

REF Interactive Mapping Tool: Data Dictionary

Boundaries

Omernik Ecoregions

Source: [Ecoregions | Ecosystems Research | US EPA](#)

Description of layer: These ecoregions group geographic areas that exhibit similar geology, physiography (landforms), vegetation, climate, soils, wildlife, land use, and hydrology. Level III ecoregions were created by the U.S. Environmental Protection Agency based on work by James M. Omernik.

Bailey's Ecoregions

Source: [USDA Bailey's Ecoregions](#)

Description of layer: These ecoregions group geographic areas based on climatic differences and their effect on plants, animals, and soils. Bailey's ecoregions were developed for the U.S. Forest Service by Robert G. Bailey. Subwatershed scores for the REF layers Rarity, Sustainability, and Diversity are based on comparisons to the entire Bailey's ecoregion the subwatershed falls within, including areas outside the NCTCOG boundary. Data for these layers were provided by EPA Region 6's Regional Ecological Assessment Protocol.

HUC 10 Watersheds

Source: [USDA Natural Resources Conservation Service](#)

Description of layer: Watersheds that fall within the North Central Texas area as categorized by Hydrological Unit Code (HUC).

HUC 12 Subwatersheds

Source: [USDA Natural Resources Conservation Service](#)

Description of layer: Subwatersheds are hydrologic units based on the drainage destination of surface water. HUC 12 subwatersheds are the smallest hydrologic units.

Historic

Cemeteries

Source: [Texas Historical Commission](#)

Date: Updates of this data are continual.

Description of layer: Burial sites designated as Texas Historic Cemeteries by the Texas Historic Commission.

National Register Districts

Source: [National Park Service](#)

Date: Updates of this data are continual.

Description of layer: Areas designated by the National Park Service as areas that contain sites or buildings that share similar history or design.

National Register Properties

Source: [National Park Service](#)

Date: Updates of this data are continual.

Description of layer: Buildings or structures designated by the National Park Service that are usually at least 50 years old and are significant in American archeology, history, culture, architecture, or engineering.

Potential Archeological Liability Sites

Source: [Texas Department of Transportation](#)

Date: Fort Worth District data was released in 2011. Dallas District data was released in 2014. Paris District data was released in 2019. All data accessed July 2020.

Description of layer: Areas that have the potential to contain archeological sites dating to prehistoric times.

Additional information: Due to file size limitations, only areas identified as having high potential to contain archeological sites for either shallow or deep soil levels are shown.

Land Use/Land Cover

Ecological Mapping Systems of Texas

Source: [Texas Parks and Wildlife Department](#)

Date: 2013

Description of layer: Illustrates current vegetation at 10-meter spatial resolution.

Land Use Data

Source: [North Central Texas Council of Governments](#)

Date: 2015

Description of layer: Illustrates 2015 land uses at the parcel level.

USFWS National Wetlands Inventory

Source: [United States Fish & Wildlife Service](#)

Date: 2020

Description of layer: Nationwide inventory of U.S. wetlands to provide information on the distribution of wetlands to aid in conservation efforts.

Additional information: Descriptions of the types of wetlands listed in the National Wetlands Inventory and found in North Central Texas are provided below:

- Freshwater Emergent Wetland: Herbaceous marsh, fen, swale, or wet meadow
- Freshwater Pond: Pond that has wetland characteristics and does not contain saltwater
- Freshwater Forested/Shrub Wetland: Forested swamp, wetland shrub bog, or wetland shrub wetland
- Riverine: River or stream channel with wetland characteristics
- Lake: Lake or reservoir basin with wetland characteristics

Brownfield Properties

Source: [Environmental Protection Agency](#)

Date: 2013

Description of layer: Sites that have been contaminated by hazardous materials.

Existing Landfills

Source: [North Central Texas Council of Governments](#)

Date: 2009

Description of layer: This inventory identifies active landfills.

Closed Landfill Inventory

Source: [North Central Texas Council of Governments](#)

Date: 2014

Description of layer: This inventory includes landfills that are closed or abandoned.

National Ecological Framework

Source: [About EPA Region 4 \(Southeast\) | About EPA | US EPA](#)

Date: 2014

Description of layer: This structural connectivity layer displays hubs of ecologically important areas and the corridors that link them. Corridors are defined as areas contiguous to hubs and featuring the least human disturbance. Auxiliary connections also are contiguous to hubs but experience a slightly higher level of human disturbance.

Additional information: Due to file size limitations, these data have been simplified. For more detailed analysis, please acquire the original dataset.

Parcel Data

The following appraisal districts have parcel data accessible on their websites:

- Collin County: [Downloads](#)
Source: Collin Central Appraisal District
- Dallas County: [Data Products](#)
Source: Dallas Central Appraisal District
- Denton County: [Denton Central Appraisal District - Downloads](#)
Source: Denton Central Appraisal District
- Ellis County: [Data Downloads – GIS and Appraisal Information : Ellis Appraisal District](#)
Source: Ellis Appraisal District
- Kaufman County: [Digital Mapping Information : Kaufman County Appraisal District](#)
Source: Kaufman County Appraisal District
- Tarrant County: [GIS Data](#)
Source: Tarrant Appraisal District

Outdoor Recreation and Conservation Areas

Local, State, and Regional Parks

Source: [North Central Texas Council of Governments](#)

Date: 2014

Description of layer: Areas designated as parks by local governments and the state.

Conservation Easements

Source: [National Conservation Easement Database](#)

Date: 2014

Description of layer: Lands that property owners have agreed to not develop to protect their conservation value.

Additional information: This layer includes conservation easements that have been uploaded to the National Conservation Easement Database. It does not include all conservation easements in the North Texas area.

Protected Areas Database of the United States

Source: [United States Geological Survey](#)

Date: 2012

Description of layer: Areas that are preserved to protect recreational, cultural, or natural resources, including the diversity of plants and wildlife.

Texas Natural Diversity Database

Source: [Texas Parks and Wildlife Department](#)

Date: 2015

Description of layer: This layer illustrates the presence of plant and animal species, vegetation communities, and significant natural resources such as bird rookeries and bat roosts. These elements include protected species, TPWD Species of Greatest Conservation Need, and others that are tracked by TPWD Wildlife Diversity biologists. The data are displayed as a heat map indicating the number of tracked element occurrence (EO) records whose spatial representation (polygon) falls within each quad. Absence of information in an area does not mean absence of occurrence. Data from the TXNDD do not provide a definitive statement as to the presence, absence, or condition of species, natural communities, or other significant features within a quad. These data cannot substitute for an on-site evaluation by qualified biologists. Please contact TPWD for more specific information on tracked elements.

Wildlife Management Areas

Source: [Texas Parks and Wildlife Department](#)

Description of layer: Areas that have been preserved to protect wildlife and their habitat. These areas were designed to represent the ecological regions of Texas.

Priority Conservation Areas (The Nature Conservancy)

Source: [The Nature Conservancy](#)

Date: 2009

Description of layer: Areas identified by The Nature Conservancy that if protected would preserve the greatest number of plants and animals living in an ecoregion.

Critical Conservation Areas – Prairie Grassland Region

Source: [USDA Natural Resource Conservation Service](#)

Date: 2014

Description of layer: The NRCS identifies critical conservation areas with the goal of restoring and protecting native prairie grasslands and wetlands. The Prairie Grassland Region covers most of the Central Plains region of the United States.

Water Features

Impaired Streams and Lakes

Source: [Texas Commission on Environmental Quality](#)

Date: 2012

Description of layer: Streams, lakes, or parts of streams or lakes that fail to meet the standards set for their use, or may fail to in the near future. This include Category 4 and Category 5 impaired segments.

Additional information: To identify the specific impairment affecting a stream segment or lake, please see the [2012 Texas Integrated Report Index of Water Quality Impairments](#) .

303(d) Streams and Lakes

Source: [Texas Commission on Environmental Quality](#)

Date: 2012

Description of layer: Water bodies that do not meet water quality standards under the federal Clean Water Act and contain pollutants that can be measured by their Total Maximum Daily Load. These water bodies are Category 5 impaired waters; TMDLs or other strategies to manage pollution are planned for these water bodies.

Additional information: To identify the specific impairment affecting a stream segment or lake, please see the [2012 Texas Integrated Report Index of Water Quality Impairments](#) .

Ecologically Significant Stream Segments

Source: [Texas Parks and Wildlife Department](#)

Date: 2008

Description of layer: Streams that have ecological value based on their water quality, biological or hydrologic function, the presence of threatened or endangered species, or whether they border existing conservation areas.

National Flood Hazard Layer (FEMA)

Source: [Federal Emergency Management Agency](#)

Date: 2015

Description of layer: The NFHL compiles data from effective Flood Insurance Rate Maps and from Letters of Map Change. To view 100-year and 500-year floodplains, select the Flood Hazard Zones subcategory of this layer.

Freshwater Springs

Source: [Texas Parks and Wildlife Department](#)

Date: 2003

Description of layer: Springs are naturally occurring features that convey groundwater to the land surface; they represent a transition from groundwater to surface water. Water issues through one opening, multiple openings, or numerous seeps in the rock or soil.

Watershed Protection Plans

Source: [Watershed Protection Plan Program | Texas State Soil and Water Conservation Board](#)

Date: 2012

Description of layer: Watershed protection plans seek to improve water quality by preventing or managing nonpoint source pollution.

Greater Trinity River Bacteria TMDL Implementation Plan Project Area

Source: [Greater Trinity River Bacteria TMDL I-Plan Project - Environment & Development - NCTCOG.org](#)

Date: 2013

Description of layer: The Texas Commission on Environmental Quality adopted Total Maximum Daily Loads for Indicator Bacteria for impaired water bodies within the Project Area. The Implementation Plan seeks to reduce bacteria loading from possible point and nonpoint sources.

USACE Mitigation Banks for Fort Worth District

Source: [U.S. Army Corps of Engineers](#)

Date: 2014

Description of layer: Mitigation banks are locations where wetlands, streams, or other natural areas have been restored or preserved and are available for developers to purchase as credits. Developers can purchase these credits to offset unavoidable impacts to natural areas.

NCTCOG Regional Ecosystem Framework (REF)

Regional Ecosystem Framework Scored Subwatersheds

Source: [North Central Texas Council of Governments](#)

Date: 2014

Description of layer: The Regional Ecosystem Framework (REF) is a preliminary screening tool that indicates areas of relative ecological importance. Subwatersheds are scored based on ecosystem considerations including green infrastructure, water considerations, and ecosystem value. The REF comprises 10 individual layers and one composite layer. The individual layers are agricultural lands, wildlife habitat, natural lands, flood zones, wetlands, surface water density, impaired water segments, diversity, rarity, and ecosystem sustainability. Seven REF layers describe subwatersheds' relative ecological importance within the NCTCOG 12-county Metropolitan Planning Area (MPA). Three layers – diversity, ecosystem sustainability, and rarity – describe subwatersheds' relative ecological importance within their ecoregion, which extends beyond the MPA.

Additional information: Description of the REF layer scores are provided below:

- REF Composite: The REF 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. Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of the ecological or environmental factor related to the REF layer. Grid cells with less than 20% presence of the ecological or environmental factor received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. The scores of all REF layers were summed to produce the REF Composite score for each subwatershed.
- Agricultural Lands: The Agricultural Lands score represents a subwatershed's quantity of agricultural lands classified as 2011 NLCD Pasture/Hay and Cultivated Crops. Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence agricultural lands. Grid cells with less than 20% presence of agricultural lands received a score of 1; grid cells with a 20% to

29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents a higher quantity of agricultural land, and a score of 1 represents a lower quantity of agricultural land.

- Diversity: The REF Diversity score is based on aggregate data from the EPA Region 6 database. 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. Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of diversity sub-layers. Grid cells with less than 20% presence of diversity sub-layers received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents higher ecological diversity, and a score of 1 represents lower ecological diversity.
- Ecosystem Sustainability: The REF Ecosystem Sustainability score is based on aggregate data from the EPA Region 6 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, RCRA, Treatment-Storage-Disposal Sites, Corrective Action and State Voluntary Cleanup Program Sites, and urban/agricultural disturbance. Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of the ecosystem sustainability measures. Grid cells with less than 20% presence of the ecosystem sustainability measures received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents the highest level of sustainability, which indicates the lowest level of stressors or fragmentors. A score of 1 represents the lowest level of sustainability, which indicates the highest level of stressors or fragmentors.
- 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. Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of floodplains. Grid cells with less than 20% presence of floodplains received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents the highest presence of flood zones, and a score of 1 represents the lowest presence of flood zones.
- Impaired Water Segments: The REF Impaired Water Segment score is based on Clean Water Act 303(d) Segments State Priority Data. Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of impaired water segments. Grid cells with less than 20% presence of impaired water segments received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with

a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents the presence of many impaired water segments, and a score of 1 represents the absence of any impaired water segments.

- Natural Areas: The REF Natural Areas score is based on areas defined as by North Texas 2050 that “generally reflect floodplains, major public parks and open spaces, shores along major lakes, and potential connections between these natural assets.” Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of natural areas. Grid cells with less than 20% presence of natural areas received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents a higher quantity of natural areas, and a score of 1 represents a lower quantity of natural areas.
- Rarity: The REF Rarity score is based on aggregate data from the EPA Region 6 REAP database. The four sub-layers used to calculate the REAP Rarity layer include: Vegetation Rarity, Natural Heritage Rank, Taxonomic Richness, and Rare Species Richness. Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of rarity sub-layers. Grid cells with less than 20% presence of rarity sub-layers received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents a high presence of rarity, and a score of 1 represents a low presence of rarity.
- Surface Water Quantity: The REF Surface Water Quantity score is based on the quantity of surface waters present in a subwatershed. Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of surface water. Grid cells with less than 20% presence of surface water received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents a high quantity of surface water, and a score of 1 represents a low quantity of surface water.
- Wetlands: The REF Wetlands score represents a subwatershed’s quantity of wetlands classified as 2011 NLCD Woody Wetlands and Emergent Herbaceous Wetlands. Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of wetlands. Grid cells with less than 20% presence of wetlands received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents a higher quantity of wetlands, and a score of 1 represents a lower quantity of wetlands.
- Wildlife Habitat: The REF Wildlife Habitat score represents a subwatershed’s quantity of lands classified by the 2011 NLCD as Forestlands, Shrublands, Grasslands, Wetlands, and Open Water.

Initially scores of 1 through 5 were assigned at the grid-cell level based on the presence of wildlife habitat. Grid cells with less than 20% presence of wildlife habitat received a score of 1; grid cells with a 20% to 29% presence received a score of 2; grid cells with a 30% to 39% presence received a score of 3; grid cells with a 40% to 49% presence received a score of 4; and grid cells with a presence of 50% or higher received a score of 5. The scores of all grid cells within a subwatershed were then averaged. Subwatershed scores of 1 through 5 were then assigned using Jenks natural breaks. A score of 5 represents a higher quantity of wildlife habitat, and a score of 1 represents a lower quantity of wildlife habitat.