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# GLOBALIZATION AND WATER RESOURCES MANAGEMENT: THE CHANGING VALUE OF WATER

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## TRANSITION TO ALTERNATIVE WATER SUPPLIES IN EAST-CENTRAL FLORIDA, USA

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**ABSTRACT:** The State of Florida is experiencing rapid population growth that is projected to result in significant increases in water demands through 2020. The Floridan aquifer, which in 1995, supplied 58% of all groundwater used in Florida and 90% of all groundwater used in the St. Johns River Water Management District (SJRWMD), is projected to reach sustainable limits by 2020 in much of SJRWMD. This will necessitate the development of alternative sources of supply such as surface water and brackish groundwater. The cost of alternative source development will be greater than the current cost of fresh groundwater. Acceptance of these more costly alternatives may depend on how the increased costs can be distributed among the customers of more than 60 publicly and privately owned public supply utilities in the region. Such distribution of costs may require new institutional arrangements among these utilities and local governments, or legislation.

### INTRODUCTION

Water in the state of Florida is managed by five water management districts, which were created in 1972 by the State Legislature (Chapter 373, *Florida Statutes*). Each of these water management districts, within its specific geographic boundaries, has broad authority and responsibility for water supply availability as well as for flood protection, water quality protection, and ecosystem protection and restoration. Florida's water management districts operate with funds derived from ad valorem taxes, and other state and federal funding sources.

In the area of water supply management, all of the five water management districts have implemented similar programs to develop and implement regional water supply plans and to regulate the use of water through water use permitting. The St. Johns River Water Management District (SJRWMD), which covers approximately 12,400 square miles in northeast Florida (Figure 1), recently completed its first regional water supply plan, District

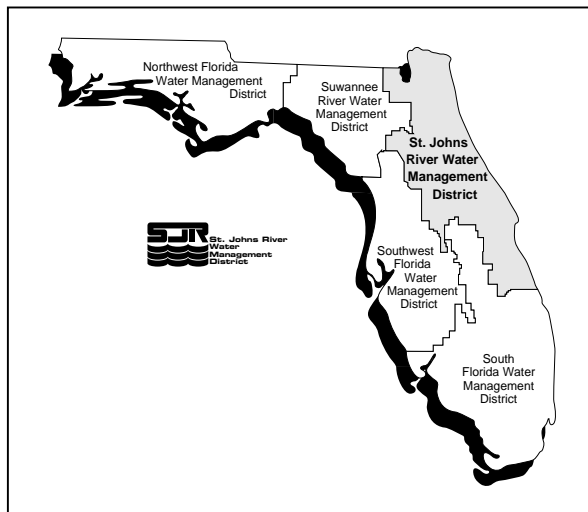


Figure 1. State of Florida

Water Supply Plan (DWSP) (Vergara 2000). Conclusions reached in DWSP indicate that significant changes lie ahead, possibly in the immediate future, for major water users in about 40% of SJRWMD and particularly for public supply utilities in the fast developing east-central Florida area. These changes are expected to include changes in sources of water, treatment technologies, user costs, and the institutional/governance arrangements associated with water supply development. Conclusions specific to the east-central Florida area are:

- Public supply demands are expected to double by 2020
- The Floridan aquifer can meet some but not all of these demands without environmental harm
- 100 to 200 mgd in alternative water supplies will probably need to be developed
- Demands cannot be met from within public supply service areas
- Alternative sources are available
- Implementation strategies to deal with regional solutions will be necessary to avoid competition water use permit applications
- Major water users should collectively decide on the alternative solution and implementation strategy
- New sources may be needed as soon as 2004

### The East-Central Florida Area

The east-central Florida area is a 5000 square mile area that stretches from the high sandy ridges of central Florida on the west to the coast of the Atlantic Ocean on the east and from the Ocala National Forest on the north to the Indian River citrus area on the south (Figure 2).

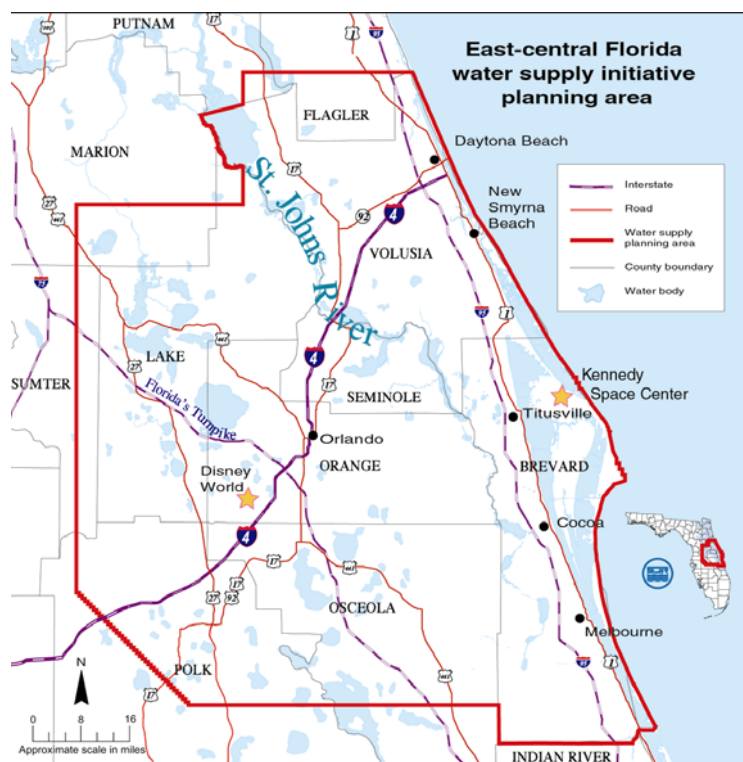


Figure 2. East-central Florida

The area's major natural features include the St. Johns River; numerous lakes, wetlands and springs; and the Floridan aquifer – one of the most productive fresh water aquifer systems in the world. The area's major cultural features include Disney World and other nearby theme parks, the Kennedy Space Center, and notable Atlantic beach communities such as Daytona Beach and Cocoa Beach. The city of Orlando is the area's largest city. Significant growth in the Orlando metropolitan area has been the most significant catalyst for regional growth during the past several decades and this relationship is expected to continue during the next 20 years.

## WATER USE

Fresh ground water from the Floridan aquifer has historically been the primary source of water supply for all categories of water use in the east-central Florida area. Total water use in the area is projected to increase from 526 million gallons per day (MGD) in 1995 to 866 mgd in 2020, a 65% increase. Water use to supply publicly and privately owned public supply utilities is projected to increase from 323 mgd to 632 mgd during the same 20-year timeframe. This projected increase in public supply represents about 85% of the total projected increase in the area. Water use for agricultural irrigation and other non-public supply uses accounts for the remaining 15% of the total projected increase. Major water users in the area propose to supply the projected increases by increasing withdrawals of groundwater from the Floridan aquifer. SJRWMD has demonstrated, in its 1998 Water Supply Assessment (Vergara 1998) and in DWSP, that the rate of withdrawal of groundwater in the east-central Florida area is approaching a rate that cannot be sustained without causing unacceptable impacts to water resources and related natural systems.

## WATER SUPPLY SOURCES

The Floridan aquifer can supply some but not all of the 340 mgd of projected increased water use between 1995 and 2020 without environmental harm to wetlands, lakes, and springs, and without unacceptable increases in the levels of salinity in groundwater. SJRWMD has estimated that 100 to 200 mgd of alternative water supplies from sources other than the Floridan aquifer will need to be developed. SJRWMD has identified naturally occurring sources of water and management strategies that are more than adequate to meet projected increased demands. These alternative sources and management strategies include:

- Naturally occurring sources
  - Brackish groundwater
  - Fresh and slightly saline surface water
  - Seawater
- Management strategies
  - Artificial recharge
  - Aquifer storage recovery
  - Avoidance of the impacts of groundwater withdrawal through artificial hydration
  - Water conservation
  - Use of reclaimed water
  - Water supply interconnections
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It is doubtful that the identified management strategies, regardless of how aggressively they are pursued, will result in the increased availability of 100 to 200 mgd of additional supplies from the Floridan aquifer. Naturally occurring alternative sources will have to be developed.

Projected 2020 demands will most likely be met by first utilizing a combination of management strategies to maximize production of fresh groundwater from the Floridan aquifer and then developing alternative naturally occurring sources to provide for remaining deficits. The St. Johns River is the most likely source of naturally occurring alternative water supply for the east-central Florida area. SJRWMD has estimated that up to an average of 350 mgd can probably be developed from this source without unacceptable environmental impacts. However, the St. Johns River varies in both quality and quantity throughout the year and significant amounts of raw and/or finished water storage would be required to ensure reliable water supplies. In addition the river is slightly to moderately saline during low flow periods and at least partial desalting would be required.

## COSTS OF WATER

SJRWMD has estimated that implementation of the most likely solution (maximizing production from the Floridan aquifer and development of naturally occurring alternative supplies from the St. Johns River) will cost between \$1.0 and \$1.4 billion. The cost to withdraw, treat, and deliver fresh groundwater in today's market averages about \$0.75 per 1,000 gallons. Surface water from the St. Johns River, the most likely source of naturally occurring alternative water supply, would cost up to \$2.25 per 1,000 gallons to treat and deliver. Although the incremental increase is 200%, the impact on individual public supply utility water customers would be considerably less dramatic.

For example, if fresh groundwater and treated surface water from the St. Johns River were used by a public supply utility in a 75% to 25% ratio respectively, the monthly water bill for a typical family of four using about 10,000 gallons per month would be \$11.25. If fresh groundwater were used without the surface water blend, the monthly water bill for the same family would be \$7.50. Therefore, the use of the more costly surface water in this example would result in a 50% increase in the monthly cost of water – or \$3.75 per month (SJRWMD 2000). This is less than the cost of one trip to your favorite fast food restaurant.

## GOVERNANCE – THE REAL CHALLENGE

A 50% increase in the cost of water during a twenty-year period in a high growth area such as east-central Florida may not appear problematic, but problems will surely occur. Public supply costumers in the east-central Florida area are served by more than 60 public supply utilities with distinct service areas and distinct governance. These public supply utilities do not have a history of cooperation. Some of these utilities have competed for future service areas and have interconnected their facilities only for emergency purposes. These utilities own and operate their own facilities and have established utility rates based on financial considerations specific to each utility. These utilities range in size from the largest, Orlando Utilities Commission, which delivers about 100 mgd, to small utilities delivering less than 1 mgd. Disparities in size, financial condition, location relative to naturally occurring sources of alternative water supplies, etc. set the stage for difficulties in developing water supply solutions that will work for all utilities. Nothing is more important to successful water supply development for the future in east-central Florida than finding and implementing the right form of water supply governance.

Several governance models are available including:

- A governmental wholesale water utility created through existing state law (regional water supply authority)
- A non-profit corporation formed by local governments
- “Lead” local governments contracting with other local governments and privately owned utilities
- Interlocal agreements between local governments
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Despite the urgings of SJRWMD, local governments and private utility companies have not made significant progress toward reaching acceptable governance solutions. Without such solutions SJRWMD anticipates significant litigation between major water users and between major users and SJRWMD as part of the water use permitting process. The Florida Legislature has once before mandated the creation of a regional water supply authority – the West Coast Regional Water Supply Authority, which was recently constituted as Tampa Bay Water. That organization has had a stormy and litigation rich history, which should be avoided at all costs in east-central Florida.

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