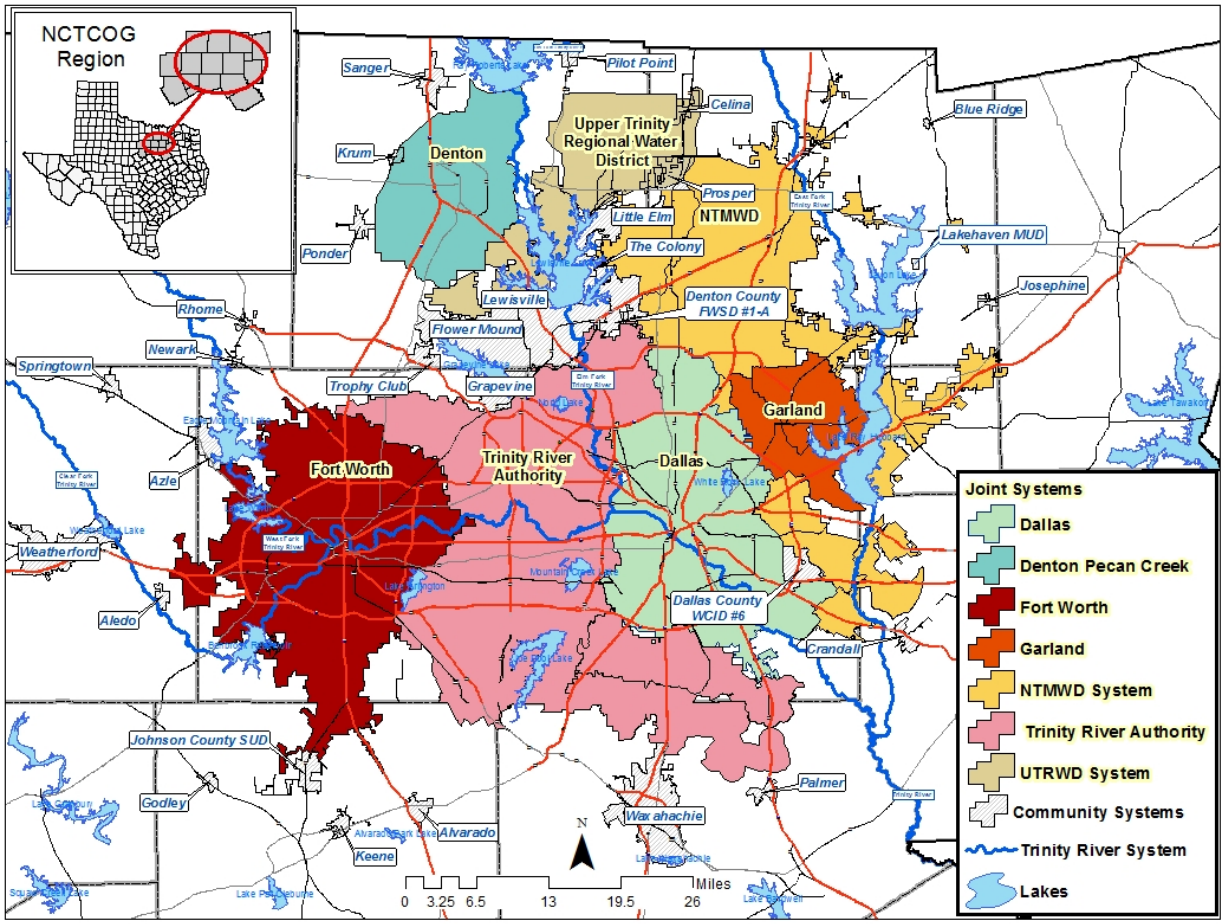
# Water Quality Management Plan Update 2014




North Central Texas
Council of Governments

**North Central Texas Council of Governments**

The North Central Texas Council of Governments (NCTCOG) was established in 1966 to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating for sound regional development.

North Central Texas is a 16-county metropolitan region surrounding the two urban centers of Dallas and Fort Worth. Currently, NCTCOG has 242 members, including 16 counties, 170 cities, 24 school districts, and 32 special districts. The area of the region is approximately 12,800 square miles, which is larger than nine states, and the population of the region is approximately 6.5 million.

NCTCOG's structure is relatively simple—each member government appoints a voting representative from the governing body. These voting representatives make up the General Assembly which annually elects an Executive Board. The Executive Board is the policy and fiduciary approval body for all NCTCOG activities and is supported by technical study and policy development committees as well as a professional staff headed by the Executive Director.

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The Environment and Development Department serves as staff to both the NCTCOG Executive Board and Water Resources Council. Staff supports a myriad of activities providing technical support, policy guidance, program coordination and development, and project implementation.

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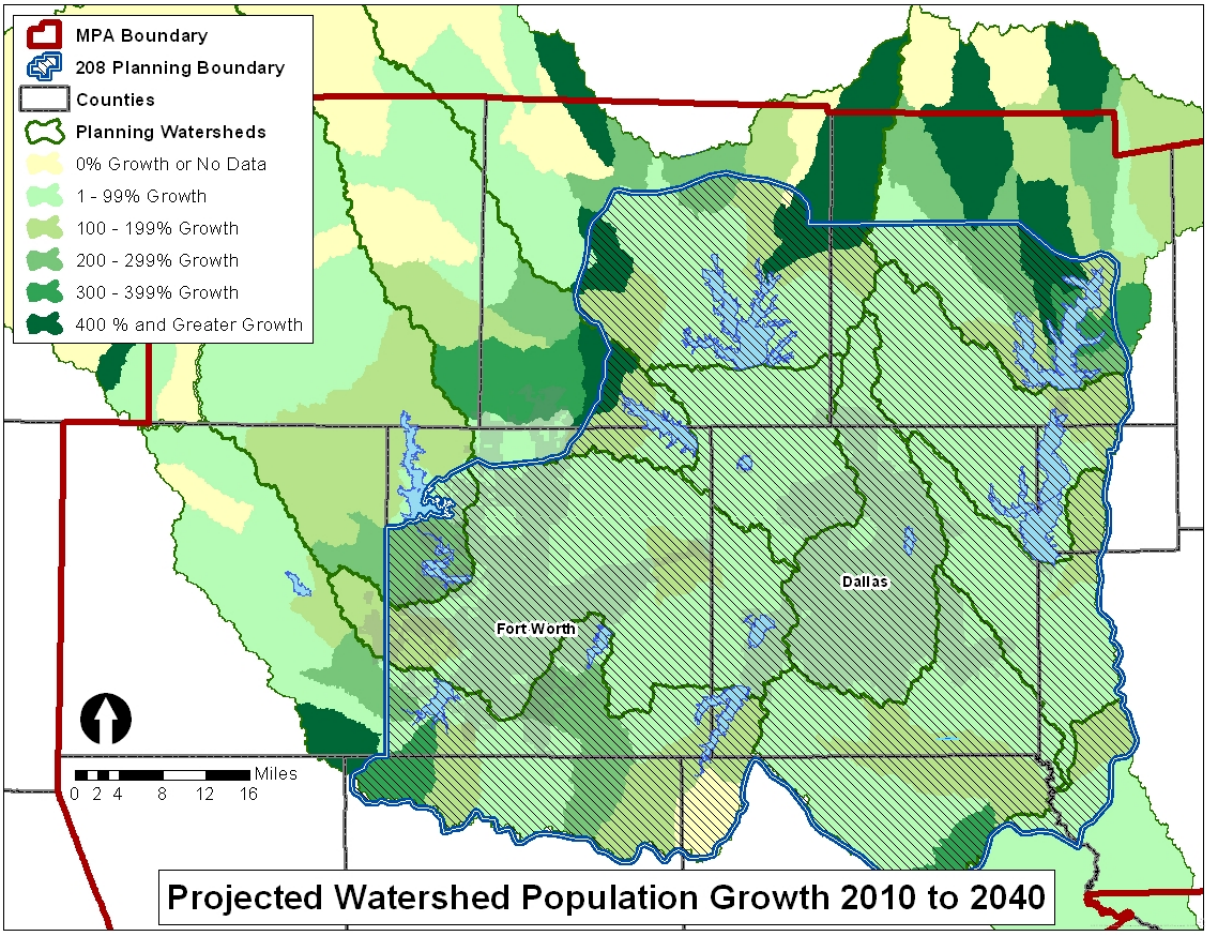
# Introduction

## Purpose and Scope

Wastewater service is an integral part of the infrastructure support for the Dallas/Fort Worth (DFW) metropolitan area. Even under the constraints of the economic recession, the North Central Texas region, more properly described as the Metropolitan Planning Area (MPA), has been growing over the past decade, and is currently projected to continue to grow to approximately 10.5 million by 2040. As the region matures, communities now on the perimeter and beyond may become more interdependent as they integrate into the urban metropolitan area and assume new roles in protecting water quality. For such a densely populated and growing area, the provision of adequate treatment services is important, with respect to social, economic, environmental, and health benefits for the region's 10.5 million residents in 2040.

Figure 1




Proper wastewater treatment, whether accomplished through a large and sophisticated regional collection and treatment system or a small, on-site septic tank, is often taken for granted by residents. They are unaware of the years of planning and a continuing process of redesign and upgrading that have provided the infrastructure and facilities capable of handling the region's wastewater.

The economic recession has impacted the DFW region's wastewater capacity planning in several ways. Slower than projected population growth has provided the wastewater service providers a 'margin of safety' for their existing and planned treatment capacity. It has also made capacity planning somewhat less certain going forward as growth trends that were reliable in the past do not hold in the present, and may not in the future.

***Water Quality Management Planning***

In 1975 the North Central Texas Council of Governments (NCTCOG) was designated by the Governor of Texas as the water quality management planning agency for the North Central Texas region. Protection of water resources and the provision of water supply and wastewater services are overseen on a statewide basis by the Texas Commission on Environmental Quality (TCEQ), who in turn rely on the NCTCOG for oversight, conformity review, and evaluation of capacity for wastewater services in the DFW region. The entire Water Quality Management Planning process is mandated by the Clean Water Act (CWA), and implementation is the responsibility of state and local planning agencies. The area for which NCTCOG is responsible is called the "208 area", after the section of the CWA that establishes the process for water quality review.

Each year the NCTCOG Environment and Development Department updates the Water Quality Management Plan for the Upper Trinity River Basin, accounting for treatment capacity and service area changes since the prior year's report. In addition, the report details upgrades in wastewater infrastructure funded either through grants and loans from the State Revolving Fund established for that purpose, or financed by individual municipalities, utility districts or other entities.

The WQMP is divided into sections which represent developments in each of the 13 watershed groups that make up the Upper Trinity Basin planning area. Watersheds define natural regions that feed a particular stream system and activities within the watershed area influence the ecological health of that system and all waters downstream. In DFW, water in the Upper Trinity Basin flows into the Trinity River.

Each WQMP is reviewed by the Water Resources Council, followed by regional review by municipalities and any other interested entities. Finally, a formal public hearing offers the opportunity for individual stakeholders from the planning area to review and comment on the Plan. After the public hearing, staff reviews and incorporates any modifications to the final plan, which is then presented to NCTCOG's Executive Board for adoption. Following adoption by the NCTCOG Executive Board, the annual WQMP is submitted to the TCEQ and to US EPA Region 6 for review. Finally, the locally adopted plan is certified by the Board of the TCEQ.

WQMP OBJECTIVE 1

The WQMP supports several objectives for planning, coordination, and implementation of wastewater treatment facilities in the DFW region.

- Facilitate planning, design, and construction of wastewater treatment facilities that meet permit limits and wastewater discharge requirements.

Permit limits are set by the state to avoid pollutant overload to surface waters. Such threats are minimized when facilities are properly and timely planned. As the designated water quality management planning agency for North Central Texas, NCTCOG makes recommendations to TCEQ to designate agencies for wastewater collection and treatment according to provisions of Section 208 and Section 604(b) of the Federal Clean Water Act.

This WQMP will:

- Identify emerging water quality issues that will impact wastewater treatment strategies or that require adjustments to treatment processes.
- Track and summarize wastewater treatment performance for regional joint system and community plants.
- Ensure that critical infrastructure is considered in emerging regional emergency response and coordination activities.
- Facilitate wastewater treatment facility planning that assures capacities are sufficient to meet future wastewater needs.

Wastewater overflow due to insufficient treatment capacity causes surface water contamination from bacteria, solids, and other pollutants normally removed in treatment processes. As part of water quality management planning, NCTCOG has historically provided periodic assessment of wastewater treatment planning activities and needs.

This objective is addressed by NCTCOG continuing to:

- Monitor and regularly update wastewater treatment service area information.
- Provide feedback to regulatory agencies to improve data acquisition and use.
- Re-evaluate demographic and wastewater generation projections using NCTCOG forecasts based on 2010 census information to ascertain capacity planning needs.
- Compile and summarize wastewater treatment reported flows on a regular schedule.
- Participate in coordination efforts between NCTCOG agency and state demographic forecasting processes to enhance consistency of data for planning purposes.
- Encourage planning, construction, and effective maintenance of wastewater collection infrastructure to convey wastewater to treatment facilities, limit inflow and infiltration, and keep pace with regional growth.

***WQMP Objective 2***

Provide support for infrastructure maintenance, rehabilitation, capital improvement, replacement etc. of transmission pipelines and collection systems.

The transmission pipelines that convey wastewater from a source to the treatment facility are an integral part of the treatment system. Decaying or insufficient pipelines allow wastewater to seep into the ground, which can surface when the ground becomes saturated. Decaying or insufficient pipelines also allow rainwater to inflow and infiltrate the pipeline system, which causes increased volumes at the treatment plant and increased potential for capacity exceedances. Focusing attention on infrastructure is appropriate based on evidence gained by the NCTCOG's administration of the Community Development Fund (CDBG) grant of the Texas Community Development Program. NCTCOG also follows regional wastewater infrastructure updates by monitoring the Texas Water Development Board's Clean Water State Revolving Fund, and contacting individual municipalities concerning development or upgrade of their collection or community treatment systems.

This objective is addressed by NCTCOG continuing to:

- Examine and summarize the status of wastewater treatment and collection systems in small communities for use in targeting resources for infrastructure improvements.
- Document and summarize local government actions to construct, maintain, and rehabilitate collection systems.
- Provide assistance on the use of planning, policy, and other measures and approaches to effectively address state and federal water quality regulations.

WQMP OBJECTIVE 3

Inform and support regional water quality management efforts by providing planning, policy assistance, and information for local agencies to use in compliance efforts. This objective is addressed by NCTCOG continuing to:

- Participate in stakeholder meetings conducted by the TCEQ on new regulations as they are developed.
- Informing NCTCOG committees of updated, new or upcoming regulation.
- Provides access to regulatory information from the NCTCOG Web site.
- Develops a calendar of water quality meetings on the NCTCOG Web site.
- Monitor and facilitate transitions of wastewater treatment from rural settings to dense growth areas to promote efficient and appropriate processes that accommodate local government interests while maintaining adequate capacity and discharge quality.

***WQMP Objective 4***
Facilitate municipal awareness of water quality issues

In North Central Texas, rural areas are often developed in patches as development advances on the fringe of incorporated areas. As the urbanizing rural areas become incorporated, municipalities eventually become responsible for providing public service to areas which are often served by onsite or septic wastewater systems. Mismanaged onsite or septic systems are difficult and costly for municipalities to integrate into public service systems. Municipal awareness of, or involvement in, early development stages will conserve public resources over the long term.

This objective is addressed by NCTCOG:

- Tracking new permit information for non-municipal wastewater discharges.
- Exploring future ways of tracking permits.
- Identifying neighborhoods or other developed tracts that do not receive service from the local or regional wastewater treatment plants, but which lie within an incorporated area that is otherwise served.
- Promoting and encouraging exploration of opportunities to maximize wastewater effluent use.

***WQMP Objective 5***
Support wastewater reuse strategies and water conservation.

By 2050 this region will require at least 2 billion gallons of water per day to meet drinking water demand. Currently available resources cannot meet this goal, and expanding traditional water sources is not the only method to meet the shortfall. One method to make up the deficit is to increase the reuse of treated wastewater. Wastewater reuse enhances water conservation and particularly conserves and supplements raw drinking water supplies. The *State Water Plan*, as compiled by the Texas Water Development Board, identifies conservation as a valuable water supply tool for every region in Texas.

This objective is by NCTCOG:

- Annually identifying and updating current regional projects where treated effluent is used for alternative purposes.
- Pursuing opportunities to work with the major water systems and their customer cities to ensure the efficient and effective use of water.

WATERSHEDS PLANNING APPROACH IN THE UPPER TRINITY BASINS

| Watershed | Percent Developed Area 2005 | Percent Developed Area 2010 | Percent Increase in Developed Area |
|---|---|---|---|
| Arlington/Benbrook/Joe Pool/Weatherford Lakes | 36.58% | 40.39% | 3.81% |
| E. Fork Trinity below Lake Ray Hubbard | 44.98% | 49.93% | 4.95% |
| Elm Fork Trinity below Lewisville Lake | 70.02% | 84.04% | 14.03% |
| Grapevine Lake* | 31.29% | 43.61% | 12.32% |
| Lake Bridgeport* | 15% | 26.47% | 11.10% |
| Lake Ray Hubbard | 51.71% | 56.71% | 5.00% |
| Lake Worth/Eagle Mountain Lake* | 18.11% | 24.01% | 5.90% |
| Lavon Lake* | 16.86% | 20.75% | 3.90% |
| Ten Mile Creek, Red Oak Creek | 42.26% | 49.20% | 6.94% |
| Trinity River Headwaters | 79.21% | 85.82% | 6.61% |
| Trinity River below Dallas | 0.93% | 8.69% | 7.76% |
| West Fork Trinity below Lake Worth | 68.66% | 76.43% | 7.77% |
| Lewisville Lake* | 18.69% | 43.97% | 25.28% |
| **Totals for Study Area** | **38.02%** | **46.92%** | **8.90%** |

*percentages for the portion of the watershed within the Metropolitan Planning Boundary

**Table 1**

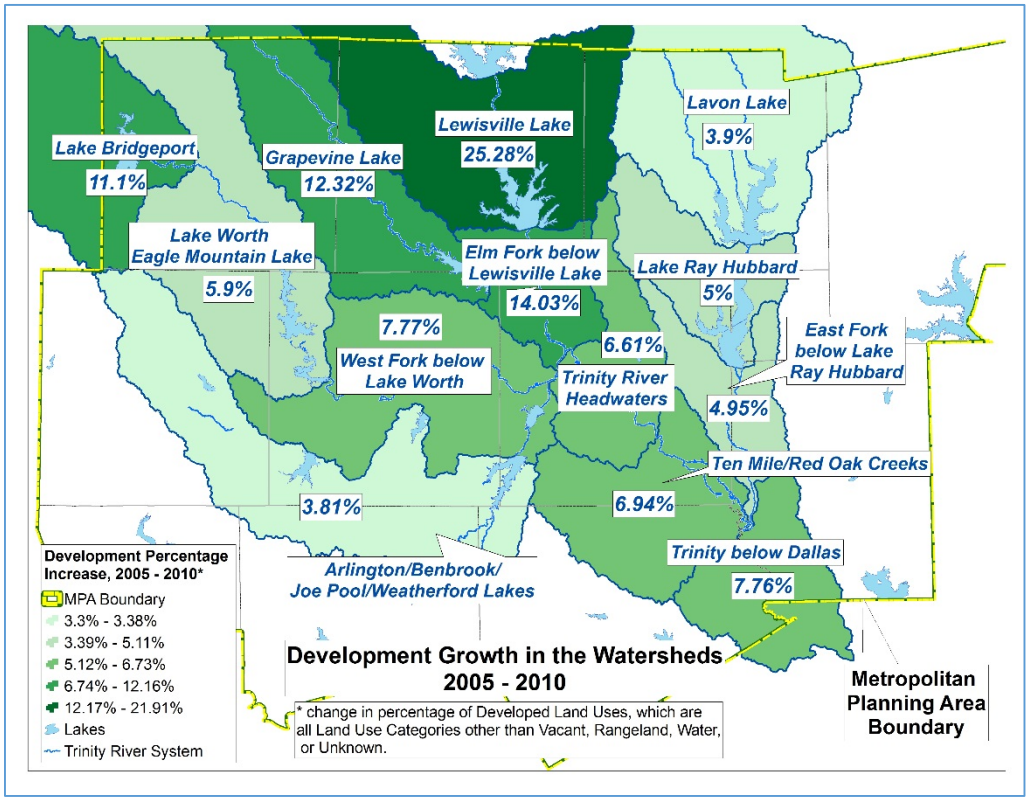


Figure 2

The North Central Texas region's population is expected to reach approximately 10.5 million by 2040. There are many efforts going on across the region that will help prepare for this influx of people and the increased strain on water resources. However, a collaborative, long-range effort involving all North Central Texas communities to ensure protection efforts are being applied efficiently and effectively is needed. This will not be an easy task and there are several challenges to protecting water supply reservoirs and their watersheds that must be addressed.

Both Table 1 and Figure 2 above illustrate the growth in developed area between NCTCOG's 2005 Land Use data and the updated 2010 Land Use dataset. Each of the Upper Trinity River watersheds has added significant developed acreage during the five year period between land use updates. Data for some of the watersheds are limited to the areas for which land use data are available, which is the area within the MPA. These are indicated by Figure X on the in Appendix E: Wastewater Treatment Planning Needs and Individual System Assessments.

***Watershed Planning and Integrating Infrastructure Planning***

The North Central Texas Council of Governments (NCTCOG) has established a Regional Ecosystem Framework (REF) for North Central Texas which "is based on a collaboratively developed vision of desired future conditions that integrates ecological, economic, and social factors." This is being accomplished on a watershed basis by connecting people, places, and programs.

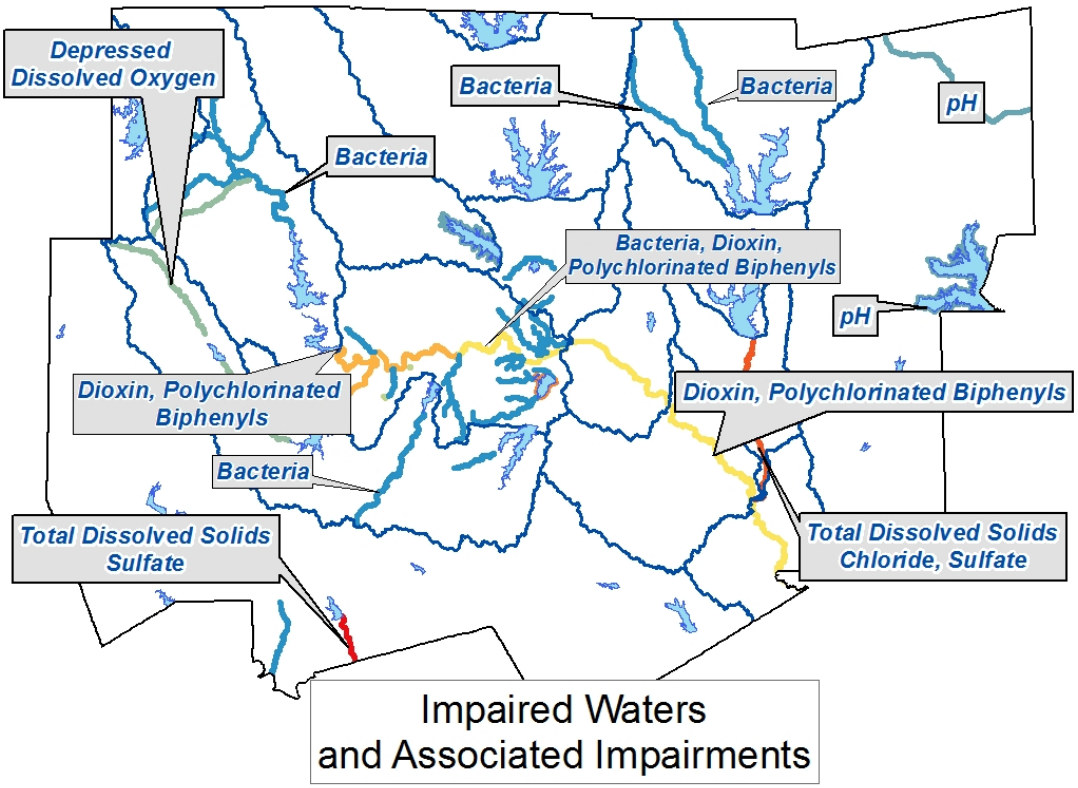
For FY2014, NCTCOG is revisiting and expanding the Regional Ecosystem Framework under a grant from the Federal Highway Administration. The REF identifies and prioritizes areas' primary ecological values in order to streamline future transportation planning efforts. The goal of the REF is to identify valuable ecological and social features in each watershed, and to develop mitigation strategies and opportunities prior to the planning of a transportation infrastructure project. This long-range planning resource and dataset could be used in planning other infrastructure needs, and provide a framework to integrate conservation planning and ecological aspects into long-term watershed analyses.

***Water Quality Concerns – Municipal Stormwater***

Municipal Stormwater refers to the runoff which occurs whenever rain falls on an urbanized area. Regulation to promote water quality began with industry, and industrial water discharges have been cleaned up significantly since the promulgation of the Clean Water Act in 1975. It became apparent that the industrial and commercial sources of water pollution that had been the focus of environmental regulation were not the only contributors of toxins to our waters, and greater attention needed to be paid to "non-point" sources of contamination: contaminants that are not easily traced to any particular source. Most of these contaminants are picked up as rain falls to the ground, falling on whatever structures and activities occur on land prior to the water entering a stream.

One important part of the effort to protect water quality is the Municipal Separate Stormwater Sewer System (MS4) permitting program mandated by the EPA, and administered in Texas by the TCEQ. MS4 permits make municipalities (and some other entities) responsible for the stormwater runoff in their jurisdiction. Most of the cities in the Urbanized Area (UA) are covered under Phase I and II MS4 Permits. Phase I permits are required for cities in the UA that have a population above 100,000, and require sampling and testing of stormwater flow. The Phase II permits for smaller cities are focused on attaining water quality improvements through the application of best management practices within city operations, and implementation of ordinances which discourage stormwater pollution.

Figure 3




***Water Quality Concerns – 303(d) Impairments***

The 16-county NCTCOG region has dozens of water bodies listed as impaired on the state's 303(d) list from the *2012 Texas Integrated Report of Surface Water Quality,* which addresses assessment requirements under the federal Clean Water Act. NCTCOG continues to facilitate stakeholder-driven efforts to address regional water quality concerns in areas that have water bodies included on the 303(d) list.

*Bacteria TMDL and I-Plan*

In December 2013, the "Implementation Plan (I-Plan) for Seventeen Total Maximum Daily Loads for Bacteria in the Greater Trinity River Region" was approved by TCEQ Commissioners. The I-Plan describes what will be done to reduce the levels of bacteria in streams that are included on

the 303(d) list for bacteria, and the reduced levels that are to be achieved are called Total Maximum Daily Loads (TMDLs). These actions and target levels for reduced bacteria are determined by stakeholders, in meetings organized by NCTCOG, and negotiated with the TCEQ.

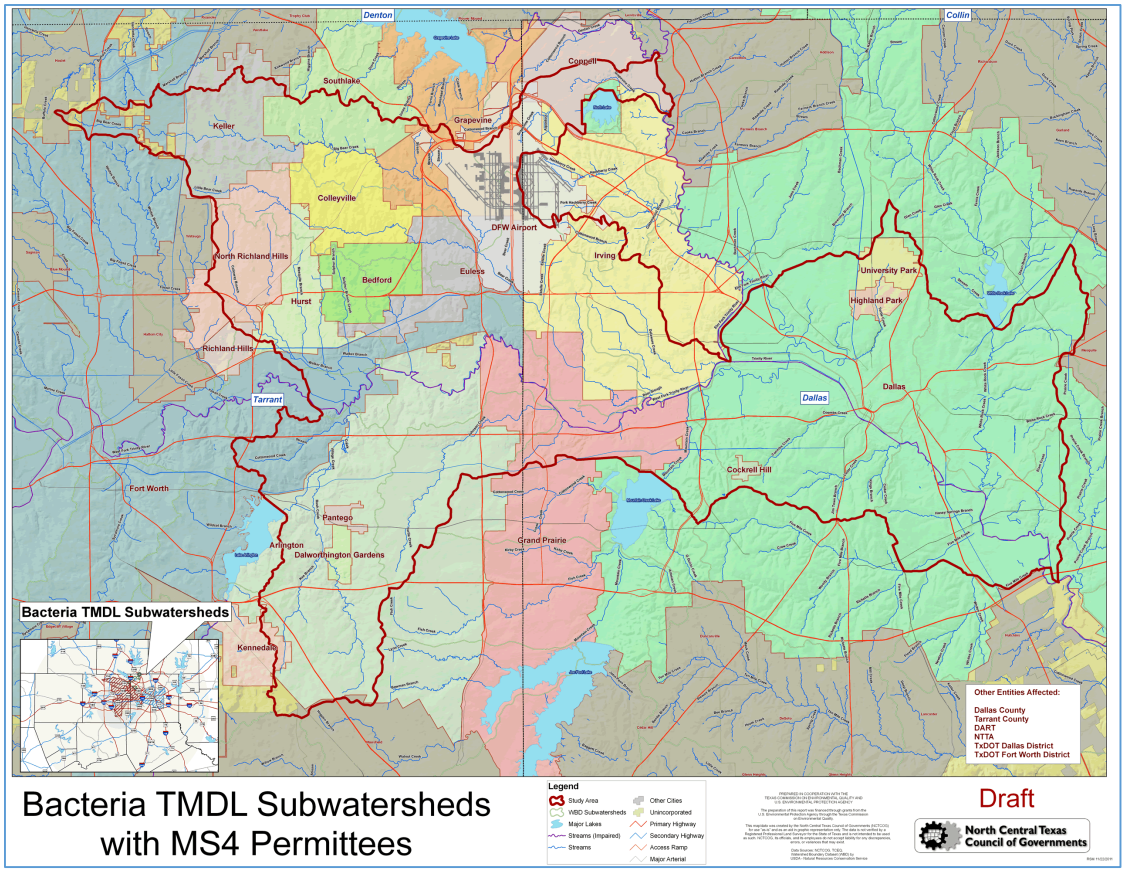



Figure 4

The areas covered by the I-Plan include a continuous segment of the Upper Trinity River beginning at the confluence of Five Mile Creek and running upstream to the confluence of Village Creek with the West Fork Trinity River. Also included are two tributaries off of the Elm Fork of the Trinity River, Cottonwood Branch and Grapevine Creek. The river segments and their watersheds are be broken down more precisely by their designated segment numbers, 0805_03 and 0805_04.

Segments 0805_03 and 0805_04 represent the portion of the Upper Trinity included in the I-Plan. The watersheds for these segments encompass the central portion of the City of Dallas as well as the cities of Cockrell Hill, University Park, and the Town of Highland Park. The two tributaries of the Elm Fork Trinity River, Grapevine Creek and Cottonwood Branch – 0822B and 0822A respectively, have smaller watersheds, involving the cities of Coppell, Irving and the Dallas-Fort Worth International Airport.

The segment of the West Fork Trinity River included in the I-Plan is 0841. In addition to the river segment, there are 11 tributaries that are also impaired for bacteria. They are: Bear Creek, Arbor

Creek, Copart Branch, Mountain Creek, Dalworth Creek, Delaware Creek, Estelle Creek, Johnson Creek, Kee Branch, Rush Creek, Village Creek, and West Irving Branch. The watersheds of 0841 cover a significant portion of the central Metroplex cities, including Haslet, Keller, Southlake, Colleyville, and North Richland Hills in the northwest. Hurst, Bedford, Euless, and Irving in the central portion, and Arlington, Grand Prairie, Kennedale, Pantego, and Dalworthington Gardens in the south are included in this watershed of the West Fork of the Trinity River.

In addition to the cities that are parties to the I-Plan, a number of other jurisdictions in these watersheds are included because they have MS4 permits regulating their wastewater discharges: Dallas County, Tarrant County, Dallas Area Rapid Transit (DART), North Texas Tollway Authority (NTTA), and Texas Department of Transportation (TxDOT) Dallas and Fort Worth Districts.

The overall population in the greater bacteria TMDL watershed is 1.33 million people according to 2010 U.S. Census data and is fairly densely populated with urban and suburban clusters.

***PCB Impairment***

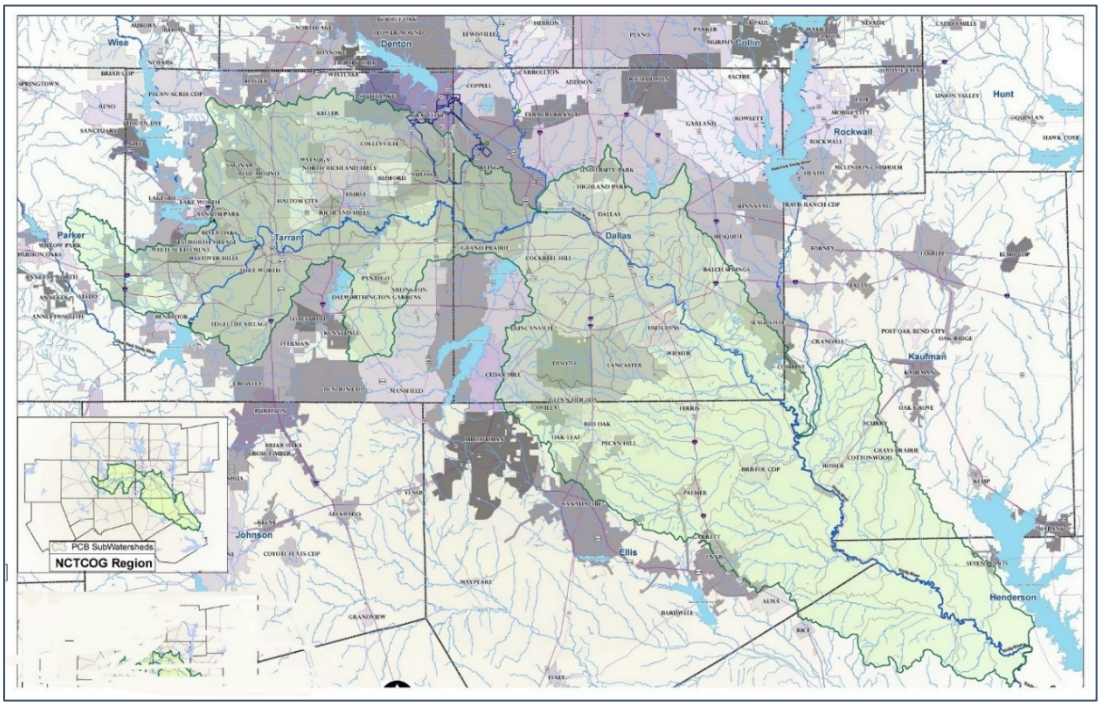


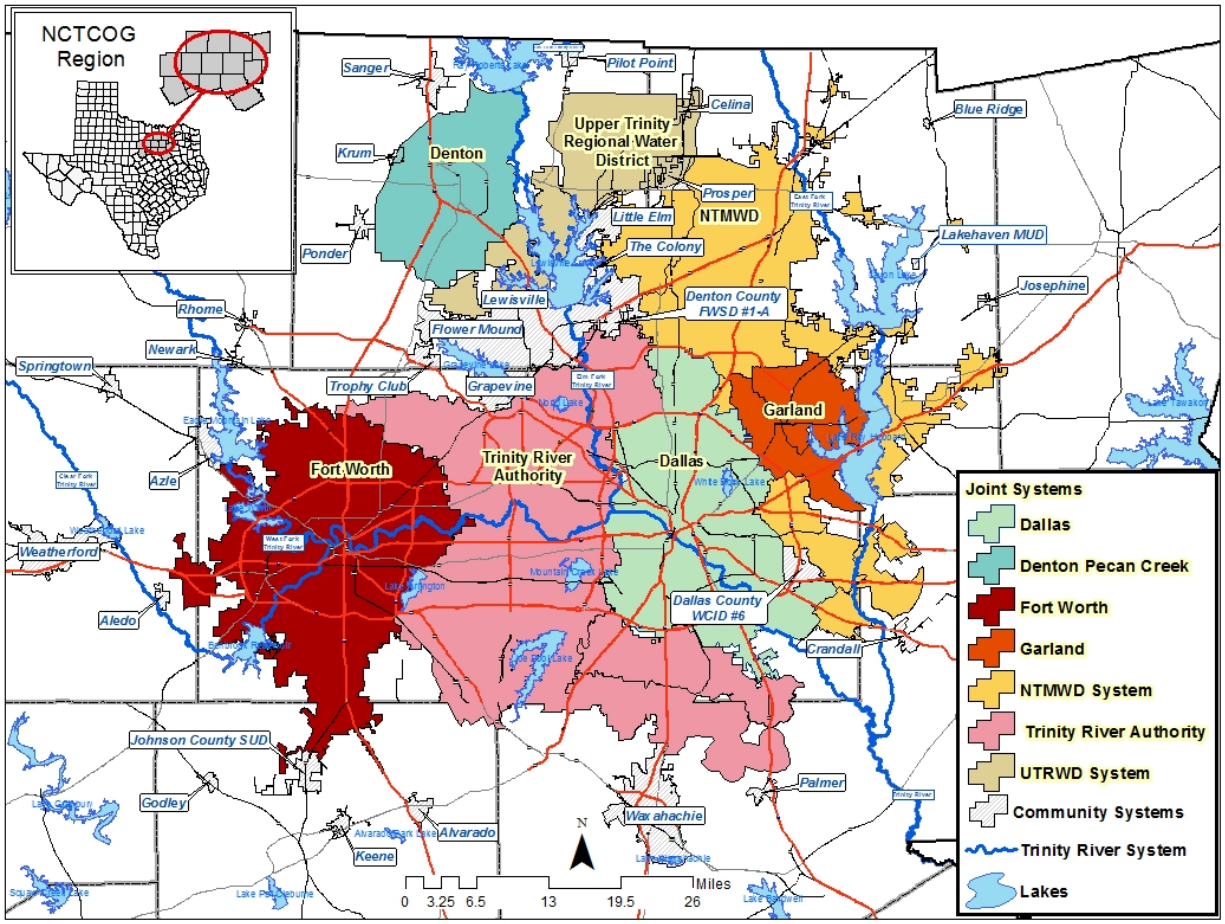

Figure 5 Extent of PCB Impairment

Bacteria is not the only impairment impacting the Trinity River. In 1996 segments of the Trinity were first listed as impaired for Polychlorinated Biphenyls (PCBs) on the state's 303(d) list- which references a section of the Clean Water Act mandating the evaluation of a state's water bodies. In 2002, the Texas Department of State Health Services issued a fish consumption advisory for 150 miles of the Trinity River due to PCBs in fish tissue. In 2010, another fish consumption advisory expanded the area of impairment to cover 12 assessment units. Figure 6 (above) shows the extent of the PCB watersheds in the urbanized area, and the local governments that will be included in future efforts to manage this PCB contamination. The Trinity's PCB impairment begins

in south Navarro County running upstream to the confluence with the Elm Fork (Segment 0805). From there, it proceeds upstream along the West Fork (Segment 0841) to below Lake Worth (Segment 0806) and to the confluence with the Clear Fork. A portion of the Clear Fork below Lake Benbrook Dam is also included (Segment 0829). The combined watersheds of all four segments cover 1,540 square miles. Beginning in September 2014, TCEQ has tasked NCTCOG with facilitating the effort to develop an I-Plan for the PCB impairment. Development of an I-Plan for PCBs is likely to prove challenging since PCBs were banned in 1976, leaving few potential current sources. PCBs may be present in sediments or on surfaces slowly leaching or releasing them into stormwater or groundwater.

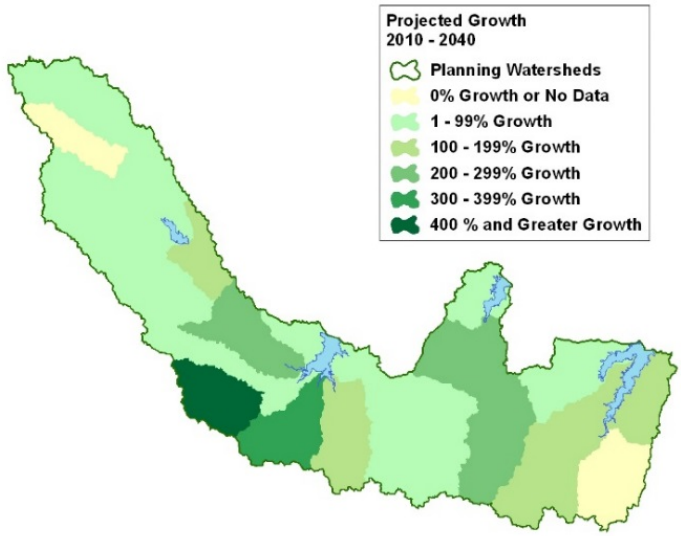
## Methodologies for Determining Regional Wastewater needs and Individual System Capacity

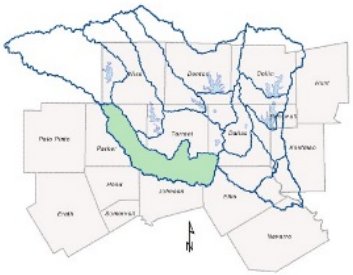
NCTCOG assesses planning needs for wastewater treatment to protect water quality. Appendix E "Wastewater Treatment Planning Needs and Individual System Assessments" discusses procedures and results of the 2014 update. The Figure below illustrates the current service area array serving NCTCOG region.




Regional Wastewater Service Areas 1

## ARLINGTON / BENBROOK/JOE POOL/WEATHERFORD LAKES WATERSHED



***Projected Growth by Watershed***

Although the recession of 2008 has slowed development somewhat within region, the Lakes Arlington, Benbrook, Joe Pool and Weatherford Watershed is projected to enjoy above-average growth in most of its 22 Watersheds, with the higher growth rates generally occurring in the area of the 'second tier suburbs' at the southern side of the watershed. From its current estimated population of 507,649, the region is projected to grow to 855,141 by 2040, an overall growth rate of 68.45% over the 27 year period. Four subwatersheds, Gourdneck Creek, Mustang Creek, Soap Creek, and Town Creek are projected to lose population during the same period

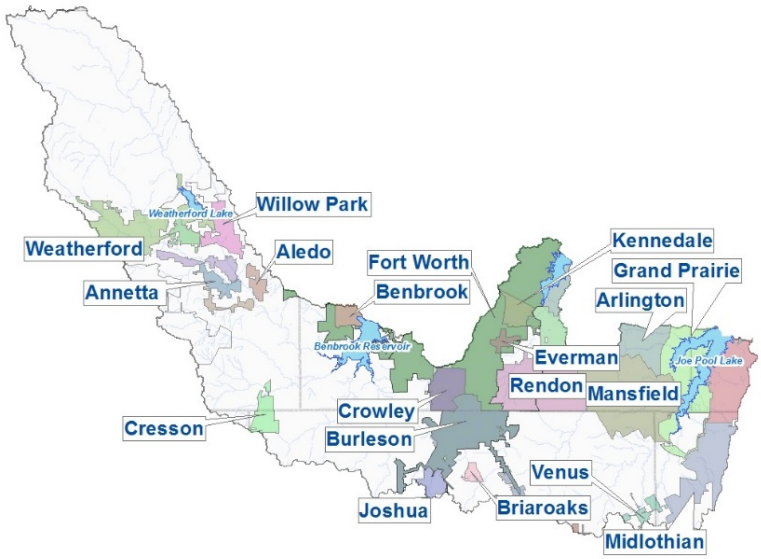
| Arlington / Benbrook/Joe Pool/Weatherford Lakes Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Growth 2013 - 2040 |
|---|---|---|---|
| Bear Creek | 2,296 | 5,548 | 142% |
| Brown Branch-Clear Fork Trinity | 7,851 | 14,150 | 80% |
| Clear Fork Trinity - Lake Weatherford | 7,234 | 11,022 | 52% |
| Cottonwood Creek-Clear Fork Trinity River | 3,883 | 4,388 | 13% |
| Deer Creek-Village Creek | 39,275 | 56,611 | 44% |
| Dutch Branch-Benbrook Lake | 19,340 | 29,257 | 51% |
| Gourdneck Creek | 2,302 | 1,420 | -38% |
| Headwaters Mountain Creek | 14,095 | 32,611 | 131% |
| King Branch-Walnut Creek | 24,195 | 72,654 | 200% |
| Low Branch-Mountain Creek | 26,281 | 81,872 | 212% |
| Lynn Creek-Walnut Creek | 106,516 | 151,409 | 42% |
| Mustang Creek | 10,508 | 7,099 | -32% |
| Quil Miller Creek-Village Creek | 54,916 | 74,989 | 37% |
| Rock Creek | 12,304 | 18,033 | 47% |
| Soap Creek | 10,095 | 3,725 | -63% |

| Arlington / Benbrook/Joe Pool/Weatherford Lakes Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Growth 2013 - 2040 |
|---|---|---|---|
| South Bear Creek | 1,357 | 3,711 | 173% |
| South Fork | 9,790 | 10,815 | 10% |
| Squaw Creek-Clear Fork Trinity River | 10,037 | 11,349 | 13% |
| Town Creek | 21,836 | 18,114 | -17% |
| Underwood Branch-Willow Creek | 13,986 | 19,185 | 37% |
| Village Creek-Lake Arlington | 48,650 | 129,713 | 167% |
| Wildcat Branch-Lake Arlington | 60,902 | 71,211 | 17% |
| **Watershed Total** | **507,649** | **855,141** | 68% |

***Land Use***

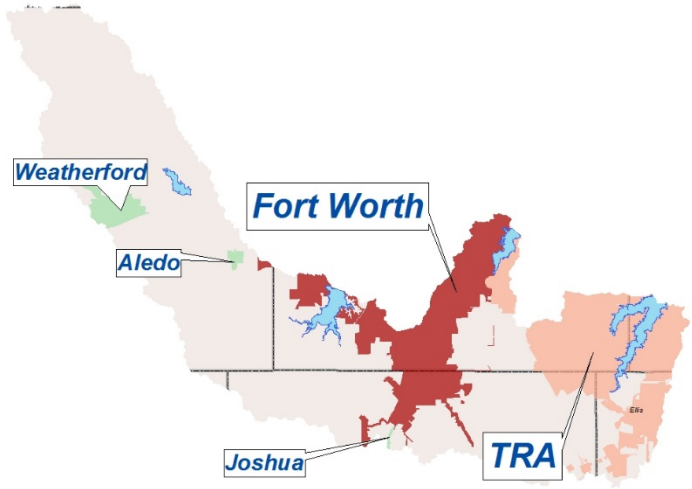
This relatively undeveloped watershed sits at the southwest corner of the Metroplex. Although there are 19 communities that have a majority of their jurisdiction within the watershed's boundaries, only seven of these fall within the current urbanized area (UA). The cities of Burleson and Mansfield both have 99% of their jurisdiction within this watershed and are Phase II Municipal Separate Sewer System (MS4) permit holders.

The increase in the area of developed land for the Arlington/Benbrook/Joe Pool/Weatherford Lakes watershed was relatively small (3.81%) between the 2005 and 2010 land use datasets. The overall proportion of developed land increased to 40.29%.



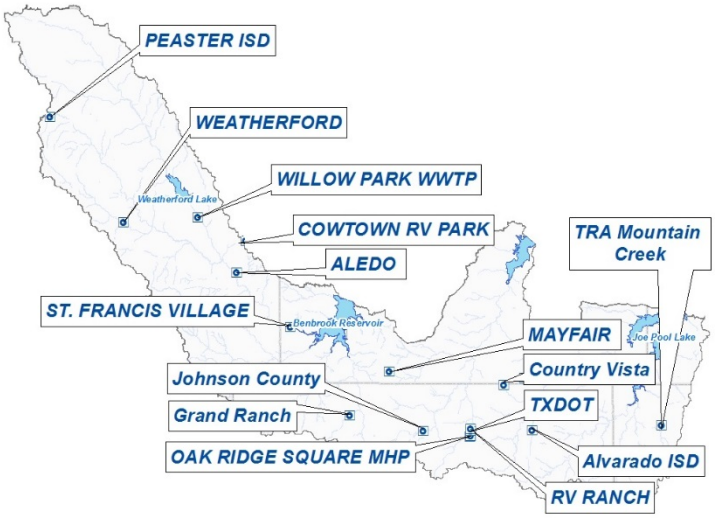

***Cities in Watershed***

The Arlington / Benbrook / Joe Pool / Weatherford Lakes watershed comprises 533,430 Acres and includes all or part of 26 incorporated cities. Among these cities are small portions of both Arlington and Fort Worth, parts of Cedar Hill, Midlothian, Benbrook, Cresson and Grand Prairie, and all or most of Burleson, Joshua, Crowley, Everman, Forest Hill, Kennedale, Venus, Mansfield, Aledo, Rendon, Annetta, Annetta South, Annetta North, Weatherford, Willow Parks, and Hudson Oaks. Overall, the watershed is currently about 15% urbanized (Urbanized= City Limits Area / Watershed Area).



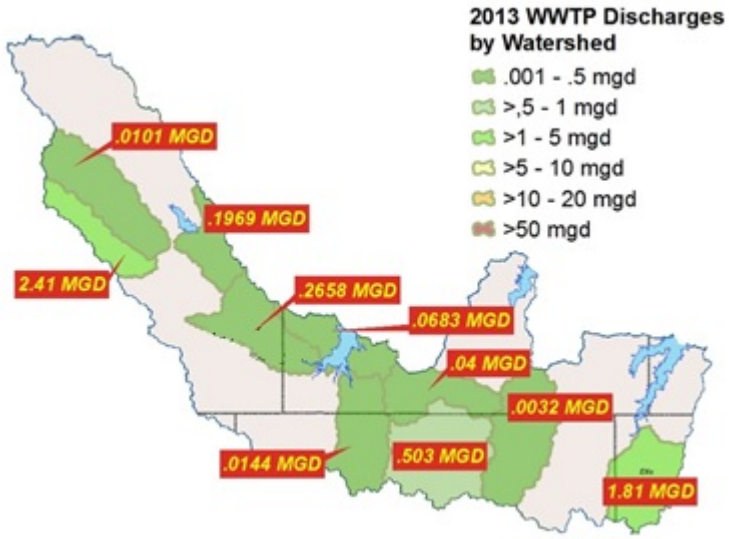

***Watershed Wastewater Service Providers***

The Arlington / Benbrook / Joe Pool/ Weatherford Lakes watershed is broadly served by four Trinity River Authority facilities, and the Fort Worth system.




***Watershed Wastewater Treatment Facilities***

This watershed, although it contains all or part of 26 incorporated cities., is still only about 15% urbanized. Many small wastewater treatment facilities serve the area, resulting in small discharges in 11 of the 22 subwatersheds, which drain to all 4 lakes in the region.




***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***

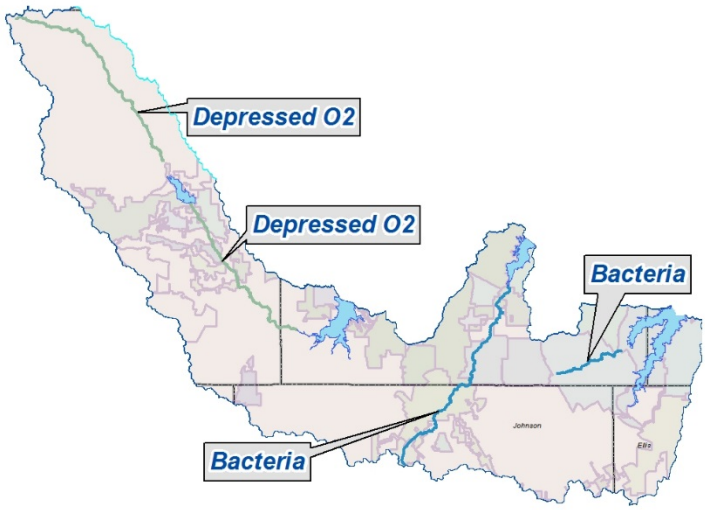
Total municipal wastewater discharges into the watershed increased to 5.33 MGD in 2013, a 61% increase over the previous year. About 34% of the total was handled by one of the regional wastewater treatment plants, TRA's

Mountain Creek facility, while the City of Weatherford facility handled 45 %, or 1.81 MGD.

***Treatment Facility Capacity Utilization in the Arlington / Benbrook / Joe Pool / Weatherford Lakes Watershed***

| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| PEASTER ISD WWTP | 0.036 | 0.0101 | 28% |
| WEATHERFORD WWTP | 4.5 | 2.4079 | 54% |
| WILLOW PARK WWTP | 0.3 | 0.1969 | 66% |
| COWTOWN RV PARK | 0.0216 | 0.0093 | 43% |
| BENBROOK VILLAGE | 0.035 | 0.0284 | 81% |
| ST. FRANCIS VILLAGE | 0.085 | 0.0683 | 80% |
| GRAND RANCH | 0.0305 | 0.0144 | 47% |
| MAYFAIR WWTP | 0.096 | 0.04 | 42% |
| JOHNSON CTY SPEC. | 0.7 | 0.4412 | 63% |
| JOHNSON COUNTY NB | 0.006 | 0.0018 | 30% |
| OAK RIDGE SQUARE | 0.0195 | 0.0356 | 0% |
| TXDOT WWTP | 0.006 | 0 | 0% |
| RV RANCH WWTP | 0.024 | 0.0244 | 102% |
| COUNTRY VISTA WWTP | 0.042 | 0 | 0% |
| WALNUT CREEK MHP | 0.0225 | 0 | 0% |
| ALVARADO ISD WWTF 1 | 0.035 | 0.0032 | 9% |
| TRA MOUNTAIN CRK (#2) | 3 | 1.814 | 60% |
| ALEDO | 0.35 | 0.2374 | 68% |
| **Totals** | **9.3091** | **5.3329** | **57%** |

Overall the 18 wastewater treatment facilities in the region operated at 57% of capacity. Only the RV Ranch plant was exceeding its permitted Average Daily Flow of .024 Million Gallons per Day (MGD)

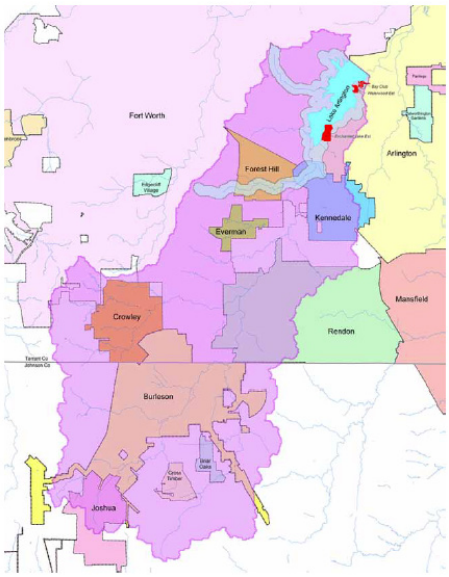



***Watershed Stream Impairments***

*The* Arlington / Benbrook / Joe Pool/ Weatherford Lakes Watershed contains three streams that are characterized as impaired by the TCEQ:

- Clear Fork of the Trinity above and below Lake Weatherford
- Village Creek
- Walnut Creek

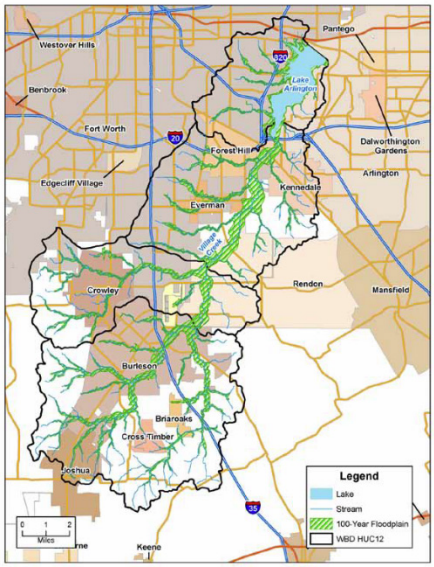
***Regional Water Quality Projects***




**Lake Arlington Watershed Protection Plan**

The City of Arlington manages Lake Arlington, which provides drinking water for multiple cities, cooling for a power generating station, and recreational facilities. The Arlington City Council adopted the Lake Arlington Master Plan on April 12, 2011. The Master Plan incorporates:

- water quality computer modeling;
- the development of Best Management Practices (BMPs) for water quality protection;
- the preparation of standards and guidelines for activities around the Lake;
- planning for recreational activities, open space, and determining boating capacity




The Master Plan builds upon a *Greenprint* of the Lake Arlington watershed which characterizes areas' suitability for protection or development. NCTCOG contracted with the Trust for Public Land (TPL) in 2010 to Greenprint the Lake Arlington watershed. Greenprinting is a GIS technique developed by TPL to prioritize areas for protection. The goal of this project was to identify areas that would offer the greatest benefit to water quality, if conserved. The Lake Arlington watershed Greenprint is based on land use, proximity to streams, proximity to ponds and wetlands, water erosion potential, floodplains, and proximity to the reservoir. Most of the areas identified as priorities for conservation generally follow riparian corridors.

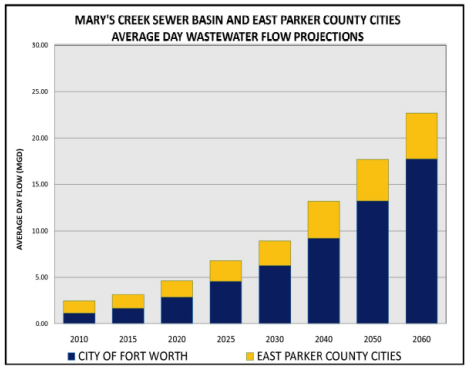
The City of Arlington and the Trinity River Authority are currently implementing the **Watershed Protection Plan** for Lake Arlington.

***Status of Treatment Capacity Expansion within the Watershed***

The following projects represent active developments expanding or updating wastewater treatment capacity within the watershed.

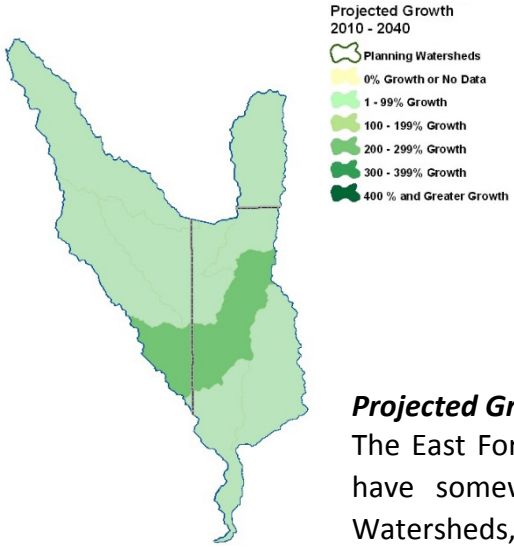
# Growth Projections

- The Mary's Creek basin has the most potential for development
- The basin is centrally located and near potential water reuse opportunities
- Preliminary Wastewater Master Plan identifies a need by 2025
  - regional development could impact schedule




The City of Fort Worth continues working toward construction of the Mary's Creek Water Recycling Center, with a planned startup in 2025. This project will relieve the city's Village Creek WWTF as development increases flows on the west side of Fort Worth. Land adjacent to the closed West Side Landfill has been purchased, and design of the Mary's Creek Reclamation Facility is ongoing. Although permitting, design and construction may not begin until 2017 or later, preliminary activities include water quality and stormwater modeling of Mary's Creek.

## EAST FORK BELOW LAKE RAY HUBBARD WATERSHED



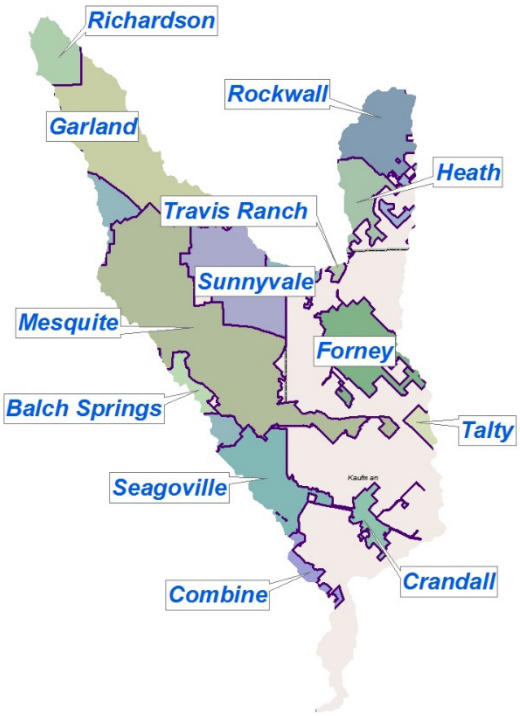
***Projected Growth by Watershed***

The East Fork below Lake Ray Hubbard watershed is projected to have somewhat lower-than-average growth in most of its 7 Watersheds, with two Watersheds, the North Mesquite Creek and Long Branch- Buffalo Creek showing insufficient data for projecting population growth. From its current estimated population of 332,988, the region is projected to grow to 476,265 by 2040, an overall growth rate of 43%.

| East Fork below Lake Ray Hubbard Subwatersheds | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| White House Ridge | 2,982 | 4,908 | 65% |
| Anthony Branch-Buffalo Creek | 12,496 | 13,360 | 7% |
| Mustang Creek | 10,508 | 45,749 | 335% |
| North Mesquite Creek | 60,067 | 103,935 | 73% |
| South Mesquite Creek | 105,877 | 118,490 | 12% |
| Long Branch-Buffalo Creek | 25,205 | 36,936 | 47% |
| Duck Creek | 175,920 | 189,823 | 8% |
| **Watershed Totals** | **332,988** | **476,265** | **43%** |

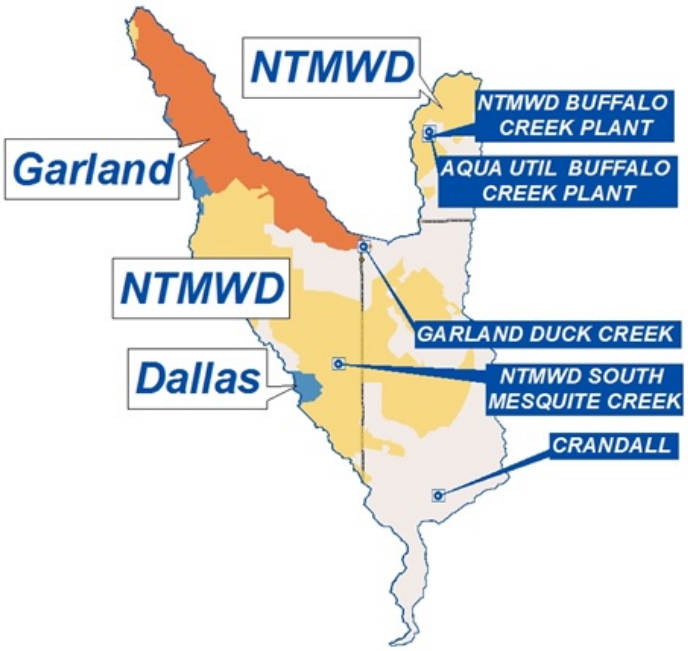
***Land Use***

Almost half the area of the East Fork Watershed is within municipal boundaries, and nearly 50% of the watershed area is undeveloped. An additional 64,547 people are projected to live in the watershed by 2040. The Land Use Map on the right represents a 2010 update of the land use in the study area.



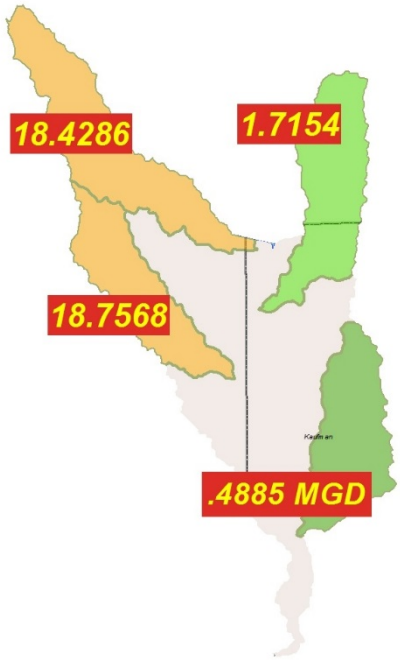

***Cities in Watershed***

The East Fork below Lake Ray Hubbard watershed comprises 149,020 Acres and includes all or part of 13 incorporated cities. Among these cities are small portions of Combine, Seagoville and Balch Springs, parts of Garland, Rockwall, Mesquite and Sunnyvale, and all or most of Heath, Forney, Talty, Crandall and Travis Ranch. Overall, the watershed is currently at least 50% urbanized.




***Watershed Wastewater Service Providers***

The East Fork watershed is primarily served by North Texas Municipal Water District and the City of Garland. A small portion at the western edge of the watershed is served by the City of Dallas.




***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***

Significant municipal wastewater discharges totaling over 32 MGD occur in the Duck Creek and South Mesquite Watersheds, although their contribution primarily affects the North Mesquite Creek and Mustang Creek Watersheds draining directly to the East Fork of the Trinity River.

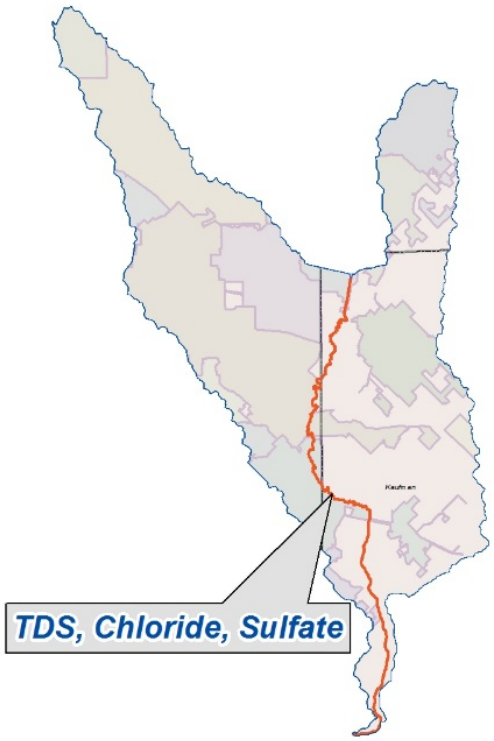
**Legend**

- .001 - .5 mgd
- >,5 - 1 mgd
- >1 - 5 mgd
- >5 - 10 mgd
- >10 - 20 mgd
- >50 mgd

***Treatment Facility Capacity Utilization in the East Fork below Lake Ray Hubbard Watershed***

| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| NTMWD S. MESQUITE CREEK | 25 | 18.76 | 75.03% |
| GARLAND DUCK CREEK WWT | 40 | 20.94 | 52.35% |
| NTMWD BUFFALO CREEK PLANT | 2.5 | 1.7154 | 68.62% |
| AQUA UTIL BUFFALO CREEK PLANT | 0.2 | 0 | 0.00% |
| CRANDALL WWTP | 0.9 | 0.4885 | 54.27% |
| **Watershed Totals** | **68.6** | **41.90** | **61%** |

The East Fork of the Trinity Watershed is primarily served by several North Texas Municipal Water District facilities, although much of the wastewater goes to other watersheds for discharge from NTMWD facilities.



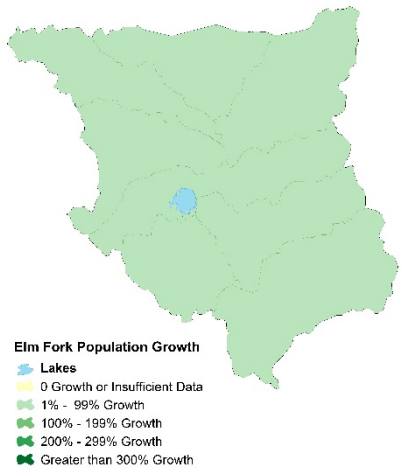

***Watershed Stream Impairments***

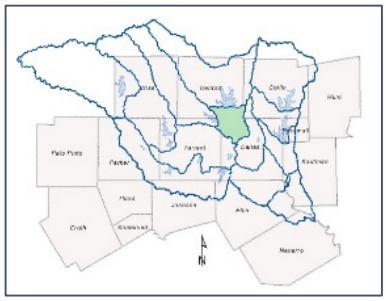
The East Fork is listed as an impaired water body on the recent 2012 303(d) list. Buffalo and Duck Creeks were previously listed, but are no longer. The East Fork is listed for chloride, sulfate and total dissolved solids, which are contaminants that should be addressed in the stormwater programs of the contributing cities in the watershed.

***Status of Treatment Capacity Expansion within the Watershed***

There are no known projects to expand wastewater capacity in this watershed.

## ELM FORK TRINITY WATERSHED

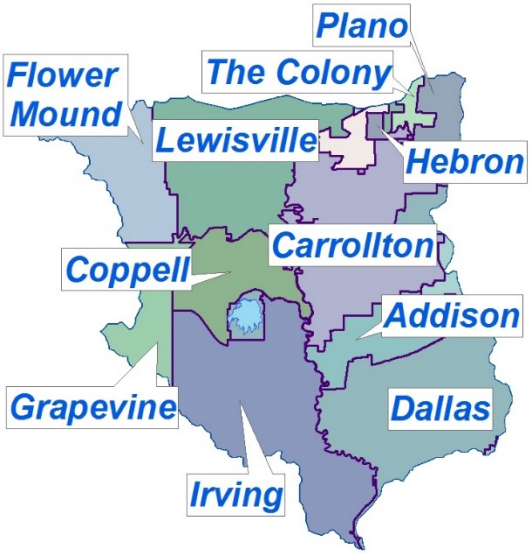


***Projected Growth by Watershed***

The Elm Fork Watershed is projected to have steady, if not exceptional growth in most of its 7 Watersheds. From its current estimated population of 522,394 the region is projected to grow to 657,067 by 2040, an overall growth rate of 26%. Infill will account for most of the growth in this area, which is 98% urban.

| Elm Fork Trinity Subwatersheds | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Cottonwood Branch-Denton Creek | 57,847 | 66,144 | 14% |
| Cottonwood Branch-Hackberry Creek | 45,855 | 65,899 | 44% |
| Farmers Branch-Elm Fork Trinity River | 78,340 | 103,846 | 33% |
| Grapevine Creek-Elm Fork Trinity River | 74,818 | 87,576 | 17% |
| Indian Creek-Elm Fork Trinity River | 117,089 | 157,078 | 34% |
| Prairie Creek-Elm Fork Trinity River | 49,833 | 61,731 | 24% |
| Timber Creek | 98,612 | 114,794 | 16% |
| **Watershed Totals** | **522,394** | **657,067** | **26%** |



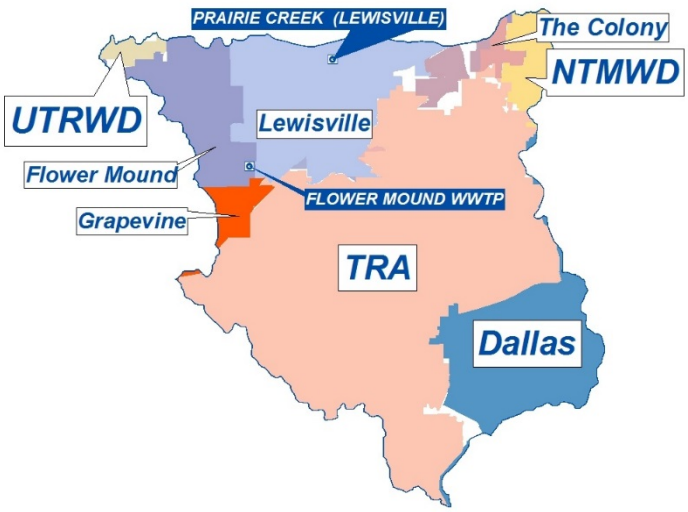

***Land Use***

Although the urban density within the Elm Fork of the Trinity watershed is already high, its increase in developed land uses between 2005 and 2010 is second highest at 14%.

***Cities in Watershed***

There are 11 cities with all or a portion of their area in this watershed. Most of these cities participate in NCTCOG's Regional Stormwater Management Program (RSWMP), and one of these two received a

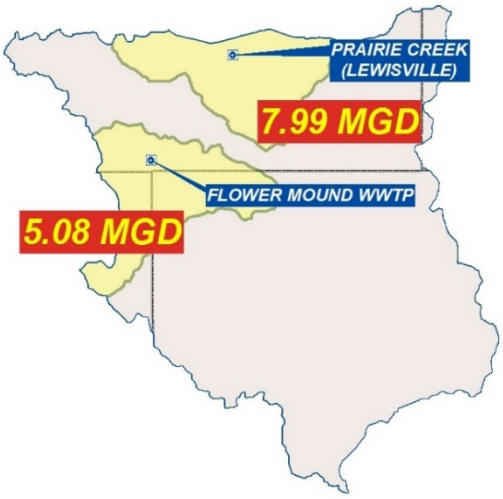
waiver from the permit requirements. The City of Irving is one of three Phase I communities within this watershed.




***Watershed Service Providers***

The Elm Fork Trinity watershed is primarily served by TRA Central WWTP and the Dallas Central and Southside facilities, with the UTRWD Lakeview and NTMWD Wilson Creek facilities at its margins.

***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***




The municipal wastewater discharged in the Elm Fork Trinity Watershed comes from two facilities, the Lewisville Prairie Creek WWTP at 7.99 MGD and the Flower Mound WWTP at 5.08 MGD. These figures are the average of average daily flows for the 2012 reporting year, for a total of 13.08 MGD. The majority of municipal wastewater generated in the watershed goes south to the TRA Central WWTP and the Dallas Central WWTP, which are both outside of the Elm Fork Trinity watershed. This is one of a few watersheds with slightly greater wastewater throughput than the previous year.

***Treatment Facility Capacity Utilization in the Elm Fork Trinity Watershed***

| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| FLOWER MOUND WWTP | 10.00 | 5.08 | 50.79% |
| PRAIRIE CREEK (LEWISVILLE) | 12.00 | 7.99 | 66.65% |
| **Watershed Totals** | **22.00** | **13.07** | **59.44%** |

***Watershed Stream Impairments***

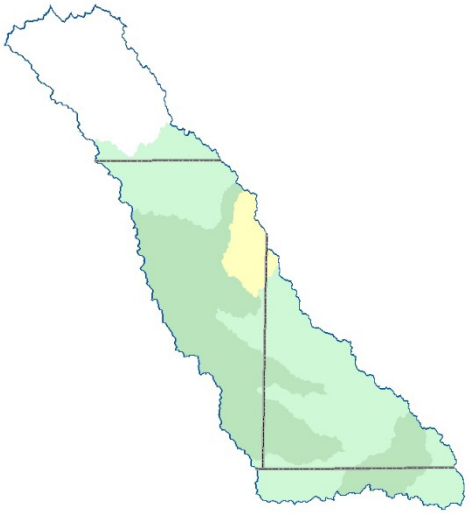
State studies indicate that two tributaries of the Elm Fork Trinity River are affected by high bacteria levels; Grapevine Creek and Cottonwood Branch and their watersheds include land in the cities of Grapevine, Coppell, and Irving, as well as the Dallas-Fort Worth International Airport.

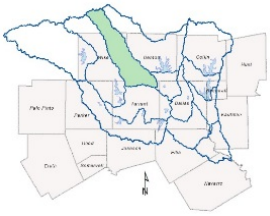
When pollutants such as bacteria reach high levels, the state, under the Clean Water Act, establishes a Total Maximum Daily Load (TMDL) for that particular water body or stream segment. TMDLs are the maximum amount or load of a pollutant that a water body can receive and still maintain its uses (recreation, fish/ wildlife habitat, etc.). The load is then allocated among the sources of pollution within the watershed and measures to reduce pollutant loads are developed as necessary. These measures are combined into an Implementation Plan, or I-Plan, and developing them is a group effort, requiring participation from cities, businesses, and interest groups.

***Reclaimed Water Use***

The UTRWD contracts with Denton County Fresh Water Supply District #1A to supply up to 2 million gallons per day (MGD) of treated effluent from the City of Lewisville wastewater treatment plant to the Castle Hills golf course in Carrollton for irrigation.

## GRAPEVINE LAKE WATERSHED





***Projected Growth by Watershed***

The Grapevine Lake Watershed is projected to have population growth in most of its 18 subwatersheds. From its current estimated population of 273,562 the watershed is projected to grow to 517,429 by 2040, an overall growth rate of 89%.In the Grapevine Lake watershed, which is less than 12% urbanized, very few entities are impacted by the Texas Pollutant Discharge Elimination System stormwater permit.

| Grapevine Lake Subwatersheds | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Black Creek-Denton Creek | 1,226 | 2,902 | 137% |
| Catlett Creek-Sweetwater Creek | 3,243 | 8,088 | 149% |
| Cottonwood Branch-Denton Creek | 57,847 | 137,277 | 137% |
| Denton Creek-Grapevine Lake | 11,934 | 18,993 | 59% |
| Dove Creek-Grapevine Lake | 46,546 | 61,061 | 31% |
| Elizabeth Creek-Denton Creek | 8,731 | 13,688 | 57% |
| Harts Creek-Denton Creek | 699 | 712 | 2% |
| Headwaters Elizabeth Creek | 14,986 | 43,416 | 190% |
| Henrietta Creek | 31,734 | 55,723 | 76% |
| Hog Branch-Denton Creek | 6,867 | 11,707 | 70% |
| Marshall Branch-Grapevine Lake | 35,103 | 71,957 | 105% |
| Middle Hickory Creek | 45,048 | 74,065 | 64% |
| Morris Branch-Denton Creek | 2,131 | 3,725 | 75% |
| North Pecan Creek-Denton Creek | 1,089 | 1,080 | -1% |
| Oliver Creek | 5,725 | 11,986 | 109% |
| Panther Creek-Denton Creek | 653 | 1,049 | 61% |
| **Watershed Totals** | **273,562** | **517,429** | **89%** |

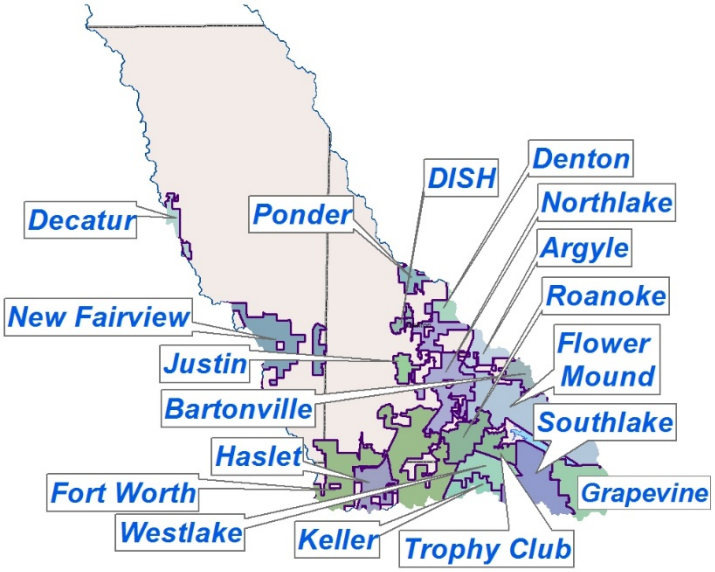
As population growth continues, the urbanized area will become larger. For now, the handful of cities in the watershed that have stormwater permits have to be mindful of impact to the lake and implement management programs to address this.

***Land Use***

In 2005 land use within the watershed was primarily agricultural; approximately 31% of the watershed was developed. By 2010, the developed portions of the watershed had increased to 44%.

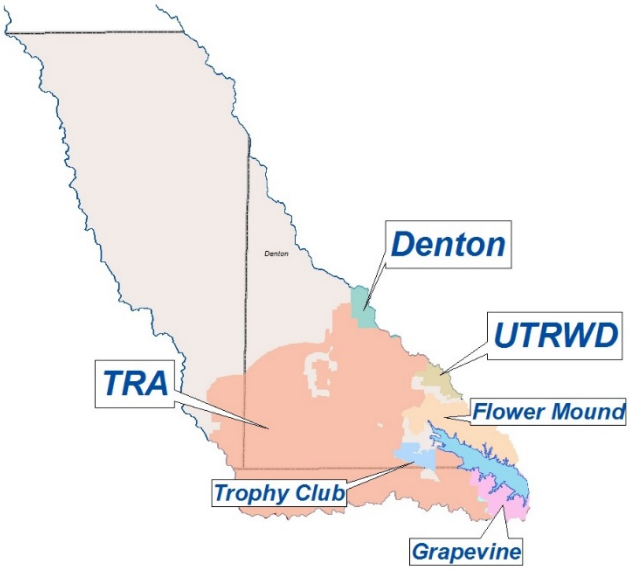
In 2005 Land Use within the watershed is primarily agricultural, with about 31% of the study area, limited to Wise, Tarrant and Denton Counties, showing developed uses. By 2010, the percentage of Urban Land Uses had increased to almost 44%.

The Grapevine Lake Watershed comprises 444,470 Acres, although the Watersheds at the northern reaches in Montague County are outside the Water Quality Management Planning area. Only 14.5% of the area for which we have data is currently urbanized.



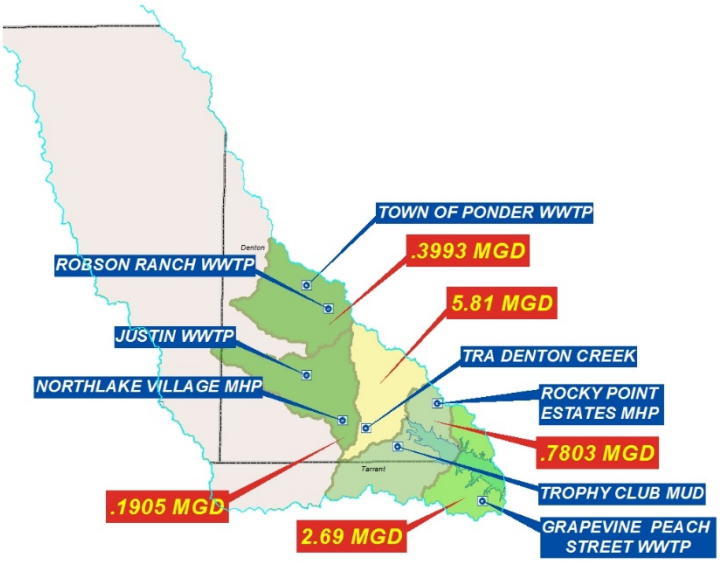

***Cities in Watershed***

The region includes all or part of 18 incorporated cities. Most of the cities are clustered in the southeast portion of the watershed, which is northwest of Grapevine Lake.




***Current Service Providers***

Wastewater treatment services are limited to the southern portion of the Lake Grapevine watershed, which generated about 9.9 MGD average daily flow in 2013. This represents a significant increase from the previous year (7.8 MGD), but in line with 2011's 9.14 MGD The majority of treated wastewater discharged in the watershed came from the Trinity River Authority Denton Creek facility, with about 5.8 MGD, and the Grapevine WWTP at 2.7 MGD.




***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***

The Grapevine Lake watershed includes nine permitted wastewater dischargers, with over 80 percent of the permitted and actual 2013 discharges for two treatment facilities adjacent to the lake–the Grapevine Peachtree Plant and the Trinity River Authority Denton Creek Plant. Although smaller plants such as Robson Ranch rapidly approach their permitted discharge limits, the larger facilities are operating at about 50% of current capacity.

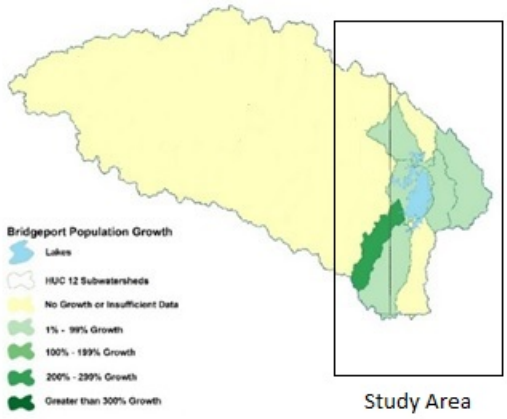
***Treatment Facility Capacity Utilization in the Grapevine Lake Watershed***

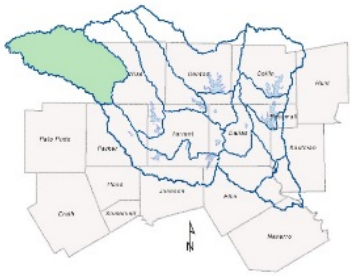
| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| JUSTIN WWTP | 0.4000 | 0.1804 | 45% |
| TOWN OF PONDER WWTP | 0.2250 | 0.1566 | 70% |
| ALTA VISTA MHP WWTP | 0.0080 | 0.0044 | 55% |
| ROBSON RANCH WWTP | 0.3750 | 0.2100 | 56% |
| NORTHLAKE VILLAGE MHP WWTP | 0.0250 | 0.0101 | 40% |
| TRA DENTON CREEK | 11.5000 | 5.8072 | 50% |
| TROPHY CLUB MUD WWTP | 1.7500 | 0.7803 | 45% |
| ROCKY POINT ESTATES MHP WWTP | 0.0600 | 0.0000 | 0% |
| GRAPEVINE PEACH STREET WWTP | 5.7500 | 2.6986 | 47% |
| **Watershed Totals** | **20.093** | **9.8476** | **49%** |

***Watershed Stream Impairments***

Grapevine Lake is a long impoundment on the Denton Creek section that ultimately drains to the Elm Fork of the Trinity River. Grapevine Lake is a U.S. Army Corps of Engineers Lake that also features significant use for flood control and recreation. While Grapevine Lake is used to some extent as a water supply reservoir, it does not contribute as much to the regional water supply as some of the other reservoirs. The cities of Grapevine and Dallas and Dallas County Park Cities are eligible to take a combined volume of 161,250 acre-feet from Grapevine Lake.

## LAKE BRIDGEPORT WATERSHED



***Projected Growth by Watershed***

Lake Bridgeport Watershed is the uppermost impoundment on the West Fork of the Trinity River. Lake Bridgeport has received attention from recent watershed studies conducted as part of the 2010 Trinity River Basin Environmental Restoration Initiative. These studies focused on the impacts of sediment and nutrient loads to all of the impoundments on the Upper West Fork Trinity River.

| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Boons Creek | 950 | 2,330 | 145.26% |
| Willow Creek | 1,530 | 2,097 | 37.06% |
| Jasper Creek | 682 | 1,000 | 46.63% |
| Beans Creek | *Not Projected* | | |
| Lake Bridgeport | 1,810 | 2,427 | 34.09% |
| Pecan Branch-West Fork Trinity River | 45 | 76 | 68.89% |
| Dry Creek-West Fork Trinity River | 6,222 | 7,757 | 24.67% |
| Big Creek-Lake Bridgeport | 622 | 1,361 | 118.88% |
| Venchoner Creek | 741 | 1,055 | 42.38% |
| Cottonwood Creek-Big Creek | 75 | 138 | 84.00% |
| **Watershed Totals** | **12,677** | **18,241** | **43.89%** |

***Land Use***

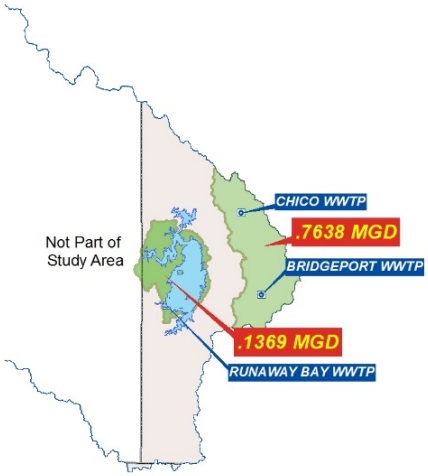
The watershed can be characterized as largely rural, with primarily ranchland and agricultural activities. Scattered coal mining and gravel pits have mostly reverted to undeveloped land.

***Watershed Cities***

Three of the four small cities in the Lake Bridgeport watershed provide wastewater service.

***Current Service Providers and 2012 Wastewater Discharges***

There are only four municipal wastewater treatment facilities in the Lake Bridgeport watershed. The Runaway Bay and Bridgeport facilities are adjacent to the lake, while the City of Jacksboro treatment plant is farther up in the watershed (and beyond our planning area). Wastewater discharges should not generate major impacts, although the level of nutrient loading may be an issue to consider in the future.



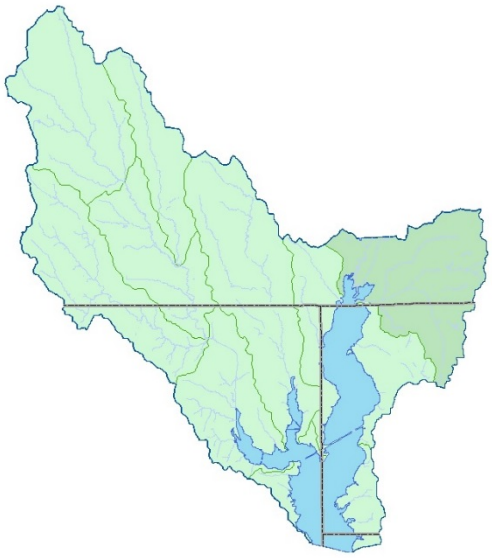

***Treatment Capacity Utilization in the Lake Bridgeport Watershed***

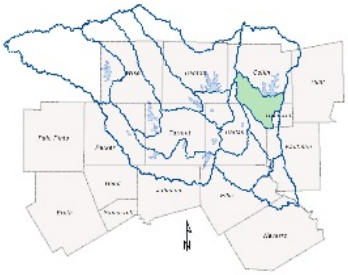
| Wastewater Treatment Plant | Permitted Average Daily Flow | Average Daily low 2013 | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| RUNAWAY BAY WWTP | 0.4 | 0.1369 | 34.23% |
| Jacksboro WWTP | N/A | N/A | N/A |
| BRIDGEPORT WWTP | 0.84 | 0.6489 | 77.25% |
| CHICO WWTP | 0.15 | 0.115 | 76.67% |
| **Watershed Totals** | **1.39** | **0.9008** | **64.81%** |

***Watershed Stream Impairments***

Sand and gravel pit operations could become significant contributors of sediment loading, but most are located in watersheds that drain to waterways below the Lake Bridgeport dam and not into the reservoir itself. Additional development in the watershed and recreational uses may contribute additional loading. The West Fork of the Trinity River below Bridgeport Reservoir is an impaired water, with high levels of bacteria.

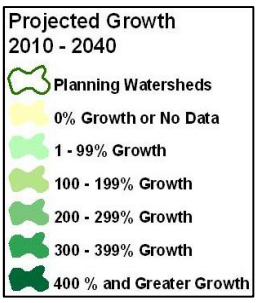
## LAKE RAY HUBBARD WATERSHED





***Projected Growth by Watershed***

The 9 subwatersheds of the Lake Ray Hubbard Watershed are projected to have average to above average growth, with the greatest changes in the Camp Creek and Brown Branch Watersheds surrounding Lavon to the northeast of the City of Rockwall. From ts current estimated population of 550,531 the region is projected to grow to 861,413 by 2040, an overall growth rate of 84.65%. Lake Ray Hubbard is the primary water supply reservoir on the East Fork Trinity River. It was originally designed to provide water to the North Texas region, with a storage capacity of approximately 490,000 acre-feet. In addition to water coming from its watershed and lake releases from Lavon Lake, Lake Ray Hubbard also receives water from lakes in East Texas—Lake Tawakoni and Lake Fork—with plans to connect with Lake Palestine in the near future. Lake Ray Hubbard therefore represents the cornerstone of water supply reservoirs for Dallas and the customers of the Dallas system.



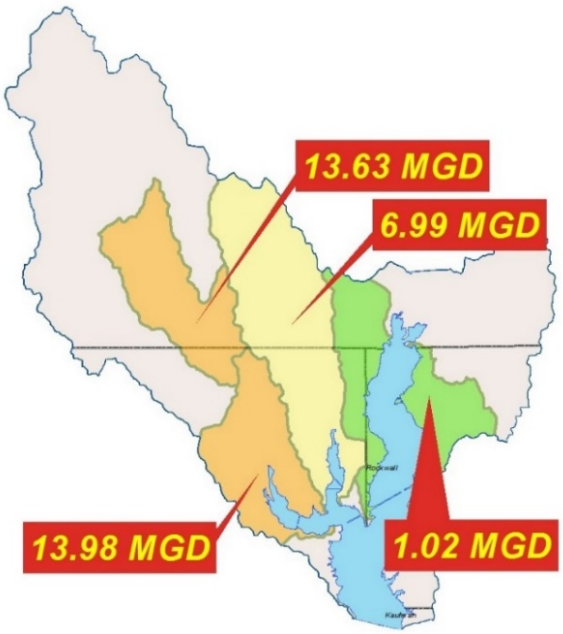

| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Camp Creek-Lake Ray Hubbard | 12105 | 34,570 | 185.58% |
| Cottonwood Creek-East Fork Trinity River | 65494 | 82,114 | 25.38% |
| Headwaters Rowlett Creek | 121,408 | 167,221 | 37.73% |
| Muddy Creek-Lake Ray Hubbard | 99,334 | 165,322 | 66.43% |
| Pittman Creek-Spring Creek | 155,361 | 187,872 | 20.93% |
| Rowlett Creek-East Fork Trinity River | 24,687 | 34,048 | 37.92% |
| Rowlett Creek-Lake Ray Hubbard | 93,253 | 95,765 | 2.69% |
| Town of Allen-Cottonwood Creek | 65,499 | 80,351 | 22.67% |
| **Watershed Totals** | **637,141** | **847,262** | **32.98%** |

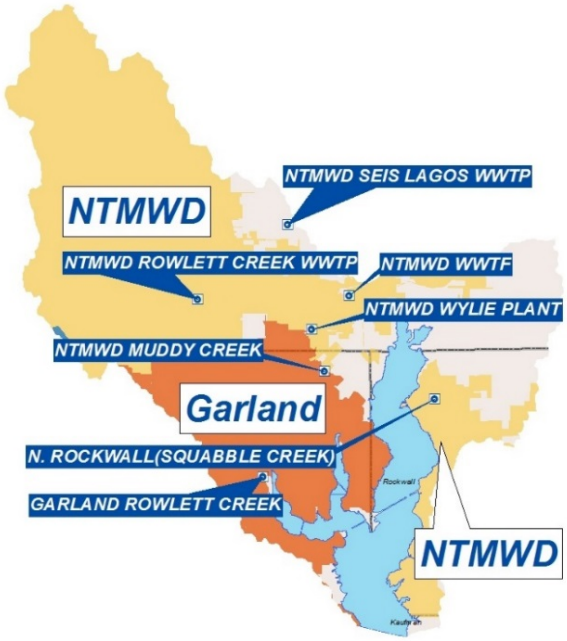
***Land Use***

Lake Ray Hubbard is a major drinking water source in North Central Texas and has nine cities in its watershed. The 193,036 Acre Lake Ray Hubbard Watershed is currently 91% urban land uses – the management of stormwater discharges is a major contributor to water quality.

***Watershed Cities***

The watershed includes all or part of 19 incorporated cities. The cities of Sachse, Wylie, Murphy, Parker, and St. Paul are entirely within the watershed while significant portions of Richardson, Plano, Allen, Frisco and Garland occupy nearly half the watershed. Most of the cities in this watershed fall in the Dallas-Fort Worth-Arlington urbanized area (UA) boundary and are actively participating in NCTCOG's Regional Stormwater Management Program. Garland and Plano are both "Phase I", which means because of their size they are required to follow a sampling program to demonstrate the quality of their stormwater runoff.




***Wastewater Discharges and Current Service Providers***

The Lake Ray Hubbard Watershed receives wastewater flows from seven WWTPs generating a total of 36 MGD on average for 2013. This represents about 57% of permitted Average Daily Flow overall. The northern portion of this watershed hosts five North Texas Municipal Water District WWTPs which generate

the majority of the watersheds wastewater flows, to which the Garland Rowlett Creek WWTP added 14 MGD on average during 2013.

***Treatment Facility Capacity Utilization in the Watershed***

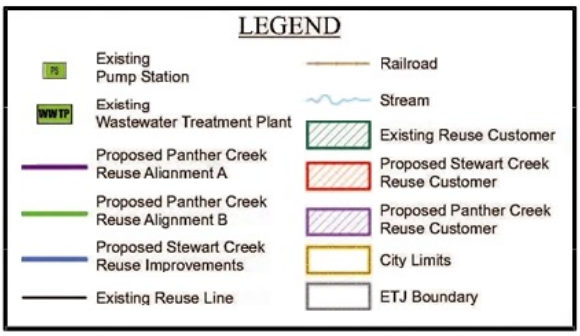
| Wastewater Treatment Plant | Permitted Average Daily Flow | Average Daily Flow 2013 | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| NTMWD ROWLETT CREEK WWTP | 16 | 13.63 | 85.19% |
| NTMWD SEIS LAGOS WWTP | 0.25 | 0.1817 | 72.68% |
| NTMWD WYLIE PLANT | *Retired* | | |
| NTMWD MUDDY CREEK REGIONAL WWTP | 20 | 6.82 | 34.10% |
| NORTH ROCKWALL(SQUABBLE CREEK) | 1.2 | 1.02 | 85.00% |
| GARLAND ROWLETT CREEK PLANT | 24 | 13.98 | 58.25% |
| NTMWD WWTF | 0.15 | 0 | 0.00% |
| **Watershed Totals** | **63.6** | **35.6317** | **56.02%** |

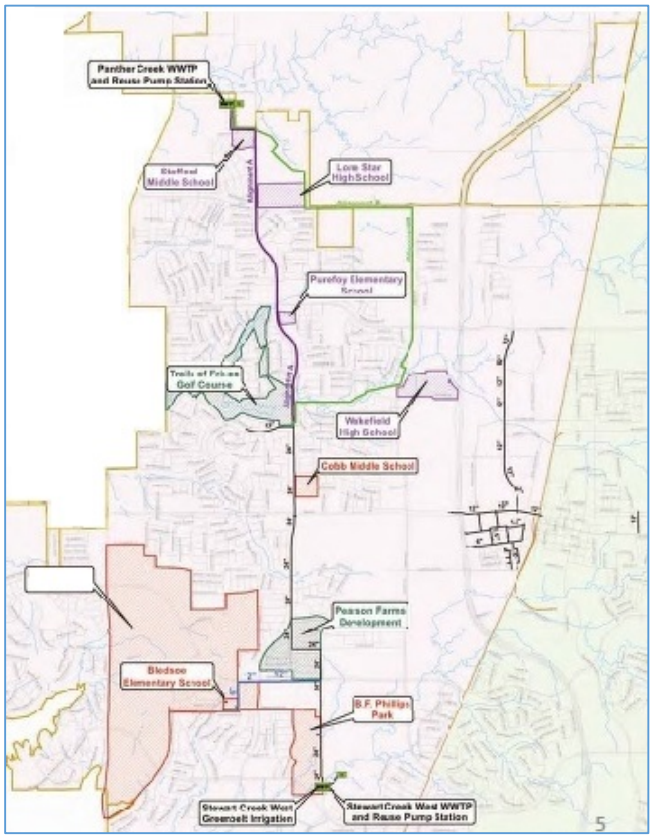
***Watershed Stream Impairments***

There are currently no impaired waters in the Lake Ray Hubbard watershed.

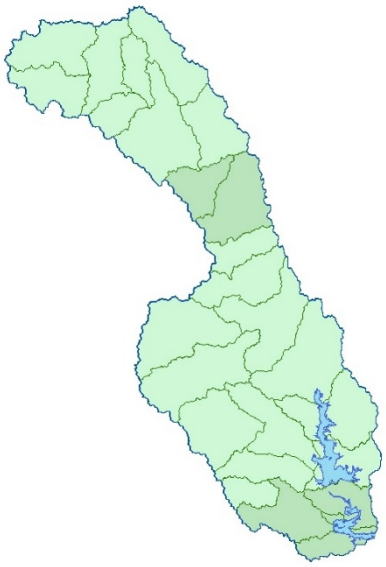
***Watershed Wastewater Recycling***

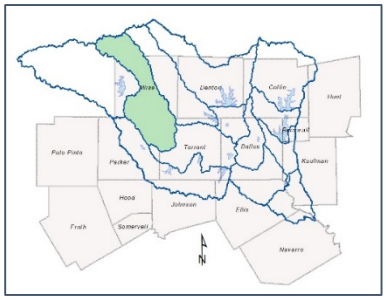
The City of Frisco uses a portion of the effluent of both the Panther Creek and Stewart Creek Wastewater Treatment Plants for irrigation at area golf courses and public facilities. The figure to the right diagrams the flow of reclaimed water to its final users.



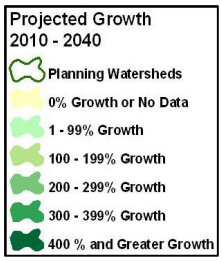
## LAKE WORTH / EAGLE MOUNTAIN LAKE WATERSHED





***Projected Growth by Watershed***

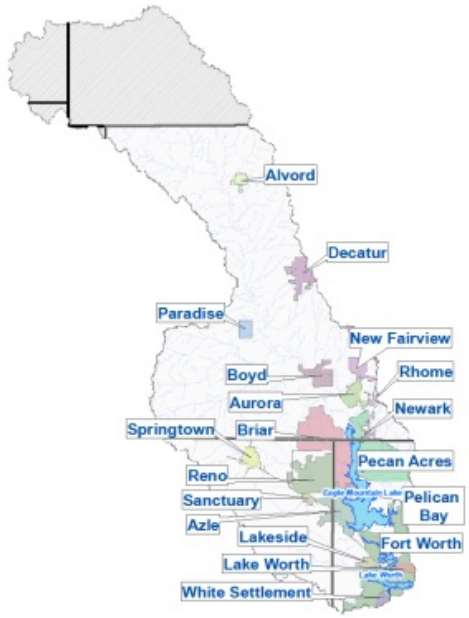
Lake Worth is the impoundment of the West Fork Trinity River in Fort Worth. It was constructed in 1914 by Fort Worth for water supply. Lake Worth and Eagle Mountain Lake operate in tandem to contribute significant drinking water resources for the Fort Worth system. Eagle Mountain Lake is owned by the Tarrant Regional Water District (TRWD). The TRWD is permitted to divert approximately 160,000 acre-feet of water annually for municipal and irrigation purposes.




The Lake Worth Watershed is projected to enjoy above-average growth in most of its 21 Watersheds, with growth rate generally decreasing to the north of the watershed. From its current estimated population of 155,449, the region is projected to grow to 281,311 by 2040, an overall growth rate of 80.97%. Two subwatersheds, Lower Brushy Creek and Waggoner Branch, are projected to experience little to no growth during the same period.

| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Ash Creek | 13,325 | 18,875 | 41.65% |
| Blue Creek- Eagle Mountain Lake | 9,964 | 14,430 | 44.82% |
| Briar Branch- Big Sandy Creek | 1,950 | 4,615 | 136.67% |
| Chicken Creek- Big Sandy Creek | 2,057 | 4,869 | 136.70% |
| Cowskin Creek- Big Sandy Creek | 148 | 229 | 54.73% |
| Dosier Creek- Eagle Mountain Lake | 18,691 | 27,533 | 47.31% |
| Garrett Creek | 3,919 | 4,430 | 13.04% |
| Headwaters Silver Creek | 3,469 | 6,095 | 75.70% |
| Live Oak Creek | 18,366 | 44,801 | 143.93% |
| Lower Brushy Creek | 1,519 | 1,550 | 2.04% |
| Lower Walnut Creek | 18,430 | 28,885 | 56.73% |
| Martin Branch | 4,882 | 6,706 | 37.36% |
| Pringle Creek- Big Sandy Creek | 1,392 | 1,507 | 8.26% |
| Salt Creek | 5,219 | 6,724 | 28.84% |

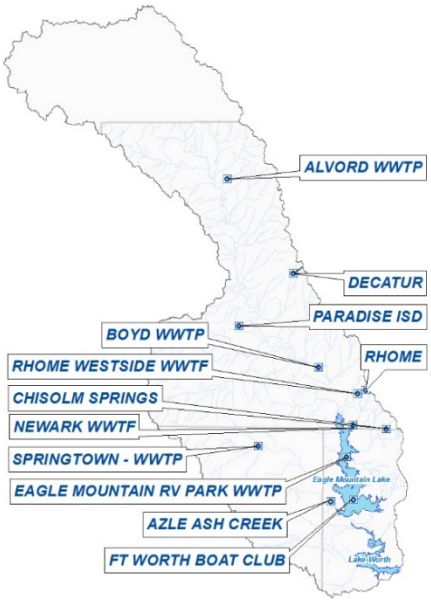
| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Silver Creek- Lake Worth | 11,275 | 25,808 | 128.90% |
| Upper Walnut Creek | 12,009 | 18,734 | 56.00% |
| Waggoner Branch- Big Sandy Creek | 4,317 | 3,456 | -19.94% |
| Walnut Creek- West Fork Trinity River | 4,559 | 5,958 | 30.69% |
| West Fork Trinity- Lake Worth | 19,958 | 56,106 | 181.12% |
| **Watershed Total** | **155,449** | **281,311** | **80.97%** |




***Cities in Watershed***

The Lake Worth / Eagle Mountain Lake Watershed encompasses 567,829 acres, of which 505,424 acres are within the planning area. (The watersheds at the northern reaches in Montague and Clay Counties are outside the planning area.)

57,368 acres ,11.35% of the total study area are devoted to urban land uses. The watershed includes all or part of 16 incorporated cities, and 2 Census Defined Places, Briar CDP and Pecan Acres CDP. Small portions of Weatherford and Fort Worth, as well as all or most of Lake Worth, Lakeside, Springtown, Aurora, Rhome, Boyd, Paradise, Decatur, and Alvord are cities in this primarily rural watershed.




***Current Service Providers***

The upper reaches of the Lake Worth / Eagle Mountain Lake Watershed are served by individual municipal systems in Chico, Alvord, Boyd, Springtown and Decatur. Below Lake Worth a significant area is served by Fort Worth, and a smaller part by Trinity River Authority's Denton Creek facility.

***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***

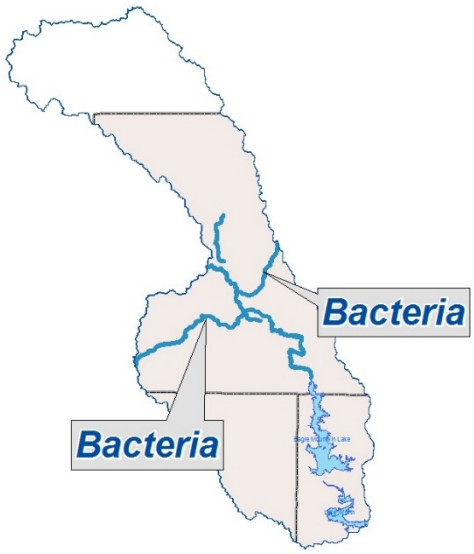
The Lake Worth - Eagle Mountain Lake Watershed receives the discharges of 12 small wastewater treatment facilities, with only 1 approaching a million gallon per day average in 2012: Azle Ash Creek WWTP at .896 MGD. Paradise ISD, Eagle Mountain RV Park, Rhome Westside and Boyd are all exceeding their permitted capacity according to the available records, with a total average daily volume of 23,900 gallons per day. The exceedance amounts to about 1% of average daily flow in the watershed.

***Treatment Facility Capacity Utilization in the Watershed***

| Wastewater Treatment Plant | Permitted Average Daily Flow | Average Daily Flow 2013 | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| PARADISE ISD WWTF | 0.03 | 0.033 | 110.00% |
| SPRINGTOWN - WWTP | 0.48 | 0.3225 | 67.19% |
| DECATUR WWTP | 1.2 | 0.6732 | 56.10% |
| EAGLE MOUNTAIN RV PARK WWTP | 0.006 | 0.012 | 200.00% |
| FORT WORTH BOAT CLUB WWTF | 0.0158 | 0.009 | 56.96% |
| NEWARK WWTF | 0.1 | 0.0848 | 84.80% |
| RHOME WESTSIDE WWTF | 0.15 | 0.1553 | 103.53% |
| RHOME | 0.08 | 0 | 0.00% |
| ALVORD WWTP | 0.112 | 0.1036 | 92.50% |
| BOYD WWTP | 0.12 | 0.1296 | 108.00% |
| CHISHOLM SPRINGS WWTP | 0.225 | 0.0333 | 14.80% |
| AZLE ASH CREEK WWTP | 2.45 | 0.896 | 36.57% |
| **Watershed Totals** | **4.9688** | **2.4523** | **49.35%** |

***Watershed Stream Impairments***

Currently, bacteria in the West Fork of the Trinity River and its tributaries are at levels that require their inclusion in the 303(d) list of impaired waters. Just downstream of Lake Worth, the West Fork is listed for high levels of Dioxin and PCBs.




The levels of polychlorinated biphenyl's (PCB's) in fish tissue have made fish from Lake Worth off limits for consumption since 2000. The Texas Commission on Environmental Quality issued a Total Maximum Daily Load (TMDL) for PCBs that went into effect August 23, 2006. Even though PCBs have not been manufactured or used in the United States for decades, PCB contamination leaching from lake and stream sediments will continue for years.

An implementation plan (I-Plan) for the Total Maximum Daily Load for polychlorinated biphenyls (PCBs) in fish tissue in Lake Worth has been

approved by the Texas Commission on Environmental Quality. This I-Plan was developed to reduce concentrations of PCBs in fish tissue to a level that allows the Texas Department of State Health Services (DSHS) to lift its advisory on the consumption of fish from Lake Worth. An advisory against consuming blue catfish, channel catfish, and smallmouth buffalo from Lake Worth was issued by the DSHS on November 15, 2010 due to elevated levels of PCBs along with the insecticides aldrin and dieldrin in fish samples collected from the lake. This advisory replaced a 2000 advisory that warned against consuming all species of fish.

**Lake Worth Vision Plan**

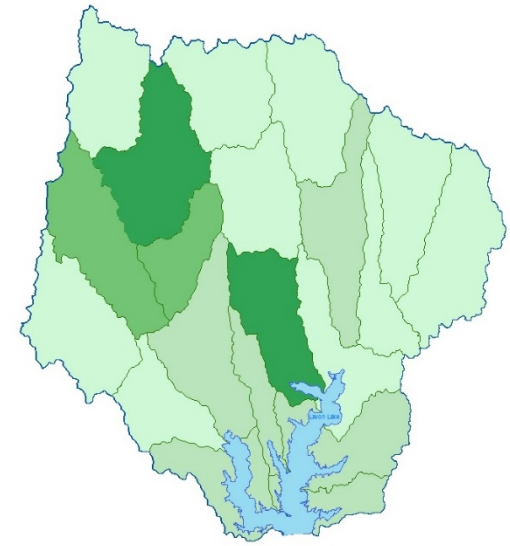
The Fort Worth City Council adopted the Lake Worth Vision Plan on May 10, 2011. The Lake Worth Vision Plan describes and depicts the most appropriate future land use, development patterns and forms, recreational use, and facilities on and around Lake Worth. The Plan is based on the following four principles to guide future decision-making for Lake Worth.

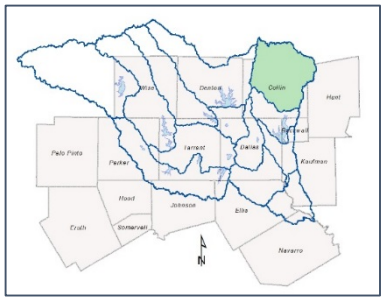
- Protect and enhance Lake Worth's water quality, natural beauty, and recreational character.
- Develop Model Sustainable Communities in the Lake Worth area that create desirable places to live and work while enhancing livability of existing communities.
- Create Lake Worth Regional Park, a linear park that encompasses the lake and provides high-quality recreational amenities and cultural hubs.
- Connect communities, resources, and amenities with parkways, greenways, and trails.

**Eagle Mountain Lake Watershed Protection Plan**

The Tarrant Regional Water District (TRWD) and Texas AgriLife Research and Extension Service are working together with watershed stakeholders to develop a Watershed Protection Plan for the Eagle Mountain Lake watershed. The development of this plan was initiated in 2008 in response to future concerns over nutrient and sediment loadings in the lake. TRWD and Texas AgriLife seek to change landowners' management practices to reduce these pollutant loadings in Eagle Mountain Lake.

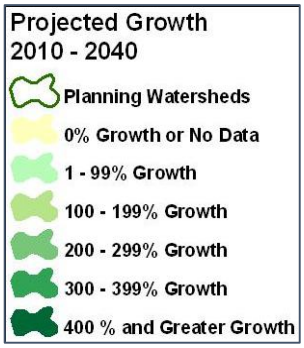
## LAVON LAKE WATERSHED




***Projected Population Growth, 2013 – 2040***

Lake Lavon was constructed by the Army Corp of Engineers in 1954 for flood control and water conservation. The purpose of Lake Lavon is to provide protection to the East Fork of the Trinity River with a 35 year occurrence flood protection. At total storage capacity, Lake Lavon holds 245 billion gallons of water. The Lake Lavon Watershed is projected to enjoy above-average growth in most of its 19 Watersheds, with particularly robust growth rates in Headwaters Little Elm Creek, Stiff Creek and Whites Creek Watersheds. From its current estimated population of 335,336, the region is projected to grow to 794,494 by 2040, an overall growth rate of 137%. No Watersheds are projected to lose population during the same period. This watershed is among the four watersheds in the study area that are projected to provide 25% of the regions 2010 to 2040 growth, adding about 459,000 additional people.

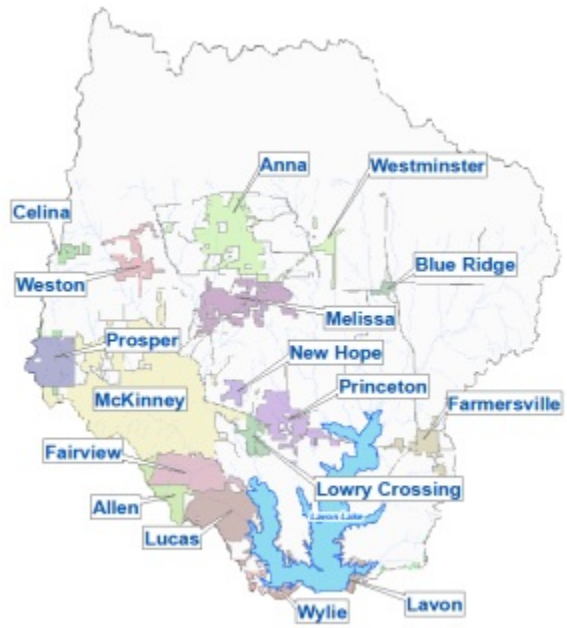



| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Clemons Creek-E. Fork Trinity River | 24,239 | 64,792 | 167.30% |
| Desert Creek-Pilot Grove Creek | 3,349 | 6,709 | 100.33% |
| Elm Creek-Lavon Lake | 8,728 | 25,419 | 191.24% |
| Headwaters Little Elm Creek | 842 | 1,425 | 69.24% |
| Headwaters Sister Grove Creek | 3,942 | 7,564 | 91.87% |
| Honey Creek | 7,541 | 26,674 | 253.72% |
| Lower Wilson Creek | 58,399 | 88,632 | 51.77% |
| Muddy Creek-Lake Ray Hubbard | 99,334 | 165,322 | 66.43% |
| Pot Rack Creek-Indian Creek | 1,457 | 2,127 | 45.98% |
| Price Creek-Lavon Lake | 4,254 | 10,852 | 155.10% |
| Sister Grove Crk-Pilot Grove Crk | 4,427 | 7,437 | 67.99% |

| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Pot Rack Creek-Indian Creek | 1,457 | 2,127 | 45.98% |
| Price Creek-Lavon Lake | 4,254 | 10,852 | 155.10% |
| Sister Grove Crk-Pilot Grove Crk | 4,427 | 7,437 | 67.99% |
| Stiff Creek-Sister Grove Creek | 5,439 | 23,848 | 338.46% |
| Throckmorton Crk-E. Fork Trinity | 10,879 | 33,364 | 206.68% |
| Ticky Creek-Lavon Lake | 10,439 | 24,643 | 136.07% |
| Town of Allen-Cottonwood Creek | 65,499 | 80,351 | 22.68% |
| Town of Celina-Little Elm Res. | 4,282 | 12,224 | 185.47% |
| Upper Wilson Creek | 58,171 | 102,942 | 76.96% |
| White Rock Creek-Lavon Lake | 23,884 | 53,633 | 124.56% |
| Whites Crk-East Fork Trinity | 2,620 | 16,748 | 539.24% |
| **Watershed Total** | 397,725 | 754,706 | 89.76% |

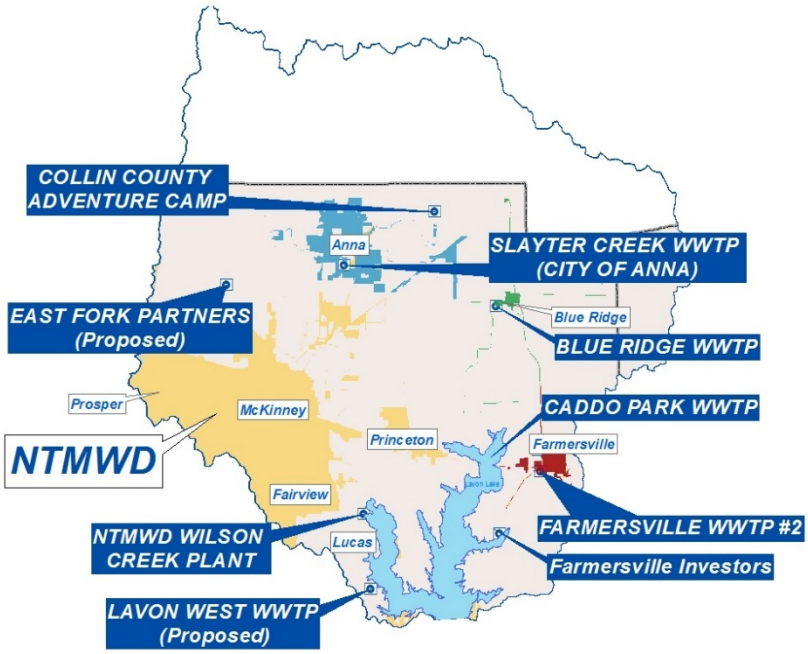
***Land Use***

Land use throughout the watershed is predominantly agricultural / undeveloped, interspersed with small cities. The southwestern portion of the watershed is currently primarily urbanized, and from this area population growth spreads to the north, on both the east and west sides of Lake Lavon. The Lake Lavon Watershed encompasses 491,719 acres, of which about 200,671 acres (41%) were devoted to urban land uses in 2010. The subwatersheds at the northern reaches of the watershed are in Grayson and Fannin Counties, outside the planning boundary.




***Cities in Watershed***

The Lake Lavon Watershed includes all or part of 17 incorporated cities. The subwatersheds projected to experience the greatest growth surround the cities of Anna and Melissa, and the area east of Princeton and north of Lake Lavon.

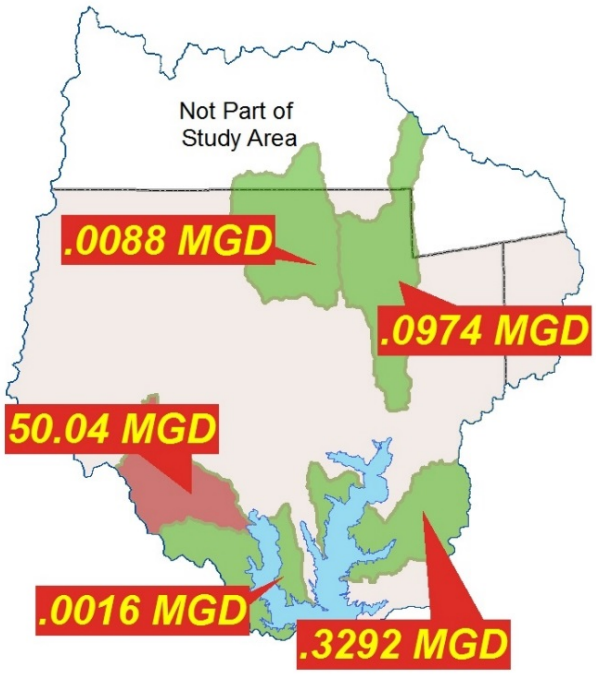



***Current Service Providers***

The Lake Lavon Watershed is served by a number of North Texas Municipal Water District facilities including Wilson Creek, Anna and Farmersville. In addition to these facilities there are 3 campgrounds operating their own wastewater treatment facilities.

***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***

The Lake Lavon Watershed receives the discharges of at least 7 WWTPs, of which 3 are small park plants. There are 2-3 additional wastewater treatment facilities planned, although the largest proposed facility, the planned 2.5 MGD East Fork Partners plant in Weston, may join the North Texas Municipal Water District. The only sarge wastewater treatment plant discharging in the Lake Lavon Watershed is NTMWD's Wilson Creek Plant.



***Treatment Facility Capacity Utilization in the Watershed***

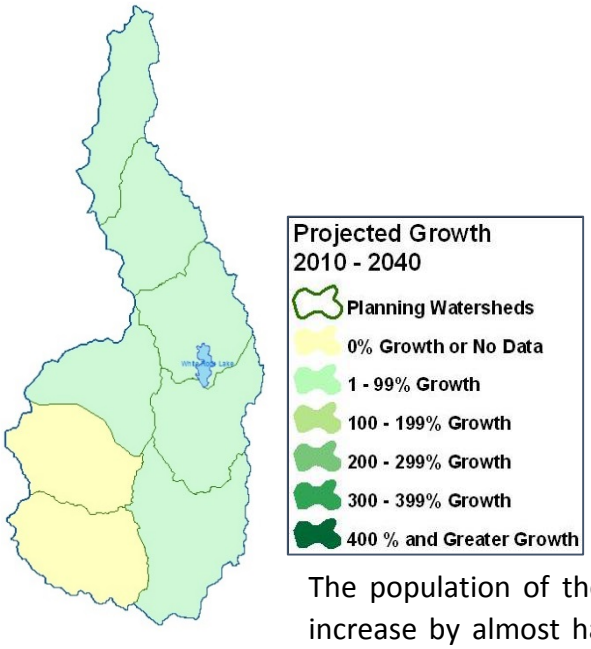
| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| NTMWD Wilson Creek WWTP | 64 | 50.0449 | 78.20% |
| BLUE RIDGE WWTP | 0.28 | 0.0974 | 37.74% |
| FARMERSVILLE WWTP #2 | 0.53 | 0.3292 | 85.92% |
| FARMERSVILLE WWTP | 0.2250 | Permit Effective but no flow since 2007 | |
| FARMERSVILLE INVESTORS WWTP (PROPOSED) | 0.0000 | Outfall listed, but no flow | |
| EAST FORK PARTNERS (PROPOSED) | 2.5000 | Proposed, but appears will go to NTMWD | |
| **Watershed Totals** | **67.535** | **50.4715** | **74.73%** |

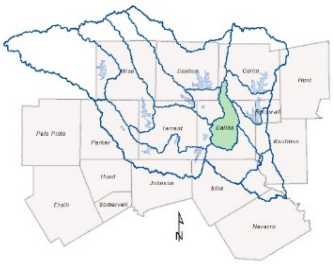
***Watershed Stream Impairments***

From 2000 to 2002, Lake Lavon was listed on the Texas Commission on Environmental Quality's 303d impaired list for Atrazine. The issue was solved when Texas State Soil and Water Conservation Board along with Collin County Soil and Water Conservation Board implemented a variety of best management practices in the surrounding watershed. The remediation was very successful and Lavon was delisted for Atrazine in 2004.

Other concerns in 2002 and 2004 were depressed dissolved oxygen and levels of nitrate + nitrite nitrogen in certain parts of the lake. These are concerns but there is not sufficient information to require a Maximum Daily Load (TMDL)

## TRINITY HEADWATERS WATERSHED



***Projected Population Growth, 2013 - 2040***

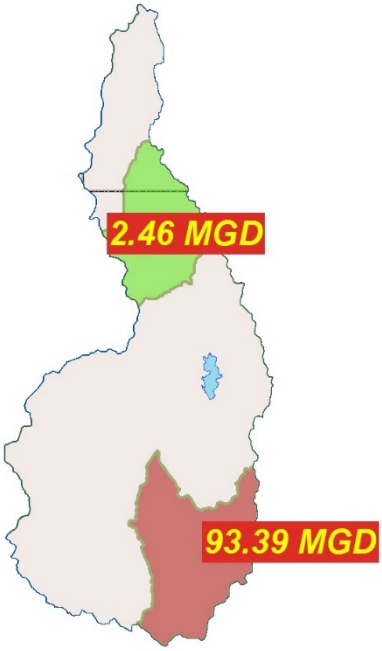
The Trinity River Headwaters watershed is so called because it begins the main stem of the Trinity River, just past the junction of the Elm and the West Forks of the Trinity. This watershed also receives the drainage from White Rock Lake.

The population of the Trinity Headwaters Watershed is projected to increase by almost half in seven of its eight Watersheds. From its current estimated population of 1,210,497, the region is projected to grow to 1,567,666 by 2040, an overall growth rate of 29.51%. Two subwatersheds are projected to lose population during this period, although at about 1% each the effect is minimal. Because of the current high population density in this watershed, it is not surprising that the Trinity Headwaters is one of four watersheds that are projected to provide 25% of the regions 2013 to 2040 growth. The Trinity Headwaters is projected to contribute about 357,169 additional people.

| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Growth 2013 - 2040 |
|---|---|---|---|
| City of Dallas-White Rock Creek | 158,860 | 202,223 | 27.30% |
| Headwaters Fivemile Creek | 140,335 | 139,382 | -0.68% |
| Five Mile Creek-Trinity River | 90,936 | 112,522 | 23.74% |
| Turtle Creek-Trinity River | 163,655 | 161,394 | -1.38% |
| Headwaters Turtle Creek | 159,512 | 228,287 | 43.12% |
| White Rock Creek-White Rock Lake | 196,588 | 302,076 | 53.66% |
| Floyd Branch-White Rock Creek | 163,784 | 218,127 | 33.18% |
| Headwaters White Rock Creek | 136,827 | 203,655 | 48.84% |
| **Watershed Totals** | **1,210,497** | **1,567,666** | **29.51%** |

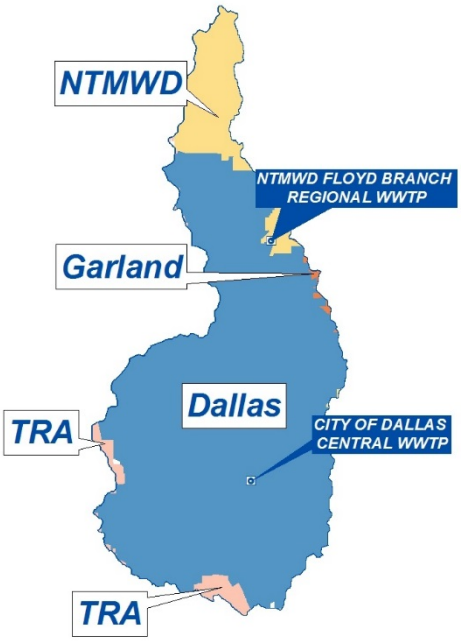
***Cities in Watershed***

The City of Dallas occupies the majority of the watershed, with portions of 11 other cities making up the rest of the watershed.




***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***

The watershed's two wastewater treatment facilities generated a total average daily flow of 96 MGD during 2013. This represents 62% of the watershed's permitted 155 MGD average daily flow.




***Current Service Providers***

The Trinity Headwaters are served entirely by NTMWD, TRA and the City of Dallas Central and Southside WWTPs. The City of Garland provides wastewater treatment to a sliver of territory along the eastern edge of the watershed.

***Treatment Capacity Utilization in the Region***

| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| NTMWD FLOYD BRANCH WWTP | 4.75 | 2.46 | 51.79% |
| DALLAS CENTRAL WWTP | 150 | 93.39 | 62.26% |
| **Watershed Totals** | **154.75** | **95.85** | **61.94%** |

***Watershed Stream Impairments***

State studies indicate that the headwaters of the Trinity River, also known as the Upper Trinity (Segment 0805), are impacted by high bacteria levels along a section that runs from the confluence of the Trinity's West Fork and Elm Fork in Dallas, downstream to Five Mile Creek and its confluence with the Trinity. Since the City of Dallas occupies most of the area within this segment's watershed, its stormwater program and implementation of best management practices have the greatest influence on reducing pollutants from runoff. The cities of University Park, Highland Park, and Cockrell Hill are also located along this segment.

**A TMDL Project for Bacteria**

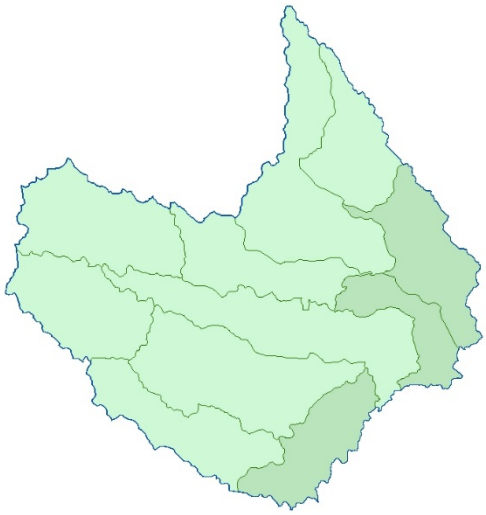
Bacteria concentrations are occasionally elevated in portions of the Upper Trinity River that flow through Dallas. High concentrations of bacteria may pose a risk to people who swim or wade in them—activities called "contact recreation" in the state's standards for water quality. The impairment of the contact recreation use in Segment 0805 applies to only two assessment units at the upper end of the segment. The goal of this project is to reduce bacteria concentrations to within acceptable risk levels for contact recreation by developing total maximum daily loads (TMDL). A TMDL is like a budget for pollutants. It estimates the amount of a pollutant that a water body can receive and still support its designated uses. In December 2013, the "Implementation Plan (I-Plan) for Seventeen Total Maximum Daily Loads for Bacteria in the Greater Trinity River Region" was approved by TCEQ Commissioners. The I-Plan describes what will be done to reduce the levels of bacteria in streams that are included on the 303(d) list for bacteria, and the reduced levels that are to be achieved are called Total Maximum Daily Loads (TMDLs). This project is being coordinated with two closely related bacteria problems in North Central Texas—the Lower West Fork Trinity River and the Cottonwood Branch and Grapevine Creek projects.

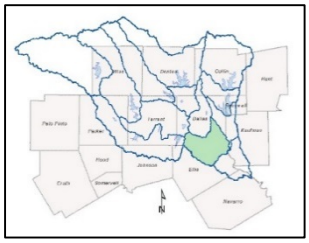
**A TMDL Project for PCBs**

Segment 0805 (Upper Trinity River) is one of four segments impaired for PCBs. The goal of this project is to reduce PCBs in fish tissue so that it is safe to eat fish caught in the affected segments through development of total maximum daily loads (TMDL). The load is allocated among the sources of pollution within the watershed, and measures to reduce pollutant loads are developed as necessary. A TMDL is part of the state's Water Quality Management Plan after it is adopted by the TCEQ and approved by the U.S. Environmental Protection Agency.

Beginning in September 2014, TCEQ has tasked NCTCOG with facilitating the effort to develop an I-Plan for the PCB impairment. Development of an I-Plan for PCBs is likely to prove challenging since PCBs were banned in 1976, leaving few potential current sources. PCBs may be present in sediments or on surfaces slowly leaching or releasing them into stormwater or groundwater.

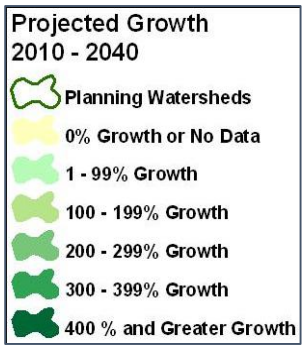
## TEN MILE CREEK, RED OAK CREEK WATERSHED





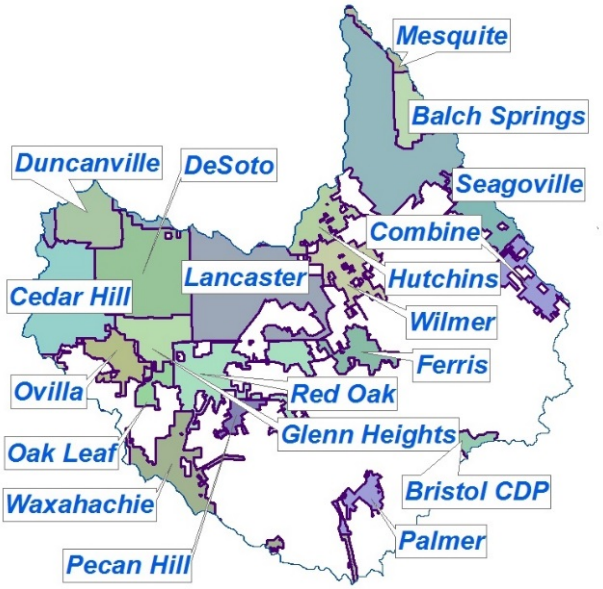
***Projected Population Growth, 2013 – 2040***

The Ten Mile Creek and Red Oak Creek watershed drains across southern Dallas and northern Ellis Counties. It is comprised of a group of tributaries to the Trinity River below Dallas, as well as the Main Stem of the Trinity River running through southeast Dallas County.



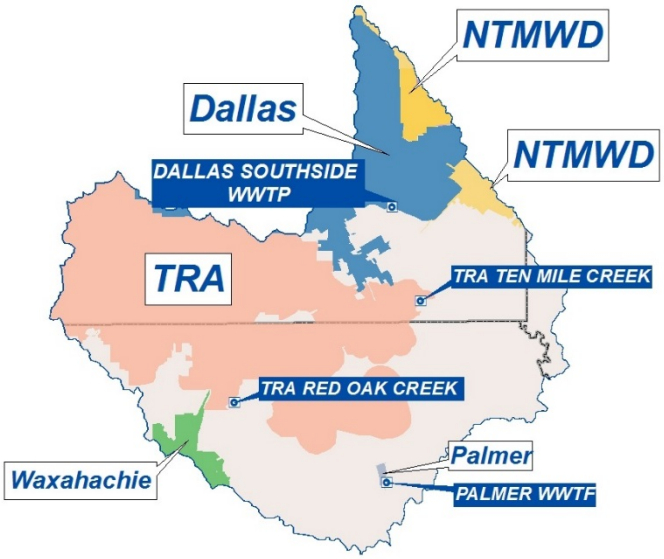

This watershed is projected to experience growth in all 11 subwatersheds, with a 160% growth rate in sparsely populated Lower Red Oak Creek Watershed. From its current estimated population of 416,949, the region is projected to grow to 501,779 by 2040, an overall growth rate of 21%. No watersheds are projected to lose rate of population during the same period.

| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Growth 2013 - 2040 |
|---|---|---|---|
| Deep Branch-Tenmile Creek | 26,138 | 42,099 | 61.06% |
| Headwaters Red Oak Creek | 41,935 | 54,202 | 29.25% |
| Headwaters Tenmile Creek | 131,634 | 144,164 | 9.52% |
| Hickory Creek-Parsons Slough | 50,541 | 55,848 | 10.50% |
| Lower Grove Creek | 3,660 | 7,567 | 106.75% |
| Lower Red Oak Creek | 2,361 | 6,139 | 160.03% |
| Middle Red Oak Creek | 30,123 | 42,101 | 39.76% |
| Parsons Slough-Trinity River | 7,205 | 14,595 | 102.57% |
| Prairie Creek-Trinity River | 89,092 | 93,886 | 5.38% |
| Upper Grove Creek | 9,942 | 11,962 | 20.32% |
| Upper Red Oak Creek | 24,318 | 29,216 | 20.14% |
| **Watershed Totals** | **416,949** | **501,779** | **20.68%** |




***Watershed Cities***

There are portions of 19 cities in the Ten Mile Creek and Red Oak watersheds. The cities in the watershed are primarily suburban, but it also contains several rural cities

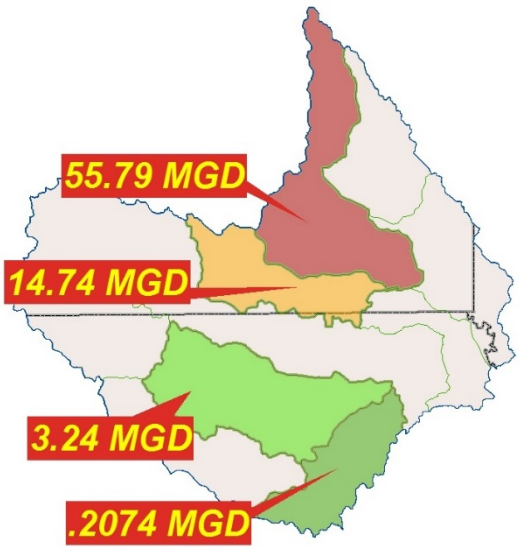



***Current Service Providers***

Ten Mile Creek and Red Oak Creek watershed are currently served by the Trinity River Authority's Ten Mile Creek and Red Oak Creek facilities, by the City of Dallas Southside WWTP, and by municipal systems in Waxahachie and Palmer.

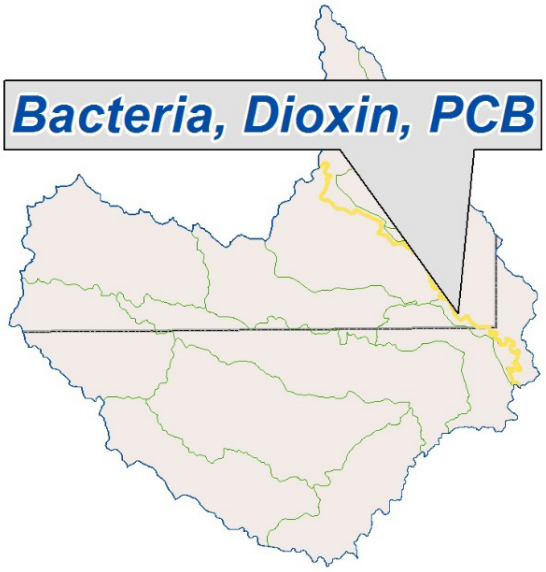
***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***

The largest wastewater discharges in this watershed occured in the Prairie Creek subwatershed (56 MGD) and the Deep Branch/Ten–Mile Creek subwatershed (15 MGD) during 2013.



***Treatment Capacity Utilization in the Region***

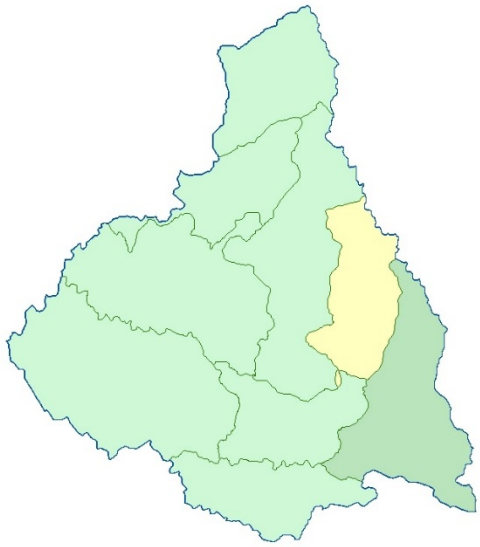
| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| TRA RED OAK CREEK REGIONAL WWT | 6 | 3.24 | 54.00% |
| PALMER WWTF | 0.23 | 0.2074 | 90.17% |
| SOUTHSIDE WWTP (DALLAS) | 110 | 55.79 | 50.72% |
| TRA TEN MILE CREEK | 24 | 14.74 | 61.42% |
| Watershed Totals | 140.23 | 73.9774 | 52.75% |

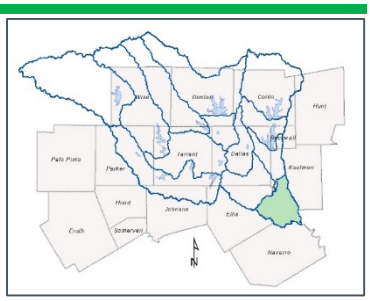



***Watershed Stream Impairments***

From a point immediately upstream of the confluence of the Cedar Creek Reservoir discharge canal in Henderson/Navarro County to a point immediately upstream of the confluence of Elm Fork Trinity River in Dallas County, Upper Trinity River consolidates contaminants from its tributaries, and continues to remain impaired throughout its course through the watershed. This segment of the Trinity River is included under the Bacteria TMDL I-Plan, and will be a part of the eventual program for PCB abatement.

## TRINITY BELOW DALLAS WATERSHED





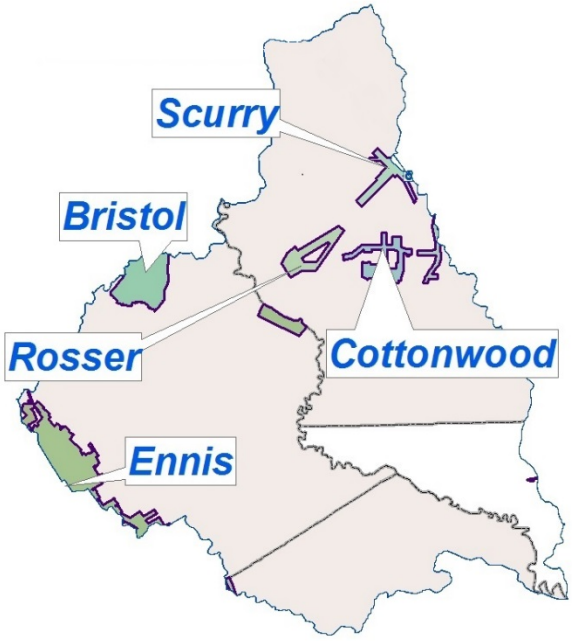

***Projected Population Growth, 2013 - 2040***

The Trinity below Dallas Watershed is not densely populated, and although the percentage of population increase is projected to be 47% between 2013 and 2040, that will only amount to about 20,000 additional people at 2040.

The small cities in the watershed are expected to grow modestly, with the principal impact of

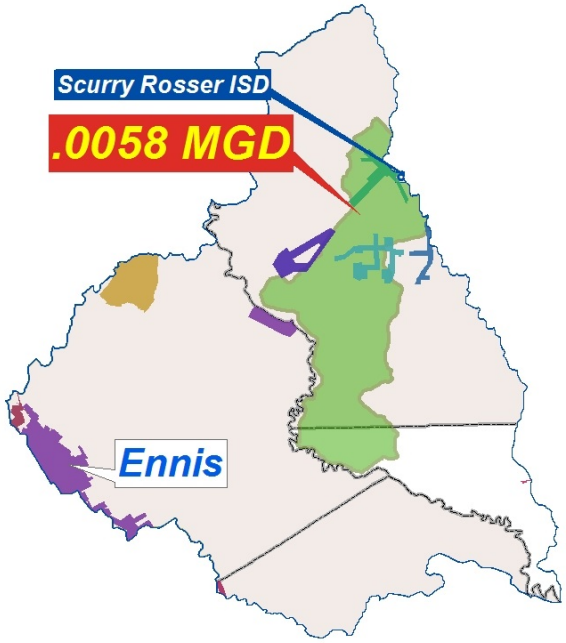
| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Growth 2013 - 2040 |
|---|---|---|---|
| Town of Chatfield-Grays Creek | 693 | 1,185 | 71.00% |
| Bois d'Arc Creek-Trinity River | 9,964 | 14,561 | 46.14% |
| Walker Creek-Village Creek | 9,831 | 11,372 | 15.67% |
| Caney Creek-Trinity River | 2,060 | 5,223 | 153.57% |
| Smith Creek-Trinity River | 1,742 | 2,281 | 30.94% |
| Headwaters Bois d'Arc Creek | 3,664 | 3,334 | -9.01% |
| Old Channel East Fork Trinity River-Trinity River | 1,390 | 2,735 | 96.76% |
| Coal Iron Creek-Cottonwood Creek | 3,038 | 5,271 | 73.50% |
| Headwaters Old Channel [East Fork Trinity River] | 3,133 | 6,249 | 99.46% |
| **Watershed Totals** | **35,515** | **52,211** | **47.01%** |

wastewater flows coming from onsite sewage systems.




***Watershed Cities***

The Trinity River below Dallas Watershed is sparsely populated. Ennis is the principal city in the watershed, along with all or parts of rural cities of Cottonwood, Scurry, Rosser, and Bristol.




***Current Service Providers***

Only the Scurry-Rosser ISD and the Ennis Oak Grove WWTP serve the Trinity below Dallas Watershed area. Of these two, only Scurry-Rosser ISD's discharge is within the Trinity below Dallas Watershed. The Ennis service area extends into the southwest corner of the watershed, but the Oak Grove WWTP is to the west.

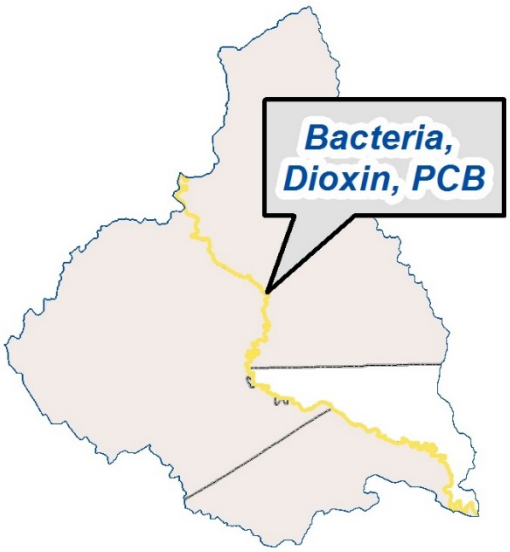
***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***

The only municipal wastewater discharge in the Trinity below Dallas watershed is from the Scurry- Rosser ISD.

***Treatment Capacity Utilization in the Region***

| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| SCURRY ROSSER ISD WWTP | 0.04 | 0.0058 | 14.50% |
| **Watershed Total** | **0.04** | **0.0058** | **14.50%** |

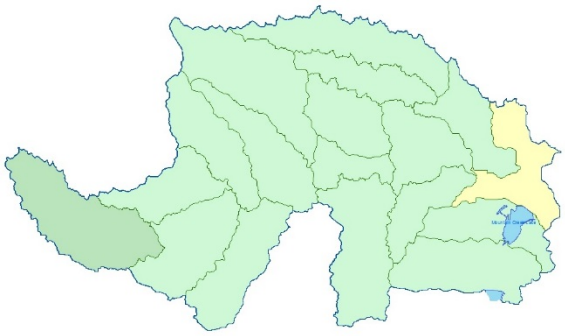
In 2013, the treatment capacity available within the Trinity below Dallas watershed was only being 15% utilized, but this figure does not take into account the flow to the Ennis Oak Grove WWTP, which lies outside the watershed. The Ennis plant operated in 2013 at 93% of its currently permitted capacity. The watershed is primarily served by on-site systems.

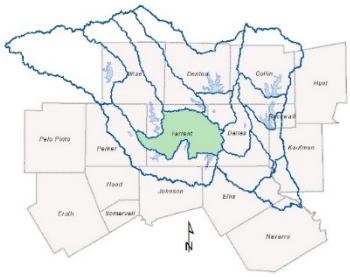



***Watershed Stream Impairments***

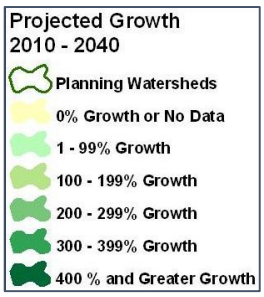
The Upper Trinity within the Trinity below Dallas Watershed is impaired, receiving its flow primarily from impaired segments upstream. Although it is south of the area covered under the "Implementation Plan (I-Plan) for Seventeen Total Maximum Daily Loads for Bacteria in the Greater Trinity River Region", it is within the area listed for PCB contamination. Beginning in September 2014, NCTCOG will be facilitating the effort to develop an I-Plan for the PCB impairment.

## WEST FORK OF THE TRINITY WATERSHED





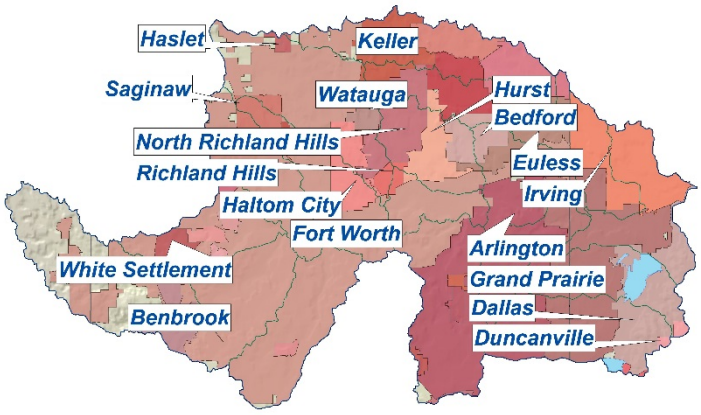
### *Projected Population Growth, 2013 – 2040*




The West Fork of the Trinity watershed is projected to have strong growth in all but 3 of its 18 Watersheds. From its current estimated population of 1,899,556 the region is projected to grow to 2,513,348 by 2040, an overall growth rate of 32%**.** The West Fork of the Trinity watershed is among the four watersheds that are projected to provide 25% of the regions 2013 to 2040 growth, contributing a projected 613,792 people.

| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Big Bear Creek | 98,379 | 138,274 | 40.55% |
| Cottonwood Creek-Mountain Creek Lake | 104,493 | 108,127 | 3.48% |
| Delaware Creek-West Fork Trinity River | 121,996 | 117,979 | -3.29% |
| Estelle Creek-Bear Creek | 69,337 | 88,404 | 27.50% |
| Farmers Branch-West Fork Trinity River | 83,172 | 120,747 | 45.18% |
| Fish Creek-Mountain Creek Lake | 154,581 | 174,952 | 13.18% |
| Headwaters Sycamore Creek | 162,335 | 174,022 | 7.20% |
| Headwaters Walker Branch | 109,590 | 136,125 | 24.21% |
| Johnson Creek | 84,671 | 104,736 | 23.70% |
| Johnson Creek-West Fork Trinity River | 95,351 | 175,110 | 83.65% |
| Lake Como-Clear Fork Trinity River | 132,912 | 203,085 | 52.80% |
| Little Bear Creek | 91,470 | 134,244 | 46.76% |
| Marine Creek-West Fork Trinity River | 96,105 | 134,790 | 40.25% |
| Marys Creek | 40,050 | 108,670 | 171.34% |

| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Rush Creek-Village Creek | 164,177 | 232,732 | 41.76% |
| Sycamore Creek-West Fork Trinity River | 85,194 | 109,943 | 29.05% |
| Walker Branch-West Fork Trinity River | 29,664 | 50,978 | 71.85% |
| Whites Branch-Big Fossil Creek | 176,079 | 200,430 | 13.83% |
| **Watershed Totals** | **1,899,556** | **2,513,348** | **32.31%** |

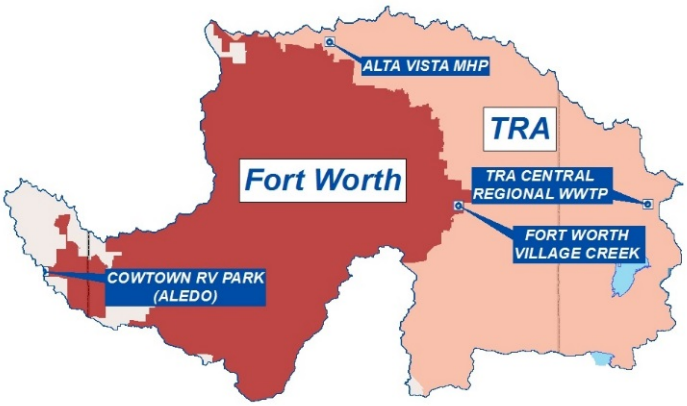


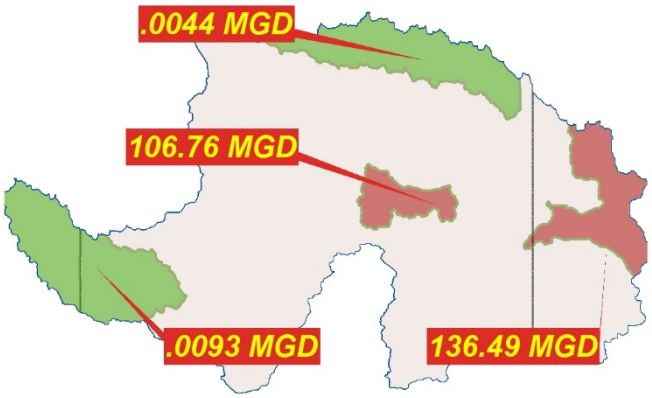

***Cities in Watershed***

Portions of 18 cities make up this watershed encompassing much of the 'mid-cities- region between Dallas and Fort Worth. This large watershed is predominantly suburban, with a wide variety of development patterns, and a population of 1.9 million.

***Current Service Providers***

The West Fork of the Trinity watershed is broadly served by the Fort Worth Village Creek and Trinity River Authority Central Regional wastewater treatment plants. At the edges of the watershed are two very small plants at the Alta Vista mobile home park and Cowtown RV Park.



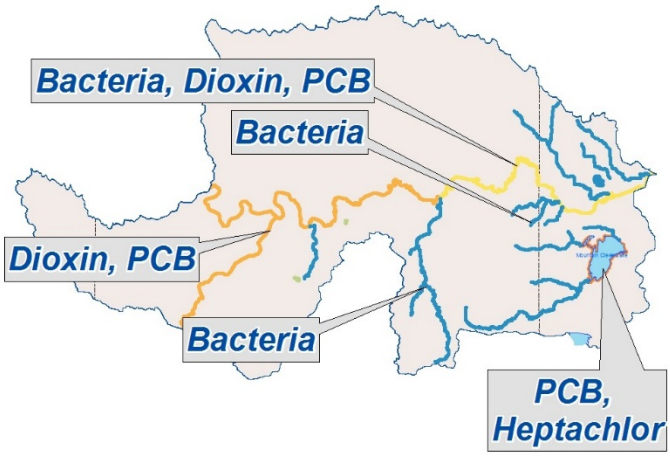




***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***

The West Fork of the Trinity contains two large wastewater discharges from plants that treat water generated from within and outside the watershed. Both the Fort Worth Village Creek and TRA Central wastewater treatment plants discharge an average daily flow of 107 MGD and 136 MGD, respectively.

***Treatment Capacity Utilization in the Watershed***

| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| ALTA VISTA MHP WWTP | 0.008 | 0.0044 | 55.00% |
| CITY OF FORT WORTH VILLAGE CREEK | 166 | 106.76 | 64.31% |
| COWTOWN RV PARK WWTF (ALEDO) | 0.0216 | 0.0093 | 43.06% |
| TRA CENTRAL REGION WASTEWATER | 189 | 136.4864 | 72.22% |
| **Watershed Total** | **355.0296** | **243.2601** | **68.52%** |

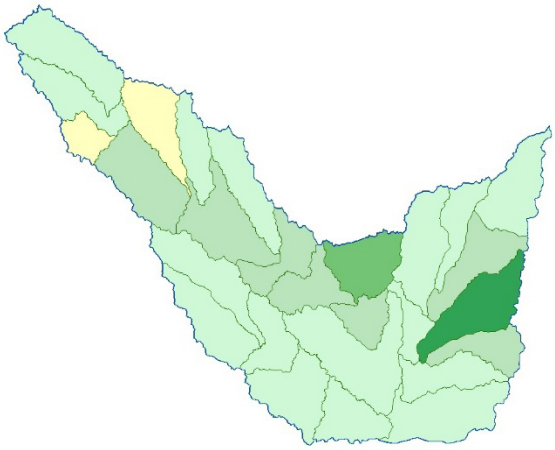


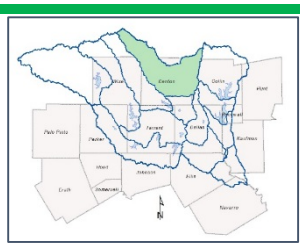

The watershed's treatment capacity utilization is 69% of permitted average daily flow. The TRA Central Regional plant is the largest WWTP in the watershed, and is currently discharging 72% of its permitted average daily flow.

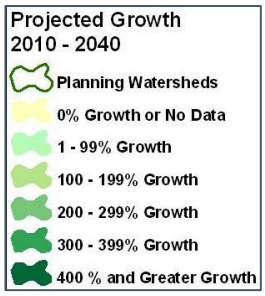
***Current Known Impairments to Watershed Water Quality***

The West Fork of the Trinity River is determined to be impaired by bacteria; the portion included in the I-Plan is segment 0841. In addition to the river segment, there are 11 tributaries that are also impaired for bacteria. They are: Bear Creek, Arbor Creek, Copart Branch, Mountain Creek, Dalworth Creek, Delaware Creek, Estelle Creek, Johnson Creek, Kee Branch, Rush Creek, Village Creek, and West Irving Branch.

## LEWISVILLE LAKE WATERSHED








***Projected Population Growth, 2010 – 2040***

The Lewisville Lake Watershed is projected to have growth in all but 1 of its 18 Watersheds. From its current estimated population of 581,226 the region is projected to grow to 872,129 by 2040, an overall increase of 50%. The watershed is anticipated to add 290,903 people by 2040.

| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Population Growth 2013 - 2040 |
|---|---|---|---|
| Bingham Creek | *Outside project area* | | |
| Blocker Creek | *Outside project area* | | |
| Buck Creek-Clear Creek | 3,336 | 6,783 | 103.33% |
| Cottonwood Branch-Little Elm Res. | 62,143 | 66,513 | 7.03% |
| Culp Branch-Elm Fork Trinity River | 4,703 | 17,352 | 268.96% |
| Doe Branch-Little Elm Reservoir | 14,468 | 67,273 | 364.98% |
| Flat Creek | 118 | 130 | 10.17% |
| Harmony Ranch-Little Elm Res. | 3,912 | 9,259 | 136.68% |
| Headwaters Hickory Creek | 4,779 | 6,231 | 30.38% |
| Headwaters Little Elm Creek | 842 | 1,425 | 69.24% |
| Headwaters White Rock Creek | 136,827 | 203,655 | 48.84% |
| Little Duck Creek-Duck Creek | 4,626 | 5,090 | 10.03% |
| Lower Hickory Creek | 54,256 | 52,560 | -3.13% |
| Milam Creek-Clear Creek | 5,536 | 12,896 | 132.95% |
| Moores Branch-Clear Creek | 8,278 | 20,764 | 150.83% |
| Mustang Creek | 10,508 | 17,807 | 69.46% |
| Panther Creek-Little Elm Res. | 25,202 | 55,353 | 119.64% |
| Pecan Creek | 6,851 | 12,461 | 81.89% |
| Pecan Creek-Little Elm Res. | 117,126 | 151,344 | 29.21% |
| Running Branch-Little Elm Res. | 12,319 | 16,046 | 30.25% |

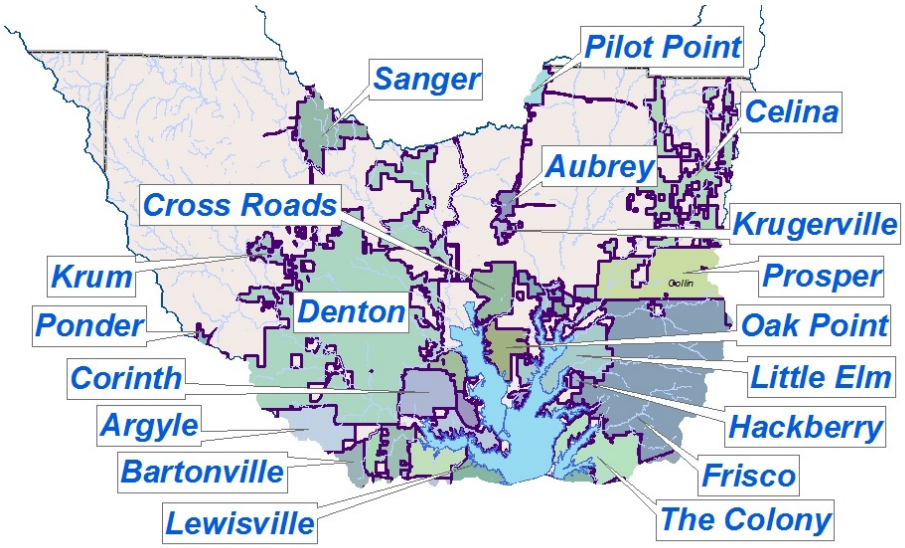
| Subwatershed Name | 2013 Population | 2040 Projected Population | Projected Growth 2013 - 2040 |
|---|---|---|---|
| South Hickory Creek | 3,690 | 6,237 | 69.02% |
| Stewart Creek-Little Elm Res. | 80,976 | 109,126 | 34.76% |
| Town of Celina-Little Elm Res. | 4,574 | 12,224 | 167.25% |
| Upper Hickory Creek | 15,801 | 20,653 | 30.71% |
| Whites Creek-Clear Creek | 355 | 947 | 166.76% |
| **Watershed Totals** | **581,226** | **872,129** | **50.05%** |

***Land Use***

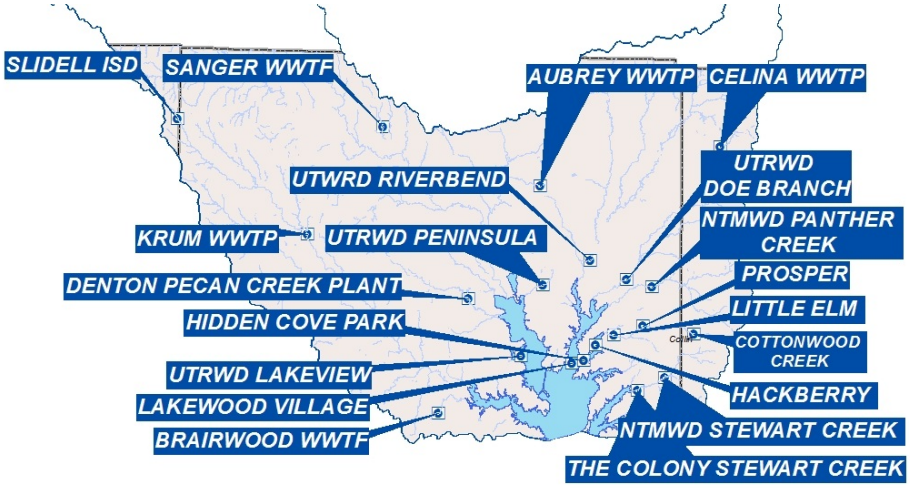
Roughly 16.3% of the Lake Lewisville watershed is currently urbanized. The areas excluded from this figure are north of our planning boundary. Much of the Lewisville Watershed lies within the Denton and Dallas / Fort Worth Urbanized Areas, yet the northern reaches are primarily agricultural and pasture land. Due primarily to residential development pressures, this watershed will experience growth over the next 30 years.

***Cities in Watershed***

Portions of 19 cities lie within the Lewisville Lake watershed. Many of these cities are relatively small in population today; Denton, Frisco and Lewisville are currently the largest cities in the watershed.

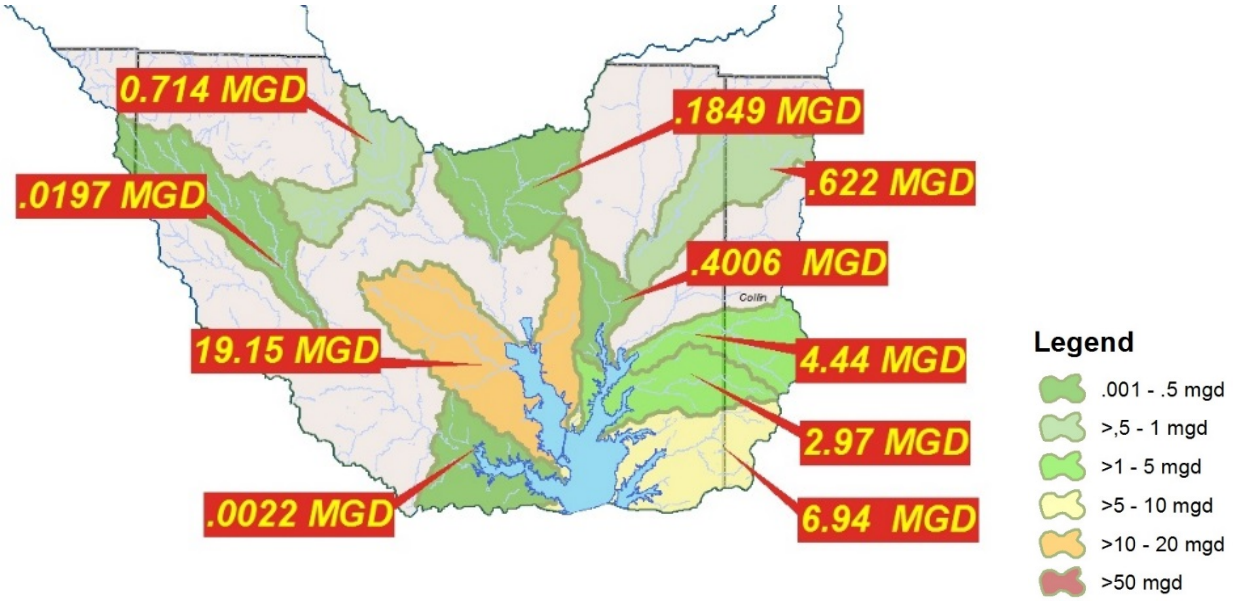


***Current Service Providers***



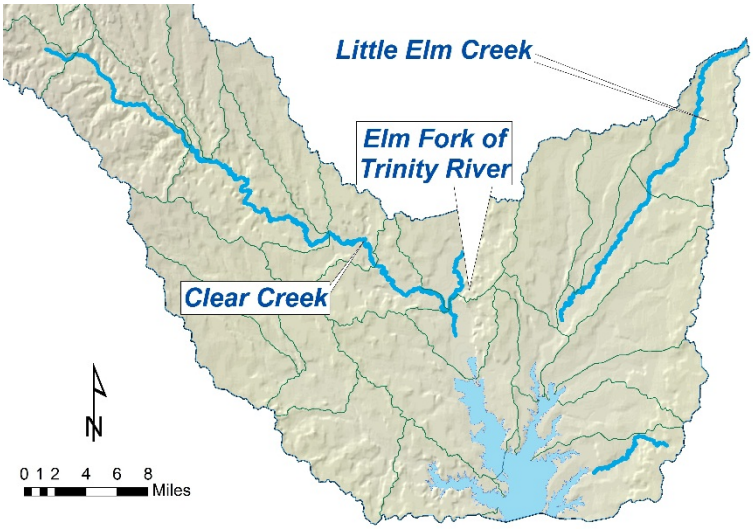

| Wastewater Treatment Plant | Permitted Average Daily Flow, MGD | Average Daily Flow 2013, MGD | Percentage of Permitted Average Daily Flow |
|---|---|---|---|
| SLIDELL ISD WWTP | 0.02 | 0.0025 | 12.50% |
| KRUM WWTP | 0.137 | 0.0172 | 12.55% |
| SANGER WWTF | 2 | 0.714 | 35.70% |
| BRAIRWOOD WWTF | 0.005 | 0.0022 | 44.00% |
| DENTON PECAN CREEK PLANT | 21 | 14.4257 | 68.69% |
| UTRWD LAKEVIEW REGIONAL PLANT | 7.5 | 4.4511 | 59.35% |
| UTRWD PENINSULA REG REC PLANT | 0.94 | 0.2695 | 28.67% |
| TOWN OF LAKEWOOD VILLAGE WWTF | 0.1 | 0.0645 | 64.50% |
| HIDDEN COVE PARK WWTP | 0.016 | 0.0076 | 47.50% |
| HACKBERRY WWTP | 0.71 | 0.2469 | 34.77% |
| TOWN OF LITTLE ELM WWTF | 4 | 2.3948 | 59.87% |
| UTRWD DOE BRANCH REG WATER REC PLANT | 2 | 0 | 0.00% |
| THE COLONY STEWART CREEK PLANT | 4.5 | 3.9061 | 86.80% |
| TOWN OF PROSPER WWTP | 0.556 | 0 | 0.00% |
| NTMWD PANTHER CREEK WWTP | 10 | 4.4379 | 44.38% |
| NTMWD STEWART CREEK WEST PLANT | 5 | 3.0383 | 60.77% |
| COTTONWOOD CREEK WWTP | 0.3 | 0.2585 | 86.17% |
| CELINA WWTP | 0.5 | 0.622 | 124.40% |
| UTWRD RIVERBEND | 5.7 | 0.4006 | 7.03% |
| AUBREY WWTP | 0.4 | 0.1849 | 46.23% |
| Watershed Totals | **65.384** | **35.4443** | **54.21%** |

***Watershed Wastewater Discharges – 01/2013 to 12/31/2013***




The Lewisville Lake watershed receives significant wastewater discharges from both regional wastewater treatment plants (UTRWD Lakeview and Riverbend; NTWMD Panther Creek and Stewart Creek; and municipal systems, of which the largest contributor was Denton's Pecan Creek WWTP. Discharge volumes in 2010 from those five plants totaled nearly 30 MGD. Essentially all of the significant Publicly Owned Treatment Works dischargers within the Lewisville Lake watershed have permit limits for selected nutrients. Several of the wastewater treatment facilities have plans for expansion or construction is underway.

The Lewisville Lake watershed includes 24 permitted wastewater discharges, most of which serve the more developed areas adjacent to the lake. Of the approximately 50 million gallons per day (MGD) permitted within the Lewisville Lake watershed, nearly 80% is allocated to the five largest wastewater treatment plants adjacent to the lake, including: Denton Pecan Creek Plant, North Texas Municipal Water District (NTMWD) Stewart Creek West Plant, Upper Trinity Regional Water District Lakeview Regional Plant, NTMWD Panther Creek Plant, and The Colony Stewart Creek Plant. Discharge volumes in 2010 from those five plants totaled nearly 30 MGD. Essentially all of the significant Publicly Owned Treatment Works dischargers within the Lewisville Lake watershed have permit limits for selected nutrients. Several of the wastewater treatment facilities have plans for expansion or construction is underway.




***Current Known Impairments to Watershed Water Quality***

**Lewisville Lake East Watershed Greenprint**

NCTCOG contracted with the Trust for Public Land (TPL) in 2010 to Greenprint the Lewisville Lake East watershed. Greenprinting is a GIS technique developed by TPL to prioritize areas for protection. The goal of this project was to identify areas that would offer the greatest benefit to water quality, if conserved. The Lewisville Lake East Watershed Greenprint is based on land use, proximity to streams, proximity to ponds and wetlands, water erosion potential, floodplains, and proximity to the reservoir. Most of the areas identified as priorities for conservation generally follow riparian corridors.

**Hickory Creek 319 Project**

Although Lewisville Lake is not currently impaired, there are significant water quality concerns for the lake. The Lewisville Lake watershed, for example, has one of the highest application rates in the state for new or amended wastewater permits. Development is increasing within the Hickory Creek watershed, creating increases in runoff volumes and reductions in open space. Past monitoring efforts by the Texas Commission on Environmental Quality have resulted in Hickory Creek being listed as a "nutrient enrichment concern" due to high ammonia concentrations. The sources of ammonia are currently not well understood within this watershed, and are generally listed as "originating from unknown point and nonpoint sources." Watershed monitoring and modeling efforts indicate that the current approaches to

- managing nonpoint source pollution in Hickory Creek are not sufficient. New tools are needed to stimulate best management practices (BMPs) development and reverse declining water quality trends. The goals of this project are to: Develop a practical, cost-effective approach to managing point and nonpoint source pollution within the Hickory Creek watershed.
- Use the monitoring and modeling research generated within this project to demonstrate the effectiveness of BMPs.
- Use stakeholder advisory group feedback and research results to create a watershed plan for Hickory Creek.

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# Appendices

## APPENDIX A: DESIGNATED MANAGEMENT AGENCY UPDATE

# 2013 Areawide Water Quality Management Plan for North Central Texas

As the designated water quality management planning agency, the North Central Texas Council of Governments recommends entities for designation as management agencies, for either collection, or treatment, or both. For entities to be designated as management agencies for wastewater collection or treatment, they must demonstrate the legal, institutional, managerial and financial capability necessary to carry out the responsibilities in accordance with Section 208(c) of the Clean Water Act. An entity must be recommended for the appropriate designation before it can apply for state revolving loan funds. Designation does not require the entity to provide wastewater services, but it does enable the designated management agency to apply for grant and loan funds to provide those services. Formal designation requires that the entity be recommended by the water quality management planning agency, and have submitted Designated Management Agency (DMA) resolutions to the Texas Commission on Environmental Quality (TCEQ, formerly TNRCC.) Whether recommended by the TCEQ or a designated management planning agency like NCTCOG, the DMA information is transmitted as part of the appropriate planning document to EPA for approval as an update to the Water Quality Management Plan.

Because of permit application and issuance constraints, wastewater service entities within NCTCOG's areawide jurisdiction may be incorporated into the TCEQ's quarterly updates to the Texas Water Quality Management Plan in order to facilitate the permit process. In these situations, the North Central Texas Council of Governments usually has recommended designation in prior WQMP amendments, and the remaining action is for the entity to submit the resolution to the state.

This appendix identifies any entities that NCTCOG has not previously recommended for status as a designated management agency. The entities that have received formal designation as management agencies by submitting the appropriate resolution materials or other required documentation to the TCEQ for permit renewal or issuance are also indicated in this appendix.

| Designated Management Agency Updates | | | | |
|---|---|---|---|---|
| | | | | |
| Planning Entity | Service Area Recommended | Recommended Designation | DMA Date | Notes or Comments |
| ***Pending review of 2013 requests*** | | | | |

## APPENDIX B: 208/201 COORDINATION ACTIVITIES UPDATE

| 208/201 Coordination Activities<br>2013 Water Quality Management Plan for North Central Texas | | |
|---|---|---|
| *Since the 2013 Amendment of the Annual Water Quality Management Plan for North Central Texas, NCTCOG has addressed the following items for information on systems that are seeking funding for construction of infrastructure or facilities.* | | |
| **Planning Entity and Service Area** | **NCTCOG Evaluation** | **Conclusion and/or WQMP action** |
| **City of Grand Prairie**<br><br>**CWSRF Tier III Project No. 73654**<br><br>**Wastewater Replacement Pipelines** | The population projections and engineering detail for the proposed project are consistent with NCTCOG forecast data. | The population projections are reasonable for facility planning purposes, and NCTCOG staff confirms that this project conforms with the Water Quality Management Plan for North Central Texas. |

As the designated water quality management planning agency, the North Central Texas Council of Governments (NCTCOG) is required to undertake 208/201 coordination with the state agency (Texas Commission on Environmental Quality – TCEQ). NCTCOG is to evaluate and facilitate development and implementation of wastewater treatment management plans and practices to meet the goals of the Clean Water Act as amended, and to specifically coordinate with the state agency to ensure that plans developed under Section 208 fit with companion requirements under Section 201 which deals primarily with facility planning and funding of treatment facilities or infrastructure. The 208/201 coordination activities typically involve examination of facility plans submitted as part of funding applications. NCTCOG compares the facility planning information with regional goals and plans included as part of the current amended Areawide Water Quality Management Plan. As part of this ongoing process, NCTCOG prepares a response to TCEQ regarding facility planning proposals, and conformance with elements of the Water Quality Management Plan for North Central Texas. NCTCOG may make specific recommendations

regarding proposals on an as-needed basis, and in some circumstances the planning information for specific facilities may be revised in the subsequent amendment of the regional WQMP.

This appendix indicates those entities for which NCTCOG has done 208/201 coordination activities in partnership with the TCEQ since the last amendment of the WQMP. NCTCOG has indicated, as needed, where specific adjustments to the WQMP have been made to accommodate any 208/201 evaluation.

## APPENDIX C: CLEAN WATER STATE REVOLVING FUND COMMITMENTS

| 2013 Regional CWSRF Construction Starts | | |
|---|---|---|
| **Entity** | **Construction Start** | **Net Amount** |
| West Tawakoni | 6/28/2013 | $115,000 |
| West Tawakoni | 6/28/2013 | $112,500 |
| Bedford | 7/1/2013 | $630,000 |
| Commerce | 1/17/2013 | $3,490,000 |
| Keller | 3/25/2013 | $5,835,000 |
| Springtown | 4/23/2013 | $3,930,000 |
| | | **$14,112,500** |

| 2013 Construction Completions | | |
|---|---|---|
| **Entity** | **Complete** | **Net Amount** |
| Aledo | 6/6/2013 | $675,000 |
| Aledo | 6/6/2013 | $2,110,000 |
| Aledo | 6/6/2013 | $3,345,000 |
| Aledo | 6/6/2013 | $1,900,000 |
| Commerce | 4/4/2013 | $2,005,000 |
| Greenville | 8/27/2013 | $20,000,000 |
| | | **$30,035,000** |

## APPENDIX D: CITY POPULATION PROJECTIONS

| City | NCTCOG 2013 | NCTCOG Population Estimate 2040 | Percentage Increase |
|---|---|---|---|
| Addison | 13,840 | 31,999 | 131.21% |
| Aledo | 2,830 | 2,973 | 5.05% |
| Allen | 87,800 | 122,292 | 39.28% |
| Alvarado | 3,850 | 5,321 | 38.21% |
| Alvord | 1,340 | 2,512 | 87.46% |
| Anna | 9,360 | 17,305 | 84.88% |
| Annetta | 1,310 | 1,360 | 3.82% |
| Argyle | 3,420 | 17,550 | 413.16% |
| Arlington | 369,320 | 508,707 | 37.74% |
| Aubrey | 2,610 | 3,020 | 15.71% |
| Aurora | 1,280 | 2,398 | 87.34% |
| Azle | 10,960 | 16,054 | 46.48% |
| Balch Springs | 24,270 | 29,200 | 20.31% |
| Bedford | 47,310 | 71,322 | 50.75% |
| Benbrook | 21,530 | 36,633 | 70.15% |
| Burleson | 39,010 | 49,808 | 27.68% |
| Caddo Mills | 1,380 | 2,267 | 64.28% |
| Carrollton | 122,280 | 160,660 | 31.39% |
| Cedar Hill | 45,570 | 72,466 | 59.02% |
| Cleburne | 29,120 | 37,375 | 28.35% |
| Colleyville | 23,270 | 60,739 | 161.02% |
| Combine | 1,960 | 3,268 | 66.73% |
| Coppell | 39,090 | 38,343 | -1.91% |
| Copper Canyon | 1,340 | 1,574 | 17.46% |
| Corinth | 20,420 | 24,557 | 20.26% |
| Cross Roads | 1,620 | 9,018 | 456.67% |
| Crowley | 13,440 | 18,662 | 38.85% |
| Dallas | 1,213,600 | 1,710,511 | 40.95% |
| Dalworthington Gardens | 2,290 | 4,215 | 84.06% |
| Denton | 116,950 | 160,302 | 37.07% |
| DeSoto | 49,930 | 63,663 | 27.50% |
| Double Oak | 2,890 | 3,091 | 6.96% |
| Duncanville | 38,680 | 38,751 | 0.18% |
| Edgecliff Village | 2,870 | 3,862 | 34.56% |
| Ennis | 18,590 | 19,076 | 2.61% |
| Euless | 51,750 | 80,598 | 55.74% |
| Everman | 6,110 | 9,895 | 61.95% |

| City | NCTCOG 2013 | NCTCOG Population Estimate 2040 | Percentage Increase |
|---|---|---|---|
| Fairview | 8,000 | 23,158 | 189.48% |
| Farmers Branch | 28,800 | 40,769 | 41.56% |
| Farmersville | 3,290 | 2,875 | -12.61% |
| Fate | 7,370 | 7,996 | 8.49% |
| Ferris | 2,440 | 3,619 | 48.32% |
| Flower Mound | 65,710 | 94,669 | 44.07% |
| Forest Hill | 12,360 | 17,325 | 40.17% |
| Forney | 16,030 | 14,582 | -9.03% |
| Fort Worth | 767,560 | 1,202,359 | 56.65% |
| Frisco | 129,680 | 176,436 | 36.05% |
| Garland | 229,120 | 256,842 | 12.10% |
| Glenn Heights | 11,410 | 16,152 | 41.56% |
| Granbury | 8,290 | 12,395 | 49.52% |
| Grand Prairie | 178,290 | 246,565 | 38.29% |
| Grapevine | 47,070 | 85,144 | 80.89% |
| Greenville | 25,990 | 29,580 | 13.81% |
| Haltom City | 42,190 | 59,654 | 41.39% |
| Haslet | 1,550 | 5,082 | 227.87% |
| Heath | 7,260 | 18,014 | 148.13% |
| Hickory Creek | 3,250 | 6,848 | 110.71% |
| Highland Park | 8,500 | 10,539 | 23.99% |
| Highland Village | 15,420 | 15,064 | -2.31% |
| Hudson Oaks | 1,800 | 1,588 | -11.78% |
| Hurst | 37,460 | 53,721 | 43.41% |
| Hutchins | 5,350 | 10,706 | 100.11% |
| Irving | 220,750 | 291,142 | 31.89% |
| Joshua | 6,010 | 7,000 | 16.47% |
| Justin | 3,250 | 3,362 | 3.45% |
| Kaufman | 6,660 | 6,537 | -1.85% |
| Keene | 6,120 | 6,540 | 6.86% |
| Keller | 41,090 | 67,605 | 64.53% |
| Kennedale | 6,820 | 18,807 | 175.76% |
| Krugerville | 1,670 | 2,499 | 49.64% |
| Lake Dallas | 7,140 | 11,117 | 55.70% |
| Lake Worth | 4,780 | 7,539 | 57.72% |
| Lakeside | 1,320 | 2,435 | 84.47% |
| Lancaster | 36,980 | 64,582 | 74.64% |
| Lewisville | 97,140 | 135,882 | 39.88% |

| City | NCTCOG 2013 | NCTCOG Population Estimate 2040 | Percentage Increase |
|---|---|---|---|
| Little Elm | 29,230 | 37,804 | 29.33% |
| Lowry Crossing | 1,720 | 4,229 | 145.87% |
| Lucas | 5,750 | 25,504 | 343.55% |
| Mabank | 3,080 | 2,648 | -14.03% |
| Mansfield | 58,490 | 127,049 | 117.21% |
| McKinney | 140,390 | 203,842 | 45.20% |
| McLendon-Chisholm | 1,560 | 8,206 | 426.03% |
| Melissa | 5,710 | 12,659 | 121.70% |
| Mesquite | 140,240 | 182,750 | 30.31% |
| Midlothian | 19,330 | 48,807 | 152.49% |
| Murphy | 18,440 | 20,039 | 8.67% |
| New Fairview | 1,270 | 5,984 | 371.18% |
| Newark | 1,010 | 1,282 | 26.93% |
| North Richland Hills | 64,240 | 87,500 | 36.21% |
| Northlake | 2,160 | 17,496 | 710.00% |
| Oak Leaf | 1,300 | 1,882 | 44.77% |
| Oak Point | 2,930 | 11,697 | 299.22% |
| Ovilla | 3,510 | 5,427 | 54.62% |
| Pantego | 2,430 | 5,072 | 108.72% |
| Pelican Bay | 1,560 | 25,167 | 1513.27% |
| Pilot Point | 3,870 | 1,447 | -62.61% |
| Plano | 264,360 | 353,027 | 33.54% |
| Princeton | 7,440 | 12,290 | 65.19% |
| Prosper | 13,380 | 49,898 | 272.93% |
| Red Oak | 11,230 | 12,352 | 9.99% |
| River Oaks | 7,280 | 9,511 | 30.65% |
| Roanoke | 6,470 | 13,800 | 113.29% |
| Rockwall | 38,990 | 61,876 | 58.70% |
| Rowlett | 56,420 | 85,176 | 50.97% |
| Royse City | 9,690 | 19,676 | 103.05% |
| Runaway Bay | 1,310 | 1,437 | 9.69% |
| Sachse | 21,090 | 31,340 | 48.60% |
| Saginaw | 20,140 | 22,463 | 11.53% |
| Sanger | 7,170 | 12,569 | 75.30% |
| Sansom Park | 4,690 | 4906 | 4.61% |
| Seagoville | 15,020 | 25,638 | 70.69% |
| Shady Shores | 2,620 | 4,787 | 82.71% |
| Southlake | 27,080 | 46,102 | 70.24% |

| City | NCTCOG 2013 | NCTCOG Population Estimate 2040 | Percentage Increase |
|---|---|---|---|
| Springtown | 2,660 | 2,766 | 3.98% |
| St. Paul | 1,070 | 2,597 | 142.71% |
| Stephenville | 19,320 | 26,324 | 36.25% |
| Sunnyvale | 5,270 | 26324 | 399.51% |
| Talty | 1,770 | 1,967 | 11.13% |
| Terrell | 15,210 | 18,726 | 23.12% |
| The Colony | 37,360 | 42,804 | 14.57% |
| Trophy Club | 9,400 | 11,124 | 18.34% |
| University Park | 22,920 | 23,795 | 3.82% |
| Watauga | 23,500 | 23,602 | 0.43% |
| Waxahachie | 31,550 | 33,925 | 7.53% |
| Weatherford | 25,940 | 27,385 | 5.57% |
| Westlake | 1,040 | 3,680 | 253.85% |
| Westworth Village | 2,500 | 5,690 | 127.60% |
| White Settlement | 16,390 | 27,784 | 69.52% |
| Wilmer | 4,050 | 9,077 | 124.12% |
| Wylie | 43,450 | 64,370 | 48.15% |
| Total | 5,833,110 | 8,433,355 | 44.58% |

## APPENDIX E: WASTEWATER TREATMENT PLANNING NEEDS AND INDIVIDUAL SYSTEM ASSESSMENTS

Data sources, assumptions and procedures used to assess planning needs are as follows.

**Data and Sources:**

- Monthly average flows (January 2013 – December 2013) reported by each wastewater treatment system to TCEQ, EPA, NCTCOG, or a combination of these sources.
- City boundaries according to NCTCOG current city boundaries.
- Wastewater service area boundaries of joint systems updated 2013 according to information provided by the joint systems
- Capacity plans to 2040 were requested from facility owners, managers or consultants 2013. Where no new information was provided, information provided in previous years was assumed
- Demographic data for 2010 Census and demographic projections / estimations for 2013 to 2040.

**Assumptions and Procedures:**

- Yearly average of monthly average daily flows approximates average flow and remains constant over time
- Proportions of contribution from each category of flow are as reported by EPA (June 2000) referencing Association of Metropolitan Sewerage Agencies 1997 Financial Survey figures:
  - Inflow & Infiltration = 33 gallons per capita per day
  - Commercial & Industrial Flow = 20% of Average Flow (including combined sewer); 21% (corrected figure excluding combined sewer effects since Texas has separate sewer facilities for sanitary and storm sewers)
  - Residential Flow = 55% of Average Flow (including combined sewer); 57% (corrected)
- Service areas are defined by the destination of wastewater to a particular treatment plant
- Service areas default to 2010 current city boundaries for community systems
- Population and employment figures for joint systems was calculated with GIS tools using Traffic Survey Zones, 2010 current city boundaries and updated service area boundaries
- Population is evenly distributed within a Traffic Survey Zone
- Population and employment assigned to a service area is proportional to the area of a Traffic Survey Zone that lies within that service area
- Assume entire population within incorporated boundaries of a community or joint wastewater treatment system is served
- Population and employment data per city was downloaded from the NCTCOG website for projecting community systems (i.e. adjusted Census)
- Linear growth was assumed between each 5-year increment of demographic projection in years 2013,(2-year increment) 2015, 2020, 2025, 2030, 2035, and 2040
- Capacity plans are considered adequate if NCTCOG-projected flow remains less than or equal to 90% of planned permitted capacity. Capacity plans are also considered adequate if a facility's planned capacity exceeds 90% of NCTCOG-projected flow for a temporary period less than or equal to 5-years. This 5-year allowance is made to offset inaccuracies of

NCTCOG-projected flow may result from gaps in flow data, uncertainty in demographic projections, and inaccuracies introduced in data analysis using GIS because the actual distribution of population within a Traffic Survey Zone may be concentrated in a relatively small area.

**Calculation of Percent Capacity:**

- Infiltration and Inflow (I&I)= 33gpcd
- Residential Flow Rate = 57% of Average Flow
- Commercial Flow Fate = 21% of Average Flow
- Average Flow is calculated from the yearly average of monthly averages reported by WWTP operators for each facility.
- Residential flow = residential flow rate X average flow 2013 (or available year)
- Commercial flow = commercial flow rate X average flow 2013 (or available year)
- Residential rate = residential flow / residential population
- Commercial rate = commercial flow / employment
- I&I rate = I&I rate (0.000033) X residential population (residential population and employment taken from NCTCOG demographics projections)

**Total projected flow** = residential rate X residential population + commercial rate X employment + I&I rate X residential population

Total flow was calculated for 2015, 2020, 2025, 2030, 2035, and 2040 and intervening years were extrapolated from these figures.

**Percent Capacity** = projected flow / plant capacity

A handful of cities intersect the 208 planning boundary because of growth in the community, but do not currently discharge treated wastewater within the 208 boundary. Planning assessments were not performed for the communities fitting this description, which are Alvarado, Ennis, and Waxahachie. Farmersville also fits the same description except that its plants are managed by the North Texas Municipal Water District and was therefore considered as part of a regional system and was included.

Approximately 57% of treatment capacity plans are adequate to 2040 according to NCTCOG-projected flows calculated March 2014. The remaining 43% of treatment facilities likely need additional planning to accommodate future flows.

Plant capacity is based on figures provided to us by community and regional wastewater treatment plant owners, managers or consultants in 2014 based on their own planning. The capacities indicated through 2040 do not represent approved permit limitations, and simply reflect planned expansions. The Water Quality Management Plan for North Central Texas does not currently examine or seek to correlate the planned expansion data with any state wasteload allocation or approved permit limits. The state addresses permits on a five-year timeframe,

which makes it difficult to match with the 25 year planning timeframe illustrated for the wastewater plants.

For each of the 13 Upper Trinity River Basin watershed shown in Figure X on page 11, NCTCOG assessed the projected growth by watershed/ HUC12 subwatershed, land use changes and percent of urbanization. These factors, along with wastewater discharges from Regional and Community municipal wastewater systems during 2013 inform the individual plant assessments.

Individual treatment plant assessments appear on the following pages.

Figure X shows the current areas served by both the large regional wastewater service providers, and by smaller community systems designed to handle the wastewater needs of a particular city, or in some cases, water district.

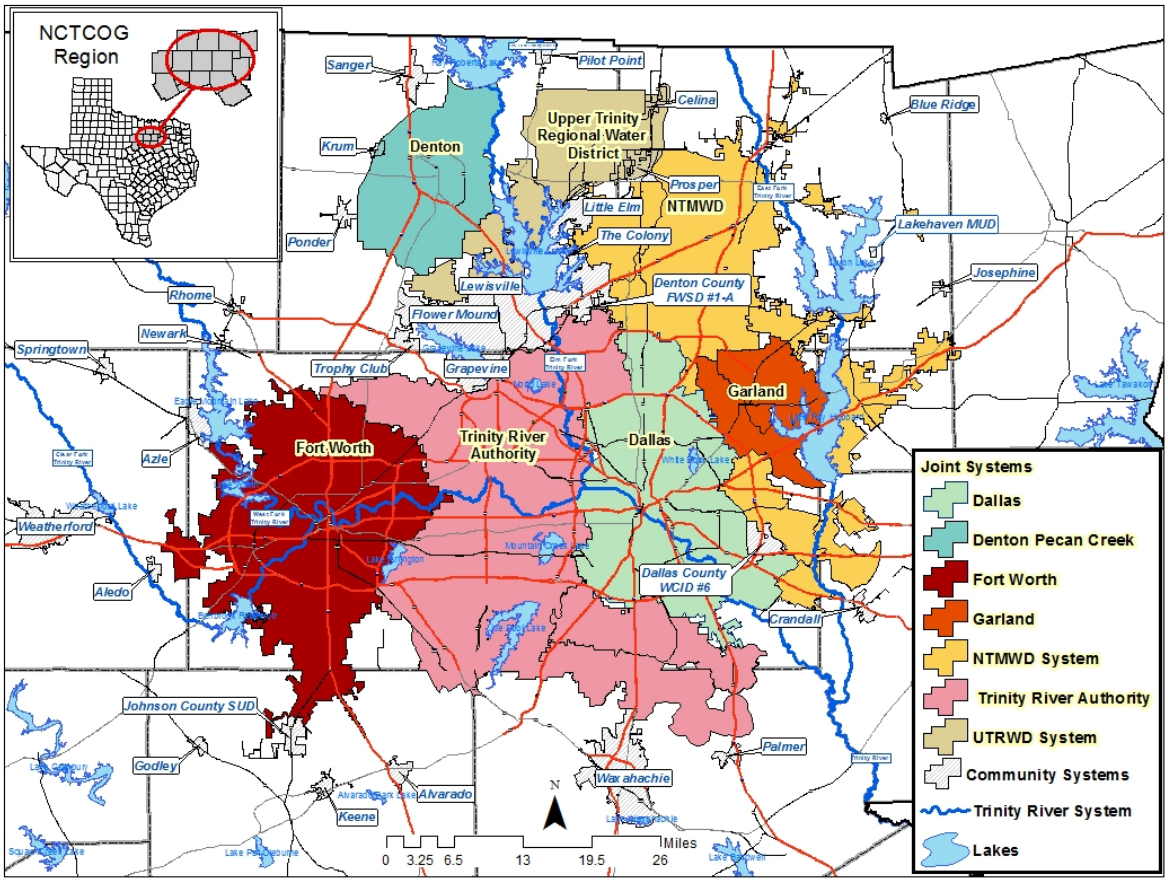
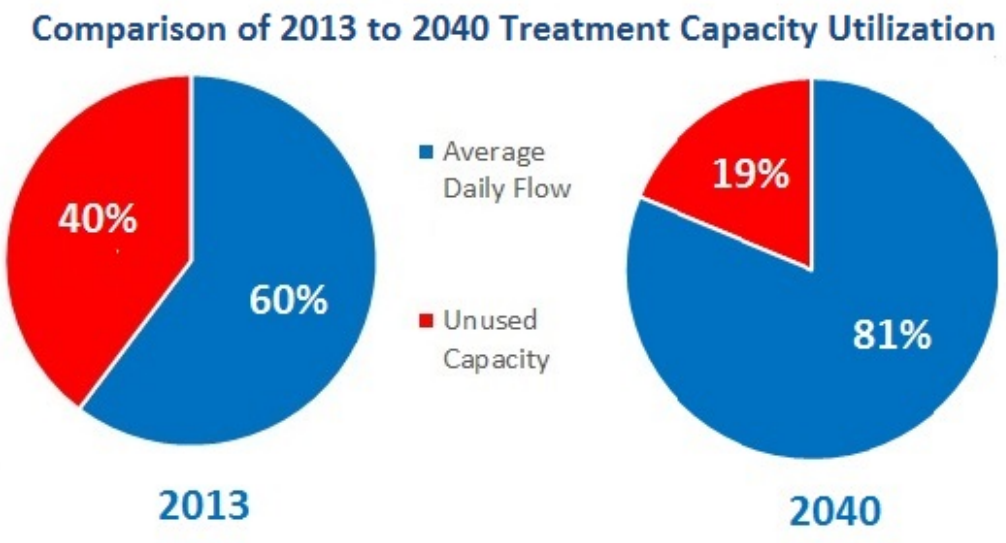
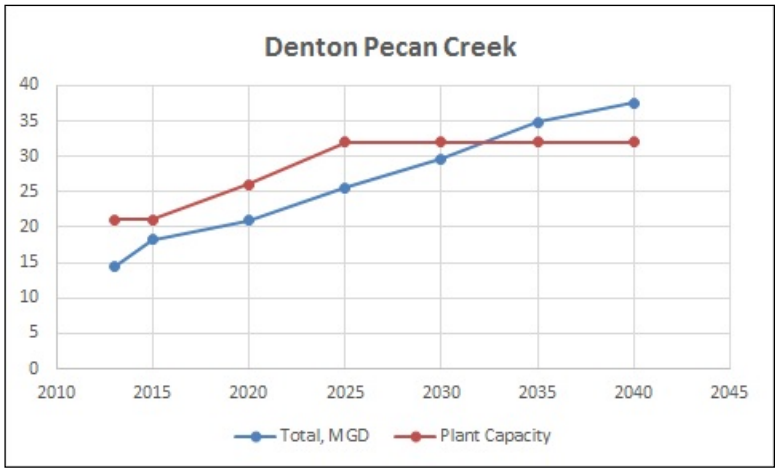



Figure X - Service Areas of Wastewater Treatment Providers

Because Regional Wastewater Treatment Providers offer services by contract to customers who may not be geographically located within their designated service areas, the following table shows by city who are the customers of each of the Regional Providers.

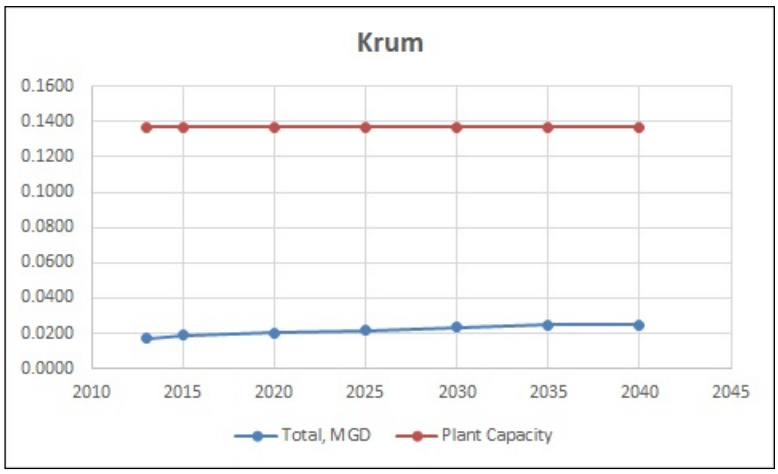
| Regional Wastewater Treatment Provider | Participating Cities |
|---|---|
| Dallas | Dallas, Cockrell Hill, University Park, Highland Park |
| Denton Pecan Creek | Denton |
| Fort Worth Village Creek | Westover Hills, Benbrook, Forest Hills, Edgecliff Village, Everman, Saginaw, Blue Mound, Lakeside, Westworth Village, White Settlement, Lake Worth, River Oaks, Sansom Park, Crowley, Burleson, Pantego, Haltom City, Richland Hills, Hurst, Watauga, North Richland Hills |
| Garland (Duck Creek and Rowlett) | Garland, Richardson, Rowlett, Sachse, Sunnyvale |
| NTMWD | Anna, Melissa, Princeton, Fairview, Royse City, Fate, Allen, Murphy, McKinney, Frisco, Seagoville, Rockwall, Heath, Lavon, Wylie, Parker, Plano, Mesquite, Forney, Anna, Crandall, Prosper |
| TRA | Northlake, Haslet, Roanoke, Bedford, Euless, Southlake, Dalworthington Gardens, Mansfield, Kennedale, Arlington, Westlake, Keller, Colleyville, Duncanville, DeSoto, Coppell, Carrollton, Cedar Hill, Farmers Branch, Addison, Grand Prairie, Irving Midlothian, Lancaster, Ferris, Glenn Heights, Ovilla, Venus, Corral City |
| UTRWD | Double Oak, Celina, Highland Village, Hickory Creek*, Lantana, Mustang SUD, Oak Point*, Cross Roads, Bartonville*, Lake Dallas*, Lincoln Park, Aubrey, Corinth, Shady Shores*, Prosper, Sanger, Double Oak |
| *Indirect customer – receives wastewater service from a wholesale customer | |





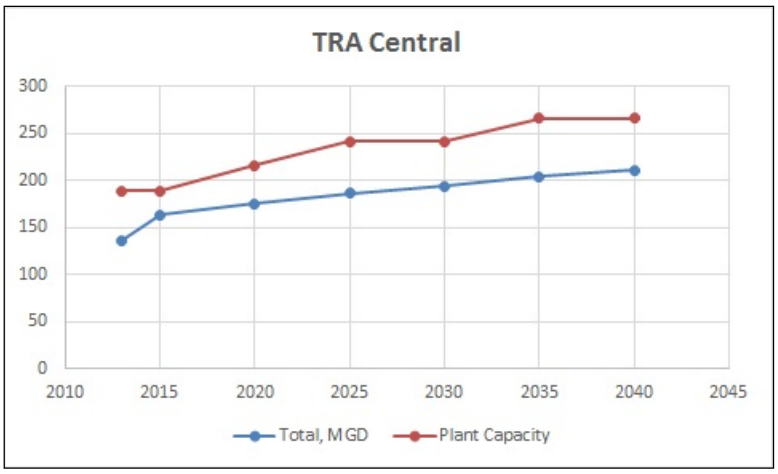

***Denton Pecan Creek Regional Wastewater System***

Denton Pecan Creek System currently serves part of Argyle. Denton Pecan Creek System capacity plans are sufficient to treat COG-projected flows through 2030 when additional capacity would be necessary to remain under 90% of permit limit.



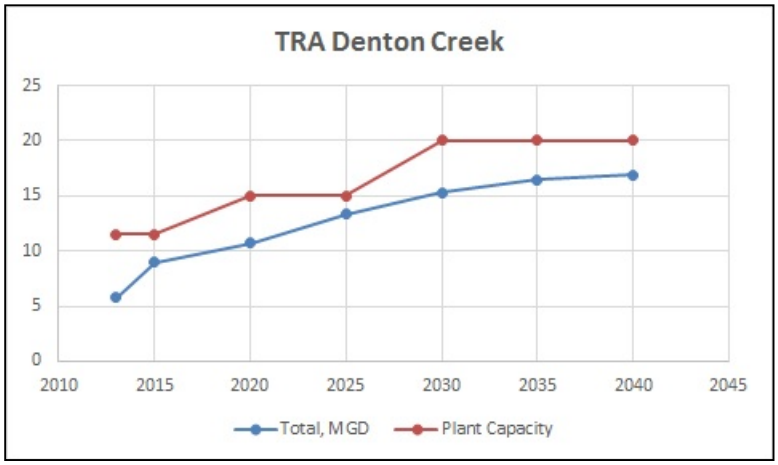

***Krum Wastewater Treatment Plant***

Krum contributes to the Denton Pecan Creek System, although they still reported discharges at their community plant during each month of 2013. It is assumed that future COG-projected flows will be treated at the Denton Pecan Creek plant.



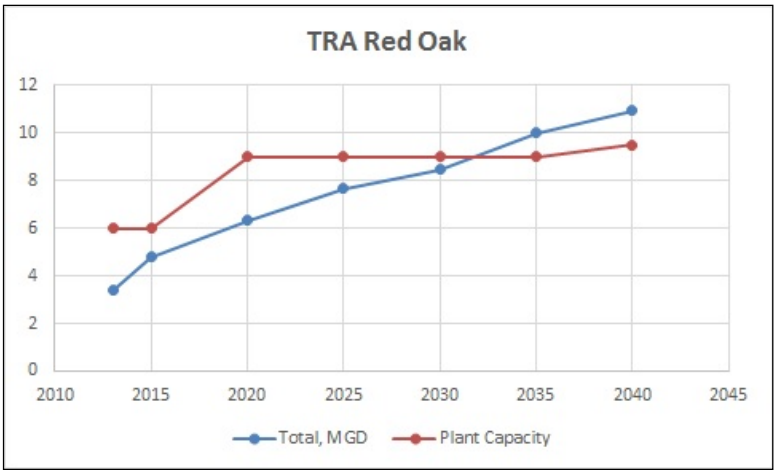

***Trinity River Authority Central Regional Wastewater System***

TRA Central Regional Wastewater System capacity plans are sufficient to treat COG-projected flows through 2040.



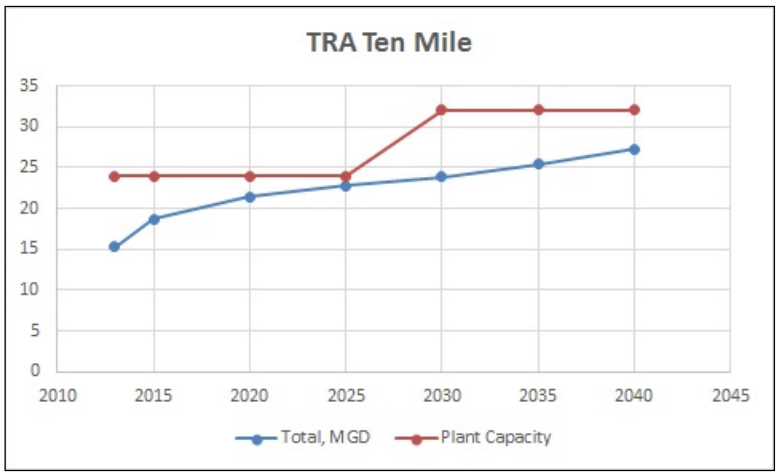

***Trinity River Authority Denton Creek Regional Wastewater System***

TRA Denton Creek Regional Wastewater System capacity plans are sufficient to treat COG-projected flows through 2040.



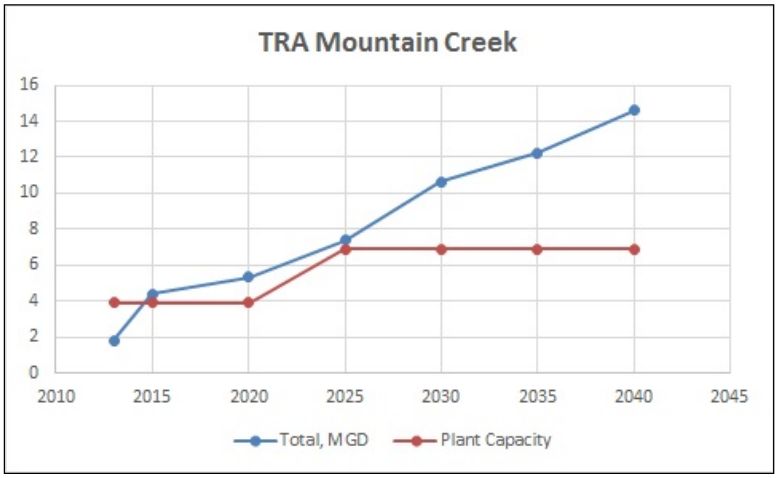

***Trinity River Authority Red Oak Regional Wastewater System***

TRA Red Oak Regional Wastewater System capacity plans are adequate until almost 2030, when the projected waste volume exceeds known system capacity increases.



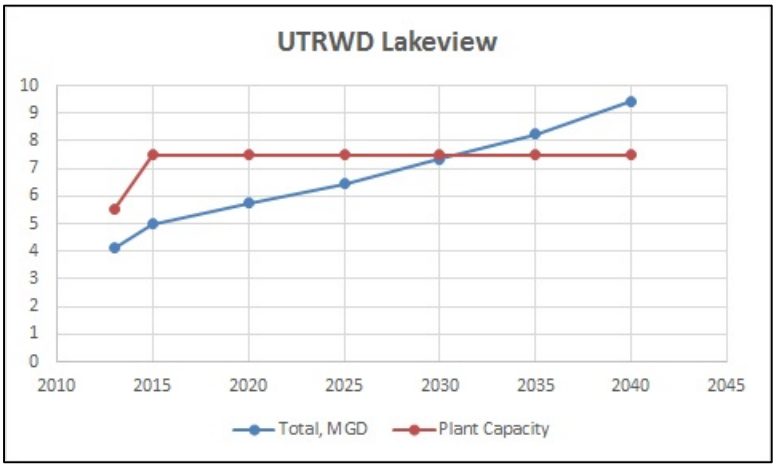

***Trinity River Authority Ten Mile Regional Wastewater System***

TRA Ten Mile Regional Wastewater System capacity plans are sufficient to treat COG-projected flows until nearly 2025, when projected waste flows exceed 90% of their current capacity.



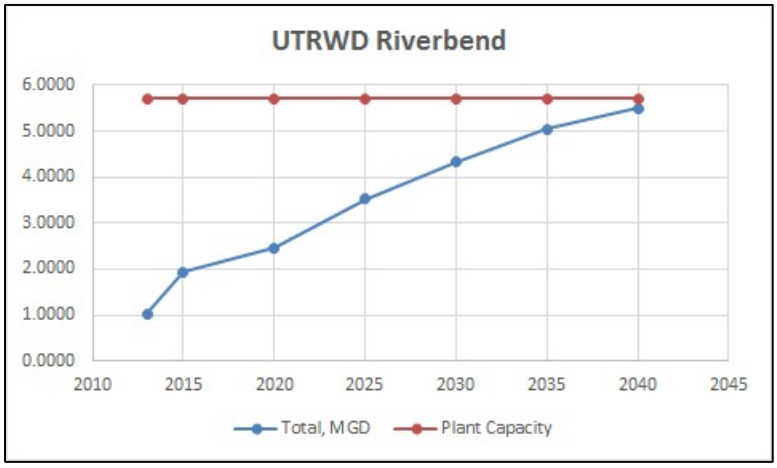

***Trinity River Authority Mountain Creek Regional Wastewater System***

TRA Mountain Creek Regional Wastewater System plans to seek additional contracting parties located within the MCRWS' service area to meet future wastewater treatment if the COG-projected growth occurs over the next 25 years.



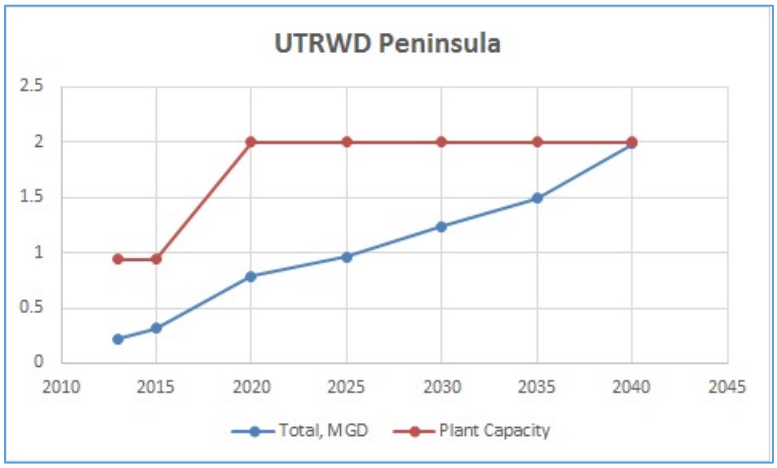

***Upper Trinity Regional Water District Lakeview System***

UTRWD Lakeview System capacity plans are sufficient to treat COG-projected flows through 2030, but will required increased treatment capacity soon thereafter.



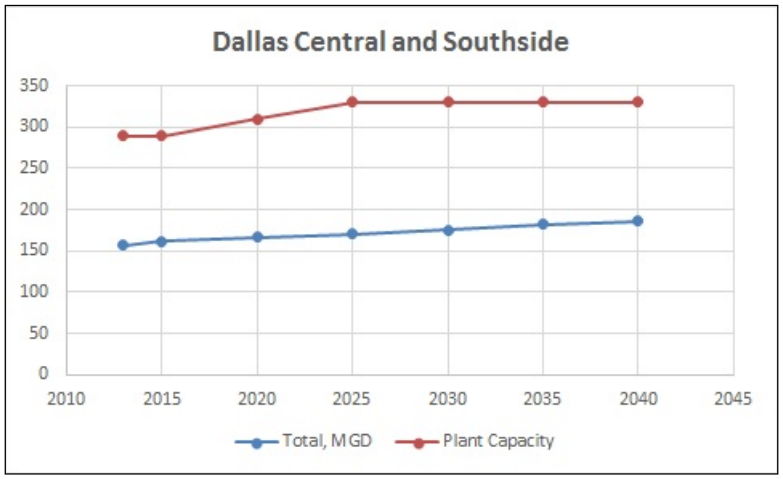

***Upper Trinity Regional Water District Riverbend***

UTRWD Riverbend Regional Water Reclamation Plant treated 1.2 MGD average daily flow, and is permitted at a maximum of 2.0 MGD. In addition to the Riverbend plant, the Doe Branch Water Reclamation Plant will serve part of Celina and other unincorporated areas in northeast Denton County. It reported no Average Daily Flow for 2013, but is currently permitted to discharge 2 MGD average daily flow, and ultimately 5.225 MGD



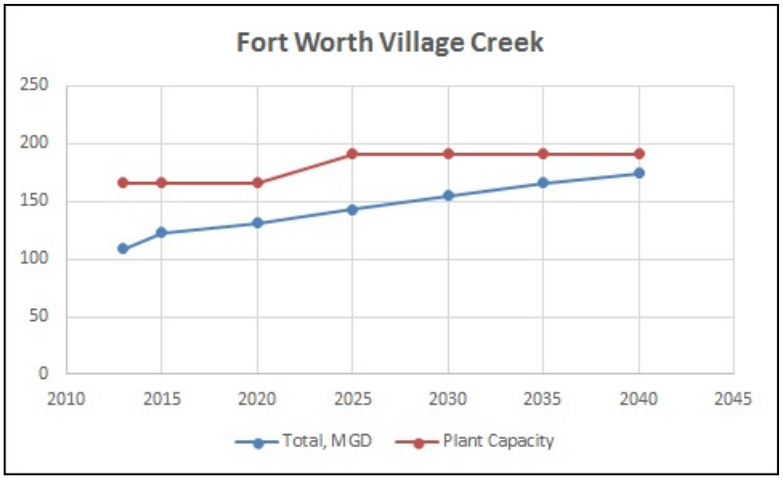

***Upper Trinity Regional Water District Peninsula***

UTRWD Peninsula is treating wastewater from part of Oak Point and unincorporated areas in northeast Denton County. UTRWD Peninsula System capacity plans are sufficient to treat COG-projected flows through 2035, but will require additional capacity before 2040.



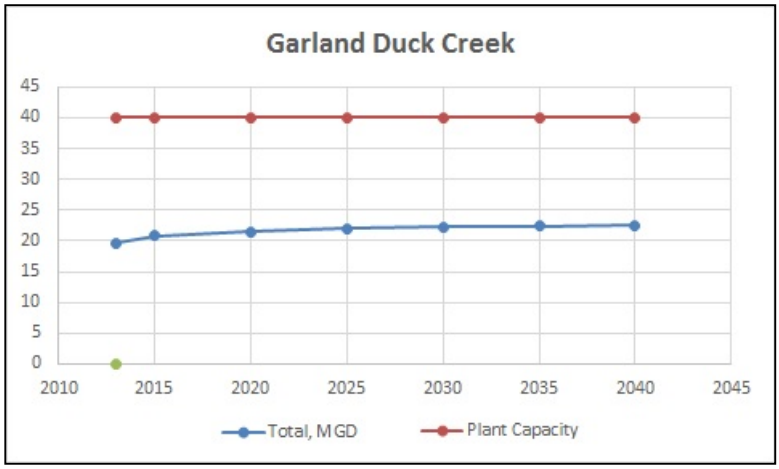

***Dallas Southside and Central Regional Wastewater System***

Dallas Southside and Central plants are interconnected and function as one system. Capacity plans are sufficient to treat COG-projected flows through 2040.



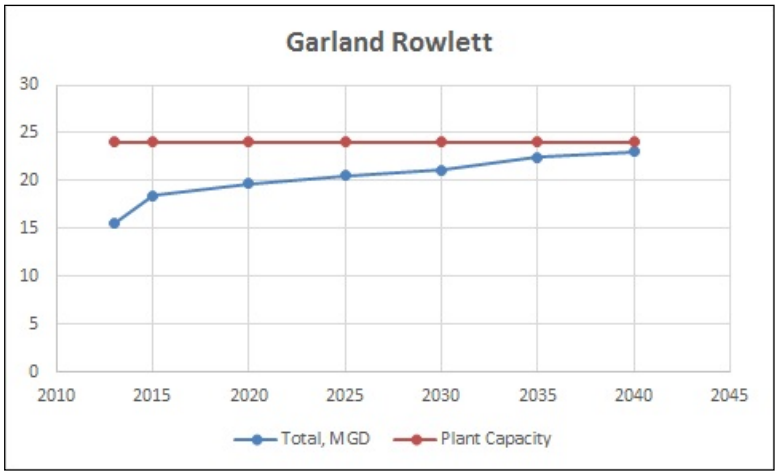

***Fort Worth Village Creek Regional Wastewater System***

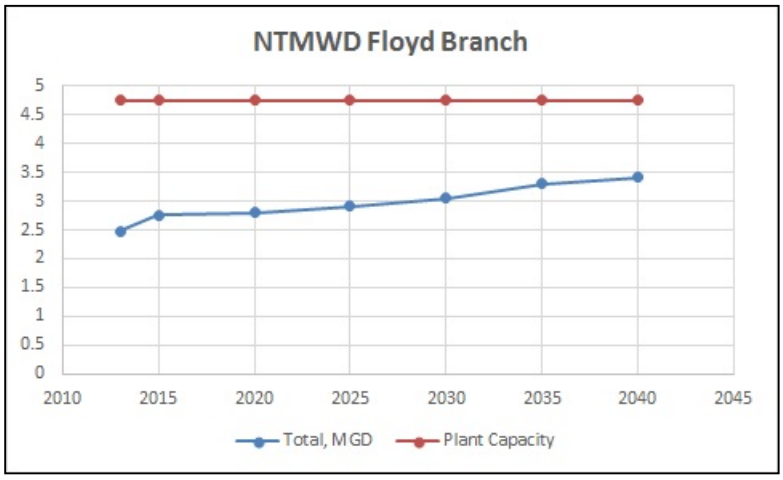
The City of Fort Worth approved a plan in July, 2011 to build a second wastewater treatment facility to serve the rapidly growing western region of the service area. The Mary's Creek Water Reclamation Facility is to be sited adjacent to the closed westside landfill, and is scheduled to open in 2025.




***Garland Duck Creek and Rowlett Regional Wastewater Systems***

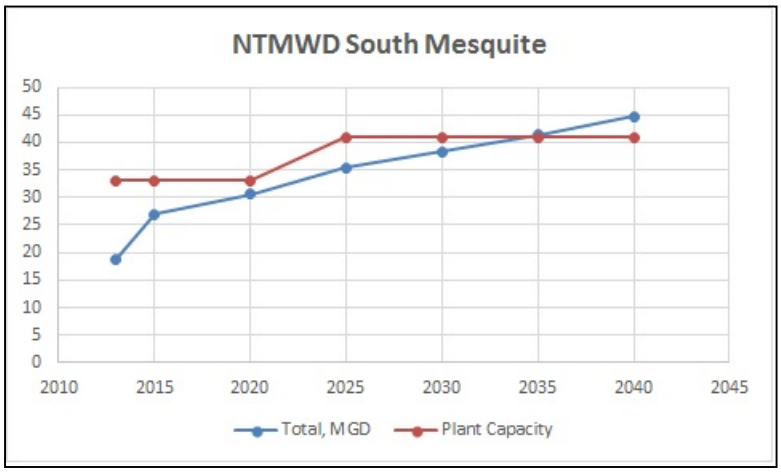
Capacity plans for both facilities are sufficient to treat both COG-projected and Garland-projected flows through 2040.



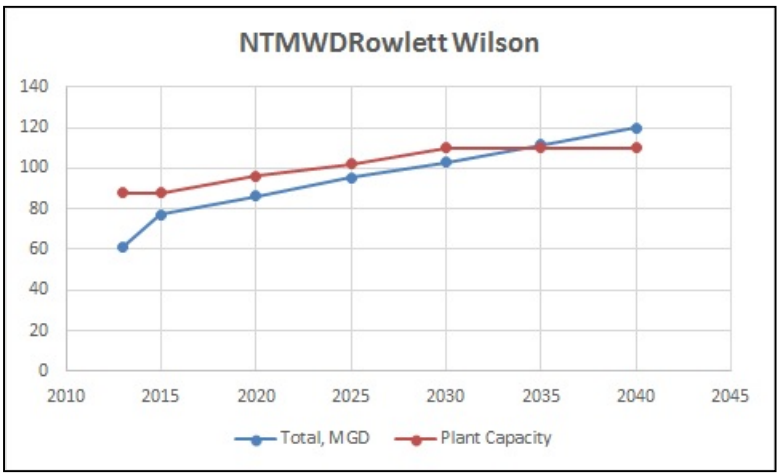




***North Texas Municipal Water District Floyd Branch***

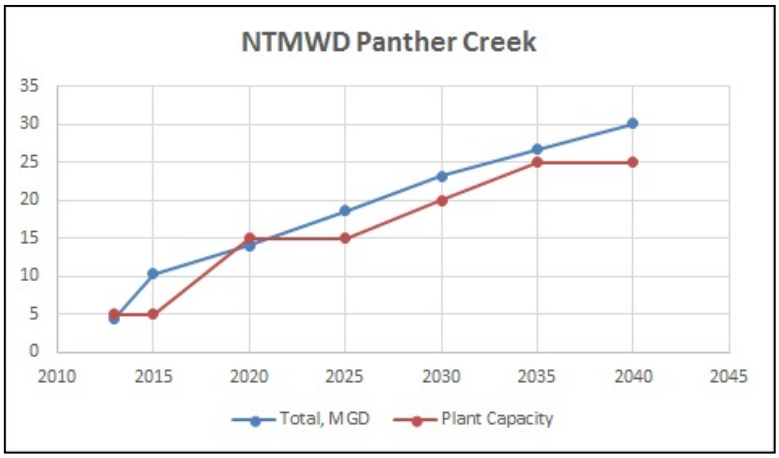
NTMWD Floyd Branch capacity plans are sufficient to treat COG-projected flows through 2040.



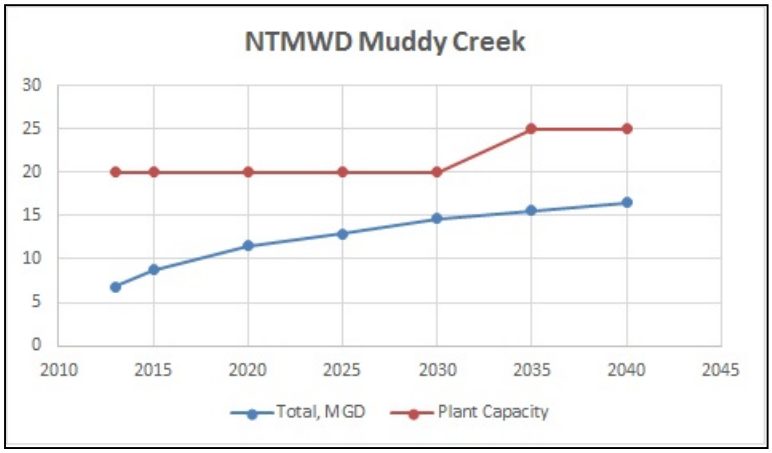

***NTMWD South Mesquite System***
COG-projected flows will approach 90% of the known planned treatment capacity by 2030.




***NTMWD Rowlett Creek and Wilson Creek Regional Wastewater System***
NTMWD Rowlett Creek and Wilson Creek are interconnected and function as one system. According to COG-projected flows, the system will remain below 90% capacity until at least 2025.

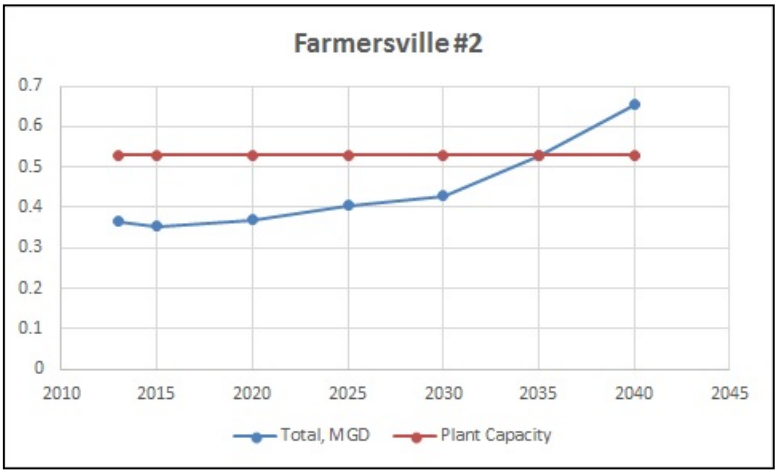



***NTMWD Panther Creek***
Panther Creek is one ot the Frisco area plants that combine to handle a rapidly increasing population. Although there is some flexibility between plants, the Panther Creek facility will need to add capacity in the very near future.



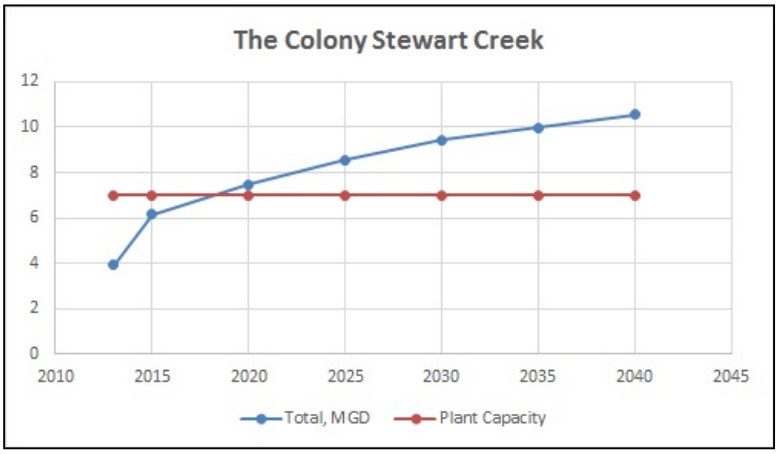

***NTMWD Muddy Creek Regional Wastewater System***

The NTMWD Muddy Creek system easily handles COG-projected wastewater flows through 2040.



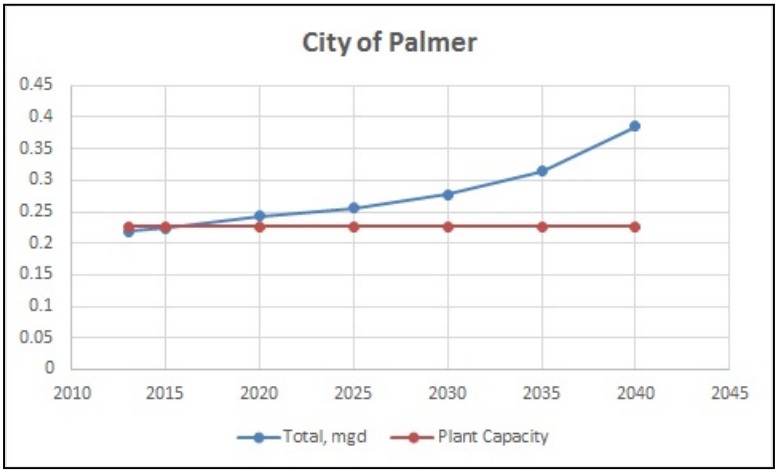

***Farmersville/NTMWD System***

Farmersville owns two wastewater treatment plants managed by NTMWD. Only #2 is currently in operation; #1 would increase capacity by at least .225 MGD. Farmersville system capacity plans are sufficient to treat COG-projected flows through 2040.



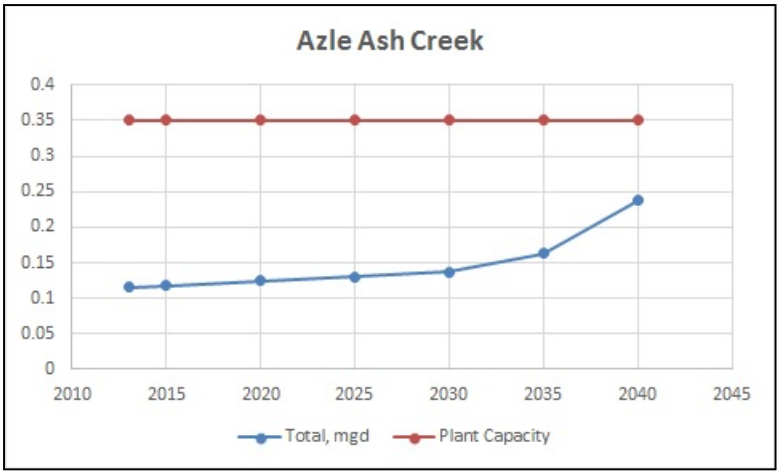

***The Colony***

The Colony capacity plans are sufficient to treat COG-projected flows only through about 2018, when projected flows will exceed 90% capacity.



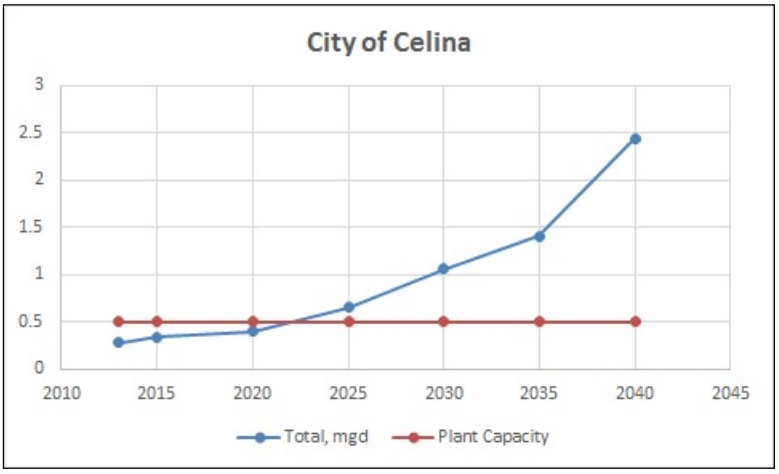

***Palmer Wastewater Treatment Plant***

Palmer's wastewater treatment plant is operating at known capacity currently, and is expected to require at least double its current capacity of .225 MGD.



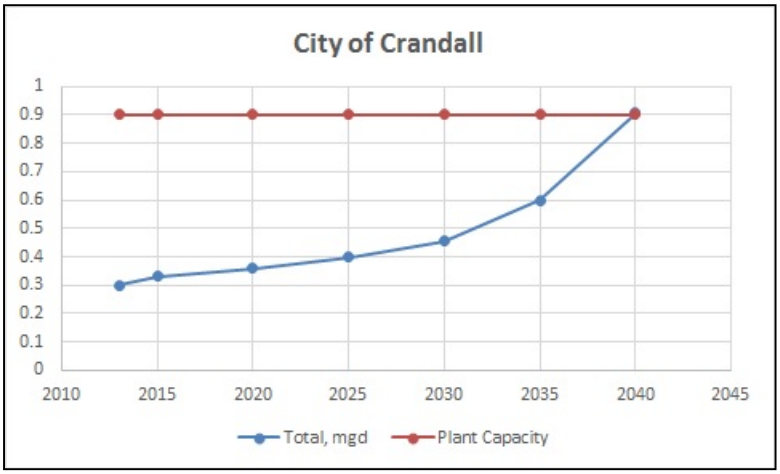

***Azle Ash Creek and Walnut Creek Wastewater System***

Azle capacity plans are sufficient to treat COG-projected flows through 2040.



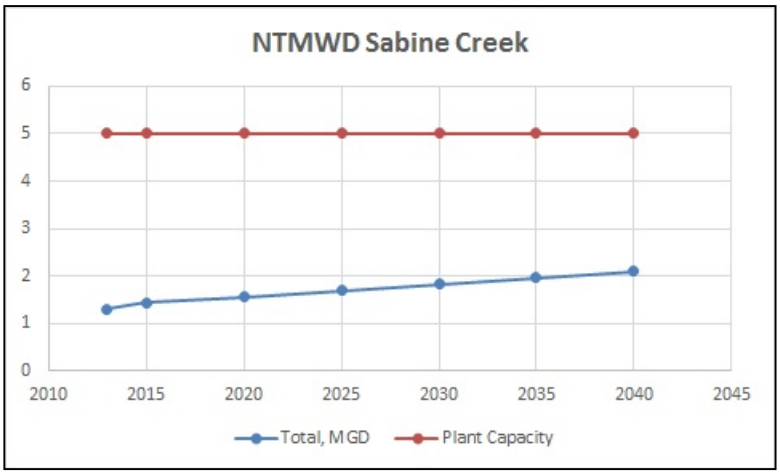

***Celina Wastewater Treatment Plant***

Celina has committed to sending .6 MGD to the UTRWD Doe Run Water Reclamation Facility, which should handle future needs through 2040.



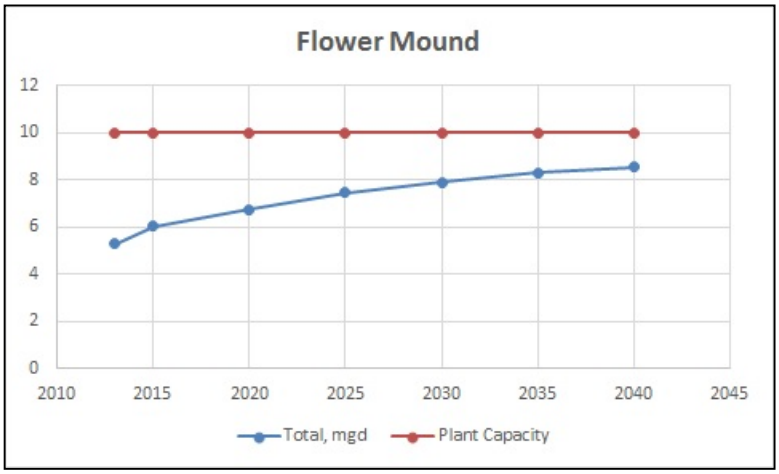

***Crandall Wastewater Treatment Plant***

Crandall capacity plans are sufficient to treat COG-projected flows through at least 2038.



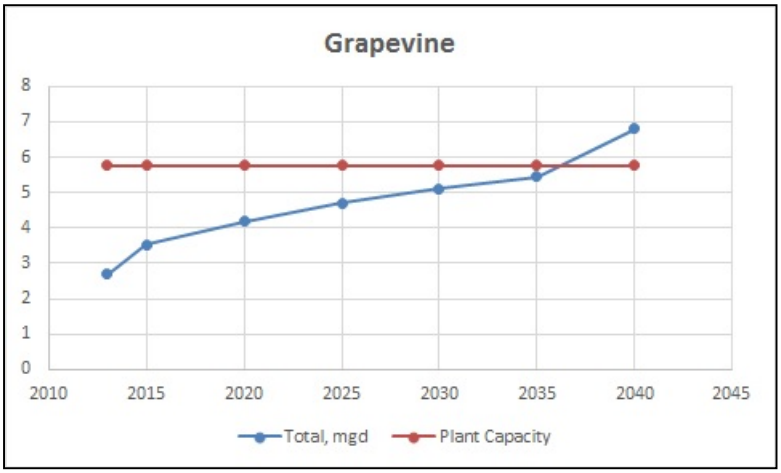

***NTMWD Sabine Creek Regional Wastewater Treatment Plant***

The Sabine Creek Wastewater Treatment Plant treats wastewater from Fate and Royse City and is permitted for 5 MGD. Plant capacity plans are sufficient to treat COG-projected flows through 2040.



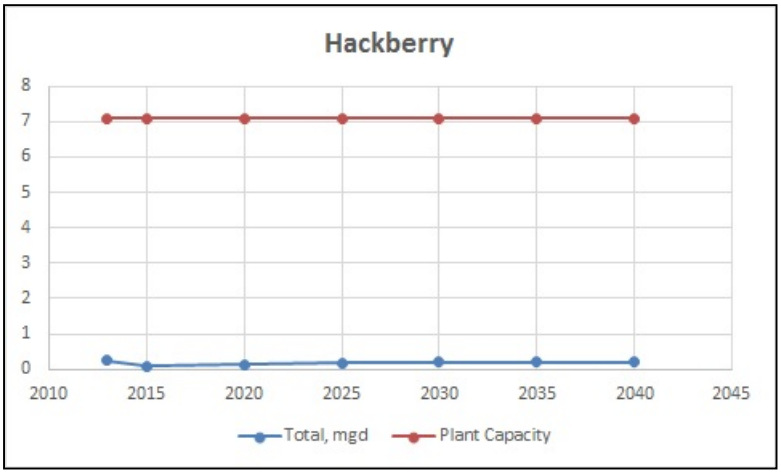

***Flower Mound Wastewater Treatment Plant***

Flower Mound wastewater treatment plant capacity plans are sufficient to treat COG-projected flows through 2040.



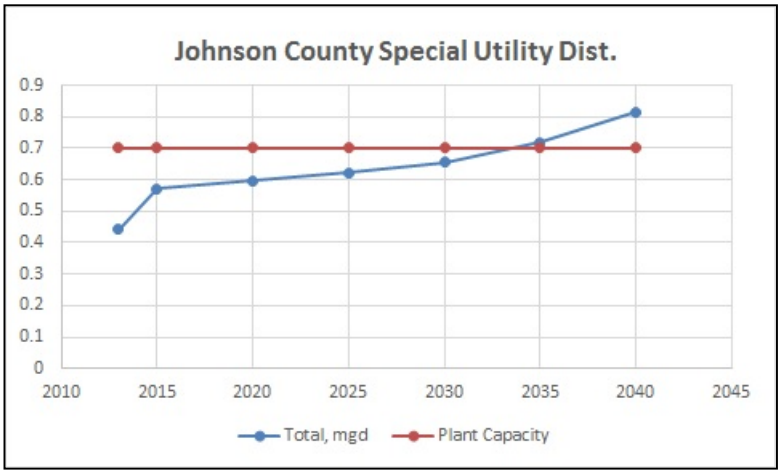

***Grapevine Peach Street Wastewater Treatment Plant***

Grapevine wastewater treatment plant capacity plans are sufficient to treat COG-projected flows through 2035. The current permit limit of 5.75 MGD will need to be addressed if the population grows as predicted, although 'build-out' may occur earlier than projected.



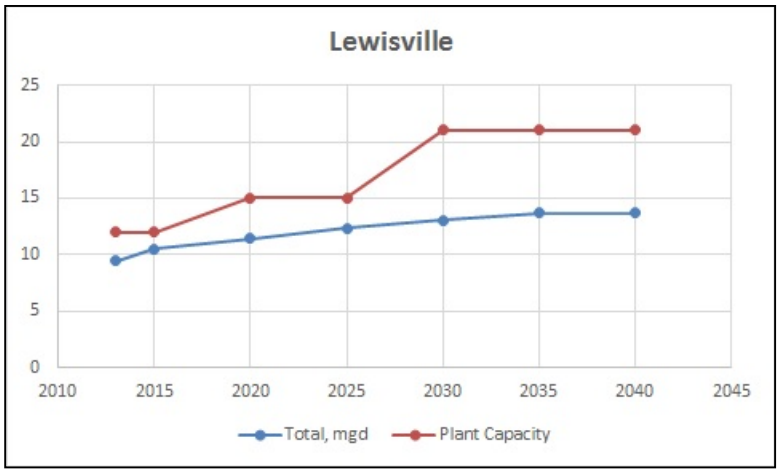

***Hackberry Wastewater Treatment Plant***

Hackberry has sufficient capacity to service COG-projected flows to 2040 and beyond.



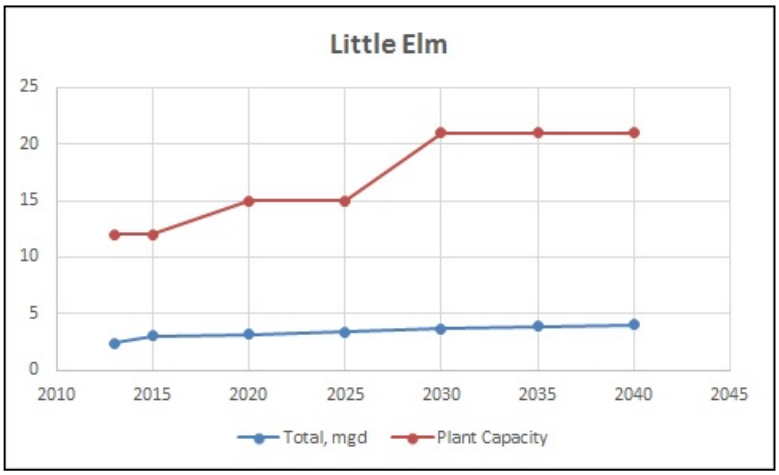

***Johnson County FWSD #1 Wastewater Treatment Plant***

Johnson County FWSD #1 provides wastewater treatment to Joshua and a small part of Burleson. Current capacity is sufficient to treat COG-projected flows through 2030, when COG-projected flows reach 90% of permit limit.



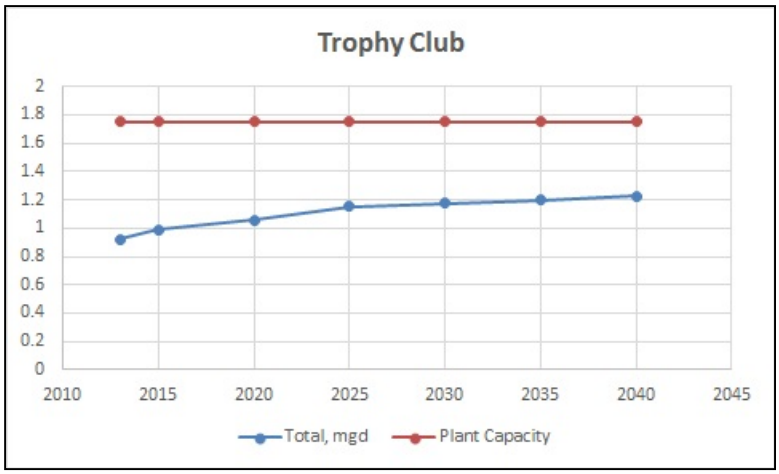

***Lewisville Wastewater Treatment Plant***

In addition to its own residents, Lewisville provides wastewater treatment for a subdivision in the Denton County FWSD #1-A. Lewisville wastewater treatment plant capacity plans are sufficient to treat COG-projected flows through 2040.




***Little Elm Wastewater Treatment Plant***

Little Elm wastewater treatment capacity plans are sufficient to treat COG-projected flows through 2040.




***Trophy Club MUD Wastewater Treatment Plant***

Trophy Club MUD wastewater treatment capacity plans are sufficient to treat COG-projected flows through 2040.

## APPENDIX F- COMMENTS RECEIVED AND RESPONSES FROM PUBLIC MEETING, MAY 8, 2014

- **Question** - Are both Pecan Creek subwatershed and Pecan Creek – Little Elm Reservoir subwatershed both in the Lake Lewisville watershed? If so, are you sure that one subwatershed has 6800 people, while the other has 117,000 people?

**Answer** – the two subwatersheds are both in the Lake Lewisville watershed. The current population was recalculated using the method described in Appendix E, with similar results. The population figures were also consistent with 2013 orthophotography of the two subwatersheds.

- A representative of the City of Garland wrote to update the Permitted Average Daily Flow of the Garland Duck Creek plant to 40 MGD.

- **Question –** What is the source of your data for Average Daily Flow through each wastewater treatment plant?

**Answer** – The Permit Compliance System (PCS) and Integrated Compliance Information System (ICIS) databases of the Environmental Protection Agency (EPA) provide information on public and private entities that hold permits to discharge wastewater into rivers. This online report details when a permit was issued and expires, how much the permittee is permitted to discharge, and the actual monitoring data showing the volume of wastewater generated monthly.

A customized search is used to retrieve the average daily flow of wastewater treatment plants (SIC code 4259) during the period from January 1 to December 31 of the prior year.

In future Water Quality Management Plans, NCTCOG staff will improve the quality and timeliness of average daily flow data by arranging to acquire access to the NetDMR system operated by the Texas Commission on Environmental Quality.