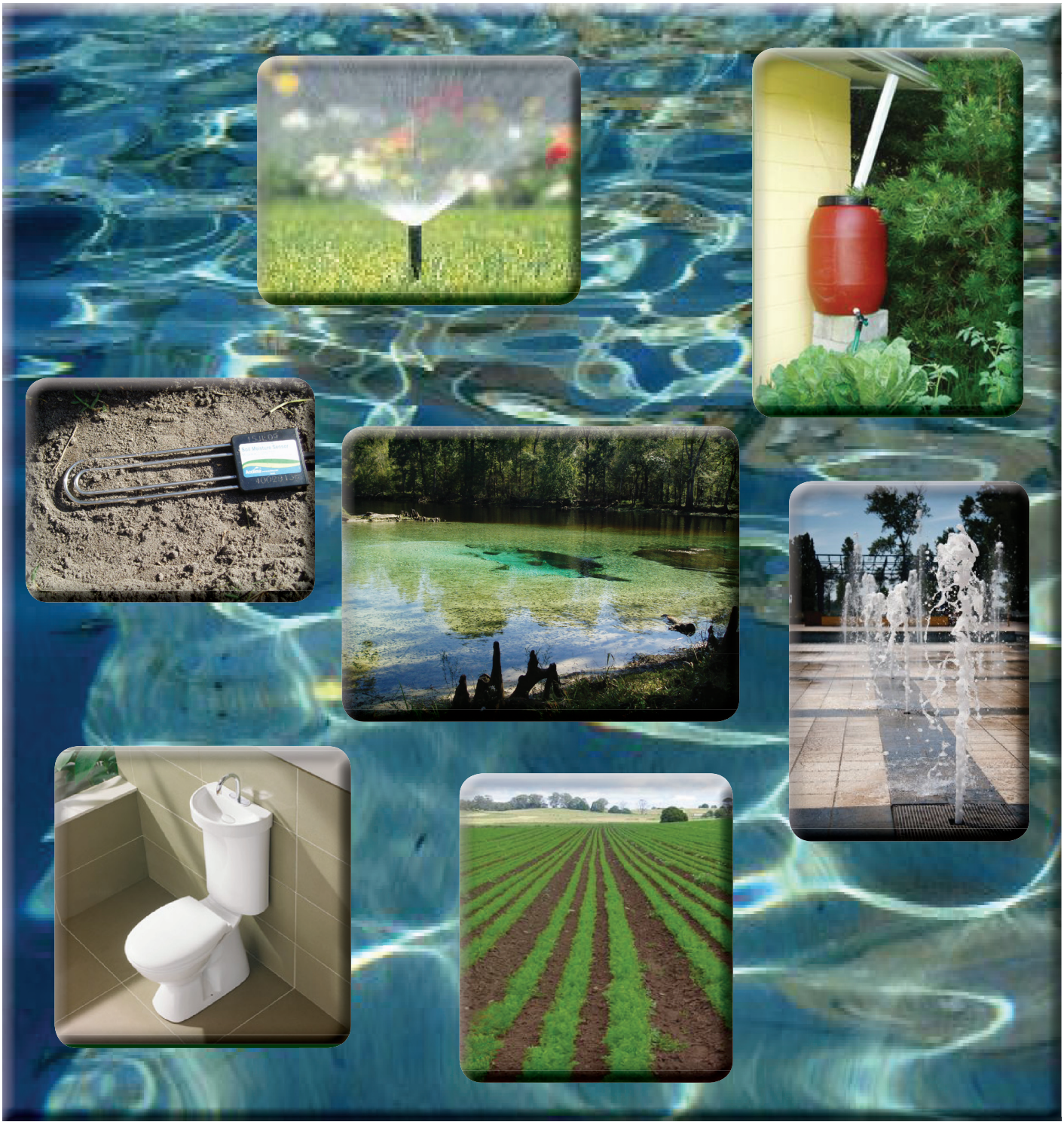
Alachua County
Water Conservation Initiative



April 2010

Executive Summary

The refrain "You don't miss your water till your well runs dry", from a 1961 soul song written and recorded by William Bell, summarizes Alachua County's current water situation. Many of our current water use attitudes are based upon the period in Florida's history following World War II, when there were less people and water seemed abundant. During this era, public water policy valued ditching, draining, and pumping over conservation and resource protection. Hopefully, Mr. Bell's song and this report can provide inspiration for a new set of water policies and practices in Alachua County that are appropriate for the 21st century. This report presents a menu of water conservation opportunities that can reduce consumptive water use and therefore better protect water resources in Alachua County.

This report responds to policy direction from the Alachua County Board of County Commissioners and was prepared by the Environmental Protection Department staff. The water conservation opportunities listed in this report were collected from a variety of sources, many of which were obtained from published documents and reports. The appropriate references for these published sources are listed at the end of each chapter. These opportunities include water conservation best practices, and in some cases, "next" practices. Additional input was provided by County citizen advisory committees, water management districts, water utilities, and other stakeholders. The listed opportunities do not include independent evaluations of their associated effectiveness, feasibility, or cost benefits.

In some cases, local governments are uniquely positioned to encourage water conservation through their land use planning and development authority. Local land use authority can help promote low impact development and the establishment of green infrastructure via incentives, regulations, and land acquisition programs. However, Florida law gives the Water Management Districts exclusive authority for regulating and permitting consumptive water use. In order to implement an effective local water conservation program, Alachua County will need to work closely with our water management districts, municipalities, water utilities, agricultural interests, and other stakeholders.

Table 1 summarizes the specific water conservation opportunities with references to more detailed explanations in subsequent chapters. The next step will be for the Board of County Commissioners to review the opportunities outlined in this report and to provide staff new policy direction to implement new water conservation measures in Alachua County.

Table 1: Water Conservation Opportunities

Agriculture Opportunities	Page	Jurisdiction
A- Fund Mobile Irrigation Labs (MIL).	22	Water Management District
B- Install tailwater recovery systems.	22	DACS
C- Harvest rainfall.	22	DACS
D- Install micro-irrigation systems, such as subsurface drip irrigation (SDI) where suitable.	23	DACS
E- Provide cost share incentives to promote water conservation.	23	DACS
F- Increase the use of reclaimed water for agricultural irrigation.	23	DACS
G- Improve methods for measuring water use and estimating agricultural water needs.	23	DACS
H- Estimate the annual water needs of different agri-cultural commodities.	24	DACS
I- The accuracy of water need estimates should also be improved by better measurement of key climatic conditions within the agricultural areas of the state.	24	Education and Outreach
J- Increase agricultural irrigation research.	24	Education and Outreach
K- Increase education.	24	Education and Outreach
L- Amend water use permitting rules to create incentives for water conservation.	24	Water Management District
M- Water management districts should consider placing additional incentives in the permitting process that would encourage agricultural water users to move toward the most efficient techniques of irrigation and the recovery and recycling of water.	25	Water Management District

Landscape Irrigation Opportunities	Page	Jurisdiction
A- Adopt into local ordinance and Florida Building Code irrigation design and installation standards and certification program.	29	Local Government
B- Revise site development regulations and the County Landscaping Code.	29	Land Development Regulations
C- Eliminate Homeowner Association (HOA) restrictions that prohibit or limit the use of Florida Friendly Landscaping and other water conservation techniques.	30	State
D- If using turf in the landscape, use one of the more drought tolerant species.	30	Education and Outreach
E- Improve irrigation technology.	30	Education and Outreach
F- Provide incentives for removing existing in-ground irrigation systems.	30	Local Government
G- Create a rebate program for improving existing irrigation systems.	30	Local Government
H- Issue citations for malfunctioning irrigation systems.	30	Local Government
I- Require irrigation system analyses.	31	Local Government
J- Require audits for high volume residential customers.	31	Local Government
K- Develop an evapo-transpiration program.	31	Education and Outreach
L- Provide incentives for lawn replacement programs.	31	Local Government
M- Encourage the use of artificial turf.	31	Education and Outreach
N- Mow High, often, and sharp.	31	Education and Outreach
O- Limit dormant season (winter) irrigation.	32	Water Management District
P- Encourage the use of windbreaks to be formed by walls, fences, shrub beds, or hedges.	32	Land Development Regulations
Q- Conduct research to improve turf and landscape water conservation.	32	Education and Outreach
R- Evaluate the use of water budgeting.	32	Utility
S- Conduct public education to reduce water usage.	32	Education and Outreach
T- Fund mobile irrigation labs.	32	Water Management District
U- Minimize the use of potable water and groundwater for lawn irrigation.	32	Education and Outreach
V- Provide incentives for the use of non-potable water sources.	33	Local Government
W- Require commercial development to utilize rainwater harvesting.	33	Land Development Regulations
X- Control direct water withdrawal from water bodies.	33	Water Management District
Y- Prohibit, or at least require permits for, new wells used for landscape irrigation.	33	Water Management District
Z- Insure that all landscape irrigation regulations apply to golf courses and neighborhood common areas.	33	Water Management District
AA- Develop goals for reducing outdoor water use.	33	Local Government
AB- The County should consider adoption of Countywide Ordinances for water conservation.	33	Local Government

Water Pricing Opportunities	Page	Jurisdiction
A- Evaluate the impact that non-discretionary charges, such as wastewater fees, have on the effectiveness of conservation rate structures.	40	Utility
B- Establish a water pricing structure that includes the full cost of operating, maintaining, and protecting the water supply system and resources.	40	Utility
C- Develop a methodology to assess environmental costs.	40	Local Government
D- Phase in conservation rate structures.	40	Utility
E- Evaluation of conservation rate structures.	40	Utility
F- Require drought rates as part of utility conservation rate structures.	41	Utility
G- Phase in informative billing.	41	Utility
H- Require more accurate and widespread measurement of water use, including metering and sub-metering.	41	Water Management District
I- Install individual meters at multi-family housing.	41	Land Development Regulations
J- Water use data collection.	41	Utility / WMD
K- Full cost accounting.	42	Utility
L- Additional revenue sources.	42	Local Government

Industrial, Commercial and Institutional Opportunities	Page	Jurisdiction
A- Install water efficient fixtures.	45	Education and Outreach
B- Increase the amount of pervious areas on property.	46	Land Development Regulations
C- Create demonstration sites.	46	Education and Outreach
D- Create an auditing program.	46	Education and Outreach
E- Establish a Conservation Certification program.	46	Local Government
F- Consider a range of financial and regulatory incentives and alternative supply credits.	46	Water Management District
G- Use cooperative funding for the use of alternative technologies to conserve water.	46	Water Management District
H- Promote the utilization of reclaimed water.	47	Utility / WMD
I- Investigate methods of assuring that large users from a public supply implement the same conservation measures as users with individual permits.	47	Water Management District
J- Harvest rainwater.	47	Land Development Regulations
K- Recover air condition condensate.	47	Land Development Regulations
L- Prohibit the use of groundwater for chillers.	47	Water Management District
M- Reduce landscape irrigation at ICI facilities.	47	Land Development Regulations
N- Establishment of benchmarks for the efficiency of ICI water uses based on national standards.	48	Education and Outreach
O- Require entities to demonstrate water use efficiency for Consumptive Use Permit (CUP) application, renewal, and five-year compliance reports.	48	Water Management District
P- Incentivize use of Soil Moisture Sensors for high end users especially institutions and commercial settings	48	Local Government
Q- Revise Alachua County Comprehensive Plan Policy to require that Consumptive Use Permits issued by the water management districts do not allow harm to the resource.	48	WMD/Local Government
R- Alachua County should lead by example by implementing effective water conservation programs.	48	Local Government

Residential Water Use Opportunities	Page	Jurisdiction
A- Support the adoption of national standards set by the EPA's WaterSense™ and Energy Star™ programs for more water efficient clothes washers, dishwashers, and other plumbing devices.	51	Local Government
B- Update the state plumbing code.	51	State
C- Create programs to replace inefficient appliances and fixtures.	52	Local Government
D- Provide incentives for meeting Water Star℠ standards.	52	Local Government
E- Create tax incentives for the installation of water efficient appliances.	52	Local Government
F- Minimize/discourage the use of garbage disposals.	52	Education and Outreach
G- Promote waterless plumbing fixtures.	52	Education and Outreach
H- Require inefficient plumbing fixtures be retrofitted at time of home sale or when retrofits requiring a building permit are conducted.	53	Local Government
I- Create a water audit inspection program for the sale of new and existing homes	53	Local Government
J- Facilitate leak repair.	53	Local Government
K- Encourage the use of non-potable water supplies for appropriate uses.	53	Utility / WMD
L- Set a water budget.	53	Utility
M- Publish Municipal water usage.	53	Education and Outreach
N- Encourage covers and leak detection for swimming pools.	53	Land Development Regulations
O- Prohibit the installation of residential swimming pools if access to a neighborhood pool within the subdivision exists.	54	Local Government
P- Prohibit the use of potable water to wash any hard surface.	54	Water Management District
Q- Prohibit the use of potable water in fountains.	54	Water Management District
R- Limit the use of potable water for washing vehicles.	54	Water Management District
S- Coordinate and expand public outreach programs.	54	Education and Outreach
T- Require permits for all new potable wells.	54	Water Management District
U- Restrict the installation of new wells for landscape irrigation.	55	Water Management District
V- Graywater reuse	55	Health Department
W- Develop goals for reducing indoor water use.	55	Local Government

Reclaimed Water Opportunities	Page	Jurisdiction
A- Encourage metering and volume-based rate structures.	59	Utility
B- Implement viable funding programs.	60	Water Management District
C- Facilitate seasonal reclaimed water storage.	60	Utility / WMD
D- Encourage use of reclaimed water in lieu of other water sources in the agricultural irrigation, landscape irrigation, industrial/commercial/institutional, and indoor water use sectors.	60	Education and Outreach
E- Link reuse to regional water supply planning, (including integrated water resource planning).	60	Water Management District
F- Update the Comprehensive Plan.	60	Local Government
G- Develop integrated water education programs.	61	Education and Outreach
H- Encourage ground water recharge and indirect potable reuse.	61	FDEP
I- Discourage effluent disposal.	61	FDEP
J- Encourage the use of reclaimed water for power generation cooling water.	62	Water Management District
K- Provide water use permitting incentives for utilities that implement reuse programs.	62	Water Management District
L- Continue to encourage reuse in Northeast Florida.	62	Education and Outreach
M- Encourage use of supplemental water supplies.	62	Utility
N- Encourage efficient irrigation practices.	62	Education and Outreach
O- Encourage reuse system interconnects.	62	Utility
P- Enable redirecting of existing reuse systems to more desirable reuse options.	63	Education and Outreach
Q- Use reclaimed water at government facilities.	63	Local Government
R- Incorporate reuse, regional water supply planning, and integrated water resources planning into the Department of Community Affairs' rules governing the state's Comprehensive Planning Program.	63	State
S- Ensure continued safety of water reuse.	63	FDEP
T- Continue existing programs to address many of the issues and unknown implications of using reclaimed water.	63	State
U- Require new developments to install reclaimed water systems for irrigation where feasible.	64	Land Development Regulations
V- Apply landscape irrigation restrictions to reclaimed water systems.	64	Water Management District

Table of Contents

Table of Contents

Chapter 1: Introduction

Introduction

Rum Island Spring

Florida must use water more efficiently to provide water for future generations and to protect and preserve aquatic ecosystems. In Alachua County, as most of northern peninsula Florida, the primary source of water is the Floridan aquifer. In Alachua and the neighboring counties, the Floridan aquifer is also the source for most of the springs on the lower Santa Fe River.

Water conservation is emphasized in the Florida Water Resources Act, and is incorporated into the activities of water management districts, public and investor-owned utilities, local governments, and others. Despite this general awareness and many ongoing water conservation activities, there is still a significant need for greater conservation. The record droughts experienced in 2000 and 2001 throughout the state brought an increased and immediate need for conservation. Record low levels for lakes, aquifers, spring discharges, and rivers were experienced throughout Alachua County, as well as, the remainder of the state. The hurricanes of 2004 improved hydrologic conditions, but in 2008 and 2009 Floridan aquifer levels in Alachua County again were in the lower 25% for the period of record (Wetherington 2009). We can be sure that natural climatic cycles will someday again bring on a critical drought.

Drought is not the only time when water should be used efficiently. Florida continues to grow rapidly, and traditional sources of water are limited. Conservation will be an important way to meet new needs while protecting Florida's water-dependent natural environment. For these reasons, the Florida Department of Environmental Protection (FDEP) led a statewide Water Conservation Initiative (Initiative), with the goal of finding ways to use less water while achieving the same beneficial purposes (DEP 2002). It is for these same reasons that the Alachua County Environmental Protection Department (ACEPD) has developed this summary report focusing on options for water conservation.

This report is intended to develop a list of alternatives that may provide solutions to achieving additional permanent water use efficiencies in all water use categories in Alachua County. The report is organized in the following chapters:

- **Agricultural Irrigation**
- **Landscape Irrigation**

- **Water Pricing**
- **Industrial/Commercial/Institutional**
- **Home and Indoor Water Use**
- **Reclaimed Water**

The following principles in assessing water conservation alternatives should be considered in this water conservation initiative:

- **Water conservation is critical to Alachua County's future.** Water conservation means measures that result in permanent and cost-effective improvements in water use efficiency (not the temporary responses to periods of drought). In meeting the growing demand for water, we must focus our attention on how to use less water to achieve better results.

- **Water conservation must be practiced by all water users.** We must find opportunities for improved water use efficiency everywhere. Agriculture, industries, golf courses, businesses, homeowners, and all Alachua County water users must share this objective.

- **Make sure that the most significant opportunities for improved water use efficiency receive the most attention.** Although water conservation is the responsibility of all water users, some categories of use are bigger than others and have more opportunity for improvement. Alachua County must take a strong role in working with the water management districts for improved water conservation.

- **Water is undervalued.** Something as indispensable to human life, ecosystem health, and the economy as water should be recognized for its true value. Undervaluing water leads to wasteful use of water, environmental damage, and inefficient capital investments.

- **Recognize the value of water.** To be used efficiently, the true value of water must be reflected in Alachua County programs and policies.

  Educate Citizens on Water: School curricula, local government programs, and other efforts should help inform citizens on the basic facts of water, the unique circumstances of this county's dependence on and use of water, and how to use water efficiently.

  Water is Water: All water has value and should be put to the most beneficial

and efficient uses, regardless of the source.

Accurately Measure Water Use: We can't gauge the effectiveness of our water conservation efforts, or determine where more work is needed, if we don't even know how much is being used. Metering is a method that can be used to reduce water use and can be applied to all water sources, including self-supply.

Price Water Appropriately: Users of water should pay for this resource in accordance with its economic and environmental value and in proportion to the volumes used.

Reuse Water in an Environmentally Sustainable and Beneficial Manner: Use of reclaimed water reduces wastewater discharge problems and makes large quantities of water available for irrigation and other beneficial uses.

Alachua County must be smart when providing financial assistance, subsidies, or incentives for water conservation. Support of efficiency improvements is more cost-effective than subsidizing the development of new water resources. Supporting efficiency will require coordination with all municipalities within Alachua County. We need to know if our efforts to conserve water are making a difference, therefore it is essential to measure the effectiveness of conservation measures. The most effective water conservation programs are those that carefully combine a mix of separate alternatives, including: indoor water use auditing, utility conservation rate structures, education, and financial incentives such as rebates for efficient plumbing fixtures. It is important to develop a basic local government regulatory framework to manage the public resource of Florida's water. We should continue to benefit from partnerships and collaboration with FDEP, water management districts, water providers, and citizens in a holistic approach to conserve water.

Background

Demand for water in Florida is increasing. Recent estimates of statewide use of fresh water were 6.8 billion gallons a day for 2005 (kenny et al 2009). By 2030 water use is projected to increase significantly. Water management districts continue to conduct water supply assessments and planning that include evaluating alternative water supplies to preserve groundwater and surface water resources. Higher demands are predicted under drought conditions. The most cost-effective way to provide additional water is

through water conservation practices. This chapter of the report provides background information on water use and conservation statewide and specifically in Alachua County.

Water Use in Florida

FDEP in their *Florida Water Conservation Initiative* report (2002) provided the following statistics to frame the issue.

- More water is withdrawn and used in Florida than in any other state east of the Mississippi River. It should be noted that about 63% of water withdrawals in Florida are saline water used for thermoelectric power generation (mostly for cooling water purposes). Freshwater withdrawals in Florida are complex and may be comparable and even lower than some states east of the Mississippi (Borisova, K. 2010).
- Sixty percent of all water used for agricultural irrigation east of the Mississippi River is used in Florida.
- Florida is more dependent on groundwater (60% of fresh water use) than any other state east of the Mississippi River.
- Current demands for public water supplies in South Florida are greater than demands for public supplies in 39 individual states.

The 2000/2001 Drought

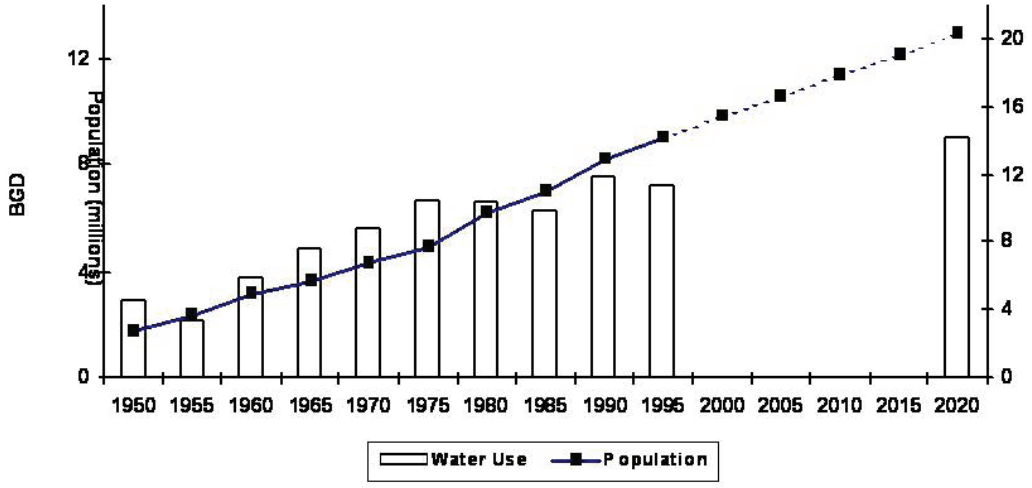
The draught conditions of the late 1990s and early 2000s brought water use and water conservation issues to the forefront of policy makers and regulators. Groundwater and surface water levels were at or below record low levels in January 2001 within the St. Johns River Water Management District (SJRWMD) (FDEP 2002). In the Suwannee River Water Management District (SRWMD), the year 2000 reportedly was the fourth lowest rainfall year since 1931 (FDEP 2002). SRWMD also reported that in the spring of 2001 most surface water gaging stations on the Suwannee, Santa Fe, and Withlacoochee rivers were at record lows (Wetherington 2009). Florida has emerged from the drought, but even after the heavy rainfall associated with hurricanes in 2004, groundwater levels in the Floridan aquifer in much of the Santa Fe River basin remain below average. These trends in declining water levels may not be climatically based.

Trends in Water Use

Although water use is growing, for the last two decades the rate of increase in total fresh water use has been less than that of the population growth (FDEP, 2002). FDEP anticipates that this trend will continue to the year 2020 (Figure 1.1). By 2020, average

year water use is projected to be about 9.1 BGD for a population of about 20.4 million (FDEP, 2002). This represents a projected 26 percent increase in fresh water demand for a projected 43 percent increase in Florida's population.

Figure 1.1: Total Fresh Water Withdrawals and Population



When evaluating trends in water use one must consider how water is used. It is not only the primary use of water by individuals for consumption. There is a "footprint" of water and energy in many items we eat, wear, and use on a daily basis. Water is used to grow crops, sustain animals, process food, manufacture products, etc. This cumulative water use is often forgotten when evaluating the true cost of water.

The Floridan aquifer system is the primary source of groundwater in Alachua County. Groundwater supplies public and private water systems, self-supplied residences, and the springs and aquatic ecosystems of the Santa Fe River and tributaries. The U.S. Geological Survey (kenny et al 2009) reported that the 2005 gross per capita daily water use for the state of Florida averaged 158 gallons (Table 1.1). Whereas, in Alachua County the gross per capita daily water use was reportedly 151 gallons, 4.43% less than the state average (Kenny *et al* 2009). Total water use in Alachua County represented 1.34% of the total used statewide in 2005.

Table 1.1: Public Water System Use Statewide and in Alachua County for 2005.*

Population	Statewide Population 2005	Alachua County Population 2005	Alachua County's Percentage of Statewide Water Use
Total	17,918,227	240,764	1.34%
Served by Public Supply	16,128,250	181,415	1.12%
Gross per Capita Daily Water Use (gallons)	158	151	4.43%

*Reported Water Use Data from the US Geological Survey (Kenny *et al* 2009).

Water Use Patterns

Agriculture has historically withdrawn about half of all fresh water used in Florida, while urban demands have steadily increased relative to other uses (FDEP, 2002). This general pattern is expected to continue until 2030, although agricultural water use as a percentage of total use is expected to decline as the population of Florida increases. Uses of water also vary in the degree to which they "consume" water. All "withdrawals" of water remove water from a source (FDEP 2002). Uses vary in the percentage of the water withdrawn that is returned to the aquifer, such as through groundwater recharge, and made available for other uses. Water use can be divided into categories by type of use. Public supply and agriculture are the highest water uses statewide and in Alachua County (Table 1.2). The third and fourth greatest water uses in Alachua County are domestic self-supply (private wells) and power generation (Kenny *et al* 2009). Conservation of water is important in all water use categories and strategically important is preserving water for aquatic ecosystems and future use.

Table 1.2: Groundwater Use Statewide and in Alachua County for 2005.*

Water Use Type	Statewide Groundwater Use (mgd)**	Alachua County Groundwater Use (mgd)	Alachua County Percentage of Statewide Water Use
Public Supply	2,492.39	27.43	1.10%
Domestic Self-supply	185.45	5.69	3.07%
Commercial/Industrial/Mining	365.56	0.63	0.17%
Agriculture	1,301.57	23.05	1.77%
Power Generation	17.65	2.65	15.01%
Recreational Irrigation	171.03	0.40	0.23%
Total Groundwater Use	**4,242.43**	**59.89**	**1.41%**

*Reported Water Use Data from the US Geological Survey (Kenny *et al* 2009).

**Million gallons per day

Permitted water use in Alachua County for 2008/2009 provide a more detailed look at current water use in Alachua County. Table 1.3 (ACDGM, 2009) summarizes data for the 30 largest water users by water management district within Alachua County, with permitted water use totaling 66.67 mgd. Water use differs among water management districts, with agricultural water use being greatest in the more rural SRWMD. The highest water use in the SJRWMD portion of Alachua County was public water systems and water utilities (ACDGM, 2009). Public water systems represent the second largest water use in the SRWMD portion of Alachua County. Homes outside the service areas for public water or other water utilities obtain their water by private wells (self-supply domestic).

Table 1.3: Summary of Permitted Water Use for the Thirty Largest Water Users in Each Water Management District in Alachua County as an Average Daily Rate (ADR)*

Water Usage Description	Total Permitted Average Daily Rate (mgd)	SJRWMD Permitted Average Daily Rate (mgd)	SRWMD Permitted Average Daily Rate (mgd)**
Public Water Systems and Water Utilities	34.60	29.70	4.90
Agriculture	21.38	1.71	19.66
Golf Course	2.53	1.33	1.21
Commercial and Industrial	0.95	0.08	0.87
Commercial and Agriculture	0.30	0.30	None Reported
Industrial and Landscape	0.43	0.43	None Reported
Landscape	0.09	0.09	None Reported
Nursery	0.41	None Reported	0.41
Power Production	0.69	0.69	None Reported
Dewatering	0.44	0.44	None Reported
Mixed Uses	4.85	4.85	None Reported
Water Bottling	0.00	0.00	0.00
Total Large System Permitted Water Use	**66.67**	**39.62**	**27.05**

* Data provided by the SJRWMD as Water Use Permit allocations (Florence, 2008); data provided by the Suwannee River Water Management District as Water Use Permit allocations (Kruse, 2009)

** Summary does not include the municipal water systems for Archer, which has a permitted average daily rate of 0.279 mgd

Agricultural Water Use

Agricultural water use in Florida has been an issue for many years. In the early years of agriculture, water conservation was not a consideration and in many areas rich wetland

soils were ditched and drained to facilitate ranching and row crop production. In the 1960s and 1970s, irrigation ditches (flooding) and large volume gun irrigation systems were common. Agricultural water conservation has greatly increased in the last 40 years with the advent of new technologies. Micro-irrigation, plastic mulch, water recovery and reuse, shallow chisel plowing, advances in technology (real-time weather stations, soil moisture sensors, and evapotranspiration (ET) sensors), conservation tillage, and the use of efficient center pivot systems in lieu of large volume gun irrigation have all contributed greatly to saving water (FDACS, 2006).

The establishment of the water management districts and implementation of water use permitting through the districts brought water use actual permitted and conservation potential to the attention of the districts. The droughts experienced throughout the state in 2000 and 2001 brought an increased and immediate need for greater conservation. Subsequent legislation established an agricultural water conservation program and put the Florida Department of Agriculture and Consumer Services (FDACS) in the lead role. FDACS developed best management practices (BMPs) for water conservation, and the water management districts permitted water use in an effort to conserve water. Water metering of agricultural water use began in the 1970s and is now required by most water management districts. Knowing and understanding water use patterns is key to conserving water.

Water Supply Planning

The State's five water management districts are required to periodically evaluate whether adequate water supplies exist to meet the needs of their areas. Water supply assessments are conducted by the water management districts every five years, and those assessments form the basis of District Water Supply Plans. If the assessment indicates that water supply will not be adequate to serve existing users and projected new development over a 20 year period without unacceptable impacts to water resources and related natural systems, then the district must prepare Regional Water Supply Plans for those Priority Water Resource Caution Areas (PWRCA) with deficiencies. The districts must also identify how water supply needs will be met for the next 20 years. Such Regional Water Supply Plans identify alternative water supply projects to be implemented by local governments in these areas, in order to supplement their traditional sources of water to meet projected demand.

The SJRWMD adopted its most recent District Water Supply Plan in 2005. The 2003 Water Supply Assessment that was the basis for the 2005 SJRWMD Water Supply Plan did not identify Alachua County as part of a Priority Water Resource Caution Area (PWRCA). The SRWMD adopted its most recent District Water Supply Plan in 2004, which did not

recommend that regional water supply planning, as provided in Chapter 373.036, F.S., be undertaken within the District for the upcoming five-year cycle. This conclusion was based on the lack of sufficient technical supporting data or analyses to support the designation of critical water supply areas (SRWMD Water Supply Plan 2004). Since neither of the current district plans recommended regional water supply planning for Alachua County in accordance with Chapter 373.0361, F.S, Alachua County is not required to adopt a 10-year water supply facilities work plan into its Comprehensive Plan.

The SJRWMD and SRWMD are currently in the process of updating their District Water Supply Plans, which are both scheduled for adoption around December 2010. Alachua County is coordinating with both districts on their updates in order to develop Water Supply Plans that contain the most accurate data on projected needs and sources of water. As an initial step in the update process, the SJRWMD has prepared the SJRWMD Draft Water Supply Assessment 2008, which will lead to the next update of the SJRWMD District Water Supply Plan. The Draft Water Supply Assessment identifies the SJRWMD portion of Alachua County as a Potential Priority Water Resource Caution Area (SJRWMD, 2009; ACDGM, 2009).

Poe Springs County Park

If the updates to the SRWMD or SJRWMD Water Supply Plans that are currently underway determine Alachua County, or a portion of the County, to be a Priority Water Resource Caution Area (or equivalent), with a recommendation to initiate regional water supply planning, then Alachua County will be required to adopt a 10-year water supply facilities work plan into its Comprehensive Plan. Such Comprehensive Plan amendments relating to the Evaluation and Appraisal Report (EAR) or the Alachua County Comprehensive Plan and subsequent Plan Amendments must be adopted by the County within 18 months of adoption of the updated District Water Supply Plans (estimated to be December 2010), or whichever district adopts their plan last. Additionally, the plan will include a comprehensive Water Conservation Chapter, with important background information, water conservation goals, and water conservation opportunities for all the sectors covered in this report. The information contained in the final version of the Water Management Districts Water Supply Plans should be included in any evaluations of the water conservation opportunities contained in this report.

Water Resources Protection

The use and allocation of water resources in Alachua County is an emerging issue.

Historically, water resources have been viewed as virtually unlimited. Past practices are now contributing to declining water quality and limited availability, which in turn can negatively impact aquatic ecosystems (ACDGM, 2009). The Alachua County Comprehensive Plan: 2001-2020, effective May, 2005, established new buffer standards for development in the unincorporated area to enhance protection of surface waters and wetlands. The current comprehensive plan and amendments to the plan relating to the EAR encourage indoor and outdoor water conservation, low impact development (LID), Florida Friendly landscaping, and a variety of policies to back local regulations to conserve and protect water resources.

SJRWMD (2009) has proposed constraints and rule provisions related to water conservation including the following: (1) proposing rule revisions on residential high volume in-ground irrigation systems, (2) updating regulatory approaches for public water system conservation, (3) modifying Environmental Resource Permit (ERP) criteria to prohibit Home Owners Association (HOA) documents from containing any language that prohibits a property owner from implementing Florida Friendly landscaping, (4) requiring surface/stormwater systems to be designed to maximize the use of stormwater for irrigation, (5) better defining water conservation requirements for public water systems and suppliers and their secondary users, and (6) establishing criteria and reporting requirements for per capita water demand.

Water Quality

Hogtown Creek

There is a clear relationship between water conservation and water pollution. Conserving groundwater provides the water necessary for surface water flow. Adequate surface water flow and groundwater levels provide the basis for healthy aquatic ecosystems throughout Alachua County and the region. Reductions in spring flow, coupled with water quality degradation, greatly diminish the resource. Without adequate flow, pollutants (such as nitrates) can become more concentrated and adversely impact aquatic ecosystems. Many fish and invertebrate species need adequate flow, cool water temperatures, and highly oxygenated waters to survive. As Alachua County urbanizes, we discharge waters into natural systems that have excess nutrients, relatively high temperatures, and little dissolved oxygen.

Removing more water than can naturally recharge the aquifer through rainfall equates to mining water. Reductions in groundwater levels means lower spring flow, poorer groundwater and surface water quality, and a decrease in aquatic ecosystem health.

Many of our surface waters directly recharge the Floridan aquifer, the source of the springs on the Santa Fe River and our drinking water.

Low Impact Development (LID)

Implementation of Low Impact Development (LID) techniques for stormwater management can improve water quality and conserve water. Lack of past stormwater management has allowed the direct discharge of stormwater to surface waters. Stormwater has not been dispersed to slowly infiltrate into the ground and recharge the surficial aquifer, which in turn slowly discharges to stream and lakes. This has resulted in excessive sedimentation and nutrient enrichment of surface waters. LID is a suite of stormwater and land development strategies at the parcel and subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small scale hydrologic controls to more closely mimic the preexisting natural hydrologic character of the site. These strategies store, infiltrate, evaporate, and detain runoff.

LID strategies function best when we protect the natural areas, from a local scale to a watershed scale, which include protection of high-quality upland habitat, wetlands, and buffers to surface waters and wetlands because their proximity to contaminants from urban areas is a significant factor in pollution potential. LID strategies can enhance flow to surface waters through groundwater infiltration and slow discharge to surface water through natural seepage into streams and lakes. This slow recharge reduces flooding by attenuating peak stormwater flows. It enhances surface waters by allowing slow recharge over a longer duration providing sustained baseflow to streams and lakes and improves the quality of the water. The use of LID techniques makes more water available to slowly recharge groundwater; this slow recharge reduces runoff and decreases pollutant loading to surface water and groundwater.

Minimum Flows and Levels

Protection of groundwater and surface water levels and aquatic ecosystems is being conducted statewide through the establishment of minimum flows and levels (MFLs). These levels and/or flows are established by the water management districts and adopted by the water management district governing boards to prevent significant

harm to the water resources or ecology of an area resulting from water withdrawals permitted by the districts. Establishing MFLs is a requirement of Florida Statutes 373.042(2).

MFLs define how much water levels and/or flows may change and still prevent significant harm. The water management districts are required to develop recovery or prevention strategies in those cases where a water body currently does not or will not meet an established MFL. Water uses cannot be permitted that will cause any MFL to be violated. Each water management district is required to annually update their priority water body list and schedule for the establishment of MFLs for surface waters and aquifers within their respective districts.

Promulgation and adoption of MFLs or water reservation have not been set forth or adopted by SJRWMD for the large lakes in the Alachua County portion of the Orange Creek Basin (Newnans, Lochloosa, and Orange). MFLs were adopted by the SJRWMD for Lake Tuscawilla in 2004 and Lake Wauberg in 1998. MFLs were adopted by the SRWMD for the Upper Santa Fe River in 2007. MFLs for the Lower Santa Fe River including Poe, Hornsby and Treehouse Springs, as well as, Santa Fe River Rise are scheduled to be completed in 2011 if funding permits (ACDGM, 2009). Table 1.4 below provides a schedule for adoption of MFLs in Alachua County.

Table 1.4: Alachua County Waterbody Minimum Flows and Levels (MFLs) Established by the Water Management Districts (ACDGM, 2009)

Basin	Waterbody Name	Water Management District	Date Established or Proposed
Suwannee River Basin	Upper Santa Fe River	SRWMD	2007
Suwannee River Basin	Lower Santa Fe River	SRWMD**	2011
Suwannee River Basin	Treehouse Spring (ALA112971)	SRWMD**	2011
Suwannee River Basin	Poe Spring	SRWMD**	2011
Suwannee River Basin	Hornsby Spring	SRWMD**	2011
Suwannee River Basin	Santa Fe Lake	SRWMD**	2013
Suwannee River Basin	Lake Alto	SRWMD**	2013
Orange Creek Basin	Paynes Prairie*	SJRWMD	1994
Orange Creek Basin	Lake Wauberg	SJRWMD	1998
Orange Creek Basin	Lake Tuscawilla	SJRWMD	2004

*Reservation of Water established to provide water to Paynes Prairie State Preserve from Prairie Creek via Camps Canal
** SRWMD 2009 revised MFL schedule.

Water Conservation

Water conservation is preventing wasteful use of water (FDEP, 2002). Water conservation has great potential to deliver multiple benefits:

- **Saving dollars.** Many water conservation measures can meet new demands less expensively than developing new supplies. This is because significant efficiency improvements make more water available without the development of new infrastructure.

- **Expanding supplies.** If increased demands can be met from existing supplies of water, then the effect is the same as developing new supplies.

- **Environmental protection.** Water conservation can help protect Florida's natural systems from both the negative effects of over-withdrawals and the disturbances associated with the development of reservoirs, pipelines, and wellfields. Conservation can also improve water quality by reducing wastewater discharges with high nutrient concentrations and, in the case of irrigation, by reducing the potential for fertilizer and chemical leaching and runoff.

The water management districts have identified six conservation practices that have been implemented or could be implemented: a water conservation rate structure, leak detection programs by the utilities, public education, landscape irrigation restrictions, low volume plumbing codes, and landscape ordinances (FDEP, 2002). Historically, Florida has been able to rely on the least expensive sources of ground and surface water to meet its needs without significantly degrading natural systems. As Florida and Alachua County look for additional supplies of water to satisfy future demand, the state will have to develop new and perhaps more expensive sources. Conservation reduces the need to develop these new supplies and can be considered a new "source" of water.

One of the biggest obstacles to reducing per capita use of water is changes in the ways in which home-owners use water (FDEP, 2002). For example, an increasing number of Floridians are installing automatic landscape irrigation systems. Although the systems may irrigate efficiently, even the best automatic systems can result in much more water being applied to a home's lawn and ornamental plants than is needed. If the system has inefficient features, like automatic timers for irrigation,

even more water may be used. In north Florida most lawns and landscapes need no supplemental irrigation in the winter months when plants are dormant or in the summer rainy system, June through September. Preventing increases in water use from increased use of water-intensive technologies like in-ground irrigation systems at homes will be a significant challenge. The water management districts are developing permitting and regulatory strategies to reduce outdoor irrigation, such as reducing irrigated turf areas and restricting the amount of high volume irrigation that can be used (SJRWMD 2009).

New water conservation standards may include requiring the use of reclaimed water. The protection of water quality should be linked with policies related to groundwater impacts, including: water use, conservation, and reuse (ACDGM, 2009). Reclaimed water disposal options that disperse the effluent help in two ways: first by reducing the hydraulic loading that forces nutrient rich water to recharge groundwater and secondly by allowing vegetation to uptake the nutrients before the nutrients reach the groundwater (ACDGM 2009). We must recognize the value of groundwater recharge from septic tank effluent and high quality treated wastewater, including underground injection and aquifer storage and reuse. Returning water to the aquifer can help provide water for springs flow and reduce the environmental impacts of water use.

Use of Reclaimed Water

Water reuse is an important component of both wastewater management and water resource management in Florida. Recognizing this importance, the encouragement and promotion of water reuse have been established as formal state objectives in both Chapters 403 and 373, F.S. Reuse has been identified as a key component of the regional water supply plans prepared by the water management districts. Reuse strategies recommended in the regional water supply plans include further development of urban reuse systems, reuse system interconnections, aquifer storage and recovery (ASR) for storage, and groundwater recharge.

During the past 15 years, Florida has become recognized as a national leader (along with California) in water reuse. Approximately 575 million gallons per day (MGD) of reclaimed water was used for beneficial purposes in 2000. The total reuse capacity of Florida's domestic wastewater treatment facilities has grown from 362 MGD in 1986 to 1,116 MGD in 2000. The current reuse capacity represents about 51 percent of the total permitted domestic wastewater treatment capacity in Florida. Reclaimed water from these

systems was used to irrigate 103,660 residences, 401 golf courses, 385 parks, and 159 schools (FDEP 2002). In Alachua County eight municipal water reclamation facilities (WRF) are permitted to treat 23.04 million gallons per day (MGD) of wastewater. Four of these facilities (Gainesville Regional Utilities (GRU) Main Street and Kanapaha plants, University of Florida, and City of Alachua) are the main permitted sources of reuse within Alachua County (see Reuse of Reclaimed Water).

Historically, potable quality water has been inexpensive in north Florida. As a result, utilities had difficulty motivating potential customers to substitute reclaimed water for potable quality water for irrigation needs. GRU initially provided reclaimed water at no cost to users, but they now charge a reduced fee for reclaimed water (see Water Pricing section). Due to the relatively low price of potable water, data assembled by the Southwest Florida Water Management District indicate that in many instances, the use of reclaimed water may only offset about 25 percent of potable water use (FDEP, 2002). Reuse activities vary in the degree to which they "offset" the use of traditional sources of water. They can also vary in the degree to which they recharge aquifers. State policy is moving toward encouraging those particular reuse activities that have the highest "offset" and/or the highest "recharge fraction" (FDEP 2002).

The use of reclaimed water should be required to the maximum extent possible unless it is demonstrated that implementation is not technically, economically, or environmentally feasible. The goal of this reuse shall be to maximize the direct use of all available reclaimed water to meet irrigation needs in place of a higher quality water source (e.g. groundwater supply) and to provide beneficial aquifer recharge with reclaimed water that cannot feasibly be reused for irrigation. Consideration should be given to the nutrient levels present in the reuse water. Runoff (of reuse water) into surface water bodies can degrade water quality. Water reuse should be regulated and monitored to protect groundwater and surface water quality (ACDGM 2009).

Water Conservation and Utility Rate Structures

The cost of water and the design of utility rate structures send influential price signals to water users. Sending the appropriate price signals strongly encourages water conservation. Opportunities exist in Alachua County and throughout Florida to strengthen the economic incentive for utility customers to more carefully evaluate their water use habits.

Revenues from implementing a conservation rate structure may provide opportunities to fund water conservation activities. FDEP (2002) reviewed the potential for using

revenues for financing water conservation programs and determined that the funding should be consistent and significant. FDEP made the following general recommendations:

- **A portion of the revenues from water conserving rate structures could be used to fund utility conservation programs.** Conservation rates usually include inclining blocks or tiered rates to discourage excessive water use. Revenues from the upper tiers (from this excessive use) could be used by utilities to establish their own water conservation trust fund. Utilities and/or local governments could then develop and finance a variety of conservation programs best suited for their needs. These funds can be used for activities such as toilet replacement programs, efficient clothes washer rebates, Florida Friendly Landscaping education, irrigation efficiency programs, and home water use audits. Other communities in Florida are considering similar approaches.

- **A Revolving Loan Fund could be made available to water utilities, and possibly agriculture and other water users, to finance cost-effective water conservation projects.** FDEP currently administers a revolving loan fund that is used by public utilities to finance water supply projects, wastewater treatment, and reuse projects. The possibility of using this fund, or establishing a separate revolving fund dedicated for water conservation programs, should be explored. A revolving loan fund would address the issue of front-loaded costs for new conservation programs and allow utilities and others to pay for water conservation programs by amortizing costs over the life of the project benefits.

- **Water management districts and/or other governmental agencies could increase funding assistance for water conservation through ad valorem revenues.** Traditionally, the water management districts have focused their limited funding to water supply and water resource development. With the exception of SWFWMD, the districts currently allocate only a small fraction of their budgets (less than 1%) to water conservation programs. Regional water supply planning could identify more cost-effective water conservation projects. In addition to ad valorem revenues, administrative fines collected from consumptive use permit violations could be used to establish district water conservation funds.

In order to increase water-use efficiency, funding for water conservation must be put on a level playing field with funding for development of new water supplies. The funding sources that are available to pay for new supply projects should also be available to fund cost-effective conservation projects and programs. Local governments also play an important role in water conservation by implementing irrigation restrictions, land use regulations that restrict the amounts of irrigated turf and landscape plants, and requiring in-home water saving fixtures.

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Chapter 2: Agriculture

Agriculture Opportunities	Page	Jurisdiction
A- Fund Mobile Irrigation Labs (MIL).	22	Water Management District
B- Install tailwater recovery systems.	22	DACS
C- Harvest rainfall.	22	DACS
D- Install micro-irrigation systems, such as subsurface drip irrigation (SDI) where suitable.	23	DACS
E- Provide cost share incentives to promote water conservation.	23	DACS
F- Increase the use of reclaimed water for agricultural irrigation.	23	DACS
G- Improve methods for measuring water use and estimating agricultural water needs.	23	DACS
H- Estimate the annual water needs of different agri-cultural commodities.	24	DACS
I- The accuracy of water need estimates should also be improved by better measurement of key climatic conditions within the agricultural areas of the state.	24	Education and Outreach
J- Increase agricultural irrigation research.	24	Education and Outreach
K- Increase education.	24	Education and Outreach
L- Amend water use permitting rules to create incentives for water conservation.	24	Water Management District
M- Water management districts should consider placing additional incentives in the permitting process that would encourage agricultural water users to move toward the most efficient techniques of irrigation and the recovery and recycling of water.	25	Water Management District

INTRODUCTION

Agricultural water conservation has been a long ongoing process, yet was brought to the forefront in Florida through the passage of legislation in 2001 and through the release of the "Florida Water Conservation Initiative" document one year later. Both of these efforts primarily originated as a result of the record drought of 2000, which severely affected most parts of the state. In general, water conservation is emphasized in the 1972 Florida Water Resources Act and the associated consumptive use permitting requirements of the state's five water management districts. (FDACS, 2006) (FDEP 2002)

The droughts experienced in 2000 and 2001 throughout the state increased an immediate need for conservation. In 2001, the Florida Legislature enacted section 570.085, Florida Statutes, which states that the Florida Department of Agriculture and Consumer Services (FDACS) shall establish an agricultural water conservation program that includes the following: (1) a cost-share program for irrigation system retrofit and application of mobile irrigation laboratory evaluations for water conservation, (2) the development and implementation of voluntary interim measures or best management practices, adopted by rule, which provide for increased efficiencies in the use and management of water for agricultural production, and (3) a provision of assistance to the water management districts in the development and implementation of a consistent, to the extent practicable, methodology for the efficient allocation of water for agricultural irrigation (FDACS, 2006).

Knowing and understanding water use patterns is paramount to conserving water. The University of Florida's research and development of real-time weather stations and soil moisture sensors has improved irrigation efficiency and allows irrigation to be focused on targeted areas where water is needed, eliminating those areas of a field with adequate soil moisture for crop production (Munoz-Carpena and Dukes, 2005). Conserving water by improving irrigation efficiency can also reduce energy consumption and production costs. (FDACS, 2006)

WATER CONSERVATION OPPORTUNITIES

A. **Fund Mobile Irrigation Labs (MIL).** A MIL typically consists of a one or two person field team, a vehicle, and specialized equipment for use in evaluating irrigation systems. MIL teams provide free irrigation system evaluations and educational information related to irrigation management and water conservation. Conserving water by "fine-tuning" components, irrigation system management, and irrigation scheduling is considered a BMP. Florida currently has 15 functioning labs providing services in 36 counties. Funding needs to be secured for a MIL dedicated to educate irrigation system operators on the efficient use of irrigation water in Alachua County. (FDACS, 2006) (FDEP 2002) (Smajstrla et al., 1991)

B. **Install tailwater recovery systems.** Recovery systems conserve water and improve water quality by collecting and re-using irrigation water and/or rainfall that runs or seeps off farm fields, nurseries, or citrus groves. Because of their additional ability to also intercept subsurface lateral flow, they are becoming increasingly popular in high (seasonal) groundwater table environments. A tailwater recovery system typically consists of collection and storage components (ditches and ponds) and delivery components (pump stations and pipes). (FDACS, 2006) (FDEP 2002)

C. **Harvest rainfall.** Where practicable collect and store rainfall and runoff using reservoirs or other means of storing water onsite for later use. Average annual rainfall in mainland Florida varies across the state from approximately 47 to 68 inches. The bulk of the rainfall events are intense storms, concentrated during the summer months from June through September. More than fifty percent of our total annual rainfall commonly occurs during these four months. Because of the seasonal pattern of rainfall events, the significant runoff generated in the summer months could be collected and reused during the remainder of the year. Farming systems can be designed or modified to capture and store this rainfall and recycle the water that is applied for irrigation. (FDACS, 2006) (FDEP 2002)

D. **Install micro-irrigation systems, such as subsurface drip irrigation (SDI) where suitable.** According to the United States Department of Agriculture's Natural Resources Conservation Service, micro-irrigation systems are suited to orchard and row crops, windbreaks, greenhouse crops, on steep slopes where other methods would cause excessive erosion, or on areas where application devices interfere with cultural operations. (EOEAWR, 2006) (FDACS, 2006) (FDEP 2002)

E. **Provide cost share incentives to promote water conservation.** Cost-share is the co-funding of conservation measures to improve the efficient use of water in agriculture that might otherwise be unaffordable. Projects can include the conversion to more efficient irrigation systems, such as micro-irrigation, recycling of irrigation water, rainfall harvesting, meter and soil moisture sensors, and the use of reclaimed water for irrigation. Cost share projects could also help implement technologies that improve the management of existing irrigation systems, such as water table monitoring wells and soil moisture sensors. The cost of implementing these measures is usually shared between some governmental agency and the grower. Currently, cost share programs are available to support selected water conservation measures through the U. S. Department of Agriculture (USDA/Natural Resources Conservation Service). (FDACS, 2006) (FDEP 2002) (Smajstrla et al., 1991)

F. **Increase the use of reclaimed water for agricultural irrigation.** Reclaimed water can be used for edible crops, row crops, feed, fodder and pasture crops, citrus and nurseries. (EOEAWR, 2006) (FDACS, 2006) (FDEP 2002)

G. **Improve methods for measuring water use and estimating agricultural water needs.** Measuring agricultural water use and estimating crop water needs are fundamental to improving water use efficiency in the agricultural sector. Accurate agricultural water use information is needed by the water management districts for the efficient allocation of water resources and for planning for future water needs. (FDACS, 2006) (Munoz-Carpena and Dukes, 2005) (FDEP 2002)

H. **Estimate the annual water needs of different agricultural commodities.** The calculation of annual water needs includes supplemental irrigation needs, water used for land preparation, crop establishment, and cold protection. The water management districts should continue to work closely with the agricultural community and the irrigation industry in establishing a statewide maintenance and calibration process for the measurement of agricultural water use. The districts should continue to develop consistent statewide water planning tools that use both selective metering and more consistent methodologies for estimating agricultural water needs. (FDACS, 2006) (FDEP 2002)

I. **The accuracy of water need estimates should also be improved by better measurement of key climatic conditions within the agricultural areas of the state.** There has been great improvement in measuring basic climatic data (such as rainfall and temperature) in agricultural areas, but significant improvement is needed for measuring other key agricultural climatic factors (such as solar radiation, wind speed, and relative humidity). (FDACS, 2006) (FDEP 2002)

J. **Increase agricultural irrigation research.** Research should focus on: (1) determining the most efficient irrigation management practices for specific crops, (2) development and testing of new efficient irrigation technologies, (3) field-testing and/or development of more drought-tolerant and water efficient crop varieties, (4) development of cost-effective freeze protection measures that use less water, and (5) development of methods to reduce water use for crop establishment. (FDACS, 2006) (FDEP 2002) (Smajstrla et al., 1991)

K. **Increase education.** Agricultural water users, policy makers, and the general public need to be informed about agricultural water conservation opportunities. Many agricultural producers still lack the information about conservation measures that can be taken to improve irrigation efficiency and the costs/benefits associated with these measures. The Florida Cooperative Extension Service, MILs, and grower organizations should play a more active role in this arena. (FDACS, 2006) (FDEP 2002)

L. **Amend water use permitting rules to create incentives for water conservation.** The state's water management districts have the exclusive authority to promulgate rules

to allocate water and to ensure that it is used efficiently through consumptive use permitting. Varying degrees of water use efficiency may be included in consumptive use permits as conditions for issuance. The water management districts also have authority to promulgate rules to address the need for temporary water use reduction in times of drought through the declaration of water shortage orders and phased water use restrictions. All of these rules affect agriculture. This recommendation relates to both: 1) improving consistency in regard to the districts' water shortage rules, plans, and orders (s. 373.175, F.S.) and 2) possibly amending the water use permitting rules of the districts. (FDACS, 2006) (FDEP 2002)

M. **Water management districts should consider placing additional incentives in the permitting process that would encourage agricultural water users to move toward the most efficient techniques of irrigation and the recovery and recycling of water.** This could include:

1) The districts issuing longer-term water use permits, or reducing permitting fees for agricultural producers employing significant water conserving irrigation technologies, surface water reuse, compliance reporting data, best management practices, and/or Whole Farm Conservation Planning measures. (FDACS, 2006)

2) Short-term water conservation during times of water shortage could also be streamlined and improved by developing a more uniform set of irrigation restrictions and standard prohibition time periods, to be employed statewide when appropriate. This common set of agricultural water shortage rules/restrictions, with some regional considerations, would create predictability for farm production managers, efficiencies for large agribusiness spanning multiple water management districts' jurisdictional boundaries, and clearly promote a consistent water conservation message statewide. (FDACS, 2006)

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Chapter 3: Landscape Irrigation

Landscape Irrigation Opportunities	Page	Jurisdiction
A- Adopt into local ordinance and Florida Building Code irrigation design and installation standards and certification program.	29	Local Government
B- Revise site development regulations and the County Landscaping Code.	29	Land Development Regulations
C- Eliminate Homeowner Association (HOA) restrictions that prohibit or limit the use of Florida Friendly Landscaping and other water conservation techniques.	30	State
D- If using turf in the landscape, use one of the more drought tolerant species.	30	Education and Outreach
E- Improve irrigation technology.	30	Education and Outreach
F- Provide incentives for removing existing in-ground irrigation systems.	30	Local Government
G- Create a rebate program for improving existing irrigation systems.	30	Local Government
H- Issue citations for malfunctioning irrigation systems.	30	Local Government
I- Require irrigation system analyses.	31	Local Government
J- Require audits for high volume residential customers.	31	Local Government
K- Develop an evapo-transpiration program.	31	Education and Outreach
L- Provide incentives for lawn replacement programs.	31	Local Government
M- Encourage the use of artificial turf.	31	Education and Outreach
N- Mow High, often, and sharp.	31	Education and Outreach
O- Limit dormant season (winter) irrigation.	32	Water Management District
P- Encourage the use of windbreaks to be formed by walls, fences, shrub beds, or hedges.	32	Land Development Regulations
Q- Conduct research to improve turf and landscape water conservation.	32	Education and Outreach
R- Evaluate the use of water budgeting.	32	Utility
S- Conduct public education to reduce water usage.	32	Education and Outreach
T- Fund mobile irrigation labs.	32	Water Management District
U- Minimize the use of potable water and groundwater for lawn irrigation.	32	Education and Outreach
V- Provide incentives for the use of non-potable water sources.	33	Local Government
W- Require commercial development to utilize rainwater harvesting.	33	Land Development Regulations
X- Control direct water withdrawal from water bodies.	33	Water Management District
Y- Prohibit, or at least require permits for, new wells used for landscape irrigation.	33	Water Management District
Z- Insure that all landscape irrigation regulations apply to golf courses and neighborhood common areas.	33	Water Management District
AA- Develop goals for reducing outdoor water use.	33	Local Government
AB- The County should consider adoption of Countywide Ordinances for water conservation.	33	Local Government

INTRODUCTION

Outdoor water use has steadily risen in recent years, primarily due to the increased use of permanent in-ground irrigation systems. Today over 50% of Florida's public water supply is used outdoors, mostly for landscape irrigation (FDEP, 2002). Through the 1960s and early 1970s in-ground irrigation systems were the exception and were mainly used for large areas of turf such as golf courses. It is now common place to completely clear lots of vegetation during new home construction and install turf, landscape plants, and automated irrigation systems after the home is built (FDEP, 2002). Many of the irrigation systems in use today are high volume systems that were not designed with efficiency or water conservation in mind. The groundwater resources formerly believed to be infinitely abundant throughout most of peninsula Florida, coupled with our warm climate has falsely made regular ongoing landscape irrigation seem reasonable.

To conserve water Alachua County residents must use outdoor water more efficiently. Sustainable landscape irrigation practices must be implemented through the combined efforts of citizens, public and private water suppliers, water management districts, local governments, irrigation system designers and installers, schools and other institutions, golf courses, and businesses. Retaining or installing drought tolerant and native vegetation suited to site conditions and limiting the area of irrigated turf grass through Florida Friendly landscaping practices are the first steps towards increased water conservation. Local government landscaping regulations requiring less irrigated turf and specifying efficient irrigation design standards, as well as, local adoption and enforcement of water management district watering restrictions will also help conserve water. The use of more efficient irrigation systems with low volume sprinklers/emitters and soil moisture and/or operating rain sensors are also fundamental to saving water. As with other water uses, a water conservation rate structure may be key to reducing outdoor water use.

Alachua County recently adopted a Landscape Irrigation Ordinance, which adopts water management district restrictions for unincorporated Alachua County. Municipalities within the County have the option to opt into the ordinance. Alachua County Environmental Protection Department, Gainesville Regional Utilities (GRU), and

University of Florida Institute of Food and Agriculture Sciences (UF-IFAS) extension all provide public education to inform citizens and businesses on ways to conserve water in the landscape. GRU offers rebates to customers for irrigation system audits and for installation/replacement of rain sensors. Additionally, GRU is conducting a pilot program to explore the use of soil moisture sensors to conserve water.

WATER CONSERVATION OPPORTUNITIES

A. **Adopt into local ordinance and Florida Building Code irrigation design and installation standards and certification program.** Requiring efficient design and installation by certified professionals would increase the efficiency of new irrigation systems. The standards could require an annual inspection of the systems to insure that the systems are maintained to remain efficient. Standards are developed and are in the Florida Irrigation Society (FIS) Landscape Standards and Specifications, which are streamlined into Florida Water Star criteria. (FDEP, 2002) (SJRWMD, 2009)

B. **Revise site development regulations and the County's Landscaping Code**. Regulations to consider could include:

1) limiting site clearing to preserve established vegetation that will not require irrigation,

2) limiting permanently irrigated areas to a maximum percentage of the property or lot,

3) disincentives for in-ground irrigation systems,

4) increasing the use of Florida Friendly landscaping and turf that will not require permanent irrigation,

5) allowing only temporary irrigation in areas utilizing drought tolerant species,

6) requiring at least 6 inches of quality topsoil of a consistent type for enhanced soil health,

7) the use of mulch in landscaped beds,

8) the use of micro irrigation in areas requiring permanent irrigation,

9) limiting the use of narrow strips of sod (commonly used between roads and sidewalks),

10) requiring the use LID techniques (porous paving materials, on-site stormwater detention, etc),

11) allow certified Florida Friendly-Yards to be counted toward the open space requirement in a development. (FDEP, 2002) (EOEAWR, 2006)

C. **Eliminate Homeowner Association (HOA) restrictions that prohibit or limit the use of Florida Friendly Landscaping and other water conservation techniques.** There are currently conflicts between water conserving goals and HOA requirements to install and maintain non-Florida Friendly landscaping. Florida Senate Bill 2080 prohibits HOAs from prohibiting the use of Florida Friendly Landscaping. (SJRWMD, 2009a) (Citizen Comment 12-28-2009)

D. **If using turf in the landscape, use one of the more drought tolerant species.** Grasses with excellent drought tolerance include bahiagrass and centipede grass. Another alternative with bahiagrass is to allow turf to go dormant during dry periods (bahiagrass will turn green again when rains resume). Limit or prohibit the use of St Augustine and other groundcovers where site conditions would require regular ongoing irrigation. (UF IFAS) (SJRWMD Public Comments 3-1-2010)

E. **Improve irrigation technology.** Require technology to improve landscape irrigation efficiency, such as irrigation controllers using soil moisture sensors (SJRWMD, 2009). GRU in conjunction with IFAS and SJRWMD are conducting pilot studies using soil moisture sensors. If this technology is successful, it could be implemented on a broader scale. Installers must provide homeowner education for the proper use and maintenance of this technology. (GRU Public Comments 3/2010)

F. **Provide incentives for removing existing in-ground irrigation systems.** Financial incentives could be provided to homeowners and business owners that remove existing in ground irrigation systems. By removing or permanently disabling the system, it is also less likely that future property owners will irrigate this property.

G. **Create a rebate program for improving existing irrigation systems.** Upgrading existing irrigation systems could conserve water resources. Rebates could include controllers, shut off valves, pressure reduction valves, etc. (Austin Water Utility). GRU has an irrigation rebate program that was started in 2008 (GRU Public Comment 3/2010).

H. **Issue citations for malfunctioning irrigation systems.** Tickets could be issued for easily spotted malfunctions, such as: broken sprinkler heads, water runoff, and over

spray. (Austin Water Utility)

I. **Require irrigation system analyses**. Commercial, multi-family, and municipal properties over a pre-determined acreage with automatic irrigation systems must submit an irrigation analysis once every three years according to a staggered schedule. (Austin Water Utility)

J. **Require audits for high volume residential customers.** Require an irrigation analysis once every few years according to a staggered schedule for high use customers. Have licensed professionals perform the analyses. (Austin Water Utility)

K. **Develop an evapo-transpiration program.** Set up a monitoring station and a framework for distributing the data (website, newspaper, text messages, emails, etc) to citizens. Citizens will be notified as to how much water their landscape needs relative to real time data. (City of Austin)

L. **Provide incentives for lawn replacement programs.** The replacement of irrigated lawn with low water use features (plants and permeable non-plant material) and the conversion of associated sprinkler irrigation to drip or soaker hose type irrigation could be eligible for an incentive on a per square foot of irrigated lawn area converted basis. Sprinkler irrigation conversions to drip or soaker hose type irrigation alone without the removal of lawn would be eligible for an incentive for each square foot of irrigated landscape area converted. Conversion of 1,000 square feet of turf grass to drought tolerant, low water use plants is estimated to reduce the water requirement by 77 percent. The reduction in plant water needs is lowered from approximately 37,200 gallons per year to 8,680 gallons per year per 1,000 square feet. (Marina) (Western)

M. **Encourage the use of artificial turf.** Artificial turf does not require irrigation, fertilizers, or pesticides and should be considered to conserve water resources. (Citizen Comment 9-15-2009)

N. **Mow High, often, and sharp**. Mow lawns at the highest recommended height (at least 2.5 inches), and do not allow grass to grow higher than about 4 to 5 inches. Sharpen the mower blades to cut the grass blades cleanly rather than shred them. This will minimize water loss and help to reduce the chances of disease infestation. Allow grass clippings to decompose where they fall, and contribute to the organic content of the topsoil. (EOEAWR, 2006)

O. **Limit dormant season (winter) irrigation.** The Southwest Florida Water Management District has implemented an optional "Skip a Week" program during the winter months. Grass does not need as much water in the winter and limiting irrigation conserves water while conditioning yards to survive drought conditions. (SWFWMD)

P. **Encourage the use of windbreaks to be formed by walls, fences, shrub beds, or hedges.** Windbreaks reduce wind velocity and can greatly reduce water loss that occurs by evaporation during irrigation and by evapotranspiration from plants. (UF IFAS)

Q. **Conduct research to improve turf and landscape water conservation.** Include research for residential, commercial, and recreational uses. Include behavior aspects of water conservation. Research could include water quality aspects. Explore Florida Friendly landscaping and ways to maximize landscaping efficiencies. (FDEP, 2002)

R. **Evaluate the use of water budgeting.** Homeowners and business owners would receive a water budget for a set amount of landscaped area. The cost of water would increase significantly if the budget was exceeded. (FDEP, 2002)

S. **Conduct public education designed to reduce water usage.** Utilize social marketing techniques to get citizens to adopt water conserving behaviors. Form partnerships (municipalities, county, utilities, water management districts, FDEP, etc) to develop consistent messages and to pool resources. (FDEP, 2002)

T. **Fund mobile irrigation labs.** Mobile Irrigation labs provide residents and businesses with a lawn-watering checkup. On request, they visit a house or business, measure the yard, test the soil and, among other things, calculate the best way to set a sprinkler system. The goal is to alert homeowners to any problems and to help correct them. (FDEP, 2002) (Olmsted, 2008)

U. **Minimize the use of potable water and groundwater for lawn irrigation**. Where technology and regulations allow, use collected rainwater or reclaimed water (treated wastewater- see chapter on Reuse for additional information) to help meet outdoor water demand. Additionally, use of other groundwater sources for lawn irrigation, such as private irrigation wells, should be minimized or avoided. (EOEAWR, 2006)

V. **Provide incentives for the use of non-potable water sources**. Rain barrels and cisterns are methods for rainwater harvesting that could be encouraged and subsidized for outdoor water use. Many areas currently offer rebates for citizens that purchase rain barrels (Volusia and Orange County and the Florida Keys). Alachua County hosts rain barrel sales that are subsidized with County funds to make the barrels affordable. (Florida Keys)

W. **Require commercial development to utilize rainwater harvesting**. The City of Tuscon requires all new commercial development to include rainwater harvesting systems to provide roughly 50% of the landscape watering budget. (Tucson , 2009)

X. **Control direct water withdrawal from surface water bodies**. Communities should consider adopting an ordinance that prohibits the taking of water from any surface water source without a permit. In Florida, this is the jurisdiction of the water management districts. (EOEAWR, 2006)

Y. **Prohibit, or at least require permits for, new wells used for landscape irrigation**. All new irrigation wells should be permitted, regardless of size. Permits can be denied for water conservation purposes. Irrigation well construction or use should not be permitted where municipal water is available.

Z. **Develop goals for reducing outdoor water Use.** Set goals for outdoor water reduction and develop and implement a plan to measure effectiveness in meeting the goals

AA. **Insure that all landscape irrigation regulations apply to golf courses and neighborhood common areas.** Additional water savings can be realized by addressing landscaping water demands on these areas.

AB. **The County should consider adoption of Countywide Ordinances for water conservation.**

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Chapter 4: Water Pricing

Water Pricing Opportunities	Page	Jurisdiction
A- Evaluate the impact that non-discretionary charges, such as wastewater fees, have on the effectiveness of conservation rate structures.	40	Utility
B- Establish a water pricing structure that includes the full cost of operating, maintaining, and protecting the water supply system and resources.	40	Utility
C- Develop a methodology to assess environmental costs.	40	Local Government
D- Phase in conservation rate structures.	40	Utility
E- Evaluation of conservation rate structures.	40	Utility
F- Require drought rates as part of utility conservation rate structures.	41	Utility
G- Phase in informative billing.	41	Utility
H- Require more accurate and widespread measurement of water use, including metering and sub-metering.	41	Water Management District
I- Install individual meters at multi-family housing.	41	Land Development Regulations
J- Water use data collection.	41	Utility / WMD
K- Full cost accounting.	42	Utility
L- Additional revenue sources.	42	Local Government

INTRODUCTION

Water rates are the mechanism through which utility companies generate revenue to cover economic costs and to finance expansion. Water rates are classified as fixed rates or volumetric rates. With fixed rates, users pay a set amount regardless of water usage. The advantage of fixed fees is that they are easy for utilities to administer and easy for customers to understand. The disadvantage of fixed rates is that they do not provide an incentive for customers to conserve water. With volumetric rates, consumers are charged in proportion to their water usage.

Volumetric rates can be further classified into uniform, declining block, and inverted block rates structures. In uniform rate structures the customer pays the same price for any additional unit of water used. This varies from a fixed rate structure, because the rate is determined based on the usage. In declining block rate structures, the customer pays less per additional units of water as usage increases. This structure is similar to buying in bulk, when you buy more the unit price decreases. In an inverted block rate structure, customers pay more per each additional unit of water as usage increases. Inverted block rate structures are most frequently associated with water conservation rates, as they charge high use customers more.

Most utilities use a combination of fixed fees and volumetric rates. These "hybrid" charges are appealing to utilities because the fixed component can be used to cover the fixed costs of the utilities (such as infrastructure costs and capital expenses), while the volumetric component can be used to cover variable costs (such as labor and pumping costs).

Background and General Information

Conservation rate structures are water rates designed to promote the efficient use of water by providing an economic incentive for consumers to limit water use. They are based on the "Law of Demand", which states that as the price of a good or service increases, consumer demand for the good or service will decrease and vice versa (assuming all other factors are equal). This is closely related to the concept of price elasticity, which is defined as the extent to which the demand for a good or service is sensitive to changes in price. Price elasticity between –1 and 0 characterizes an

inelastic demand, for which a change in price results in a smaller percentage change in the quantity demanded. In contrast, price elasticity less than –1 characterizes an elastic demand, for which an increase in the price results in a larger decrease in quantity demanded.

According to Beecher et al. (1994), the most likely price elasticity range for residential water demand is –0.2 to –0.4. These values indicate that residential water demand is inelastic and demand will not greatly decrease as the price increases. This implies that an increase in water rates will lead to an increase in utility revenues, but not a decrease in water usage. However, the price elasticity varies among regions, customer classes, water use categories, seasons, and time periods (Borisova et al 2008). According to Mitchell and Chesnutt (2009), outdoor residential demand is more elastic than indoor residential demand and summer demand is more elastic than winter demand. Whitcomb (2005) provides a detailed analysis of price elasticity in Florida.

Inverted block water rates (i.e. rates that increase with increased usage) can be an effective mechanism for promoting conservation. With inverted block rates, customers pay relatively low rates for water used below certain tiers. These non-discretionary uses (drinking, bathing, etc.) are charged at a relatively low rate. The cost per 1,000 gallons increases as use increases, which discourages discretionary uses (i.e. landscape irrigation).

Inverted block rates are very effective at reducing discretionary uses (particularly landscape irrigation). However, as prices increase more customers install private self supply irrigation wells in order to avoid paying for water used to irrigate landscaping. Irrigation well installation is largely unregulated by SJRWMD or SRWMD. Once a homeowner installs a well, the water is free and there is no financial incentive to conserve.

Water rate structures and charges vary widely in Alachua County (Table 4.1). Currently Gainesville, Newberry, High Springs, Archer, Waldo, and Micanopy use inverted block rate structures. The number of blocks varies from a minimum of 3 in Gainesville to a maximum of 11 in Micanopy. Alachua and Hawthorne use uniform rates. Additionally, Gainesville has a separate rate structure for water used only for irrigation and for reclaimed water (see Reclaimed Water chapter).

Table 4.1: Summary of the Current Rate Structures in the County

Public Water System	Type of Service	Charge	Units	Cost/Unit
City of Gainesville Gainesville Regional Utilities (GRU)	Residential Water	Customer Charge	1	$7.30
		1,000 - 9,000gals	per 1,000 gal	$1.65
		10,000 - 24,000gals	per 1,000 gal	$3.30
		+25,000gals	per 1,000 gal	$6.00
	Irrigation Only	Customer Charge	1	$7.30
		First 15,000 gallons	per 1,000 gal	$3.30
		Over 15,000 gallons	per 1,000 gal	$6.00
	Reclaimed Water	Customer Charge	1	$6.00
		Per 1,000 gal no limit	per 1,000 gal	$0.60
	Non-Residential Water	Customer Charge	1	$7.30
		Consumption Charge	per 1,000 gal	$3.30
	Irrigation Only	Customer Charge	1	$7.30
		Consumption Charge	per 1,000 gal	$ 4.35
City of Newberry	Residential and Commercial Water[1]	Base Rate (first 4,000 gallons)	1	$14.00
		4,001 to 5,000 gallons	per 1,000 gal	$1.75
		5,001 to 10,000 gallons	per 1,000 gal	$2.25
		10,001 to 20,000 gallons	per 1,000 gal	$2.75
		20,001 or greater	per 1,000 gal	$3.15
City of Alachua	Residential and Commercial Water[1]	First 3,000 gallons	1	$7.30
		Additional 1,000 gallons	per 1,000 gal	$1.10
City of Hawthorne	Residential and Commercial Water[1]	First 3,999 gallons	1	$11.97
		Additional 1,000 gallons	per 1,000 gal	$1.39
City of High Springs	Residential and Commercial Water	Base Charge	1	$3.06
		0 to 3,000 gallons	per 1,000 gal	$2.69
		3,001 to 5,000 gallons	per 1,000 gal	$3.04
		5,001 to 15,000 gallons	per 1,000 gal	$3.31
		Greater than 15,000 gallons	per 1,000 gal	$3.58

Table 4.1 (continued): Summary of the Current Rate Structures in the County

Public Water System	Type of Service	Charge	Units	Cost/Unit
City of Archer	Residential and Commercial Water	Residential Base Charge for 3,000 gallons	1	$14.91
		Commercial Base Charge for 3,000 gallons	1	$18.22
		3,001 to 6,000 gallons	per 1,000 gal	$3.59
		6,001 to 9,000 gallons	per 1,000 gal	$3.70
		9,001 to 12,000 gallons	per 1,000 gal	$4.42
		12,001 to 15,000 gallons	per 1,000 gal	$4.97
		15,001 to 18,000 gallons	per 1,000 gal	$5.52
		18,001 to 21,000 gallons	per 1,000 gal	$6.07
		21,001 or greater	per 1,000 gal	$6.62
City of Waldo	Residential and Commercial Water	Customer Charge	1	$15.44
		1,000 to 3,000 gallons	per 1,000 gal	$3.21
		3,001 to 6,000 gallons	per 1,000 gal	$3.27
		6,001 to 9,000 gallons	per 1,000 gal	$3.33
		9,000 or greater	per 1,000 gal	$3.39
Town of Micanopy	Residential and Commercial Water	Base Charge for residential and commercial accounts	1	$20.07
		0 to 1,000 gallons	per 1,000 gal	$2.19
		1,001 to 2,000 gallons	per 1,000 gal	$2.46
		2,001 to 3,000 gallons	per 1,000 gal	$2.73
		3,001 to 4,000 gallons	per 1,000 gal	$3.00
		4,001 to 5,000 gallons	per 1,000 gal	$3.28
		5,001 to 6,000 gallons	per 1,000 gal	$3.55
		6,001 to 7,000 gallons	per 1,000 gal	$4.37
		7,001 to 8,000 gallons	per 1,000 gal	$4.92
		8,001 to 9,000 gallons	per 1,000 gal	$5.46
		9,001 to 10,000 gallons	per 1,000 gal	$6.01
		10,001 or greater	per 1,000 gal	$6.56

[1]Irrigation meter available with no charge for wastewater, water fees remain the same.

WATER CONSERVATION OPPORTUNITIES

A. **Evaluate the impact that non-discretionary charges, such as wastewater fees, have on the effectiveness of conservation rate structures.** Wastewater charges applied by many utilities, based on non-discretionary water usage, can distort the conservation price signal sent by the inverted volumetric water rates to the customers. (Borisova, 2008)

B. **Establish a water pricing structure that includes the full cost of operating, maintaining, and protecting the water supply system and resources.** Consumers should be charged the full cost of water. Full cost pricing refers to price levels that recover all the direct and indirect costs associated with providing water. Full cost pricing can take the form of any rate structure, so long as all costs are recovered through prices. (EOEAWR, 2006)

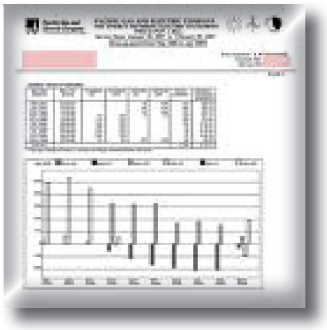
C. **Develop a methodology to assess environmental costs.** Commit to developing a methodology for assessing the environmental costs of water withdrawals for water suppliers to use in setting true "full cost" water prices. (EOEAWR, 2006)

D. **Phase in conservation rate structures.** Conservation rates should be phased in, concentrating on the largest utilities first. Inverted block rates should be used unless specific circumstances warrant an alternative rate structure, and only if the utility can demonstrate that it will be able to achieve its water use objective under that alternative rate structure. (FDEP, 2002) (SJRWMD, 2009)

E. **Evaluate conservation rate structures.** Stallworth, 2003 suggests that "for effective pricing utilities, communities, and water planners will need to consider at least three issues: the service population's ability to afford higher rates, the effects of conservation rates on a utility's revenues, and their actual effectiveness in reducing water demand." Evaluation of water conservation stipulated by inclining block structures is very important. Inclining block rates can be designed in a variety of ways (number of blocks, price difference between the blocks, etc.), and not all of these designs induce water conservation. For example, a high uniform rate may provide greater incentives for water conservation than a low (on average) inclining block. (UF Comment 12-28-2009)

F. **Require drought rates as part of utility conservation rate structures.** All utilities should adopt drought rate structures to use during a water management district's declared water shortage. Utilities should develop rate structures that are appropriate for its service area. Utilities should develop drought emergency plans which include advanced approval of drought rates. (FDEP, 2002)

G. **Phase in informative billing.** Informative billing should be required on a statewide basis. Many customers are not aware of their utility's rate structure or rates, how much water they use, how their bill is calculated, how much they could reduce their bill by reducing water consumption, or how their usage compares to others in the same customer class. Bills containing such information may encourage conservation. (FDEP, 2002) (SJRWMD, 2009)



H. **Require more accurate and widespread measurement of water use, including metering and sub-metering.** Accurate measurement of water use gives consumers a reliable accounting of the water they use. In order for consumers to effectively conserve water, they need the month-to-month comparison data that metering provides. Sub-metering refers to installing secondary meters to capture water use data for multiple uses or users deriving water from a single source. It is recommended that Alachua County pursue more widespread use of water meters, and that meters and submeters for water utility customers be read and billed on a bimonthly basis at a minimum. (FDEP, 2002) (SJRWMD, 2009)

I. **Install individual meters at multi-family housing.** Many apartment complexes do not meter individual water usage, and include payments for water use into the rent. As a result, residents cannot monitor their water use, and have very little incentives to conserve water. (UF Comment 12-28-2009)

J. **Water use data collection.** Coordinate with water utilities within their jurisdiction to merge utility account level consumption data with tax appraisal data to identify and map consumption. This process would show geographically where there is room for improvement in water conservation ("found water") year to year. Counties and utilities should work together to fully fund this process. (SJRWMD Comment 3-01-2010)

K. **Full cost accounting**. The county should emphasize the use of "full cost accounting" versus "cash flow" accounting as the basis for future water pricing programs. (SJRWMD Comment 3-01-2010)

L. **Additional revenue sources.** Consider implementing a fund similar to the Chesapeake and Atlantic Coastal Bays Restoration Fund to pay for water conservation programs. (Citizen Comment 2-3-2010)

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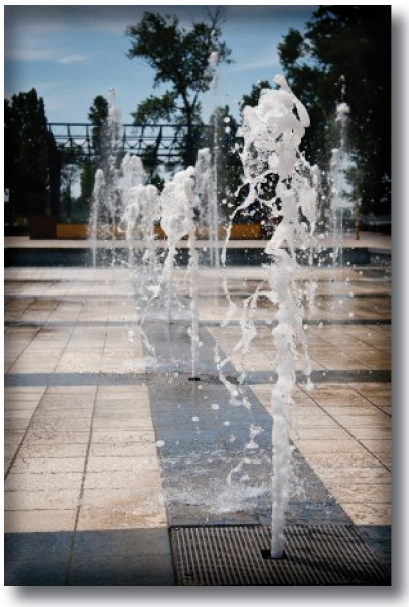
Chapter 5: Industrial, Commercial, & Institutional

INTRODUCTION



The industrial, Commercial, and Instituional (ICI) category covers a diverse number of users. Generally ICI refers to nonresidential public water supply customers and excludes multifamily residential uses. Water is crucial for the functioning of many ICI facilities, such as: hospitals, schools, prisons, universities, colleges, etc. ICI facilities use water in various ways, including: heating, cooling, processing sanitary needs, and landscaping. In many communities, such as Alachua County, these facilities constitute one of the largest water users, and therefore instituting ICI water conservation measures could significantly help reduce the overall consumption in our community.

Publicly managed buildings, facilities, and landscapes should be at the forefront on indoor and outdoor water use efficiency. These highly visible facilities should set an example and lead the way in water saving techniques. These sites should serve as demonstration sites with signage to make the public aware that the state, counties, and municipalities are leaders in water conservation.

The North Carolina's *Water Efficiency Manual for Commercial, Industrial and Institutional Facilities* and the East Bay Municipal Utility District's *Watersmart Guidebook* have excellent menus of water conservation opportunities for specific ICI uses and industries.

WATER CONSERVATION OPPORTUNITIES

A. Install water efficient fixtures. All ICI users should install/retrofit water saving sanitary devices, including, but not limited to: low-flow showerheads, faucet aerators, toilet displacement devices, and low flow or high efficiency toilets. Waterless urinals and fixtures should also be investigated. (EOEAWR 2006)

B. **Increase the amount of pervious areas on property.** ICI facilities often include large areas of impervious surfaces (building rooftops, parking lots, etc.) which offer excellent opportunities for green roofs, bioretention areas in parking lots, rainwater harvesting, pervious parking, and other Low Impact Development (LID) techniques. (EOEAWR 2006)

Efficient fixtures at the Alachua County Jail

C. **Create demonstration sites.** Use public buildings as demonstration sites for innovative water conservation techniques, such as: composting, foam flush and dual flush toilets, cisterns for rain collection, and water-wise landscaping. (EOEAWR 2006) Examples include the ICON Water Reduction System implemented at the County Jail and the LEED certification for two recently built fires stations.

D. **Create an auditing program.** Conduct indoor and outdoor audits and account for full use of water based on full metering of public buildings, parks, irrigated playing fields, and other facilities. Analyze existing water use data to spot trends, patterns, and unexplained increases that could indicate leaks or inefficient use of water. (EOEAWR 2006) (FDEP, 2002). For example, GRU's conservation programs include identification of high users and performance of voluntary audits of customer water use.

E. **Establish a "Conservation Certification" program.** Recognition can be an effective tool to promote water conservation among industrial, commercial, and institutional (ICI) users. Certification of ICI users that implement Best Management Practices (BMPs) and other water conserving measures can provide a market advantage for certified businesses among consumers who prefer to do business with companies that have good environmental records. (FDEP, 2002)

F. **Consider a range of financial and regulatory incentives and alternative supply credits.** Tax and regulatory incentives can be effective tools to encourage water conservation. Investigate the feasibility of tax and regulatory incentives (corporate income tax, sales tax, property tax, or environmental permitting) to encourage implementation of water conservation measures. (FDEP, 2002)

G. **Use cooperative funding for the use of alternative technologies to conserve water**. Self-supplied facilities that use large quantities of water often have little incentive

to conserve water if the efficiency improvements cost more than conventional technology. Investigate the feasibility of a program to identify and fund water conservation projects that are not economically feasible for self-supplied facilities to undertake due to the low cost of water compared to the higher cost of more efficient technology. (FDEP, 2002)

H. **Promote the utilization of reclaimed water.** Potable quality water is not needed for many industrial, commercial, and institutional activities. Substitution of high-quality reclaimed water offers significant opportunities to conserve potable quality water. (FDEP, 2002)

I. **Investigate methods of assuring that large users from a public supply implement the same conservation measures as users with individual permits.** Some large water users receiving their water from a permitted public supplier are not required to do as much water conservation as individual permit holders. Public water suppliers are responsible for meeting the conservation requirements of their permits, and there needs to be adequate mechanisms to ensure that their large customers follow Best Management Practices. (FDEP, 2002)

J. **Harvest rainwater.** As part of the site plan process, the County could require that new commercial developments meeting a size threshold provide a preliminary feasibility study, including cost analysis, to determine whether rainwater harvesting is viable at the site. (East Bay, 2008). Incentives could be given to facilities that substitute potable water with harvested rainwater.

K. **Recover air condition condensate.** As part of the site development process the County could require that commercial sites exceeding a threshold for tonnage of air-conditioning examine the feasibility of diverting all condensate drain water to a common point where it could easily be re-used. (East Bay, 2008)

L. **Prohibit the use of groundwater for chillers.** Pumping groundwater to be used solely for cooling properties is not an efficient use of limited water resources and should not be permitted if reclaimed water is available.

M. **Reduce landscape irrigation at ICI facilities.** Limit the use of potable water for irrigation at ICI facilities. See the Landscape Irrigation Chapter for specific recommendations that could be applied to ICI facilities.

N. **Establishment of benchmarks for the efficiency of ICI water uses based on national standards.** Benchmarks would be helpful for measuring efficiency progress. (SJRWMD, 2009)

O. **Require entities to demonstrate water use efficiency for Consumptive Use Permit (CUP) application, renewal, and five-year compliance reports.** Requirement for a plan to improve efficiency to meet the required goal to be included in the CUP if the permittee does not meet the established water use efficiency goal. (SJRWMD, 2009)

P. **Incentivize use of soil moisture sensors for high end users, especially institutions and commercial settings** (IFAS Comment 02-22-2010)

Q. **Revise Alachua County Comprehensive Plan Policy to require that Consumptive Use Permits issued by the water management districts do not allow harm to the resource.** Protect water resources by working with the water management districts to ensure that no water use permits are issued that could result in harm to water resources.

R. **Alachua County Government should lead by example.** Alachua County Governments should show leadership by implementing effective water conservation programs in all County operations.

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Chapter 6: Residential Water use

INTRODUCTION

Some of the greatest indoor water savings is through the use of water-efficient appliances, toilets, and showerheads (FDEP, 2002). Maximizing the use of efficient fixtures can reduce indoor water use by as much as 30 percent. Water leaks can be one of the largest sources of waste of indoor water, so detecting and eliminating these is a great way to conserve water. Creating and implementing water audit inspection programs and requiring upgrades of plumbing fixtures will substantially conserve water (FDEP, 2002). Expanding programs and providing incentives to replace inefficient home plumbing fixtures and appliances, adopting Florida Water Star[SM] standards for residential and commercial development in local codes, and expanding educational outreach campaigns can also improve indoor water conservation.

Alachua County Environmental Protection Department provides public outreach to citizens on ways they can conserve water at home and at their places of employment and is a funding partner of the St Johns River Water Management District (SJRWMD) Watershed Action Volunteers (WAV) Program. WAV volunteers give presentations and use hands on models to educate children and adults on water conservation.

WATER CONSERVATION OPPORTUNITIES

A. **Support the adoption of national standards set by the EPA's WaterSense™ and Energy Star™ programs for more water efficient clothes washers, dishwashers, and other plumbing devices.** Creating standards would require manufactures to make more efficient products and would make efficient products readily available for citizens. (FDEP, 2002)

B. **Update the state plumbing code**. The State should include efficiency standards for household appliances in the plumbing code and should update existing plumbing fixture standards to reflect current designs that allow for greater water use efficiency. (EOEAWR, 2006). Reduce restrictions so grey water (wastewater from sinks and showers) can be used indoors. (Citizen Comment, 12-17-2009)

C. **Create programs to replace inefficient appliances and fixtures.** Toilets account for about 25% and clothes washers for 22% of water used in homes. The replacement of high volume plumbing fixtures, such as showerheads and faucet aerators, and appliances with water efficient models (EPA WaterSense™, SJRWMD Water Star℠, or equivalent) has the potential for saving water. Hot water heaters could be included in these programs, as centrally located water heaters or manifold plumbing systems can realize significant savings. Incentives and rebates could be utilized. (FDEP, 2002) (SJRWMD Public Comment 3/1/2010).

D. **Provide incentives for meeting Water Star℠ standards.** Meeting SJRWMD Water Star℠ standards for certification will result in significant indoor and outdoor water savings. (SJRWMD, 2009)

E. **Support tax incentives for the installation of water efficient appliances**. The State should investigate opportunities to provide a sales tax exemption on the purchase of qualified water-efficient toilets, washing machines, and other appliances. (EOEAWR, 2006)

F. **Minimize/discourage the use of garbage disposals**. Encourage consumers to reduce the use of sink garbage disposals to improve septic system function (where applicable) and save water. Divert compostable waste to a compost pile instead. Finished compost can then be added to the soil around the home or even spread thinly on the lawn to help boost its soil moisture retention capacity and reduce the need for watering. (EOEAWR, 2006)

G. **Promote waterless plumbing fixtures**. Communities, water suppliers, developers, and individuals wishing to go beyond current standards should consider installing waterless plumbing fixtures such as a composting toilet or a 3-ounce foam flush toilet, which can be flushed with only 6 ounces of a soapy solution (3 ounce pre-flush and 3-ounce post flush). State and municipal buildings should be used as demonstration sites for these technologies. (EOEAWR, 2006). More research needs to be conducted on waterless urinals before they are encouraged on a large scale. (GRU Public Comment 3/2010)

H. **Require inefficient plumbing fixtures be retrofitted at time of home sale or when**

retrofits requiring a building permit are conducted. Requirements for low-volume plumbing fixtures in all new development and remodeling did not come into effect until 1994. Upgrading older fixtures to EPA WaterSense™, SJRWMD Florida Water Star℠, or comparable guidelines presents great saving opportunities. (FDEP, 2002) (SJRWMD, 2009)

I. **Create a water audit inspection program for the sale of new and existing homes.** This would result in older homes eventually becoming more water efficient and would ensure new homes are built to achieve current water conservation levels. Florida Water Star℠ now has a Bronze certification for residential retrofits. (FDEP, 2002) (SJRWMD Public Comment 3/1/2010)

J. **Facilitate leak repair**. Communities should create a list of plumbers that would be willing to fix a leak at a reasonable rate. This list should be provided to the public to encourage people to fix leaks that they might otherwise allow to run continuously. Governments and utilities should also consider rebate and incentive programs to further encourage the repair of wasteful leaks. Ordinances requiring the repair of leaks could also be adopted. (EOEAWR, 2006)

K. **Encourage the use of non-potable water supplies for appropriate uses.** This could include the use of cisterns and other rain collection devices. Collected rainwater could be used in clothes washing machines, for flushing toilets, and/or for outdoor uses. Gray water could also be used for some uses, such as flushing toilets. All uses would have to meet Building Codes and Health Department regulations. (FDEP, 2002)

L. **Set a water budget.** Require citizens to meet or demonstrate steady progress toward meeting a residential water use per capita per day (gpcd,) including both indoor and outdoor use. (EOEAWR, 2006)

M. **Publish municipal water usage.** Graph the community's water usage and make the data publicly available, so the public can see their water conserving progress. (Austin). Gainesville residents can check their consumption at www.GainesvilleGreen.com

N. **Encourage covers and leak detection for swimming pools.** Covering public and private pools when not in use prevents evaporative losses. It will be necessary to make sure the covers are appropriate for the specific pools and that they do not create a safety hazard. (EOEAWR, 2006) A program could be put in place requiring

leak detection in pools. (SJRWMD Public Comment 3/1/2010).

O. **Prohibit the installation of residential swimming pools if access to a neighborhood pool within the subdivision exists.** Pools not only require the initial water to fill them, but also require continual inputs due to evaporation, splash loss, and filter maintenance. Reducing the number of residential pools would also benefit water quality, as many homeowners erroneously discharge pool water to creeks and stormwater collection systems.

P. **Prohibit the use of potable water to wash any hard surface**. Sidewalks, walkways, driveways, or parking areas should be swept unless flushing is needed to protect health and safety. (EOEAWR, 2006) (Los Angeles, 2009)

Q. **Prohibit the use of potable water or groundwater in fountains, decorative pools or other aesthetic water features**. Potable watershould not be used to clean, fill, augment, or maintain decorative fountains unless the water is part of a re-circulating system. (Los Angeles, 2009)

R. **Limit the use of potable water for washing vehicles**. Encourage more efficient use of water for washing vehicles. Encourage the use of a bucket and sponge and only allow the use of a hose if it has a self closing shut off valve. Encourage use of the hose only for final rinses. Promote the use of professional car wash services which re-circulate the water. (EOEAWR, 2006) (Los Angeles, 2009) (Citizen Comment, 10-23-2009)

S. **Coordinate and expand public outreach programs.** Utilize social marketing techniques to encourage water conserving behaviors. Form partnerships to strengthen messages and increase campaign budgets. (FDEP, 2002). Add water conservation into elementary, middle, and high school curriculum. (Citizen Comment 12-18-2009).


THE WADER

Spring 2008

When was the last time you examined your own back yard? What activities take place there? What kinds of trees, shrubs and plants live there? Do you have wildlife visitors? Do you own a pool? Tend a garden? Do you notice the changes that take place there through the seasons. The way the sun hits, the wind blows, the water falls? As we move into this beautiful spring season, you may want to take notice of what happens there as you garden, play with your children or chase your pets around because what you do in your own back yard affects everyone

Alachua County receives an average of 50 inches of rain a year. The rain that falls in your back yard carries the activities that take place there to creeks, streams, ponds, and to the aquifer. This means that any automobile fluids and wastes, detergents, fertilizers, pesticides, household chemicals or pet wastes that remain on your driveway or yard are eventually carried to the aquifer. How that happens is another story – if you live in the eastern Gainesville area, rainwater that falls on your yard may drain across to Boulware Springs, or it may eventually drain to one sink or another where the water is deposited directly into the Floridan aquifer. On the west side of Gainesville (west of I-75), much of the rainwater drains directly to the aquifer. An interesting fact about our county is that there are very few surface waters (except lakes) so regardless of your geographic position, the water that falls on our community and any pollutants it contacts

Inside this Issue...

Creeks Week ..... 1&2

Program Spotlight ..... 3&4

Landscaping Tips 3

What's Happening 4

The Wader is an electronic newsletter published by the Alachua County Environmental Protection Department to promote protection of water resources, with an emphasis on public outreach efforts of ACEPD and partnering organizations. To submit an article please contact Stacie Greco at sgreco@alachuacounty.us

T. **Require permits for all new potable wells.** Require permits for all new potable wells regardless of size. Require the installation of a meter for monitoring water consumption as part of the permit requirements. Permitting wells and accounting for their consumption will help in planning efforts.

U. Restrict the installation of new wells for landscape irrigation. Restrict the installation of new wells when public supply is available. Since there is no price signal to encourage water conservation, the installation of a private well can lead to substantial uses of groundwater for landscape irrigation. (GRU Public Comment 3-2010)

V. Explore greywater reuse. Coordinate with the Health Department and evaluate the regulations regarding greywater reuse. (public comment 12-17-2009)

W. Develop goals for reducing indoor water use. Set goals for indoor water reduction and develop and implement a plan to measure effectiveness in meeting the goals.

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Chapter 7: Reclaimed Water

Reclaimed Water Opportunities	Page	Jurisdiction
A- Encourage metering and volume-based rate structures.	59	Utility
B- Implement viable funding programs.	60	Water Management District
C- Facilitate seasonal reclaimed water storage.	60	Utility / WMD
D- Encourage use of reclaimed water in lieu of other water sources in the agricultural irrigation, landscape irrigation, industrial/commercial/institutional, and indoor water use sectors.	60	Education and Outreach
E- Link reuse to regional water supply planning, (including integrated water resource planning).	60	Water Management District
F- Update the Comprehensive Plan.	60	Local Government
G- Develop integrated water education programs.	61	Education and Outreach
H- Encourage ground water recharge and indirect potable reuse.	61	FDEP
I- Discourage effluent disposal.	61	FDEP
J- Encourage the use of reclaimed water for power generation cooling water.	62	Water Management District
K- Provide water use permitting incentives for utilities that implement reuse programs.	62	Water Management District
L- Continue to encourage reuse in Northeast Florida.	62	Education and Outreach
M- Encourage use of supplemental water supplies.	62	Utility
N- Encourage efficient irrigation practices.	62	Education and Outreach
O- Encourage reuse system interconnects.	62	Utility
P- Enable redirecting of existing reuse systems to more desirable reuse options.	63	Education and Outreach
Q- Use reclaimed water at government facilities.	63	Local Government
R- Incorporate reuse, regional water supply planning, and integrated water resources planning into the Department of Community Affairs' rules governing the state's Comprehensive Planning Program.	63	State
S- Ensure continued safety of water reuse.	63	FDEP
T- Continue existing programs to address many of the issues and unknown implications of using reclaimed water.	63	State
U- Require new developments to install reclaimed water systems for irrigation where feasible.	64	Land Development Regulations
V- Apply landscape irrigation restrictions to reclaimed water systems.	64	Water Management District

INTRODUCTION

Reuse is the deliberate application of reclaimed water (wastewater that has been treated at a permitted wastewater treatment facility), in compliance with State and local rules, for a beneficial purpose. Criteria used to classify projects as "reuse" or "effluent disposal" are contained in Rule 62-610.810, F.A.C.

According to the State of Florida's Water Conservation Initiative this should be accomplished by encouraging and promoting reuse to maximize the amount of reclaimed water used for all domestic wastewater treatment facilities (WWTFs) having capacities of 0.1 million gallons per day (MGD) or larger (FDEP 20002). Ideally, 100 percent of the domestic wastewater being treated would be re-used as reclaimed water. Reuse should be efficient and effective. Efficient reuse would maximize the amount of potable quality water saved through the use of reclaimed water and/or maximize the amount of reclaimed water that recharges an underlying aquifer that is used for potable supply or augments a Class I surface water (which are used as a potable water source). Effective reuse would direct reuse activities toward uses that offer the greatest benefits.

The Florida Legislature has established "The encouragement and promotion of reuse of reclaimed water and water conservation..." as formal state objectives in Section 403.064(1), Florida Statutes (F.S.), and Section 373.250, F.S. The objectives are included in the statute dealing with environmental and wastewater control and the statute dealing with water resources and water supply. Florida's reuse program was implemented in response to the state reuse objectives. (RCC 2003)

The use of emerging technologies which reduce nutrient concentrations for wastewater treatment and effluent disposal are important tools for improving water quality and protecting the Floridan aquifer. Instead of disposing of reclaimed water into a waterbody or by land application, using it for irrigation and in created wetlands can further reduce nitrogen concentrations. This type of reuse disperses the reclaimed water which reduces hydraulic loading that forces nutrient rich water to recharge groundwater and allows vegetation to uptake the nutrients before they reach the groundwater. These same principles also apply to septic systems.

Water reuse is an important aspect of water resource conservation and protection.

Reclaimed water can be reused in a number of applications: industrial uses (such as cooling water), landscape irrigation, and wetland hydration. The use of reclaimed water for landscape irrigation has increased over the past 15 years. In Alachua County eight municipal water reclamation facilities (WRF) are permitted to treat 23.04 mgd of wastewater, of which 13.21 mgd is permitted by FDEP for reuse. The Gainesville municipal facilities (Main Street and Kanapaha), University of Florida, and City of Alachua are the main permitted sources of reuse within Alachua County (Table 7. 1).

Table 7.1 Permitted and Reported Reclaimed Water use in Alachua County.*

Water Reclamation Facility (WRF)	Total Permitted Average Daily Flow (mgd)**	Permitted Reclaimed Water Use (mgd)	Reported Reclaimed Water Reuse 2008 (mgd)
GRU Main Street WRF	7.50	1.958	0.00***
GRU Kanapaha WRF	10.00	6.890	3.082
University of Florida WRF	3.00	3.96	0.943
City of Alachua WRF	0.937	0.40	0.041
City of High Springs WRF	0.24	0.00	0.00
City of Newberry WRF	0.764	0.00	0.00
City of Hawthorne WRF	0.50	0.00	0.00
City of Waldo WRF	0.099	0.00	0.00
Reclaimed Water Totals	**23.04**	**13.21**	**4.066**

*FDEP Water Reclamation Facility permits and facility monthly operating reports.
**Permitted average annual daily flow in million gallons per day (mgd).
***Current reclaimed water from MSWRF is used for cooling. The Paynes Prairie Sheetflow Restoration projec will result in 100% reuse of the MSWRF flow.

WATER CONSERVATION OPPORTUNITIES

A. **Encourage metering and volume-based rate structures.** Metering reclaimed water use and implementing volume-based rate structures are consistent with the philosophy that reclaimed water is a valuable water resource. Therefore it should be encouraged as a means for promoting efficient and effective use of reclaimed water. Add provisions encouraging reclaimed water metering and volume-based rate structures to Chapters 62-40 and 62-610, Florida Administrative Code (F.A.C.). (RCC 2003), (FDEP 2002)

B. **Implement viable funding programs.** Viable funding programs are needed in all five water management districts. This will result in additional reuse efforts, with increased recharge of available water resources and increased conservation of potable water. In addition, funding programs offer opportunities to impose grant or loan conditions that will encourage efficient and effective use of reclaimed water. There could also be conditions for metering and volume-based rate structures. This should also fund a statewide research program. (RCC 2003), (FDEP 2002)

C. **Facilitate seasonal reclaimed water storage** (including aquifer storage and recovery "ASR"). One of the most promising technologies for provision of seasonal storage is ASR. This alternative involves the use of an underground formation to store reclaimed water during low demand periods, with subsequent recovery of the stored water to meet high demands for water. Consider review and refinement of aquifer storage and recovery rules in Rule 62-610.466, F.A.C. (RCC 2003), (FDEP 2002)

D. **Encourage use of reclaimed water in lieu of other water sources in the agricultural irrigation, landscape irrigation, industrial/commercial/ institutional, and indoor water use sectors.** Substitution of potable water with high-quality reclaimed water offers significant opportunities to conserve potable water. Various uses of reclaimed water are addressed in the other chapters of this report. (RCC 2003)

E. **Link reuse to regional water supply planning, (including integrated water resource planning).** Currently the State of Florida requires the use of reclaimed water in lieu of other water sources within Water Resource Caution Areas designated by the water management districts. (Chapter 62-40, F.A.C) The policies of all the water management districts encourage reuse of reclaimed water in regional water supply planning. The four water management districts that have prepared regional water supply plans have included water reuse as important components of their plans. Consider providing for longer term DEP permits for reuse programs that are consistent with regional water supply plans. (RCC 2003) Also the regional water supply plans should take into account that the more effective water conservation programs are, the less water is available for reuse (Borisova 2009)

F. **Update the Comprehensive Plan.** The Alachua County Comprehensive Plan needs updated policies reflecting recent water management actions to protect levels and flows

of surface waters and springs and to promote water conservation, use of reclaimed water and integrated water resource projects. (ACDGM 2009)

1) Potable Water and Sanitary Sewer Element policies in Objective 8 promote the increased conservation and reuse of water. These policies should be updated to further enhance water conservation activities in Alachua County. (ACDGM 2009)

2) New water conservation standards may include requiring the use of reclaimed water and the connection to those systems to be used when reclaimed water becomes available.

3) Linking protection of water quality with policies related to groundwater impacts, including water use, conservation, and reuse. (ACDGM 2009)

4) Policies should be developed to further promote environmentally sound methods of effluent disposal and prohibit the use of rapid infiltration basins (RIBs or percolation ponds), which do not provide adequate nutrient removal. (ACDGM 2009)

G. Develop integrated water education programs. This is a critical strategy that really embraces the full range of water programs. We must do a better job of educating the public about the nature of water, limitations on water, the fact that all water is recycled, and the need for and issues involved with alternative water supplies. (RCC 2003), (FDEP 2002)

H. Encourage ground water recharge and indirect potable reuse. When considering efficiency and effectiveness of reclaimed water use, indirect potable reuse and ground water recharge offer significant advantages, including high recharge fractions. Recharge fraction is the portion of reclaimed water used in a reuse system that recharges an underlying potable quality groundwater or augments a Class 1 surface water that is used for potable supply, expressed as a percentage of the amount of reclaimed water used.(RCC 2003), (FDEP 2002)

I. Discourage effluent disposal which does not provide a beneficial use. Florida has established the encouragement and promotion of water reuse as formal state objectives (Section 403.064(1), Florida Statutes (F.S.), and Section 373.250, F.S). While Florida has been remarkably successful in embracing water reuse, large quantities of wastewater

effluent are wasted through surface water discharges, ocean outfalls, and deep injection wells. Re-use should be encouraged and effluent disposal discouraged.(RCC 2003)

J. **Encourage the use of reclaimed water for power generation cooling water.** The South Energy Center which supplies energy to the Shands Cancer Center uses reclaimed water for cooling. The use of reclaimed water should also be considered for Deerhaven and the proposed biomass power generation facility.

K. **Provide water use permitting incentives for utilities that implement reuse programs.** In an effort to further encourage water reuse, the water management districts may be able to offer some incentives for implementation of water reuse projects through their water use permitting activities. (RCC 2003), (FDEP 2002)

L. **Continue to encourage reuse in Northeast Florida.** Reuse in Northeast Florida should be encouraged because of declining groundwater levels in the region.

M. **Encourage use of supplemental water supplies.** As water reuse systems mature and demands for reclaimed water approach and begin to exceed available supplies, effective use of ground water, surface water, treated stormwater, and if need be even potable water should be used to supplement the reclaimed water supply. (RCC 2003), (FDEP 2002)

N. **Encourage efficient irrigation practices. S**ome irrigation practices using reclaimed water may not be very efficient. While metering and the use of volume-based rates probably offer the greatest potential to increasing irrigation efficiency, other measures are also available. The efficient irrigation methods outlined in the Agricultural Water Use and Landscape Irrigation sections of this Water Conservation Initiative should be applied to irrigation systems that utilize reclaimed water. (RCC 2003)

O. **Encourage reuse system interconnects.** Interconnection of reuse systems, which is connections between reclaimed water systems, offers significant advantages in that greater flexibility and reliability will result. This will require strengthening cross-connection control requirements in Rule 62-555.360, F.A.C. (RCC 2003), (FDEP 2002)

P. Enable redirecting of existing reuse systems to more desirable reuse options. Reuse activities may have differing levels of desirability based on their anticipated potable quality water offsets and recharge fractions. Revise Rule 62-610.800(10), F.A.C., to enable redirecting of less desirable reuse systems to reuse activities featuring relatively high potable quality water offsets and/or recharge fractions. (RCC 2003), (FDEP 2002)

Q. Use reclaimed water at government facilities. State and other governmental agencies should lead by example in water reuse. Not only does the use of reclaimed water at state facilities conserve water, but it also can provide a very effective means of educating the public. When feasible, reclaimed water should be used at parks, rest areas, welcome centers, and other governmental facilities, all with attractive and visible signs describing the use of reclaimed water and touting the advantages and safety of water reuse. (RCC 2003)

R. Incorporate reuse, regional water supply planning, and integrated water resources planning into the Department of Community Affairs' rules governing the state's Comprehensive Planning Program. (RCC 2003)

S. Ensure Continued Safety of Water Reuse. This strategy addresses such topics as cross-connection control, public education, responsible utility management, responsive oversight, control of pathogens, control of the emerging pollutants of concern (EPOC), and implementation of a "water is water" philosophy. As noted by York, et al. (2001), there is a need to adopt a "water is water" philosophy for water management. This recognizes the facts that the Earth's water supply is finite, that all water is reused, and that, regardless of the prefixes applied to water (storm-, surface-, ground-, waste-, reclaimed-), water is simply water. Even untreated domestic wastewater is 99.9 percent water (by weight). Much of the commonly used water-related terminology simply poses artificial barriers to the use of the so-called alternative sources. (RCC 2003)

T. Continue existing research programs to address many of the issues and unknown implications of using reclaimed water. Investigate fate, transport, and water quality changes during aquifer storage and recovery. Evaluate the need for landscape fertilization and develop BMPs for the use of fertilizer when irrigating with reclaimed water. There is an ongoing and continual need for research related to groundwater recharge and indirect potable reuse. Evaluate the results of the ongoing Water Environment Research Foundation (WERF) pathogen study. DEP should fund a pathogen study at a water reclamation facility in an effort to supplement the ongoing WERF pathogen study. DEP should fund a Giardia infectivity study to verify the results of a

recent infectivity study completed by the Los Angeles County Sanitation District. DEP should fund studies of the emerging pollutants of concern (EPOC) in reclaimed water and in other water sources. (RCC 2003)

U. **Require new developments to install reclaimed water systems for irrigation where feasible**. It is much less expensive to install reclaimed water distribution systems at the time properties are developed rather than attempting to retrofit neighborhoods with reclaimed water. Where feasible new developments should be required to install reclaimed water distribution systems as a condition of permitting. (GRU 2010)

V. **Apply landscape irrigation restrictions to reclaimed water systems.** Currently there are no restrictions on the use of reclaimed water for landscape irrigation which can lead to wasteful overwatering. The same irrigation restrictions should apply to reclaimed water.

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