Avoiding a Water Crisis in Florida –How Should Florida's Water Supply be Managed in Response to Growth?
by Lynne Holt

"The source of the water crisis is simple but exceedingly difficult to address, water resources are finite but the population that depends on those supplies is increasing inexorably." Dennis Hjeresen, Los Alamos National Laboratory and the Green Chemistry Institute[1]

Water remains essential for life. According to the United Nations, 1.1 billion people throughout the world have no access to safe drinking water. In the United States, this is certainly not the case. However, water conflicts have pitted Colorado, Arizona, and other western states against each other, particularly in periods of drought, and Florida is no exception. These conflicts not only occur between states, but also within them. We need only think of the recent recommendation in a 2003 report by the Florida Council of 100 calling for a feasibility analysis of a new statewide water distribution system. The recommendation proposed "developing a system that enables water distribution from water-rich to water-poor areas seems to make good environmental and economic sense."[2] It garnered widespread opposition from North Floridians, thus setting the stage for potential, prolonged water conflicts within the state.

Although Florida is renowned for its wetlands, its enormous population growth in the last half of the 20th century has caused widespread degradation to thousands of square miles of these wetlands.[3] Floridians in 2005 may not be facing a statewide water crisis at present but they are certainly facing enormous challenges. They cannot afford to be complacent.

Addressing the water supply issue in Florida requires consideration of a number of intertwined questions. How has water resource and supply planning evolved to respond to projected increasing demand? With respect to meeting growing demand, what measures have Floridians taken to curb consumption or expand water supply? How have water resource and supply planning efforts addressed environmental considerations, such as the preservation of wetlands, springs, and the Everglades, for which Florida is famed? From an economic perspective, is Florida's water priced efficiently to capture all the costs that underpin long-term water supply sustainability? Is Florida even on the right trajectory toward achieving such sustainability? The following overview addresses these questions.

Background

Approximately 90 percent of Florida's drinking water comes from groundwater and the other 10 percent from surface water. The looming problem is that groundwater withdrawals are projected to outstrip demand in some regions of the state unless creative solutions are found. Florida's population in 2000 was almost 16 million, but it is expected to increase by over 41 percent to 22.6 million in 2020. At the same time, demand for potable water is expected to increase from 7.7 billion gallons per day in 2000 to an estimated 9.1 billion gallons per day in 2020.

Rainfall in Florida averages 54-55 inches annually. Only Louisiana has a higher average rainfall than Florida. But rainfall is highly variable from year to year, ranging from 30-80 inches annually. Moreover, over 70 percent of annual rainfall is lost to evaporation and only 30 percent finds its way to bodies of water or aquifers. The water then flows to the sea, along the way sustaining important natural areas such as the springs, the Everglades, crystalline streams and winding rivers that are of great importance to the maintenance of biodiversity and to recreational opportunities for residents and tourists alike.

The distribution of rainfall and social demands on water are also highly variable throughout the state. Not surprisingly, the south, southwest regions, and central regions of the state have experienced the greatest population increases relative to groundwater supply. So the pressure on planners to come up with alternative supply sources and measures – reclaimed water, water from storage and recovery, desalinated water --has been stronger in those regions than in the northeast and the Panhandle. For example, since the 1970s, the Tampa-St. Petersburg metro area has encountered significant problems with water supply for at least two reasons. First, due to urban growth, there is relatively little open land into which rain water can seep and recharge. Second, extensive groundwater pumping has resulted in saltwater intrusion.[4]

Freshwater uses in Florida are generally categorized under six types of users: agricultural irrigation, public supply (households served by municipal or private water utilities), domestic self-supply (households with their own wells), industrial/commercial, electric generation, and recreational irrigation (such as golf courses). As Table 1 reflects, the state's freshwater withdrawals from 1975 through 2000 have increased in terms of millions per gallons per day, largely due to increased use from public supply and agricultural irrigation.

Table 1

Water Use: Freshwater Withdrawal by Categories of Use in Florida
Specified Years 1975 Through 2000
(In millions of gallons per day)

Category	1975	1980	1985	1990	1995	2000
Total	6,773	6,701	6,313	7,583	7,230	8,192
Public supply	1,124	1,406	1,685	1,925	2,079	2,437
Domestic self-supplied	228	243	259	299	297	199
Commercial-industrial mining	883	700	709	770	692	563
Agricultural irrigation[a]	2,930	3,026	2,798	3,495	3,244	3,923
Recreational irrigation[b]	(NA)	(NA)	182	310	281	411
Power generation	1,608	1,326	680	784	637	659

(NA) Not available.
a/ Withdrawals for crops, livestock, and fish farming.
b/ Withdrawals for turf grass and landscaping. Included under agricultural irrigation prior to 1985.

Source: Bureau of Economic and Business Research, University of Florida, Table 8:40, *Florida Statistical Abstracts 2003*

To legally withdraw water from aquifers, lakes or rivers in Florida, users must receive consumptive use permits from Florida's water management districts (WMDs) or the Department of Environmental Protection. Applicants for permits must establish that the proposed use of the water meets three conditions: (1) it is a reasonable beneficial use; (2) it will not interfere with any presently existing legal use of water; and (3) it is consistent with the public interest. Subject to certain conditions specified in law, permit holders may be authorized to transport water across county borders and outside the watershed or drainage basin from which it is taken. The transport of water from one community to another, however, is presently constrained by Florida's "local sources first" policy that "directs the Department of Environmental Protection and the water management districts to encourage the use of water nearest the area of use and application whenever practical." Such sources include naturally occurring water sources, as well as alternative water sources. Exceptions to this policy include water for use by the Central and Southern Florida Flood Control Project, bottled water companies, and electric utilities for generation.

Florida's Water Supply Planners/Providers

The entities responsible for water resource development and regional water supply planning at large spatial scales are Florida's five Water Management Districts: Northwest Florida WMD, St. Johns River WMD, Suwanee River WMD, Southwest Florida WMD, and South Florida WMD. Each district may levy property taxes and also receives local, state and federal funding. Legislation enacted in 1997 requires the WMDs, as part of the planning process, to develop regional water supply plans that project water needs for a 20 year period and identify where traditional water sources are not likely to be adequate to meet those needs. These plans must include a list of water source options that will meet projected needs and also take into consideration natural ecosystems. Legislation enacted in 2004 authorizes the WMDs to promulgate rules that identify preferred water supply sources as a means of improving long-term water use efficiency.

At the municipal level, Florida's 146 water supply and irrigation utilities are responsible for actually supplying the water (although funding assistance for that purpose may come from WMDs). Florida law provides that the planning, design, construction, operation and maintenance of public and private facilities for water collection, treatment, and distribution for sale, resale, and end use is predominantly the responsibility of those utilities. Since 2002, local governments have been required to address water supply infrastructure (treatment plant capacity and pipes) in their comprehensive plans.

Mandated coordination of regional and local water planning was spurred in large part by the severe drought conditions afflicting Florida in the late 1990s. Legislation enacted in 2002 required local governments to amend their comprehensive plans to better integrate them into the WMDs' regional water supply plans. In essence, local governments had to consider the adequacy of the water supply in addition to the necessary infrastructure for delivering water. The WMDs, for their part, are required to review and comment on the comprehensive plan amendments and the local governments' evaluation and appraisal reports (EARs). One component of the EAR requires the local government to consider its WMD's regional water supply plan. Specifically, a work plan

covering a planning period of at least ten years must account for construction of water supply facilities to service existing and new development for which the local government is responsible.

Legislation enacted in 2004 strengthened the linkages between growth management and water supply planning already mandated in previous years. The legislation requires local governments to consider updates to the WMDs' regional water supply plans before amending their local comprehensive plans on water supply availability. The current deadline for the required amendments is December 31, 2006.

The Development of Regional Impact (DRI) Process

Land use planning is another important dimension of water resource and supply planning. Enacted in 1972, the Environmental Land and Water Management Act established the DRI program that preceded the comprehensive plan requirements referenced above. The DRI program has several environmental and planning objectives, including "ensur(ing) a water management system that will reverse the deterioration of water quality and provide optimum utilization of our limited water resources." Any development that is determined to have a substantial impact upon the health, safety, or welfare of citizens in more than one county is subject to the DRI process. State, regional, and local agencies must review those projects defined as DRIs for projected impacts on regional facilities and resources. The review process must determine how regional impacts will be mitigated. Developers must obtain a local government development order to define mitigation conditions and submit to administrative review at the state level.

Because the comprehensive planning process has become more regional in scope so as to address environmental issues, the Department of Community Affairs has proposed streamlining DRI environmental reviews. As the Department noted in a recent working paper, "The environmental regulatory processes have become more sophisticated over time resulting in an overlap with the development of regional impact (DRI) process primarily with environmental impact assessments that can be eliminated or combined."[5] How to improve coordination of the comprehensive plan amendment process with the DRI process is currently a matter of debate because they are different procedural activities with different standards and approval requirements. There may be advantages as well as costs of evaluating development projects from multiple perspectives.

Conservation and Increasing Water Supplies

Florida's WMDs have responded to projected increased demand by promoting several strategies that encourage conservation. The term "conservation" here refers to any action or technology that leads to permanent and cost-effective improvements in water use efficiency. Perhaps one of the most significant conservation measures in Florida has been the reuse of reclaimed water. Approximately 600 million gallons of reclaimed water is used each day for beneficial purposes, including irrigation of 154,000 residential lawns, 427 golf courses, 486 parks, and 213 schools. Benefits from water conservation initiatives include: (1) saving money because needs can be met less

expensively than if new supplies are developed; (2) expanding water supply because conservation has the same net effect as new supply development; and (3) protecting the environment from the adverse effects of over-withdrawal and the development of reservoirs, pipelines and well-fields.[6] In addition to using reclaimed water, Floridians can conserve water through the use of more efficient appliances and toilets. Retrofitting toilets, in particular, is the simplest and most cost-effective investment residents can make.[7]

Legislation enacted in 2004 requires the Florida Department of Environmental Protection to establish a statewide water conservation program for public water supply. To implement this directive, the following parties entered into a written agreement to develop a water conservation work plan: the five WMDs, the Department of Environmental Protection, the Florida Public Service Commission, the utility councils of both the American Water Works Association and the Florida Water Environment Association, and the Florida Rural Water Association. Scheduled for completion in February 2005, the work plan will include recommendations for, among others, developing and implementing a standardized water conservation planning process for water utilities. One component of the charge to the signatories is the development of measures to assess and benchmark the effectiveness of water conservation programs and practices.[8]

Environmental Considerations

Underlying much of Florida's water planning policies to date is the operating assumption that population growth is generally good for economic development and that the influx of new residents to our state is inevitable. Yet we know growth exacerbates water problems and that poor development planning and agricultural practices have had adverse effects on our environment and water resources. One need only consider the example of the re-engineered patterns of water flow in the Everglades and its environs to illustrate the point that massive damage to a fragile ecosystem will be extremely costly to reverse, assuming it can even be reversed at all.[9]

Florida's policymakers have also come to appreciate the importance of environmental considerations in water management planning and implementation. In part, their understanding has been influenced by recreational activities and tourism dollars associated with Florida's lakes, rivers and springs that Florida's soaring population growth has helped to spur. According to an economic impact study (2003) conducted for the Florida Department of Environmental Protection, tourism spending at four state parks with springs (Ichetucknee, Wakulla, Homosassa, and Blue Springs) provided an estimated $68.5 million in 2002 to surrounding local economies.[10] Legislative policy now directs the Department of Environmental Protection and the WMDs to: "prevent damage from floods, soil erosion, and excessive drainage, minimize degradation of water resources caused by the discharge of storm water, and preserve natural resources, fish, and wildlife."

The WMDs must establish minimum flows and levels for surface water and aquifers within their jurisdiction in order to prevent significant harm resulting from withdrawals. Minimum flows for surface water are statutorily defined as "the limit at which further withdrawals would be significantly harmful to the water resources of the

area." Minimum levels are defined as "the level of groundwater in an aquifer and the level of surface water at which further withdrawals would be significantly harmful to the water resources of the area." The WMDs must develop priority lists of water bodies for which they will establish minimum flow and levels. Florida law also requires the inclusion of a recovery or prevention strategy in a WMD's regional water supply plan for any violation of the set flow or level that is projected to occur within a 20 year period. Such strategy may include the development of additional water supplies.

We noted above that water supply availability varies across the state, often pitting the more populous and water-poor communities in the south and central regions against less populated northern communities with greater access to available water. However, another type of "water war" is being waged among user types. Florida's water permitting does not set priorities based on the type of intended use, leading some environmental groups to advocate that resource protection take priority over permits for other types of water withdrawals. For example, a recent report recommends: "After water resources are inventoried and protected, water supplies should be permitted according to the legal tests of reasonable and beneficial use, existing use and public benefit. If users get first claim to water, it is very hard to ensure that the resource will be protected. If the resource is stressed to make up for the water that has been permitted away, then the resource will be harmed, in some places permanently."[11] Setting priorities among potential alternative uses is an important and growing challenge.

What Price Water?

Water can be viewed as a basic right, but water also is a commodity, subject to the usual economic pulls of supply and demand, as constrained by public policy and environmental considerations. One method of curbing water use and thus reducing conflicts over water in Florida and elsewhere is the adoption of more efficient pricing and funding mechanisms to capture the real cost of supplying water. The World Water Council ranked 147 countries in terms of water use pricing and the United States came in last. For example, Germans pay $1.78 per cubic meter of water, the French, $1.08, the British, $1.23, and the Americans, only $0.54.[12]

It would appear that water is unusually cheap in the United States. There may be compelling societal arguments for maintaining low prices for water supply (the "basic right" argument), but Florida should consider three implications of such low costs.

1. ***Dealing with Infrastructure Decay and Growth***. Utilities' infrastructure needs to be replaced over time and pricing water supply too low (below-marginal cost charges to customers) typically results in inadequate long-term capital investments. The water supply industry is very capital intensive because almost every component of the water delivery system – capturing and storage of water, transport of water, water treatment, water delivery, and disposal of dirty water -- require fixed capital investments in long-term infrastructure assets. The high ratio of fixed costs relative to variable (usage-based) costs involved in water supply suggests that water utilities typically operate for many years without fully recovering their costs. However, many water utilities are subject to political pressures that are more responsive to current consumer demands—leading to short-term solutions. The end product is typically low water pricing. While it might make political sense in the near term to undercharge customers for water, it does not

make good economic sense. Without adequate cash flows and financial returns, water utilities cannot invest in much-needed infrastructure replacements.

According to a report by the Environmental Protection Agency (2002), wastewater and water utilities will incur significant costs over the next 20 years as they expand capacity to accommodate projected growth. The infrastructure of U.S. water utilities is rapidly aging; the report notes that most of the pipes were installed after World War II and are due for replacement. The EPA's analysis found that over $500 billion above current spending would be needed by 2019 to operate and maintain water and wastewater utilities in the United States. The report concludes that some combination of increased spending and innovative management practices will be necessary to meet projected needs.[13]

2. ***Environmental Concerns***. Water should also be priced to include environmental impacts, both short- and long-term. Robert Glennon observes, "Water rates, with rare exceptions, do not include a commodity charge for the water itself. The water is free. As a consequence, this pricing structure shunts off on other customers (or on society generally) many other costs: groundwater users do not pay, for example, the cost of harm to rivers and riparian habitat, of dried-up lakes, of water-quality degradation or of subsidence caused by groundwater pumping." [14] There are no broadly-accepted monetary estimates for water pollution damages, according to a recent OECD report.[15] However, imperfect these estimates might be, other countries are taking steps to account for adverse environmental impacts. Federal reforms in Australia have encouraged sub-national governments to require full-cost recovery, including all environmental costs. Costs are recovered through an environmental charge on consumers or, as in the case of the state of Victoria, water companies are required to make environmental contributions (based on a percentage of their revenues) with the expectation that the costs will be passed on to consumers. Given the broad environmental impacts of water use in Florida, Floridians need to be concerned about the best ways of integrating environmental concerns into the state's water policy.

3. ***Influence on Consumption Behavior***. Absent pricing schemes that capture the true costs of water use, consumers will not be able to respond rationally to conservation signals. Therefore, the tariff design must be easy for them to understand and relate logically to usage. The extent to which consumers are responsive to water pricing and the optimal rate structure for inducing them to reduce water use are the focus of extensive research, well beyond the scope of this essay. Although the jury is still out as to their effectiveness, experiments with watering restrictions and seasonal pricing are often included in the mix of approaches used by water companies to send their customers conservation signals.

Path to Long-Term Sustainability

Inadequate investments in water supply and poor management of water company operations often result in calls for change—sometimes in the form of privatization. However, privatization is not a panacea for all the problems facing water utilities, as past examples of aborted efforts in the city of Atlanta and Cochabamba, Bolivia aptly illustrate[16] Effective privatization requires the public sector to exercise sound oversight, monitoring, and regulation. Water utilities must be able to earn an allowed return on

equity sufficient to cover costs for system maintenance, infrastructure improvement, water quality compliance, enhanced security costs, and projects to accommodate population growth. Whether under public or private management, water must be supplied in a manner that is efficient and socially and environmentally responsible. As a recent report on privatization noted,

> In the end, it doesn't matter to a resident of a settlement in Bombay or a suburb of Chicago whether a public or private company owns or manages the facilities that deliver clean and affordable water to their taps. What does matter is that people – wealthy and poor—have the water they need, that the environment gets a fair share, that profit levels are reasonable, and that ambient water quality is protected for future generations.[17]

At least five approaches might assist water supply efforts in meeting those objectives:

1. ***Regional approaches***. Local governments could be encouraged through state and regional incentives to band together to purchase raw water. The most notable example in Florida is, of course, the formation of Tampa Bay Water - a wholesale, not-for-profit water supplier that serves Hillsborough County, Pasco County, Pinellas County, St. Petersburg, New Port Richey, and Tampa. These governments decided it was cheaper to cooperate in managing the water supply than to continue the costly downward spiral of water wars and litigation. Tampa Bay Water not only helps local government members and their residents save money through its regional purchasing power. It also has the technical expertise to manage water more efficiently than many smaller water providers. For example, Tampa Bay Water uses a customized computer tool –Optimized Regional Operations Plan - to analyze and forecast groundwater conditions and levels at water supply facilities. Information gleaned from these analyses and forecasts enables the company to rotate water production to prevent adverse environmental impacts.[18]

2. ***Incentives***. Government incentives could be implemented to encourage water conservation alternatives that have the effect of reducing groundwater withdrawal. For example, the South Florida WMD and the Florida Department of Agriculture and Consumer Affairs have participated in the design and construction of excess water (tailwater) recovery systems. These systems involve farm production water that originates from a surface or groundwater source. That water is used to irrigate crops; tailwater from that irrigation is then captured and stored for future use, particularly during the dry season when there is peak demand.

3. ***Benchmarking.*** Establishment and implementation of benchmarking and performance standards can go a long way toward monitoring management objectives affecting water conservation, water quality and water supply efficiency. An example of benchmarking for Florida's WMDs is the most recent *Florida Water Plan Annual Progress Report* (October 2004), which compares the measurable performance of the WMDs in meeting several objectives related to water supply, flood protection, water quality, and natural system protection. We cannot comment on the comparability, completeness, or application of the data ultimately submitted but the act of defining objectives and measures would appear to be a necessary first step. In like manner, benchmarking the performance of water supply utilities (whether publicly or privately-

owned) should also be promoted to ensure that water services to retail customers are efficiently provided and the water meets quality standards.

4. ***Science-based Policy***. Investments in research are needed to identify both the biological and chemical contaminants that could threaten water supplies and the methods of removing those contaminants without adversely affecting health and the environment. Further scientific research will be needed to improve policies governing wetlands management, the treatment of drinking water supplies, the use of water in agriculture, the maintenance and preservation of aquatic habitats and species diversity, wastewater treatment and reuse, and flood and drought management.[19] Addressing these topics should take account of broad patterns of water availability and flow at regional and state scales.

5. ***Heightening Public Awareness***. The public's eyes often glaze over when water issues come to the fore. It's always easier to raise public awareness about threats to specific water bodies, as supporters of the Everglades restoration projects and the Florida Springs Task Force initiatives have discovered. People respond best, for example, to concrete examples and understand connections between the adverse impacts of reduced water flow at Blue Spring in Volusia County and fewer manatees visiting the spring each winter.

Conclusion

The collision course between the supply of and demand for water resources in Florida can only be averted through scientifically-supported, outcomes-based strategies that provide incentives for innovation and coordination, as well as penalties for substandard performance. Conservation measures are certainly one component of the overall strategy and properly targeted conservation rate structures, as we discussed, can encourage Floridians to reduce water consumption.

There is no shortage of legislation governing water and land use planning and oversight in Florida, nor is there a paucity of task forces to consider policies for improving that planning and oversight. The challenge facing Florida's policymakers is to implement the best of these proposals and enforce those laws on the books that will ensure a rational and effective water policy. The short-term crisis has been abated, but the next one is only around the corner. There is no excuse for Florida not being ready.

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Endnotes

[1] "Green Chemistry: The Impact of Water Quality and Supplies," in *Water and Sustainable Development: Opportunities for the Chemical Sciences. A Workshop Report to the Chemical Sciences Roundtable.* Washington D.C.: The National Academies Press, 2004, p. 11**;** available at: http://www.nap.edu/books/0309092000/html.

[2] Florida Council of 100, *Improving Florida's Water Supply Management Structure*, September 2003, p. 23.

[3] In just 20 years, more than 2,000 square feet of wetlands were lost, according to Ron Larson, author of *Swamp Song: A Natural History of Florida's Swamps*. Gainesville: University of Florida Press, 1995, p. xvi.
[4] Robert Glennon, *Water Follies*: *Groundwater Pumping and the Fate of America's Fresh Waters*. Washington: Island Press, 2002, p. 73.
[5]Florida Department of Community Affairs, Draft, *Growth Management Initiative: Streamlining the Developments of Regional Impact Program*, November 15, 2004, p. 3.
[6] Florida Department of Environmental Protection, *Florida Water Conservation Initiative*, April 2002.
[7] Joseph J. Delfino and James P. Heaney, *Challenges to Water Resources Sustainability in Florida*. Presented at the Universities Council on Water Resources Annual Meeting, Portland, Oregon, July, 2004 under the theme "Allocating Water: Economics and the Environment."

[8] Fact Sheet: Joint Statement of Commitment for the Development and Implementation of a Statewide Comprehensive Water Conservation Program for Public Water Supply; available at: http://www.dep.state.fl.us/water/waterpolicy/docs/jsoc_fact.pdf.
[9] For an accessible account of the history the Everglades restoration effort, see Diane Raines Ward, *Water Wars: Drought, Flood, Folly, and the Politics of Thirst*. New York: Riverhead Books, 2002, pp. 235-251.
[10] Mark A. Bonn and Frederick W. Bell, Economic Impact of Selected Florida Springs on Surrounding Local Areas, April 10, 2003; available at: http://www.dep.state.fl.us/springs/reports/EconomicimpactStudy.doc.
[11] Florida Water Coalition, Inc., *Water Policy for Protecting Nature, not Promoting Growth*. September 2003; available at: http://www.fladefenders.org/publications/WaterCoalitionPositionPaper.pdf. Environmental groups represented by this coalition include Florida Wildlife Federation, Florida PIRG, Legal Environmental Assistance Foundation, 1000 Friends of Florida, Defenders of Wildlife, Audubon of Florida, Clean Water Network, and Earthjustice.
[12] William K. Reilly, "The Worth of Water," *Water for a Sustainable and Secure Future: A Report of the Fourth National Conference on Science, Policy and the Environment*, Washington D.C.: the National Council of Science and the Environment, January 29-30, 2004, p. 7. A survey of 18 OECD countries, including the United States, found that water charges represented the smallest portion of income or expenditure in the United States. See OECD, *Improving Water Management: Recent OECD Experience*, 2003, Table 3.4, p. 61.
[13] U.S. Environmental Protection Agency, *The Clean Water and Drinking Water Infrastructure Gap Analysis*, September 2002; available at: http://www.epa.gov/safewater/gapreport.pdf. The water and wastewater gap totaling $533 billion was: $263 billion for capital payments and operations and maintenance for water, and $270 billion for wastewater. The report shows that revenue increases totaling a little over 3 percent annually above current rates would largely close the payment gap.
[14] Glennon, p. 220.
[15] OECD, *The Price of Water: Trends in OECD Countries*, Vol. 1, No. 8, 1999, p. 28.
[16] In 1999, the City of Atlanta hired United Water to manage the city's water system. In early 2003, the deal collapsed and the water system was returned to public management following ratepayer outcries and the failure of the company to realize its savings projections. Privatization woes are not confined to the United States. The Bolivian Congress passed the Drinking Water and Sanitation Law in October 1999. This law set the stage for a subsidiary of Bechtel, International Water, to privatize Cochabamba's municipal water supply. After privatization, prices escalated and millions of Bolivians eventually took to the streets in a mass protest which ended with one death and thirty injured. The government ultimately revoked the privatization legislation.
[17] Gary H. Wolff, *Public or Private Water Management? Cutting the Gordian Knot*, January/February 2004; available at: http://www.pacinst.org/publications/essays_and_opinion/public_or_private_editorial.pdf.
[18] Other regional water supply efforts in Florida include the Water Authority of Volusia and an agreement between Orange County and Orlando Utilities Commission to develop a minimum of 15 mgd of alternative water supplies by 2013.
[19] National Research Council, *Confronting the Nation's Water Problems: the Role of Research*, 2004, p. 17 and 20.