Recommendations

for a

Drought Resistant Florida

July 2007

Being Drought Smart

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Cover Photos

We appreciate being able to use photos from the following sources:

Top Row: micro irrigation (SFWMD), rain sensor (James Phillips).
Bottom Row: Water Conservation Area II (SFWMD), water efficient landscaping (SFWMD).

The Department of Environmental Protection thanks the members of the Work Groups that contributed to the development of this report.

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Contents

Background

Climate and rainfall patterns in Florida, in combination with growing water demands, create exceptional challenges, especially during times of drought. Even though average annual rainfall in Florida is 54 inches (greater than any other state but Louisiana), it is not evenly distributed and has some unusual characteristics that tend to produce periods of water shortages. Major statewide or regional droughts occurred in recent decades, including the early 1970s, the early 1980s, the 1989-1990 period, and the 1999-2001 period. In mid-2007, as in other periods in the past, a severe drought began affecting parts of Florida. Both water users and natural systems are threatened from a prolonged period of below average precipitation.

The current drought is particularly severe in the South Florida Water Management District. In past droughts, the region has been able to rely on the storage capabilities of different regions of the watershed, such as the Kissimmee Chain of Lakes, the Water Conservation Areas, and Lake Okeechobee. Never before have all three of these regions had critically low water levels at the same time. As of the middle of June, no water has flowed in the Kissimmee River for 222 consecutive days, water levels in Lake Okeechobee have fallen below the historic low reached during the 2001 drought, and water levels within two of the Water Conservation Areas have declined to below their floor elevations. In response to the drought, the District, for the first time in its history, issued Phase III water shortage orders (45% reduction goal) for several regions.

Throughout the rest of the state, the drought continues, but has not required the same demanding actions that were needed in South Florida. For the twelve-month period from May 2006 to April 2007, Florida had the second driest period on record. This set the stage for the wildfires burning throughout the state in May and June. Since January, 3,020 wildfires have burned 310,857 acres on state jurisdiction, and 261 wildfires have burned 146,212 acres on federal jurisdiction. Many rivers and lakes are nearing record low levels. In the Northwest Florida Water Management District, many of the rivers are flowing in the 1st to 5th percentile range. In the Southwest Florida Water Management District, the Peace and Hillsborough Rivers are only flowing at the 4th percentile. In May, portions of the Suwannee River Water Management District were experiencing rainfall deficits of up to 30 inches.

In June, the start of the summer wet season brought some relief. Portions of southeast Florida received more than ten inches of rain. Unfortunately, northern sections of the South Florida Water Management District received much less. On June 25, the level of Lake Okeechobee was at 8.91 feet NGVD, only slightly above the record low of 8.89, because the rain did not extend into the main watersheds feeding the Lake. Average or above average rainfall in the summer wet season may lessen the effects of the drought, but the fall dry season may be more challenging.

The water management districts' adopted water shortage rules govern their response to drought. In the current drought, the districts have implemented different measures, based on the seriousness of the drought in their regions, the particular mix of sources and water users, and the experience acquired in previous droughts. In early June, the South and Southwest Florida Water Management Districts had one or more emergency water shortage orders in effect; Suwannee River had a voluntary water shortage advisory in effect; Northwest had issued a water shortage warning; and St. Johns River was monitoring water resources closely.

It is likely that such responses will always be necessary in times of severe water shortage brought on by drought, but we can reduce the frequency of drastic responses by being more "drought smart" in our use of water. Being efficient during times of normal rainfall makes more water available to

recharge aquifers and replenish surface waters. In times of water shortage, effective conservation allows more users to share the limited water available.

While this report focuses on improving water use efficiency as a drought response, it is also important to develop drought resistant alternative water supplies. The 2005 legislature created the Water Protection and Sustainability Program to help fund the development of alternative water supply projects at the local level. In fiscal year 2005-2006, that program contributed $100 million in state matching funds to local governments for alternative water supply projects. An additional $60 million was allocated for fiscal year 2006-07.

In response to the 2007 drought, the Department of Environmental Protection, in coordination with the Department of Agriculture and Consumer Services, the South Florida Water Management District, and the Florida Division of Emergency Management, produced the April 17, 2007 Florida Drought Action Plan. The "Action Steps" in the plan include the following:

> *Continue to implement the Conserve Florida program [the statewide water conservation program for public water supply] and consider implementation of any of the fifty-one recommendations in the 2002 Florida Water Conservation Initiative not yet fully implemented. (Mid-term Action Step, p. 13)*

In response, participants in the Conserve Florida program met on April 26 in Altamonte Springs, May 16 in West Palm Beach, and June 19 in Tampa to consider the feasibility of water conservation measures that might be of assistance in the current drought. The Florida Department of Agriculture and Consumer Services also participated, to facilitate statewide drought response coordination, even though they are not a direct participant in Conserve Florida. The participants also requested the Florida Section of the American Water Works Association to propose additional utility participants if appropriate.

Six Work Groups were established to consider short-term and mid-term responses to the drought with priorities for potential immediate benefit. To the extent possible, recommendations were asked to be related to the water conservation "Best Management Practices" and "Measures" already included in the Conserve Florida planning *Guide* and the Florida Department of Agriculture and Consumer Services' *Manual of Agricultural Best Management Practices*. Research recommendations were made, as appropriate, and will be considered in the Research Agenda being developed by the Conserve Florida Clearinghouse.

This report builds on the recommendations from each of the six Work Groups that contributed ideas to address the drought. The full reports from each Work Group may be found in the 2007 Drought Response Report folder at ftp.dep.state.fl.us/pub/owp/ConserveFlorida. The Department thanks the Work Groups and very much appreciates their work. In some cases, this report integrated separate recommendations of the Work Groups, made them more specific, or made other modifications.

Following this introduction is a table summarizing all the recommendations, broken down by topic area (State Leadership, Agricultural Irrigation, Public Water Supply, etc.). Each recommendation has been evaluated as high, medium, or low in terms of short and mid-term drought responsiveness, water saved, cost-effectiveness, and ease of implementation. Within topic areas, recommendations are listed in order of their responsiveness to drought, and secondarily by the amount of water saved. Following the table is a one-page description of each recommendation that provides additional information. Implementing the recommendations will require policy, funding, and regulatory actions.

Summary of Drought Smart Ideas

Water Conservation Alternative	Drought Responsiveness		Water Conservation		
	Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
State Leadership					
SL-A: The state should consider an Executive Order requiring water audits and conservation plans for state facilities, and encouraging audits and conservation plans for local governments.	Medium	High	Medium	High	Medium
SL-B: The water management districts should immediately form a Working Group to share experiences in the current drought and improve responses to the current water shortage orders.	Medium	High	Medium	High	Medium
SL-C: The water management districts should begin the process of formally revising their adopted water shortage plans and rules to develop more effective and specific water shortage measures.	Low	High	Medium	High	Medium
Agricultural Irrigation					
AI-A: Provide more mobile irrigation labs to achieve water conservation Best Management Practices (BMPs) for agricultural irrigation.	Medium	High	High	High	Medium
AI-B: Increase implementation of agricultural water conservation Best Management Practices.	Medium	Medium	Medium	Medium	Medium
AI-C: Improve methods for measuring water use and estimating agricultural water demands.	Low	High	High	Medium	Medium
Public Water Supply					
PWS-A: Develop goal-based conservation plans, using the Conserve Florida *Guide,* for the state's larger utilities over the next five years.	Low	High	Medium	High	Medium
PWS-B: Implement automated meter reading programs to provide real-time identification of high water usage.	Low	Medium	High	Medium	Low

Water Conservation Alternative	Drought Responsiveness		Water Conservation		
	Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Landscape Irrigation					
LI-A: Provide more mobile irrigation labs for improving efficiency in landscape irrigation.	Medium	High	High	High	Medium
LI-B: Require all local governments to adopt landscape ordinances consistent with the standards developed by the "Landscape Irrigation and Florida-Friendly Design Committee" (section 373.228, Florida Statutes).	Low	High	High	High	Medium
LI-C: Establish a statewide training and certification program for irrigation design, auditing, and installation professionals, in coordination with the EPA WaterSense Program and the Florida Irrigation Society.	Low	High	High	High	Medium
LI-D: Revise and enforce the statutory provision (s. 373.62, F.S.) that requires operational sensors on all automatic irrigation systems.	Low	Medium	High	High	Medium
LI-E: Develop more effective enforcement and education programs to promote compliance with landscape irrigation restrictions	Low	Medium	High	Medium	Medium
Water Pricing					
WP-A: Define minimum requirements for conservation rates and require their use by utilities in the development of their rate structures, based on the AWWA Rate Manual and the WateRate software application	Low	High	High	High	Medium
WP-B: Phase in conservation rate structures statewide within three years.	Low	High	High	High	Medium
WP-C: Develop consensus on criteria for adopting drought rates as part of utility conservation rate structures	Low	Medium	Medium	High	Medium
WP-D: Phase in informative billing statewide within three years.	Low	Medium	Medium	High	Medium
Indoor Water Use					
IU-A: Expand programs to replace inefficient toilets, targeting the greatest efficiency opportunities.	Low	Medium	High	High	Medium
IU-B: Require property sales agreements to include a provision that inefficient water using devices will be brought up to current codes.	Low	Medium	High	High	Low
IU-C: Support the adoption of national standards for more water efficient clothes washers, dishwashers, and plumbing devices.	Low	Medium	High	Medium	Low

Water Conservation Alternative	Drought Responsiveness		Water Conservation		
	Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Reuse of Reclaimed Water					
RW-A: Implement appropriate watering guidelines on reclaimed water use, for those reuse systems with adequate storage.	Medium	High	High	High	Medium
RW-B: Encourage utilities that meter reclaimed water customers to implement volume-based rate structures. When feasible, the utility should implement inclining block rates or special drought rates during droughts.	Medium	High	High	High	Medium
RW-C: Encourage reuse utilities to give priority to reuse activities that maximize recharge fractions and/or potable water offsets.	Low	Medium	High	High	Medium
Industrial/Commercial/Institutional					
ICI-A: The water management districts should issue emergency orders requiring utilities to implement a water audit program for all ICI customers.	Low	Medium	Medium	High	Medium
ICI-B: The water management districts should confirm the existence and implementation status of conservation plans for all ICI permittees.	Low	Medium	Medium	High	High

State Leadership

SL-A: The state should consider an Executive Order requiring water audits and conservation plans for state facilities, and encouraging audits and conservation plans for local governments.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Low	Medium	Medium	High	Medium

Specific recommendation

The state should consider an executive order mandating water conservation audits and plans for state facilities, including water use reduction goals, a schedule for implementation, and reporting requirements. Where such plans already exist, they should be reviewed and updated as needed. The order should encourage local governments to adopt similar orders for county and municipal facilities (Miami-Dade County Resolution R-1200-05 is an example of local leadership).

Reasons for recommendation

The state should lead by example. Many state facilities are older and inefficient in terms of water use. Even in newer facilities, there are many examples of water use inefficiency. Some measures that could be taken, such as leak repairs and replacement of faulty and/or poorly designed irrigation equipment, and the review and adjustment of irrigation scheduling and management practices, could have significant immediate effects in areas affected by drought. Other responses, such as toilet and urinal replacements, would take longer to implement and, therefore, not have much effect in mitigating the current drought. However, they would reduce potable demand in a large water use sector, leaving more potable water available for essential uses in future droughts.

Cost-effectiveness and water savings

The cost of implementation and the amount of water saved will vary depending upon the specific conservation measures taken. Water savings could range from minimal to large depending upon the type of facility and its age.

Who should implement it?

Implementation would be largely through the Florida Department of Management Services and individual building superintendents.

SL-B: The water management districts should immediately form a Working Group to share experiences in the current drought and improve responses to the current water shortage orders.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Medium	High	Medium	High	Medium

Specific recommendation

The water management districts should cooperatively evaluate their experiences in the current drought and develop strategies to achieve more consistent and effective public responses to water shortage orders.

Reasons for recommendation

Public compliance with water shortage orders is variable. District staff should cooperatively try to determine the reasons for the variations in response and develop strategies to improve compliance.

Cost-effectiveness and water savings

Costs would be minimal. Improved public compliance could save significant amounts of water.

Who should implement it?

The water management districts would implement the recommendation.

SL-C: The water management districts should begin the process of formally revising their adopted water shortage plans and rules to develop more effective and specific water shortage measures.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
low	High	Medium	High	Medium

Specific recommendation

The districts should reevaluate their water shortage plans and rules, and revise them to improve their effectiveness and promote additional consistency.

Reasons for recommendation

During a water shortage, it is important that the districts' responses to the shortage have the desired effect of reducing consumption and improving efficiency. Experiences in the last and current droughts have led to questions about the effectiveness of some routinely employed drought responses. For example, do irrigation restrictions actually save water, or do people negate the effect of fewer watering days by watering longer on the days they are allowed to irrigate? The districts need greater certainty that their water shortage responses are effective.

Cost-effectiveness and water savings

Costs for planning and rule development are part of the normal district operating budget. Water savings could be significant if substantial improvements in compliance are achieved.

Who should implement it?

The water management districts would implement the recommendation.

Agricultural Irrigation

AI-A: Provide more mobile irrigation labs to achieve water conservation Best Management Practices (BMPs) for agricultural irrigation.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Medium	High	High	High	Medium

Specific recommendation

Expand the number of Mobile Irrigation Labs (MILs) to include areas of the state that don't have MILs (mostly the central portions of the state and western panhandle). MIL operators should be trained to provide other water conservation services. The districts should consider, as a permit condition, requiring large agricultural users to have a MIL evaluation. Highly inefficient users should be required to implement MIL recommendations within a specified time period. The district could provide a longer duration permit as an incentive for permittees that achieve a high level of efficiency. (See the related recommendation for additional MILs for landscape irrigation.)

Reasons for recommendation

Mobile Irrigation Labs provide free or low-cost irrigation system evaluations and information related to water conservation opportunities. They identify problems and recommend solutions for existing systems, provide guidance on the selection and installation of new systems, and assist with irrigation management and planning. The primary goal is to ensure efficient use of irrigation water.

Since 2002, the number of MILs has increased by 6 statewide, to a total of 21 in 2007. Three of these were agricultural MILs that encompass portions of northeast Florida, Lake County, and Northwest Florida, and serve a total of 14 counties. Since 2005, the recommendations provided by these MILs have the potential to save 1.5 billion gallons of water every year. For all urban and agricultural MILs combined, the savings potential increases to 1.75 billion gallons. Actual water savings can be expected to vary from year to year and farm to farm depending upon such factors as climatic conditions, crop(s) grown, number of acres in production, etc.

Cost-effectiveness and water savings

It costs approximately $100,000 to $150,000 per year to operate a MIL. Water savings, as noted above could be very substantial, particularly if MIL evaluations and implementation of all cost-effective recommendations were mandatory for large agricultural operations.

Who should implement it?

The Florida Department of Agriculture and Consumer Services, the Water Management Districts, the USDA Natural Resource Conservation Service, and the Soil and Water Conservation Districts should work together to support a comprehensive MIL program designed to provide services to agriculture producers statewide.

AI-B: Increase implementation of agricultural water conservation Best Management Practices.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Medium	Medium	Medium	Medium	Medium

Specific recommendation

The water management districts should consider using the Department of Agriculture and Consumer Services' "Agricultural Water Conservation Best Management Practices" manual as part of their water use permitting program, and could offer regulatory incentives based on successful implementation of the practices in the manual. If necessary, the manual could be modified to reflect district needs. The Mobile Irrigation Lab operators should distribute these manuals during their evaluations.

Reasons for recommendation

Implementing Best Management Practices and increasing educational programs could result in significant long-term water savings. This may work best if it can be combined with regulatory and financial incentives.

Cost-effectiveness and water savings

Best Management Practices are designed to be cost-effective although initial capital outlay for some practices is significant. Actual savings are variable depending upon the BMP being implemented. Education is critical to effective implementation. In some cases, cost-sharing would expedite implementation.

Who should implement it?

The water management districts and Florida Department of Agriculture and Consumer Services should collaborate to improve the BMP manual, increase implementation of BMPs, and develop crop-specific BMP documentation.

AI-C: Improve methods for measuring water use and estimating agricultural water demands.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	Medium	High	Medium	Medium

Specific recommendation

To the extent practical, considering regional differences in factors such as climate, soils, and farming practices, develop consistent methodologies for water use measurement and estimating agricultural water needs. Appropriate measurement (not necessarily metering) and reporting of water use, for those who use more than 100,000 gallons of water per day, is already required by section 62-40.540(6), Florida Administrative Code, and should be implemented by all of the water management districts.

Reasons for recommendation

Measuring agricultural water use and estimating crop water needs are fundamental to improving water use efficiency in the agricultural sector, particularly during times of drought. This information helps the Districts allocate the appropriate quantity of water for a particular crop through consumptive use permitting. Over-allocation wastes water and under-allocation might harm agricultural production.

Proper management of the irrigation system is difficult if one does not know the amount of water applied to the crop. Measuring devices are also critical for detection of problems leading to significant waste of water, such as broken pipes. Excessive irrigation results in higher energy costs, and higher overall costs of production. Appropriate levels of irrigation minimize field runoff and leaching of fertilizer. Benefits associated with this effort will include: savings of surface and groundwater resources, improved information to be used in planning and management, energy savings, and reduced operation and maintenance expenses.

Cost-effectiveness and water savings

The development of consistent methodologies could be done at minimal cost. Costs at the farm level to implement accurate water measurement methods will vary depending upon the measurement method chosen. Water savings could be very significant.

Who should implement it?

The water management districts and the Florida Department of Agriculture and Consumer Services should work together to implement this recommendation.

Public Water Supply

PWS-A: Develop goal-based conservation plans, using the Conserve Florida Guide, for the state's larger utilities over the next five years.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Low	Medium	Medium	High	Medium

Specific recommendation

The water management districts should encourage medium and large utilities (those with more than 10,000 connections as defined in the *Conserve Florida* water conservation *Guide)* to develop cost-effective, goal-based water conservation plans. They should focus on utilities seeking new permits or renewals of existing permits, with emphasis on utilities that have higher than average water usage for their size.

Reasons for recommendation

The vast majority of public water supply is produced by a small subset of the state's larger public water supply utilities. The Miami-Dade Water and Sewer Department, the state's largest utility, used the *Conserve Florida Guide* to develop a cost-effective, utility specific, goal-based conservation program. Expected water savings should exceed what would have been required under the district's normal permit requirements. Use of the *Guide* should become the preferred method for developing public water supply conservation plans.

Cost-effectiveness and water savings

The *Guide* is specifically designed to create conservation plans that are cost-effective and result in improved water savings for the utility over its current practices.

Who should implement it?

The water management districts should identify the most appropriate mechanisms to move their large utilities toward use of the *Guide* as the preferred means of developing the conservation plans required under district consumptive use permitting rules. Smaller utilities should be considered on a separate timeframe, and may require longer to implement.

PWS-B: Implement an automated meter reading program to provide real-time identification of high water usage.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	Medium	Medium	Medium	Low

Specific recommendation

Utilities should consider upgrading to automated meter reading technology, which allows quick identification of high water usage from leaks, irrigation systems, etc.

Reason for recommendation

Water users may often be unaware that their irrigation systems are over watering their lawn or that they have leaking pipes or fixtures. Automated meter reading technology can identify when water use deviates from normal, and a utility service person can visit the customer and let them know there may be a problem. For example, it can identify when water is being used late at night when people are normally in bed, indicating a possible leak, or a sprinkler system coming on because of an improperly set timer.

Cost-effectiveness and water savings

The technology is currently being used by a number of utilities and is thought to be cost-effective. Anecdotal information indicates that it is effective at alerting utility personnel to potential leaks and other problems.

Who should implement it?

The utilities would implement the recommendation.

Landscape Irrigation

LI-A: Provide more mobile irrigation labs for improving efficiency in landscape irrigation.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Medium	High	High	High	Medium

Specific recommendation

Expand the number of Mobile Irrigation Labs (MILs) providing services to homeowners and businesses to improve efficiency for landscape irrigation to include those areas of the state without access to MILs. Private contractors certified by the Florida Irrigation Society and/or the Irrigation Association, and existing MIL operators should be trained and retained to conduct simple audits, teach operators how to set controllers, and develop seasonal schedules for each customer.

Reasons for recommendation

Mobile Irrigation Labs provide free or low-cost irrigation system evaluations and educational information related to water conservation opportunities. They also identify and solve problems with existing irrigation systems, provide guidance regarding the selection and installation of new systems, and provide assistance with irrigation management and planning. The primary goal of every MIL is to educate irrigation system operators on the efficient use of irrigation water.

Cost-effectiveness and water savings

It costs approximately $100,000 to $150,000 per year to operate a MIL. Water savings could be very substantial. Since 2002, the number of MILs has increased by 6 statewide, to a total of 21 in 2007. Three of these were agricultural MILs that encompass portions of northeast Florida, Lake County, and Northwest Florida, and serve a total of 14 counties. A University of Florida study found baseline moderately sized homesites were using 74 percent of domestic water outdoors. Study homesites with irrigation systems decreased water consumption by an average of 22 percent while maintaining quality landscaping.

Who should implement it?

The Florida Department of Agriculture and Consumer Services, the Water Management Districts, the USDA Natural Resource Conservation Service, and the Soil and Water Conservation Districts should work together to fund a comprehensive MIL program designed to provide services to homeowners, businesses, and agriculture producers statewide.

LI-B: Require all local governments to adopt landscape ordinances consistent with the standards developed by the "Landscape Irrigation and Florida-Friendly Design Committee"(section 373.228, Florida Statutes).

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Low	High	High	High	Medium

Specific recommendation

Local governments should develop and adopt landscape irrigation and Florida-Friendly landscape ordinances that are consistent with the standards developed by the Committee on Landscape Irrigation and Florida Friendly Design Standards (December 2006). As part of the public outreach associated with the new ordinance, a program to assist residents with timer settings and other aspects of irrigation system operation should be implemented (mobile irrigation labs could be used for this).

Reasons for recommendation

Up to one-half of public water supply in Florida is devoted to landscape irrigation. The Committee was created by statute to develop recommendations for local landscape irrigation and design ordinances. Proper landscape design and irrigation system standards can save significant amounts of water and money, while achieving both attractive landscapes and protection of our natural resources. The recommendations of the Committee should be implemented at the local level in order to ensure implementation.

Cost-effectiveness and water savings

Properly designed and installed landscapes and irrigation systems are more cost-effective and save significant amounts of water compared to those that are poorly designed and installed.

Who should implement it?

Local governments would develop and implement ordinances. Ordinances should be adopted first in the counties and cities with high rates of water use for landscape irrigation. The water management districts could require development of landscape irrigation ordinances, based on the Committee's recommended standards, within the consumptive use permitting process. Alternatively, the legislature could amend section 373.228, F.S. to require all local governments to develop the ordinances. It could also consider eliminating section 373.185(3), which allows deed restrictions, covenants or local ordinances enacted prior to October 1, 2001 to prohibit a property owner from installing a xeriscape or Florida-friendly landscape on his or her property.

The districts should also consider cost-sharing with utilities to provide educational programs for inspectors and local officials on enforcement of these new local ordinances. The Florida Yards and Neighborhoods program, Mobile Irrigation Labs, and contractors available through the Florida Irrigation Society may be able to help with education and outreach aspects of implementing the new ordinance with the allocation of adequate funds.

LI-C: Establish a statewide training and certification program for irrigation design, auditing, and installation professionals, in coordination with the EPA WaterSense Program and the Florida Irrigation Society.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Low	High	High	High	Medium

Specific Recommendation

A statewide training and certification program should be developed to ensure that irrigation installers, designers, managers, and landscape maintenance professionals are aware of the most up-to-date technologies and practices for water efficient design, installation, and operation of an irrigation system. The state and the water management districts should support the start-up of these programs until they become self-sufficient through tuition. Chapter 373, Florida Statutes should be revised to include statewide irrigation licensure and require that a licensed professional be on the job site during installation.

Reasons for recommendation

Training in the proper design, installation, and maintenance of irrigation systems can significantly reduce lawn and landscape water use. Certification would provide homeowners, builders, and other customers with a mechanism to identify properly trained irrigation professionals and ensure they are getting an efficient and quality product. The Florida Irrigation Society has developed a program and will undertake its Statewide Licensure Initiative in July 2007.

Cost-effectiveness and water savings

Properly designed and installed irrigation systems are more cost-effective than those that are not and they save significantly more water. There would likely be landscaping benefits as well, due to all plants receiving the appropriate amount of water for proper growth. Initial costs of installation may be higher due to having a licensed professional doing the installation.

Who should implement it?

Local governments and water management districts should work together to implement in cooperation with the Florida Irrigation Society and other appropriate stakeholders. Training would likely occur through professional organizations, or educational institutions such as the University of Florida Institute of Food and Agricultural Sciences, Program for Resource Efficient Communities (PREC), and the TREEO center.

LI-D: Revise and enforce the statutory provision (s. 373.62, F.S.) that requires operational sensors on all automatic irrigation systems.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Low	Medium	High	High	Medium

Specific Recommendation

Section 373.62, Florida Statutes, should be amended as follows (additions are underlined, deletions are struck through):

Any person who operates ~~purchases and installs~~ an automatic lawn sprinkler system ~~after May 1, 1991~~, shall install, ~~and must~~ maintain, and operate a rain and/or soil moisture sensor device(s) or switch that will override the irrigation cycle of the sprinkler system when adequate rainfall has occurred or when adequate moisture is present in the soil.

All licensed irrigation contractors shall test for correct operation of each rain and/or soil sensor devise(s) on each property on which the contractor is contracted to perform work. In the event the rain and/or soil moisture sensor device(s) is not in proper operating condition or no rain and/or soil moisture sensor device(s) is installed, the contractor must repair the existing device or install a new device(s) and confirm proper operation of such device(s) prior to completing any service to the system on the property.

Reasons for recommendation

Up to one-half of public water supply in Florida is devoted to landscape irrigation, and automatic irrigation systems are the "water guzzlers" of urban water use. They are being installed more and more as a standard feature in many new homes and developments in Florida. Rain and soil moisture sensors are often improperly installed, and may later be damaged or disabled by the homeowner. Proper installation and maintenance of rain or soil moisture sensors helps ensure that irrigation systems do not operate when there is precipitation or when soil moisture is adequate.

Cost-effectiveness and water savings

Rain or soil moisture sensors are inexpensive. Recent research at the University of Florida has shown that properly installed and maintained sensors could save very significant amounts of water. Rain sensors are not as effective in a drought as soil moisture sensors, since there is generally little rain to trigger them during a drought. Soil moisture sensors automatically shut the irrigation system off when sufficient water has been applied, which makes them a better drought management tool.

Who should implement it?

The Legislature would need to make the statutory revision. If the statute is amended, local governments and water management districts should work together to implement this recommendation. It could also be accomplished by amending the Florida Building Code. Incentives, such as rebates, should be considered.

LI-E: Develop more effective enforcement and education programs to promote compliance with landscape irrigation restrictions.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	Medium	High	Medium	Medium

Specific recommendation

The water management districts should encourage local governments and utilities to develop creative enforcement solutions to promote greater compliance with irrigation restrictions. This could include rebating fines if the homeowner allows a system audit and complies with the audit recommendations. It could also involve incentives such as free or low-cost rain or soil moisture sensors. The goal is to achieve willing compliance through education and technical assistance, resorting to fines only for willful offenders.

Reason for recommendation

Enforcement of irrigation restrictions through fines can reduce water use, but is unpopular and costly to implement. A different approach could be to help homeowners comply, rather than fine them for non-compliance.

A frequent response from homeowners is that they didn't know they were violating the restrictions or that they didn't know their irrigation controller was improperly set. While this may not always be true, it provides an opportunity to educate the homeowner, adjust their irrigation controller, and ensure that they have a functioning rain or soil moisture sensor. This alternative approach to enforcement may be more effective on some homeowners than a fine.

Cost-effectiveness and water savings

This approach could result in considerable water savings during a drought if non-compliance rates are high and sufficient resources were applied to address the problem. Enforcement staff would need training to be able to provide the technical assistance, and there would be additional costs involved if subsidized rain sensors or other equipment are provided to the homeowner.

Who should implement it?

The water management districts should encourage local governments and utilities to implement the recommendation. Potential partners could be Florida Yards and Neighborhoods and county extension agents. Funding would be necessary.

Water Pricing

WP-A: Define minimum requirements for conservation rates and require their use by utilities in the development of their rate structures, based on the AWWA Rate Manual and the WateRate software application.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Low	High	High	High	Medium

Specific Recommendation

The water management districts, the Department of Environmental Protection, the Public Service Commission, public water suppliers, and other stakeholders should collaboratively develop minimum statewide requirements, based on the AWWA Rate Manual and the WateRate software application, that define what a conservation rate structure is. All utility rate structures should be amended, if necessary, to meet the minimum requirement.

Reasons for recommendation

Water management districts often require utilities to implement conservation rate structures in which the price of water escalates as use goes up. However, there is no statewide minimum standard and conservation rate structures vary widely from utility to utility. Poorly designed conservation rates are known to have little or no effect on water use. Appropriately designed and applied conservation rates have been proven to reduce water use and should be universally implemented even during normal rainfall periods.

Cost-effectiveness and water savings

Conservation rate structures are cost-effective and can result in significant water savings.

Who should implement it?

The water management districts have the authority to require utilities to adopt a conservation rate structure, but cannot fix rates. The utilities have the rate setting authority and are responsible for implementing specific rates.

WP-B: Phase in conservation rate structures statewide within three years.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	High	High	High	Medium

Specific Recommendation

The legislature and the water management districts should require all utilities to phase in effective conservation rates at least as effective as those recommended in the American Water Works Association manual, "Principles of Water Rates, Fees, and Charges." First priority should be on utilities with more than 5,000 customer connections and those in areas designated as Water Resource Caution Areas by the water management districts. Although most conservation rate structures are oriented towards residential usage, it is recommended that all rate classes be subject to conservation rates appropriate to their rate class.

Reasons for Recommendation

Water conserving rate structures can significantly reduce water use without government expenditure or new regulation, while helping to protect both the quantity and quality of water resources.

Cost-effectiveness and water savings

The only utility cost is the process of determining an appropriate rate structure. Customers that use large amounts of water will see higher bills unless they implement measures to reduce their use. Water savings can be significant and lasting.

Who should implement it?

Utilities can decide to amend their rate structures on their own initiative, with the approval of the appropriate rate setting authority. The water management districts can require holders of water use permits to promote water use efficiency, including requiring conservation rates, but cannot set rates. Legislative guidance would be helpful in promoting more effective conservation rates. The Florida Public Service Commission can require conservation rates for utilities that it regulates (less than ten percent of the total).

WP-C: Develop consensus on criteria for adopting drought rates as part of utility conservation rate structures.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	Medium	Medium	High	Medium

Specific recommendation

Utilities, in coordination with the water management districts, should develop consensus on criteria for adopting drought rate structures appropriate for their service areas that would be implemented immediately upon declaration of a water shortage by the water management district. The drought rate could be a surcharge added to the utility's existing rate structure, or a separate rate structure automatically implemented during water shortage. Drought rates can be tiered so that they increase with the severity of the drought. Billing procedures that do not allow a customer to respond to price, such as bills based on use estimates, should be eliminated.

Reason for the recommendation

Drought rates are intended to achieve a targeted reduction in water use proportionate to the severity of a drought. They have been used successfully in California and in limited cases in Florida, including Charlotte County and the City of Englewood. By reducing water consumption they can help mitigate the environmental and economic impacts of a drought. If designed properly, they have the added benefit of helping utilities remain financially viable during times of mandatory usage restrictions.

Cost-effectiveness and water savings

The only utility cost is the development of the rate structure. Water users will incur increased costs during drought, with large users seeing the most significant increase.

Who should implement it?

The desired consensus could be the product of case studies, research investigation, and/or the development of model rate structures. Drought rates should be implemented by the utilities, with oversight by the water management districts or the Public Service Commission as applicable.

WP-D: Phase in informative billing statewide within three years.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	Medium	Medium	High	Medium

Specific Recommendation

All utilities with more than 5,000 connections should phase in informative billing within three years. At a minimum, customers' bills should include the rate structure, monthly rates, amount of water used in the current month, amount of water used the previous month, and amount of water used the same month in the previous year. Information showing the average usage of customers in the same customer class, seasonal rates and the applicable months, and who to contact for water conservation information, could be included as well.

Reasons for recommendation

Informative billing helps consumers use water efficiently by enabling them to see the relationship between their water usage and their water bill. This allows them to make informed decisions regarding steps they can take to reduce their consumption. A bill that helps customers save water and money is a fundamental requirement of any well-run utility.

Cost-effectiveness and water savings

Utilities that do not already have informative billing will incur cost, which in some cases could be significant, to develop an informative billing system. Over time, this cost will be offset by customer savings and more efficient use of water.

Who should implement it?

Informative billing would be implemented by utilities at the direction of the appropriate water management district, local government, or the Public Service Commission. Because most billing programs and formats are unique for each utility, the details of how to best implement the recommendation should be determined by the individual utilities. Legislative guidance could speed implementation of informative billing.

Indoor Water Use

IU-A: Expand programs to replace inefficient toilets.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	Medium	Medium	High	Medium

Specific Recommendation

Implement toilet incentive/replacement programs that use only WaterSense labeled high efficiency toilets (HETs). Though currently not on the shelves, the EPA anticipates having WaterSense labeled HETs available for distribution to consumers later in 2007. For some funding agencies, this requirement would take effect only when HETs are readily available to consumers to avoid hindering program participation.

Reasons for Recommendation

Replacement of older, inefficient toilets is a relatively simple way to permanently reduce indoor home water use. Improvements in technology and testing methodologies have resulted in highly efficient toilets that also have a high level of customer satisfaction. The WaterSense label ensures that the toilet bearing the label performs up to a high standard of performance and efficiency. While toilet replacement programs have a low impact on drought in the short term, the long-term effect of using HETs exclusively in Florida should be considerable.

Cost-effectiveness and water savings

Toilet replacement programs are cost-effective and save considerable amounts of water.

Who should implement it?

Water management districts should require the use of HETs in the water conservation programs of the public water supply utilities they regulate. Utilities should consider pooling their resources to support a bulk purchase program. If a government is conducting a large program they could bulk purchase those toilets on their own, based on a set of specifications. If a number of governments were conducting smaller scale programs, those governments could collectively bulk purchase the toilets.

IU-B: Create a water auditor inspection program for the sale of new and existing homes, supported by a refundable utility service fee.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	Medium	High	High	Low

Specific recommendation

Local governments should consider requiring a water audit at the time of home sale.

Reason for recommendation

Identifying plumbing leaks and other water inefficiencies is a necessary first step to correcting them. By requiring an audit at the time of sale, inefficiencies can be identified at a time when the owner has an incentive to correct them.

Cost-effectiveness and water savings

The audit program should not represent a significant cost since many utilities already have audit programs. Water savings would vary from home to home, but would likely be significant in many cases if the auditor's recommendations were implemented.

Who should implement it?

The local government would have to adopt an ordinance requiring it. The utilities would implement it as part of their conservation program.

IU-C: Support the adoption of national standards for more water efficient clothes washers, dishwashers and plumbing devices.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	Medium	High	Medium	Low

Specific recommendation

Support national efforts to establish new mandatory water efficiency standards.

Reason for recommendation

National standards and labeling give consumers the ability to select and purchase the most efficient appliances they can afford. Many consumers will purchase more efficient appliances even at higher cost if given the knowledge to choose.

Cost-effectiveness and water savings

Efficient appliances vary in their cost-effectiveness depending upon how much the consumer is paying for water and energy. The water saving potential is medium in the mid-term.

Who should implement it?

All water managing agencies, utilities, and local governments should support improved efficiency standards.

Reuse of Reclaimed Water

RW-A: Implement appropriate watering guidelines on reclaimed water use for those systems with adequate storage.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Medium	High	High	High	Medium

Recommendation

The practice of exempting reclaimed water from irrigation restrictions imposed through water shortage orders during drought should be lifted, to the extent possible, if there is if sufficient reclaimed water storage.

Reasons for recommendation

During the dry season, reuse demand can climb dramatically and, in some cases, be three to four times the demand experienced during the wet season. Systems have to be designed around the dry season demand in order to have sufficient reclaimed water for all customers. Designing systems with this constraint severely limited the ability of utilities to further expand their systems and, therefore, the utilities had to rely heavily on alternate disposal systems such as surface water discharges during the wet season. Where available, utilities began to pursue supplemental supplies for augmentation of the reclaimed water system during the dry season, so that better use of reclaimed water could be achieved year-round.

This recommendation would continue the general trend in Florida of recognizing the value of reclaimed water during both normal and drought periods.

Cost-effectiveness and water savings

There is no cost associated with restricting use of reclaimed water during a declared water shortage, except the cost, if any, from landscape damage if the water shortage is severe. The water saved would be significant.

Who should implement it?

The water management districts should remove from their rules and policies the automatic exemption for reclaimed water systems irrigating in droughts.

RW-B: Encourage utilities that meter reclaimed water customers to implement volume-based rate structures. When feasible, the utility should implement inclining block rates or special drought rates during droughts.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Medium	High	High	High	Medium

Specific Recommendation

Not all reclaimed water systems meter customers, for but those that do, the value of the water should be reflected appropriately in a volume-based rate. The charge for service should be based upon the volume that is used by the customer. During droughts, inclining block or drought rates should be implemented.

Reasons for recommendation

When metering of reclaimed water service and a volume-based rate structure is in place, significantly less reclaimed water is used. Systems that currently have a flat fee could be encouraged to adopt volume-based rates through funding assistance for the installation of meters. A condition of the funding could be the adoption of the rate structure that would reflect the volume of reclaimed water utilized by the customer.

Cost-effectiveness and water savings

Most utilities in Florida currently charge a flat monthly fee for reclaimed water service. This is due to the fact that many systems began implementing reuse at a time when it was important to have use of reclaimed water be more attractive to the customer than the use of potable water for irrigation, to encourage growth of the customer base. In addition, there was generally a much greater volume of reclaimed water available than the customer base could support and overuse was not discouraged.

As a reuse system with this type of rate structure becomes mature, shortages of reclaimed water become prevalent. The recent drought exacerbated this situation and shortages of reclaimed water became even more prevalent in mature reuse systems. Observations made in the SWFWMD indicate that, before efficiency standards were implemented, when a customer switches from potable water to reclaimed water for irrigation, the volume used for irrigation is often as much as four times greater than that observed for potable water. Conservation rates, usable only in systems than meter use, send a powerful price signal to encourage efficient use.

Who should implement it?

The Department of Environmental Protection, the water management districts, utilities, and the Public Service Commission all have a role in the implementation of this recommendation.

RW-C: Encourage reuse utilities to give priority to reuse activities that maximize recharge fractions and potable water offsets.

Drought Responsiveness		Water Conservation		
Short-term	**Mid-term**	**Amount of Water Saved**	**Cost Effectiveness**	**Ease to Implement**
Low	Medium	High	High	Medium

Specific Recommendation

Especially in times of drought, reuse options that increase aquifer recharge and/or potable water offsets should be favored over other options.

Reasons for recommendation

As noted in the 2002 Water Conservation Initiative report, reuse activities may have differing levels of desirability based on their anticipated potable quality water offsets and recharge fractions. Ground water recharge and indirect potable reuse will figure prominently in water resource management and should be encouraged. Ground water recharge involves the discharge of reclaimed water into rapid infiltration basins, or after additional treatment, through injection wells to recharge the underlying ground water resource. Indirect potable reuse involves discharging high-quality reclaimed water that has received additional treatment into a surface water body that serves as a potable water source. Both ground water recharge and indirect potable reuse are regarded as highly desirable forms of reuse resulting from their relatively high recharge fractions

Cost-effectiveness and water savings

These highly desirable types of reuse are usually cost-effective and produce the biggest amounts of available water.

Who should implement it?

The Department of Environmental Protection, the water management districts, utilities, and the Public Service Commission share responsibility for this with local governments.

Institutional-Commercial-Industrial Uses

ICI-A: The water management districts should issue emergency orders requiring utilities to implement a water audit program for all ICI customers.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Medium	Medium	Medium	High	Medium

Specific Recommendation

When conditions warrant it, the water management districts should issue an Emergency Order similar to SWFWMD's Executive Director Order No. SWF 01-14 (March 21, 2001). Article 75.a.i. of the 2001 Order required municipal utilities in the Tampa Bay Region to implement a water audit program for non-residential customers and to submit a report to SWFWMD.

Reasons for recommendation

The recommendation identifies an existing mechanism the districts can use, if warranted, to find and correct water use inefficiencies at large water using facilities that are not under direct permitting control of the districts.

Cost-effectiveness and water savings

The cost of the audits is not high and potential water savings could be significant. Corrective actions could range from inexpensive to very costly.

Who should implement it?

The water management districts would implement the recommendation, as warranted by the severity of the drought.

ICI-B: The water management districts should confirm the existence and implementation status of conservation plans for all ICI permittees.

Drought Responsiveness		Water Conservation		
Short-term	Mid-term	Amount of Water Saved	Cost Effectiveness	Ease to Implement
Low	Medium	Medium	High	High

Specific Recommendation

The water management districts should require all permitted ICI users to confirm that they have a water conservation plan, and report the status of plan implementation within 30 days. For ICI users whose permits do not contain a requirement for a conservation plan, the water management district should amend the permit, if permissible under WMD rules, to require one. The WMDs should, if possible under the terms of the permit, require that older plans be updated to incorporate new Best Management Practices and improved technologies. Where compliance monitoring is inadequate, it should be given greater priority, especially during drought.

Reasons for recommendation

Industrial, commercial, and institutional (ICI) water users frequently supply their own water. Often they are large water users and, therefore, represent an opportunity to significantly reduce water use. Generally, permittees are required to develop and implement a conservation plan as a condition of their water use permit, but compliance monitoring and enforcement is sometimes inadequate. A conservation plan with regular compliance monitoring and enforcement is necessary to ensure that all appropriate conservation measures are being taken.

Cost-effectiveness and water savings

A robust conservation program saves water and money. Life-cycle cost effectiveness varies upon the specific conservation practices employed.

Who should implement it?

The water management districts should initiate implementation by contacting all ICI permittees regarding the existence and implementation status of their conservation plans. The districts should follow-up with recommended improvements, compliance monitoring, and enforcement as needed.

For more information, please contact:

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