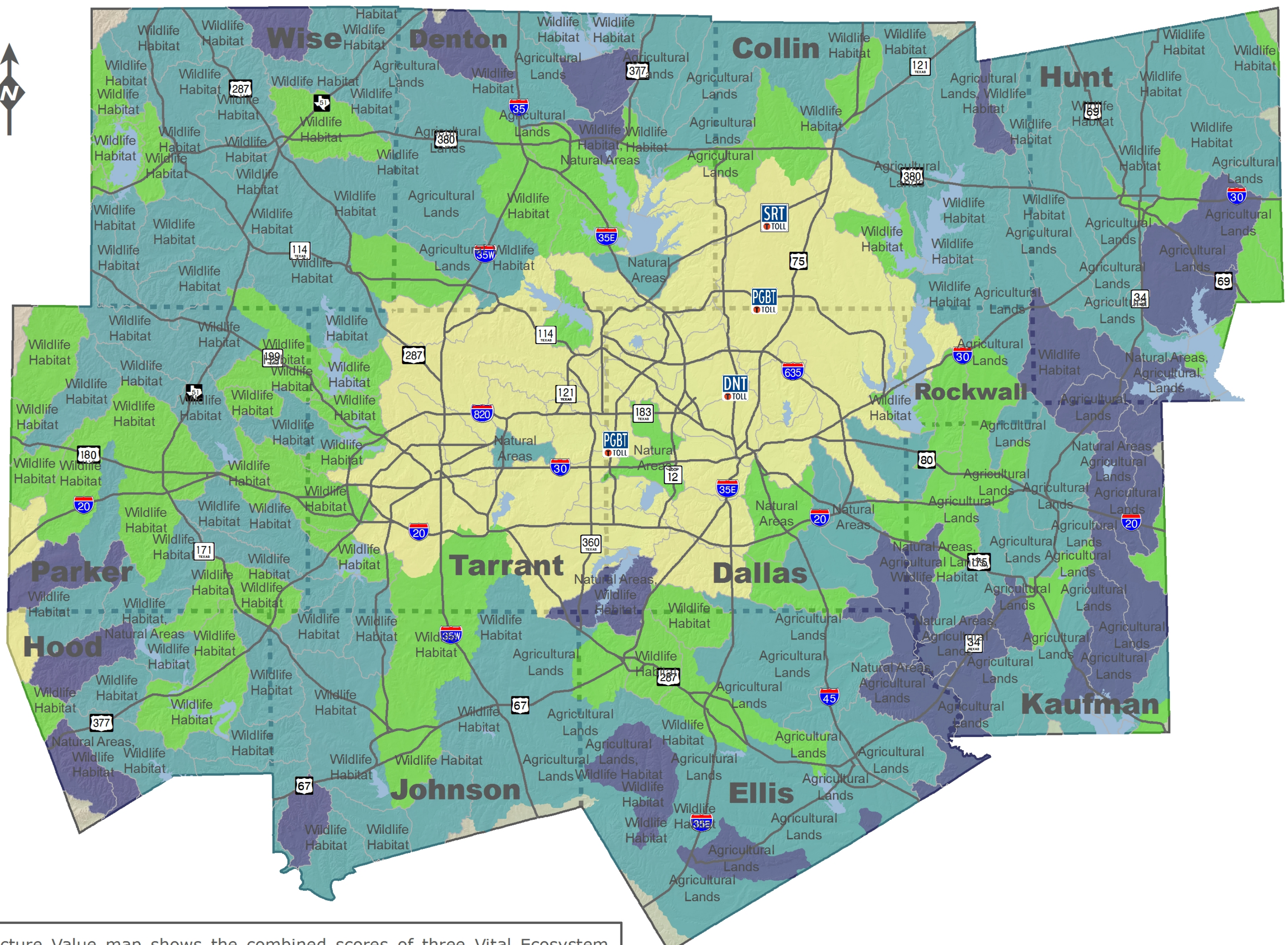
Green Infrastructure

Legend

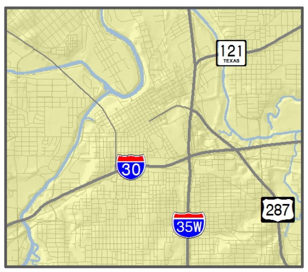
Combined Green Infrastructure Score*

Light yellow	3 to 5	Some Green Infrastructure
Light green	6 to 7	
Light blue	8 to 9	
Purple	10 to 12	More Green Infrastructure

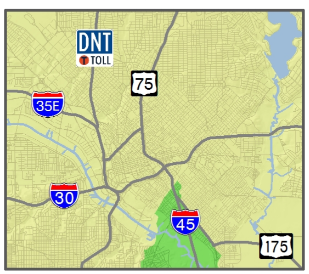
*Includes scores for Wildlife Habitat, Agricultural Lands, and Natural Areas layers.



Fort Worth CBD



Dallas CBD



The Subwatersheds by Green Infrastructure Value map shows the combined scores of three Vital Ecosystem Information Layers (VEIL): Wildlife Habitat, Agricultural Lands, and Natural Areas. The methodology for how the Wildlife Habitat, Agricultural Lands, and Natural Areas layers are calculated are described in the respective REF maps. The minimum combined score is 3 and the maximum combined score is 15. The subwatersheds are displayed using natural breaks. Subwatersheds are labeled if the individual VEIL layer has a score of 4 or 5, indicating a higher presence of this particular ecosystem attribute. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information, please visit www.nctcog.org/REF.

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Regional Ecosystem Framework: Unified Subwatershed Map

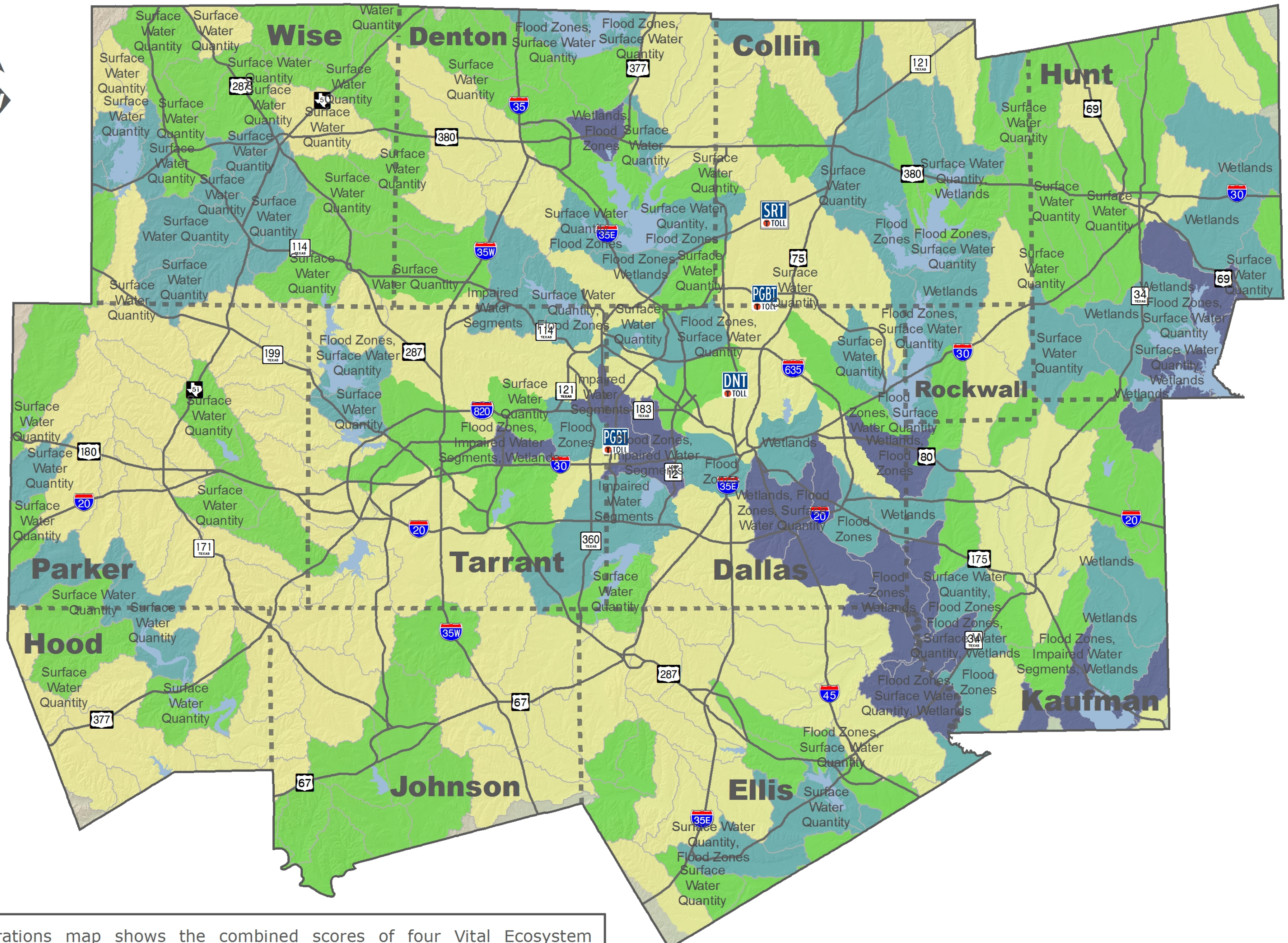
Water Considerations

Legend

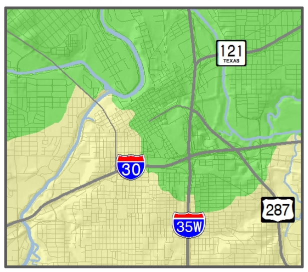
Combined Water Considerations Score*

Score	
4 to 7	Some Water Considerations
8 to 9	
10 to 12	
13 to 18	More Water Considerations

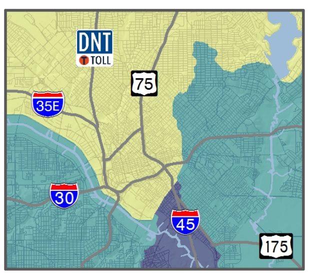
*Includes scores for Surface Water Quantity, Flood Zones, Impaired Water Segments, and Wetlands layers.



Fort Worth CBD



Dallas CBD



The Subwatersheds by Water Considerations map shows the combined scores of four Vital Ecosystem Information Layers (VEIL): Surface Water Quantity, Flood Zones, Impaired Water Segments, and Wetlands. The methodology for how the Surface Water Quantity, Flood Zones, Impaired Water Segments, and Wetlands layers are calculated are described in the respective REF maps. The minimum combined score is 4 and the maximum combined score is 20. The subwatersheds are displayed using natural breaks. Subwatersheds are labeled if the individual VEIL layer has a score of 4 or 5, indicating a higher presence of this particular ecosystem attribute. This information has been developed for the Dallas-Fort Worth MPA for use in long-range planning. These scores are meant to be used as a preliminary screening tool for potential impact identification. For more information, please visit www.nctcog.org/REF.

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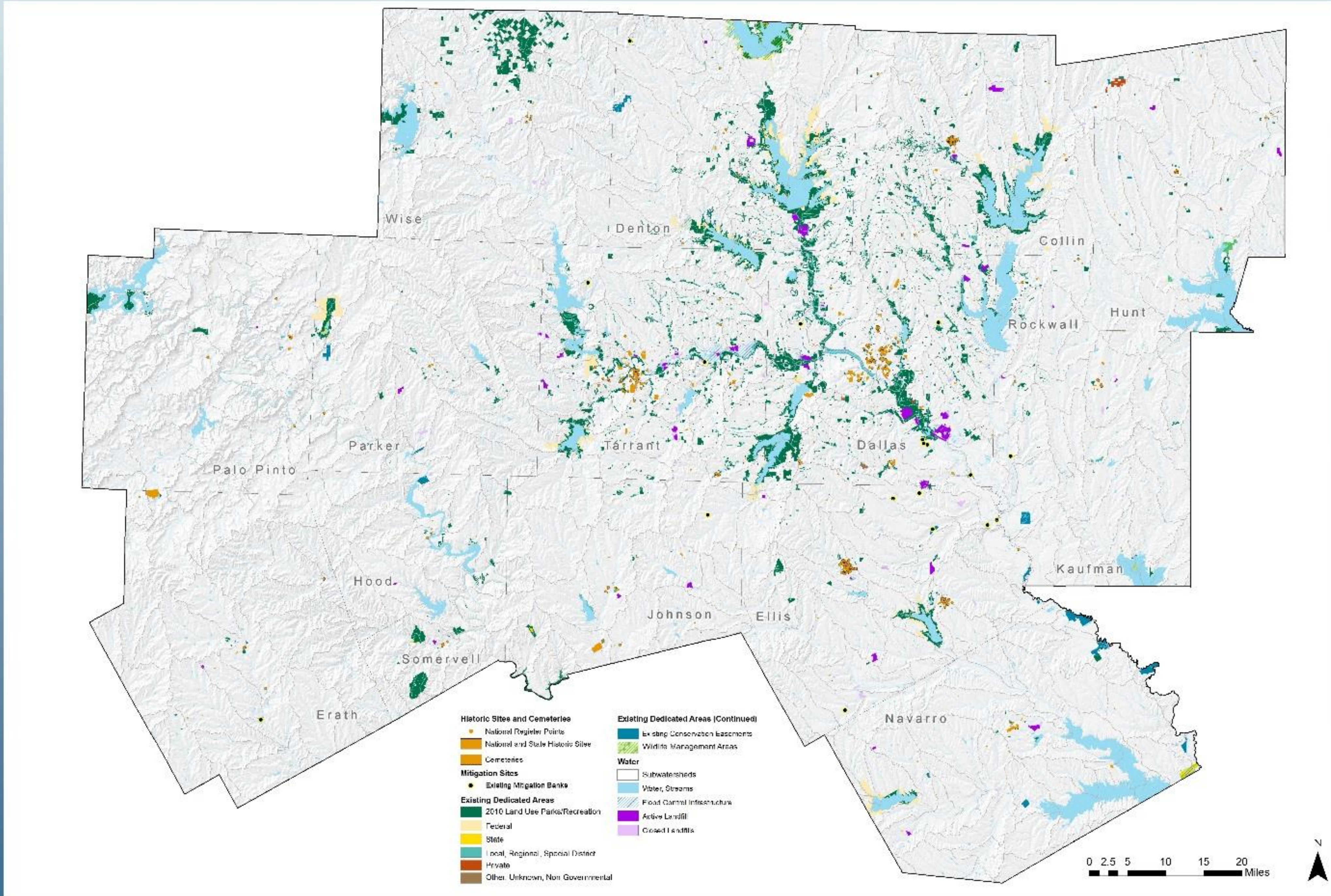
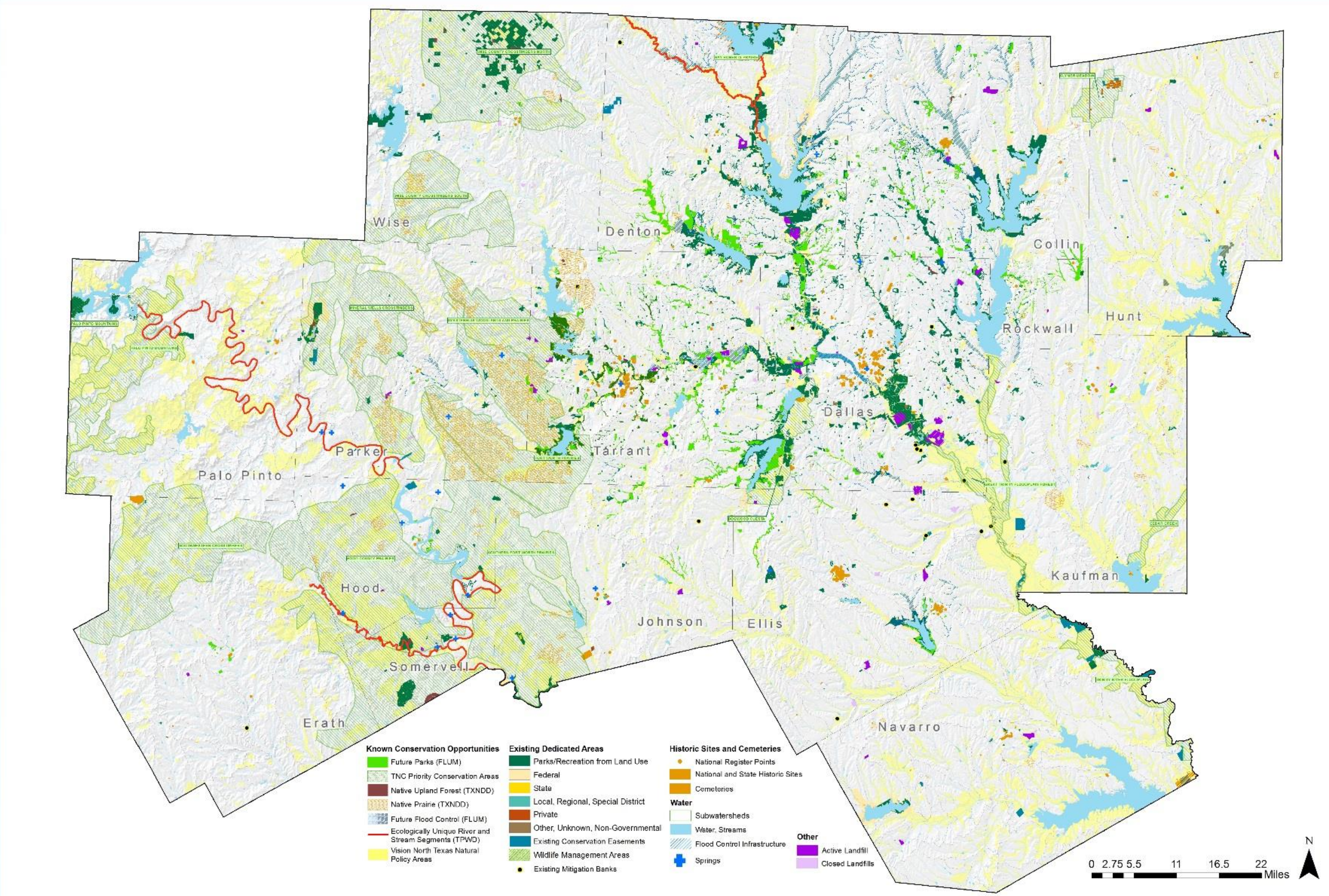


Data Sources: NCTCOG 2010 Land Use, NCTCOG Dams (Acquired 2014), National Conservation Easement Database (Acquired 2014), USGS Protected Areas Database of the US (Acquired 2014), NRCS Texas Conservation Easements (Acquired 2014), TPWD Land and Water Resources Conservation and Recreation Plan (Acquired 2014), TPWD Wildlife Management Areas (Acquired 2014), Connemara Easements (Acquired 2014), USACE Mitigation Banks (Acquired 2014), FEMA DFIRM dataset (Acquired 2014), NCTCOG Landfill Data (Acquired 2014).
Produced September 2014, North Central Texas Council of Governments

NORTH CENTRAL TEXAS EXISTING DEDICATED LANDS



Data Sources: NCTCOG 2010 Land Use, NCTCOG Future Land Use Maps, National Conservation Easement Database (Acquired 2014), USGS Protected Areas Database of the US (Acquired 2014), NRCS Texas Conservation Easements (Acquired 2014), TPWD Land and Water Resources Conservation and Recreation Plan (Acquired 2014), TPWD Wildlife Management Areas (Acquired 2014), TPWD Significant Stream Segments (Acquired 2014), TPWD Springs (Acquired 2014), Connemara Easements (Acquired 2014), USACE Mitigation Banks (Acquired 2014), FEMA DFIRM dataset (Acquired 2014), NCTCOG Landfill Data (Acquired 2014), TPWD Texas Natural Diversity Database (Acquired 2014)

NORTH CENTRAL TEXAS KNOWN CONSERVATION OPPORTUNITIES