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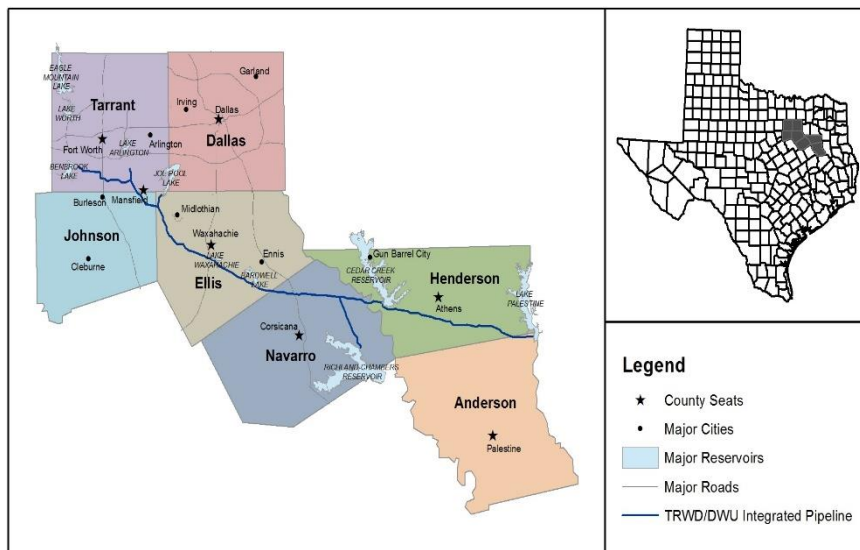
## Using GIS to Evaluate Lake Palestine and Potential Impacts of Raw Water Withdrawal for an Expanding Population

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Population growth and economic expansion in North Texas have been some of the highest in the nation, but these attractions will not continue without a key ingredient – water. Tarrant Regional Water District (TRWD) and Dallas Water Utilities (DWU) have joined forces to develop and implement an ambitious, historic program - the Integrated Pipeline (IPL). This partnership will ensure that maximum effort is given today to meet the water needs of its constituents in the future [1].

The population of the DFW Metroplex is expected to approach 12 million people by the year 2050 [2]. To address the resultant demand for additional water supplies, the TRWD/DWU partnership will design, build, and operate the IPL raw water infrastructure system to take advantage of existing raw water resources within the state of Texas. This project will transport water from Lake Palestine (untapped, but built in 1965 for this purpose), Cedar Creek Reservoir, and Richland-Chambers Reservoir through 150 miles of pipelines and pump stations, delivering about 350 million gallons per day (MGD), or 392,310 acre-feet per year to North Texas. (Fig. 1).



With Lake Palestine never before been tapped, it is of interest to the surrounding community and the TRWD/DWU partnership to investigate the possible impacts to the surrounding Lake Palestine community. With a maximum allocation

of 102 MGD [3], allotted to the IPL from Lake Palestine, the possible drawdown of the lake is an area of interest for community.

*Figure 1: Proposed Route of the IPL*

The authors analyzed each of three different withdrawal scenarios using Geographic Information Systems (GIS). Three withdrawal scenarios were provided by DWU (maximum allocation, supplemental allocation, monthly variant) and analyzed for their impacts to lake's surface elevation. Data from the Texas Water Development Board and the Palmer Drought Severity Index were compiled to look at both wet year and dry year scenarios and determine new water surface elevations. Results indicated that as much as a third of the lake volume could be withdrawn in any given year.

*References:*

[1] Johnson, Becky, et.al. IPL Regional Partnership for Water Supply Economic Impact Analysis. Prepared for the Tarrant Regional Water District (TRWD). Fort Worth, TX: Texas Christian University, 2015. Print.

[2] "North Texas 2050." Vision North Texas. Vision North Texas, n.d. Web. 16 Mar. 2015.  
[http://www.visionnorthtexas.org/regional\\_summit/North\\_Texas\\_2050.pdf](http://www.visionnorthtexas.org/regional_summit/North_Texas_2050.pdf).

[3] City of Dallas, Water Utilities. Email correspondence, November, 2015.

