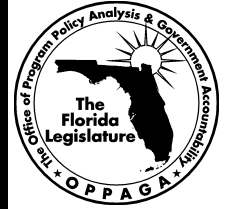




# Office of Program Policy Analysis And Government Accountability



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## Review of the Reuse of Reclaimed Water

### Report Abstract

**Current regulatory mechanisms are effective in encouraging and promoting water reuse. There has been a significant increase in reuse in the last ten years and reuse has been an important component of water resources and wastewater management in Florida. Given the complexity of reuse decisions, statutory changes that would increase reuse requirements are not warranted at this time. However, some rules need to be amended to eliminate barriers that hinder the development of different types of uses of reclaimed water.**

### Purpose of Review

The Joint Legislative Auditing Committee, at the request of the House Select Committee on Water Policy, directed OPPAGA to review the reuse of reclaimed water. We examined program requirements and activities of the Department of Environmental Protection (DEP) and the five Water Management Districts to determine if mechanisms designed to implement reuse have been successful or if conditions exist where reuse is feasible but not being implemented. We also examined reuse patterns to determine if feasibility study requirements impact reuse decisions and we examined alternative strategies for increasing water reuse in Florida. Reuse of reclaimed water is one part of the consideration of general water supply issues. We will address the economic components of water supply issues in a separate report.

### Program Requirements

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. The state's initial impetus for reuse came from efforts in the early 1970s aimed at eliminating environmental degradation caused by sewage effluent disposal. The state began its program in 1987 when the Department of Environmental Regulation (DER) began looking at ways to promote reuse. In 1989, the Legislature established a state objective to encourage and promote conservation and the reuse of reclaimed water. Reuse can be used to replace potable water for a variety of purposes including agricultural and landscape irrigation, industrial uses, and ground water recharge.

Specific types of water reuse are authorized through DEP rules. Reuse policies are primarily implemented through two regulatory programs; (1) consumptive use permits; and (2) wastewater treatment facility permits.

- State Water Policy requires that reuse be considered as part of the consumptive use permitting process. In addition, water management districts require consumptive use permittees located within Water Resource Caution Areas (WRCAs) to implement reuse, unless objective evidence demonstrates that such use is not economically, technically, or environmentally feasible.<sup>1</sup> Districts can also require reuse outside of a WRCA when feasible under certain circumstances.

<sup>1</sup> State Water Policy was amended in 1989 to require WMDs to designate areas that have water supply problems that have become critical or are anticipated to become critical within the next 20 years as water resource caution areas. These areas were originally designated as Critical Water Supply Caution Areas. This terminology was subsequently changed to Water Resource Caution Area.

- Through its antidegradation rules, DEP restricts domestic wastewater treatment facilities from discharging into sensitive coastal areas and surface water bodies, and encourages reuse as an alternative disposal method when feasible. The antidegradation rules require preparation of feasibility studies as part of the public interest test for any new or expanded surface water discharge. In addition, s. 403.064, F.S., requires all applicants for permits to construct or operate a domestic wastewater treatment facility located within a WRCA to prepare a reuse feasibility study.<sup>2</sup> For feasibility studies prepared under s. 403.064, F.S., the applicant has final authority in determining whether reuse is feasible.

## Findings

### **Wastewater disposal and consumptive use permit requirements have helped to expand reuse and ensure implementation when feasible.**

Wastewater discharge and consumptive use permit requirements have encouraged reuse as intended by the Legislature. Reuse is a viable option when limitations are placed on a wastewater treatment facility's ability to dispose of sewage effluent and when consumptive use permittees have to consider alternative sources of water. As a result of these permitting requirements, reuse is generally implemented where it is feasible.

**Wastewater Management Strategy.** Reuse is an effective alternative to wastewater disposal. Antidegradation requirements for wastewater discharge permits have historically been the primary driving force in implementing reuse. These requirements help to divert wastewater by restricting discharges into some sensitive coastal areas and surface water bodies. When antidegradation policies apply, and DEP denies wastewater discharge permits at current treatment levels, reuse becomes a viable and less costly disposal alternative.

**Water Supply Alternative.** An emerging influence on reuse is the need for alternative water supplies. The consumptive use permitting process involves considering the feasibility of alternative sources, such

as reclaimed water. When water management districts determine there is a need to limit or offset potable withdrawals, reuse becomes a viable water supply alternative by helping to reserve higher quality water for potable uses. Our analysis of DEP reuse data shows reuse offset an average of 229 million-gallons-per-day (mgd) of potable water in 1994 and 1995, or 5% of fresh ground water withdrawals. According to the EPA's "Guidelines for Water Reuse," the greatest benefit of urban reuse systems is their contribution in delaying or eliminating the need to expand potable water supplies. For example, the City of St. Petersburg experienced about a 10% population growth between 1976 and 1987. However, the city experienced no significant increases in its potable water demand due, in part, to the development of an urban reuse system. The average residential water demand for potable water was reduced from 435 gallons per day to 220 gallons per day after reclaimed water was made available, in conjunction with other activities.

**Reuse Has Increased Significantly.** As shown in Exhibit 1, the amount of reuse permitted (reuse capacity) and the amount actually produced (reuse flow) have increased. The amount of reuse permitted has increased by 137% since 1986. The amount of reuse actually produced has also increased since 1986, but at a lesser rate (75%) than the permitted reuse capacity. By fiscal year 1994-95, the state had nearly met DEP's goal for the year 2005 to expand reuse capacity to 40% of the state's treated wastewater treatment capacity. Exhibit 1 shows that 38.9% of the state's wastewater capacity in 1995 was for reuse.

<sup>2</sup> Facilities with less than .1 million gallons per day are exempt from the study requirements.

**Exhibit 1**  
**Increases in Reuse Since 1986 <sup>1</sup>**

	1986	1990	1994	1995	% Change 1986-95
Wastewater Capacity (mgd)	N/A	N/A	2,176	2,210	N/A
Wastewater Flow (mgd)	N/A	N/A	1,482	1,565	N/A
Reuse Capacity (mgd)	362	526	696	859	137%
Percent of Wastewater Capacity	N/A	N/A	32.0%	<b>38.9%</b>	
Reuse Flow (mgd)	206	266	354	361	75%
Percent of Wastewater Flow	N/A	N/A	23.9%	23.1%	

<sup>1</sup>The data in this exhibit includes all wastewater treatment facilities, regardless of size.

Source: Department of Environmental Protection's Reuse Data and Water Management Districts' Annual Reuse Reports.

**The criteria for requiring reuse feasibility studies does not effectively target potential reusers.**

Currently, the requirement for a wastewater treatment facility or consumptive use permit applicant to conduct a reuse feasibility study is triggered if the permit applicant is within a Water Resource Caution Area (WRCA). State Water Policy requires water management districts to designate areas that have water supplies that have become critical or are anticipated to become critical within the next 20 years as WRCA's. In response to water supply concerns, reuse is required within these areas unless such use is not economically, technically, or environmentally feasible. Although not mandated to implement reuse wastewater treatment facility and consumptive use permit applicants must study reuse feasibility to provide information that can be used in deciding whether to implement reuse.

**Reuse Is Not Predicated Solely on Water Supply Concerns.** Although wastewater disposal has clearly been a driving force in the implementation of reuse, the effect of water supply concerns to date has been more limited. Exhibit 2 shows that although areas with water supply problems (WRCA's) reclaim a larger volume of wastewater (269.5 mgd vs. 87.3 mgd), this represents a much smaller percentage of reclaimed water when compared to areas outside the WRCA's. Twenty-one percent of wastewater inside areas with water supply concerns (WRCA's) is reused, while 66% of wastewater outside these areas is reused.

Several factors, however, affect current reuse statistics that may change the impact of water supply concerns on reuse. Developing reuse facilities can take as long as

five to ten years to fully implement. As a result, we may not have seen the full effects of the regulations in the five years the requirements have been in place. Also, currently several large wastewater treatment facilities that are located within WRCA boundaries have lagged behind the rest of the state in implementation of reuse. These large population areas feature unique constraints for implementation of reuse because they are largely coastal areas and have had historically cheaper wastewater disposal options. In spite of these constraints, DEP projects the use of reclaimed water to nearly double by the year 2020.

**Exhibit 2**  
**Majority of Wastewater Reused Occurs in Areas Not Designated as Water Resource Caution Areas<sup>1</sup>**

Water Management District	Average 1994 and 1995 Wastewater Flow Reused		Total Percent Flow (mgd)
	Inside WRCA Percent of Flow (mgd)	Outside WRCA Percent of Flow (mgd)	
South Florida	7.3 % 50.1 mgd	97.5 % 56.2 mgd	14.2 % 106.4 mgd
St. Johns	37.8 % 106.1 mgd	N/A	37.8 % 106.1 mgd
Southwest	33.0 % 97.0 mgd	50.7 % 4.5 mgd	33.6 % 101.5 mgd
Northwest	85.2 % 16.3 mgd	39.7 % 21.8 mgd	51.4 % 38.1 mgd
Suwannee River	N/A	45.1 % 4.8 mgd	45.1 % 4.8 mgd
Statewide	21.0 % 269.5 mgd	66.1 % 87.3 mgd	25.2 % 356.8 mgd

<sup>1</sup>The data in this exhibit is for facilities with capacity of .1 mgd or greater.

Source: Data from water management districts annual reuse reports compiled and calculated by the Office of Program Policy Analysis and Government Accountability.

Regardless of potential increases in reuse, linking feasibility study requirements solely to water supply concerns is not the best method for targeting potential reuse clients. The economics of reuse feasibility are site specific and depend on several factors including the cost of developing other sources of water; the costs to treat and dispose of wastewater; and the costs to treat, store, and distribute water reuse. Reuse is not likely to be developed in many areas because it is less costly to dispose of wastewater and/or develop other water supplies. Other factors can include the distance of potential reclaimed water users from reuse suppliers, the availability of other alternative water supplies, and the type of reclaimed water available and needed. These types of conditions could place an undue economic burden on the permittee or its rate payers

For example, a Dade County official said that reuse is not economically feasible because Dade County does not have critical water supply problems and continues to be granted permits to dispose of its wastewater through traditional and less costly methods. In spite of this situation, the statutes still require the county to conduct a feasibility study, because it is located within a WRCA. The County reached the same conclusion after the \$440,000 study that reuse was not economically feasible; it would cost an estimated \$277 million to implement a minimum level of reuse and would place wastewater service rates among the highest in the state.

**Feasibility Studies Are Too Narrow in Scope to Be Useful in Making Water Supply Decisions.** Reuse may not be the only or most cost effective water supply alternative, but it is the only one required to be considered in a feasibility study. If reuse is determined not to be feasible, the permittee is not required to evaluate other alternatives. Given the complexity of wastewater and water supply problems, reuse feasibility decisions should be part of a broader analysis of water supply availability for utilities having responsibility for both water and wastewater management. For example, while local officials acknowledge that water supply issues may become more critical in South Florida in the future, both Dade County and water management district staff believe that there are more cost effective alternatives available in the area than reuse. For those communities facing critical water supply or wastewater disposal problems, a more thorough consideration of all available alternatives is essential in making the most

cost effective decisions. Consequently, reuse feasibility studies have limited use in these situations.

**Given the complexity of reuse decisions and the sufficiency of current permit requirements further state mandates are not warranted at this time.**

**Current Requirements Sufficient.** As stated above, wastewater treatment facility and consumptive use permitting requirements are effective at addressing reuse when it is feasible. The state should be involved in reuse to the extent that water supply and wastewater problems exist and are not being addressed effectively through existing regulations. For example, if water supply problems in Dade County were deemed sufficiently critical, the water management district could place restrictions on the County's consumptive use permit. The DEP could also deny the County's deep well injection permits, making reuse a more feasible disposal option for Dade County. However, water management district and DEP permitting decisions in Dade County do not indicate to date that environmental and water supplies conditions are adverse enough to modify permit conditions. If conditions change however, permits may be modified resulting in reuse becoming a more economically feasible option

**Reuse could be expanded by eliminating unnecessary barriers in the reuse rules concerning the use of reclaimed water.**

A more effective method of expanding reuse without additional state requirements is to eliminate impediments in existing rules that hinder the development of expanded opportunities for reuse. The Department is currently drafting rule revisions to Ch. 62-610, F.A.C. (referred to as the Phase 2 revisions), that will refine requirements for ground water recharge, indirect potable reuse, aquifer storage and recovery, and the use of reclaimed water as barriers to salt water intrusion. The Phase 2 rules are also anticipated to address the use of other water sources to augment reuse supplies, blending concentrates from reverse osmosis operations with reclaimed water, and using reclaimed water in cooling towers and for watering fields used for cattle grazing.<sup>3</sup> These new types of reuse can potentially be more efficient and cost-effective than traditional reuse. According to DEP

<sup>3</sup> Reverse osmosis is a membrane process for removing dissolved solids from water.

officials, these rule changes will not result in adverse impacts to ground water quality. The rule revisions may also encourage reuse in areas like southeastern Florida, which have not implemented major reuse systems. The new uses may also provide a greater benefit as a water supply alternative than some traditional uses, such as spray fields.

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## Conclusions and Recommendations

Reuse has proven to be a beneficial strategy for addressing wastewater disposal and some water supply problems resulting in a significant increase in reuse over the last ten years. Given the effectiveness of existing permitting requirements and the complex regional and local nature of reuse decisions, we do not believe that statutory changes to increase reuse requirements are warranted. Although increased reuse requirements are not warranted, feasibility study requirements could be improved to better target those areas that would benefit from a feasibility assessment. Current feasibility study requirements tied to the WRCA designations are not the most effective method of targeting potential reuse clients and can impose unnecessary costs and activities on some permit applicants. A more predictive method is needed for determining which applicants are required to review the feasibility of reuse. To accomplish this, we recommend that the Legislature:

- Amend Ch. 403.064, F.S., and State Water Policy to give permitting authorities discretion in requiring the feasibility studies. DEP and the WMDs should establish a more predictive screening mechanism that could be used to determine if conditions are such that a comprehensive feasibility study needs to be conducted. For example, reuse feasibility studies should not be required where permits have not been modified to reduce the permittees withdrawals or capacity to discharge wastewater. Reuse is almost certainly not economically feasible when these conditions exist. In this situation, permit authorities could waive feasibility study requirements where reuse decisions will hinge solely on economic feasibility. A more predictive screening method should reduce the number of permittees required to conduct feasibility studies, thus avoiding unnecessary costs, and

- Broaden the feasibility study requirements contained in Ch. 403.064, F.S., and State Water Policy to include an assessment of all alternative water supplies. This is consistent with an American Water Works Association recommendation to expand the level of water supply planning and is already being done voluntarily by some municipal facilities. Permitting authorities should also be given the authority to waive this requirement for utilities that only have wastewater disposal responsibilities.

One mechanism for increasing reuse and its benefit as a water supply source is to use reclaimed water for non-traditional uses such as aquifer storage and recovery, indirect potable, and ground water recharge. However, provisions in existing reuse rules currently limit a more widespread application of reuse for these types of uses. The Department is in the process of revising the rules and has rescheduled the planned completion date several times: the planned completion date is December 1997. Because of the benefits that will result from expanding the uses of reclaimed water, we recommend that DEP take the necessary steps to ensure that it meets this deadline.

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## Agency Response

**The Secretary of the Department of Environmental Protection provided the following written response to this review.**

“The emphasis on Dade County in the OPPAGA report is not reflective of the overall effectiveness of the reuse program. Dade County has lagged significantly behind the rest of the state in implementing reuse. However this is a very complex issue that involves many players. The summary in the OPPAGA report does not fully describe the situation. Of note is the fact that the South Florida Water Management District concluded that the county does face critical water supply problems and documented this by designing the county as a water resource caution area through their formal rulemaking process. In addition, a respected consulting engineering firm, in the reuse feasibility study for Dade County, recommends that ‘Miami-Dade proceed with an

aggressive reuse program based on implementing the medium reuse alternative.’ Please note that professional engineers have a professional responsibility to their clients to recommend ‘feasible’ courses of action.

“The Department disagrees with OPPAGA’s conclusion that linking preparation of reuse feasibility studies to water resource caution areas may not be the best strategy. No alternative strategies are offered by OPPAGA.

“The requirements for reuse and feasibility studies within water resource caution areas is linked to the nature of these areas --areas designated by the water management districts as having critical water supply problems (current or projected during the next 20 years). It appears logical that reuse offers promise within these areas as a partial remedy for water problems. In cases where reuse may not be part of the optimal regional water supply strategy, the Water Policy (Chapter 62-40, F.A.C.) establishes a framework where the water management district can excuse utilities from evaluating the feasibility of reuse.

“As discussed with OPPAGA staff, it is very difficult to draw meaningful conclusions from the data in Table 2. As noted in the report, there are multiple factors that affect the numbers presented in this table.

“The Department is interested in expediting the Phase II rulemaking on the reuse rule. However, as discussed with OPPAGA, the need to hold two additional public workshops makes the December 1997 target an impossibility.

“OPPAGA’s review objective is an evaluation of the reuse program. That should entail an evaluation of the ability of the state’s program to achieve the state objectives of encouraging and promoting reuse, as established in Sections 403.064 and 373.250, F.S. However, OPPAGA ventured into the possible need for expansion of the scope to include the full range of alternative water supplies. While this has merit, it appears beyond the bounds of the reuse program, and should be

addressed in a separate forum. It also should be noted that the department’s rules governing preparation of reuse feasibility studies will accommodate utilities wishing to prepare feasibility studies that evaluate a wider range of water supply options.”

**The following written response was provided by the Northwest Florida Water Management District:**

“Thank you for the opportunity to review the draft report Review of the Reuse of Reclaimed Water. The Northwest Florida Water Management District concurs that current regulations have proven effective in encouraging reuse. As suggested in the report, a review of the present rules to identify additional ways to promote reuse would be worthwhile.”

**The Executive Director of the South Florida Water Management District provided the following comments to our review:**

“The term ‘potable’ is used in the report to denote high quality ground or surface water. Potable water implies treatment by a public water supply plant. The term ‘potable’ could be replaced with ‘conventional sources of water’.

“The representation that water management districts (districts) require applicants located within water resource caution areas (WRCA) to implement reuse unless ‘objective evidence demonstrates...’ implies that the districts make the final feasibility determination. This is not true within the SFWMD. In south Florida, the consumptive use permit (CUP) applicant makes the final determination of feasibility in the same manner that domestic wastewater plants address the s.403.064 F.S. requirements of the Department of Environmental Protection. Representations that the SFWMD can require reuse outside of a WRCA is only true when reclaimed water is readily available and is not shown by the applicant to be environmentally, economically or technically feasible.

“Exhibit 2, in your report, suggests that reuse is driven primarily as a means of wastewater disposal. Where inexpensive disposal alternatives are available, such as deep well and ocean outfalls, utilities have opted for the least cost option. When the costs of implementing a reuse system are close to alternative disposal options, reuse increases. This is not to discount the importance of reuse as a water supply option.

“Although only 21% of the wastewater is reused within the WRCA, in many cases this use was vital in providing for local demands which could not have been met from conventional sources. Therefore, comparing volumes of wastewater used inside vs. outside of WRCAs to gauge the success of reuse as a water supply option does not present the whole picture. The additional text in the revised draft helps explain the differences in current use, but does not emphasize the fact that the reuse within the WRCA has significantly protected/conserved limited conventional water supply sources.

“In the discussion regarding water supply availability and the complex menu of options to consider in resolving potential shortfalls in conventional supplies, it would be beneficial to recognize the regional water supply planning responsibilities of the Districts. These planning efforts, in the form of Needs and Sources documents, Regional Water Supply Plans and District Water Management Plans, are the vehicle where the cost effectiveness of reuse can be evaluated with other regional water supply alternatives. This regional planning approach, in conjunction with local scale (project size) water supply feasibility determinations made by the end users through the permit process, supports efficient water resource development.

“Recommendations regarding feasibility study requirements should be expanded to include CUPS. Feasibility determinations, as required under CUP programs, should also be implemented in a manner which is cost-sensitive. In cases where a utility line would have to be extended for several miles or the wastewater treatment facility is not constructed

yet, a simple “not available/feasible” response including this information should be sufficient as opposed to a more costly, rigorous feasibility evaluation.

**The following written response was provided by the Interim Executive Director of the Southwest Florida Water Management District:**

“Thank you for the opportunity to comment on the preliminary and tentative report *The Reuse of Reclaimed Water*. We have reviewed the report and concur with the conclusions and recommendations.”

**The Executive Director of the Suwannee River Water Management District provided the following written response to our review:**

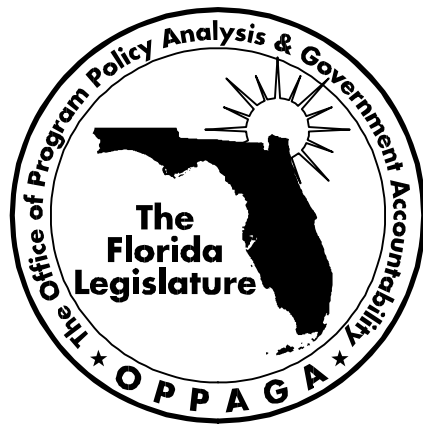
“I have reviewed this report and have asked Bill Kirk, P.G., Hydrogeologist, and Joe Flanagan, CIA, Director of Program Accountability, to provide additional analysis and comment. As a group, we concur with the conclusions and recommendations of the Reuse Report.

“The District has not designated any Water Resource Caution Areas. The District does, however, follow the directives of Chapter 62-40.416(4), F.A.C., by implementing, through assistance and support, the reuse of reclaimed water whenever it is environmentally, technically, and economically feasible. Furthermore, District staff intends to encourage reuse of reclaimed water as a supply alternative through revisions to Chapter 40B-2, F.A.C., and the development of the Basis of Review of Water Use Permit Applications.

“Again, we support the Reuse of Reclaimed Water report and look forward to working with the Department of Environmental Protection and other water management districts to further ensure responsible resource management and practical application of policy directives. If you would like any further discussion of the technical issues involving reuse, please contact Bill Kirk.”

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**The Florida Legislature**  
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