oppaga

Progress Report

August 2000 **Report No. 00-04**

Wastewater Reuse Reduces Discharges and Provides Alternative Water Supplies

at a glance

Reuse of wastewater has significantly reduced the discharge of effluent into the environment, and its implementation will continue to grow at a steady rate. Reclaimed water is also an important alternative water source, helping water users reduce withdrawals of traditional water supplies by about 4%.

Reuse could be further expanded, but the implications of such policies need to be considered. Reuse is not widely used in southeastern Florida and could serve as an effective, but costly, alternative to ocean outfalls and underground injection disposal of wastewater. Water management districts could use their regulatory authority to require users to assume the additional cost of using reclaimed water when feasible.

Issues relating to the allocation and pricing of reclaimed water are likely to increase in future years and may ultimately require reconsideration of regulatory policies.

Purpose

In accordance with state law, this progress report informs the Legislature of actions taken by the Department of Environmental Protection (DEP) and the five water management districts in response to a 1997 OPPAGA report. [1, 2] The 1997 review was conducted in response to a request from the House Select Committee on Water Policy. This report presents our assessment of the extent to which the department has addressed the findings and recommendations included in our report.

Background

Reuse of reclaimed water helps eliminate environmental degradation caused by sewage effluent disposal and provides an alternative water supply that helps delay or eliminate development of new potable water supplies. Reclaimed water is water that has received at least secondary treatment at a domestic wastewater treatment facility and is then reused. Reuse is the deliberate application of reclaimed water for a beneficial purpose.

[1] Section 11.45(7)(f), *F.S.*

[2] *Review of the Reuse of Reclaimed Water,* OPPAGA Report No. 96-61, March 3, 1997.

Reused wastewater can be used to replace potable water for a variety of purposes including agricultural and landscape irrigation, industrial uses, and ground water recharge.

Reuse policies are implemented primarily through two regulatory programs, wastewater treatment facility permits and consumptive water use permits. Specific types of water reuse are authorized through department rules.

Reducing sewage effluent disposal

The state's initial impetus for reuse came from efforts in the early 1970s aimed at eliminating environmental degradation caused by sewage effluent disposal. In 1989, the Legislature established a state objective to encourage and promote conservation and the reuse of reclaimed water.

The department established antidegradation rules that restrict domestic wastewater facilities from discharging into sensitive coastal areas and surface water bodies. The most widely chosen alternatives to such sewage effluent discharges are various types of reuse. Permit applications for any new or expanded surface water discharge must include a study of the feasibility of reuse.

Furthermore, s. 403.064, *F.S.*, requires wastewater permit applicants in Water Resource Caution Areas to study the reuse feasibility regardless of whether anti-degradation rules apply. If the antidegradation rules do not apply, the applicant has the final authority to determine whether reuse is feasible.

Water management districts require applicants for consumptive water use permits in Water Resource Caution Areas to implement reuse, unless the applicant determines that reuse is not economically, technically, or environmentally feasible. [3]

Regulation of reuse

The department protects public health by regulating the use of reclaimed water. The department and the districts use these rules to determine if proposed non-potable uses of reclaimed water are appropriate and if the systems are designed in a manner that keeps the public from accidentally using reclaimed water for potable purposes.

Other rules affecting reuse include Public Service Commission cost recovery guidelines, water management district cost-sharing programs, and local government development regulations. District cost-sharing and local government regulations to promote reuse are most widely used in portions of the Southwest Florida Water Management District.

Prior Findings

In our 1997 report, we reviewed the activities of the department and districts to determine the success of efforts to implement reuse. We concluded that wastewater disposal and consumptive use permitting requirements helped expand reuse and that further state mandates for expanding reuse were not warranted.

Our prior study identified two areas for potential improvement. First, we found that the criteria for requiring reuse feasibility studies do not effectively target potential reusers. To address this concern, we recommended that the Legislature give permitting authorities more discretion in requiring the feasibility studies and that the department and districts establish a more predictive screening mechanism to determine when a comprehensive study needs to be conducted. We also recommended that the feasibility study requirements include an assessment of all alternative water supplies.

Second, we found that eliminating unnecessary barriers in the reuse rules concerning the use of reclaimed water could expand reuse. We recommended that the department take the necessary steps to

[3] Four of the five water management districts have designated all or part of their districts as Water Resource Caution Areas. These areas have water supply problems that have become critical or are anticipated to become critical within the next 20 years. See *Florida Water Policy*, OPPAGA Report No. 99-06, August 1999.

complete ongoing rulemaking activities by its deadline of December 1997.

Current Status

Water reuse has been effectively implemented in most areas of the state. The concerns we raised in 1997 have generally been addressed, although not necessarily to the extent that we recommended. Regulatory authorities and the Legislature should consider how far reuse implementation should go, whether there need to be changes to regulations that affect the pricing and allocation of reclaimed water, and whether reuse feasibility study requirements should be modified.

Reuse has reduced surface water discharges

Municipal wastewater discharges to surface waters have been significantly reduced in most areas of the state. This accomplishment can be attributed to the department's enforcement of its rules restricting discharges to environmentally sensitive waters. As described in Exhibit 1, reuse has reduced sewage effluent discharges in most areas of the state where the primary alternative is surface water discharge.

Exhibit 1
Reuse Has Reduced Wastewater Discharges by 36% Statewide

DEP District	Water Reused in 1999 (mgd)	Wastewater Flows Reused in 1998
Central	177	80%
South	63	74%
Northwest	47	59%
Southwest	146	51%
Northeast	32	24%
Southeast	58	9%
Statewide	**523**	**36%**

(mgd) = million gallons per day

Source: DEP's *1999 Reuse Inventory*.

Reuse has not been implemented as often in two of the department's districts. In the northeast district, a significant amount of surface water discharge is permitted because it has not been shown that the effluent causes environmental problems. In the southeast district, most wastewater discharges are ocean outfalls or underground injection wells. The department has not reduced wastewater disposal by these two methods because it concluded that existing discharges meet state standards.

Further steps to increase reuse implementation

Regulatory agencies and the Legislature could increase reuse in two ways. First, the water management districts could require some water users to make greater use of reclaimed water. A second option would probably require legislative action—the department could revise its permitting standards to reduce ocean outfall and underground injection discharges.

More water demand can be met with reclaimed water

Reclaimed water is a significant alternative water supply resource and is projected to increase. In 1999, it is estimated that the use of 523 mgd of reclaimed water reduced water withdrawals by about 351 mgd and also served to add about 143 mgd to the state's ground water resources. This can be compared to the total of 2,065 mgd of freshwater withdrawn for public supply and the 3,244 mgd of water withdrawn for agricultural use in Florida in 1995. [4]

As shown in Exhibit 2, reuse continues to increase in popularity. In 1996, the Reuse Coordinating Committee forecast that reclaimed water flows would reach 573 mgd in 2010. Based on Florida's actual experience, it is likely that the 573-mgd forecast will be achieved several years earlier than 2010. Based on current trends,

[4] Water use figures were taken from Marella, R.L., *Water Withdrawals, Use, Discharge, and Trends in Florida, 1995*, USGS Report 99-4002, 1999.

it appears that reclaimed water flows may reach 630 mgd in 2005. Assuming that the distribution of reuse activities remains the same, use of 630 mgd of reclaimed water in 2005 could serve to avoid over 420 mgd of water withdrawals and recharge about 170 mgd to ground water. To replace greater amounts of potable water supplies with reclaimed water, regulatory authorities will need to require greater use of reclaimed water and require users to increase the efficiency of reclaimed water use.

Exhibit 2
Growth in Reuse Flows

Water Management District	1996 Reuse Flow (mgd)	1999 Reuse Flow (mgd)
Northwest Florida	42	47
St. Johns River	102	137
South Florida	136	180
Southwest Florida	117	152
Suwannee River	5	7
Total	**402**	**523**

Source: DEP's *1996 Reuse Inventory* and *1999 Reuse Inventory*.

Although regulatory authorities could take steps to increase the significance of reuse as a water supply source, the extent of reclaimed water use is limited by two factors.

- It is not feasible to reuse all wastewater because the flows vary daily and seasonally. Achieving 50% to 75% reuse of wastewater flows in a given system could be considered full implementation. Demand for reclaimed water, as with water in general, is typically higher during the drier seasons when wastewater flows are well below peak levels.
- Reclaimed water generally is not conserved as carefully as potable water.

Increasing the efficiency of reclaimed water use

Since reuse has generally been viewed as a means of disposing of wastewater effluent without harming the environment, regulatory authorities have not been concerned with how efficiently reclaimed water is used. In areas with limited water supplies, the districts are beginning to encourage efficient reuse that offsets water demand or efficiently recharges ground water supplies.

Developing reclaimed water as an alternative water source

In contrast to the clear policy that has made reuse the preferred alternative to some types of wastewater discharge, the state's policy for developing reclaimed water as an alternative water source is less clear. Although users are directed to implement reuse in Water Resource Caution Areas when feasible, state law does not clearly define feasibility.

Because state law does not clearly define the circumstances under which it is feasible to use reclaimed water, water management district policies vary widely and result in different outcomes.[5] Two districts (Northwest Florida and St. Johns River) will not approve permits to use traditional water sources when they believe that it is feasible to use reclaimed water.

Northwest Florida does not permit the use of groundwater for certain types of irrigation in its coastal Water Resource Caution Area. As a result, the district has achieved a 93% rate of reuse of reclaimed water and avoided an additional 17% in withdrawals from overused water resources.

[5] The Suwannee River Water Management District does not have any Water Resource Caution Areas. Its staff assist users that choose to implement reuse.

St. Johns River also takes a strong regulatory stance to promote reuse. Although the applicant has the final right to determine feasibility, district staff closely review reuse feasibility studies. For instance, staff may examine financial records if it appears that the applicant biased the study to avoid determining that it is feasible to reuse reclaimed water. One result of this policy is that the district has a relatively high rate of reclaimed water utilization (49% of the wastewater flow is reused).

Exhibit 3
Water Withdrawals Avoided
Due to Reuse in 1999

Water Management District	Withdrawals Avoided (mgd)	Water Reused (mgd)	Wastewater Flows Reused
Northwest Florida	25	47	59%
Southwest Florida	116	152	51%
St. Johns River	84	137	49%
South Florida	123	180	22%
Suwannee River	3	7	68%
State Total	**351**	**523**	**36%**

Source: DEP's *1999 Reuse Inventory*.

The perspective of South Florida Water Management District regulators is quite different; the district's overall reuse rate is only 22%. However, within the district, reuse has been successfully implemented along the west coast. As noted in Exhibit 1, the reuse rate is 74% in DEP's south district, which roughly corresponds to the western portion of the South Florida Water Management District. In 1999, the per capita reuse capacity was 159 gallons per day in Collier County and 123 gallons per day in Lee County (state average is 70.8 gallons per day per person).

However, in the eastern portion of the district where the population is concentrated, reuse is rarely implemented. In 1999, the per capita reuse was 51 gallons per day in Palm Beach County, but only 10.7 gallons per day in Broward County and 10.9 gallons per day in Dade County. One reason is that the department continues to allow wastewater utilities to use discharge methods that are significantly less costly. Because disposal is generally significantly cheaper than reuse, it is difficult to determine whether the district's regulatory policies are another reason that reuse is uncommon along the southeast coast.

South Florida's policies and practices provide significantly less incentive to implement reuse than Northwest Florida or St. Johns River. The district accepts an applicant's feasibility determination regarding the use of reclaimed water without question or analysis. The district's current procedures do not require the use of reclaimed water; as long as an applicant mitigates any harm that may occur as a result of its consumptive use, the district does not interfere in economic decisions about using reclaimed water. [6]

Southwest Florida Water Management District has a different reuse policy in its Water Resource Caution Areas. [7] Although it takes a strong regulatory position to encourage implementation of reuse, the district uses financial support to help build reclaimed water systems wherever feasible.

The district provides a 50% funding match to reclaimed water systems and staff expect the reuse rate to increase significantly by 2005. With the financial incentive to build reclaimed water systems and the regulatory stance against approving permits for uses that can be met with reclaimed water, Southwest Florida staff find users very willing to implement reuse.

In summary, water management districts affect water user decisions about implementing reuse by using financial incentives and through their policies. Although technically the user has the right to determine whether reuse is feasible, some districts have asserted other regulatory authority to encourage the reuse of

[6] Division of Administrative Hearings, *Seacoast Utility Authority v. PGA National Golf Club & Sports Center, Ltd., and South Florida Water Management District,* Case No. 94-2903.

[7] Water Resource Caution Areas are known as Water Use Caution Areas in Southwest Florida.

reclaimed water in circumstances where users might not have chosen reuse.

Existing standards will not convert ocean outfall and underground injection discharges to reuse

According to staff in the department's southeast district office, ocean outfall and underground injection discharges are not discouraged in favor of reuse unless they represent expanded discharges. The department takes this position because the existing discharges do not violate existing resource protection standards. Thus, it is not likely that the department will use its permitting authority to require wastewater facilities to implement costly reuse programs when existing discharge methods are much less expensive.

If the Legislature determines that existing resource protection standards are inadequate, stricter standards could result in wastewater facilities being required to implement reuse to reduce those discharges. According to department staff, the existing standards are adequate. If stricter standards are established, the most significant impact will probably be in southeast Florida, where many utilities depend on ocean outfall and underground injection wastewater disposal.

Issues in allocating and pricing reclaimed water

Because the widespread use of reclaimed water is relatively new, issues relating to the allocation and pricing of reclaimed water are rare. However, based on discussions with regulatory agency and utility staff, it appears that such issues are likely to become more important.

One such issue was dealt with by the 1999 Legislature, but several other issues are more complex and may take some time before a resolution can be reached. The 1999 Legislature revised Public Service Commission rate regulation guidelines by increasing a utility's ability to recover through their rate structure the costs of increasing water supply.[8]

Pricing issues will be more difficult to resolve. In many areas of the state, wastewater utilities essentially have monopoly control of supplies because users are located in an exclusive service area of a particular wastewater facility. If these users are unable to obtain traditional water supplies then the reclaimed water could be priced at an exorbitantly high level due to the lack of supply alternatives.

Pricing is also an important issue for water management districts because many potential users of reclaimed water will require a backup water source in the event that the supplier chooses not to renew a contract to supply reclaimed water. The water management districts are using different approaches to providing backup water allocations since such a permit can be considered to be an existing legal use of water even if no water is actually used.

A related issue is conservation of reclaimed water. Reclaimed water is a commodity that may be sold by wastewater utilities and it is not directly regulated under the districts' consumptive use permitting rules. In contrast, other sources of water must be used in a reasonable and beneficial manner. As a result, permits reasonably require efficient water use, but these requirements do not apply to reclaimed water.

The Southwest Florida Water Management District is able to indirectly regulate rates and reclaimed water conservation through conditions placed on the financial assistance it provides to build reclaimed water systems. The Public Service Commission and some local utility authorities also regulate reclaimed water rates.

In order to address concerns about backup water allocations and conservation of reclaimed water, the Legislature may wish to consider alternative means of allocating reclaimed water and regulating the rates charged for its use. These issues should be

[8] Chapter 99-319, *Laws of Florida.*

addressed in the context of broader state water policy issues.

Streamlining planning and study requirements

Although the Legislature has not acted to give the department and the water management districts more discretion in requiring reuse feasibility studies, informal action by some permitting authorities appears to have reduced unnecessary work on wastewater reuse feasibility studies. According to regulatory staff and the staff of some permitted entities, the requirement to complete a feasibility study often requires relatively little effort.

- Most wastewater utilities have already completed at least one comprehensive reuse feasibility study that simply requires updating.
- In the Southwest Florida Water Management District, the availability of district cost sharing makes it economically feasible to implement reuse in many areas of the district and the district helps utilities develop reuse implementation plans.
- In situations where a consumptive use permit applicant can show that reclaimed water is not available or its use is not environmentally feasible, the districts typically accept a brief demonstration of those facts in lieu of a full study. In a similar fashion, department staff also accept brief statements from utilities with known technical limitations that prevent reuse.

Feasibility studies do require significant effort by the permit applicant if opportunities to further reduce wastewater discharges exist.

In the St. Johns River Water Management District, applicants are sometimes required to provide additional supporting evidence if there is disagreement over whether it is economically feasible to use reclaimed water as an alternative water source.

To reduce paperwork and increase the usefulness of wastewater feasibility studies, regulatory agencies and the Legislature could consider incorporating feasibility studies into the regional water supply planning process. The districts are preparing regional water supply plans to identify feasible water resource development alternatives for areas that are anticipated to have inadequate water supplies. In these plans, reclaimed water is evaluated on an equal basis with other alternative water resources and receives no special preferences.

The department has asked at least one water management district to estimate the impact of alternative water supplies, including reuse, in its regional water supply plans. At a regional level, these projections will be useful indicators to potential users as to whether sufficient reclaimed water supplies are available.

The plans present an opportunity to improve the reuse feasibility study requirement. Instead of completing a feasibility study at the time that a water permit is needed, major utilities could complete a reuse master plan in advance that would be reviewed as part of the regional water supply planning process. That plan could later be used in lieu of submitting a feasibility study.

The Florida Legislature

Office of Program Policy Analysis and Government Accountability

Visit *The Florida Monitor*, OPPAGA's online service. This site monitors the performance and accountability of Florida government by making OPPAGA's four primary products available online.

- OPPAGA publications and contracted reviews, such as policy analyses and performance reviews, assess the efficiency and effectiveness of state policies and programs and recommend improvements for Florida government.
- Performance-based program budgeting (PB ^{2}) reports and information offer a variety of tools. Program evaluation and justification reviews assess state programs operating under performance-based program budgeting. Also offered are performance measures information and our assessments of measures.
- Florida Government Accountability Report (FGAR) is an Internet encyclopedia of Florida state government. FGAR offers concise information about state programs, policy issues, and performance. Check out the ratings of the accountability systems of 13 state programs.
- Best Financial Management Practice Reviews for Florida school districts. OPPAGA and the Auditor General jointly conduct reviews to determine if a school district is using best financial management practices to help school districts meet the challenge of educating their students in a cost-efficient manner.

OPPAGA provides objective, independent, professional analyses of state policies and services to assist the Florida Legislature in decision making, to ensure government accountability, and to recommend the best use of public resources. This project was conducted in accordance with applicable evaluation standards. Copies of this report in print or alternate accessible format may be obtained by telephone (850/488-0021 or 800/531-2477), by FAX (850/487-3804), in person, or by mail (OPPAGA Report Production, Claude Pepper Building, Room 312, 111 W. Madison St., Tallahassee, FL 32399-1475).

The Florida Monitor: http://www.oppaga.state.fl.us/

Project conducted by Julie Ferris (850/487-4255)

John W. Turcotte, OPPAGA Director