

Executive Summary

Rural and emerging suburban communities in Rhode Island increasingly face water scarcity in summer months because of shifting demographics and increasing development combined with periodic natural scarcity. As a result, the Rhode Island Water Resources Board, the Kent County Water Authority, and private developers are investigating water supply augmentation scenarios in Coventry and West Greenwich, Rhode Island.

I conduct a case study of Coventry and West Greenwich, two towns which are experiencing rapid suburbanization, to examine the question: *Is it necessary to augment existing water supplies to meet increasing demands in Coventry and West Greenwich?* Current water demands are met by the regional supplier Kent County Water Authority (KCWA) and by private wells. In 2004, KCWA delivered an average of 2.3 mgal/d to Coventry and 0.7 mgal/d to West Greenwich, with combined total residential, commercial and industrial uses of approximately 3.0 mgal/d.¹ Though current water supply is adequate for current demand, the KCWA has stated limits to available supply in the near future.

I perform two buildout scenarios in Coventry and West Greenwich using GIS to determine whether or not current water supply is adequate for future water demands. The buildout analysis indicates that 48-53 percent of Coventry and 35-40 percent of West Greenwich have yet to be developed. Using acreage and zoning data from the buildout analysis and existing water data, I establish future water projections.² A summary of residential, commercial and industrial future water projections indicates that total new water demands in Coventry and West Greenwich could range from 14.4 - 21.2 million gallons per day.

Future water projections indicate that current water supply is unlikely to meet future water demands at full buildout without conservation. KCWA currently has 22 mgal/d of water available for distribution from the Scituate Reservoir and groundwater wells combined.³ In the summer of 2004, all of Kent County's service area used an average of 11.7 mgal/d.⁴ Therefore, approximately 10 mgal/d may be available to be allocated for future use. If no new supplies are developed to meet future demands, and if KCWA maximizes existing sources, then Coventry and West Greenwich may experience a deficit at buildout of 4 – 11 mgal/d. If KCWA augments the Mishnock Wellfield to produce 4.3 mgal/d, then Coventry and West Greenwich may experience a deficit at buildout of only 3 – 10 mgal/d.

I apply new water demands to USGS subbasin stress ratios; ratios in Coventry and West Greenwich are expected to range from 0.3 to 5.2 at buildout.⁵ Subbasin stress ratios and water deficits at full buildout indicate that the potential for conservation and water efficiency through land use is so large that even when new water sources are identified in Coventry and West Greenwich, it may not be necessary to significantly expand supplies. Agencies and towns can reduce the increasing water demand by the following methods: institution of a regional graduated growth management plan, rehabilitation of existing wellfields by upgrading wells and solving water quality problems, institution of rural residential zoning in the western portion of both towns, adoption of a water-conserving landscape ordinance, cooperation between state and municipal agencies to amend Handbook 16 and State Guide Plan Element 721, and implementation of an Artificial Recharge Pilot Project in the industrial sector. By improving the efficacy of existing wellfields and sources, and by initiating aggressive conservation measures, no new sources will need to be developed to meet future needs in these subbasins.

¹ Fitta, Kevin J., P.E., System Engineer for Kent County Water Authority, Written communication on February 7, 2005, re: Data Request – Graduate Thesis.

² I apply data from the United States Geological Survey (USGS) Water Use and Availability Studies for both the Pawtuxet River Basin and the Pawcatuck River Basin (2004), and use indirect data and direct sample data from the Kent County Water Authority to estimate future water projections.

³ PARE Engineering Corporation, *Water Supply System Management Plan*. Report prepared for the Kent County Water Authority, Rhode Island: Volume 1, October 2001.

⁴ Fitta, Kevin J., P.E., System Engineer for Kent County Water Authority, 2005.

⁵ Stress basin ratios exceeding one indicate that more water is being withdrawn than can be recharged to the aquifer.