

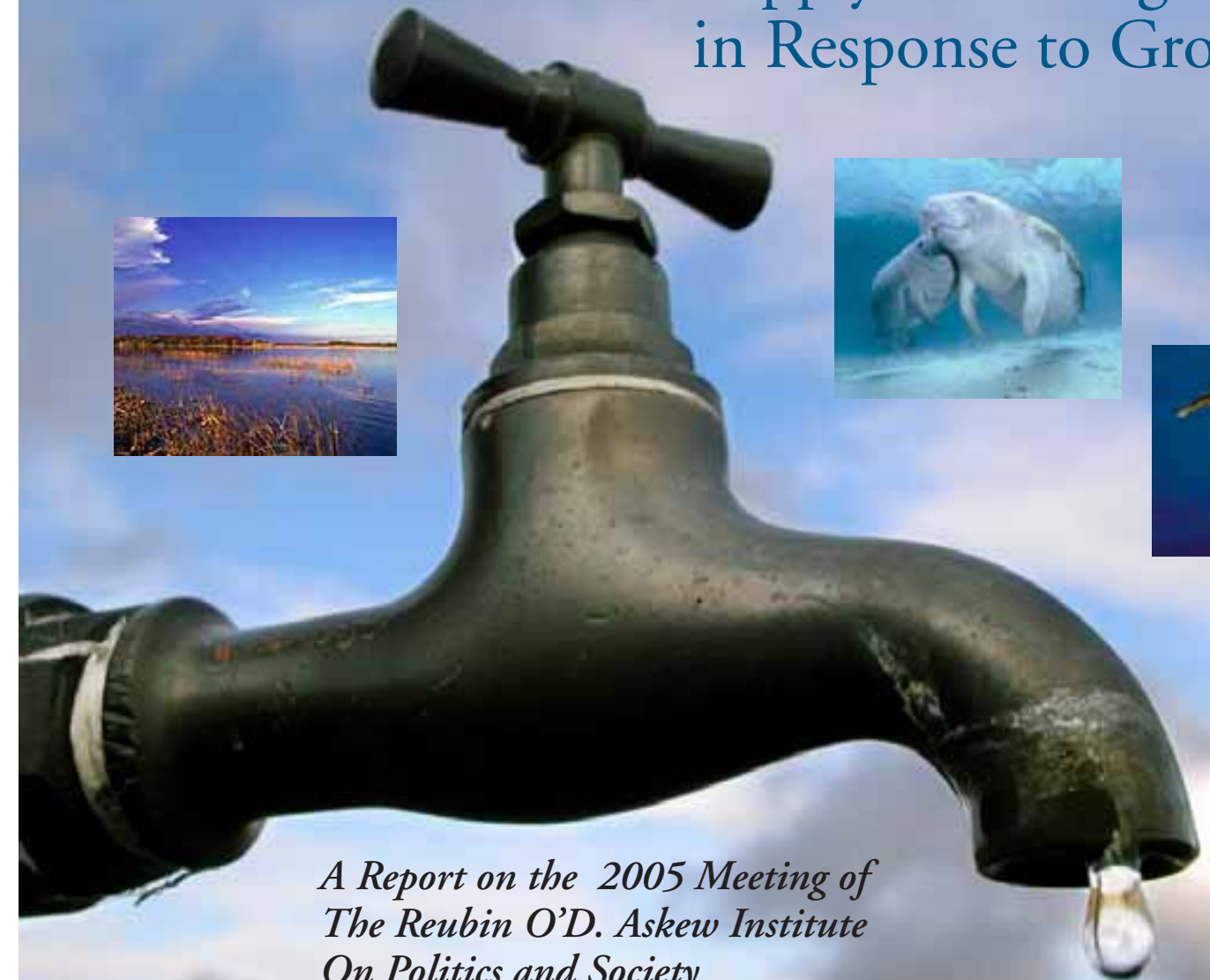
The Reubin O'D.

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How Should
Florida's
Water

Supply be Managed
in Response to Growth?



*A Report on the 2005 Meeting of
The Reubin O'D. Askew Institute
On Politics and Society*

Remarks by Governor Askew

Water is the single most important issue facing Florida today because water is life. Without an adequate supply of water our state will not be able to continue to grow and flourish.



I think we learned more about the specifics of water management in the last few days than any of us have before. We understand from Paul Reiter that this is not just a Florida issue; it is a global issue that faces every nation in the world. We learned from Len Shabman, Christine Klein and others that states have approached the problem differently with more or less success. We must learn from these examples and do what is best for Florida.

We need people who are willing to look down the road. The 1972 Environmental Land and Water Management Act brought diverse groups together to develop the first water and land planning in Florida and created our regional approach to water which has been quite successful. Our laws now need to be updated to take advantage of new information, new technologies and the conservation of our water supply.

The year's Askew Institute will make more specific recommendations than we have done in the past and that is good. Edward Everett Hale, chaplain of the US Senate, once said, "I am only one; but still I am one. I cannot do everything, but still I can do something; I will not refuse to do something I can do." That is an important lesson for each and every one of us. If each one of us does one thing to conserve or use water more wisely that will be an excellent start, and I hope our recommendations will reflect that.

Florida Water Day is April 26. We should use this as a time to bring groups together to talk about our water crisis and to inform the public. It is time to stop discussing whether or not Florida has a water crisis; I think it is a continuing crisis that must be addressed now if we are to have the water we need in the future. There is no greater challenge facing Florida.

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HOW SHOULD WATER BE MANAGED IN RESPONSE TO GROWTH:

AN INTERNATIONAL PERSPECTIVE

BY PAUL REITER, EXECUTIVE DIRECTOR, INTERNATIONAL WATER ASSOCIATION, UNITED KINGDOM

Water is life. Loren Eiseley said in *The Immense Journey*, "If there is magic on this planet, it is contained in water." So this is our home. And it's a home we can't reproduce, we have to understand, and we have to live in. For many reasons, that observation can lead to pessimism. For me it is reason for optimism, but only if we deal with the world we are facing. The world's population is now 6 billion people and we're already running up against serious water issues because water resources are fixed and finite. We live off a little less than 1 percent of the water on the planet. A number of the readily available resources have already been used. So we either learn to use that small percentage better or we learn to tap into the big percentage that we don't use which is essentially salt water or a combination of salt and fresh water.

That challenge plays out in three ways: (1) coping with growing water demands; (2) addressing widespread water pollution (seen and unseen); and (3) closing the gap on access to water and sanitation. Most water is tied up in agriculture. We're feeding ourselves as the global population grows through a more inefficient use of water but a more efficient production of food through irrigation. In the first half of the last century, irrigated land doubled and from 1950-1980, it doubled again. Since 1980, irrigation usage has increased at a slower rate. Basically, we have a significant amount of water going to agriculture. And in some sense this is a miracle. We are able to produce a lot of food by irrigating land and by building the conveyance mechanisms needed to do that. This is good news from an agricultural point of view but from a water resource, supply, and availability point of view, it's a dismal picture.

Let's take a walk over 75 years, by 20 year increments. We can see that as the population grows, we use more water resources. By 2025, there will be a significant population on the planet in water scarce circumstances. This is no mystery. There is a fixed supply of water and a



PAUL REITER

"We need to think differently and be innovative so

as to meet emergent and traditional challenges and operate in a truly sustainable manner."

growing population. In the next 20 years, a majority of the 2 billion people added to this planet will be in dry areas. We really have to tackle this problem! That set of challenges gets exacerbated by climate change. For example, Australia is likely to have its access to water reduced by 30 percent due to a small change in how the water will hit the coast. Even if consumption were not growing, usage would need to become 30 percent more efficient in 20-50 years, just to stay even.

While all this is going on, we have significant and growing water quality challenges. Of course, the U.S. is one of the leaders in pollution control and in confronting water degradation. But the silent source of pollution is really nitrate and phosphate accumulation. America, Europe, Japan and Korea have real problems in this arena. Saline intrusion is another silent issue. These pollutants contribute to habitat loss and extinction and reductions in biodiversity which is critical for this planet. The National Research Council reported in 2000 that nitrogen is the largest pollution problem in the coastal waters of the U.S. Two-thirds of coastal rivers and bays in the U.S. are moderately to severely degraded.

In the developing countries, we have a familiar picture of both lack of water and

water quality issues. Approximately 20 percent of the world's population lacks access to safe water and more than 30 percent lacks access to sanitation. Lack of access to drinking water is concentrated primarily in Africa and in parts of southeast Asia. The consequences of poor drinking water are of course higher rates of infant mortality. In the last 300-400 years, about 80 percent of increased life expectancy was due to hygiene and the remaining 20 percent was due to medicine. Moreover, increasingly more people moved into urban areas in that time interval.

The key question for poor and rich countries alike is how do we do more with less? In the developing countries, the dual imperatives of using less water and polluting less water come out of a series of interests — underlying growth and resource constraints. Of course, environmental awareness causes the bar to be raised. If we put those two imperatives together with technologies, we are currently in the midst of a pretty big paradigm shift. In the old paradigm, water management is divided strictly between agriculture, urban, and industrial uses; water is used only once; we use water very inefficiently and pollute water because it's abundant and a great way of transmitting things that we want to get rid of — municipal waste or agricultural waste. Moreover, in the old paradigm, we treat the environment as an unequal partner. We think of the environment as a constraint as opposed to treating the environment on an equal footing with water for people and water for industry. The new paradigm that is coming about in fits and starts in parts of the world is one of integrated water planning and management. It involves using water efficiently the first time and then reusing it multiple times, minimizing pollution at the source and treating the environment as an equal partner.

So how might we think about this differently? An example is the forest product industry. In 1900 a tree would go through a saw mill; 40 percent of the

resource was used and the remaining 60 percent was waste. By the turn of this century almost all of it is used. In 1950, about 10 percent of fiber was recycled globally. By 2000 it was up to 45 percent. And what's happening is that the increased demand for paper is largely met by increased recycling. Ask yourself this question. What would you think would be the comparable statistic with water? I bet you that there is very little aggregate change in how we have used water over the last 50 years. We need to become more efficient. And we need to think differently about water quality and matching lower quality water to certain uses such as irrigation, in much the same manner that fiber is reused for toilet paper and packaging material.

We need to think differently and be innovative so as to meet emergent and traditional challenges and operate in a truly sustainable manner. The dimensions of innovation include: the management and policy framework, planning and regulation, technical components, and social and education components. Perhaps the best example of a management framework that could be applied to the U.S. is France. In 1400, France created six basin agencies. Each basin agency has a taxing authority with revenues collected on the pollution side and revenues collected on the water supply side. These agencies collectively deal with 20,000 municipalities. The interests of those municipalities get brokered through the basin agencies entirely by consensus — quality maintenance standards, waste water treatment facility needs, drinking water plant needs, and distribution system needs. In the process these agencies make locally-based investment decisions. An example of water management on a broader scale is the European Union. The European Union established the EU Water Framework Directive with the goal of achieving the highest quality status for all water in the EU by 2027.

Turning to Australia, we have another example of a new paradigm. The Murray-Darling basin is where most of the water resources in that continent are found. The situation with the Murray-Darling is similar to Southern California. Irrigation doubled from 1900-1950 and then doubled again from 1950-1980. The Murray-Darling was moving to being a completely dry river at the mouth. A cap was originally put on withdrawals of the basin at 11,000 gegaliters per year. A commission was created and an effort is being made to reduce withdrawals

to 8,000 gegaliters per year. You could see that would be a substantial decrease in withdrawals from this basin. And if you add that to climate change, you can see that Australians are busy rethinking how they're using water. What are they doing? They are working on rolling back consumptive water uses, buying back water rights because of inefficient water use in agriculture, introducing market mechanisms for agriculture water use and pricing, establishing water trading schemes between urban and agricultural usage and imposing stringent conservation plans for urban water utilities. Although it's coming from Australia, this list could be applied to Southern California and Florida because these things make sense.

What we learned from Australia and elsewhere is there must be first the recognition of a problem. You can't solve problems in a political environment unless you agree that you have a problem. Once that's been accomplished to a sufficient degree, there is a need for a national and multinational framework for basin authorities, quality standards, and required action. Finally, there should be true integration of basin management with revenue and expenditure authority and effective partnerships with local governments. I think this is where France has the best system in the world.

How do you go about making changes? In Europe you can do this easier than in the U.S., because you can take top-down measures. And top-down measures only work if there is a shared respect for authority — a belief in regulators and regulation which isn't universal and, in fact, is not so true here. In a bottom-up environment, you have to figure out something else to get people on the same page. I think it's the notion of shared values and commitments. Tallahassee, and Tampa and Orlando have to come to their own conclusions about their problems and to create political consensus and make it stick. But it's hard and that's what needs to be done in the U.S.

What are the technical approaches to doing more with less? These include: efficiencies in supply and demand, including conservation and how we use water; the

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FLORIDA'S WATER STORY DISTILLED: CUTTING THROUGH THE RHETORIC ABOUT WATER SUPPLY IN FLORIDA

By CYNTHIA BARNETT, ASSOCIATE EDITOR, *FLORIDA TREND MAGAZINE*

I chose the theme of “distilling Florida’s water story” because separating what’s real from what’s rhetoric is one of the trickiest aspects in the public debate over water supply – actually in any public debate today. It will come as no surprise to you that the field of journalism is in a crisis of identity and credibility. Part of our crisis is self-inflicted, of course. But part of it has to do with the incredible amount of information available to the public on any issue – and the speed at which it becomes available. When I began my career just 20 years ago, journalists were still what Walter Lippman termed “gatekeepers,” the go-between between the public and the government and other sources. Today, with the Internet and the bloggers and the incredible growth and power of the public relations industry, there are huge amounts of information everywhere we turn – on any topic.

So the journalist’s role as gatekeeper is over. On the issue of water, you can all go online and read the water management districts’ water-supply plans, the text of every water bill pending in the Legislature, and the SEC documents of every publicly-traded water company. My role, and that of my journalist peers, is evolving into what the media analyst Tom Rosenstiel calls “authenticator.” That is, we are watching and reading the reports and the blogs and the press releases and the government-paid-for infomercials along with you. And then it’s our job to dig further to try and help our readers and viewers distill truths — to authenticate information if you will.

I’ve come up with five pieces of “conventional wisdom” about water supply in Florida. Some I hope to debunk, others to simply distill. And one or two I hope we can debate as the day progresses.

Conventional Wisdom No. 1 — “Florida is different.” Many people are convinced that Florida’s problems are completely different from those of the western states, and from those of other parts of the globe afflicted with water shortages. Why? There is plenty

of water in *some* parts of Florida. The problem isn’t so much that water is in short supply. It’s that the water is not where the people are. Florida’s water supplies are recharged by rainfall. But while the state gets a high 55 or so inches of rain a year, most of that rain falls to the north of where we are now. Eighty percent of the population lives south of the so-called hydrologic divide, but only 44 percent of rain falls south of it. I would argue that this is no different from the issue of water distribution at every single level of our society: globally, continentally and nationally. *So in my distilled version: Florida is not so different.*

Conventional Wisdom No. 2 — “Florida has the highest consumption of water in the world.” This is something that people outside Florida, including water-policy experts, seem to believe about Florida. I first heard this statement in a water-policy class at the University of Michigan. This statement is also made outright by University of Arizona Professor Robert Jerome Glennon, a well-respected water-law expert, in his book *Water Follies: Groundwater Pumping and the Fate of America’s Fresh Waters*. I thought you’d find it interesting that two of the most popular books about water supply in recent years devote entire chapters to Florida. Nationally, the issue is definitely not seen as a western one anymore. Robert Glennon’s book has a chapter

on the Tampa Bay Water Wars and Diane Raines Ward’s *Water Wars: Drought, Flood, Folly and the Politics of Thirst* has a chapter on the Everglades. Back to the conventional wisdom, no matter how you calculate per-capita consumption in the United States, California comes out on top. Florida’s ranking moves around depending on how you calculate consumption. In 2000, Florida’s total freshwater withdrawals were 8.2 billion gallons a day. The measure of water consumption considered by the U.S. Geological Survey to be the most accurate is to divide total water withdrawals for public supply by population. That measure doesn’t include agriculture, power and other industrial withdrawals. Per capita use in Florida was 174 gallons per day in 2000, based on the USGS measurement — slightly below the national per capita average for 2000 of 180 gallons a day. The bad news is that while per-capita use has been declining in the United States since 1980 due to water conservation, per-capita use in Florida increased slightly for the 2000 cycle because the drought that year greatly increased lawn irrigation.

So my distilled version is this: Florida doesn’t have the highest consumption of water in the world. But it’s getting close.



Conventional Wisdom No. 3 — “No one is willing to talk about the price of water. Politicians, especially.” This observation seems to be particularly true of groups such as the Florida Council of 100 and the Florida Chamber of Commerce. But the conventional wisdom also says that politi-

cians won’t touch the issue of price with a 10-foot pole. I think this was true for many years, but I think it’s really changing. So why do we need to talk about price? In addition to encouraging conservation, of course, the idea is to get consumers to pay the true costs of getting water to them, which includes fixing America’s crumbling water infrastructure. And then, of course, there is the constant drive to create new sources of water. Across Florida, utilities are raising their rates to pay for new water-supply projects such as desalination plants, reverse-osmosis facilities and reservoirs. But I think it’s fair to say that just as many governments are afraid to take the politically unpopular step of increasing water bills. So some politicians are willing to talk about raising the price of water. As Florida Senator Paula Dockery told me recently, “You shouldn’t pay a cheap amount for a scarce resource.” Some of the funding ideas raised by Senator Dockery’s “Water Work Group” that has been meeting since last June include: bottled-water tax, ad valorem tax, quarter-penny sales tax hike, and user fee. I get the impression that of these options, the user fee is the most palatable to politicians. *So my distilled version is that Floridians, even elected officials, are talking about the price of water. They have to.*

Conventional Wisdom No. 4 — “Privatization of water is not an issue in Florida.”

In fact, the North American market is considered by private water companies to be the “crown jewel” of the global water market, partly because water use is so high here. Let’s consider the pros and cons of private water. On the global scene, a major criticism of private companies is that they’ve come in with huge promises and then reneged on them later after landing a contract. In the case of Atlanta, citizens felt that United Water was less accountable and less responsive than the city government. And that’s saying a lot because citizen dissatisfaction was the reason for the privatization in the first place. In the older case of Duval, Nassau and St. Johns counties and United Water, rate increases led to a buyout by the Jacksonville Electric Authority which has now reduced rates by some 25%. As for the advantages, U.S. water systems will require investments of \$250

billion over the next 30 years. Moreover, according findings from a new AEI Brookings Institution report, customers do not appear to pay more, on average, for water and private-owned systems comply with health/safety regulations about as well as government-owned systems. *So my distilled version is that water privatization is a key issue in the United States, including Florida.*

Conventional Wisdom No. 5 — “Floridians in 2005 do not face a statewide water crisis at present.” Charlotte County gets water from DeSoto County. Sarasota County gets water from wells in Manatee County. In coastal Walton, Okaloosa and Santa Rosa counties in the Pan-

handle, water levels have dropped as much as 100 feet below sea level. Near Orlando, groundwater levels have dropped 25 feet in places. On the east coast, Titusville has notified the St. Johns River Water Management District that it will run out of water five years from now, in 2010. So the psychology of a crisis, of course, is that it’s a crisis when it’s happening to you. For example, Arnold and Beverly Larsen of Spring Hill, faced with a large sink hole in their yard, probably think we have a crisis on our hands. For the rest of us, it may require another drought. But consider just how many Floridians are dealing with crises right now.

To conclude, I think it’s worth mentioning that in 1972, when Governor Askew brought together stakeholders from throughout Florida, when he declared a crisis and oversaw passage of the strongest water laws in the nation, the state had undergone a really scary drought. Hundreds of acres of the Everglades were on fire, leaving a thick black smoke hanging over most of south Florida. I would be interested to hear from Governor Askew whether he thinks water reform is possible without such a drama. *My own distilled version is this: Floridians in 2005 face a statewide water crisis at present. Many just don’t realize it.*



COMPLEXITY, CONFUSION, AND COMPLACENCY

IN WATER SUPPLY MANAGEMENT

BY DR. SANFORD BERG, THE UNIVERSITY OF FLORIDA

There are at least two views of history that, in my opinion, shape the ways that we perceive reality. They also guide our policy prescriptions. Let's consider these views in the context of water. First is the *conspiracy theory*. According to that theory, particular groups are deliberately manipulating public attitudes to gain private advantage. The groups are very powerful and difficult to pin down. In fact, the inability to obtain tangible evidence regarding the conspiracy is "evidence" of the conspiracy's effectiveness. Crisis is often the result of such forces. We hear charges by environmentalists that business interests are blocking or stalling their initiatives and countercharges from businesses along the same lines. So I think the conspiracy theory is alive and well.

Second is the *confusion theory*. According to that theory, technological, economic, political and social forces are very complicated; now and then an issue, like water, gets tossed up onto our radar screens. Because such issues are very complex, we have trouble understanding the nature and scope of the problems. If we delay, crisis often ensues.

Let's examine how different fields of study might approach these two views of history. I think the world is very complicated. I believe that special interests articulate their views and are able to influence laws and their implementation. People working with water issues fall into a number of categories and I think these categories shape the way they see things. We talk about "seeing is believing". It's also true that "believing is seeing". Our training in effect puts blinders on us. And that's fine, because it allows us to delve into subjects in a consistent manner, but it also means that we're often not aware of these other interconnections. Here are several examples.

- *Engineers* look to technologies for solutions to water scarcity problems. If funding is available, they are able to integrate new (often expensive) sources into water delivery systems. They recognize how grey water can be utilized



DR.
SANFORD
BERG

"I think we need to see more

attention given to educating the public regarding water as a unique contributor to the Florida environment."

in particular situations.

- *Hydrologists* are involved in resource management and have a deep understanding of the impacts of water usage on water levels and flows at various points of the system. This understanding drives decisions on water permits.
- *Political scientists* focus on issues of power and legitimacy and cohesion and the roles of different groups. Issues include centralized vs. decentralized decision-making; top-down vs. bottom-up approaches to resource allocation. Consensus is critical because ultimately in a democratic system, there needs to be widespread consensus on outcomes if the system is to avoid instability.
- *Economists* understand the importance of efficiency in sending people price signals and providing them with incentives to conserve. From this perspective, water is a commodity with values in alternative uses, including future consumption and environmental restoration. However, economists may be blinded by the beauty of markets and importance of incentives, thus giving excessive attention to those issues.
- *Planners* deal with land use, population growth projections, zoning issues, and certainly concurrency. One of the

questions raised by another presenter was, "Do we use water permitting to control growth or does water flow uphill towards money and people?" From a market economics perspective, we'd say water is going to those with financial and political clout: meeting demands. The planners certainly have a role in making this happen because they understand the law; they understand historical experience in other areas; and they bring a very deep appreciation of the topological and geographical elements that many other fields don't bring to the table.

- *Lawyers* bring us another set of perspectives. For example, rules and regulations attempt to pay significant attention to procedural fairness. That's an important contribution to this process. If the different parties don't perceive that there is transparency and opportunities for participation, water policy won't be developed through a legitimate system; the laws will either be changed or they will be disobeyed in a variety of ways.
- *Environmentalists* provide perspectives on ecosystem sustainability. Water has economic value, but often that value is non-monetary or difficult to quantify. Wetlands and estuaries contribute to the health of the planet: in Florida, rules on levels and flows attempt to incorporate impacts on biodiversity and sustainability. Questions raised are: Where does the burden of proof lie—with developers or with environmentalists? What is more problematic—erring on the side of environmental protection or erring on the side of development? What are the long-term consequences of either position?
- *Ethics* also needs to be considered because it deals with our personal values and notions of stewardship. As Floridians, we have a responsibility to leave future generations with a legacy rather than a disaster. Clearly, that's the motivation behind much of our legislation. We want to be good stewards of the

land: "It was not given to us by our parents, it is on loan to us from our children." How to be good stewards, of course, is another question. So I see the water supply management issues as being extremely complex. Many perspectives are involved and all are necessary for sound public policy.

Do we have the right level and mix of professionals in the agencies addressing water supply management issues in Florida? The water management districts spend \$1.7 billion on a group of professionals, on technical studies, and on a bureaucracy. I don't know what their mix of hydrologists and managers are. I predict there aren't very many economists in that group which, in my opinion, is a real mistake. Water management districts outsource or conduct various kinds of economic studies: on pricing and elasticity issues. Nevertheless, it is easy for managers to hire people who think like them rather than to hire people who might be open to other perspectives on issues.

Another issue is state-wide data collection. The Council of 100 Report and the Chamber of Commerce Report emphasized the need for some sort of organization to collect comparable data from the five water management districts and coordinate that effort. For the water management districts, that would be a change in their role, unless they perceived no threat from statewide analysis by hydrologists, ecologists, economists, and others. So I think information sharing is something that I would put on the agenda. That's a very self-serving statement because I see the role of universities as very important in this area, but others may not.

Where is Florida today? Is there consensus regarding the best policy for water supply management? Is there clarity regarding science? Is there commitment of all stakeholders to the current process and to the current objectives? Of course, if the current objectives are vague, we can agree with them. According to Len Shabman, one of the speakers, when it comes down to making hard choices, questions must be asked about whether your objectives are the same as my objectives. Is your understanding of science the same as my understanding of science? Ultimately, it comes down to citizen contentment with the outcome.

How can we characterize different views of the current situation? There are at least three possible responses to that question.

The first response might be that we are

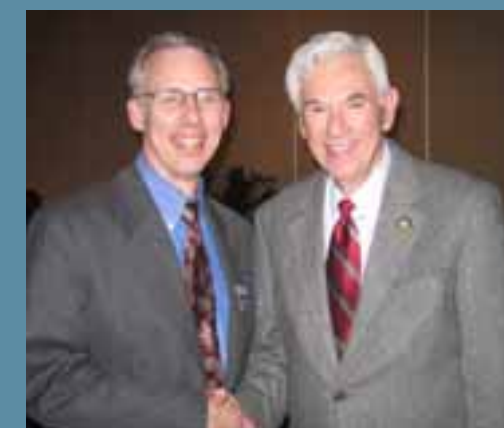
in a *high-danger situation*. And it's dangerous because conflict among those in power is creating more heat than light. The existing fragmentation of our governance systems and our water systems and the lack of sharing information often lead to conflict. To people who subscribe to the belief that we're in great danger, the knowledge base of science and engineering seems complex. To those people, our personal values could be characterized as being in cognitive dissonance. What is said doesn't always reflect votes or personal actions.

The second response might be that we are facing an *impending crisis*. I think the Chamber of Commerce task force took that position; their view was that we're making progress, we need more collaboration, but we are seeing cooperation among agencies. There is coherence in the scientific information, but let's fine-tune it and put more money into research and development. Let's establish a data institute. To promote collaboration, let's have a water supply authority for the whole state that tries to look at those issues. The Chamber of Commerce and Council of 100 reports suggest there is no crisis but a concern that while we may be on the right path, we're not sure and some changes might be needed. I didn't read in either report about people making hard choices or about price increases. Authors of these and other reports, almost by definition, don't want to offend anyone. So people come out in favor of "sustainable development" that leads to "good outcomes" and is in the "public interest": inoffensive and relatively meaningless.

The third response might be *complacency*. I like complacency. Complacency is not apathy; complacency suggests there is really consensus about the chains of political authority: whether it's top down or bottom up, it's working. The scientific knowledge base is adequate for the decisions we are making. We've done the research and development and we know that we need to do more fine-tuning. It's not a static world, it's a dynamic world, but studies suggest that we are on the right path, we can feel good about that, and we have a deep personal commitment to fulfill those obligations. Arguably, markets or quasi-markets increase the likelihood of contentment, because they remove arbitrariness that is often associated with decisions to approve or disapprove consumptive use permits. I suspect few of us view Florida as being in a complacent situation now; otherwise why would we take valuable time to think about

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WATER SUPPLY CONFLICT AND GOVERNMENT RESPONSE: THE CHALLENGE FOR FLORIDA

BY DR. LEONARD SHABMAN, RESIDENT SCHOLAR, RESOURCES FOR THE FUTURE

Dr. Leonard Shabman, Resident Scholar, Resources for the Future, expounded on *Water Supply Conflict and Government Response: the Challenge for Florida*. His presentation provided observations on: (1) how we might think about water abundance and scarcity; (2) the sources of water conflict; and (3) water policy and planning.

WATER ABUNDANCE AND SCARCITY:

Florida might be considered a wet desert with great annual and intra-annual variability of rainfall. However — and this might be a controversial observation — even in the face of the greatest imagined growth in this state, the total quantity of water withdrawn for consumptive uses, now and in the future, (considering environmental flows) is tiny in relation to the amount of water in the state of Florida. Water supply plans address the conditions for drought but exactly what is meant by conditions being “too dry” is somewhat unclear — at least in the context of aquatic systems. In terms of human consumption, the term “too dry” must be understood in the context of costs: dead lawns, dead crops, reduced tourism, and storage during water-abundant times for distribution during times of drought. Investments in conservation could prolong the period for water storage.

We also need to think about water abundance in terms of place. For example, is all the water in Florida available to Miami? Water is time and place specific; water planning and policy involves social decisions about when it is too dry, in what places, and who gets to decide what, if anything, should be done about it. We can and do, throughout our history, choose to transfer water in time, that’s what we have storage for. We can and do transfer water in space, across the landscape. We can and do transfer water for some uses and have less for others, either on a temporary or permanent basis. We can and do choose to use less water when occasional dry periods arise. Increasingly, we can and do choose to use competitive technology like desalination and water reuse. In short, water abundance (or scarcity) should be viewed as a social



DR.
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“We need to deal with the day-to-day water management and policy issues in ways that recognize trade-offs.”

problem and a choice problem.

What are the costs of different choices? In the broadest sense, costs convey information and are not constraints on water allocation. Defining, understanding, discovering, and debating what are costs and what costs are worth bearing is a focus of water planning and decision making and of water conflict resolution.

SOURCES OF WATER CONFLICTS:

There are four categories of water conflicts: value, interest, cognitive, and authority:

Authority conflict results from the post-1970’s diffusion of power that was created by the form and number of environmental laws that were passed in that period. Since then, traditional federal, state and local agency responsibilities for planning water supply capacity investments have competed in determining who decides how much water is needed, who should get it, and how it would be transferred.

Value conflict is over the desirable goals of public action and is somewhat ideological in nature. An example is opposition to desalination plants because they would “allow people to move into areas they shouldn’t be in.” It is simply a value as to where people “ought” to be living. Very often, water conflicts are caught up in that kind of discussion. They can only be resolved by someone making an authoritar-

ian or democratic choice and saying it will or will not be this way. As an empirical matter, water supply cannot be an effective control on growth. Water will move to people where they are. The water supply planning and decision choices are reactions to larger actions and democratic drivers. In the case of Florida, the question is “How” — not “whether” and not “can” — Florida provide water in the dry years. Florida will and it can, but at what cost and with what strategies?

Interest conflict arises when promised water allocations have a different effect on various consumer groups and those affected groups can block, or voice their opposition to or support for, a proposed decision. Perhaps the best recognized example of interest conflict arises when a water transfer is proposed from rural to urban regions or water-rich to water-poor regions. The reasons for the conflict are often related to the perceived value of water in a given area; from the perspective of the group trying to get the water, the water is considered to be in surplus supply for the number of users or types of uses. The “so-called” water-rich regions want to keep their water because it is considered a guarantee of future prosperity. To lose any water is to lose that prospect. Not much water is involved in these interest conflicts.

Moreover, it doesn’t make any difference to development because water moves to people and not the other way around unless one is talking about breweries. Resolution of interest conflicts occurs through bargaining and compensation. What is really often in dispute is not the water itself but rather the compensation payments for the water. Water will be moved in space and shared in dry times. It will happen; the question is under what terms and at what level of discord.

Cognitive conflict occurs when people start fighting over the data, the models, and the analysis provided by water experts and used by people making their value and interest arguments. There has been a rapid expansion of disciplines, models and analytical approaches in the general areas of what would broadly be termed ‘policy and environmental sciences.’ Once, only

engineers were viewed as water experts. However, as multiple disciplines have emerged, the number of experts has grown and so too have the differences among experts even within disciplines and within areas. A highly diffused decision-making system and a highly diffused system of expertise provide the context for water planning today, leaving water “experts” to resolve these conflicts of value and interest.

FLORIDA’S WATER POLICY AND PLANNING PROCESS:

Florida’s commitment to the state’s water planning process calls for the state to ensure availability of adequate water supply for all competing water uses deemed reasonable and beneficial and to maintain the functions of natural systems. But who defines “reasonable and beneficial?” Agricultural users withdraw most of the water in this state and that’s not an unusual situation around the nation. Is agricultural use “reasonable and beneficial”? If we decide the water is better used for environmental or urban purposes than for agriculture, we are making a judgment on relative costs and values and ought to acknowledge that fact. In determining the “adequacy” of water supply, what measure is used and at what cost? When applied to water supply issues, questions of “adequacy,” like questions of “reasonable and “beneficial” use, are not technical; however, such questions can be informed by technical analysis. Plans and planning are useful in addressing those questions in a knowledgeable manner.

Reconciliation of cognitive conflicts is a task for analysts. It’s more likely that we can easily reach an agreement on technical issues than on value or interest-dominated issues, but the separation is not often clear. What appears to be a technical conflict may instead be one of values or interest. Planners and plans need to avoid terms like “water use requirements,” as opposed to just “water use,” and “safe yield,” as opposed to just “yield.” The movement away from usage of value-laden terms in urban planning is starting to occur. However, in the environmental planning area the requirements mentality is alive and well. Some value-laden terms to avoid are “in-stream flow requirements,” “environmental constraints,” and “ecological health.” The term “health” implies a desired, indeed “required”, environmental state or condition. It is a term that stifles legitimate public debate about desired and attainable environmental conditions.

Planning has to be about more than

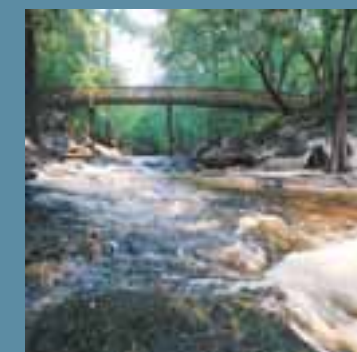
pipes and plumbing codes. Too often, water plans are about things to build or install, not about laws, rules and agreements. The planning process should foster new ways of thinking and should manage water conflict, whatever the source of conflict. Moreover, planning should be open to surprise because it really involves scenarios and predictions. A few counter-intuitive examples illustrate this point. Population has grown rapidly in Arizona but groundwater pumping has decreased because farms are being replaced by development. Another example is that the use of water-reducing household fixtures has actually increased and not decreased water use per connection. The use of a greater number of such technologies has offset anticipated reductions in demand. Similarly, water demand pricing is not a technical fix; behavior is involved. To induce changes in people’s consumption habits, utilities could provide some form of real-time pricing. The downside is that if that pricing scheme is effective, utilities might realize reduced revenues. Other options include interruptible or on-demand water use agreements, water banking, and cooperative or regional water sharing agreements.

We talked about water planning in the context of water demand but the effects of water planning on supply cannot be ignored. More people (and less agriculture) mean more water can be available for all uses. Development affects the landscape, open areas, wetlands, and recharge areas even though the net effect of that development is unclear.

CONCLUSION – THE BIGGER PICTURE:

Water allocation decisions are made every day. They are implicit and they are the product of mega-development trends that are not in the domain of water planning. “Save the Everglades” is not just a set of water policies, it’s about more. Fifty years from now, there will be an Everglades Park and it might be bigger, it might be smaller, it might have more cattails, it might have fewer cattails, but it will be there. We will make thousands of choices everyday that will determine that outcome and we will make management decisions that react to those choices. We need to deal with the day-to-day water management and policy issues in ways that recognize trade-offs. Furthermore, we need to recognize the larger context beyond our control —the mega-trends.

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ECONOMICS OF URBAN WATER SYSTEMS — DOES THE EXISTING PARADIGM WORK?

BY DR. ROGER NOLL, MORRIS M. DOYLE CENTENNIAL PROFESSOR IN PUBLIC POLICY, STANFORD UNIVERSITY

Roger Noll, Morris M. Doyle Centennial Professor in Public Policy, Stanford University, shared his observations on *the Economics of Urban Water Systems — Does the Existing Paradigm Work?*

THE NEW PARADIGM:

What does it mean to say that we need a new paradigm? The meaning here is that the traditional methods — the institutions, organizations and ways of doing business for managing water for Florida, and indeed, for many eastern states — have become too inefficient, too inequitable and too inflexible to cope with the growth in water uses. Tinkering won't work, the system that Florida has designed to cope with the water problem during the 19th century and first half of the 20th century is fundamentally incapable of dealing with that problem in the first half of the 21st century. More recent institutions like water management districts still seem to have a technocratic approach to water allocation. A new model must be based on a greater integration of water supply across regions and across uses, implying the need for some centralized mechanism that does not currently exist at the state or even multi-state level while making far greater use of market allocation and economic incentives to balance supply and demand.

The role of economics and economic thinking in constructing Florida water policy has historically been minimal and that is not irrational. Economics is not



DR. ROGER NOLL

“A new model must be based on a greater integration of water supply across regions and across uses, implying the need for some centralized mechanism that does not currently exist at the state or even multi-state level ...”

concerned with extraordinarily cheap water that can be supplied for all reasonable uses at extraordinarily low prices. Economics is concerned with the use of scarce resources, among competing users, that have valuable things to do with that resource. It is difficult to make the transition from a world in which the abundant sources of water can be used for everything to a world in which people have to think of water the way that they think of other economic commodities, where there is scarcity and there is tradeoff.

What is meant by a new paradigm is really an old concept. It is the concept of regional specialization and free trade, applied to commodities like oranges and corn. Water, particularly groundwater, has features of a common property resource, which is capable of being “over-fished.” So there has to be a regulatory infrastructure to manage it — to protect the Everglades and to prevent groundwater depletion. How do we impose restrictions and

rules on what is otherwise a market process for allocating scarce resource so that we protect those things that aren't adequately represented in that market process? The long term goal is to make water allocation be efficient and here we may learn from experiences with western water allocation and the practice of interruptible water use. For example, an alfalfa farmer in the Mohabi Desert might have a deal with Los Angeles to sell water to the city during drought years but keep the water to grow alfalfa during water-abundant years. The price of alfalfa to feed animals is roughly equivalent of \$12 per acre foot. By contrast, the urban price of water in California, is \$286 per acre foot. The marginal use for urban consumers and industry of water has an extraordinarily high implicit value, compared to growing alfalfa in the desert. That is why in drought years, the water is shipped to Los Angeles rather than staying in the Mohabi Desert to grow alfalfa.

THE PROBLEM WITH OLD WATER ALLOCATION SYSTEMS:

Until the middle of the 20th century, there was a basic abundance of water supply. Because of that abundance it was fairly easy to respond to localized water shortages. Water supply systems simply engaged in adequate long-term capacity decisions. Planning was needed to build an infrastructure that was sufficient in terms of water storage and water delivery that could get through droughts in areas where one might expect localized shortages. That was a fairly easy problem and, actually, economics had very little of a role there. The job of government was to coordinate the abundance of a resource and not to make tough decisions about big winners or big losers from the allocation of this resource. Government is not well-suited to making administrative or bureaucratic decisions that cause targeted harm and provide targeted benefits of great

magnitude because it is really difficult for the ordinary citizen to tell the difference between hard choices and corruption. For instance, catastrophic loss of political office can occur when someone makes a decision that an industry or location will be a big winner and another industry or location will be a big loser, without receiving compensation from the winner. Water permitting systems require that such allocation decisions be made. The market system has two advantages over systems that make targeted allocations: (1) decentralization — it is really difficult to assign blame; (2) financial transfers — the winners compensate the losers.

THE FUTURE—TRANSFERABLE WATER RIGHTS:

Owens Valley in California has two counties — Inyo and Mono County. “County” in the west means “state” in the east. Inyo County only has 20,000 people in it, but it's larger than Connecticut. Mono County is a little smaller with 10,000 people although it is certainly larger than Rhode Island. Los Angeles has most of the water rights from Inyo and Mono counties through the Owens River Project, but didn't get all the rights. There was one nice little community consisting of six farms in a little place called Benton, California, which is in Mono County. These farms were growing tomatoes to sell to the towns in Owens Valley: Mammoth and Bishop and Old Pine. The city of Los Angeles, during a drought period, approached the tomato farmers in Benton, all six of them, and proposed the following deal: We will buy 75% of your water, we will pay to plant orchards to replace the tomatoes, because the water use for orchards is much less than the water use for tomatoes, so your capital expense going into the orchard business will be totally paid for by the city of Los Angeles. From the 75% of water that we buy, we will give 25% of it to Mono County, to accommodate the growth in the city in Mammoth Lakes which is the largest ski resort in the United States. In addition, we will give 25% to Inyo County for the small towns along there for some of the farms, so we'll pay all of this money for the water shipped to Los Angeles. The farmers are better off, the people who live in Mono and Inyo Counties are better off and the people who live in Los Angeles are better off.

The water transaction had to be approved through a waiver by the state water board and the board rejected it on the

grounds that these are “inalienable rights”. What in the world were these guys thinking? In Marin County, which is the county on the north side of the Golden Gate Bridge, there was insufficient water for residential use but there was water to grow tomatoes in the desert. This series of wildly inefficient allocations created a firestorm and caused the California Legislature to pass a new bill that allowed water transfers of both a sale and a lease variety — the lease variety known as interruptible use. This is the new paradigm, and what is going to happen in Florida sometime in the next 20 years is totally predictable. There *will* be a state-wide water allocation mechanism based on economics. The reason is that there is no way to avoid it.

FLORIDA'S CHOICES:

The argument that we shouldn't let population and economics interfere with the optimal allocation of water suggests that democracy does not matter, and the market evaluations implicit from exchanges do not matter. We should throw out relative values of use, throw out democracy, and use some other set of criteria to allocate water and that is just nonsense. Even if one believes it is true, even if one believes that the highest and best use of water is not for human beings and it ought to be all taken away from human beings and given to something else; that is not the society we live in. Manatees don't vote. What we have to do is create enough water for the manatees in a mechanism that does not cause pain for the people who live in Miami-Dade County and in Tampa Bay. We have to accommodate the humans with intensity of demand and the fact that they vote, or else the manatees will not survive. The most effective and efficient mechanism for accommodating them is a regulated market system. In one or more droughts from now, the system will collapse, and the only question is: will we respond in a fairly easy painless way or will we really shoot ourselves in the foot first — that is the choice. In fact, in many states in the west, the decision was “let's shoot ourselves in the foot first.” The outcome involved real hardship and pain and caused some state legislatures and governors to lose office. Incumbent politicians in Florida are advised not to take that path.



“ADMINISTRATIVE FRAMEWORK GOVERNING WATER”

BY DR. CHRISTINE KLEIN, PROFESSOR, LEVIN SCHOOL OF LAW, UNIVERSITY OF FLORIDA

Dr. Christine Klein, Professor, Levin School of Law, University of Florida, provided an overview of Florida's: (1) administrative framework governing water; (2) consumptive use permitting legislation; (3) environmental protection legislation; (4) water transport authority and limitations; and (5) coordination of water planning and land use planning.

ADMINISTRATIVE FRAMEWORK:

Although there may be plenty of water in absolute terms, there's a geographic and temporal mismatch of supply and demand. Simply stated, water is not where we want it, when we want it, and in the quantities that we want it. People tend to settle, play, and use water in all sorts of places without regard to natural distribution patterns. So water suffers from a special kind of scarcity. In order to deal with that scarcity, the Florida Legislature enacted the Water Resources Act of 1972, codified as Chapter 373 in the Florida statutes. Florida's water



DR. CHRISTINE KLEIN

“Although there may be plenty of water in

absolute terms, there's a geographic and temporal mismatch of supply and demand. Simply stated, water is not where we want it, when we want it, and in the quantities that we want it.”

legislation is widely regarded as one of the most comprehensive, thoughtful statutory systems in the east. Florida statutes, unlike those of many states, provide for the regulation of both surface water and groundwater.

The important basis for the administrative framework of Florida water law is the water management district.

Florida's five independent water management districts are divided along surface water boundaries — surface basins — and this is actually a very progressive idea. However, there are a few wrinkles. For example, the surface water boundaries are an imperfect match with groundwater basins. In Florida, about 93 percent of the population is dependent upon groundwater supplies for drinking water. Groundwater regulation has typically lagged behind surface water regulation in Florida and throughout the country. Water management district lines also do not correspond to political lines, most importantly county lines. This mismatch may set the stage for competition among the various districts for

groundwater resources.

Under the common law, western states have followed some variation of the prior appropriation doctrine in developing their water laws. Through this priority system, water rights generally take on the value of private property. In order to take back a water right from someone, even for environmental needs, one might resort to a 5th Amendment takings claim and compensation might have to be paid for that water right. Florida's statutory water law system has an element of priority embedded in it. The priority system is good in terms of certainty—everyone knows the rules of the game and that is important for long-term infrastructure investments. The drawback is that the priority system makes it very difficult to be flexible and respond to changing conditions and changing social values. Eastern states, including Florida, historically subscribed to the common law riparian system where the right to use water is tied to the ownership of lands that border along a natural water course, a lake or a stream. The advantage of the riparian system is that it is very flexible. The disadvantage is a lack of certainty about whether a withdrawal will be considered “reasonable” in future years or will be subject to law suits. Florida's Chapter 373 effectively replaces the common law riparian doctrine in Florida. However, the riparian legacy and culture is still evident in court cases and certain aspects of it continue to influence the resolution of water questions.

Florida's water management districts have the authority to promulgate rules that have the force of law. The districts also have the ability to levy ad valorem property taxes on land owners within their jurisdictions. They also may issue consumptive use permits and environmental resource permits. The

Department of Environmental Protection has general supervisory authority over the water management districts. In practice, the DEP has delegated most of the day-to-day functions to the water management districts. Indeed, and this is pretty unusual, Florida's statutes actually command the DEP to delegate authority to the water management districts to the greatest extent practicable. Florida's water law, by design, is very much a bottom-up kind of system with all the advantages and disadvantages that such a system may entail.

CONSUMPTIVE USE PERMITTING LEGISLATION:

The Water Resources Act authorizes, but does not require, Florida's water management districts to impose conditions on the proposed consumptive use of water. Only the South Florida Water Management District has implemented this system aggressively, regulating water withdrawals that are less than 100,000 gallons per day; the other districts focus primarily on the larger withdrawals above 100,000 gallons per day. So there is ample legal authority for much more aggressive permitting requirements if districts decide to do that at some point in the future. By law, the districts, however, must recognize certain exemptions from permitting; primarily, they may not require permits for individual consumption of water for domestic purposes. Both surface and groundwater withdrawals are subject to the permitting requirement. A criterion for permit approval is that the proposed use of the water must be “reasonable” and “beneficial,” which merges aspects of western common law (beneficial) and eastern common law (reasonable). These terms provide quite a bit of flexibility but they also are understood to have qualitative and quantitative dimensions. Another criterion for approval—the proposed use will not interfere with existing legal uses — provides that a presently existing legal use will be grandfathered in and be given preference over any future uses. The third criterion requires the proposed use to be in the “public interest.” The term

“public interest” is a discretionary, subjective term, the interpretation of which will, no doubt, change over time.

Permits are generally valid for up to 20 years, although in practice they are rarely issued for that length of time; they are generally valid for up to 50 years for municipalities, public works, public service corporations, and governmental bodies. Priority also comes into play with permit renewal applications because they are given preference by statute over applications for new consumptive use permits. Moreover, there are water use classification systems. The districts and the DEP must develop classification systems so that, in times of water shortage, usage is cut back, generally proportionally, in accordance with particular classes of use. And finally, permits can be revoked for two or more years of non-use or for other factors, such as violating the terms and conditions of the permit.

ENVIRONMENTAL PROTECTION LEGISLATION:

Florida law provides environmental protection through statutes governing minimum flows and levels. The statutory definition of “minimum flow” refers to the limit at which further withdrawals of surface water would significantly harm the water resources or ecology of the area. The statutory definition of “minimum water level” refers to the limit at which further withdrawals of groundwater would significantly harm the water resources of the area. Florida's statutes also authorize “reservations” for water that may be removed legally from available future water use. Water reservations have been particularly controversial and mired in litigation in the face of the Everglades restoration efforts. One piece of litigation concerning this \$8

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RECOMMENDATIONS OF ASKEW PARTICIPANTS FROM THE 2005 MEETING

RECOMMENDATIONS:

General Observations by Discussion Group Participants:

1. Whether or not Florida has a water crisis today can be debated, but it is clear that the state faces a major crisis in the future unless it adopts new policies and makes additional investments in our water systems.
2. Population growth continues to be significant and will put added pressure on an already overburdened water allocation system. Florida's population is expected to increase by over 41 percent from 2000 to 2020 and the projected demand for water during that time period is projected to grow from 7.7 billion gallons per day to 9.1 billion gallons per day.
3. The public has a limited understanding of Florida's water management problems. We take water for granted, because it is relatively inexpensive and it always seems to be there.
4. Policymakers are generally hesitant to address long-term, complicated issues such as water. Citizens face many challenging issues, including education, health policy, community services and public safety. Longer-term issues, such as water, tend to appear on the policy radar screen only in times of crisis.
5. There is no one, easy solution to Florida's water problems. These public policy problems will have to be addressed at many different levels. Science-based public policy requires the development of baselines, measures of human impacts on water ecosystems, and political consensus regarding policy objectives.
6. Floridians must realize that the long-term economic viability of the state rests on good water management and conservation. Businesses will not invest in Florida and tourists will not visit if appropriate water investments are delayed or water supply is erratic due to poor resource management. Floridians must become good water stewards to ensure the future economic viability of the state.



Recommendations: The recommendations can be grouped into four basic categories: public education, policy, governance and technology.



I. Public education:

Each group decided that the need to educate Floridians and policymakers on the state's water situation was of paramount importance. Water management is a complicated issue: conservation will require people to change long-established habits. For this reason, all of the discussion groups spent time deciding what information needed to be developed and disseminated and by whom. Included in the recommendations are the following:

- a. A survey should be conducted to determine what consumers know about water issues so that a more effective public information campaign can be developed.
- b. A state water data clearinghouse should be established at a state university in Florida to provide a uniform source of information and to avoid duplicating data gathering efforts.
- c. Water Day should be celebrated and used to provide Floridians with information on water management. The water management districts and the Florida Department of Environmental Protection should conduct this information campaign.
- d. Water bills should include consumers' usage history and how their use compares to others.

"This issue is important to everyone, but political consensus on workable solutions is going to be difficult to reach. The length of time officials are in office limits their ability to work on solutions to long-term problems."

— Susan MacManus

II. Policy:

Policy recommendations ranged from the general to the specific. Each group stated that one of the major obstacles in addressing Florida's water crisis was the lack of adequate public policy measures. Several groups also noted that, despite the need for better policy development in Florida, our state has done better than many others in trying to balance new water resource development and water conservation.

- a. Florida must develop better mechanisms for consensus building about water. This includes more collaboration among stakeholders and using media before litigation.
- b. We must provide the same minimum protection to all natural systems as has been given to the Everglades, by reserving a sufficient supply of water before allowing permitting. We cannot afford to lose more precious natural systems to poor water management.
- c. Approval of consumptive use permits should be conditioned upon incentives for conservation. One group was especially concerned about the high use of water in agriculture and felt that farmers and growers needed to re-use

"If we're withdrawing more water than we're getting, we have a crisis."

— Charles Gray

"We need more accountability for water infrastructure in our comprehensive plans. Waiting until local governments want to rezone an area is too late."

— Jon Thaxton

water to a greater extent than is currently the practice.

- d. Florida's water rates should rely more on user charges and fees to pay for operation and maintenance of our water infrastructure as well as provide for capital investment. Water rates should be structured to promote conservation. Water tariffs or other funding mechanisms should be structured to accommodate disadvantaged consumers.

"We need incentives for Xeriscaping and exotics removal."

— Richard Pettigrew

- e. Additional funding is needed to develop alternative water sources through surface storage and desalinization. Such funding should focus on demonstration projects. General subsidies from taxpayers violate the "beneficiaries should pay" principle.
- f. More land acquisition, either through public or private means, is essential for the creation of designated water conservation areas.

"We have to realize that desalinization takes an enormous amount of energy."

— Charles Ohlinger

III. Governance:

In the area of governance, it was widely felt that there was the need to better coordinate decision making among the stakeholders, to enhance accountability for water in comprehensive plans, and to keep this issue in the minds of policy makers.

- a. Coordination must be enhanced among decision makers on water supply management issues. More specifically, the roles of the Florida Department of Environmental Protection and the

"Agriculture is such an important user. How can we have these conferences and have no representative from agriculture? Agriculture consumers need to be at the table."

— Ann Moore

"Desalinization can be done. I cannot envision not doing this. Saudi Arabia gets much of its water from desalinization."

— Rue Berryman

water management districts should be reexamined.

- b. More accountability for water infrastructure needs to be included in local comprehensive plans.
- c. Consider giving the Florida Department of Environmental Protection the power to plan and coordinate aquifer withdrawals, recharge and similar activities.
- d. Establish an annual meeting on water for policy makers to provide an analysis of the current situation, a briefing on new technologies, and strategies to avoid a major water crisis. This issue needs to be kept before policy makers and the public and not relegated to the back burner. Current technical forums tend to encourage the status quo.

"Surface storage is something we have to look at."

— Jon Mills

"We need to stimulate citizens to discuss and plan for our future."

— Reubin Askew

IV. Technology:

Participants concluded that new technologies will make water conservation and purification easier and, in some cases, less expensive in the future. However, they also agreed that Florida cannot afford to wait for advances in these technologies.

- a. It is important that Florida increase research and funding for new technologies, especially membrane research, to improve desalinization and purification efforts. Water purification should be established as a state and national priority.

"We have a water conservation month in April, but few pay attention to it."

— Ida Roberts



Avoiding a Water CRISIS in Florida—

How Should Florida's Water Supply
be Managed in Response to Growth?

by Dr. Lynne Molt

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.”¹ 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.² 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

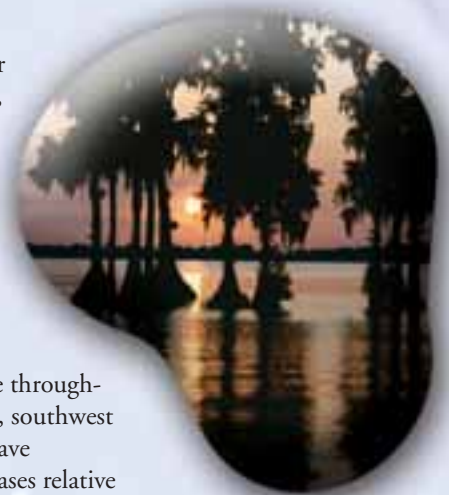
rainfall is lost to evaporation and only 30 percent finds its way to bodies of water or aquifers. The water then flows to the sea, along the way sustaining important natural areas such as the springs, the Everglades, crystalline streams and winding rivers that are of great importance to the maintenance 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.

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, Suwannee 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.

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. 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.

Conservation and Increasing Water Supplies

Florida’s WMDs have responded to projected increased demand by promoting several strategies that encourage conservation. The term “conserva-

tion” 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.³

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.⁴

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.⁵ 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.”

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 \$0.54.⁶

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 — requires 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.

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.”⁷ 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. 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.

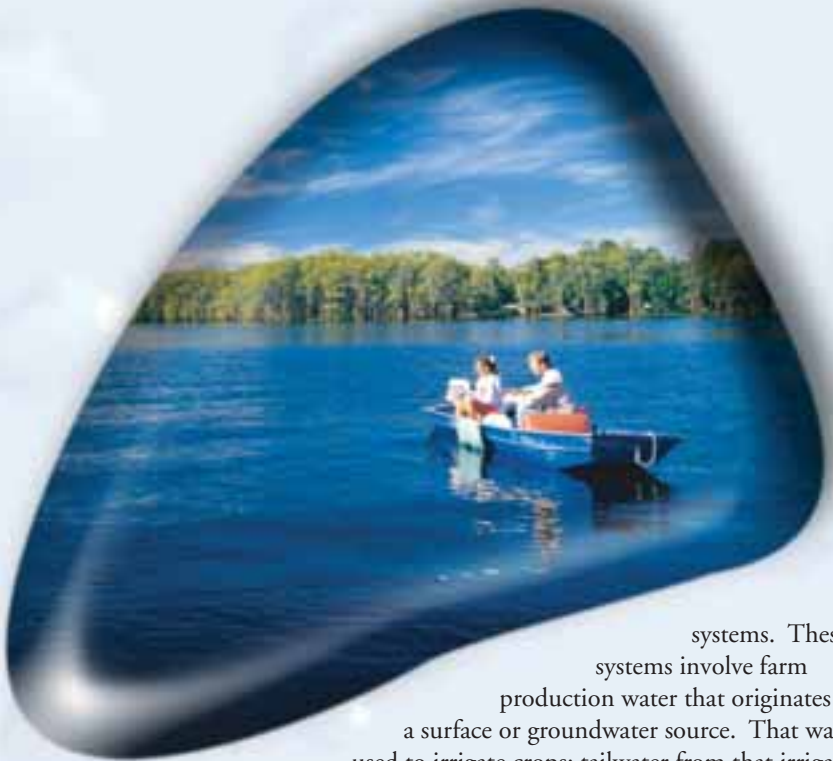
Path to Long-Term Sustainability

There are five approaches that might assist water supply efforts in Florida:

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.

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.

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.⁸ 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.

Acknowledgement: The author appreciates the comments and suggestions of Dr. David Colburn, Dr. Lynn Leverty, Dr. Sanford Berg, Dr. Joseph Delfino, and Dr. Robert Holt, all from the University of Florida, on an earlier version of this essay.

Endnotes

- 1 Florida Council of 100, *Improving Florida's Water Supply Management Structure*, September 2003, p. 23.
- 2 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.
- 3 Florida Department of Environmental Protection, *Florida Water Conservation Initiative*, April 2002.
- 4 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.
- 5 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>.
- 6 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.
- 7 Robert Glennon, *Water Follies: Groundwater Pumping and the Fate of America's Fresh Waters*. Washington: Island Press, 2002, p. 220.
- 8 National Research Council, *Confronting the Nation's Water Problems: the Role of Research*, 2004, p. 17 and 20.



WATER MANAGEMENT PLANNING

The Water Management Planning Roundtable was moderated by Dr. Joseph Delfino, University of Florida. Panelists included: Dr. Lance deHaven-Smith, Director, Reubin O'D Askew School of Public Administration, Florida State University; Mr. Tom Swihart, Administrator, Office of Water Policy, Division of Resource Management, Florida Department of Environmental Protection; and Mr. Steve Seibert, Attorney, Seibert Law Firm.

Dr. Delfino outlined the challenges facing Florida's water supply: population growth and urban expansion, annual and seasonally variable drought cycles, dependence on groundwater for potable supply, real or perceived conflicts among and within regions for water allocation, water contamination, and the Everglades Restoration initiatives. An additional challenge is the ongoing transformation of farmland to development because ensuring adequate food supply in future years is also important. Dr. Delfino reviewed several state initiatives promoting conservation. The costs associated with conservation are not very expensive. Water issues can be resolved, but the challenge is getting water to where it is needed. Hydrological and logistical issues will make cost issues more acute.

The implementation of existing laws and regulations along with average or above average precipitation should ensure future water supplies. However, if implementation of water laws and rules slows or fails and if extended periods of drought prevail, or both, sustainable water supplies will be at risk. The overriding question facing Floridians is: will we be able to come together and solve our water supply problems?

Dr. deHaven-Smith contended that Florida's water issues are not difficult from a technical perspective; we have large quantities of water although we may need to share it. The reason water supply problems cannot be resolved is mostly due to a lack of trust. People feel that those in power have a hidden agenda and therefore are less willing to come to the table. What Floridians need is leadership that will encourage public buy-in and support. Florida is currently headed toward a concurrency crisis. Legislation is now under consideration to condition local government approval of development on identified water sources and a funding stream. However, if there is no state funding for this measure, Floridians could face the same situation they faced in the mid-1980s when there was a concurrency requirement for road development but no funding. This situation had the unintended consequence of road developers shopping in rural areas for development sites; the long-term outcome was urban sprawl. So this measure, while well intentioned, could actually promote rather than contain urban

sprawl. It could also spawn knee-jerk public reactions. One strategy for addressing water supply problems is for the state to cordon off certain areas and decide not to develop them. Ultimately, if we want to move forward on water issues, we will need to restore trust in government.

Mr. Swihart explained the overall framework and oversight responsibilities of the entities that manage Florida's water supply. He provided data on the withdrawal of Florida's fresh water compared to that of other states, noting that Florida withdraws less fresh water per day than 13 other states. Agriculture accounts for the largest water consumer and half of the water is withdrawn within the jurisdiction of the South Florida Water Management District. Water supply and resource development funding is projected to be \$12.2 billion over the next 20 years; \$7.1 billion is projected for alternative water supply development during that period.

The average per capita use of water is less in Florida than in the U.S.; however, certain counties, such as Seminole, Osceola, and Dade, exceed the Florida average. Conservation is one approach for reducing per capita water use. Several measures that have promoted water conservation include: the Florida Water Conservation Initiative (2002), which culminated in long-term recommendations for improving water conservation; the *Conserve Florida* Work Plan, which seeks to improve evaluations of water conservation programs and practices and foster information sharing; and implementation of 2004 House Bill 293, which requires the Department of Environmental Protection to submit a written report on the progress of the water conservation program, including any statutory changes and funding requests necessary for program continuation. A few years ago, Florida was the epicenter for drought. The state is now experiencing rain. With the implementation of conservation measures, Floridians should be better positioned to deal with future droughts.

Mr. Seibert observed that the water conversation is better now than in past years. It is more result-oriented, regional, interdisciplinary, and collegial. Years ago, there were urban versus rural interests and everybody versus water management districts; only 12 people understood water issues. The conversation has expanded since those days. Now, the Governor and the Legislature are talking about water. Agricultural and public supply users are at the

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ENVIRONMENTAL CONSTRAINTS FOR WATER SUPPLY PLANNING

The Environmental Constraints for Water Supply Planning Roundtable was moderated by Dr. Richard Hamann, University of Florida. Panelists included: Ms. Victoria Tschinkel, Director, The Nature Conservancy – Florida; Mr. Harold Wilkening, Director, Water Supply Planning and Water Use Regulation, St. Johns River Water Management District; and David Richardson, Director, Wastewater and Water, Gainesville Regional Utilities.

Dr. Hamann provided a brief overview of the legislative requirements in the Florida Water Resources Act (Chapter 373) pertaining to consumptive use permitting, the definition of “reasonable-beneficial” use as a criterion for withdrawals, and statutory safeguards against adverse environmental impacts, including public interest standards, minimum flows and levels, and reservations. The permitting system has an opportunity every few years to evaluate if a particular consumptive use has an adverse impact on water resources. The permitting system, however, is not designed to look at cumulative impacts in a prospective way. So there are minimum flows and levels and reservations. There is only one reservation to date in the St. Johns River Water Management District (SJRWMD), but there will be many more in South Florida due to a special process for designating water reservations in the Comprehensive Everglades Restoration Plan. The President and Governor Agreement of 2002 prohibits consumptive use of water from projects in the Plan until such time as water reservations are sufficient to restore the natural systems in those projects. There is a strong commitment in Florida for such reservations.

Ms. Tschinkel explained that Florida is a very large state that is either very wet or very dry. It is also flat so underground storage of water is a problem. Florida has a long tradition of protecting and cherishing its water resources. The state’s model water law gives Floridians the chance to be good stewards of the state. Florida has 7,800 springs, more than 3 million acres of wetlands, 27 first magnitude springs, and 50,000 miles of rivers and streams. Florida’s aquifers supply 90 percent of the state’s drinking water. However, there has been a dramatic decline of water levels in the aquifers. To protect aquifers we must protect the land above them and to protect ecosystems, we need large tracts of land for recharge areas. A market system of water allocations may make access to water more efficient, but there is only so much water to be withdrawn and it only postpones the inevitable – water will be expensive and in incredibly short supply.

Florida’s spring flows are also declining and many are threatened by nutrients. Florida’s springs are the exclusive habitats for 20

species of fish, reptiles, and amphibians and 25 different kinds of algae. In addition, they provide immeasurable natural, recreational, and economic value to the state. Other areas of great concern are Florida’s (1) estuaries which provide a particular mixture of salt and fresh water necessary for the reproduction cycle of many species; however, not enough is known about these species and their reproductive timing and how to protect them; (2) river basins, such as the Wekiva Basin, home to 95 species and 32 natural communities, which has been facing the challenge of road development; (3) rivers, such as the Apalachicola, the state’s largest river, which is threatened by water demand pressures in neighboring Georgia and Alabama; and (4) the Florida Everglades, half of which has been lost to development. Expenditures of over \$8 billion are projected to make it something like it was.

Ms. Tschinkel concluded with the observation that Florida’s environment is unique in the world, it is ours, and it has been given to us to take care of. To think this is an easy job, even scientifically and intellectually, is wrong. To think we have any other choice would be wrong, too. She cited the American Indian proverb: “The frog does not drink up the pond in which he lives.”

Mr. Wilkening presented a brief overview of projected water supply in the region of the state served by St. Johns River Water Management District (SJRWMD). From 1995-2025, the population served by this WMD is projected to grow from 3.5 million to 6 million. This population projection has focused SJRWMD’s planning on public water supply use, as opposed to other uses. Public water supply use is projected to increase by 77 percent during that time period, while agricultural use is expected to decrease by 11 percent due to conversion of land to non-agricultural use and greater irrigation efficiency. The objective of the WMD’s planning efforts is to ensure that the cumulative impact of additional withdrawals does not change the hydrology of Florida’s water bodies, such as lakes and springs. Saltwater intrusion and groundwater quality is also an important constraint both on the environment and on other existing water users. *Mr. Wilkening* explained the regional water supply planning process to optimize water supply within those constraints, noting that the WMD looks at the aggregate proposed uses on a regional basis over a 25 year period. The WMD needs to make its best projections based on each user’s or utility’s proposed, spatially-based plans. A big change in the 2000 plan was the determination that the projected water demand for the next 20 years will not be met exclusively through new wellfield development. Because of the limited supply of fresh groundwater in East Central Florida to meet projected demand, the SJRWMD 2000 Plan determined a need of 100-200 mgd of additional water from alternative water sources by 2020. The SJRWMD 2004 interim plan identifies 14 projects for alternative water supply with cost data and potential users. The intent is to come up with enough alternative water options to meet demand in 2020.

Regional efforts are underway to expand water supply through the use of alternative sources. For example, the Taylor Creek Reservoir Expansion Project involves the planning efforts of several utilities to expand 10 mgd of water supply to 50 or 60 mgd or more. Other regional approaches include Tampa Bay and the Water Authority of Volusia. The technical issues are not difficult.

The real issues are in implementation, particularly through water conservation. Alternative water supplies can be made more affordable if they supplement fresh water supplies. Conservation measures can therefore play a role in lowering the percentage of more expensive, alternative sources in the water supply mix; this blending of fresh and alternative sources with their associated costs can ultimately be reflected in more affordable water prices to consumers. Regionalization and collective effort might give us the most water at the least cost but historically it has been difficult to achieve. To date, utilities have worked together to increase water supply incrementally but more can be done. Finally, there is considerable uncertainty about when Florida will run out of water. Florida will run out of fresh water but if there are alternative water sources, utilities will be better positioned to respond.

Mr. Richardson explained that water supply development in Alachua County, served by Gainesville Regional Utilities (GRU), is constrained by potential impacts on wetland water, potential impacts on surface water, and, to a far lesser extent, potential impacts on springs. Water supply withdrawals and environmental



WATER MANAGEMENT PLANNING ROUNDTABLE DISCUSSION

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table. And the public is recognizing that water is neither cheap nor inexhaustible in supply. In the past, local planners talked to regional planners who, in turn, talked to the personnel at the Department of Community Affairs. Water utility personnel would talk to regional water management district staff who, in turn, would talk to the personnel at the Department of Environmental Protection. But the water planners were not used to dealing with the land use planners. That changed with passage of legislation requiring local governments to coordinate their comprehensive plans with the water management districts’ regional water supply plans. Since that time, water management districts and local governments have been communicating and are doing it better.

In Florida, there has been a movement toward more regional approaches for addressing water supply management issues. Typically with crises there is a lack of shared vision, an absence of regional leadership, a fragmented regulatory structure, and no incentives for regionalization. However, the regional approach of Tampa Bay Water illustrates that, under certain circumstances, a

protection may have competing objectives but these objectives are still compatible. For example, GRU purchased conservation easements for future water supply expansion but those tracts are also used to protect wetlands located near wellfields. Water withdrawals are very site-specific so utilities depend on accurate geo-hydrological models to better understand the possible effects of withdrawing water at different rates at a given site. These models are particularly useful in projecting the effects of hydrological changes on the environment 20 years in the future. Utilities’ models do not always mesh with water management district models which are more regional in scope so utilities try to work with water management districts to come up with an agreed-upon model that can be used for consumptive use permitting. GRU is currently working with the SJRWMD to that end.

Conservation has caused the per capita use of GRU’s residential consumers to decrease by 15 percent over the past 15 years. This reduction was in part due to the use of inverted block rates where irrigators pay more per gallon than lower volume users. One of the unintended consequences of inverted block rates is that irrigators are installing their own wells and by-passing GRU. In doing so they are using much more water than they consumed from the GRU system. Other GRU measures to promote conservation are extensive public and employee education, water audits, and promotion of Xeroscape landscaping. Another change is the way people use water. The widespread use of automated sprinkler systems has shifted the time of peak usage to early weekday mornings from less concentrated time periods. If GRU is unable to modify user behavior sufficiently, it has several options for meeting projected demand: expanded use of reclaimed water, reduced pumping of existing wells, capping different parts of aquifers, retrofitting wells, optimizing existing wellfields, developing satellite wellfields, developing alternative supplies, and directly addressing wetland mitigation impacts.

crisis – in that case drought – can lead to: new leadership and people engaged in deliberations, a different shared vision that can be articulated and defended (common ownership of water facilities and shared rates), and finally, voter support for change.

To deal with complex water issues in Florida, we will need a greater level of civic and civil conversation. We need to make the conversation understandable because there will be higher rates and new governance for which public support will be necessary. The existing governance structure is not conducive to a water crisis. And we are in a water crisis. Next time a drought comes there will be 20 million Floridians, not 16 million, and recovery will be more difficult and the problems more pressing. We will need to alter the structure for dealing with those problems. Perhaps one approach is a century commission, suggested by State Senator Michael Bennett, which could examine policies long-term in a scientifically-based, nonpartisan manner. Such a commission might be a good repository for deliberations on water.

OVERVIEW OF TAMPA BAY WATER

BY PAULA DYE

Tampa Bay Water is a nonprofit governmental agency created by the counties of Pasco, Pinellas and Hillsborough and the cities of Tampa, St Petersburg and New Port Richey under legislation that allows local governments to join together to provide public supply sources such as water. We serve about 2.3 million residents who use about 245 million gallons of water a day.

There are three major keys to success in the Tampa Bay region: regional cooperation, coordinated planning and outside funding. When you go from the traditional and historically cheap to develop supply sources such as groundwater, and you ask a local or regional community to consider other, more expensive sources, outside funding is essential. We have been able to use funds from the Southwest Water Management District and the federal government on a lot of our projects.

Prior to 1998 when Tampa Bay Water was formed, our former agency, the West Coast Regional Water Supply Authority, was constantly battling with the Southwest Municipal Water District and our own member governments. There was no new water produced and millions of dollars were spent in litigation. The goal of forming Tampa Bay Water was to stop that. We have not had any litigation since we were formed in July 1998 and we have been able to develop alternative supplies. We have developed 91 million gallons a day of alternative supply sources and that has allowed us to go from a permitted capacity of 192 million gallons to 121 million gallons. By 2008 we will be permitted at 90 million gallons. We have given up over half the permitted capacity of our previous supply sources.

The goal for these initiatives was to restore the environment. Prior to Tampa Bay Water being formed and the new supply sources coming on-line, we were essentially mining the aquifer, and there were resulting environmental problems. The general public did not see that unless they lived on the lake or next to the wetland that was drying up. So part of the communications effort that was needed in our area was to help those people who did not live in those environmentally sensitive areas to understand why we needed to go to a new paradigm. We



PAULA DYE

“Planning for the future is difficult because we have already

developed many of the alternative supply sources available in our region. It is important to look to local sources first.”

have also been able to plan for the future. We now have alternative supply sources that will take us out to 2012. We are working on additional alternative water supply projects that will take us to 2020 right now, and in our long-term plan we have sufficient supplies to provide needed water past that.

In 1998 we were 98% groundwater and the supply sources were concentrated in the central Pasco and northwest Hillsborough areas. We also had a well field in southeastern Hillsborough County. But the environmental problems we encountered took place in the more rural areas in Pasco County and NW Hillsborough County. We really needed to develop alternative supplies.

Our alternative supply sources include the pump station on the Tampa bypass canal. That facility can pump as much as 150 million gallons per day from what is essentially a flood control structure. When the flows there are very, very high, we can take water that will eventually go into our regional reservoir. We also have a supply source on the Alafia River which is another high flow supply source. When there are 80 gallons a day or more in the Alafia River, we can take 10% of that flow up to a certain quantity. That is a sustainable stream-type water supply. We have also built a surface water treatment plant that can produce 66 million gallons per day. Finally, we have the reservoir; it is a 15 billion gallon, off stream, above ground reservoir. When it is completely filled (we were just able to start filling it on March 2), it has enough

capacity to supply the entire needs of the region for up to 200 days. The goal of that effort is to get us through dry conditions and drought conditions. The last piece of our alternative supply puzzle is the Tampa Bay desalinization plant. It is operational, but the contractor did not build it to the performance standards that we had set so a new contractor is making sure that it can operate at its full efficiency. It can operate and produce 25 million gallons a day and should be fully operational in 2006. The result of these initiatives is that last year we actually operated them below the 90 mgd ceiling, which we were required to obtain by 2008. In other words, we met our goal actually four years early.

What are our plans for the future? We know by 2012 that we will need another 8-12 million gallons of water a day. We know the increased need is going to occur in our high growth areas in Pasco and Hillsborough counties. Hillsborough is a large county, there is room for more development. Tampa Bay Water needs to make sure that we can provide those water supplies in a continuing, sustainable way into the future.

That is the next key to success; planning coordination is essential. One of the things we do at Tampa Bay Water is to work very closely with the planners at the Southwest Florida Water Management District. We also work with our member government planners and we take into account their needs and their ideas as we look at what the future might hold for us. On an annual basis we all report back to each other as to how well we are doing through our annual reports.

Our board of director's planning goals include an emphasis on the environment. We did not decrease the groundwater supply production and spend over \$600 million in developing alternative sources in order to slide back again into developing supply sources that are not going to be environmentally sustainable. So our board has set several goals to make sure that we are meeting those environmental and permitting requirements. But we also have to recognize that the cost of water has risen significantly and that there is only so much that the general public is going to be able to bear. Minimizing rate impact is also an

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THE SOUTHWEST WATER MANAGEMENT DISTRICT

BY MR. DAVID MOORE, EXECUTIVE DIRECTOR, SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

Mr. David Moore, Executive Director, Southwest Florida Water Management District, provides two case studies to illustrate how the SWFWMD's water management planning efforts respond to population growth and environmental constraints.

PARADIGM SHIFT:

We really made a paradigm shift in water supply planning on Florida's west coast about ten or fifteen years ago when we began developing more alternative supplies. Prior to that time, the paradigm was to sink a well in the ground and withdraw groundwater. The primary alternative supply source is actually captured wet-weather flows that come down the river. The challenge is storage of that captured water. If we can combine productive use of this water together with conservation, reclaimed water, and, as appropriate, desalination, we should be able to meet the needs of all our customers with local sources through 2050. A better understanding of long-term and short-term climate variability effects on river flow also aids the WMDs in water supply planning and setting minimum flows and levels. For example, the Peace River Cumulative Impact Assessment provides us with insights about the importance of climate cycle impacts on river flow.

TAMPA BAY WATER WARS— REGIONAL PARTNERSHIP:

The first case study is about the northern Tampa Bay area where the water wars originated. Pumping of wellfields in the area caused aquifer levels and lake levels to drop significantly in the 1960s and 1970s. The West Coast Regional Supply Authority, the first water supply authority in the region, agreed to cut the pumping of wellfields in the area by close to half. However, while the aquifer levels came back up, they never came back up to their previous level. The lake level also came back up, but never to its previous level. The origin of the water wars revolves around the question of the extent of groundwater withdrawal impacts on lakes and aquifers. The extent of those impacts is certainly debatable given development, drainage, and climate variability. When the



DAVID MOORE

“...the key to alternative supply development, conservation,

and water resource development is incentive-based funding from the WMD.”

wellfields were first developed in the 50's and 60's, there were very few people living in northwest Hillsborough County and Pasco County. As more people moved in close to these wellfields, lakes would dry up and residents would complain. There was also increased sinkhole activity.

Partnership is what ended the water wars in the Tampa Bay area. The governments of Hillsborough, Pinellas and Pasco Counties came together with St. Petersburg and New Port Richey and formed the new Tampa Bay Water Authority. The idea was to bring incentive-based funding to the table to solve the problem rather than to fight over the magnitude of water withdrawal impacts. The SWFWMD put \$183 million on the table to develop alternative supplies and more than \$90 million in additional funding to implement water conservation projects that would curb demand. Per capita water use which was at about 140-150 gallons per day per person in that tri-county area back in the late 1980's-early 1990's is now down to about 120-125 gallons a day per person.

In the past two years, the 11 wellfields in the Tampa Bay area were able to reduce pumping from 160 mgd to 90 mgd. This supply has been augmented by desalination producing 25 mgd and captured flood waters producing the remaining 60 mgd. To capture flood waters for Tampa Bay, the SWFWMD built a thousand acre, 55-foot high reservoir that is in the process of being filled. In addition to the off-stream reservoirs, of course, the SWFWMD uses aquifer storage recovery (ASR). ASR was pioneered

on Florida's west coast, in Manatee County; the first ASR system was erected along the Manatee River. There are three types of ASR systems – potable, reclaimed, and raw water. It is the latter – raw water – that has caused the most controversy and needs more research. Sarasota, Tampa, Charlotte County and Desoto County rely heavily on ASR technology.

Desalination is another option that works well in Tampa Bay because it is co-located with an existing power plant that had all the permitting completed and all the infrastructure in place. The second reason it works well in Tampa Bay is that Tampa Bay has half the salinity of the Gulf of Mexico but the large, less salty quantity of water from the Gulf – 1.35 billion mgd —dilutes the saltier water. The plant is currently in the process of pre-treatment rehabilitation but within 15-18 months, it should be fully operational.

Another source of water supply that will help SWFWMD meet projected demand through 2020-2025 is the Downstream Augmentation Project – a regional partnership of Tampa, Hillsborough County, Pasco County, Tampa Bay Water, and the SWFWMD. This project will result in construction of a regional reclaimed water system that will offset treated potable water with reclaimed water for irrigation and other purposes.

Finally, the Tampa Bay region has the highest concentration of reclaimed water lines in the world. To induce local governments to supply reclaimed water, the SWFWMD pays \$.50 per dollar expended for those lines. Reclaimed water is like wild fire; once a few subdivisions get it, the surrounding subdivisions want it, so it's worked out pretty well there.

SOUTHERN WATER USE CAUTION AREA:

The Southern Water Use Caution Area (SWUCA) includes all of DeSoto, Hardee, Manatee, and Sarasota counties and parts of Charlotte, Highland, Hillsborough, and Polk counties. The SWFWMD is trying to manage water in this region in a comprehensive manner. The total level of groundwater use in the region has not changed

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COMMENTS

By MARIANNE ARNEBERG

Water management is a complex issue and one the public does not understand well. The Orlando Sentinel has been trying to educate the public on water for a number of years, and we recently completed a year-long in-depth series on this subject. There is no more critical nor more difficult issue facing our state today.

The key to building better public policy on water is to develop a consensus on the extent of the water crisis, why we have a water crisis, and who is responsible. Right now everyone blames everyone else. There also is a disconnect between our current problems and the length of time it will take to resolve them. If we do not make better plans today, we will have fewer options in the future. For example, water managers need to be working with local government



not to approve growth that will lead to additional water shortages in the future.

I am extremely encouraged that Governor Bush is taking this issue seriously. The new growth plan requires local governments

to identify sustainable water sources for new developments and a revenue stream to pay for it. However, the fact that we are unwilling to raise taxes complicates resolving the water crisis since it is obvious that providing adequate water for Florida's future will require additional resources. Reuse systems, desalinization and other means of increasing the water supply, even educating the public about water conservation, are not cheap.

Those of you who are experts on water should be doing everything you can to communicate with the public and policy makers. You need to communicate with them in a concise and direct manner which engages their interest. Remember, this will be a long-term discussion which must engage all Floridians.

ADMINISTRATIVE FRAMEWORK GOVERNING WATER

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billion federal-state plan reached the U.S. Supreme Court last year and its outcome has the potential to directly impact the future allocation of water in Florida.

WATER TRANSPORT AUTHORITY AND LIMITATIONS:

Florida water law authorizes the transport of water across district, watershed, and county lines. This authority came to the forefront over a year ago when the Florida Council of 100 released its report *Improving Florida's Water Management Supply Structure*. Two recommendations worded in very careful, very neutral terms really sparked public debate. One recommendation said that we should establish a water supply commission with a statewide perspective. Another recommendation called for an analysis to determine the practicality of a state-wide water distribution system from water-rich to water-poor areas. These recommendations caused a grassroots outcry. It was reported that a thousand people waited three hours at a public meeting in Chiefland High School so that they could weigh in on this question. The real issue is whether there should be

localized or statewide management of water resources, and to what extent we should allow regions to consume more water than nature provides by importing water from other parts of the state. We will see a push and pull among various regions in an effort to sort out the appropriate scope of their respective “water budgets.” Although arguments may be couched in scientific terms, this is really a matter of social policy and of what we think is best for Florida.

Thoughtful scholars have noted that water law has always focused upon satisfying demand, rather than limiting demand to recognize some hydro-geologic realities limiting supply. In western parts of the country, water transport over mountains and basins is routine; there the joke is that water runs uphill toward money. In Florida, uphill is only a few feet or inches. Nonetheless, certain conditions must be satisfied before the request to move water may be granted. These conditions are all couched in very flexible terms. However, a political debate rather than a legal debate will determine how, when, and whether we should move water around. Hopefully, we will give some very thoughtful consideration to all state needs—both human and



environmental—and not simply let the water flow uphill toward money and let dollars and sheer voting power dominate.

COORDINATION OF WATER AND LAND USE:

The ongoing challenge is to find what has been called “the missing link” between water planning and land use planning. Currently, land use and water use planners are legally required to engage in some degree of consultation, and there are some very interesting bills before the Florida legislature to improve coordination efforts. This will no doubt be an ongoing struggle as population grows and water supply remains constant.

OVERVIEW OF TAMPA BAY WATER

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important part of the goals that our board of directors has set. There are two ways to accomplish this: one is to look for outside funding sources and the other is to match supply development to when the water is needed. We want to bring new sources on-line when we need them so that we are not bonding our community for a long period of time and having those facilities sit there.

The outside funding is also truly essential. The cost of the infrastructure program I just described was over \$600 million. The federal government helped us with \$54 million to build the regional reservoir and the SWFWMD provided \$183 million of that program. Without that money it would have been much, much more difficult for the local government officials who have to look at the rate impact and be able to sell that to their constituents. The cost of water for the city of St. Petersburg prior to 1998 was about \$.30 per thousand gallons. The cost of water today in the Tampa Bay area is \$2.06 per thousand gallons. That equates to about \$30-35 dollars on an annual water bill, but it is a huge increase for the local governments to be able to support. The outside funding has kept that from being even higher.

Planning for the future is difficult because we have already developed many of the alternative supply sources available in our region. It is important to look to local sources first. For Tampa Bay Water we have found that the “the low through is gone, the

high through is tapped and the only thing that is left is the ugly through.” The ugly through does require some assistance. We have two concepts that we are working on in depth. I am going to talk about one: the downstream augmentation of a couple of river supplies. The three keys to success that we have implemented to date are all coming out in this project as well.

The basic concept of this augmentation plan is to put a gallon of reclaimed water downstream and take a gallon of surface water upstream. In that way we are protecting the environment by keeping the same quantity of freshwater in that stream system. The reclaimed water is produced by the city of Tampa Bay and is of extremely high quality. We want to pipe the reclaimed water to the stream location where we have existing intakes. The water will not be piped upstream, because we looked at that project back in the 1990's and it was not acceptable to the community. Our local community did not feel comfortable with indirect potable reuse where you clean and drink the reclaimed water. This is a variation on that idea. Instead of drinking it, we put it downstream and drink the surface supply. People will accept that and it meets the same goal of maintaining the flow in the river system.

This project is extremely expensive to do, however. It will cost about \$90- \$120 million for the required infrastructure. The water management district is funding 50%



of the cost of the project and the federal government has appropriated \$1.45 million for next year. We are working with the state as well. The planning coordination aspect is where it originated in the SWFWMD's regional water supply plan. Regional cooperation includes not just the involved institutions, but also the larger project where the reclaimed water would use the same pipeline to go further north. We would take it for augmentation, and the city of Tampa, Pasco County and Hillsborough County would use it for irrigation projects. By working together and sharing the infrastructure, we can reduce the costs of those pipelines and we are able to afford what would be a really expensive project if it was built for each party individually. In that way, regional cooperation is, again, essential. Using cooperation, coordination and outside funding we believe that we have found the solution to meeting the long-term water needs of the Tampa Bay area.

THE SOUTHEAST WATER MANAGEMENT DISTRICT

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much since 1975; phosphate mining used considerably more groundwater in earlier years than now, but the influx of 1 million additional people has kept overall consumption pretty constant. The goal is to reduce current groundwater withdrawal in the eight-county region from 650 mgd to 600 mgd. However, certain challenges remain. The region faces problems with saltwater intrusion. The bad news is that it is happening; the good news is that intrusion is slowly occurring over a very long period of time. Then there is the Peace River that used to flow year round but no longer does;



a major spring has dried up in the upper part of that river. Spring management without reduced groundwater pumping will not restore that river's flows.

Projected additional water needed in the SWUCA area by 2025 is over 200 mgd. The first strategy is to induce people to become a bit more efficient. Conservation can free up at least one-third of the needed water and conservation rate structures can contribute to that effort. Another third will come from alternative supplies, such as capturing flood waters. The remaining third will come from a strategy that would encourage coastal areas to develop alternative supplies. The groundwater freed up from alternative use in those areas could be moved inland to subdivisions that are replacing agricultural land and that have less access to alternative supplies. Moreover, subdivision residents use less water than agricultural users and citrus growers. Freed-up groundwater can also be used to replenish the environment. To reduce the fiscal impact for alternative supply development in coastal areas so that

this strategy can work, the SWFWMD plans to pay up to half the capital costs.

CONCLUDING OBSERVATIONS:

Conservation, development of alternative supplies and land use-water linkage strategies will enable the SWFWMD to increase water supply to meet projected need. Yet, an unanswered question remains: What do we do about saltwater intrusion and the Peace River? Because saltwater intrusion is moving at a very slow rate, we should be able to manage it over the next 50 years. The only way to ultimately slow it down will be through development of new technologies. The primary way to add water to the Peace River is to capture water from Lake Hancock or other lakes during the wet season and release it to the Peace River during the dry season. Finally, the key to alternative supply development, conservation, and water resource development is incentive-based funding from the WMD.

HOW SHOULD WATER BE MANAGED IN RESPONSE TO GROWTH

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conjunctive use of water; water reuse which is the future; and desalination, which is also part of the future but is currently expensive and uses a lot of energy. All these approaches involve the cascading use of water. As the value of water and nutrients rises, reuse and desalination become more likely. Membranes are going to change this planet because they make it possible to use water from the ocean and turn poor quality water into good quality water. On the other end, waste water plants turn waste into high quality water—that's the reuse side. Drinking water membrane plants are becoming increasingly cost effective. Whereas the traditional systems favored huge economies of scale, the new technologies allow for these smaller membrane plants to be built at lower costs and in a more decentralized or nodular manner. Tucson, Israel and Tenerife provide examples of water supply systems that have been extremely innovative in using new technologies to reuse water with great efficiency. To put things in perspective, California uses approximately 2,000 cubic meters of water per person per year, whereas Israel and Tenerife use only 300-400. Both countries produce agricultural products for export. These countries give you an idea about what's possible if you really want to get serious about using water efficiently.

Education is very important in the overall strategy of learning to do more with less. If you can sell kids on what the problems are and what the potential solutions are, they become your best friends. I have been through this in Seattle with

electricity, solid waste, and water and kids became the champions of change there.

Let's focus now on Seattle and examine how you get ideas for change and put them into practice. I was the Deputy Director of the Seattle Public Utilities at a time when we had a real crisis. Everyone knows Seattle is wet. But in spite of that, Seattle was facing looming water shortages because of increasing population growth and because it was not possible to build anything new due to the environmental ethos. Because of growth, water quality was deteriorating. Along came the Chinook salmon and a very dramatic decrease of the salmon population over time. Any business involved in withdrawing water from salmon-borne rivers was affected by the Endangered Species Act and that included water companies. This situation resulted in a new paradigm for my water company. And the lesson here is sometimes a crisis is your best friend. It caused us to change our perspective, our approach, and our scope. At the utility, the environmental issues became a priority. We increased the environmental flows on source rivers which meant that we didn't have anywhere else to go for water so we had to invest in conservation which we did effectively. We initiated a 1 percent program which meant we were reducing water use through conservation equal to our growth rate. We rethought our entire water program and fought with the regulators because they were compartmentalized. For its part, the city had to rethink its land use regulations and educate the public. It had to elevate nonpoint sources as a priority and

collaborate with other jurisdictions on water and environmental issues. There were no watershed governance structures in the state and local law so we had to create them. To that end, we created forums, recovery plans, watershed compacts and interlocal agreements for financing actions — all without

enabling legislation. It was all done bottom-up. It was terribly hard and I wouldn't recommend it to anyone. But nonetheless it was practical. My former mayor said, "Salmon swim through 27 jurisdictions to spawn. In our need to solve this problem, the salmon will save us from ourselves." What came out of this was a good network of regional connections. We created a regional water suppliers forum called "Water for Fish and People." And we drafted state legislation that dealt with some really thorny issues that are still not through the Legislature.

So what did we learn from all this? Balancing priorities is tough—not any big news there. One big source of news is that the science is very uncertain and if you're not careful, you'll have the fish biologists running your utility. The politics of the environment are nasty and, of course, you're always working backward across physical versus jurisdictional boundaries and working with decentralized jurisdictional structures.

I am no expert on Florida but I humbly say this to you. Like California, Florida is a state that has experienced considerable growth and will keep growing. I was told because Florida had all those hurricanes and there was rain, nobody is worried about water anymore. And it was stunning to hear that but it was a predictable response. With water, you're talking about investments of 100-150 years. And the Romans were thinking about 1,000 years. We have to get our horizon lengthened here and we have to be thinking about how we can operate sustainably. Reduce water use by an amount equal to increased population growth. At least that would keep you even. Think about how you can get your water resource stabilized so that it is harmonious with the environment and people. There are two major closing ideas. First, nations are powerful and need to be a building block for what to do. Second, there are many technical options. In Puget Sound, we reduced our consumption through conservation and pricing by 35 percent without sacrificing our basic lifestyle through more efficient use and that was before reuse and conjunctive use. Any course of action has to start with an agreement that you have an issue you need to work through. And that's an issue that you, not me, need to work through.



COMPLEXITY, CONFUSION, AND COMPLACENCY IN WATER SUPPLY MANAGEMENT

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something that is already being handled really well?

I think there are some observations for which there might be agreement. Florida's leaders and citizens do seek a sustainable supply of clean water. The current strategy is to avoid competition for that water by command and control. We basically have a planned economy in water. I am concerned that after the second or third drought, a water crisis is going to break our management systems and we will incur considerable waste and costs through temporizing approaches. In some cases, we will see technological fixes requiring investments in two dollar water when twenty cent water is available but the transaction can't be made. That's the kind of inefficiency that drives economists bonkers. So I think our current strategy focuses on creating a larger water pie through alternative water sources — recycling, reuse, and the cascading approach. I also know that consumers don't face the true cost of the water they use. That resource is valuable and it is given away, much like the radio spectrum before policy changed. I find the current process very hard to justify.

Now, let's consider a couple of axioms. The first axiom of public investment in municipal infrastructure is to get someone else to pay. That is, Washington, D.C. is where all the money is, so let's get our elected officials to spend 200 billion dollars on renewing our infrastructure. Every decade or so, there's a big initiative and a pot of money is authorized in Washington and gets distributed, via the pork-barrel, around the nation. Because these are not loans or moneys from user fees, consumers don't face the true cost of improvements to their sewage systems. They can get someone else to pay for those improvements. That's fabulous politics but bad economics. The approach is not a good long-run solution. It is not transparent; we don't really see what we're giving up when we get something. By contrast, *personal* investment in public infrastructure is voluntary. When I buy a municipal bond for a water project, I do it because it has some tax advantages and I am confident that the municipality is going to use the money to actually make the investment and it will provide me with the cash flows that I need for my retirement. I could also elect to invest in private water companies without receiving those tax benefits.

In addition to these two axioms of getting others to pay or voluntarily paying — average water prices in the United States are lower than in other developed countries.

Water doesn't determine our standard of living. We can pay higher prices for water and ensure that our standard of living does not suffer. In fact one of the insights that I think economics brings to the table is the discussion of trade-offs — the opportunity costs associated with groundwater and the value of that water to other parties who might be willing to pay for its use.

Now I'll turn to another insight from a colleague of mine at the University of Florida, David Sappington. David is one of the 50 most cited economists in the United States. He went to the Federal Communications Commission for a year to serve as the chief economist. His experience there led him to conclude that the four main drivers of regulatory decisions are: (1) Politics; (2) Politics; (3) Politics; and (4) Economics. The first driver is politics because people are afraid to come to the table; they believe that our system of checks and balances is not amenable to resolving many environmental, water, and growth concerns. The second driver is politics. David observed that you can bring technical information in and confer with regulators. However, regulators are accountable to elected officials so while they may be autonomous, they are not really independent. Technical points just get trumped by political powers. The third main driver, according to David, is also politics.

Economics is only the fourth driver! So here is a personal anecdote. I entered economics thinking that public policy was really where the action was. I wanted to deal with poverty and affordability. I wanted to design institutions that improve sector performance. When I was a new professor, I talked to someone who served a year on the Council of Economic Advisors. I was in awe of that person who had been in the center of power. So I asked, "What was it like? What did you do?" He hunched his shoulders, looked at me, and said "For an entire year I killed dumb ideas." And we drank to that because dumb ideas are dangerous ideas, they're costly ideas, and they don't really improve performance. They're either a zero-sum game or they are ideas whose time has come and gone or they are ideas whose time has not come yet. I think economics contributes to killing dumb ideas. So if politics runs things but economics can stop dumb ideas periodically, I guess I'm content.

Here's my evaluation of Florida's water supply management efforts. I believe there's



a lot of conflict but much of it is a nontransparent conflict where decisions are made but are not for public review. I see a lot of groups talking past each other. I hope that we will engage in discussions about our personal values, what our communities of interest are, and where there is compatibility in our understanding of and confidence in science. In terms of science, I think we're at a stage where complexity causes eyes to glaze over, but there is some coherence and consensus about what happens, for example, when we deny a river some flows or when we dredge at given sites.

I think our personal values are very confused. I should thank the newspapers because periodically the *Gainesville Sun* will run a series of articles on water. The *Orlando Sentinel* several years ago had a wonderful series on water. I think we need to see more attention given to educating the public regarding water as a unique contributor to the Florida environment. The discussion in this state on important policy issues, like water, is sterile. It seems that most national policy debate is driven by talking heads who talk louder and louder. We really don't have people engaging in and developing a sense of trust on important water policy issues. Thus, I think there is still a lot of confusion which leads to inaction. And I think we have complacency tempered by some public concern. Unwarranted complacency can bring us to crisis. That crisis could come from droughts that will produce changes in attitudes and public policy or from cumulative poor performance that will lead to scientists documenting the need for caution. Nevertheless, either scenario will be a tragedy. In our discussions at this conference, we have a chance to raise those important issues. Hopefully, these discussions will lead to approaches that, though belated, begin to address the elements of the water problem that are reversible and move us toward building a broader consensus on water policy for Florida.

A List Of Related Organizations In Florida

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Tallahassee, Florida 32303
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The meeting will open on Thursday at noon on March 30th with an opening address from our keynote speaker, and it will end on Friday March 31st with an open-ended discussion of recommendations for the future. In between, you will shape the direction of the meeting through wide-ranging discussions in small discussion groups. The resulting recommendations will reflect your conversations with the discussion leaders and with other participants.

Registration materials will be available in the fall of 2005. Please visit the Askew website at www.clas.ufl.edu/askew for more information. The meeting is limited to the first 200 registrants. We look forward to seeing you in 2006.

Past reports of the statewide and regional Askew Meetings are available. You can request them by simply filling out the form that follows:

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2002 – Democracy and the Economy in Florida at a Time of National Crisis

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2000 – The Graying of Ocala and the Need for a Stronger Community

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