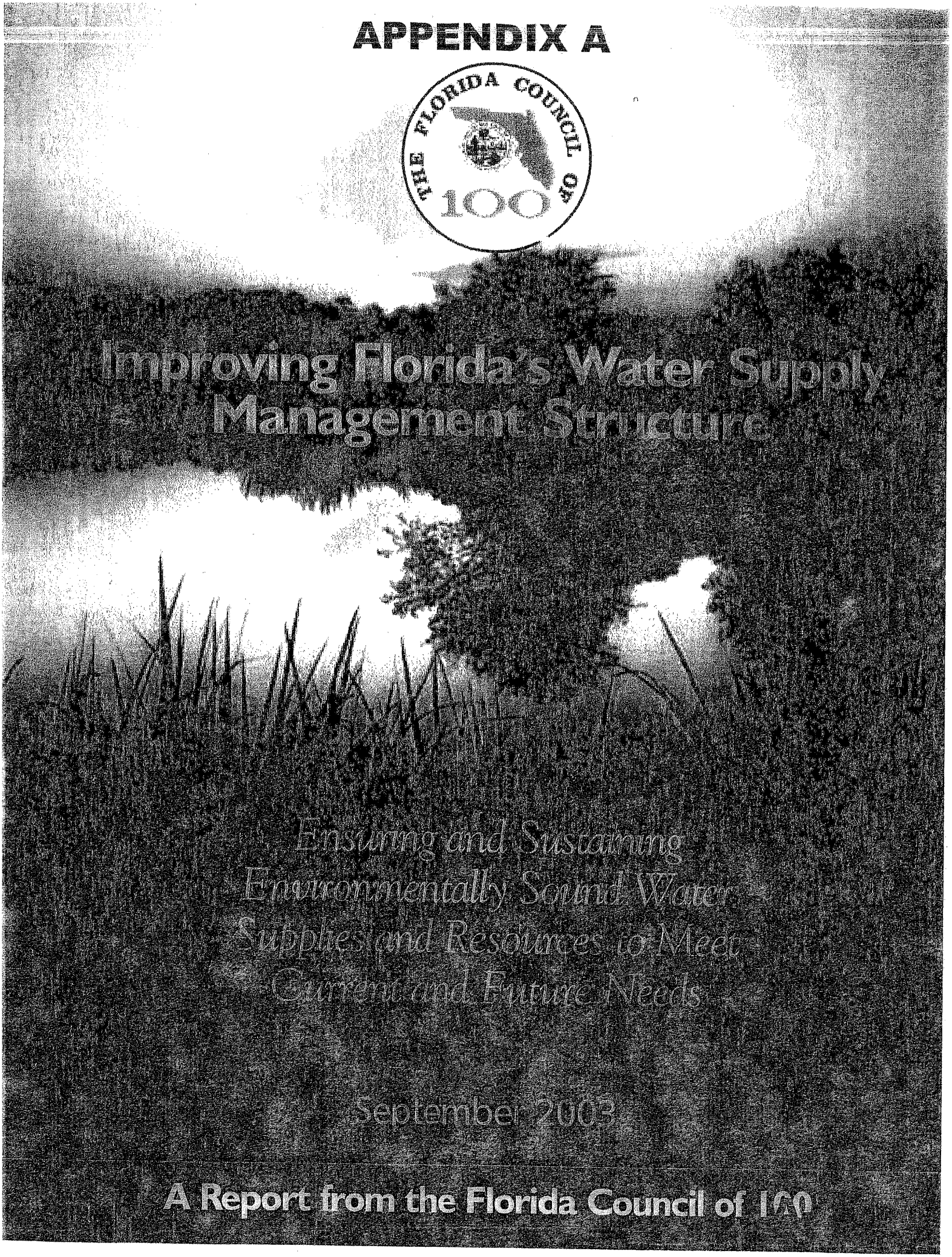
APPENDIX A



Improving Florida's Water Supply Management Structure

Ensuring and Sustaining Environmentally Sound Water Supplies and Resources to Meet Current and Future Needs

September 2003

A Report from the Florida Council of 100

APPENDIX A

Improving Florida's Water Supply Management Structure

A Report from the Florida Council of 100

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About the Florida Council of 100

Formed in 1961 at the request of Governor Bryant, The Florida Council of 100 exists to promote the economic growth of Florida and to improve the economic well-being and quality of life of its citizens. It is a private, non-profit, non-partisan association whose members represent a cross-section of key business leaders in Florida. The Council was the first of its kind in the United States and works in close harmony with the Governor, the Chief Justice, and the Legislature, as well as with other private organizations to achieve its goals for all the people of Florida. The Council has other task forces and working groups on issues related to K-20 education, Front Porch Florida, and tort reform. The Water Management Task Force was established in the spring of 2002 to recommend statewide water management policies and recommendations that foster sustainable and environmentally sound water supplies and resources that are economically feasible to meet current and future Florida needs.

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Task Force Members

Jean-Marc Allard	Chairman & CEO, Hubbard Construction
Jim Apthorp	Director, Collins Center for Public Policy
Lee Arnold	Chairman & CEO, Arnold Companies
Al Austin	CEO, Austin Company
John Baker	President & CEO, Florida Rock Industries
Andy Barnes	Chairman & CEO, *St. Pete Times*
Hugh Brown	President & CEO, BAMSI
Fred Bullard	President, The Bullard Group
Carl Cannon	Publisher, *Florida-Times Union*
Pam Davis	President & CEO, ITC and Related Companies
Nancy Davis	Chairman, McArthur Management Company
Don DeFosset	President & CEO, Walter Industries
Ferdinand Duda	President & CEO, A Duda & Sons
Llwyd Ecclestone	Chairman, PGA Resorts Company
Bob Fagan	President, Chairman & CEO, TECO Energy
Alfy Fanjul	Chairman & CEO, Florida Crystals Corporation
John Fitzwater	Publisher, *The Ledger*
Bill Frederick	President & CEO, Frederick Enterprises
Jeff Gargiulo	President & CEO, Sunkist Growers
Bill Graham	President & CEO, The Graham Company
Ben Hill Griffin	Chairman & President, Ben Hill Griffin
Gary Morse	Chairman & CEO, The Villages
Bob Moss	President & CEO, Bob Moss & Associates
Jon Moyle	President, Moyle, Flanigan & Raymond
Whit Palmer	Chairman & CEO, MFM Investments
Lance Ringhaver	President, Ringhaver Equipment
Darryl Sharpton	President, Sharpton, Brunson & Company
Jim Smith	Partner, Smith and Ballard, PA
Bob Soran	President & COO, Uniroyal Technology
Leo Vecellio	President & CEO, Vecellio & Grogan

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The task force would like to acknowledge a number of water advisors who lent their time and expertise to this effort. Jim Garner and Cathy Vogel of Squire, Sanders, & Dempsey, PA spent many hours educating us about the current water management system and other issues related to water. Renu Khator, Interim Provost at USF provided water policy assistance in the early stages of our effort. Tom MacVicar, President of MacVicar, Federico, & Lamb, Inc; Wally Milon, Professor at the Department of Economics at UCF; Tom Missimer, Ph.D at CDM Missimer; Pete Dunbar, Attorney at Pennington, Moore, Wilkinson, Bell and Dunbar; Jake Varn, Attorney at Fowler White; Eric Olsen, Attorney at Hopping, Green and Sams; and Doug Manson, Attorney at Carey, O'Malley, Whitaker & Manson offered their perspectives and expertise in various areas of our study. They all helped shape the debate. Steve Seibert, Attorney & Mediator with Seibert Law Firm brought his Tampa Bay water wars legacy and prior state level experience to the discussion, which was invaluable. We also spoke with most of the Chairmen and all five of the Executive Directors of the water management districts, and we appreciate their insights on their districts and planning for the future. Jerry Maxwell, General Manager of Tampa Bay Water provided much needed assistance throughout our study. And of course, we could not have conducted our research without the help of Secretary David Struhs and the Florida Department of Environmental Protection staff and documents. We also spoke with Rick Marella at the US Geological Survey who provided assistance in our gathering and understanding of current and projected Florida water data and statistics. Finally, the task force thanks the Council of 100 Executive Director, Charlie Ohlinger and Issues Director, Kathy Lowy, for their hard work and dedication in pulling together all of the research, data, and information for the final report.

APPENDIX A

Dear Governor Bush, President of the Senate King, and Speaker of the House Byrd:

From the Chairman of the Florida Council of 100:

Since its inception in 1961, The Florida Council of 100 has worked with governors and legislatures to help improve the quality of life and the economic well-being of the people of Florida. Over the years, we've offered our thoughts on several public policy issues, including education, judicial administration, constitutional amendments, and civil service. Many of our ideas have been implemented, and resulted in improvements for all Floridians.

Our latest issue is water management, specifically management of the supply of water. We know that effective water management is absolutely essential to sustain our unique environment that we're all so fond of, while also accommodating the continuing growth of industry and people which demographers tell us to expect. We've researched this issue, and have drawn the conclusion that some improvements must be made to meet the water needs of the 21st century.

This report, then, explains the current and forecasted water situation, and proposes some recommendations to improve water management at the state level, which the Council believes, will improve the water supply for all Floridians.

Al Hoffman
Chairman, The Florida Council of 100
(CEO, WCI Communities)

From the Chairman of the Council Water Management Task Force:

Our task force was formed over a year ago to address Florida's water supply from a statewide perspective. Our mission was agreed early on, and guided us through our efforts:

- *Recommend statewide water management policies...*
- *that foster sustainable and environmentally sound water supplies and resources...*
- *that are economically feasible to meet current and future Florida needs.*

The mission begins with a steadfast requirement of environmentally sound policies only. Any water supply policy or methodology that is advanced at the expense of our fragile environment should be rejected. Throughout the report, references are made to planning and implementation that is environmentally sound. We make all of our recommendations with this *"environment first"* premise in the forefront of our thinking and expectations. We believe it is in the best interest of Florida's environment to stress accountability in water supply planning and development.

We have been all over the state meeting with state and water management district leaders learning about Florida's public policy and the variances among water management districts. We've reviewed the key concerns that we heard in our travels at the state, regional, and local levels regarding water resources in Florida. We have researched the available water science and data, examined Florida's statutes, surveyed our members and key state and local water management players, and conducted interviews with several water experts. We have analyzed the recent history of water management in Florida, as well as other water management structures in the United States.

From this research and analysis, the task force has concluded that Florida needs to refocus its water management efforts to meet the projected increasing demands of our state. Our focus has been to propose sound water policy that protects the environment, while at the same time, enhances economic development and growth that has been forecasted. Policy decisions should not be at the expense of either one of these important and beneficial aspects of our wonderful state.

We urge you to read this report closely, and trust you will agree with our conclusions, or at the least agree that now is the time to address the issue from a statewide perspective. Much has been done, but much more remains to be done. Every resident and visitor, now and in the future, is dependent upon those now in charge to take bold action to assure an adequate water supply. The result will be better long-term management of Florida's water resources, greater consistency among the five water management districts, and economically feasible water supplies that meet Florida's current and future needs. The time is now for improving how water is managed in Florida.

Lee Arnold
Chairman, Water Management Task Force
(Chairman & CEO, Colliers Arnold/Arnold Companies)

INTRODUCTION: THE CURRENT WATER SITUATION

For everyone around the world, water is a critical resource for all aspects of daily life—for people to live, for countries to grow and develop, and for our environment to survive. Water supply has become a global issue, an issue that the United States must address, and an issue that Florida must address.

Roughly 80 percent of the Earth's surface is water, but only one percent is drinkable, i.e. fresh water. According to the *CIA Global Trends* report, by 2015, nearly half the world's population – more than three billion people – will live in countries that are "water stressed," meaning they have less than 126 gallons per day per capita for consumption (As a point of comparison, Floridians consume 169 gallons per day per capita, US Geological Survey). The United Nations estimates that 2.7 billion people will face severe water shortages by 2025 if consumption continues at current rates. Equally concerning, the World Health Organization estimates that by 2025, the demand for fresh water is expected to rise by 56 percent more than is currently available.

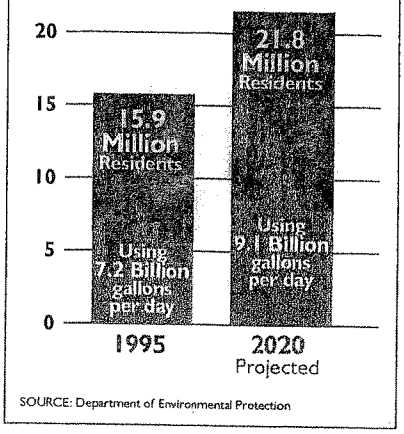
According to a recent US General Accounting Office (GAO) report, groundwater depletion is occurring across the United States. American farmers are withdrawing water from the Ogallala aquifer, which underlies the Great Plains, at an unsustainable rate, with a third of the Texas portion already significantly depleted (*National Geographic*, 2002). In 2002, the federal government threatened to cut the amount of water California could draw from the Colorado River unless the state developed a conservation plan by the end of 2002. California had been drawing 20 percent more water from the Colorado River than it was entitled to. It shares the Colorado River with six other states. And according to Colorado Attorney General Ken Salazar, a water law expert, where a drought has Lake Mead on the Colorado River at two-thirds of its capacity, "the people of Nevada should be concerned and alarmed about running out of water...the situation we have in Colorado is a disaster-emergency." (*Reno Gazette-Journal*, October 2002).

Florida, on the other hand, is blessed with an abundance of rainfall and great aquifers. We do not have water supply problems anywhere close to the magnitude facing rapidly growing western states and other countries. However, the Florida Department of Environmental Protection (DEP) estimates that by 2020, Florida's population is expected to increase 25 percent from 15.9 million residents today to about 21.8 million residents. Even though Florida averages 54 inches of rain per year, in order to meet this expected increased demand, Florida will need 9.1 billion gallons of fresh

water per day (bgd), a 26.4 percent increase from today, as shown in Figure 1.

Figure 1

Florida's Growing Fresh Water Needs



SOURCE: Department of Environmental Protection

As the demand continues to increase, water supply needs are already exceeding in capacity in some areas of the state. There are areas throughout Florida where water resources are stressed – particularly fresh groundwater – and forecasted growth and demand must be addressed by the development of additional water supplies. To date, the responsibility for water supply has been fragmented among regional agencies and local governments. While local governments have traditionally been the entities responsible for providing water supply, the problems that have developed in Florida are regional in nature – and rapidly becoming statewide – and may soon be beyond the scope of local resolution at reasonable cost.

In fact, some areas of the state *are* being proactive in addressing regional water shortages. For example, in Volusia County, in northeast Florida, the Volusian Water Alliance was established in 1996 to plan for future water supply needs. Over a seven year period, this intergovernmental planning body worked hard to address water shortages in the county, and just recently created the Water Authority of Volusia to resolve their water needs.

South Florida consumes 50 percent of the fresh water used in Florida. Current demands for public water supplies in this region are greater than demands for public supplies in 39 individual states (DEP). The Everglades Comprehensive Everglades Restoration Plan (CERP) includes expansion of water supplies to restore the environment and partially meet the needs of a growing population. CERP plans to build 18 reservoirs among many innovative alternative water supplies. And finally, many are familiar with the water conflicts of the 1980's and 1990's in the Tampa Bay area. A regional utility, Tampa Bay Water, was established in 1998 to act as a water wholesaler/supplier to solve the water conflicts that dominated the Tampa Bay area. The utility, still the only one of its kind in Florida, is constructing major capability to provide water to member utilities.

Clearly, water supply is an issue that we must confront today and plan for the future. The time is now for Florida, like other states and countries around the world, to plan for population growth, coupled with an increase in fresh water demand, so that our fragile environment will be forever sustained.

The Florida Council of 100, an organization of chief executives from leading Florida companies, created a task force to study water management issues and problems in Florida. The task force has conducted research, examined Florida's statutes, surveyed our members and key state and local water management players to obtain feedback about Florida's water management structure, examined other state's water management structures, such as California, Hawaii, Rhode Island,

and Texas, and conducted interviews with water experts around the state. We have analyzed the history of water management in Florida since 1972 and visited each of the five water management districts and met with each Executive Director. From this research and analysis, the task force has concluded that Florida needs to refocus its management of water supply efforts to sustain our environment and meet forecasted population growth demands. Ninety-eight percent of our survey respondents think Florida is facing long-term water supply/distribution challenges.

This document outlines our conclusions and recommendations. It is organized around several key facts:

- The environment must be protected in all supply planning, science and governance decisions.

- Unlike water stressed states like Arizona and California, Florida receives an abundance of rainfall, averaging 54 inches per year.

- Fresh water demands will increase from 7.2 bgd to 9.1 bgd by 2020.

- Management of Florida's water resources is decentralized to five water management districts, with general supervisory oversight by the DEP.

- Districts prepare regional water supply plans for areas of concern; the plans provide a list of possible water projects and costs, but leave vast uncertainty in time-phasing and funding.

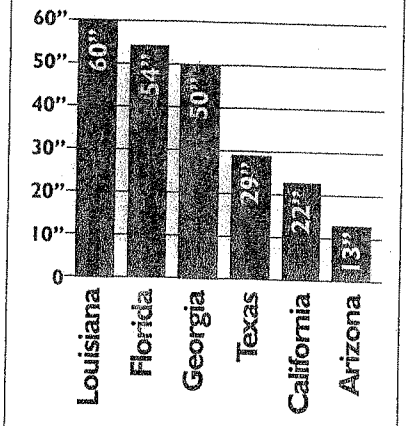
- Cooperative efforts among environmentalists, users, and capital providers have been proven effective in many areas.

CHAPTER 1:
WHY FLORIDA NEEDS TO BE CONCERNED ABOUT WATER

"Florida is surrounded and saturated by water. Water pulses through its labyrinth of water ways and spills excess from both its coasts."
– Water Wars, Diane Raines Ward, 2002

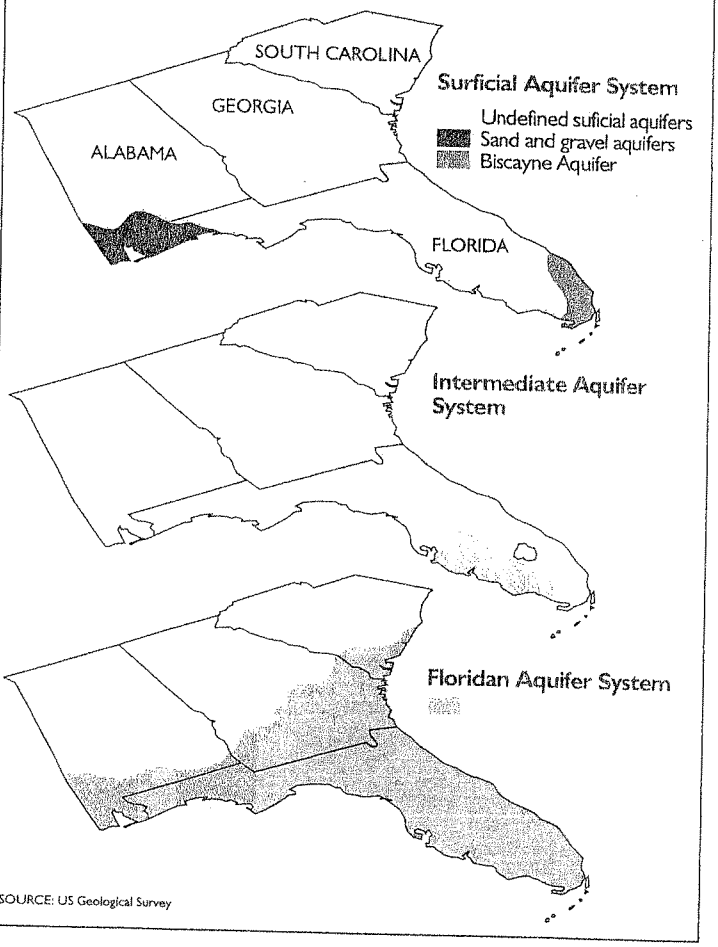
Florida's lifeblood is its water. Florida is home to 7,800 freshwater lakes, including Lake Okeechobee, the second largest lake located entirely within the United States. Florida also has more than three million acres of wetlands; 27 first magnitude springs (where flows exceed 100 cubic feet per second); about 600 springs; 50,000 miles of rivers and streams; and 1,197 miles of coastline (Vogel, 2002). Florida receives, on average, 54 inches of rain per year. Unfortunately, the rain is not evenly distributed across the state. For example, more rain falls in northwestern Florida than in the Orlando area, where water demands are higher. Additionally, according to the Florida Water Atlas, about 39 inches of rain evaporates, and another eight inches runs off into lakes, rivers, wetlands or the ocean, leaving about seven inches to percolate the aquifer. Only Louisiana receives more rain than Florida, as evident in Figure 2.

Figure 2
Average Annual Rainfall, 2000 (Inches)



SOURCE: National Oceanic and Atmospheric Administration, 2002

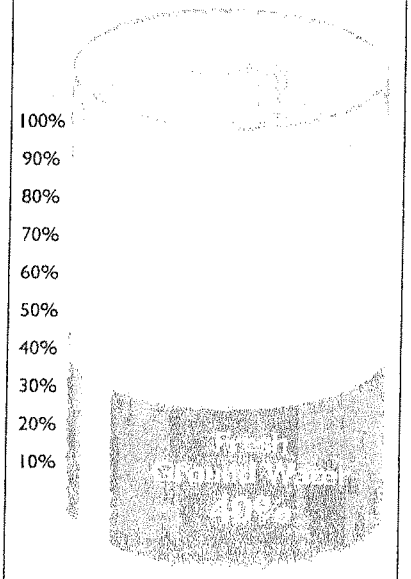
Figure 3
Sequence of Aquifer Systems in the Southeast



SOURCE: US Geological Survey

Florida is almost entirely underlain by porous rock formations known as aquifers that store and transport water, most of which comes from rainfall. The Floridan Aquifer underlies virtually the entire state and is the source of water for most of north and central Florida (Figure 3). In the southeast region of the state, the Floridan dips to great depths and becomes brackish.

Figure 4
Total Fresh Water Widthdrawals by Source, 1995
Total: 7.2 Billion Gallons Daily



SOURCE: *Water Widthdrawals, Use, Discharge, and Trendsin Florida, 1995*, U.S. Geological Survey, published 1999 (Most recently available data)

So, water users in southern Palm Beach, Broward and Miami-Dade Counties rely on the Biscayne Aquifer, which is the only source of potable groundwater for the nearly 3.5 million inhabitants in the region. A third aquifer system, known as the Sand & Gravel Aquifer, serves the western stretch of the Panhandle. Florida has more available groundwater in aquifers than any other state (Purdum 2002).

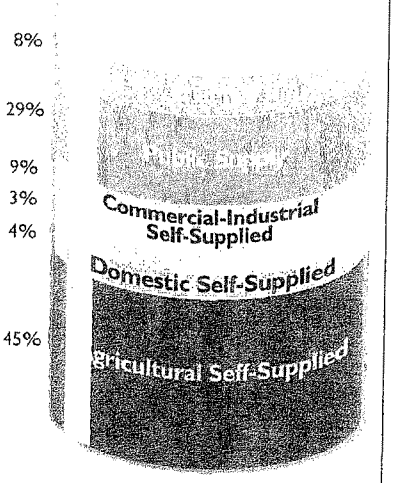
With all of this surface water (lakes and rivers) and groundwater (aquifers) in the state, how can Florida be concerned about water supply? An examination of current water demand is a first step in addressing this question.

Current Florida Water Withdrawals

The Floridan Aquifer is one of the world's most prolific sources of fresh groundwater. Consequently, our state is the largest user of groundwater east of the Mississippi River, and ranked fifth in the Nation in groundwater withdrawals in 1995. Furthermore, 90 percent of Florida's population depends on groundwater for drinking water; the other 10 percent of the population depends on surface water. When agriculture, recreation, power production and industry are factored in, withdrawals total 7.2 bgd as shown in Figure 4.

As previously mentioned, the state draws most of its supply from the Floridan Aquifer. Population growth, drained wetlands, farming, and cyclical drought have taxed supply, except in lower populated north Florida. As documented by Tom Missimer, Ph.D, CDM Missimer, several areas of Florida within the Floridan Aquifer system have reached unacceptably low, seasonal levels (acceptable is defined as water levels that do not create environmental or other impacts that either damage the aquifer system or cause harm to the environment or surface infrastructure). Some of these regions include the northern Tampa Bay region into coastal Pasco and Hernando counties, some areas of northwest Florida, and some coastal areas of northeast Florida. Hence, Missimer forecasts that "with the projected future water use for the next 20 to 50 years, the Floridan Aquifer System in these areas will not be a viable source of water supply, if the water levels are going to remain at acceptable levels." We can no longer assume that the Floridan Aquifer contains an infinite amount of water for all regions that will never be exhausted.

Figure 5
Florida Water Usage
Total: 7.2 Billion Gallons Daily



SOURCE: *Water Widthdrawals, Use, Discharge, and Trendsin Florida, 1995*, U.S. Geological Survey, published 1999 (Most recently available data)

In terms of actual consumption of fresh water, 45 percent is used by agriculture, as depicted in Figure 5.

According to the Florida Department of Environmental Protection

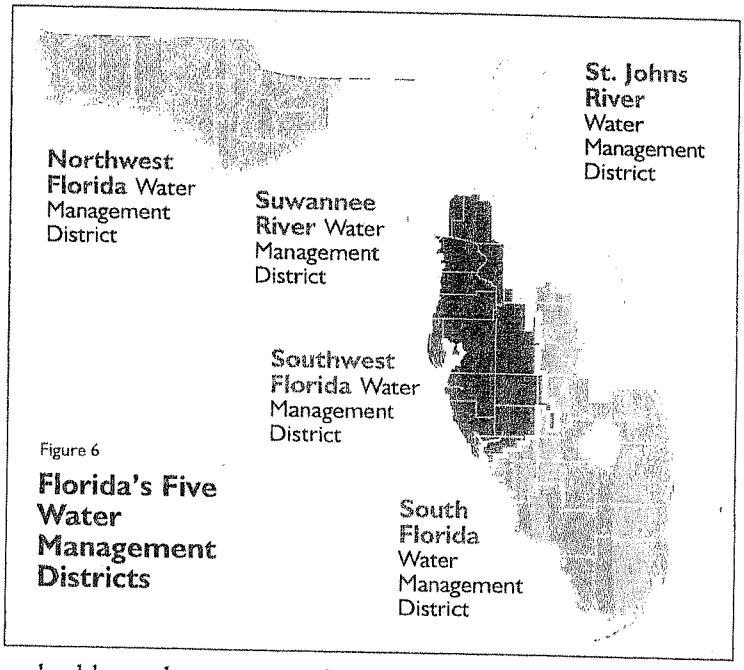


Figure 6
Florida's Five Water Management Districts

(DEP) projections, by 2020, Florida's population is expected to increase 25 percent from 15.9 million residents today to approximately 21.8 million residents. To meet water demands for this population increase, Florida will need 9.1 billion gallons of water per day, a 26.4 percent increase from today. Will Florida be able to meet this projected water demand?

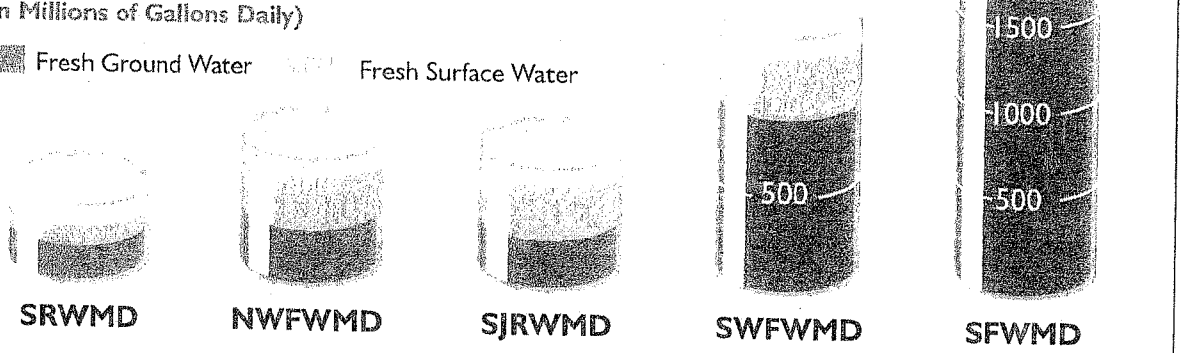
Water Withdrawals: Florida Water Management Districts

Water withdrawal data in Florida is collected at the federal, state and local levels. In Florida, the state is divided among five water management districts that are based on river watershed boundaries, as evident in Figure 6 (a more detailed description of Florida's governance structure is depicted in Chapter 2). These districts track and provide water data that is critical for forecasting projected water demand and needs.

As previously mentioned, it is evident that the state's population and water demand will increase by 2020. It is important to examine Florida's five water management districts individually since the state is so hydrologically diverse. Although there are many hydrological, governance, and funding variances, the primary difference of key concern is the total demand of water.

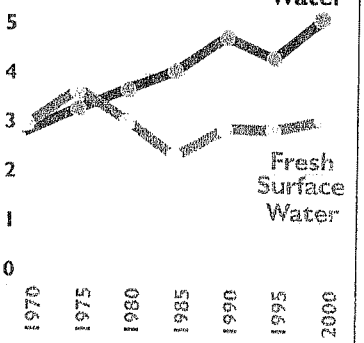
In total demand, the South Florida Water Management District (SFWMD) consumes about half of all fresh water consumed in Florida—not surprising given the agriculture and population needs. In considering the total fresh water demand, the type of water demanded, ground (aquifers) and surface (lakes and rivers) also varies from district to district, as shown in Figure 7.

Figure 7
Water Withdrawls by Category and District, 1995
(In Millions of Gallons Daily)



SOURCE: *Water Withdrawals, Use, Discharge, and Trendsin Florida, 1995*, U.S. Geological Survey, published 1999 (Most recently available data)

Figure 8
The Freshwater Demand Trend
(In Billions of gallons daily)



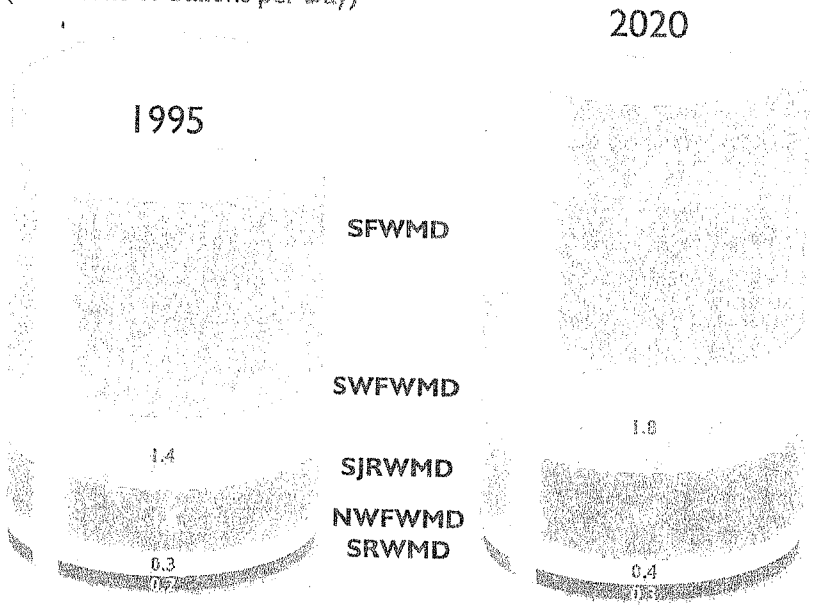
SOURCE: *Freshwater Widthdrawals by Category in Florida, 1995*, U.S. Geological Survey, January 2003

Overall, forecasts for 2020 show that agriculture, domestic self-supply, and industry/commercial/electric demand will stay about the same or be reduced; public supply and recreation will increase in all of the water management districts.

Of interest, the demand increases over the last 30 years have been in groundwater, while surface water has remained relatively constant (Figure 8). As Floridians in water stressed areas can relate, it is the increased use of groundwater that impacts lake and wetland water levels, and thus our total environment.

As evident in the projections of fresh ground and surface demand in Figure 9, and according to DEP estimates, water demand will increase in all five water management districts by 2020. Today, about half of the water withdrawals are in the SFWMD, and as might be expected, about half of the forecasted growth will be in SFWMD as well.

Figure 9
Summary of Freshwater Demand Projections, 1995-2020
(In Billions of Gallons per Day)



SOURCE: *Summary of Water Projections*, DEP, 2002

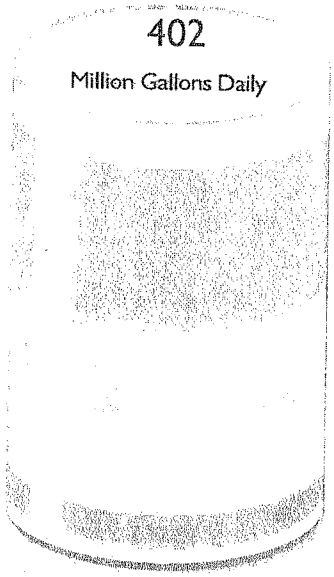
For a more detailed summary of each water management district projections, please see Appendix I.

It is obvious that Florida will need to increase its supply of fresh water in order to meet future demand. In some water stressed areas of the state, water conservation and reuse initiatives are not adequately addressing this problem. Only 402 million gallons/day (mgd) of reclaimed water is used for the purposes indicated in Figure 10. Increased use of reclaimed water will directly reduce the increasing need for fresh water.

Not using reclaimed water causes overreliance on existing ground and surface water. The state has advocated the use of conservation policies to address water shortages and efforts are underway throughout the state to conserve and reuse water. In 2001, the state launched the Statewide

Water Conservation Initiative to find ways to improve efficiency in all categories of water use. Its report published in April 2002 evaluated how Floridians use water and what can be done to make significant permanent, cost-effective improvements in water use efficiency.

Figure 10
Reclaimed Water Utilization in Florida, 1996



SOURCE: *Water resources Atlas of Florida*, 1998

It is evident that the state has made good progress in addressing water supply needs, such as the agreement between Miami-Dade County and DEP in July 2003 to increase its treatment level of wastewater among other initiatives, or the acceleration of water supplies in western Palm Beach County to develop over 900 acres of rock pit reservoirs. Some would argue that Florida is not facing a water crisis if we average 54 inches of rain a year and are implementing alternative water supplies in some areas around the state. However, some parts of the state are experiencing water shortages and conservation efforts are in place to address them. According to a recent GAO report, published in July 2003, water managers in Florida expect local shortages of freshwater in the next decade. Some residents are incensed and think a building moratorium is the way to go, as one resident commented, "Absolutely justified! Look at the hundreds of houses being built on U.S. 301...and then have the guts to tell me I can't water my little yard!" (*Tampa Tribune*, July 2002). While Florida may not be a drought climate state like Arizona, which averages only 13 inches of rain per year, there are areas around the state where water resources are stressed and will become more so. We conclude that Florida must and can do more to use water efficiently. This situation will only worsen if it is not addressed quickly.

CHAPTER 2:
IT'S TIME TO REEVALUATE FLORIDA'S WATER GOVERNANCE STRUCTURE

Florida's Water Management Structure

The history of Florida's current water management structure dates back to 1972, often called the "Year of the Environment," with the passage of the 1972 Florida Water Resources Act, Chapter 373. This act was based on the 1972 Model Water Code, promulgated by Dean Frank Maloney, at the University of Florida. As a result of one of the worst droughts on record in Florida, a broader statewide approach was needed to protect water resources and restore degraded areas. The 1972 Water Resources Act enacted a new water law for the state. It also established five water management districts based on river watershed boundaries (not aquifer boundaries), as seen in Figure 6. These districts are managed by individual boards of governors and have the authority to regulate, manage, permit, and tax. According to the law, *water is a resource of the state*—it is held in trust by the state for the people of Florida. Water is allocated by a permit system administered by the water management districts for up to 50 years, although in practice, most permits are for 10-20 years.

While the Water Resources Act embodied most of the Water Code, there were some omissions and changes. One of the primary omissions was the proposed creation of a state water board, a state entity that would oversee the water management districts and have authority over water supply and quality issues. Instead, the Act gave the Department of Natural Resources (now the Department of Environmental Protection) "general supervisory authority" over the water management districts and directed the Department to delegate water resources programs to them where possible.

The idea of a state water board was determined not to be necessary at that time.

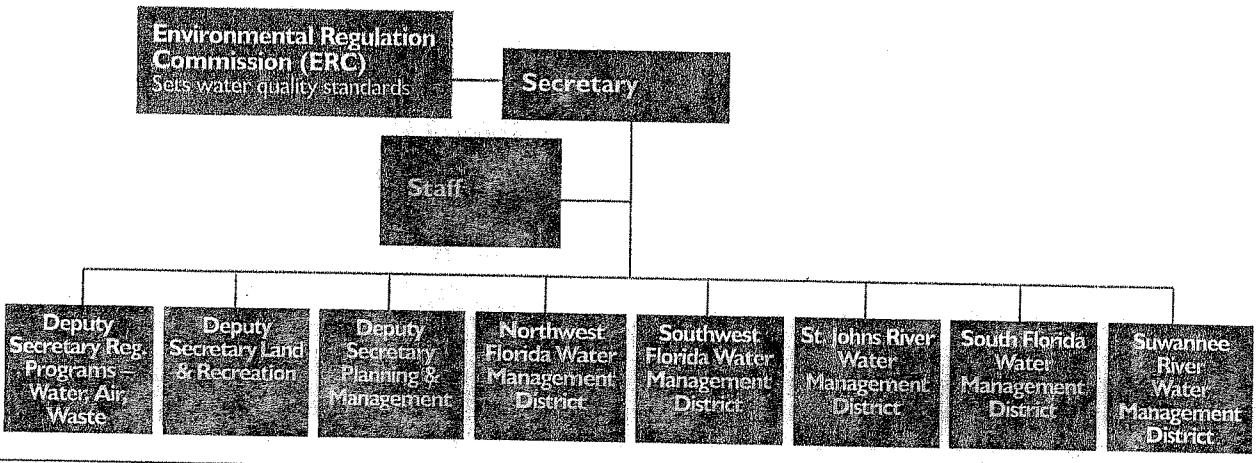
We have reviewed other state water boards, such as the Hawaii Commission on Water Resources Management, the California State Water Resources Control Board, and the Texas Water Development Board, to see how other states manage their water resources and see many differences. Florida's current state organizational structure is depicted in Figure 11.

We have concluded that the current situation is different now in Florida. The governance structure that was implemented in Florida in 1972, when the population was half of what it is now, may not be as effective for the 21st century.

The 1972 statute did not clearly define "general supervisory powers," resulting in non-standardized processes for managing water resources across the state. This has led to slowly increasing

Figure 11

DEP Organizational Structure



authority and responsibility for the water management districts, whose mission and role have changed dramatically since 1972 (see list of district responsibilities, next page).

Water management districts are responsible for water supply planning and also for the regulation of the consumptive use of water. This dual responsibility creates an inherent conflict in their mission. Local and regional governments are and should remain responsible for water supply development and operation. Local governments have been responsible for providing water supply; however, many of the problems that have developed are regional in nature and difficult for local resolution. Funding traditional and alternative supplies is a huge challenge for local and regional governments. Planning must address funding sources to guarantee desired results and protect our environment. However, at the state level, there is no singularly focused advocate for water supply.

Unfortunately, today's decentralized and fragmented governance structure system has not avoided regional water shortages. Florida's approach to water supply has traditionally been crisis driven, which often results in negative environmental impacts, economic losses, litigation and proposals for moratoria on growth and development. For example, near Orlando, groundwater levels have dropped 25 feet in some places. Titusville, in the St. John's River Water Management District, claims that by 2010, it will not have enough water to meet its estimated population growth. (*Florida Waters*, 2002). Furthermore, the lack of a sense of urgency and acknowledgement that Florida has water stressed areas, and the absence of a singularly focused advocate for water supply, have resulted in concern about detrimental impacts to our all important environment, as well as our economic development. These factors have further inhibited technological innovation and private sector involvement to increase water supply.

Water Management Law—"Local Sources First"

Florida water law currently provides for long-distance transfer of water across hydrologic

Water Management District Responsibilities

- Regulates water supplies and water quality
- Allocates water for consumptive use by industry, agriculture, and urban populations
- Manages storage of surface water associated with changing water use
- Implements regional water supply process
- Manages natural ecology
- Exercises ad valorem taxing authority
- Purchases land for water management, supply and protection of water resources
- Protects wetlands
- Issues water permits
- Oversees water resource development
- Develops regional water supply plans
- Develops and implements Surface Water Improvement and Management Plans (SWIM)
- Plugs free-flowing artesian wells
- Restores ecosystem
- Serves as local sponsor for Corps of Engineers' projects
- Establishes minimum flows and levels (the limit at which further water withdrawals would cause significant harm to the water resource or ecology of the area)
- Reviews comprehensive plan elements relating to water resources
- Declares water shortage emergencies and manages droughts
- Provides flood protection
- Operates the Central & Southern Florida Project (SFWMD)

boundaries. The law also stipulates that if water is ever transferred, it must not diminish availability of water for present and future needs of the sending area. The receiving area must have exhausted all "reasonable" local sources and options. Therefore, transfer of water across county boundaries is strongly discouraged by interpretations of the current law.

Because water is a public resource benefiting the entire state, Florida law requires waters in the state to be managed on a state and regional basis. Water is a statewide resource that is permitted and managed by districts for the benefit of all within the state. While it is politically important to look to local sources first, it may be in the best interest of the environment, and the potential sending and receiving regions, to revisit the impacts of allowing transfers, both economically and environmentally. One of the unintended consequences of Florida's "local sources first" policy is that districts and localities think they "own their water," and must prevent access by any other district or locality.

For example, in north Florida, residents in the Suwannee River Water Management District, which has a plentiful supply of water, are worried that south Florida may one day look to north Florida's rivers, lakes, and aquifers for assistance with the limited water supply in the south (*The Gainesville Sun*, May 2003). Hence, the "local sources first" policy discourages the full understanding of Florida water law that states water is a public resource, leading to polarization between water-rich and water-poor areas of the state, as depicted in the north Florida example.

The Council of 100 will not propose "stealing" water from the Suwannee River or its district, or for that matter, any area of the state. To the contrary, we believe it is critical that the environment

be protected, and that if a region were to supply water, it must always be assured that its economic interests are met now and into the future, including development rights and adequate supply.

There are areas throughout the state where water-rich areas are successfully supplying water-poor areas across county lines and receiving utility revenues for the transaction. For example, the Jacksonville Electric Authority (JEA), Tampa Bay Water, and Sarasota/Manatee agreements exemplify how water is being delivered across county lines, in an environmentally and economically sound process.

Recent Governance Changes

To ensure that water management districts are preparing for future demand, the legislature amended the Florida Water Resources Act in 1997. The legislation was designed to provide long-term water supplies for current and future users. The chart below depicts the major governance changes in the last six years.

1997 legislation – requires all water management districts to prepare regional water supply plans for those areas where existing or reasonably anticipated sources of water and conservation efforts will not be adequate to meet current or future needs.

1998 legislation – encourages "local sources first" policy.

2000 Comprehensive Everglades Restoration Plan (CERP) enacted – objective is to capture 1.8 billion gallons per day of rainwater that goes out to sea, store in new reservoirs and wells, distribute it to the Everglades in the right amounts at the right times, and to farms and people as available.

2002 legislation – requires local governments to amend their comprehensive plans to better integrate them with the water management districts' regional water supply plans. By 2005, the legislation requires local governments to include in their potable water element a 10-year work plan for building water supply facilities that are considered necessary to serve existing and new development and for which the local government is responsible.

CHAPTER 3:
WHY THE SCIENCE AND TECHNOLOGY OF WATER NEEDS IMPROVEMENT

There is no question that gathering, managing, and updating accurate and consistent water data and information is critical for planning current and future water needs. In Florida, water data is compiled by many governmental entities, including municipalities, counties, water management districts, the Florida Department of Environmental Protection (DEP), the U.S. Geological Survey, state universities, and many others. While the DEP is mandated to be the "central repository for all scientific and factual information generated by local governments, water management districts and state agencies" (Water Resources Act of 1972, Chapter 373), the development, definition and use of water data and science across the state seems often uncoordinated and conflicting. For example, water management districts are required to establish minimum flows for all surface watercourses in an area and minimum water levels for groundwater. However, based on interviews and data obtained from water management districts, this requirement is not yet fulfilled across the state due to varying measurement techniques and other concerns.

While there are prolific sources of water data available that are accessible and user friendly, there is no one centralized location where all of the data is collected. It is dispersed among the various governmental agencies that collect the data. It is not unusual to get into disputes over water issues because in some cases, how the data is collected differs from district to district. From our research and interviews, it is unclear whether water management districts and localities use common scientific proven methodologies and technologies to compute water data, such as water flows/levels and costs, or future water demand projections. Creating a common system of water science across all water management districts would mitigate such disputes. It is critical for a state as vast and diverse as Florida to have a standardized methodology process for reporting and collecting water data, and for planning and forecasting needs. Florida is growing so rapidly – it is imperative that the state has a solid and reliable foundation for gathering water data.

It is often difficult to draw scientifically-based conclusions of the scope of the water problems Florida faces, and to know how effective specific solutions will be in addressing these problems. There is clearly a need to review how water data and science is gathered and managed in the state. All participants need to find common ground in the science of water or Florida will go forward unprepared to sustain our environment while accommodating forecasted population growth. Failure to do so will foster litigation and costly disputes.

CHAPTER 4:
HOW PARTNERSHIPS CAN HELP ADDRESS THE STATE'S WATER STORAGE AND DISTRIBUTION PROBLEM

As discussed in Chapter 2, Florida receives an abundance of rainfall each year—54 inches on average, annually, the second most of any state in the continental United States. As noted in Chapter 1 of this report, Florida is not like states out West, like California, which averages 22 inches per year, or Texas, which averages 29 inches per year (National Oceanic and Atmospheric Administration, 2002). However, while Florida may not have a drought-like climate year round, there are some areas of the state that are working hard to address water shortages. It is our conclusion that Florida's localized shortage issues are not a water resources problem, because the water exists within the state. One need only to fly on an airplane around the state to see that Florida has an abundance of open space and potential for environmentally sound sources of water.

Rather, we would argue a significant part of Florida's problem is one of water storage and distribution. And, like Florida's population, water availability is disproportionate by district. For example, homeowners in northwest Seminole County must cut back their water use by 17 percent. State water managers fear a water crisis in Central Florida (*Orlando Sentinel*, July 2003). The southern part of Hillsborough faced the prospect of a moratorium on construction in July 2002, which led to a spectacular show of solidarity among building industry workers who arrived in downtown Tampa in honking dump trucks, much to the amazement of the County Commissioners. And in Lake County, it is estimated that groundwater use will increase by 150 percent in coming years as a result of growth (*Orlando Sentinel*, 2002). As we've heard many times from water folks in Florida, "80 percent of the population and public consumption is south of I-4; 80 percent of the water resources are north of I-4."

The private sector is involved in water supply development and operation in several parts of Florida. For instance, private utilities profit on the sale of water, and private companies extract, bottle and sell water at a profit. And Tampa Bay Water's design-build-operate agreements with third party vendors are good examples of private companies engaging in the financing, design, building and operation of public facilities through public-private partnerships. With parts of Florida stressed for water, water management districts are looking to the private sector for assistance, such as storing water and stripping phosphorous from water to improve water quality. Private sector involvement can be an even bigger part of the solution for developing, treating, distributing, and creating alternative water supplies, as it has been throughout the world.

Additionally, there are examples of agriculture water users involved in public-private partner-

ships. For example, the Jacksonville Energy Authority (JEA) is exploring the possibility of paying to install conservation irrigation systems on agricultural operations, in return for cutbacks on agricultural permits, to free up groundwater. Also, they are looking at increased agricultural use of reclaimed water to free up more traditional water supplies for consumption.

Developing alternative water supplies is going to be even more necessary in Florida because Florida's fresh groundwater in some areas is stressed from rapid growth and the necessary restoration and maintenance of our environment (CERP, for example). Unfortunately, the development of alternative water supplies in parts of the state has been difficult, time consuming, and in some cases, expensive and subject to environmental criticism.

Water supply leaders at the DEP and water management districts can rightly take credit for alternative water supplies that have been implemented or considered, including:

- Reservoirs (above and below ground level)
- Reverse osmosis (using brackish water)
- Desalination (using seawater)
- Medium distance piping
- Aquifer storage/recovery
- Reuse water

One way for the state to invest in alternative water supplies is to better encourage partnerships. Encouraging public-private partnerships and public-public partnerships enhances public supply, conservation, environmental supply and restoration, water distribution efficiency and effectiveness. It encourages the use of water in a sustainable manner. Increased private sector and public utility involvement makes good environmental and economic sense.

Creating incentives for private companies and public entities to develop water resources and build new water supplies and infrastructure can help address Florida's water storage, treatment, and distribution challenges. Looking at ways to distribute water more effectively within regions or even across the state to water stressed areas, and implementing alternative water supplies and creative solutions to meet current needs and future demand, must be considered.

CHAPTER 5:
FINDINGS AND RECOMMENDATIONS FOR IMPROVING WATER SUPPLY MANAGEMENT IN FLORIDA

After extensive research and analysis, the task force concluded that there are three primary areas within Florida's current water management structure and policy that need to be addressed: governance, science and technology, and partnerships. The findings below led to our recommendations for improving water supply management in Florida.

Summary of Governance Findings

- **Water is considered a public resource that benefits the entire state and is supplied by localities.**

Although water is a resource of the state, water is managed and regulated primarily at the regional and local levels. This has resulted in legislation, such as the "local sources first" policy. The "local sources first" policy was designed to require consideration of "local" alternative supplies. However, the unintended result of the "local sources first" policy is that districts, counties, and municipalities think they "own" the water in their areas, and must prevent access by any other district or locality. Thus, water is less seen locally and regionally as a *state* resource.

We see "local sources first" evolving into a resource-based test as part of the regional water supply plans. Such a resource-based test might include the cost associated with developing alternative water supplies. For example, might it not be economically reasonable to consider transporting water from a non local source, if: A) it costs significantly more to develop alternative water supplies (such as a desalination plant) locally than it is to transport water from someplace else; B) there is no harm to the environment or the potential sender's needs; and C) it is mutually beneficial, and minimum flows and levels are not violated?

- **Water management districts are in charge.**

The passage of the 1972 Florida Water Resources Act and subsequent amendments established the current water management structure, in which five water management districts, with individual boards of governors, were established with the authority to regulate, manage, permit and tax. The districts are responsible for water supply planning, the establishment of minimum flows and levels, and the regulation of the consumptive use of water. This is often a clear, inherent conflict to have the districts responsible for water supply planning and the regulation of the consumptive use of water.

All five water management districts have indicated their districts will meet water supply needs for the next 20 years. However, after having reviewed many of the regional water supply plans developed

by the districts as required by the 1997 legislation, it is apparent that the plans define the need, but do not lay out time-phased, specific plans with funding sources. We conclude that the regional water supply plans do not ensure an adequate water supply with *certainty*.

- **The decentralized water governance system has not resolved the uncertainty caused by the need to grow our water supply from 7.2 bgd to 9.1 bgd.**

Based on our research and analysis, we conclude that Florida lacks a statewide vision and advocate for a sustainable water supply. While there are plenty of success stories throughout the state to address the expected increase in water supply, regional water problems and shortages persist. Such shortages hinder sound environmental practices, economic development, the involvement of the private sector, and technological innovation to increase water supply. The approach to water supply in Florida has resulted in a crisis driven mentality, which depends on the severity of the "La Niña" effect, prior planning, and cooperative governance. Thus, the decentralized structure has not solved the uncertainty of meeting our future water needs. Therefore, we recommend to:

Recommendation 1. *Establish a Water Supply Commission, with a statewide perspective, to ensure an adequate water supply to sustain the environment and accommodate forecasted population growth.*

Many key statewide functions in Florida have an appointed state entity with varying levels of authority. Examples include the Florida Transportation Commission, (with DOT and seven districts), the Florida Board of Governors (with 11 universities), and the Florida Board of Education (with 67 school districts and 28 community colleges). Likewise, we see the need for a state Water Supply Commission. Central to this commission's authority and focus is ensuring the supply of water for all areas of Florida.

A statewide Water Supply Commission would be comprised of at least seven members, with at least one from each of the five water management districts, who serve four-year staggered terms, without compensation. The Governor would select commission members and the Senate would confirm each member in the same manner as similar gubernatorial appointments. The commission would have a small, dedicated staff to provide constant assistance to the commission. Funding for the commission would come from a legislatively set pro-rata share of the ad valorem revenues of the five water management districts.

Specifically, Commission functions would include:

- Redefining the water supply relationship among the state, districts, and localities
- Planning, coordinating, and advocating statewide sustainable environmentally sound water supply policy
- Exercising general supervisory authority over the water management districts for water supply planning
- Resolving conflicts relating to water supply
- Reviewing, approving, and monitoring district water supply plans and resolving "science" conflicts
- Establishing statewide water conservation and reuse goals based upon the plans of local districts and governments
- Encouraging the establishment of regional and/or countywide water supplies, (e.g., multi-jurisdic-

tional utilities, such as Fairpoint Utilities or Tampa Bay Water), which provide wholesale water to member utilities
- Making recommendations to the Governor and cabinet on the resolution of water supply challenges and disputes
- Reviewing the "local sources first" policy and making appropriate recommendations to the Governor which may include evolution into a resource-based test that would be part of the development of regional water supply plans

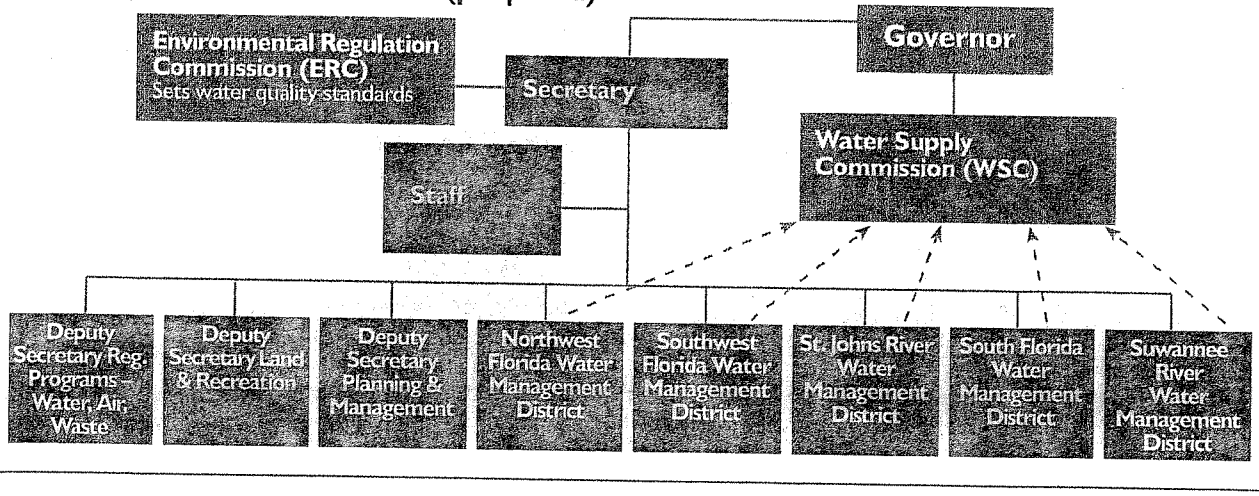
Commission functions would *not* include:

- The development of water supplies (best done at the local level)
- Permitting (best done at the district level)
- Ad valorem taxing (best done at the district and local levels)
- Setting of minimum flows and levels (best done at the district level)
- Regulating and protecting water quality (best done at the DEP, district and local levels)
- Protecting wetlands (best done at the DEP, district, and local levels)
- Providing flood protection (best done at the DEP, district, and local levels)
- Restoring the ecosystem (best done at the DEP, district, and local levels)
- Implementing stormwater projects (best done at the DEP, district ,and local levels)
- Managing droughts (best done at the DEP, district, and local levels)
- Managing the natural ecology (best done at the DEP, district, and local levels)

The creation of a Water Supply Commission would not be an additional layer of bureaucracy, as indicated in Figure 12. From the state perspective, water availability would now be as important as water quality – both being critical to Florida's future. And finally, creating a standardized process for managing water resources across the state would ensure accountability for developing adequate water supplies at the local level to meet current and future needs. Please note that we do not propose taking responsibility away from local governments as to water supply and development. We are focused on sustainable water supplies, which by definition are environmentally sound and responsible. Accountability and certainty in planning and funding are key elements of the Water Supply Commission oversight functions.

Figure 12

DEP Organizational Structure (proposed)



Summary of Science and Technology Findings

• **The development, definition, and use of water data and science across the state are often uncoordinated and conflicting.**

It is evident from our research and data gathering that the "science of water" needs improvement. Because there is no statewide centralized source of water data and information, water data is spread throughout the state in an uncoordinated manner, making it difficult to locate information, to find updated information, and to be sure it is credible. It is unclear whether water management districts and localities use common scientific proven methodologies and technologies to compute water flows/levels and costs. This makes it difficult to draw scientifically-based conclusions of the scope of the problems and the effectiveness of solutions. Therefore, we recommend to:

Recommendation 2. *Establish a Water Data Center that is clearly in cooperation with the U.S. Geological Survey and the Florida Geological Survey.*

A Water Data Center would consolidate and demystify all water data and make it available for use by governmental entities and to the public. A Water Data Center would create a standardized methodology for reporting and collecting water data, and for planning and forecasting needs. The Water Data Center could be placed in a state university with demonstrated water expertise. Since the Florida Geological Survey is the repository for all geologic data in Florida, this center would become a repository of credible data that would be shared by everyone.

Recommendation 3. *Establish a Science Advisory Council, comprised of voluntary scientists and engineers.*

Much like the Council of Economic Advisors and similar groups, this voluntary group would advise the Governor, the Florida Water Supply Commission, and the Environmental Regulation Commission, on appropriate use of data, measurement techniques, and methodologies. Such a group would bring the best minds in the private and public sector into the discussion of water supply.

Summary of Partnerships Findings

• **Alternative water supplies are underway, however the pace of implementation is not meeting current needs and future demand in all areas.**

There is much evidence that good alternative water supplies are being implemented and considered around the state. For example, in central Florida, drawing more water from the St. John's river is being considered, and in the Tampa Bay area, a desalination plant was completed in March 2003. A reservoir is also being developed in the Tampa Bay area to address water needs. Water management districts are looking for innovative ways to maximize their resources by involving the

private sector, such as storing water or stripping phosphorous from water to improve water quality. Contracting private companies to design, build and operate, (DBO) and even maintain new water supplies can save time, reduce costs, and enable public entities to benefit from the company's expertise, state-of-the-art technologies, and R&D capabilities they would not otherwise have access to. These partnerships, as evident in examples such as the Orlando Utilities Commission, can be effective approaches to developing alternative water supplies. Therefore, we recommend to:

Recommendation 4. *Find ways to encourage public-private partnerships and public-public partnerships.*

Allowing market-driven forces to play a role in water management would enhance water supply, conservation, distribution efficiency and the environment. Creating a structure and atmosphere that better supports creative solutions to Florida's water storage and distribution problem would help to ensure that we are using water in a sustainable manner. Establishing more wholesale water agencies that can make multi-year contracts to private enterprise would enable partnerships to develop.

Furthermore, creating incentives for private companies and public entities to develop water resources and build new water supplies and infrastructure are innovative ways to address future water needs. If we are able to lease public lands for tree farming and other ventures, why not lease lands for water supply development to public water suppliers? Excess water (i.e., excess to minimum flows and levels and local consumption needs now and for the future) on and within state land could become an income generator for the state and the locals from which water is supplied.

Recommendation 5. *Conduct analysis to determine practicality of a statewide water distribution system that ensures all safeguards for future growth and protection of the environment.*

Developing a system that enables water distribution from water-rich areas to water-poor areas seems to make good environmental and economic sense. Florida has vast resources of water in certain areas of the state. A statewide water distribution system would establish an economic value to water and water would become a general revenue source for the state of Florida and sending areas. Many argue that a statewide water distribution system from water-rich areas to water-poor areas is more environmentally sound and cost effective than other alternative water supplies, such as desalination. However, until a comprehensive analysis is conducted, we will not know the answer to this argument for certain. This analysis might well involve the private sector in a public/private solution.

SUMMARY

Water is unique among all resources. It is absolutely essential to life, and in this context, rightfully called our most precious resource.

We began our mission to recommend policy for sustainable environmentally sound water supplies. With this vision, we have focused our attention on those elements of current governance that, with adjustments, will build certainty into meeting the projected fresh water requirements of Florida over the next 20 years. Even if population growth is less than forecast, the pressing need to address a water supply adequate to protect our environment and maintain economic stability must be addressed by leaders throughout Florida.

As we have seen, the lack of water resources in not a functional problem. The only way to effectively guarantee protection of our environment is to have an adequate water supply. The only way to effectively accommodate forecasted population growth is to have an adequate water supply. Reevaluating and modifying the current governance structure will address many of the oversight and management issues that have developed over the years since the creation of the five water management districts. Improving how science and technology is used, monitored, and maintained provides a solid and credible foundation of information that can be used to effectively address the issues of today and for the future. And finally, encouraging innovative and creative solutions to our water distribution problem, such as partnerships, is a positive step in preparing Florida to meet the needs of the 21st century.

And, as a concluding comment, potential funding of new traditional and alternative water supplies is not included in this report, as most see funding of water supply development as the responsibility of the consumer of the water. Our proposals recommend a strategy and a structure to improve governance, define the science, and build partnerships to guarantee certainty in water supply development. The recommendations set forth set the stage for continuous reasonable debate of the planning, implementation and funding challenges, as well as the maintenance of our wonderful environment. All of these tools combine to enhance the opportunity for meaningful improvement that Florida citizens deserve and will demand.

With so much potential and rapid growth, it is time for Florida to plan for meeting its future water needs. Now is the time to be proactive. ■

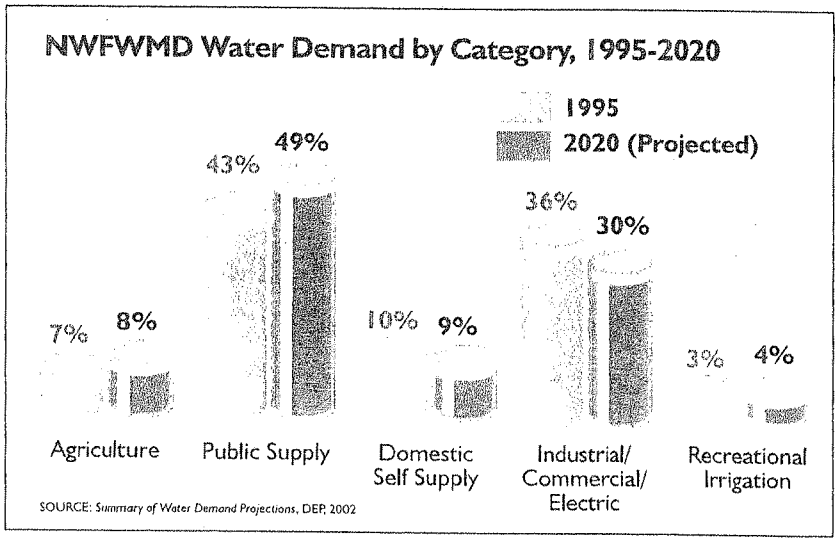
APPENDICES

I. About the Water Management Districts

Northwest Florida Water Management District

The Northwest Florida Water Management District (NWFWMD) stretches from the St. Mark's River Basin in Jefferson County to the Perdido River in Escambia County. The district encompasses all 15 counties as well as the portion of Jefferson County within the St. Mark's River Basin. Within its 11,305 square miles of land are parts of five major drainage basins. The district has a nine member governing board appointed by the Governor and confirmed by the Senate.

Northwest Florida has more rivers and streams than any other region in the state. Seven major rivers cross the district on their way to the coast. Although surface water is plentiful, the Floridian and Sand and Gravel Aquifers supply about 77 percent of the potable water needs in the region. Within the region are eight first magnitude springs, most of which are popular recreation spots.

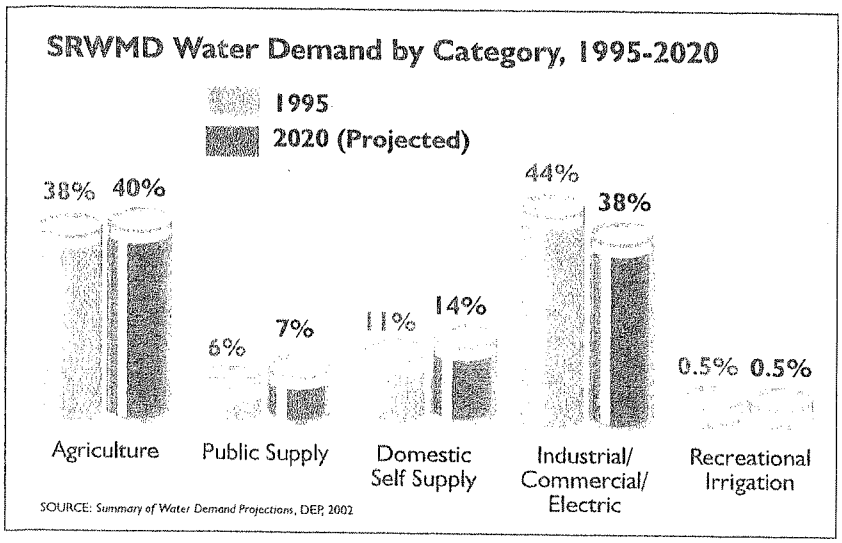


By 2020, it is projected that the NWFWMD's population will increase by 29 percent and the number of million gallons per day (mgd) will increase by 26 percent. The graph at right depicts the projected demand by category. Public Supply use will continue to be the largest water user in 2020.

Suwannee River Water Management District

The Suwannee River Water Management District (SRWMD) covers 7,640 square miles in north central Florida including all or part of 15 counties. The area is one of the least populated in the state, with a 1995 population of about 280,000. The district is primarily rural. The district has a nine member governing board appointed by the Governor and confirmed by the Senate.

The defining feature of the region is the Suwannee River. The region's surface waters, lakes,



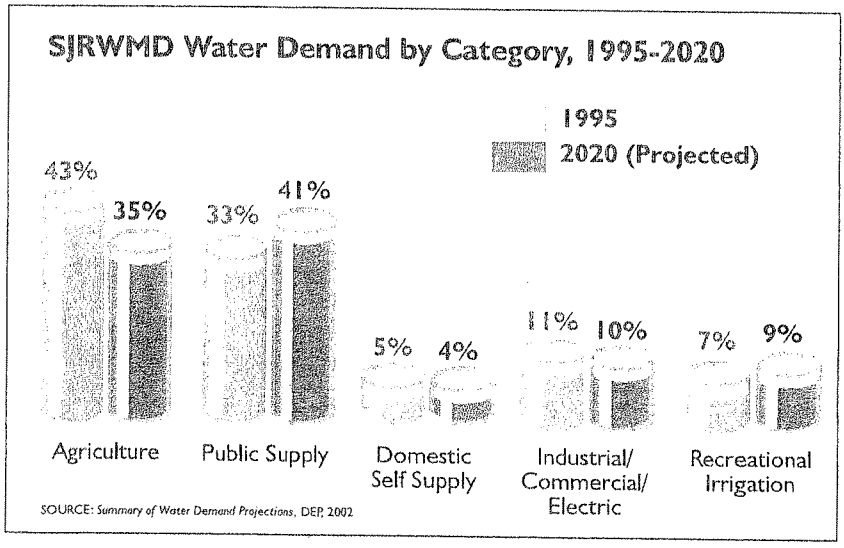
and springs, as well as rivers, are a major recreational resource for residents and tourists. Ground water is the major source for public supply, agriculture, industry, and domestic use.

Most of the water used in the district is from the Floridan Aquifer. Total water used has not changed dramatically over the last two decades, due largely to the consistent water use of the three major users. Potable and irrigation use account for most of the increase.

By 2020, it is projected that the district's population will increase by 34 percent and the number of million gallons per day (mgd) will increase by 16 percent. The graph above depicts the projected demand by category. Agriculture use will become the largest water user in 2020.

St. Johns River Water Management District

The St. John's Water Management District (SJRWMD) is located in northeastern and east central Florida, extending south from the Georgia border to cover 12,400 square miles, almost 21 percent of the state's total area. The district includes all or part of the nineteen counties and has a population of approximately 3.7 million, or 25 percent of the state's total population. The district has a nine member governing board appointed by the Governor and confirmed by the Senate.

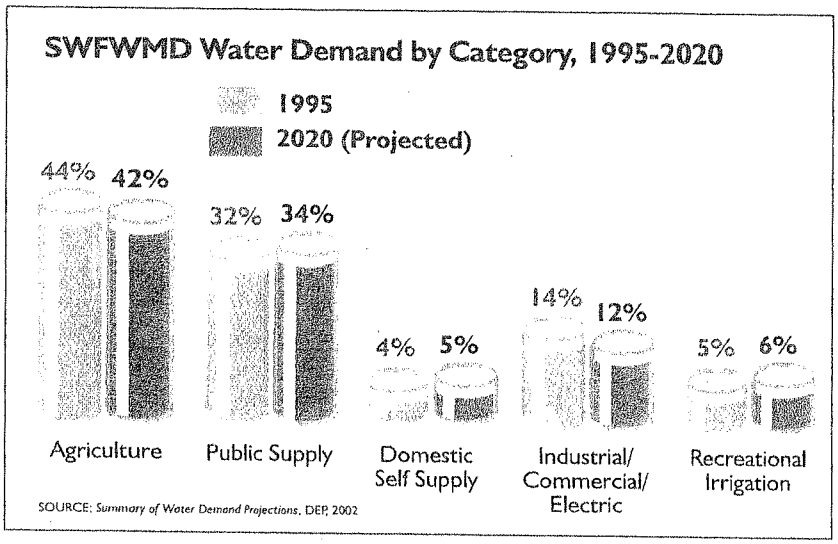


The district contains the longest river in the state, over one-third of the state's lakes including the second largest, with 12 of the 20 lakes exceeding ten square miles. Ground water is drawn from three aquifers. About three-fourths of the fresh water used is taken from ground water sources.

By 2020, it is projected that the district's population will increase by 33 percent and the number of million gallons per day (mgd) will

increase by 18 percent. The graph on the previous page depicts the projected demand by category. Public Supply will become the largest water user in 2020.

Southwest Florida Water Management District



The Florida legislature created the Southwest Florida Water Management District (SWFWMD) in 1961 to be the local sponsor of the Four Rivers Basin's Flood Project. The US Army Corps of Engineers initiated this major flood control project after Hurricane Donna severely damaged Florida in 1960. SWFWMD continues to cooperate with the Army Corps in maintaining and operating portions of this flood control system.

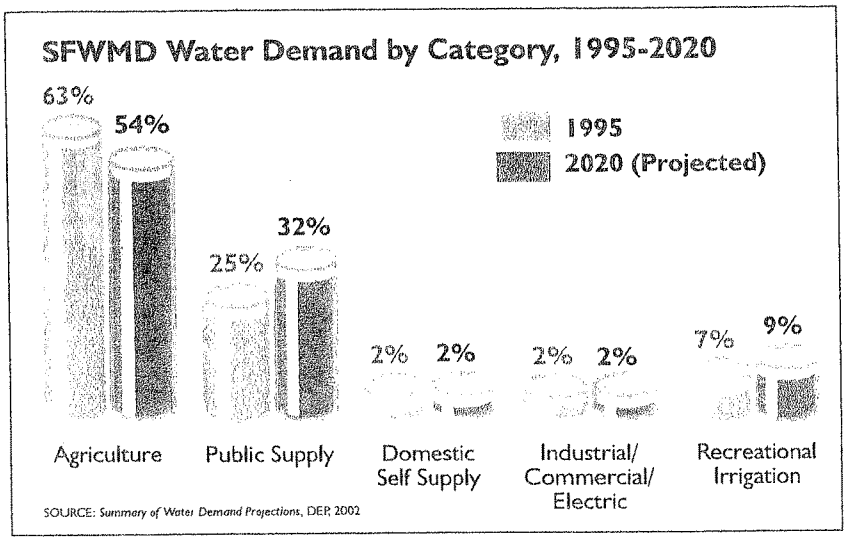
SWFWMD is divided into nine hydrologic basins, eight of which have separate basin boards. Members of the basin boards are appointed by the Governor, confirmed by the Senate, and serve three-year terms. These boards identify water-related issues and problems in their basins and provide programs and budgets to address these concerns. Currently, SWFWMD is the only district with this basin governance system. The district has an 11 member governing board appointed by the Governor and confirmed by the Senate.

SWFWMD includes all or part of 16 counties on the west central coast of Florida. The district contains one fourth of the state's population, or approximately 3.6 million people. The district's western coastline includes 13 major rivers and many smaller streams, canals, springs and waterways. Approximately 1,700 lakes ten acres in size or larger are found in southwest Florida, 23 percent of all such lakes in Florida.

By 2020, it is projected that the district's population will increase by 29 percent and the number of million gallons per day (mgd) will increase by 22 percent. The graph above depicts the projected demand by category. Agriculture will continue to be the largest water user in 2020.

South Florida Water Management District

South Florida Water Management District (SFWMD) covers 17,000 square miles and encompasses all or portions of 16 counties. 40 percent of the population and 31 percent of the land area of the state are within its boundaries. The district contains two watersheds or drainage basins: the



Big Cypress Basin and the larger Okeechobee Basin. The district has a nine member governing board appointed by the Governor and confirmed by the Senate.

South Florida has a distinct wet and dry season, and is the only savannah climate in the continental United States. Within the region, rainfall varies considerably. During the average wet season (May 1 through October 31), rainfall ranges from 46 inches near the southeast coast to 36 inches in the Kissimmee Valley. The average dry season rainfall varies from 17 inches along the southeast coast to ten inches on the southwest coast. The driest month is December, and the wettest month is September.

The district uses as much water as all the other water management districts combined.

By 2020, it is projected that the district's population will increase by 30 percent and the number of million gallons per day (mgd) will increase by 21 percent. The graph above depicts the projected demand by category. Agriculture will continue to be the largest water user in 2020.

II. Chronology

1949 Florida legislature creates the Central and Southern Florida Flood Control District to administer the Central and Southern Flood Control Project authorized by Congress in 1948

1961 Legislature creates Southwest Florida WMD and grants authority to the District to work with the federal government to build flood control structures

1972 Water Resources Act, Chapter 373 passed
- Created the five water management districts, based on major river watesheds
- Districts are regulatory agencies with far reaching authority:
  * Allocation of water for consumptive use by industry and urban populations
  * Management and storage of surface water associated with changing water use
  * Flood control

1976 Article VII, Section 9 of the Constitution amended authorizing ad valorem tax authority for water management districts
- NWFWMD ad valorem taxes could not exceed .05 mill and for the remaining four districts the ad valorem taxes could not exceed 1.0, mill without a vote of the taxpayers

1981 Save Our Rivers Act (SOR) passed authorizing water management districts to purchase lands necessary for water management, water supply, and protection of water resources, using funds derived from an increase in the documentary stamp tax

1982 State Ground Water Rule adds water quality to the mission of the districts, as well as Governor Graham's Everglades restoration initiative

1983 Henderson Wetlands Act passed instructing water management districts to incorporate the protection of isolated wetlands into their regulatory framework

1984 State Comprehensive Plan adopted
- Water Resource Policy Statement: "Florida shall assure the availability of an adequate supply of water for all competing uses deemed reasonable and beneficial and shall maintain the functions of natural systems and the overall present level of surface and ground water quality. Florida shall improve and restore the quality of water as not presently meeting water quality standards"

1987 Surface Water Improvement and Management Act (SWIM) passed initiating the first statewide program for protecting or restoring priority surface water bodies of regional or statewide significance
- Gave specific instructions to the three largest districts to prepare protection and restoration plans for the most impacted water bodies in their areas

1990 Preservation 2000 provided a $3 billion bond program to finance various land acquisition programs over a 10-year period

1993 Florida Environmental Resources Act combined permitting for management and storing water and wetland resource management into a single environmental resource permit (ERP)
- Transferred most related land development permitting responsibilities from DEP to the water management districts

1994 Comprehensive District Water Management Plans completed for each region of the state

1995 Florida Water Plan adopted that builds upon the regional plans and provides inter-governmental strategies

for addressing priority statewide issues

1996 Amendment to Chapter 373 passed reiterating the need to establish minimum flows and levels for priority surface waters and aquifers

- Required water management districts to implement water resource recovery strategies where water withdrawals cause flows or levels to drop below established minimums
- Water management district role was in water resource development, including funding and construction
- Local government, regional water supply authorities, and government-owned and privately-owned utilities were to be in charge of water supply development

1997 Districts required to develop regional water supply plans

1998 Amendment enacted "local sources first" policy that stipulates that the water resources of a local area be fully developed for use before that local area seeks to "import" water from another community

2000 Comprehensive Everglades Restoration Plan (CERP) passed whose objective is to capture 1 trillion gallons of rainwater that goes out to sea annually, store in new reservoirs and wells, and distribute to farms, people and Everglades in the right amounts at the right times

2002 Legislation passed requiring local governments to amend comprehensive plans to better integrate them with the districts' water supply plans

III. Glossary of Water Terms

Agriculture Water Use—Includes water used for agricultural irrigation and non-irrigation purposes. Irrigation water use includes the artificial application of water on lands to assist in the growing of crops, plants, and pasture, or to maintain vegetative growth in recreational lands, parks and golf courses. Non-irrigation water use includes water used for livestock, fish, farming and other farm needs.

Aquifer—A water-bearing stratum of permeable rock, sand, or gravel that yield useful quantities of groundwater to wells, springs or surface water.

Aquifer Storage and Recovery (ASR)—The storage of water in a well during times when it is available, and recovery of the water from the same well when it is needed.

Brackish—Water that contains more than 1,000 mg/L of dissolved solids; saline water is a good example of brackish water.

Commercial Water Use—Water for motels, hotels, restaurants, office buildings, commercial facilities and civilian and military institutions.

Consumptive Use Permit (CUP)—Allows a user to withdraw a specified amount of water, either from the groundwater or from a lake or river. The water can be used to irrigate crops, nursery plants or golf courses; manufacture various products, including citrus; operate industrial plants; and provide drinking water for domestic consumption. CUPs were created as the key mechanism by which the water management districts and the state can regulate the consumption of water from the most beneficial uses and in the best interest of the public.

Desalination—Any of numerous processes that remove salt from seawater or brackish water. Primarily used for public water supply to ensure that it meets Florida DEP secondary water standards.

Freshwater—Water that contains less than 1,000 milligrams per liter of dissolved solids. Generally considered potable (suitable for drinking).

Groundwater—Water under the ground in aquifers.

Minimum Flows and Levels—the limit at which further water withdrawals would cause significant harm to the water resource or ecology of the area.

Potable Water—Water that meets the quality standards set by the Florida DEP. Considered safe for human consumption and is often referred to as drinking water.

Public Supply—Water withdrawn by public or private water suppliers and delivered to users who do not supply their own water.

Public-Water Use—Water supplied from a public- water supply and used for such purposes as firefighting, street washing, and municipal parks and swimming pools.

Reasonable-Beneficial Use—Doctrine of water use set forth in Florida law whereby use of water must be both reasonable and beneficial.

Reclaimed Water—Water that has received at least secondary treatment and basic disinfection and is reused after flowing out of a domestic wastewater treatment facility.

Reuse—Use of reclaimed water for various purposes, most commonly for landscape irrigation.

Runoff—Water, including rain and snow, which is not absorbed into the ground. Instead, it flows across the land and eventually runs into streams and rivers.

Surface Water—Water found on the surface of the Earth (rivers, lakes, streams, ponds, wetlands, oceans and seas).

Water Resource Development—Formulation and implementation of regional water resource management strategies (water management districts).

Water Resource Plan—A planning document or process which assesses both sources and uses of water and develops strategies for their most effective and efficient use according to public needs and criteria.

Water Resources—The supply of groundwater and surface water in a given area.

Water Supply—Amount of water available for human and other uses

Water Supply Development—Planning, design, construction, operation, and maintenance of public or private facilities for water collection, production, treatment, or distribution for sale, resale or end use (local governments, regional water supply authorities, utilities).

Wastewater—Water that has been used and is no longer clean.

Watershed—Land area that contributes runoff to a water body (also known as a drainage basin)

Withdrawal—Water removed from the ground or diverted from a surface-water source.

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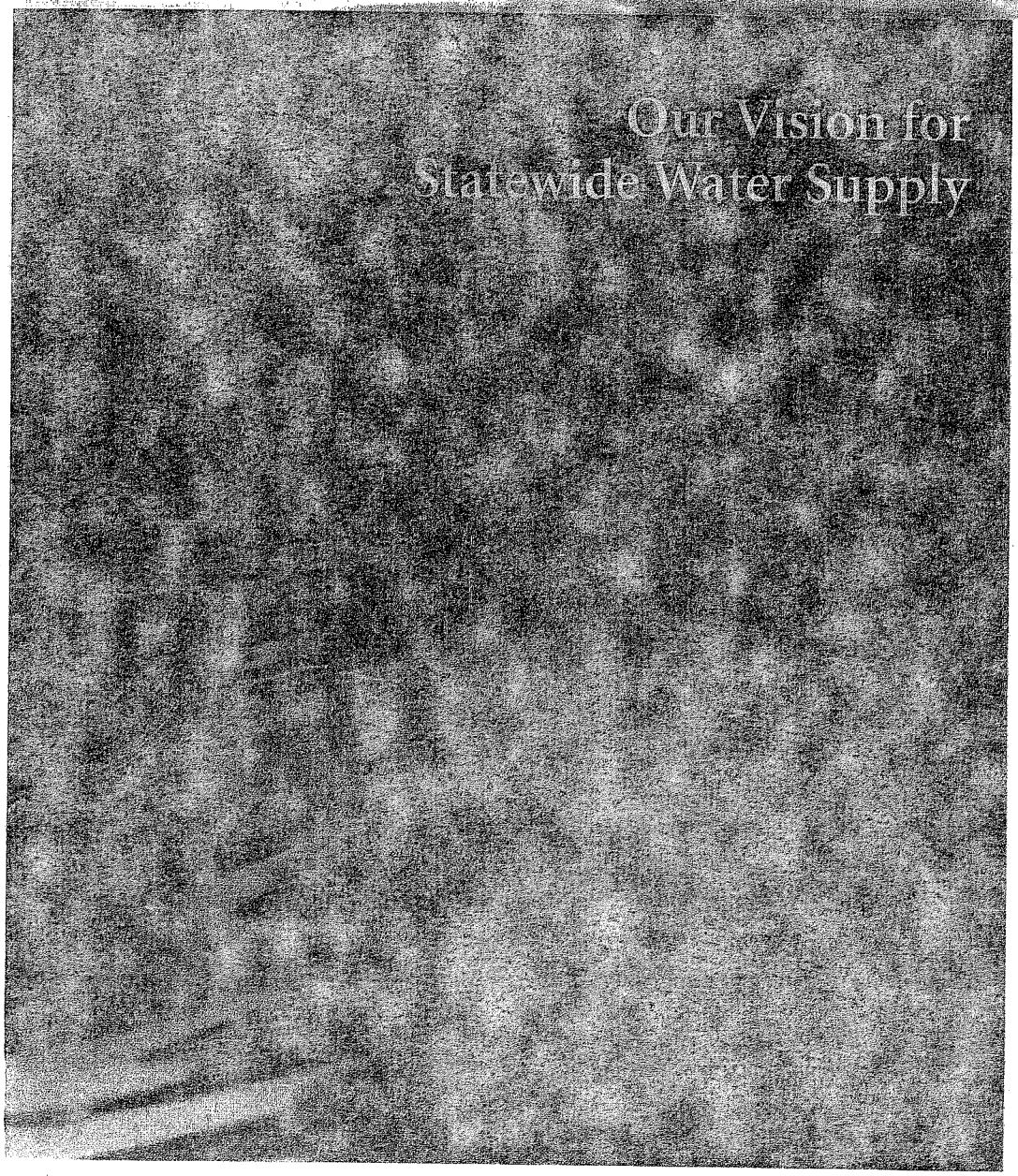

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Acknowledgements

Chair, Florida 2030

- *Chuck Carden*, Tampa Bay Water (FSAWWA Chair-Elect)

Chairs, Florida 2030 Committees

- *Frederick Bloetscher, Ph.D.* Florida Atlantic University
- *Hal Wilkening, P.E.*, SJRWMD
- *Patrick Lehman*, Peace River / Manasota Regional Water Supply Authority
- *Lisa Henthorne, P.E.*, CH2M HILL
- *Bruce Adams*, EMC Engineers
- *Bevin Beaudet, P.E.*, Palm Beach County
- *Richard A. Lotspeich*, Tampa Bay Water
- *Kenneth R. Herd, P.E.*, SWFWMD
- *Brian Wheeler, P.E.*, Toho Water Authority

Florida 2030 Steering Committee

- *Rob Teegarden*, Orlando Utilities Commission
- *Matt Alvarez, P.E.*, CH2M HILL (Past Chair)
- *Ana Maria Gonzalez, P.E.*, Hazen and Sawyer (Chair)
- *Kirby Green*, SJRWMD
- *Janet Llewellyn*, FDEP
- Utility Council Chair, *Suzanne E. Goss*, JEA
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- Florida Water Environment Association, *John A. Giachino*, Parsons
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- Administrative Council Chair, *Mark Lehigh*, Hillsborough County
- Manufacturers/Associates Council Chair, *Rick Ratcliffe*, American Flow Control

Chair, Florida 2030 Third Party Review

- *Wendy D. Graham, Ph.D.*, Director, University of Florida Water Institute

Florida 2030 Third Party Reviewers

Reviews were requested and received from 27 water resource professionals from academia, consulting, local and state agencies, professional societies, agricultural agencies and environmental organizations. A summary of third party review comments are available on our website at www.florida2030.com.

This publication includes executive summaries of the Florida 2030 papers. For the full papers and a summary of third party review comments, please visit our website at www.Florida2030.com.

Florida Section American Water Works Association

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Florida 2030 – A Vision for Sustainable Water Infrastructure

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By the year 2030, the water supply vision of Florida is one in which state-wide water demands are sustained through a combination of alternative water supplies, water use efficiency, and collaborative multi-jurisdictional water supply efforts.

It is currently the policy of the State to ensure that new supplies of water will be developed so that *all users in all parts of the State* will have adequate supplies of water to meet *all their needs now* and into the future, including sufficient water to meet *the needs of natural systems*. This policy should be the basis for any discussion with regard to water supply.

As we look to Florida's water future with a goal to continue to meet this policy, we do so with an understanding that the inexpensive groundwater that we have traditionally relied on as a primary source of water to meet its water supply needs, will not be adequate to meet all the future needs of Florida. Recently, in many areas within the State, the water management districts have found that groundwater cannot be relied on to meet the growing demand for water in these areas. Therefore, Florida's future water supply needs in these areas can be met only by:

1. decreasing demand through increased conservation;
2. increasing the use of reclaimed water; and
3. increasing the supply of water from alternative water sources, such as surface water and desalination.

The high costs of developing *alternative* sources are leading water suppliers to consider the value of quantifiable water conservation as an alternative water source. A common perception is that water conservation involves "doing without". However, a significant level of water conservation can be achieved with minimal inconvenience and at less cost than other alternative supplies. The use of reclaimed water will become increasingly important to meet the non-potable water needs of the State, including landscape irrigation, to replace the use of potable water for these purposes.

This vision also encompasses interconnected supply systems created by an assortment of multi-jurisdictional water supply entities, utilizing diverse sources, including surface waters and desalinated brackish water and seawater, efficiently managed and distributed; to meet the demand, while a high level of water use efficiency curbs demand and the need for new supplies.

Issues that Impact our Water Supply Vision

Environmental Issues

- The protection of the environment in developing new water supply is crucial.
- Withdrawal of surface water for public water supply must meet established Minimum Flows and Levels to prevent adverse effects to water bodies.

- Total Maximum Daily Load analysis need to be considered. Total Maximum Daily Load is the maximum amount of a given pollutant that a water body can absorb and still maintain its designated uses (e.g., drinking, fishing, swimming, shellfish harvesting).

- New legislation to eliminate ocean outfalls along with recent regulatory changes in the underground injection control program shows that traditional wastewater disposal or management options are becoming constrained.

Supply Issues

- Inexpensive groundwater sources are not adequate for our future needs.

- Alternative water supplies are needed and are costly.

- Water storage and distribution challenges exist with alternative water supplies.

- Relationships between the utilities, water management districts and the Florida Department of Environmental Protection need more coordination and communication to develop regional solutions.

- Water Supply development impacts stakeholders across utility jurisdictions and water management district boundaries.

- Funding sources are scarce and strained.

- With Florida's projected population growth, the demand for water supply sources will increase dramatically.

Climatological Issues

- Energy usage to treat and deliver water/wastewater needs to be considered regarding climate change and variability.

- Sea level rise may affect utility infrastructure and water supplies.

Our Balanced Vision of the Future

Demand Management
(conservation and reclaimed water reuse offsets)

- Water conservation will be the priority water supply option considered to reduce new demands, and ranked for implementation based upon its benefit and cost effectiveness.

- All classes of water users in Florida will be at the highest feasible level of water use efficiency.

- All water users, except for domestic uses and minor agricultural activities, will measure and report their water use regularly to the water management districts.

- Per capita use in urban areas will be significantly less than today.

- Maximized use of reclaimed water state-wide will dramatically reduce the demand for the development of new alternative water supplies.

Supply Management

- Complete integration of all source alternatives will be achieved in order to manage the re-

sources from a resource sustainability basis - the concept of using the 'right water at the right time.'

- Surface water supply will be a critical component of a resilient, drought-resistant, and interconnected water supply system.

- Seawater desalination will become an increasing part of Florida's future water supply portfolio and play a significant role to meet the increased water demands.

- More efficient and effective allocation and coordination of government responsibilities is accomplished.

- There will be an increased number of multi-jurisdictional water supply entities across the state to construct and operate numerous alternative water supply projects.

- There will be an equitable framework of regulatory/statutory incentives and /or mutually beneficial agreements which, taken together, will encourage the sharing of resources between utilities.

- Utilities will plan new facilities that can be adapted to future climatic impacts and join others in reducing emission of greenhouse gases by promoting water use efficiency and evaluating technologies having low carbon footprints.

- The carbon footprint of water use will be reduced dramatically by lowering levels of energy needed in water withdrawals, treatment, distribution, and collection, treatment and disposal of wastewater.

Actions for a Balanced Vision

Conservation

1. Adopt a policy that, in all state and water management district funding programs, quantifiable water conservation best management practices are considered an "alternative water supply" and are equally as eligible as capital facility expansion projects for financial assistance.

2. Provide a stable funding base for the Conserve Florida program directed by section 373.227, F.S., including the state-wide water conservation Clearinghouse for public water supply.

3. Implement new Landscape Irrigation and Florida Friendly Design Standards.

Reclaimed Water

1. Provide incentives for the development of region wide plans for the distribution, interconnection, and use of reclaimed water.

2. Provide a dedicated source of state funding for alternative water supply development projects.

3. Provide incentives for reclaimed water providers by allowing offsets to consumptive use where appropriate to do so.

Water Supplies

1. The Florida Department of Environmental Protection must use its existing authority to facilitate creation of multi-jurisdictional water supply entities.

2. Establish funding for the creation of multi-jurisdictional water supply entities.

3. Establish dedicated funding for the design and construction of alternative water supply projects.

4. Create Part VII to Chapter 373, Florida Statutes to consolidate existing statutory provisions on water supply policy, planning, production and funding.

5. Modify statutory and rule language that promotes and facilitates water supply development and resource sharing.

6. Educate the public, legislators, regulators and other stakeholders about the need for and benefit of developing a consistent, state-wide allocation policy.

7. Streamline and develop consistent permitting process between the Florida Department of Environmental Protection, the water management districts, the Florida Department of Health, the Florida Department of Community Affairs and the local environmental agencies. One-stop shopping is the objective with consistent requirements.

8. Minimum Flows and Levels need to be established to identify and protect water supply needs of natural systems before determining the availability of surface water for water supply.

Climate Change

1. Support research to develop Florida-specific climate change models in order to foster a sustainability/vulnerability analysis handbook on climate change impacts.

2. Utilities must anticipate, plan for and adapt to the potential effects of climate change.

3 Facilitate use of renewable energy sources and reduced energy designs for planned facilities. □

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Utility/Water Management District/Florida Department of Environmental Protection Partnerships

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Issue Background and Definition

Partnerships between utilities, water management districts and the Florida Department of Environmental Protection are essential in the planning, development and operation of public water supply facilities and infrastructure. Through these partnerships, the creation of multi-jurisdictional water supply entities have helped resolve many conflicts. To fully comprehend and evaluate relationships between these entities, it is important to first understand each entity's current role as related to water supply development and management.

Issue Criticality

Specific issues pertinent to partnerships include the following:

- Cooperative relationships between utilities, water management districts, and the Florida Department of Environmental Protection are vital to Florida's water supply.
- Tax reform and economic challenges will create more competition for public funds.
- Future water supplies will impact stakeholders across utility and water management district jurisdictions.
- Utilizing diverse sources of water will be important to take advantage of Florida's climate variation.
- Clear and frequent communication is necessary to identify flaws and avoid financial losses.
- High legal costs required to settle disputes related to water use permit issuances must be avoided.
- Delays in developing new water supply projects will lead to water shortages and higher costs, which must be minimized.
- Effective communication between entities is necessary to avoid constraining future collaborative efforts.

Florida 2030 Vision

By the year 2030, we must seek to achieve the most efficient and effective allocation and coordination of government responsibilities. As water supply issues and challenges change, government must also change to better manage public funds and resources. Future relationships allow for easier evaluation of inter-District projects and encourage the development of regional watershed-based solutions to local water supply problems; making water more available for all existing and future uses and avoiding adverse effects of competition for water supplies.

Pathway to Florida 2030 Vision

To achieve the Florida 2030 vision described above, the following should be considered:

- Conduct semi-annual meetings among key staff of utilities, water management districts and the Florida Department of Environmental Protection.

- Increase partnership opportunities at various association conferences/workshops.

- Conduct meetings with members of the Florida legislature to further the discussion on water issues.

- Develop an effective sustainable communication plan among water stakeholders.

- Coordinate data collection efforts with the Florida Department of Environmental Protection's Integrated Water Resource Monitoring Network with all entities.

- Set-up a framework to coordinate state-wide water resource management activities among the five water management district offices.

Issues for Consideration

1. Water management districts should evaluate the current 20-year planning horizon for water supply partnering with input from the Florida Department of Environmental Protection, the Florida Department of Health, the Florida Department of Agriculture and Consumer Services, the Florida Department of Community Affairs and utility stakeholders.

2. Annual meetings should be held within each water management district to include participation of all key stakeholders.

3. Water management districts, the Florida Department of Environmental Protection and utilities should identify opportunities for establishing additional multi-jurisdictional water supply entities.

4. Water management districts and the Florida Department of Environmental Protection should enhance dialogue among regional / district offices to ensure consistency in rule application.

For More Information

Florida 2030 Chair, Chuck Carden –
ccarden@tampabaywater.org
Issue Chair, Ken Herd –
ken.herd@swfwmd.state.fl.us
Visit our website at *Florida2030.com* ❑

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Climate Change

Issue Background and Definition

The principle impacts of climate change will manifest themselves through changing precipitation patterns that may result in more severe drought or floods, varying stream flow patterns, rising sea levels along the coasts and freshwater contamination. The uncertainty caused by climate change relative to its impacts on water resources poses a daunting challenge for drinking water, wastewater, and storm water utilities responsible for managing water resources for local communities. Therefore, utilities must anticipate, plan for and adapt to the potential effects of climate change.

Issue Criticality

From the utilities' perspective there are three critical issues regarding climate change: (1) how increasing hydrologic variability may affect water supply and demand and wastewater collection and treatment, (2) how energy usage, to treat and deliver potable water and to treat and dispose of wastewater, may contribute to climate change or variability, and in coastal areas, and 3) how sea level rise may impact water supplies. Changes in climatic patterns potentially may have large impacts on Florida in the coming century. Increasing hydrologic variability (e.g., wetter wet seasons and drier dry seasons) will pose challenges for Florida since topography limits the ability to create artificial areas to store excess precipitation for use during the anticipated extreme dry periods. Sea level rise is expected to be a long-term trend that has potentially serious effects on the southern half of the state.

Florida 2030 Vision

By the year 2030, all of Florida's water supply needs will be addressed for the long-term through a series of planning, infrastructure and policy initiatives. To insure that water supply availability is not one of the subsequent problems, utilities must plan new facilities which can be adapted to future climatic impacts, develop supplies which can be implemented in light of changing conditions, and join with others in reducing the emissions of greenhouse gases by promoting water use efficiency, evaluating technologies having low carbon footprints, and low-carbon supply options.

Pathway to Florida 2030 Vision

To achieve the Florida 2030 vision described above, the following should be considered:

- Risk assessments must be done to understand the uncertainties associated with the effects of climate change.
- There must be a diversified approach to water supplies to minimize future risks associated with climate change.
- There must be increasing conjunctive use of water supplies and an increased ability to transfer water between regions.
- Utilities must adapt to address sea level rise.

Issues for Consideration

1. Address climate impacts on utilities.

2. Evaluate the borrowing capacity of utilities to fund infrastructure needs in the long-term. In addition, develop/provide:

   a) additional funding to harden existing infrastructure,

   b) incentives to reinvest in water capture technology (e.g., horizontal wells and lock/salinity structures).

3. Support research to develop Florida-specific climate change models in order to foster a sustainability / vulnerability analysis handbook on climate change impacts.

4. Provide assistance to smaller utilities in characterizing their current water supplies and how these supplies could be affected by climate change.

5. Provide direction to the water management districts on long-term issues with protecting existing water supplies (including potential changes in state water policy).

6. Develop and promote changes to state water policy to facilitate conjunctive uses of water sources, additional storage capacity to capture run-off to tide and to promote regional sharing of water sources where needed.

For More Information

Florida 2030 Chair, Chuck Carden –
ccarden@tampabaywater.org
Issue Chair, Fred Bloetscher –
h2o_man@bellsouth.net
Visit our website at *Florida2030.com* ❑

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Water Resources Management

Issue Background and Definition

Future water supply needs are projected to increase by 2 billion gallons per day over the next 25 years. Traditionally, water supplies for most water uses in Florida have come predominantly from fresh groundwater and some surface water systems. Water resources management concerns the management and operations of sustainable water and wastewater infrastructure in a comprehensive and integrated fashion, recognizing and addressing the unique characteristics of water resources in Florida. These water resources are defined by a climate with abundant, but highly variable rainfall conditions. This inherent variability presents significant challenges for reliable and cost-effective water supply infrastructure.

Water resources management must address the total water cycle including rainfall; water sources; water supply capture, treatment and distribution; wastewater treatment and reuse. Within the water cycle, there are many potential water resource management objectives in addition to sustainable water supplies including flood control, stormwater management, and environmental protection and restoration. Integration of these multiple objectives within water resource management provides opportunities to leverage funding and seek optimal solutions.

Issue Criticality

Several significant developments have brought the issue of water resources management to the forefront in recent years, including population growth and associated costs, public concern over increases in water rates, intergovernmental coordination and cooperation, environmental restoration and protection, climate variability, and source water protection.

Florida 2030 Vision

Since the sustainable limits of traditional water resources are now being reached, the majority of future water needs in most areas of Florida will need to be met by 2030 through the development of new water resources including:

- Water use efficiency/conservation
- Expanded use of reclaimed water
- Stormwater
- Fresh surface water from lakes and rivers
- Brackish groundwater
- Brackish surface water from rivers
- Seawater

Pathway to Florida 2030 Vision

To achieve the Florida 2030 vision described above, the following should be considered:

- Integrated water resource planning based on scenario planning and optimization
- Maximize water conservation and use of reclaimed water as the foundation of sustainable water supply planning
- Regional infrastructure for regional solutions
- Creation of significant new water storage capacity
- Source water protection

- Drought management and adaptive management

Issues for Consideration

1. Extend the current 20 year water supply planning horizon to as long as possible (at least 30 years), and use integrated water resource planning to develop flexible and optimized water supply solutions for the future

2. Make the creation of new multi-jurisdictional water storage a state-wide priority (including new reservoirs, Aquifer Storage and Recovery, and wet season storage within existing drainage and water control systems) by prioritizing funding, land acquisition, and needed regulatory reforms (for Aquifer Storage and Recovery).

3. Establish state-wide priorities for water use in the most extreme drought scenarios, where the current water shortage mechanisms of "shared pain with reductions by all users" is insufficient, in order to reduce uncertainty and establishes priorities in deliberative fashion.

4. Review and amend existing water management district consumptive use permitting programs to facilitate and encourage integrated permitting of multiple sources, with conjunctive use of groundwater, surface water, and reclaimed water, providing water users with greater operational and economic certainty of how new sources fit in with current sources of supply.

For More Information

Florida 2030 Chair, Chuck Carden – *ccarden@tampabaywater.org*
Issue Chair, Hal Wilkening – *hwilkening@sjrwmd.com*
Visit our website at *Florida2030.com* ❑

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Surface Water

Issue Background and Definition

Surface water supply has traditionally been the major source of public water supply throughout the U.S. Major rivers, reservoirs and lakes are primary sources of supply and treated by public utilities in many states. In Florida, surface water sources for public water supply have been relatively few. Only about 50 of the state's 6,000 public water systems utilize surface waters as their source (only 20 provide surface water treatment at their utility with the others being consecutive systems that purchase treated water from these suppliers). Groundwater has historically been the major resource used throughout the state for public water supply primarily due to its easy accessibility and low cost.

The state's significant population growth has caused some coastal regions in Florida to experience salt-water intrusion while inland areas are experiencing adverse ecological affects. The need for development of environmental and economical sustainable alternative water supply alternatives in Florida is critical. The hydrology and geography of Florida make it challenging for the development of surface water supplies. The hydrology of peninsular Florida provides abundant rainfall in the summer months, but limited rainfall in the winter and spring months rendering some surface waters non-sustainable on a continuous basis. The geography of Florida is relatively flat, limiting the traditional construction of reservoirs or manmade impoundments. The use of surface water for public water supply must be looked at in a broader context of environmental sustainability, reliability, water quality, treatment and economic impact if it is to be a true alternative in Florida.

Issue Criticality

The development of surface water in Florida as an alternative supply is emerging as a critical component of public water supply systems. The full development of surface water supply as an alternative is dependent on multiple issues, including the following:

- *Watershed Issues:* Withdrawal of surface water for public water supply must meet established Minimum Flows and Levels to prevent adverse effects to water bodies.

- *Total Maximum Daily Load analysis:* Total Maximum Daily Load is the maximum amount of a given pollutant that a water body can absorb and still maintain its designated uses (e.g., drinking, fishing, swimming, shellfish harvesting).

- *Raw Water Quality:* Surface water plants must provide high level treatment, including filtration and high level disinfection.

- *Storage:* The key to sustainability of surface water supply is the development of water storage facilities to provide for the capture and storage of water during rainy times for use during dry periods when surface water withdrawal may not be available. Aquifer Storage

and Recovery wells and off-stream reservoirs have the potential to provide the necessary storage.

Florida 2030 Vision

By the year 2030, it is essential to develop a robust water supply system that is sustainable, reliable, safe and affordable. Surface water supply will be a critical component of a resilient, drought-resistant, and interconnected water supply system and should be considered with a mix of traditional and other alternative water supply options. When integrated with other source alternatives, such as brackish groundwater, Aquifer Storage and Recovery, reclaimed water, storm water, the resources can be managed from a resource sustainability basis - the concept of using the 'right water at the right time'. The integration of surface water supply into a diversified water system provides the ability to maximize surface water withdrawal when it is abundant in the wet season and minimize withdrawal in the dry season. The use of any alternative supply option must include a strategy to maximize reclaimed water and conservation and to promote increased regionalization along with other water efficiency strategies.

Pathway to Florida 2030 Vision

To achieve the Florida 2030 vision described above, the following should be considered:

- Minimum Flows and Levels need to be established to identify and protect water supply needs of natural systems before determining the availability of surface water for water supply.

- Off-stream surface water reservoirs and Aquifer Storage and Recovery systems are required to allow proper storage of diverted water during periods of high flow to hold water during wet times of the year for later use in the dry season.

Issues for Consideration

1. Provide regulatory incentives to encourage local governments and water suppliers to coordinate water supply projects.

2. Development of conjunctive water permitting rules and regulations to provide for the integration of diversified sources into a resource management plan.

3. Florida Department of Environmental Protection, water management districts and other stakeholders need to develop strategies that promote development of conjunctive water supply systems that integrate surface water sources with groundwater and other alternative sources.

4. Provide incentive based funding programs such as water management district cooperative funding, Senate Bill 444 funding and specific legislative initiatives for the development of surface water treatment projects.

5. Watershed management needs to relate to water quality.

6. The development of Water Reservations needs to take into consideration all existing and future water supply uses, and must be done in cooperation with all stakeholders.

For More Information

Florida 2030 Chair, Chuck Carden – *ccarden@tampabaywater.org*
Issue Chair, Pat Lehman – *peacemana@aol.com*
Visit our website at *Florida2030.com* ❑

American Water Works Association
FLORIDA 2030
A Vision for Sustainable Water Infrastructure

Desalination

Issue Background and Definition

As Florida is faced with increasing limitations on the use of traditional groundwater supplies to meet future potable water demands, the development of new alternative water supplies will be needed. Desalination is likely to be seen as one of the most favored options for meeting those future potable water demands.

Desalination is the process by which salt is removed from seawater or brackish water. Today there are more than 12,000 desalination plants operating worldwide producing over 12 billion-gallons-per-day of desalinated water. Florida embraced desalination over 30 years ago and now has more than 130 facilities operating statewide. The most common desalination process utilizes reverse osmosis technology. Water supply to a desalination plant is typically via an ocean surface or sub-surface intake, or well system.

Issue Criticality

Specific issues pertinent to the public include the following:

- Cost to desalinate is higher relative to other water supply alternatives.
- More energy is required for desalination; impact reduced with green alternatives.
- Environmental consideration for marine species and concentrate disposal is critical.

Florida 2030 Vision

By the year 2030, seawater desalination will become an increasing part of Florida's future water supply portfolio and play a significant role to meet the increased water demands. Desalination can greatly reduce environmental impacts due to over-pumping groundwater or over-utilization of surface water supplies. Desalination is drought independent and environmental impacts can be minimized with diligent attention to design and operation, and use of renewable energy for power. Diversification including large-scale desalination ensures provision of a secure water supply to meet residential and commercial water needs and sustain the public and economic welfare.

Pathway to Florida 2030 Vision

To achieve the Florida 2030 vision described above, the following should be considered:

- A state-wide or district water supply strategy should be developed which includes desalination as an important, but limited feature to ensure adequate water supply.
- Educate the public, legislators, regulators and other stakeholders by providing accurate costing information, collect and provide environmental study results in a digestible format, provide information on energy-efficient sustainable desalination facilities and approaches, and frame "4-taps" strategy (seawater desalination, surface supply, water recycling and import of water) in context.
- Facilitate creation of joint action utilities to achieve greater common goals, which can be fully public entities or a combination of both private/public partnerships.

- Facilitate use of renewable energy sources and reduced energy designs.

- Develop permitting model to streamline and expedite project permitting.

- Develop a coastal and inland county water grid to integrate desalinated water into other water systems.

Issues for Consideration

1. Need streamlined and consistent permitting process. A common process is needed between the Florida Department of Environmental Protection, the water management districts, the Florida Department of Health, the Florida Department of Community Affairs and local environmental agencies. One-stop shopping is the objective with consistent requirements.

2. Need regulations updated to deal with pretreatment, disposal and concentrate issues.

3. Need public and stakeholder outreach program to educate regarding costing and environmental advantages and sensitivity of technologies.

For More Information

Florida 2030 Chair, Chuck Carden –
ccarden@tampabaywater.org
Issue Chair, Lisa Henthorne –
lisa.henthorne@ch2m.com
Visit our website at *Florida2030.com* ❑

APPENDIX B

American Water Works Association
FLORIDA 2030
A Vision for Sustainable Water Infrastructure

Water Conservation

Issue Background and Definition

In light of current and future limitations on the use of traditional groundwater sources, increased reliance will be placed on conserving potable water resources as an option to developing new alternative water supplies. Water conservation efforts in Florida date back more than 30 years. Currently, the State's water management districts require planning and implementation of water conservation measures by public water suppliers, commercial and industrial users, landscape and golf course users, and agricultural users. Examples of existing requirements for public water suppliers include:

- Adoption of local ordinances that affect irrigation hours, new landscaping, and plumbing fixtures
- Evaluation of the feasibility of water reuse
- Leak detection
- Conservation-based rate structures
- Public education
- Industrial and commercial water use audits

The scarcity of existing and easily developed traditional water sources and the high cost of developing alternative sources are leading water suppliers to more fully consider the value of quantifiable water conservation as an alternative water source. Unfortunately, a common perception is that water conservation involves "doing without". Actually, significant water conservation can be achieved with minimal inconvenience and at less cost than other supplies.

Issue Criticality

Development of conventional and alternative supplies is costly and requires significant use of energy and capital. Implementation of conservation measures reduces both water and energy use, and is easier to implement. The following critical issues should be considered when developing conservation measures:

- Ensuring a sufficient water supply without compromising the ability to meet future generations' needs.
- Increasing the efficient use of potable water supplies increases the availability of the existing water supply for new customers by deferring increases in demand.
- Identifying cost-effective solutions to manage demands in order to help defer/avoid costs of new supply and electric generation.
- Increasing efficient use of potable water supplies to help reduce the risk of overwhelming supply deficits during a water shortage.
- Reducing energy requirements and greenhouse gas emissions, protecting air and water quality.

Florida 2030 Vision

By the year 2030, all classes of water users in Florida will have spent a decade at the highest feasible level of water use efficiency. All water users, except for domestic uses and minor agricultural activities, will measure and report their water use regularly to the water management districts. Per capita use in urban areas will be significantly less

than today. The carbon footprint of water use will be reduced dramatically by lowering levels of energy in water withdrawals, treatment and distribution; and in collection, treatment and disposal of wastewater. Water conservation will be the priority water supply option considered for new demands, and ranked for implementation based upon its multiple benefits and cost effectiveness. Ultimately, expensive treated potable water will no longer be used for non-potable uses when economically and physically feasible.

Pathway to Florida 2030 Vision

To achieve the Florida 2030 vision described above, the following should be considered:

- Develop regulations resulting in more water efficient homes, businesses and institutions throughout Florida.
- Financial incentives, an effective means of increasing conservation, should be defined and evaluated for funding through Capital Improvement Projects at the local level.
- Adopt the U.S. Environmental Protection Agency's WaterSense product standards and promote WaterSense products.
- Develop and implement rate structures that are designed to account for changes in water use, provide incentives and funding mechanisms to conserve water, and include a "safety net" for low-income/minimal use consumers.
- Continue to build collaboration between stakeholders, such as Conserve Florida, developing effective approaches to conservation.
- Continue developing educational programs integrated into quantifiable conservation program elements for all stakeholders.
- By 2020, future development should not use potable water sources for irrigation purposes where economically and physically feasible.

Issues for Consideration

1. Provide a stable funding base for the Conserve Florida program directed by section 373.227, F.S., including the state-wide water conservation Clearinghouse for public water supply.
2. Update the Florida Building Code to include efficiency requirement of various products beyond the National Energy Policy Act requirements, using the Environmental Protection Agency's WaterSense product label, U.S. Department of Energy 'Energy Star' specifications and Alliance for Water Efficiency plumbing codes and standards documentation.
3. Change existing water management district water use permitting requirements to provide consistency in application of implementation requirements and the goals associated with use of water conserving best management practices.
4. Implement new Landscape Irrigation and Florida Friendly Design Standards.
5. Adopt a policy that, in all state and water management district funding programs, quantifiable water conservation best management practices are considered an "alternative water supply" and are equally as eligible for financial assistance, with all projects consistently evaluated and selected based on cost-effectiveness, reliability and sustainability.

For More Information

Florida 2030 Chair, Chuck Carden –
ccarden@tampabaywater.org
Issue Chair, Bruce Adams –
badams@emcengineers.com
Visit our website at *Florida2030.com* ❑

American Water Works Association
FLORIDA 2030
A Vision for Sustainable Water Infrastructure

Reclaimed Water

Issue Background and Definition

The Florida Department of Environmental Protection defines reclaimed water as water that has received at least secondary treatment and basic disinfection and is reused after flowing out of a domestic wastewater treatment facility. Extensive treatment and disinfection ensures that public health and environmental quality are protected. Reclaimed water is a very important alternative water source as it saves water that would otherwise be withdrawn from freshwater ground or surface water sources to meet demands. Reclaimed water also reduces the reliance on traditional disposal methods such as ocean outfalls or deep injection wells which waste the resource.

Florida's reclaimed water systems have a total permitted wastewater treatment capacity over 2,000 million gallons per day and treated over 1,400 million gallons per day in 2006. The total reclaimed water capacity in 2006 was 1,368 million gallons per day. New legislation to eliminate ocean outfalls as a primary disposal method along with recent regulatory changes in the underground injection control program show that traditional wastewater disposal or management options are becoming constrained; thus, reclaimed water is becoming a more significant water resource alternative.

Issue Criticality

Along with water conservation, the reuse of reclaimed water is an essential tool for demand management. The maximization of reclaimed water for non-potable uses (e.g. landscape irrigation) to substitute for the current use of potable water will decrease the need for the development of expensive alternative water supply projects in the future.

Florida 2030 Vision

By the year 2030, Florida will have maximized its use of reclaimed water, and the use of reclaimed water state-wide will have dramatically reduced the demand for the development of new alternative water supplies.

Pathway to Florida 2030 Vision

To achieve the Florida 2030 vision described above, the following should be considered:

- Local governments, in conjunction with the Florida Department of Environmental Protection and water management districts must continue to work together in partnership toward consistent reclaimed water goals. Several key recommendations that have resulted from the Reclaimed Water Stakeholder meetings which began in 2008 are:
  - Ensure that water management districts explore mechanisms to allow reclaimed water use providers to comment on reuse feasibility findings of consumptive use permitting applications.
  - Incorporate proposed language changes in Section 373.361(1)(Appendix H) that will include the Florida Department of Envi-

ronmental Protection and utilities explicitly in the regional water supply planning process.

- The Florida Department of Environmental Protection and water management districts should develop consistent definitions and approaches for the use of offsets in the consumptive use permitting program, which should be codified in the district consumptive use permitting rules and possibly in the statewide Water Resource Implementation Rule (Ch. 62-40, F.A.C.).

- Expand the Conserve Florida program to include the evaluation of reclaimed water. Water management districts and utilities need to work together to identify appropriate language revisions to Section 373.227, F.S.

- Restore funding to the Water Protection and Sustainability Program for alternative water supply development.

- There must be increased public acceptance of use of reclaimed water for non-potable uses.

Issues for Consideration

1. Optimize the reclaimed water resource when used for irrigation, balancing efficiency of use while avoiding unintended adverse impacts of over-regulation.
2. Develop regulatory tools and incentives that facilitate augmentation as a tool to expand reclaimed water customer bases and promote the efficient use of reclaimed water, including augmentation in the water conservation planning process.
3. Provide incentives for reclaimed water providers by allowing offsets to consumptive use where appropriate to do so.
4. Provide a dedicated source of state funding for alternative water supply development projects, which further incentivizes and sustains reclaimed water development in Florida.
5. State policies regarding the use of reclaimed water should ensure that diverse beneficial uses are supported, including innovative and recharge uses.
6. Facilitate permitting approval processes by improving coordination between regulatory agencies in multi-jurisdictional projects and tightening time clocks for issuing necessary regulatory authorizations.

For More Information

Florida 2030 Chair, Chuck Carden – *ccarden@tampabaywater.org*
Issue Chair, Bevin Beaudet – *bbeaudet@bcwater.com*
Visit our website at *Florida2030.com* □

APPENDIX B

American Water Works Association
FLORIDA 2030
A Vision for Sustainable Water Infrastructure

Water Allocation and Transfer

Issue Background and Definition

Early in Florida's development, water supply was believed to be unlimited; more than 50 inches average annual rainfall, productive aquifers, many lakes, streams, and rivers, as well as the Gulf of Mexico and the Atlantic Ocean. However, with Florida's continued development, and the increasing demands of domestic use in combination with significant demands of agriculture and industry, the need for water supply has increased significantly and the limitations to the availability of supply are becoming more realized. When developed resources become scarce, competition among users increases often resulting in legal and political confrontations. These "water wars" are generally costly in both economic and political capital. Florida may not have a water supply problem but a water storage, distribution and cost of water production problem.

To meet growing demands some water providers are looking to water resources outside their respective regions. Thus, if the state is to meet future water demands, an environmentally sound, economically equitable and regionally collaborative allocation / transfer process is needed. To be successful, that process must address both the needs of the water user and those of the area of potential withdrawal. To that end, acceptable solutions may require some form of regulatory or politically brokered partnering involving transfers and allocations of the available water imposed at some level of acceptability by the parties.

Issue Criticality

Specific issues pertinent to water providers include the following:

- The need to avoid repeated and intensifying regional and inter-regional water wars.
- A well-defined transfer and voluntary trading process that promotes ability to transfer water from areas of availability to areas of need.
- The protection of the economic interests of the areas of availability.
- The protection of the environment is crucial to providing a framework to address the state's long term water supply.

Florida 2030 Vision

By the year 2030, the water supply vision encompasses interconnected supply systems, utilizing diverse sources, efficiently managed and distributed; to meet the demand, while a high level of water use efficiency curbs demand and the need for new supplies. It also includes an equitable framework of regulatory/statutory incentives and/or mutually beneficial agreements encouraging areas with available water to partner with areas of need to share resources. Florida's state-wide water demands will need to be sustained through a combination of growth management policies, water use efficiency and

collaborative multi-jurisdictional water supply efforts.

Pathway to Florida 2030 Vision

To achieve the Florida 2030 vision described above, the following should be considered:

- Educate the public, legislators, regulators and other stakeholders about the benefit of developing a consistent, state-wide, water allocation and transfer process.

- Development and implementation of an acceptable water transfer process that transcends multi-jurisdictional boundaries to ensure sustainable water supply for all.

- Modifications to statutory and rule language that promotes and facilitates water supply development, resource sharing and transfer amongst water providers.

- Developing options or alternatives by engaging all stakeholders in open discussion of the options/alternatives proposed. Examples of the options/alternatives for water resource transfers directly or through credits and/or some type of resource trading include: Regional Utility Grid; Resource Trading; Source Trading; Resource Re-distribution; Permit Transfers; Inter-Regional Transfer.

Issues for Consideration

1. Provide language in Section 373, F.S. clarifying that co-operative and voluntary water resource transfers between water users will be considered by water management districts, provided environmental protection is maintained or can be demonstrated.

2. Promote dialogue between the Florida Department of Environmental Protection, water management districts and water users about alternatives and options available for water resource transfer and trading, their potential role in regional water resource management and the barriers to their consideration and implementation.

For More Information

Florida 2030 Chair, Chuck Carden – *ccarden@tampabaywater.org*
Issue Chair, Brian Wheeler – *bwheeler@towater.com*
Visit our website at *Florida2030.com* ❑

American Water Works Association
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A Vision for Sustainable Water Infrastructure

Governance/Funding

Issue Background and Definition

The inexpensive groundwater the State has traditionally relied on as a primary source of water to meet its water supply needs will not be adequate to meet all the future needs of significant areas of peninsular Florida. Recently, the water management districts have declared that groundwater cannot be relied on to meet the growing demand for water in many areas within the State. This is in addition to existing limitations on groundwater withdrawals in southwest Florida. Florida's future water supply needs in these areas will be met only by: (1) decreasing demand through increased conservation, (2) increasing the reuse of reclaimed wastewater, and (3) increasing the supply of water from alternative water sources, such as surface water and desalination. Due to the high costs of developing alternative water supplies, there is increasing need for local governments and others to work together on a regional basis to address this common problem. While there are currently a limited number of regional water supply entities in the State, there will need to be many more similar multi-jurisdictional entities to ensure the future construction of the alternative water supply projects necessary to meet the State's future water supply needs.

There is an increasing concern that while the existing statutory governance structures have served the state well, they may not be adequate to fully implement the current State water policy of promoting "the availability of sufficient water for all existing and future reasonable-beneficial uses and natural systems". There is also a growing awareness that Florida may not have a water shortage problem so much as it has a storage and distribution problem. There may be a seasonal abundance of water in one part of the State at the same time there are seasonal shortages in other parts. Therefore, the issue of the storage and distribution of water over broader geographic areas of the State must be considered.

Issue Criticality

The timely creation of multi-jurisdictional water supply entities, especially in the central and southeast parts of the state, will be essential for the construction of the alternative water supply projects needed to meet not only the current regulatory restrictions for these areas, but to meet the State water policy. The consequences of failing to create the appropriate multi-jurisdictional water supply entities in a timely manner will be that the needed alternative water supply projects will not be constructed in time to meet the regulatory constraints. This will inevitably result in either large-scale building moratoria or the removal of the regulatory constraints. It could also result in competition for water supplies between the various water user groups.

If the water management districts are not able to resolve the water supply issues that have developed in many parts of the State, the State may be forced to step in to provide a solution. To meet Florida's future water supply needs over the long-term, it will be imperative to ensure: (1) effective water supply planning, (2) implementation of regional and state-wide water supply plans, (3) the creation of multi-jurisdictional water supply entities, and (4) the construction and operation of

the infrastructure for the effective storage and distribution of water to and between multi-jurisdictional water supply entities.

Funding will be important to provide seed money for the creation of multi-jurisdictional water supply entities, the initial selection and design of alternative water supply projects, and to help offset the large capital costs associated with the construction of those projects.

Florida 2030 Vision

By the year 2030, it is likely that there will be several multi-jurisdictional water supply entities across the State that will have collaborated to construct and operate numerous regional alternative water supply projects to produce, store and distribute water. It is also likely that some of these entities will have, or will be planning, interconnections between them so as to provide for a "water grid" to help ensure the effective distribution of water.

Only if a clearly defined need has been identified should a state-level entity be created to ensure that sufficient water is available for "all existing and future reasonable-beneficial uses and for natural systems" by ensuring the necessary planning and construction of regional alternative water supply projects, and by ensuring the construction and operation of the necessary storage and distribution infrastructure to provide water to and between multi-jurisdictional water supply entities.

Pathway to Florida 2030 Vision

To achieve the Florida 2030 vision described above, the following should be considered:

- Local governments will need to cooperate to develop multi-jurisdictional water supply entities in order to construct and operate alternative water supply projects.

Issues for Consideration

1. Whether the Florida Department of Environmental Protection should act more aggressively to use its existing statutory authority to facilitate the creation of multi-jurisdictional water supply entities and ensure the construction of needed alternative water supply projects.

2. Whether funding should be provided to assist in the creation of multi-jurisdictional water supply entities.

3. Whether additional funding should be provided to multi-jurisdictional water supply entities to assist with the design and construction of alternative water supply projects.

4. Whether a new Part VII to Chapter 373, Florida Statutes, should be created to consolidate existing statutory provisions on water supply policy, planning, production and funding.

For More Information

Florida 2030 Chair, Chuck Carden –
ccarden@tampabaywater.org
Issue Chair, Rick Lotspeich –
rlotspeich@tampabaywater.org
Visit our website at *Florida2030.com* ❑

APPENDIX B

APPENDIX C

2008

Water Congress

Planning for Florida's Water Future

Century Commission for a Sustainable Florida

Consensus Recommendations

There are certain challenges in "organizing" the discussion of hundreds of recommendations offered by both the Water Congress delegates and the general public. We could not possibly address all the proposed recommendations from all the sources in a two-day conference. Therefore, we looked for some consensus in the recommendations already received in an effort to assure that this Congress was successful in proposing "a comprehensive set of specific sustainable water use and supply action steps."

We attempted to highlight those ideas which were achievable, and to leave both the more technically complex and the more controversial recommendations for later discussions...or perhaps to a 2009 Water Congress. In addition, please note some recommendations arrived well after the deadline and could not be included below.

There is a delicate balance between proposing a recommendation which is too conceptual and therefore challenging to implement and one which is so specific it diverts us into a debate among technicians and lessens the impact of the Congress. We tried to find the middle ground with these recommendations.

The following is a starting point for the Water Congress discussion. It organizes some recurring themes and proposes some meaningful action steps. The delegates will decide if some or all of these recommendations, or others proposed at the Congress, will help create a more sustainable water future for Florida.

There are several broad policy themes arising from the various recommendations received;

- **Natural resources must be protected as water supply and use projects are considered and developed.**

APPENDIX C

- **Water use efficiency must be maximized; Floridians must develop a *water conservation ethic* which guides our daily lives and actions.**
- **Public education efforts must be coordinated, measured as to success, and particularly focused on young Floridians.**
- **Sufficient water for existing and future reasonable beneficial needs for all water users must be assured. This includes recognition of the different needs of different water users.**
- **Florida must become more drought resistant. Water users, suppliers and regulators must better share and coordinate their plans, decisions and knowledge; they must work together more effectively both statewide and across large regions.**
- **Floridians must take action to minimize and adapt to climate change.**

I. Water Conservation:

Most of the recommendations received, from both the delegates and the general public, involved implementing meaningful conservation measures. Two delegates put the generally accepted concepts into the following words;

"Conservation should be a way of life. Goal-based conservation initiatives and incentives must be accelerated, coordinated, implemented, monitored and enforced. Strengthen public awareness, education and citizen involvement so as to effect change in our individual and collective conservation ethic and behavior."

"Conservation should not just be considered "something we should do," but should be a defined, targeted and specific. It is possible to achieve targeted goals, but everyone must be held to some improving standard."

Potential Recommendations include the following:

1. Achieve dramatic improvements in landscape irrigation efficiency by requiring use of the recommendations found in the report, *Landscape Irrigation and Florida–Friendly Design Standards*, (where applicable) as a condition of;

a. Consumptive Use Permits issued by Water Management Districts

b. Development Orders issued by local governments

c. Development Orders for Developments of Regional Impact as reviewed by Regional Planning Councils

2. Support the development of robust incentive-based cooperative funding programs by the water management districts to encourage the development of alternative water supplies and implementation of conservation measures, including the maximum use of reclaimed water. This should also involve seeking state and federal funding to complement water management district funding initiatives.

3. Amend the Florida Constitution to raise the property millage cap for the Northwest Florida Water Management District to be the same as the other four Water Management Districts.

4. Establish a dispute resolution process by which differences in water resource management and regulation policy, data collection, or methodology among Water Management Districts and other stakeholders could be resolved within a reasonable period of time so not to delay the development of feasible, secure long-term water supplies for all sectors and to ensure the timely implementation of water conservation strategies.

(One of the most controversial subjects identified in the delegate recommendations was the establishment of some sort of statewide water entity. There was some consensus that communication and policy coordination among the water stakeholders, including the Water Management Districts could be improved, although there was not agreement about whether there should be an oversight entity and if so, the extent of its authority.

There was also some sentiment that this was a "solution looking for a problem." Arguably, this oversight responsibility is already vested in FDEP and is already being exercised or could be pursued more vigorously without establishing a new entity.

Various suggestions included establishing a statewide entity are set forth below for consideration by the delegates:

5. Convene an expert Task Force to review the complex and overlapping decision making on water consumption, water conservation, reuse, and water quality improvement, to recommend any needed long-term changes in these management structures.

6. Set up a Review Committee that would evaluate the economic and environmental impacts of projects and rules implemented by the Water Management Districts and report annually on the success of the programs.

7. Request that Governor Crist establish, within the Executive Office of Governor, a position of "water liaison." This individual would have no regulatory authority or be able to act inconsistently with FDEP, but would coordinate the Governor's expectations on matters of statewide water policy, urge a consistent message across the state

regarding matters of policy and practice, and would reflect the Governor's strong focus on the state's water future.

8. Establish a state level entity whose purpose is to ensure "long-term water conservation, use and supply plan for environmental, agricultural and public supply purposes." This entity would coordinate the effort of the DEP and the WMDs with respect to water supply activities oversee the distribution of funds for alternative water supply development, and provide positive assistance to utilities in the development of feasible, secure long-term water supplies.

IV. Water for Agriculture:

The Century Commission's ***Second Annual Report*** *stressed the need for a" long-term water conservation, use and supply plan for environmental, agricultural and public consumption purposes." Most of us tend to think only about safe and affordable water coming through our spigots...not about adequate and clean water growing our crops and serving Florida's precious natural systems.*

Some potential recommendations regarding agriculture include:

1. There must be a dramatic increase in the regional focus on water supply development. This must be accompanied by an appropriate increase in the amount of revenue devoted to this purpose.

2. Water Management Districts must consider the differing economic circumstances of end users when evaluating the economic feasibility of developing and using alternative water supplies and additional water conservation measures.

3. In circumstances where traditional water supplies are limited and the development of alternative water supplies or additional water conservation measures are not economically feasible, water managers must allocate reasonable quantities of traditional water sources to meet both fluctuating and future Agricultural and Industrial Self Supplier water needs.

4. Agricultural and Industrial Self Suppliers must have long-term (20+ year) permitted access to economically feasible water supplies, with the ability for reasonable quantity adjustments based on business conditions.

5. Public water consumption needs, especially in metropolitan areas along the coast should invest in alternative water source options, so as to stop the encroachment inland into surficial aquifer water sources required by commercial agricultural production.

6. Regulatory agencies should recognize and provide incentives and assurances to agricultural operations which maximize irrigation efficiency.

V. Water for the Environment:

"The waters in the state are among its basic resources," begins Chapter 373 of the Florida Statutes, and the DEP and water management districts are to "manage those resources in a manner to ensure their sustainability." Developing a sustainable plan for the long-term use of water demands a never-ending commitment to protect the resource.

Please note that several recommendations suggested by environmental advocates are found in "Conservation" and "Water Resource Management" sections of this document.

Potential recommendations regarding protection of our natural systems include the following;

1. Assure that natural systems receive adequate protection to assure their long-term health before water is permitted for other uses.

2. Minimum flows and levels (MFLs) must be set for all surface water bodies where consumptive use permits are sought and natural groundwater levels should not be ignored to the detriment and loss of the dependent natural ecological systems (wetlands and spring systems for example). Natural system ecological needs must not be short changed to meet public water supply demands.

3. While minimum flows have received the majority of attention by the district boards, the establishment of minimum levels for aquifers has lagged. Aquifers, especially those in water resource caution areas should have minimum levels established.

4. Require alternative water supply projects that propose to take and store peak surface water flows to create equivalent quantities or volumes of natural system storage by reversing drainage and flood control projects and securing permanent easements on affected lands.

5. Natural resources (lakes, rivers, wetlands, and estuaries) must be protected as alternative supplies are developed. In areas where groundwater withdrawals have drawn down aquifer levels, recovery strategies should be considered. These surface features are connected to groundwater and it will be difficult to protect natural resources that depend on surface waters if depressed aquifer levels continue to degrade flows and levels.

VI. Water Resource Management/Climate Change

"Water resources management involves the management and operations of sustainable water and wastewater infrastructure in a comprehensive and integrated fashion, recognizing and addressing the unique characteristics of water resources in Florida...

Water resources management must address the total water cycle including rainfall; water sources; water supply capture, treatment and distribution; wastewater treatment and reuse." (from the Florida 2030 Summary).

Potential recommendations regarding integrated water resource planning include;

1. Any proposed capital facilities designed to provide additional water supply must be evaluated first as to the comprehensiveness and effectiveness of conservation measures before any financial commitments of public funds are made. Prior to any consideration of new capital projects, such as desalination, demonstrate that the maximum possible supply available through re-use and conservation practices is being achieved.

2. Maximize the beneficial use of reclaimed water and improve upon the capture and storage of excess water. Recruit and connect large industrial users to reclaimed water systems to reduce demand on existing and future potable systems.

3. Make creation of new water storage (including new reservoirs, ASR and wet season storage) a statewide priority by prioritizing funding, land acquisition, and needed regulatory reforms (for ASR).

4. Establish statewide priorities for water use in the most extreme drought scenarios, in order to reduce uncertainty and establish priorities in a deliberative fashion.

5. Florida must maximize the cost-effective reuse of reclaimed wastewater for non-potable uses. It is recommended that a goal of 100% beneficial reuse of wastewater from publicly owned wastewater treatment facilities be established for the year 2030.

6. Reinstate the annual state funding for alternative water supply development (i.e. SB 444 funding - $60 million to be matched by water management districts and local governments/utilities).

7. Support Florida-specific research on climate change and water management interrelationships to better understand the state's water vulnerabilities and make effective adaptations.

8. FDEP, the Water Management Districts and water providers should fully consider the energy and greenhouse gas emissions consequences of water supply activities.

9. Promote water supply activities, such as increased water use efficiency, that have low carbon footprints.

10. Consider the financial needs of programs to protect drinking water and wastewater infrastructure against the threat of rising sea level.

11. The FDEP and Water Management Districts should fully incorporate climate change implications into their water planning, regulatory, and financial assistance programs.