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SL385

Maximizing the Benefits of Reclaimed Water for Irrigating the Landscape and Protecting the Environment[1]

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This publication is part of a series developed to assist Florida homeowners with managing their landscapes to reduce environmental impacts. This is a joint publication of multiple departments and programs in UF/IFAS, including the Florida-Friendly Landscaping™ program, the Department of Soil and Water Science, the Environmental Horticulture Department, and the Center for Landscape Conservation and Ecology. This fact sheet was produced with support from the Florida Turfgrass Association through a Florida Department of Agriculture and Consumer Services Specialty Crops Block Grant.

For the rest of this series, visit, http://edis.ifas.ufl.edu/topic_series_environmental_landscape_management.

Introduction

Reclaimed water is water that has been treated in municipal wastewater facilities and is safe to use for designated purposes, including residential landscape irrigation. "Water reuse" is the term used to describe the beneficial application of reclaimed water. Approximately 663 million gallons of reclaimed water are used daily in Florida (Florida Department of Environmental Protection [FDEP] 2012). Florida is a national leader in using reclaimed water, and in 2006 Florida's reuse program received the first U.S. Environmental Protection Agency (EPA) Water Efficiency Leader Award. Using reclaimed water in Florida meets a state objective for conserving freshwater supplies and preserves the water quality of rivers, streams, lakes, and aquifers. This publication discusses the benefits of using reclaimed water to irrigate the landscape and explains how using reclaimed water helps to protect the environment.

History and Legal Support

Florida has been using reclaimed water since 1966, when the Tallahassee Reclaimed Water Farm was constructed to provide irrigation water for agricultural purposes. In 1977, the first large-scale urban reuse system was constructed in St. Petersburg. In the mid-1980s, Orange County started to develop water reuse systems that later became catalysts for other Central Florida utilities and counties to follow suit. The 1990s saw the development of reclaimed water systems in southern Florida. The 2000s brought increased support and encouragement for water reuse from the state government and scientific communities.

Section 403.064 of the Florida Statutes is the main law dealing specifically with reclaimed water. Under this law, reusing water is considered to be "in the public interest," and the law establishes water conservation and reuse of

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water as formal state objectives (Figure 1). The law further states that reuse systems, designed and operated according to FDEP guidelines, are environmentally friendly, and do not pose a threat to public health and safety.

The rules governing land application of reclaimed water in Florida are found in Chapter 62-40.416 of the Florida Administrative Code. Florida's rules are consistent with national guidelines for water reuse published by the EPA in 1992, and have been deemed fully protective of public health and environmental quality. More information on the current status of reclaimed water use in Florida can be found in Toor and Rainey (2013) at http://edis.ifas.ufl.edu/ss520.

Figure 1. Reclaimed water reuse storage tank. Credits: Shanin Speas, FDEP

Why Use Reclaimed Water?

The main reason to use as much reclaimed water as possible is to conserve Florida's potable water supplies. Florida receives a large quantity of rainfall compared to other states. Approximately half of Florida's rainfall occurs from June to September. The remaining half falls during the other eight months of the year. Florida's population is expected to increase from 16 million in 1995 to 22 million in 2020. That means the need for freshwater will grow from 8.2 to 9.1 billion gallons per day (Florida Council of 100 2003).

Reusing wastewater helps conserve potable water supplies because drinking-quality water is not used for non-drinking water purposes. As much as 50% of our clean drinking water goes to non-potable needs, including lawn and landscape irrigation. Irrigating with reclaimed water reduces the demand for potable water supplies. Many municipalities have few timing or quantity restrictions on using reclaimed water for irrigation. Reclaimed water also can be used for industrial cooling water, groundwater recharge, and preventing salt water intrusion in coastal groundwater aquifers. The idea behind water reuse is simple: Use the right water for the right use.

Reclaimed water contains nutrients, such as nitrogen (N), phosphorus (P), and potassium (K). These nutrients are required by plants for normal growth and are typically applied using fertilizers. Taking advantage of the nutrients in reclaimed water for plant use may help to reduce the amount of fertilizers used on Florida's landscapes.

Finally, reusing water in the terrestrial environment (e.g., irrigation) helps reduce environmental degradation of lakes, rivers, streams, and coastal waters. If reclaimed water is used on plants, the plants can use the nutrients in the reclaimed water, which can reduce the amount of nutrients directly discharged to natural systems.

What Are the Concerns with Using Reclaimed Water for Irrigation?

Wastewater is typically treated in three stages called primary, secondary, and advanced (sometimes called tertiary treatment) in order to be used as reclaimed water. Both Martinez and Clark (2012b) and Parsons (2009) describe the production of reclaimed water in Florida. Reclaimed water is wastewater that at a minimum has received secondary-level treatment, which includes basic disinfection at a wastewater treatment facility. The treatment processes are designed to ensure that reclaimed water is safe and reliable for its intended use.

Using reclaimed water for landscape irrigation can significantly reduce demand for high-quality freshwater supplies. This allows those freshwater resources to be conserved for more important uses, such as potable water for human consumption. For some landscapes, the landscape irrigation system uses reclaimed water instead of potable water. These homes and communities are said to have a "dual system." In a dual system, one pipe supplies potable water for home use and another supplies reclaimed water for irrigation.

Depending on the level of treatment and storage, reclaimed water may contain significant amounts of nutrients. Plants in the landscape can use the nutrients in reclaimed water, and this potentially reduces the need for purchased fertilizer. All nutrient applications to the landscape should be accounted for, whether they are in the form of fertilizers or are associated with reclaimed water.

One of the most important issues with reclaimed water is preventing over-irrigation. If excessive amounts of irrigation are applied, then the nutrients that come with the reclaimed water can leach through the soil or run off from the landscape. Over-irrigation with reclaimed water could also lead to losses of nutrients previously applied as fertilizer, even if the homeowner is following UF/IFAS fertilization recommendations. More information on using reclaimed water for irrigating landscapes can be found in Martinez and Clark (2012b) at http://edis.ifas.ufl.edu/ae449 and Parsons (2009) at http://edis.ifas.ufl.edu/hs1157. Nutrient management and irrigation management are closely linked (for more information, see http://edis.ifas.ufl.edu/ss586). This linkage is especially important with reclaimed water, because reclaimed water contains N and P, which, even in low concentrations, can lead to pollution of nearby water bodies if lost from the landscape.

Avoid spraying reclaimed water onto impervious surfaces such as roads, driveways, and sidewalks. This action results in reclaimed water entering the stormwater system, increasing nutrient loads to retention ponds and streams, and increasing plant and algal growth.

Recommendations for Reclaimed Water Use

Reclaimed water generally has a low cost to the homeowner, and there is a large supply; therefore, over-watering with reclaimed water is a common problem (Martinez et al. 2011). When using reclaimed water for landscape irrigation, always follow UF/IFAS recommendations for irrigation quantities. For more information, see http://edis.ifas.ufl.edu/ss586. Two additional factors to consider when using reclaimed water are the salt and nutrient content of the water.

Salinity

All reclaimed waters contain dissolved mineral salts. These soluble salts come from the salts in the original potable water and the salts added during its use as potable water. The salinity of reclaimed water may be an important parameter in determining its suitability for irrigation (U.S. EPA 2012). This statement may be especially true for dry climates in the country. However, soluble salt content may not be the primary concern for using reclaimed water in Florida. This is because Florida usually receives large amounts of rain that can leach soluble salts from the soil before the salts build up to levels high enough to injure plants.

Plants differ in their sensitivity to salinity in the soil, so the salt content of reclaimed water should be evaluated to determine any potential problems. Many turfgrasses grown in Florida show moderate to high tolerance of saline soils, so irrigating with reclaimed water should not impact the growth of turfgrass. However, other landscape plants may be sensitive to saline soils. Before purchasing landscape plants, the salt sensitivity should be determined by consulting the nursery staff.

Nutrients

The amount of nutrients contained in reclaimed water varies from utility plant to utility plant. Nutrient content can vary according to the type and degree of treatment and storage at the facility. Nutrient content also can vary during the year. Knowing the nutrient content of the water can help you incorporate this nutrient source into a landscape fertility plan.

Your local water utility company is required to test for the nutrient content of its reclaimed water and can provide you with the results. You can also test your own irrigation water for pH, salinity, and nutrient content. One option is to have the water tested through your local UF/IFAS Extension office (find your local office at http://solutionsforyourlife.ufl.edu/map). Make sure to apply the correct amount of water so that nutrient leaching or runoff does not occur.

Using reclaimed water for irrigation has the potential to provide a portion of the nitrogen and all the phosphorus required by turfgrass (Menzel and Broomhall 2006). Accounting for nutrients from reclaimed water in the nutrient budget can lead to a reduction in nitrogen fertilizer applications, resulting in lower costs. Martinez et al. (2011) shows that significant amounts of N and P can be derived from reclaimed water, and these nutrients should be counted as part of the overall fertilizer program.

Summary

The basis for water reuse is straightforward: Use the right water for the right use in the landscape. As the population in Florida continues to grow, the demand for freshwater continues to grow as well. Alternative sources of irrigation water, such as reclaimed water, are important tools that

help conserve the limited freshwater supplies in Florida. Reclaimed water contains mineral salts and nutrients, so reclaimed water irrigation must be managed to minimize plant stress and the loss of these nutrients to the environment.

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