

# A7 | ECOLOGY & NATURAL RESOURCES

## Introduction

The term “ecology” was first used in the 1870’s, but became more commonly understood a century later when the nation became about serious air and water quality problems and the first Earth Day popularized the concept of action to improve environmental quality. Ecology is the “branch of science dealing with the relationship of living things to their environments”.<sup>35</sup> Instead of studying one particular species or aspect of the environment, it considers the interactions between natural systems and looks at the impact of human beings on those interactions, (*see also Chapter 7, Ecology & Natural Resources*).

## Assessment of Natural Assets

Natural assets shape a community’s initial development. A sheltered landing or a low-water river crossing often explain the location where the first businesses located. As a community grows, natural assets can help create a unique identity. This section of the Appendix describes Frisco’s natural assets.

## Natural Systems

*Figure A7-1* shows that Frisco is located in the Northern Blackland Prairie ecoregion of Texas.<sup>36</sup> “The distinctive element of the Northern Blackland Prairie was the vast expanse of tallgrass prairie vegetation. Frequent fire and the grazing of bison were important factors in shaping the tallgrass vegetation in the Blackland Prairie landscape.”<sup>37</sup> Settlement transformed much of this land, which was used first for

ranching, then for farming and most recently for urban development. The clay soils of this ecoregion continue to challenge construction because of their tendency to shrink when dry and swell when wet.

The Woodbine aquifer underlies Collin County and the Frisco portion of Denton County. Groundwater stored in this aquifer is used for agricultural irrigation and for municipal water supply purposes.<sup>38</sup> The region is part of the Trinity River Basin, which contains a system of smaller streams and rivers that drain to the Trinity. According to the Texas Water Development Board, “the Trinity Basin is the largest river basin whose watershed area is entirely within the State of Texas and the third largest river in Texas by average flow volume.”

*Figure A7-2* shows that Frisco includes parts of five different regional watersheds within the Trinity Basin<sup>39</sup> :

- Watersheds draining to the Upper Trinity River:
  - Elm Fork below Lewisville Lake
  - Trinity River Headwaters
- Watersheds draining to the reservoirs of the Upper Trinity River Basin, which are important supply sources for the North Texas region:
  - Lewisville Lake
  - Lavon Lake
  - Lake Ray Hubbard

For the areas within the Upper Trinity River watersheds, key issues include:

- The quality of the water for recreational use of rivers and streams;

<sup>35</sup> Online Etymology Dictionary

<sup>36</sup> Environmental Protection Agency, Western Ecology Division. Website [www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm), accessed December 6, 2014.

<sup>37</sup> Griffith, et al, “Ecoregions of Texas”, Project Report to the Texas Commission on Environmental Quality, 2007.

<sup>38</sup> Texas Water Development Board Summary, <http://www.twdb.state.tx.us/groundwater/aquifer/minors/woodbine.asp>, accessed December 6, 2014.

<sup>39</sup> “Valuing Our Watersheds: A User’s Guide to the North Central Texas Regional Ecosystem Framework”, First Draft, North Central Texas Council of Governments, 2010.

- The erosion of stream banks and the resulting damage to adjacent property; and
- Public safety and the impact of flooding on property.

Land along the rivers and streams in the water supply reservoir watersheds face these same issues. In addition, runoff, pollution and sedimentation from development and erosion in the water supply watersheds affects the quality and supply of the water in the reservoirs, impacting the quality of the drinking water supplies and increasing the cost of water treatment for local communities.

## Native Plant and Animal Populations

Today, most of the vegetation in Collin and Denton counties is characterized as cropland, areas of natural or introduced grasses and urban development. As the North Texas metropolitan area expanded outward, development replaced the cropland and grassland that had been in Frisco and other fast-growing regional communities prior to that time. *Figure A7-3* shows the major vegetation areas of this region.

The Blackland Prairie ecoregion once extended from the Red River south nearly to San Antonio.<sup>40</sup> Today, less than 1% of the original Blackland Prairie is left, and the remaining habitat is highly fragmented. Protected areas in Collin and Denton counties include the 435-acre Parkhill Prairie preserve near Blue Ridge (part of the Collin County Parks and Open Space system) and a privately-owned tract of land in Denton County that is protected voluntarily. Since so little of the prairie that once defined North Texas remains, any opportunities to retain it give the City the potential to preserve unique natural areas for the enjoyment of Frisco residents and create distinctive amenities for the community.

The areas adjacent to the creeks, streams and rivers in Frisco are particularly important for native plants, animals and birds. Often, these

areas remain undeveloped because they are located in floodplains or on steep slopes, and they function as travel corridors for various species of wildlife, allowing them to move freely in search of food and shelter and helping native species survive as development occurs around them. These corridors are also valuable for Frisco's human residents. They create linked areas of open space, opportunities to connect with nature, valuable locations for trails and options for residents of all ages and physical abilities who want to experience the North Texas environment as they walk or bike between destinations in Frisco. The 100-year floodplains in Frisco are shown in *Figure 7-2*.<sup>41</sup>

The Texas Parks and Wildlife Department identifies 25 rare species of plants and animals that potentially occur in Collin or Denton counties. These species are listed in *Table A7.1* below. The list includes birds, crustaceans, mammals, mollusks, reptiles and plants. Many of these species seek food, nesting sites or habitat along streams and rivers, so they will rely on efforts to retain floodplain areas as open space.

## Healthy Tree Cover

The prairie ecosystem is characterized by large stretches of grassland. Most of the trees were found close to streams and rivers, where there was adequate water and they were less affected by the fires that swept through the expanses of dry grassland. Today, the tree cover that lines the rivers and streams provides shade for walkers and habitat for animals and birds and is supplemented by the trees that have been planted as part of the land development process in the urban and suburban environment—

- Street trees;
- Trees in the landscaping of large development projects;
- commercial projects and on multi-family properties; and
- Trees in the lawns, landscape beds and gardens on single-family residential lots.

<sup>40</sup> Texas Blackland Prairies Ecosystem, World Wildlife Fund. Website [www.worldwildlife.org/ecoregions/na0814](http://www.worldwildlife.org/ecoregions/na0814), accessed December 7, 2014.

<sup>41</sup> A 100-year floodplain is the area that has a 1% chance of flooding in any given year.

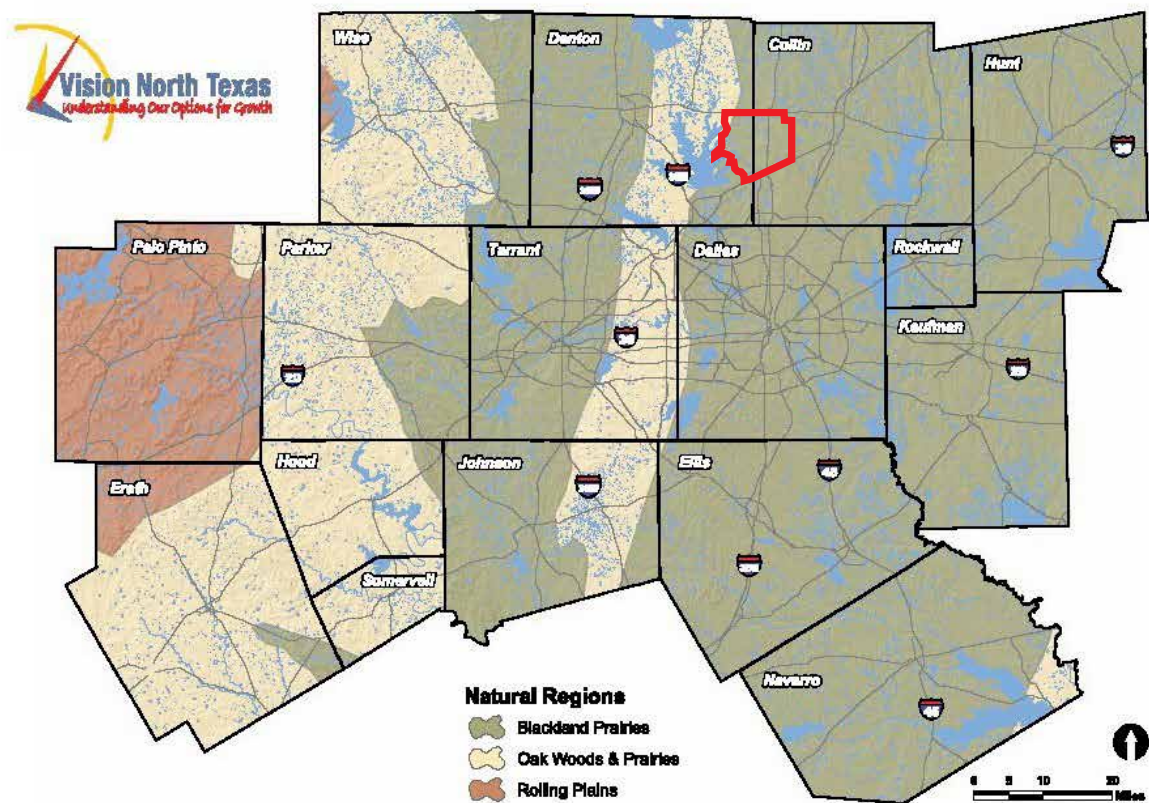


Figure A7-1: North Texas Natural Regions<sup>39</sup>

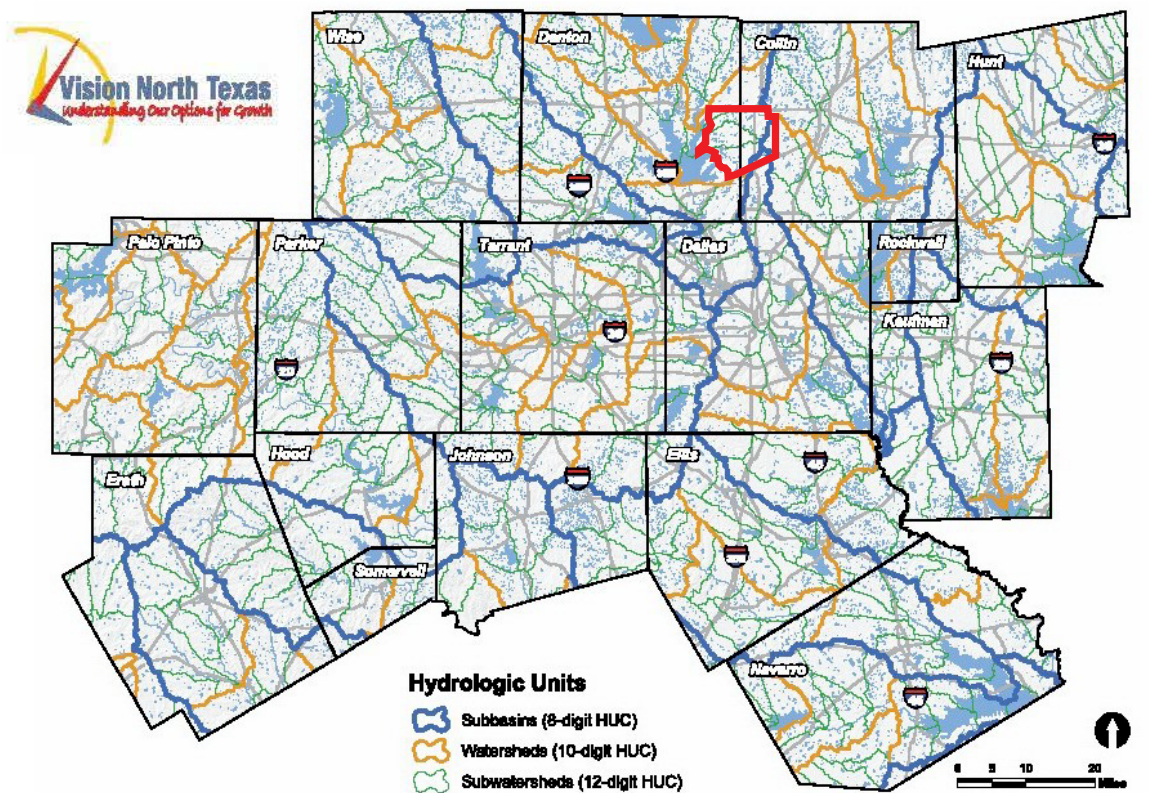
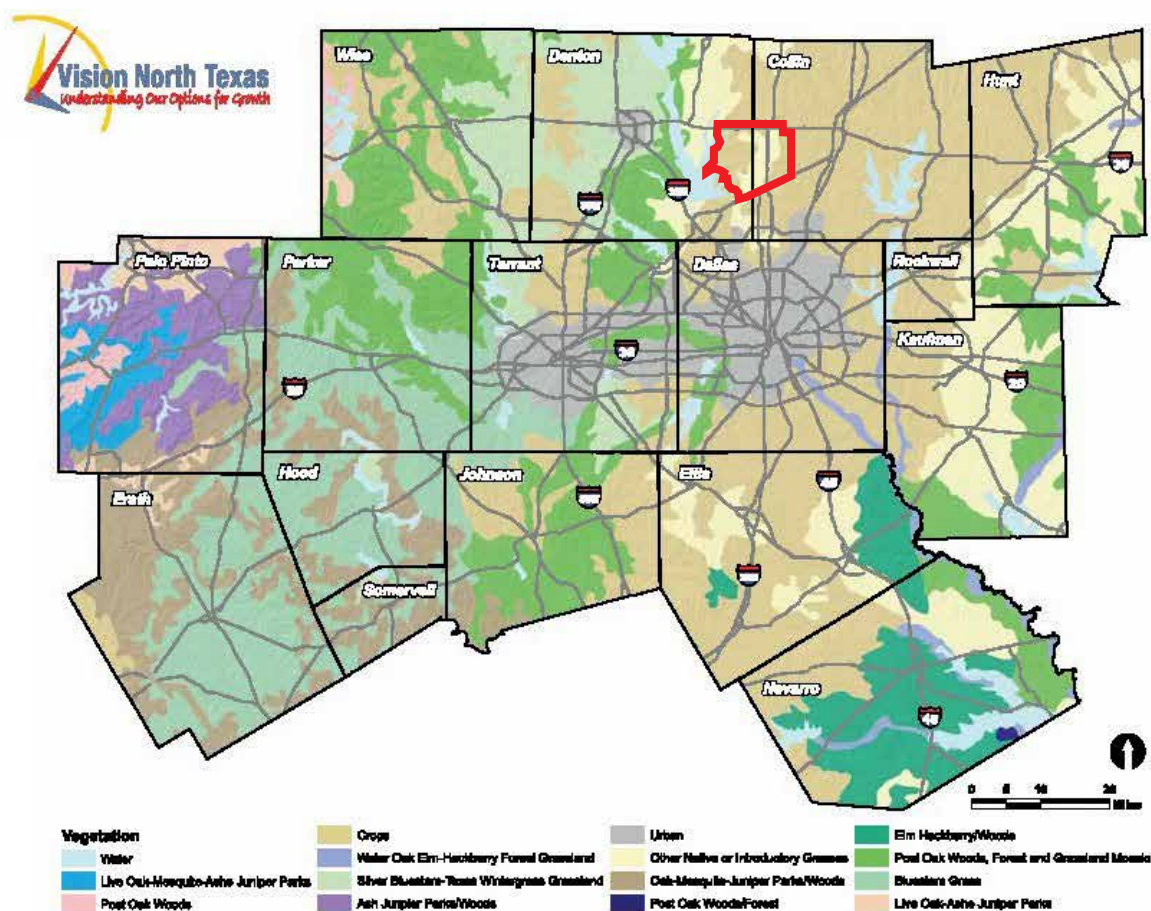


Figure A7-2: Regional Watersheds<sup>42</sup>

42 "Regional Choices for North Texas", 2008.



Figure A7-3: Regional Vegetation<sup>43</sup>

Trees provide additional community benefits as well, (see also Appendix A2, *Placemaking & Resiliency*). A study of the Houston Regional Forest found that the trees in that region generate \$456 million of environmental benefits annually, save \$131 million each year in residential energy costs and help reduce power plant emissions.<sup>44</sup> Tree shade and the process of transpiration—the absorption of water from the soil and the release of water vapor into the atmosphere through the tree’s leaf structure—help offset the urban heat island effect. Finally, trees contribute to reductions in emissions and can be included as one aspect of the State Implementation Plan for air quality non-attainment areas.

## Agricultural Heritage

Over the years, working agricultural lands have been converted to urban and suburban development as the North Texas metropolitan region has continued to expand outward. The 2014 Texas Land Trends report, prepared by the Texas A&M Institute of Renewable Natural Resources, found that Texas led the nation in the loss of working agricultural lands between 1982 and 2010.<sup>45</sup> In Collin and Denton counties, 13% of the land that was devoted to agricultural uses in 1997 was no longer being used for agricultural purposes in 2007. Agricultural holdings became more fragmented during this time as well. In 2007, over 80% of the farms or agricultural holdings in these two counties were 100 acres or less in size. An analysis in 2002 by the American Farmland Trust identified Collin County as one

<sup>43</sup> “Regional Choices for North Texas”, 2008.

<sup>44</sup> “Houston’s Regional Forest”, Texas Forest Service, 2005.

<sup>45</sup> “Texas Land Trends”, Texas A&M Institute of Renewable Natural Resources, 2014.

SPECIES CONSIDERED TO BE AT RISK		Federal Status	State Status	Collin	Denton
<b>BIRDS</b>					
American Peregrine Falcon	Falco peregrinus anatum	DL	T	x	x
Arctic Peregrine Falcon	Falco peregrinus tundrius	DL		x	x
Bald Eagle	Haliaeetus leucocephalus	DL	T	x	x
Henslow's Sparrow	Ammodramus henslowii			x	x
Interior Least Tern	Sterna antillarum athalassos	LE	E	x	
Peregrine Falcon	Falco peregrinus	DL	T	x	x
Piping Plover	Charadrius melodus	LT	T	x	
Sprague's Pipit	Anthus spragueii	C		x	x
Western Burrowing Owl	Athene cunicularia hypugaea			x	x
White-faced Ibis	Plegadis chihi		T	x	x
Whooping Crane	Grus americana	LE	E	x	x
Wood Stork	Mycteria americana		T	x	x
<b>CRUSTACEANS</b>					
A crayfish	Procambarus steigmani			x	
<b>MAMMALS</b>					
Plains spotted skunk	Spilogale putorius interrupta			x	x
Red wolf	Canis rufus	LE	E	x	x
<b>MOLLUSKS</b>					
Fawnsfoot	Truncilla donaciformis			x	x
Little spectaclecase	Villosa lienosa			x	x
Louisiana pigtoe	Pleurobema riddellii		T	x	x
Texas heelsplitter	Potamilus amphichaenus		T	x	
Wabash pigtoe	Fusconaia flava			x	x
<b>REPTILES</b>					
Alligator snapping turtle	Macrochelys temminckii		T	x	
Texas garter snake	Thamnophis sirtalis annectens			x	x
Texas horned lizard	Phrynosoma cornutum		T	x	x
Timber rattlesnake	Crotalus horridus		T	x	x
<b>PLANTS</b>					
Glen Rose yucca	Yucca necopina				x

**Federal**

LE = Federally Listed, Endangered

LT = Federally Listed, Threatened

C = Federal Candidate for Listing

DL = Federally Delisted

**Texas**

E = Endangered

T = Threatened

x = Applies

**Table A7.1: Species at Risk, Collin and Denton Counties**

of the locations in Texas where America's best farmland was being threatened by sprawling development.<sup>46</sup>

Although it is difficult for agricultural uses to compete economically with suburban and urban development, they can still bring value to a community by providing opportunities for urban agriculture in close proximity to the large market of consumers in North Texas. City residents are increasingly seeking fresh, locally-grown food, which can be purchased at grocery stores, farmers markets or through community-supported agriculture (CSA) organizations, (*see also Chapter 6, Public Health & Safety, p. 59*). Community gardens are also becoming popular with urban and suburban residents. These gardens take advantage of the high-quality agricultural soils still available within the expanding urban region and provide social benefits, giving participants an opportunity for outdoor exercise and providing neighborhoods with a community gathering place. Though the days of large-scale farming and ranching are past for Frisco, the agricultural heritage of Texas can be acknowledged with community-scale gardens and local support for agriculture in or near Frisco.

## Natural Asset Programs

### Cluster and Conservation Developments

The City of Frisco supports practices that recognize natural features as development amenities, (*see also Chapter 3, Place Making & Resiliency and Chapter 4, Land Use*). Cluster development—configuring a neighborhood so that residential lots are located close together and large areas of natural open space are preserved around them—is possible under current Frisco regulations. The natural areas in these cluster or conservation subdivisions create amenities for neighborhood residents and retain the benefits of the natural systems. These natural areas are typically placed in a conservation easement so

they provide tax advantages to the property owner.

The Connemara Conservancy Foundation is a non-profit organization with a mission to “help farmers, ranchers and other landowners as well as developers and local governments protect and conserve important tracts of remaining open space. In addition, Connemara is committed to educating current and future generations on the important role that open space plays in improving our quality of life.”<sup>47</sup> The Foundation's service area covers 33 counties in North Texas, including Collin and Denton counties. Connemara owns 72 acres of open space—the Connemara Meadows Preserve in Plano. It also accepts conservation easements as a means of preserving natural areas. The Foundation currently manages 4,845 acres of land in easements. Connemara also manages 397 acres of land dedicated by developers and private landowners as part of conservation developments have set aside part of their property for the purpose of retaining the natural character of these areas. Connemara is presently in negotiations regarding new projects including over 3,900 acres of land in North Texas. To date, none of Connemara's easements or conservation developments cover land within the City of Frisco, but they or a similar organization could be a partner with Frisco property owners as development occurs on the large remaining vacant tracts of land in the City and its ETJ.

### Current Energy Conservation Programs

Frisco homeowners and property owners are served by two different electricity providers, CoServe Electric and Oncor. Both companies offer programs to encourage energy conservation and address customer interest in the use of alternative energy sources. The descriptions below summarize these existing programs.

CoServe Electric, the electric service retailer for part of Frisco, operates several programs aimed at energy conservation and alternative energy use.

46 “Farming on the Edge”, American Farmland Trust, 2002.

47 Connemara Conservancy Foundation website, [www.connemaraconservancy.org](http://www.connemaraconservancy.org), accessed December 6, 2014.

- Free energy audits for homes and small-to medium-sized businesses;
- A Residential Rebate Program that provides incentives for the use of energy-efficient heating and cooling systems;
- Net metering that allows customers to interconnect their own energy sources (such as roof-mounted solar panels) to the electric grid and receive credit for the net energy they generate;
- Programs that support the use of distributed and alternative energy sources.

CoServe is also investigating the use of solar photovoltaics as a future energy supply source.

Outside the CoServe service area, Oncor operates the electricity grid. The Oncor area is defined as “open for competition,” so customers in this part of Frisco select from a variety of electricity retailers. Oncor has several programs that provide incentives for energy conservation. For example, customers can interconnect their energy sources to the grid. Oncor is also investing in transmission lines that will allow customers to take advantage of the wind-generated electricity from West Texas more easily. Customers can select their electricity provider based on that retailer’s mix of renewable and non-renewable energy supply sources.

Some operational and maintenance issues have been noted for the inter-connectivity from customers to the electricity grid. Property owners in Frisco interested in this approach to energy supply should work with their providers to understand the economics of these installations. Owners must also maintain the systems so they do not become community eyesores.

## Energy Efficiency Scorecard

The American Council for an Energy-Efficient Economy (ACEEE) has studied strategies that local governments can employ to use energy efficiently and to encourage their residents and businesses to follow suit. Their “2013 City Energy Efficiency Scorecard” examines 34 of the most populous cities in the U.S. and rates them in terms of:

- Local government operations;
- Buildings;
- Energy and water utilities;
- Transportation; and
- The community as a whole.<sup>48</sup>

The report outlines a series of steps that cities can take to use energy more efficiently in each of these five areas. An online Self-Scoring Tool allows individual communities to compare their own policies and programs against this scorecard to achieve up to 100 points. In the 2013 report, scores ranged from 76.75 (Boston, MA) to 17.25 (Jacksonville, FL). Dallas ranked 14th among the cities reviewed (44.5 points) and Fort Worth ranked 26th (33.0 points).

<sup>48</sup> “2013 City Energy Efficiency Scorecard”, American Council for an Energy-efficient Economy, [www.aceee.org](http://www.aceee.org), 2013.

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