The Florida Senate

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Committee on Agriculture Senator Rod Smith, Chair

REUSE OF WATER

SUMMARY

Florida's population growth and greater awareness of environmental water requirements have increased the pressure on agriculture to use water more efficiently and to make more water available for urban and environmental uses. Agricultural reuse of production water, irrigation runoff recycling and the use of water from stormwater retention areas are practices where significant gains in water conservation and efficient water use appear to be possible.

Agricultural reuse water can be compartmentalized into two categories: **reclaimed water** (treated effluent) and **on-farm reuse water** (tailwater recovery). The focus of this report is on-farm reuse water, which is farm production water that originates from a surface or groundwater source, is used to irrigate crops, with excess water (i.e., tailwater) captured and stored for future reuse.

An **agricultural tailwater recovery system** (on-farm reuse water) generally consists of three components: collection, storage, and reuse of residual irrigation water and/or excess stormwater runoff. These components involve major construction that relies upon items such as pipes, pumps, ponds, berms, ditches, etc. A properly designed and constructed tailwater recovery system will allow for the long term storage (up to several months) of on-farm production water, so it can be reused during the dry season months that also correlate with peak water use demand. The South West Florida Water Management District and the Florida Department of Agriculture and Consumer Services have participated in the design and construction of tailwater recovery systems in parts of the District; namely, the Upper Myakka River Watershed.

There is a direct relationship between implementation of structural projects such as tailwater recovery and growers' access to monetary assistance. Included in this report are recommendations to identify possible revisions to Chapter 373, F.S., that would streamline regulatory procedures and provide incentives for implementing agricultural water conservation programs.

BACKGROUND

Florida's unique geography and warm, subtropical climate have allowed the state to become one of the most productive agricultural regions in the world. However, its population growth and greater awareness of environmental water requirements have increased the pressure on agriculture to use water more efficiently and to make more water available for urban and environmental uses. Agricultural reuse of production water, irrigation runoff recycling and the use of water from stormwater retention areas are practices where significant gains in water conservation and efficient water use appear to be possible. These methods have demonstrated excellent results benefiting both the environment and water resources in some areas of the state.

For purposes of this report, it was deemed necessary to compartmentalize agricultural reuse water into two categories: **reclaimed water** (treated effluent) and **on-farm reuse water** (tailwater recovery). Reclaimed water is generally defined as water that meets or exceeds approved treatment standards for edible crops and is delivered to growers from a permitted domestic wastewater treatment plant that provides secondary treatment at a minimum. On-farm reuse water is farm production water that originates from a surface or groundwater source, is used to irrigate crops, with excess water (i.e., tailwater) captured and stored for future reuse. This water may also include stormwater runoff resulting from rainfall. It should be noted that reclaimed water is not the focus of this report; nonetheless, pertinent statutes and rules were reviewed and are included as background information.

The Florida Department of Environmental Protection's (FDEP) 2003 *Reuse Inventory Water* reports that 469

domestic wastewater treatment plants provided 603 million gallons per day (MGD) of reclaimed water for reuse throughout Florida, and the reuse capacity of these plants represents 54 percent of the total plant capacity in the state. By comparison, agriculture only uses approximately 16 percent of the available capacity. While the proportion of reclaimed water utilized for irrigation has declined from 24 percent in 1996 to 16 percent in 2003, the amount used has remained relatively static during this seven year period at about 95 MGD. This proportional decline reflects the fact that other types of reuse, notably landscape irrigation, have experienced dramatic increases during this same time period. Further compounding this problem is the fact that reclaimed water is currently viewed as a valuable commodity by most large utilities. Moreover, reclaimed water is a viable source to offset potable supplies that are used for non-potable uses (e.g., landscape irrigation) in order to extend limited groundwater supplies. As such, utilities are now charging residential and some agricultural users for reclaimed water, which imposes new economic constraints on agriculture not heretofore experienced. This is especially true for agriculture since the farmer cannot arbitrarily pass on production costs to the consumer as readily as other manufacturing sectors.

METHODOLOGY

Information was obtained from the Department of Agriculture and Consumer Services (FDACS) and from the Southwest Florida Water Management District (SWFWMD) and South Florida Water Management District (SFWMD). A review was conducted of existing Water Use Permit and Environmental Resource Permit (ERP) Rules as they pertain to on-farm reuse water, since it was surmised that most opportunities exist in these two Districts. The data and findings gathered as part of this exchange are presented in selected parts of this report, and the recommendations formulated accordingly.

FINDINGS

An **agricultural tailwater recovery system** (on-farm reuse water) generally consists of three components: collection, storage, and reuse of residual irrigation water and/or excess stormwater runoff. These components involve major construction that relies upon items such as pipes, pumps, ponds, berms, ditches, etc. These systems also capture any of the residual nutrients that are carried in the water which can be beneficially reused by crops. It is important to note that all sources of on-farm reuse water are solely generated on farm fields or from groundwater and are not delivered via outside sources (e.g., wastewater treatment plants).

Tailwater recovery systems differ from the more prevalent agricultural stormwater management systems that exist throughout the state. The latter types of systems are typically permitted by the state's water management districts via the ERP process, and are designed to treat residual irrigation water and/or excess stormwater runoff that mainly originates from the farm. These permitted systems are efficient at collecting and storing residual irrigation and stormwater runoff, but are generally not designed to accommodate reuse. Instead, this treated water is eventually released from agricultural production areas through the surface water management system at some predetermined rate to ensure that base flow is maintained.

By contrast, a properly designed and constructed tailwater recovery system will allow for the long term storage (up to several months) of on-farm production water, so it can be reused during the dry season months that also correlate with peak water use demand. The SWFWMD and FDACS have participated in the design and construction of tailwater recovery systems in parts of the District; namely, the Upper Myakka River Watershed where too much water has been discharged into a mixed hardwood swamp. This is especially important since many farms in this region are row crop operations with semi-enclosed seepage irrigation systems. Under the Lake Okeechobee Protection Program, the SFWMD, FDACS, and FDEP have implemented stormwater retention/detention systems followed by chemical treatment on two dairies in the Lake Okeechobee watershed. The stormwater collection, storage, and reuse component of these Dairy Best Available Technologies Projects provide supplemental water to existing irrigation systems which are part of the dairy's waste management system. This system provides irrigation water during the dry season and minimizes the need for chemical treatment prior to off-site discharge.

In summary, properly designed tailwater recovery systems can provide valuable water as a substitute for other resources, can minimize plasticulture farming effects, and can increase conservation during the dry season and during periods of drought.

Reuse Economics: Reclaimed water production costs can vary significantly depending on various factors, including the magnitude of the flows, method(s) of treatment and the capital costs, amortization and operating costs associated with the treatment facilities.

The Southwest Florida Water Management District's 2000 *Regional Water Supply Plan* indicates that the annualized cost per 1,000 gallons of reclaimed water production ranged from $0.17 to $5.92. Built into these costs is either a flat rate or volume based charge and a connection fee, although this mostly applies to residential users. Some economic studies have suggested that agricultural water conservation realized by tailwater recovery in conjunction with other conservation BMPs compares favorably when compared to more conventional reuse sources.

Florida Statutes and Rules Related to On-Farm Reuse Water:

Section 570.085, Florida Statutes

The Florida Department of Agriculture and Consumer Services (FDACS) is working with a Steering Committee to develop an agricultural water conservation Best Management Practices (BMP) manual in accordance with s. 570.085, F.S. Pursuant to statutory mandates under this section, FDACS is charged with developing water conservation cost-share BMPs for increased irrigation efficiencies, and assisting the water management districts to develop a unified irrigation allocation methodology. The estimated timeline for completion of the BMP manual project is 2005. Alternative sources (i.e., tailwater recovery) and regulatory incentives are two topics for inclusion in the manual. The recommendations put forth at the end of this report will also be reflected in the manual.

Section 373.406(9), Florida Statutes

The 2000 Legislature codified into law the following text: "Implementation of measures having the primary purpose of environmental restoration or water quality improvement on agricultural lands are exempt from regulation under this part where these measures or practices are determined by the district or department, on a case-by-case basis, to have minimal or insignificant individual and cumulative adverse impact on the water resources of the state. The district or department shall provide written notification as to whether the proposed activity qualifies for the exemption within 30 days after receipt of a written notice requesting the exemption. No activity under this exemption shall commence until the district or department has provided written notice that the activity qualifies for the exemption". Over the past three years, FDACS has worked with SFWMD to develop and implement an exemption process and associated procedures for certain agricultural activities in the Lake Okeechobee watershed. Many of these activities involve holding water on agricultural properties for an extended period of time.

Section 403.067, Florida Statutes

Pursuant to Total Maximum Daily Load requirements under s. 403.067, F.S., the FDACS is working with Caloosahatchee River Basin growers, a Steering Committee and three Subcommittees to develop BMPs for citrus, vegetable and cow/calf operations. As part of this effort, the Vegetable/Sugarcane Subcommittee has proposed that many growers could benefit by using existing permitted retention/detention ponds for additional treatment and reuse, and that some growers should also consider working with "upstream" neighbors to capitalize on regional treatment opportunities. Since many of these farmers already have a SFWMD ERP, this then necessitates a permit-by-permit review and possible engineering analysis (dike safety) to determine if jurisdictional wetlands which may be adversely affected by storing more water for reuse have been incorporated in the permitted impoundment area(s).

SWFWMD ERP Rule Exemption

The SWFWMD has a long-standing ERP rule exemption program known as the Agricultural Ground and Surface Water Management (AGSWM) program. AGSWM, an exemption from 40D-4, F.A.C., which encompasses Environmental Resource Permitting, and the AGSWM criteria were more recently modified to accommodate up to ten acres of tailwater recovery ponds without having to obtain an ERP. Though beneficial, the ten acre threshold has proven to be somewhat limiting for many farmers. The exemption also requires the applicant to obtain a USDA-Natural Resources Conservation Service Conservation Plan which requires engineering oversight for pond design.

SFWMD ERP Criteria

For new or non-permitted operations, SFWMD requires ERP permits when constructing works; although, site specific conditions dictate whether or not a permit modification will be required when adding a tailwater recovery component. In general, any additional retention structures for purposes other than water quality treatment will require an ERP or modification of the existing permit.

Florida Statutes and Rules Related to Reclaimed Water:

Chapter 403, Florida Statutes

Section 403.064, F.S., requires permit applicants planning to construct or operate a domestic wastewater treatment facility located within a water resource

caution area to prepare a reuse feasibility study as part of their permit application.

Chapter 62-40, F.A.C.
Rule 62-40.310(1)(d), Florida Administrative Code (F.A.C.), requires water management programs to "advocate and direct the reuse of reclaimed water as an integral part of water and wastewater management programs." Additionally, Rule 62-40.416(2), F.A.C., requires domestic wastewater treatment facilities within water resource caution areas to implement a reasonable amount of water reuse, unless such reuse is not economically, environmentally, or technically feasible.

The Indian River Lagoon System and Basin Act, Chapter 90-262, Laws of Florida
The Act established three objectives for domestic wastewater treatment plants in this area:

- The elimination of surface water discharges;
- The investigation of the feasibility of reuse; and
- The centralization of wastewater collection and treatment facilities.

Water Management District Rules
Each of Florida's five water management districts has its own rules governing reuse feasibility studies, most of which are embedded within the Water or Consumptive Use Permit process. (i.e., 40X-2, F.A.C.)

Chapter 62-610, F.A.C
Florida's reuse rules are contained in this chapter which is administered by the FDEP. Rule 62-610.820(8), F.A.C., encourages utilities that prepare a reuse feasibility study to contact the appropriate water management district before initiation of the feasibility study to obtain information about the water management district's reuse priorities for the area. Also, Rule 62-610.426 provides restrictions on edible crops and Rule 62-610.425 limits cattle grazing for dairy cows.

Current Regulatory Status:
Over the past few years, a number of documents have been promulgated that speak to the regulatory issues associated with trying to expand the use of on-farm reuse water. One such document is the FDEP's *Florida Water Conservation Initiative* which was released in April of 2002. Page 29 of the document lists agricultural recommendation number three, entitled, "Increase Rainfall Harvesting and Recycling of Irrigation Water" (tailwater). This recommendation, which scored third highest out of a total of eight agricultural recommendations, advocated capturing and storing runoff water which is mostly generated during the summer months. The recommendation further expands on this approach in the context of increased plant productivity, reduced pumping (energy) costs, and reduced fertilizer costs from recycling the unused dissolved nutrients back onto farm fields. To date, it is unclear how proactive water management districts have been trying to incorporate parts of this recommendation into ERP rule chapters.

Another effort led by the FDACS was the production of a document, entitled, "*Florida's Agricultural Water Policy"* which was released in July of 2003 by the Commissioner of Agriculture. Page 16 lists Water Conservation as a major policy initiative and included a series of recommendations to maximize its use throughout Florida. One recommendation encourages the FDEP and water management districts to consider regulatory incentives to expand agricultural reuse. While it is still somewhat early given that the document has only been in circulation for just over one year, this study by the Senate Agriculture Committee provides a significant opportunity to implement this policy recommendation.

Incentives: There is a direct relationship between BMP implementation for structural projects such as tailwater recovery and growers' access to monetary assistance. To this end, SWFWMD and FDACS have entered into a ten-year partnership agreement that provides cost-share funds for implementation of agricultural water quality and water quantity BMPs. This is accomplished through the vehicle of the FARMS program, or Facilitating Agricultural Resource Management Systems. Approved FARMS projects to date include the construction of tailwater recovery ponds to capture and recycle on-farm reuse water. Moreover, many of these cost-share projects have been funded at a 75 percent reimbursement rate, as FARMS guidelines provide a 75 percent reimbursement for BMPs that combine both water quality and water quantity benefits. This approach could be used as a model for other water management districts that are interested in promoting the concept of on-farm reuse. Furthermore, the USDA-Natural Resources Conservation Service through its Environmental Quality Incentives Program or EQIP will assist in the cost-share of up to 50 percent for an excavated tailwater recovery system. This funding source, coupled with state cost-share monies, can help growers with the significant capital outlay required to build these systems.

RECOMMENDATIONS

1. Review the exemption provided for in s. 373.406(9), F.S., and consider revising it to include measures whose primary purpose is water conservation on agricultural lands, subject to the "de minimis" criteria as currently specified. The intent would be to streamline regulatory procedures for implementing agricultural water conservation measures, including agricultural tailwater recovery systems.

2. Review Environmental Resource Permit (ERP) rule criteria and associated Basis of Review documents to determine the feasibility of augmenting permitted retention/detention ponds (without wetlands) to store tailwater for future reuse.

3. Review existing ERP exemption programs, such as the Agricultural Ground and Surface Water Management (AGSWM), for possible statewide implementation and identify any necessary statutory changes.

4. Review existing regulations for the rehydration of small (<1/2 acre), previously drained isolated wetlands for use as tailwater recovery systems, and consider statutory changes to streamline regulatory procedures while providing continued resource protection.

5. Review statutory criteria (Chapter 373, Part II) to identify possible revisions to provide incentives, such as 20-year permits, for implementing agricultural water conservation programs that reduce groundwater withdrawals in Water Resource Caution Areas where groundwater levels have been significantly impacted.