

Commute Sheds as a Regional Water Management Decision Tool

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Executive Summary

An Internet-based GIS program from the Census Bureau may help local water managers visualize the relative flow of water supply benefits amongst cities, using the conceptual link that water supply supports residents' health and their ability to work. When applied to North Carolina's Research Triangle Region, results show that 1) within the Upper Neuse Basin, there is a net flow of water supply benefits from other cities into Durham, and 2) there is a net flow of benefits into the Upper Neuse from neighboring water systems, especially Jordan Lake. These relationships can assist municipal water systems in negotiating collaborative water agreements, such as interbasin transfer pricing or joint infrastructure financing. The full report and audio presentation can be found at <http://hdl.handle.net/10161/975>.

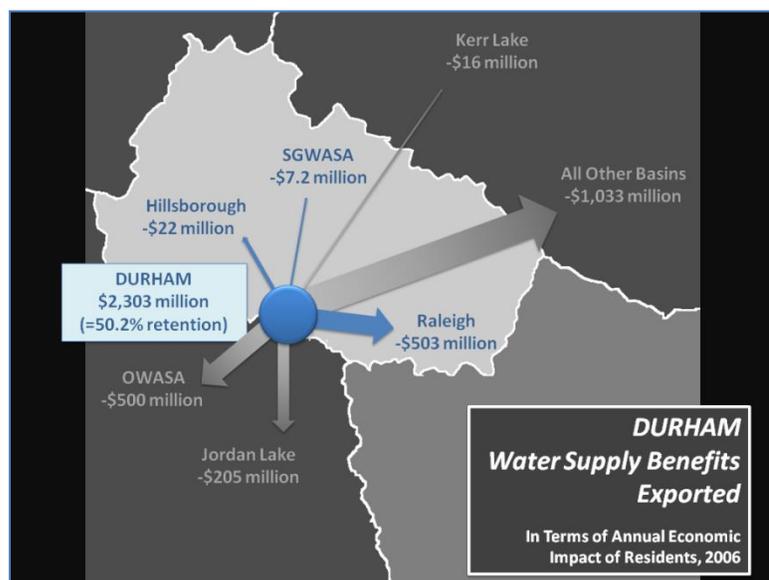
Commuters and Water Supply Benefits

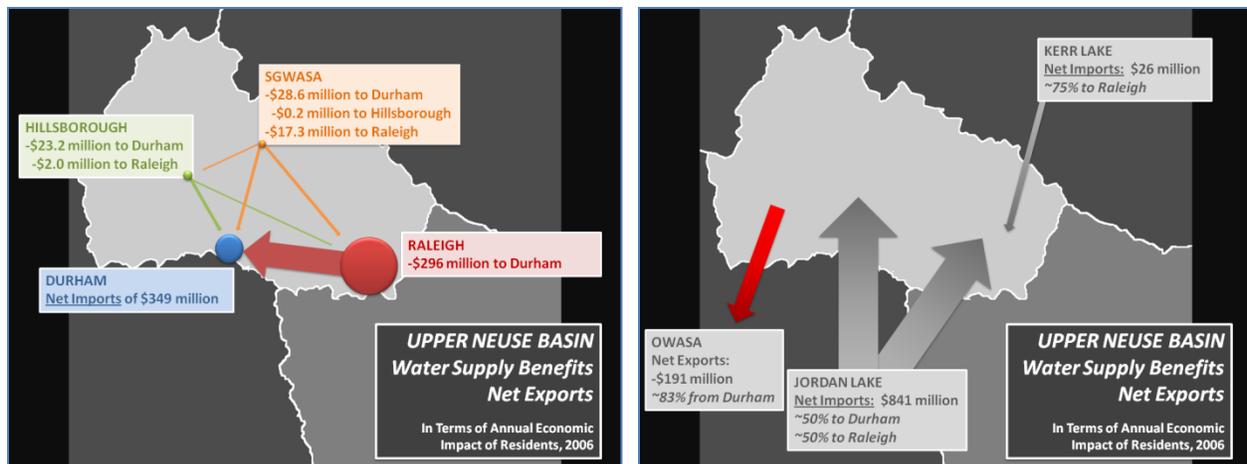
Cities spend millions to maintain and expand their water supply infrastructure, which support the health of residents and their ability to work. But residents in City A may commute to City B for work, and adding value to City B's economy. City B's economy is benefited by City A's water supply resources and infrastructure. Thus, the direction and flow of commuters can also represent the direction flow of water supply benefits within a region.

Adapting OnTheMap to Water Supply Benefits

Recently, the US Census Bureau developed the "OnTheMap" software to track "commute sheds" — the flow of workers from their city of residence to city of employment (<http://lehdmap3.did.census.gov/themap3/>). "OnTheMap" only generates the number of workers commuting from one city to another. But, it also reports the monthly earnings category of each worker. Using this earnings information, I computed a rough estimate of the economic impact generated by each city's residents, i.e. each city's water supply benefits. The commute shed then charts where these benefits are exported to.

The figure at right illustrates the water supply benefits generated by Durham's water supply, and where those benefits are exported to.





The above two figures demonstrate the net flow of water supply benefits within the Upper Neuse Basin, and amongst Triangle Region water systems. For example, Durham is a net importer of water supply benefits within the Upper Neuse — that is, Durham receives more workers from other Upper Neuse cities than it exports to them. Thus, the economic impact Durham receives from commuters is supported by the water supply infrastructure of other cities.

Recommended Applications of Commute Sheds to Regional Water Planning

Complemented with benefit valuation research, commute shed analysis can inform negotiations on water transfer agreements and collaborative infrastructure financing:

Water Allocation and Transfer Agreements: If it is determined that a proportion of water supply benefits from an intra-basin or inter-basin water purchase is being exported back to the buyer, there could be incentive for the two sides to negotiate more appropriate cost structure. For example, Durham is already a substantial virtual recipient of Raleigh’s water supply and water infrastructure benefits. In negotiating a price for future emergency water transfers, Raleigh could demand a proportionately lower price for its water agreement purchase.

Joint Financing for Infrastructure Projects: If a smaller utility is actually supporting the economy of the larger city, should the larger city help invest in the smaller utility’s capital and operation projects? For example, Durham is a substantial virtual recipient of Jordan Lake’s water supply and water infrastructure benefits. Should Cary consider a major renovation or expansion project, it could demand that Durham finance an appropriate portion of the costs for these projects.

Forecasting Supply and Demand of Water Benefits: Economic opportunity in City A may be driving housing demand in City B, if City B is already supplying a steady stream of commuters to City A. Understanding in which locations water demand will increase can help regional water managers forecast development trends and anticipate projects and needs. Commute shed analysis using *OnTheMap* can be performed in local scales such as Traffic Analysis Zones (TAZ), ZIP codes, and school districts, and will help these local planning efforts.