Economic Benefits to the North Texas Region of Meeting Identified Water Needs

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Executive Summary

North Texas Municipal Water District (NTMWD) and Tarrant Regional Water District (TRWD) together supply water to about 5 million people across the Dallas-Fort Worth region. Their service areas lie within Region C, the state-designated water-planning region encompassing Dallas-Fort Worth and surrounding counties. Both districts are projected to face growing gaps between currently identified supplies and forecasted demand. Demand on their systems is projected to grow by roughly 53 percent for NTMWD and 63 percent for TRWD by 2080. Over the same period, currently identified supplies, which include existing sources and near-term water management strategies already identified by each district, increase by about 18 percent for each district. By 2080, the resulting projected shortfall is equivalent to approximately 29 percent of NTMWD customer demand and 26 percent of TRWD customer demand. Closing these gaps will require new water supply. To the extent the projected gaps are not addressed, water availability could constrain housing development and business activity. This report estimates the gross economic activity associated with developing sufficient additional supply to meet the projected gaps.

Since 2001, Region C has added roughly 3 million residents and more than doubled its economic output. The result is that each acre-foot of water now goes much further: it supported approximately $204,000 of annual real GDP in Region C in 2001 and approximately $396,000 by 2024, roughly double in constant dollars. Water in these service areas is more economically productive than at any point in the region's history. Each acre-foot of new supply developed by the districts would potentially support more housing, business activity, and employment than it would have two decades ago. If the region is unable to secure reliable water to meet demand, the economic consequences would be correspondingly higher compared to a less water-efficient economy.

To estimate the economic activity that would be supported by meeting the gap in needs, we first estimate two types of direct effects, then use a regional input-output model to estimate the indirect and induced effects that follow. Each type of effect corresponds to activity that residents of the region would recognize:

- **Residential direct effects** are the construction and real estate activity tied to new homes that the additional water supply could serve. This includes home-builders and the trades they employ and associated sectors. Effects are based on the modeled construction and real estate activity associated with homes that could be developed and served by the additional water supply.
- **Commercial, institutional, and industrial (CII) direct effects** are the additional business activity that water availability allows across the existing economy. This includes offices, hospitals, schools, retail stores, restaurants, factories, and distribution centers that can locate or expand in the service areas. Because the CII effect is spread across the economy in proportion to its current structure, it reaches nearly every sector rather than a few water-intensive industries.
- **Indirect effects**, capturing changes in business purchases of inputs and intermediate products that follow from this new activity. These represent purchases businesses make from suppliers.
- **Induced effects**, capturing changes in household spending supported by the labor income that direct and indirect activity generates. These include household spending.

Economic activity is measured in terms of value added, the value of production after subtracting the cost of intermediate inputs. For a local or regional economy, value added is equivalent to gross domestic product (GDP). In 2026, the NTMWD and TRWD service areas generated approximately $561 billion in value added.

This report compares two scenarios through 2080. In the Baseline Scenario, no water supply is developed beyond existing and in-progress sources. In the Alternative Scenario, new water supply is developed to meet projected demand.

By 2080, we forecast economic activity to be $1.88 trillion under the Baseline Scenario and $3.04 trillion under the Alternative Scenario (constant 2026 dollars). The difference between the two scenarios is the economic impact reported throughout this report as the benefit of developing new supply to meet demand. In 2080, that difference is $1.16 trillion in annual value added, a 62% increase in economic activity over the Baseline Scenario.

Roughly $702 billion of the increase in economic activity is directly generated directly by users of the new water supply, through value added from new residential development and CII activity. The remaining $460 billion is indirect and induced activity. Indirect effects come from businesses buying goods and services from their suppliers. Induced effects come from workers spending their wages. These effects occur both within the service areas and elsewhere in Region C and Texas. Table 1 reports these results by district for 2040 and 2080.

Table 1: Gross Economic Activity Associated with Additional Water Supply

	NTMWD		TRWD	
Metric	**2040**	**2080**	**2040**	**2080**
Unmet need met (AF/yr) *(% of demand)*	82,700 *(12.7%)*	248,500 *(28.6%)*	28,800 *(4.0%)*	269,500 *(26.3%)*
Value added ($B/yr)				
Direct: Residential	4.1	28.6	3.0	70.0
Direct: CII	49.2	300.0	15.9	303.1
Indirect	23.2	141.3	9.0	179.0
Induced	9.2	55.6	4.4	84.4
Total value added *(% increase over Baseline Scenario GDP)*	85.7 *(22.4%)*	525.5 *(61.1%)*	32.3 *(7.4%)*	636.5 *(62.7%)*
Labor, Population and Housing Effects				
Labor income ($B/yr) *(% increase over Baseline Scenario)*	49.1 *(22.0%)*	299.5 *(60.2%)*	18.4 *(7.2%)*	360 *(61.6%)*
Jobs supported *(% increase over Baseline Scenario)*	501,500 *(21.8%)*	1,850,700 *(59.6%)*	199,300 *(6.8%)*	2,392,300 *(57.6%)*
Population supported *(% increase over Baseline Scenario)*	466,900 *(14.1%)*	1,449,200 *(38.8%)*	163,700 *(3.5%)*	1,588,700 *(29.7%)*
Homes supported *(% increase over Baseline Scenario)*	167,200 *(14.1%)*	513,700 *(38.8%)*	59,300 *(3.5%)*	571,200 *(29.7%)*

Note: Activity generated by each district's additional supply, including indirect and induced effects received elsewhere in Region C and Texas. Real 2026 dollars. Homes supported is cumulative housing stock or the number of housing units the additional water supply could serve as of each analysis year; all other rows are annual figures for that year. County and Growth-Type Results are estimated in separate models and are not additive to, or interchangeable with, these totals. Percentages in parentheses are the increase over the Baseline Scenario value for the same metric and year (Baseline GDP, labor income, employment, population, or housing). Unmet need met is shown as a percent of demand served by the district.

Indirect and induced effects flow outward from where the water is delivered, as shown in Figure 1. Businesses purchase materials and services across the region, while the labor income generated by direct and indirect activity supports household spending in multiple communities. Between 2030 and 2080, the figure traces indirect and induced value added between NTMWD, TRWD, the remainder of Region C and the rest of Texas. Substantial additional flows occur within and between NTMWD and TRWD customer groups, while approximately 23.8% of indirect and induced benefits are received elsewhere in Region C and a further 4.7% throughout the rest of Texas. The economic growth that can occur when water needs are met flows to the region as a whole, not only in the geographies where that incremental supply is delivered.

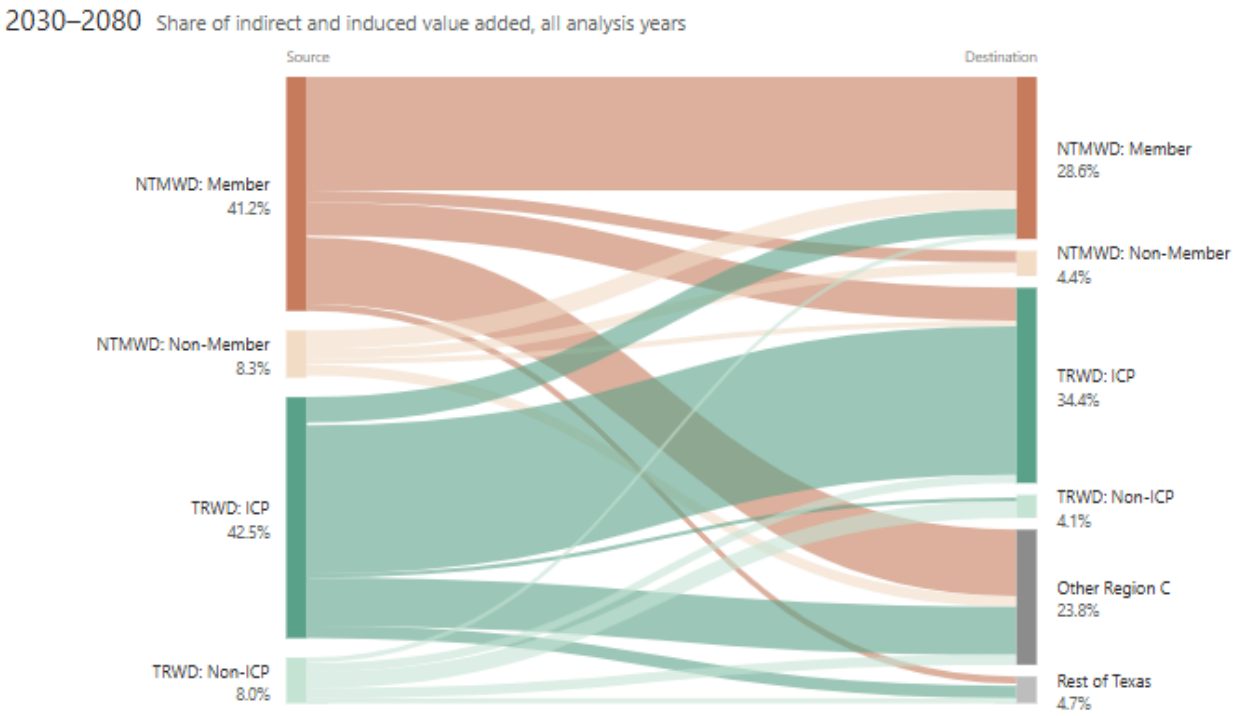
We examine how effects are distributed within the service areas in three ways: between customer groups, by county, and between Mature and Developing areas, a classification of water user groups by how much undeveloped land remains for new development (Sections 6.2 to 6.4).

Effects by customer group. Customer-group results distinguish Member from Non-Member customers for NTMWD. For TRWD, they distinguish customers supplied under contracts with the Initial Contracting Parties (ICPs)[1] from all other customers (Non-ICPs). Direct CII activity is concentrated in the Member cities and the ICPs, which hold most of each district's existing business base. Direct residential activity is split roughly evenly. By 2080:

- NTMWD Member cities account for approximately 81 percent of NTMWD's direct CII value added and 46 percent of its direct residential value added. Non-Member customers account for the remaining 19 and 54 percent. Member cities also share in the growth of Non-Member areas. Approximately 39 percent of the indirect and induced value added generated by Non-Member growth is received in Member cities, nearly twice the 21 percent retained in Non-Member areas. By 2080, growth in Non-Member areas supports approximately $14.4 billion in annual value added, $8.4 billion in labor income, and 48,400 jobs located in Member cities.
- The ICPs account for approximately 88 percent of TRWD's direct CII value added and 52 percent of its direct residential value added. Non-ICP customers account for the remaining 12 and 48 percent. ICP cities also share in the growth of Non-ICP areas. Approximately 19 percent of the indirect and induced value added generated by Non-ICP growth is received in ICP cities, more than twice the flow in the opposite direction. By 2080, growth in Non-ICP areas supports approximately $9.1 billion in annual value added, $5.2 billion in labor income, and 34,100 jobs located in ICP cities.

[1] Fort Worth, Arlington, Mansfield, and the Trinity River Authority

Figure 1: Flow of Indirect & Induced Value Added between Customer Groups (2030–2080)



Note: Indirect and induced value added only, shown as shares of the total summed across all decades (2030, 2040, 2050, 2060, 2070, and 2080). Direct effects are excluded because they remain in the originating region by construction. Ribbons connect the customer group generating the activity (left) to the region receiving it (right), and ribbon width is proportional to the share of the total. Other Region C and Rest of Texas are destinations only. Rest of Texas comprises all Texas counties outside the other five regions. Flows below 0.5 percent of the total are omitted but included in totals. Each bar shows the distribution of the originating customer group's indirect and induced value added across recipient regions.

Effects by County. County-level impacts are estimated for each of the 18 counties in which NTMWD and TRWD customers are located. Among these 18 counties only two, Tarrant and Collin Counties, generate approximately 63 percent of value added in 2080. These two counties and Dallas County, the region's largest employment center, retain approximately 68 to 74 percent of the indirect and induced value added they generate, while most other counties retain less than half.

Effects by growth type. We classify water users into 'Mature' or 'Developing' growth types based on the amount of undeveloped land they have available for future development. Mature areas are largely expected to grow through infill and redevelopment. Developing areas retain a substantial share of undeveloped land. The classification cuts across customer groups. Direct CII activity is weighted toward Mature areas, particularly for TRWD. Direct residential activity is weighted toward Developing areas. By 2080:

- NTMWD's Mature areas account for approximately 56 percent of NTMWD's direct CII value added and 36 percent of its direct residential value added. Developing areas account for the remaining 44 and 64 percent.
- TRWD's Mature areas account for approximately 75 percent of TRWD's direct CII value added and 46 percent of its direct residential value added. Developing areas account for the remaining 25 and 54 percent.

Effects by sector. The modeled economic activity extends well beyond housing. Real estate and leasing and construction are the two largest sectors, generating approximately $187 billion and $167 billion of value added, respectively, in 2080; together they account for approximately 31 percent of the regional total. Much of the remaining activity is concentrated in finance and insurance, professional and technical services, wholesale trade, manufacturing, information, and health care. Many of these sectors pay above-average wages. The sector mix differs across service areas: NTMWD Member cities have a service-intensive profile, while construction and real estate account for approximately 61 percent of value added associated with growth in TRWD Non-ICP areas. In these faster-growing communities, residential development alone accounts for nearly half of modeled value added.

Population, employment, and housing. Population and housing results come directly from the residential component of projected unmet need, while employment includes the direct, indirect, and induced effects associated with both residential and CII activity. By 2080, additional supply would provide capacity to serve approximately 1.08 million homes housing 3.04 million residents beyond those assumed supportable with currently identified supplies. The associated economic activity supports an estimated 4.24 million annual-average jobs, including approximately 1.85 million associated with NTMWD supply and 2.39 million associated with TRWD supply. These employment estimates include full- and part-time positions throughout the modeled regional economy. These jobs would be supported within a strong regional labor market: average wages in the Dallas-Fort Worth region currently exceed both the Texas and national averages (Section 6.6).

Federal, State and Local tax revenue. Section 6.7 estimates the tax effects of developing new water supply to meet demand in each modeled region. They are reported for five levels of government: county, city, special districts (including school, hospital, and water districts), state, and federal. By 2080, the associated activity would generate approximately $207 billion in annual tax revenue: approximately $33 billion in state and local revenues and $56 billion in federal revenue associated with NTMWD supply, and approximately $46 billion in state and local revenues and $73 billion in federal revenue associated with TRWD supply.

What the results mean. Without new supplies beyond those currently identified, water availability is projected to constrain economic growth in Region C. Unmet needs within the NTMWD and TRWD service areas are projected to grow from approximately 111,500 acre-feet per year in 2040 to approximately 518,000 acre-feet per year in 2080. This projected unmet need is shared across all counties, all customer groups of both districts (NTMWD Member and Non-Member; TRWD ICP and Non-ICP), and across both Mature and Developing areas, as measured by land available for development. By 2040, meeting these needs would provide capacity to serve approximately 226,000 homes and would be associated with approximately 700,000 jobs and $118 billion in annual value added. By 2080, that capacity grows to approximately 1.08 million homes, with associated activity reaching approximately 4.24 million jobs and $1.16 trillion in annual value added. The economic activity supported by this growth extends beyond the construction and real estate sectors that underpin future housing development, and into professional service sectors such as finance and insurance, professional and technical services, health care, and others paying above-average wages. However, because major water-supply projects may take decades to plan, permit, finance, and build, near-term decisions will determine whether growth in later decades can be accommodated. These estimates describe the scale of growth that water supply development could support, and the economic activity at risk if it is not developed.

Implications for water supply planning. Projected water needs are broadly distributed across both districts and among the customer groups within each service area. Although the timing and

composition of those needs differ, additional supply supports development in NTMWD Member and Non-Member areas and in TRWD ICP and Non-ICP areas. The resulting direct benefits are therefore not confined to a single district or group: residential development is relatively broadly distributed, while CII activity is more concentrated in established economic centers.

The benefits also extend beyond the communities in which the additional water is made available. Supplier purchases, commuting, and household spending generate substantial indirect and induced effects across service-area boundaries and throughout Region C. Areas containing the region's largest employment centers and concentrations of business activity receive particularly large spillover benefits, including benefits generated by water-supply development in other customer groups.

These regional benefits also carry weight for the state as a whole. Region C generates approximately 30 percent of Texas's economic output while accounting for less than 10 percent of statewide water use, so growth supported by reliable water supply in NTMWD and TRWD service areas is a material contributor to the state's overall economic base, not merely a regional outcome.[2] Because Region C's economy is closely linked to markets, supply chains, and labor across the state, a meaningful share of the indirect and induced effects discussed above, along with the associated tax revenue, employment, and business activity, extends to communities and legislative districts outside Region C. By 2080, approximately $23 billion in annual value added and 76,000 jobs are received in Texas counties outside Region C, and the associated state tax revenue, approximately $37 billion per year, accrues statewide. This statewide linkage is relevant context for state policy discussions: given Region C's outsized share of statewide output, constraints on the region's water supply carry consequences beyond the region, and investment in regional supply reliability can reasonably be understood as investment in the state's broader economic base.

This study estimates the gross economic activity associated with additional water supply. For brevity, the report refers to this activity as "benefits," but the term does not denote net economic benefits: the analysis does not account for the costs of building, financing, or operating water-supply projects and does not calculate a benefit-cost ratio. Nor does it assume that water availability independently causes economic growth; rather, it estimates the activity that adequate supply could enable under the region's population and water-demand forecasts. Because the analysis does not consider from where constrained growth might relocate, the estimates represent gross benefits to Region C and the rest of Texas but do not consider other national effects. If new project water is sourced from outside Region C, this analysis does not consider the potential economic effects on those regions.

[2] Region C Water Planning Group, "About the Region," regioncwater.org/about-the-region