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Reclaimed Water Use: The Example of Florida

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ARTICLES

RECLAIMED WATER USE: THE EXAMPLE OF FLORIDA

*Chelsea Anderson**

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INTRODUCTION

With the world population steadily rising, humans are placing more pressure on earth’s finite resources. Perhaps the resource in the most demand is water. In particular, the allocation of freshwater supplies is one

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of the defining issues of the twenty-first century.¹

This Article explores the potential for reclaimed water to curb the nation's freshwater consumption, using Florida as an example. Part I discusses what water problems Florida is currently facing, what their causes are, and what problems Florida is likely to face in the future if water management practices do not change. Part II explains what reclaimed water is, what it is used for, which states use it; and the benefits and drawbacks of using it. Part III examines the legal and policy implications of using reclaimed water in Florida and analyzes the current legal questions arising from its use. Part IV lays out potential resolutions for the legal and policy treatment of reclaimed water in Florida, including solutions from other states facing similar challenges and Florida's 2012 changes to the regulation of reclaimed water use through House Bill No. 639.

I. THE EXAMPLE OF FLORIDA

A. *The Rise in Florida's Population*

When settlers first came to Florida, they found a land saturated with water. In order to make the land more attractive for farmers and settlers, a maze of ditches carved up Florida to drain the lands. It is hard to imagine that a state so historically full of water would become a state whose residents are constantly plagued by water shortages. Despite the many water challenges Florida faces, there are solutions that can be implemented now to help meet the state's freshwater demands.

Numerous reasons exist for the transformation from water rich land to a place where drought and water shortages are routine. The most prominent reasons are population growth, the use of potable water for non-potable needs, high amounts of agriculture, and the dependence on groundwater withdrawals. In addition to these existing water problems, the potential impact of climate change on Florida's hydrologic system would exacerbate the situation and heighten the concerns surrounding freshwater availability.

With over 19 million residents,² Florida was ranked the fourth most populated state in the United States in 2010.³ That number is expected to

1. Christine Klein et al., *Modernizing Water Law: The Example of Florida*, 61 FLA. L. REV. 403, 404 (2009).

2. U.S. Census Bureau, *Annual Estimates of the Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2012 (NST-EST2012-01)*, tbl.1, available at <http://www.census.gov/popest/data/state/totals/2012/index.html>.

3. U.S. Census Bureau, *State Population Rank, Percent Change, and Population Density: 1980 to 2010*, tbl.14, available at <http://www.census.gov/compendia/statab/2012/tables/12s0014.pdf>.

grow to 22 million by the year 2020.⁴ As more residents populate the state, the demand for freshwater increases and puts pressure on state water resources. The rate of population growth in Florida resulted in an approximately 30% increase in freshwater withdrawals for public water supply between 1990 and 2005.⁵ While the total amount of withdrawals in Florida was 6.8 billion gallons per day in 2005,⁶ it is projected that the demand for freshwater will increase withdrawals to 8.5 billion gallons per day by 2025.⁷ In Central Florida alone, the total population and total water demands are projected to increase by approximately 49% and 40%, respectively.⁸ It is imperative that Florida properly manages its water resources by employing efficient water use in order to meet the growing demand for freshwater accompanying the expected population growth.

In addition to the rate of population growth in Florida, the concentration of residents in water sensitive coastal areas serves to compound the problem. For example, Fort Lauderdale and Miami have more residents than any other city in the state and are located in delicate ecosystems including wetlands, forested uplands, mangroves, beaches, and coral reefs.⁹ These areas were drained through a series of canals, levees, pumping stations, and water diversion or flood control structures that began in the late 1800s and continued through the 1960s.¹⁰ As a result of this alteration of the area's natural hydrology, problems in both water quality and water quantity have developed in South Florida's natural systems.¹¹

B. The Use of Potable Water for Non-Potable Needs

Potable water, also called drinking water, is water that is treated to meet the Drinking Water Standards set forth in the Florida Department of Environmental Protection.¹² Generally, all water withdrawn from groundwater and surface water must undergo some type of treatment to

4. Christopher J. Martinez & Mark W. Clark, *Reclaimed Water and Florida's Water Reuse Program*, U. Fla. Inst. Food & Agric. Scis. (IFAS) AE448.

5. Richard L. Marella, U.S. Geological Survey, *Water Use in Florida, 2005 and Trends 1950–2005* (2008).

6. *Id.*

7. *Id.*

8. Central Florida Water Initiative, *Draft Regional Water Supply Plan 2014: A Comprehensive Plan for Orange, Osceola, Polk, Seminole, and Southern Lake Counties*, available at http://cfwiwater.com/pdfs/CFWI_RWSP_PublicDraft_Vol2.pdf.

9. Thomas J. Culliton, Nat'l Oceanic & Atmospheric Admin., *Population: Distribution, Density and Growth* (1998), available at http://oceanservice.noaa.gov/websites/retiredsites/sotc_pdf/POP.PDF.

10. *Id.*

11. *Id.*

12. FLA. ADMIN. CODE ANN r.62-550.300–340 (2014).

meet these standards. The treatment process uses significant resources, both natural and financial, in order to meet the standards. The water receiving this level of treatment is not used as drinking water.¹³

Currently, 40–60% of potable water is being used for non-potable needs.¹⁴ These uses include but are not limited to irrigation for landscaping, golf courses, agriculture, toilet flushing, and industrial cooling. With water shortages already a problem and freshwater demands expected to increase with more population growth, potable water should be reserved for drinking water use while non-potable water should be employed for other uses.

Florida's subtropical climate, its mild winters that allow early spring crop production, its potential to harvest multiple crops per year, its close proximity to east coast markets, and its capability to ship perishable products in a timely fashion make an ideal place for agricultural production.¹⁵ While the agricultural industry provides local jobs and economic opportunities, it also requires significant water resources. In 2005, the agricultural sector was the largest user of freshwater in Florida, accounting for 40% of the State's total freshwater withdrawals.¹⁶ The amount of water withdrawals for the agricultural sector were substantially lower than the previous 25 years due to the loss of acreage of Florida's 2 major crops, citrus and sugarcane, as a result of many factors including hurricanes, diseases such as citrus canker, and encroaching urbanization.¹⁷

Out of all of Florida's reclaimed water, only 4% is used in agricultural irrigation.¹⁸ In Florida, direct contact of reclaimed water with the edible portion of the crop is prohibited in most circumstances, but reclaimed water may be used to irrigate crops whose edible portion will not be eaten raw, such as citrus, tobacco, and sugarcane.¹⁹ If more reclaimed water were used for non-potable needs, such as irrigating agricultural crops, golf courses, and landscaping, there would be more potable freshwater available for drinking water.

C. The Increase in Dependence on Groundwater Withdrawals

As Florida's population continues to grow, so does the demand for water. The high demand for in-stream uses, such as recreational uses,²⁰

13. See Martinez & Clark, *supra* note 4.

14. *Id.*

15. See Marella, *supra* note 5, at 26.

16. *Id.* at 22.

17. *Id.*

18. See Martinez & Clark, *supra* note 4.

19. FLA. ADMIN. CODE ANN. r.62-610.475(1)–(4) (2012).

20. Benedykt Dziegielewski & Jack C. Kiefer, U.S. Army Corps of Eng'rs, *Water Resources Outlook, U.S. Water Demand, Supply, and Allocation: Trends and Outlooks*, 18 (2006).

coupled with the fact that groundwater is abundant throughout the state and needs little treatment prior to use,²¹ results in a dependence on groundwater withdrawals to meet Florida's growing water needs. In 2005, groundwater withdrawals accounted for 62% of the total freshwater withdrawals in Florida, while surface water withdrawals accounted for only 38%.²² Fresh groundwater provided drinking water for 90% of Florida's population in 2005.²³ Depending so heavily on groundwater withdrawals has serious environmental consequences.

Florida is pumping groundwater from the aquifers faster than rainfall can replenish them.²⁴ Two of the most damaging results of this over-pumping of the state's aquifers are saltwater intrusion and sinkholes.²⁵ Saltwater intrusion occurs when freshwater aquifers are contaminated by saltwater.²⁶ When an aquifer is over-pumped, the initial equilibrium is disturbed; the water table drops below sea level, and the heavier saltwater replaces the lighter freshwater.²⁷ This contamination seriously affects the availability of freshwater. Over-pumping of groundwater also results in a loss of support to the bedrock, causing sinkholes to occur.²⁸ To prevent both saltwater intrusion and sinkholes, Florida cannot continue to rely on groundwater withdrawals to meet the State's freshwater demands.

The water problems Florida is currently experiencing will potentially be compounded by long-term climate change.²⁹ "Changes in rainfall, evaporation, groundwater recharge, or runoff due to climate variability . . . would affect [the] availability and demand [for freshwater]."³⁰ If climate change causes Florida's climate to become hotter and drier, residential demand for freshwater will increase due to increased irrigation.³¹ Rainfall would decrease and evaporation of freshwater would increase, further intensifying the water problems.³² As such, Florida's water problems will continue to worsen if a solution is not implemented in the near future. One possible solution is to assuage the State's demand

21. See Marella, *supra* note 5, at 10.

22. *Id.* at 1.

23. *Id.*

24. Cynthia Barnett, MIRAGE: FLORIDA AND THE VANISHING WATER OF THE EASTERN U.S. 2 (2007).

25. Tatiana Borisova et al., *Balancing Urban Water Demand and Supply in Florida: Overview of Tools Available to Water Managers*, Univ. of Fla. IFAS FE811 (2010).

26. WARREN VIESMAN, JR. ET AL., *WATER SUPPLY & POLLUTION CONTROL* 53 (8th ed. 2009).

27. *Id.*

28. WILLIAM C. SINCLAIR, U.S. GEOLOGICAL SURVEY, SINKHOLE DEVELOPMENT RESULTING FROM GROUND-WATER WITHDRAWAL IN THE TAMPA AREA, FLORIDA: WATER-RESOURCES INVESTIGATIONS 10 (1982).

29. See Borisova et al., *supra* note 25, at 2.

30. *Id.* at 1–2.

31. *Id.* at 2.

32. *Id.*

for freshwater by supplementing drinking water with reclaimed water.

II. THE SOLUTION OF RECLAIMED WATER

A. *What is Reclaimed Water?*

Reclaimed water is wastewater that has been treated to meet specific water quality criteria with the intent of being used for a range of purposes.³³ Sometimes referred to as recycled water,³⁴ reclaimed water receives primary, secondary, or tertiary treatment depending on the ultimate use.³⁵ Reclaimed water may be used for a variety of purposes including agricultural irrigation, public access areas, industrial uses, groundwater recharge, wetlands, and drinking water. There are currently only twenty states using reclaimed water.³⁶

Although other methods of supplementing freshwater supply exist, reclaimed water is one of the most economically feasible solutions. For example, desalination is another technology that is proposed as a means to supplement Florida's water demands, however it is less efficient and more expensive than using reclaimed water.³⁷ Desalination is the process of producing potable water by removing dissolved minerals such as salts from brackish water or seawater.³⁸ Although the public is more accepting of drinking desalinated water than reclaimed water,³⁹ reclaimed water is a better option for supplementing Florida's water needs.⁴⁰ This is because it is more efficient and cost effective to treat reclaimed water. The cost of designing and constructing a traditional water treatment plant is seventy percent of the cost of designing and constructing a desalination treatment plant.⁴¹ In addition, the energy costs to remove the impurities in brackish water and particularly seawater are higher than the energy costs for treating reclaimed water.⁴² Finally, because the concentrated byproduct produced in the desalination process is characterized as industrial waste,

33. U.S. ENVTL. PROT. AGENCY, EPA/600/R-12/618, GUIDELINES FOR WATER REUSE 1-4 (2012) [hereinafter EPA Guidelines].

34. *Id.*

35. *See infra* Part III.C. *Water Pollution Law.*

36. WATERREUSE FOUND., NATIONAL DATABASE OF WATER REUSE FACILITIES SUMMARY REPORT, 47-88, app. B (2008).

37. William S. Bilenky, *An Alternative Strategy for Water Supply and Water Resource Development in Florida*, 25 J. LAND USE & ENVTL. L. 77, 83-84 (2009).

38. Edward P. de la Parte, Jr. & Kristin A. Yerkes, *Emerging Issues in Desalination and Reclaimed Water Law*, 39 A.B.A. TRENDS 12 (2008).

39. *See id.*

40. *See id.*

41. *See id.*

42. *See generally id.*

the disposal can be costly and can have adverse environmental impacts.⁴³ Due to the high costs associated with desalination, Florida had 140 desalination treatment facilities as of 2010⁴⁴ and 486 wastewater treatment facilities as of 2012.⁴⁵ Therefore, reclaimed water is a more viable option for supplementing potable water supplies.

There are countless uses for reclaimed water depending on the level of treatment it receives. Reclaimed water can be used to irrigate crops if allowed under state regulations.⁴⁶ Public access areas such as residential areas, golf courses, athletic fields, and parks also use reclaimed water for irrigation.⁴⁷ Reclaimed water can be used to recharge the groundwater in aquifers and for industrial uses such as cooling water in power plants.⁴⁸ Other smaller uses of reclaimed water include fire suppression, wetland creation, and toilet flushing.⁴⁹ In addition to all of the ways reclaimed water is currently used, with the proper level of treatment it can also be used as drinking water.⁵⁰

In order to encourage consumers to use reclaimed water, some utility companies offer price incentive mechanisms known as conservation rate structures.⁵¹ The basic idea behind conservation rate structures is “the more water consumers use, the higher their water bills will be.”⁵² Theoretically, consumers are expected to respond to the higher water prices by using less water.⁵³ Studies have shown, however, that because water prices are already low, consumers do not care about price increases.⁵⁴ As water becomes more scarce and its price increases, conservation water rate structures may become more effective.

B. *Who Uses Reclaimed Water?*

According to the WateReUse Foundation, the 5 states that reported using the most reclaimed water as of 2008 include Arizona, California,

43. *See id.*

44. FLA. DEP'T OF ENVTL. PROT., DESALINATION IN FLORIDA: TECHNOLOGY, IMPLEMENTATION, AND ENVTL. ISSUES i (2010).

45. FLA. DEP'T OF ENVTL. PROT., 2012 REUSE INVENTORY 2 (2013) [hereinafter FDEP 2012 REUSE INVENTORY].

46. *See* Martinez & Clark, *supra* note 4, at 2.

47. *Id.*

48. *Id.*

49. *Id.* at 4 tbl.1.

50. *See, e.g.,* Christian M. Wade, *Would Tampa Residents Drink Treated Toilet Water?*, TAMPA TRIB. (June 24, 2009), available at <http://tbo.com/news/politics/would-tampa-residents-drink-treated-toilet-water-100626>.

51. *See* Borisova et al., *supra* note 25, at 4.

52. *Id.*

53. *Id.*

54. *Id.*

Florida, Texas, and Washington.⁵⁵ Three of these 5 states, Arizona, California, and Washington, are in the western United States and therefore operate under similar systems of reclaimed water management. The state of Texas is split by the 100th Meridian⁵⁶ and thus has a unique approach to managing reclaimed water. Florida is the only eastern state listed in the top 5 states with the most reclaimed water use.

“Because freshwater is typically scarce in the dry western states, many states turned to reclaimed water to supplement their freshwater supplies.”⁵⁷ Arizona uses reclaimed water for municipal, agricultural, industrial and commercial, environmental protection and enhancement, and potable uses.⁵⁸

California uses reclaimed water for industrial uses, golf course irrigation, as a seawater intrusion barrier, for natural system restoration of wetlands and wildlife habitat, for recreational impoundment, for geothermal energy production, commercial uses, and other uses such as in construction and dust control.⁵⁹ Reclaimed water is also used in parts of Los Angeles and Orange County to supplement drinking water supplies.⁶⁰ In Washington, reclaimed water is used for irrigation, industrial process and cooling water, toilet flushing, dust control, construction activities, and many other uses of non-potable water supplies.⁶¹ Reclaimed water is also used as a resource to create, restore and enhance wetlands, recharge the groundwater supplies and increase the flows in rivers and streams.⁶²

The programs for managing reclaimed water in Arizona, California, and Washington share similar aspects. All three states operate permitting programs for reclaimed water.⁶³ Additionally, all three states have state agencies responsible for different aspects of their reclaimed water programs. In Arizona, the Arizona Department of Environmental Quality (ADEQ) has jurisdiction over the state’s reclaimed water program and

55. See WATERREUSE FOUND., *supra* note 36, at 17–31.

56. The 100th Meridian represents the longitudinal line that separates the moist eastern United States from the arid western United States. For more information, see generally M. Rosenberg 100th Meridian: The Boundary Between the Moist East and Arid West (2013), available at <http://geography.about.com/od/learnabouttheearth/a/100thmeridian.htm>.

57. Nathan S. Bracken, *Water Reuse in the West: State Programs and Institutional Issues. A Report Compiled by the Western States Water Council*, 18 HASTINGS W.-N.W. J. ENVTL. L. & POL’Y 451, 454 (2012).

58. Ginette Chapman, *From Toilet to Tap: The Growing Use of Reclaimed Water and the Legal System’s Response*, 47 ARIZ. L. REV. 773 (2005).

59. *Id.*

60. Paul Kix, *You are Drinking What?*, WALL ST. J., Aug. 25, 2012, at C3.

61. Wash. Dep’t of Ecology, *Water Quality Program Frequently Asked Questions*, Pub. No. 10-10-029, 1 (2010) [hereinafter WDE Water Quality FAQs].

62. *Id.*

63. See ARIZ. ADMIN. CODE §§ R18-9-70–R18-9-720; CAL. WATER CODE § 13522.5 & 13523; WASH. REV. CODE § 90.46.030.

has statutory authority to adopt rules with standards for reclaimed water conveyances and water quality. The Arizona Department of Water Resources (ADWR) regulates the water quantity aspects of reclaimed water.⁶⁴ In California, the State Water Resources Control Board (SWRCB) and 9 Regional Water Quality Control Boards regulate the water quality and quantity aspects of water reuse. The California Department of Public Health (CDPH) regulates the public health aspects.⁶⁵ Finally, the Washington Department of Ecology's Water Quality Program is the primary agency responsible for permits and reviews the environmental quality aspects of reclaimed water. While the Washington Department of Health's Office of Shellfish and Water Protection reviews public health aspects.⁶⁶

Straddling the east-west boundary, Texas uses reclaimed water for several purposes, including the following: (1) Urban uses such as golf course irrigation, dust control, fire protection, toilet flushing, and landscape irrigation; (2) Industrial uses such as plant wash down, processing water, and cooling water supplies; (3) Recreational uses such as developing and maintaining decorative ponds, lakes, and fountains; (4) Agricultural irrigation; (5) Groundwater recharge; and (6) Surface water augmentation for potable reuse.⁶⁷ In El Paso, Texas reclaimed water is also used to supplement the drinking water supply.⁶⁸

The Texas Commission on Environmental Quality's (TCEQ) Water Quality Program regulates direct reuse and the agency's Water Rights Program regulates indirect reuse, although indirect reuse is not defined.⁶⁹ Direct reuse refers to the use of wastewater effluent that has been directly conveyed from the wastewater treatment plant to the place of use via pipelines, storage tanks, and other infrastructure. Indirect reuse refers to water that is discharged into a watercourse and subsequently re-diverted for a beneficial purpose or use.⁷⁰ The TCEQ regulates all aspects of direct reuse that do not pertain to crude oil and natural gas activities.⁷¹ Texas authorizes direct reuse via an individual authorization or by state rule and issues individual authorizations for direct reuse of municipal wastewater.⁷² Agricultural sources are not included in TCEQ's reclaimed water program, but TCEQ regulates Concentrated Animal Feeding Operations (CAFOs) via individual Texas Pollutant Discharge

64. See Bracken, *supra* note 57, at 457–58.

65. *Id.* at 465.

66. *Id.* at 517–18.

67. Tex. Water Dev. Bd., *Water for Texas: Water Reuse 2* (2012) [hereinafter TWDB *Water Reuse*].

68. See Kix, *supra* note 60.

69. See Bracken, *supra* 57, at 508–10.

70. *Id.*

71. *Id.* at 509.

72. *Id.*

Elimination System or state-only permits.⁷³

On the eastern side of the United States, Florida is the leading user of reclaimed water. The Florida Department of Environmental Protection reports that in 2006, Florida reused more reclaimed water per day than any other state in the United States.⁷⁴ The majority of reclaimed water in Florida is used for public access areas, including irrigation of residential areas, parks, golf courses, and schools.⁷⁵ Florida also uses reclaimed water for industrial uses, agricultural irrigation, groundwater recharge, wetlands replenishment, and for other uses.⁷⁶ In 2009, Tampa City Councilman Charlie Miranda proposed the idea of using reclaimed water to supplement Tampa's drinking water supply.⁷⁷ The plan would consist of building a wastewater treatment plant to purify wastewater to drinking water quality and injecting the treated wastewater into the ground for natural filtration before it flows into the Hillsborough River, the city's main source of drinking water.⁷⁸ This plan lacked public support and never came to fruition, but the possibility of using reclaimed water to supplement Florida's drinking water supply has not disappeared.

Florida first began using reclaimed water in the mid-1960s for spray irrigation of crops in Tallahassee.⁷⁹ After this first use of reclaimed water, Florida rapidly developed water reuse programs throughout the state. In 1973, Fiesta Village began to use reclaimed water for golf course irrigation.⁸⁰ Reclaimed water was next utilized in Vero Beach three years later in power plant cooling towers.⁸¹ A major reclaimed water system was developed in St. Petersburg in 1977, creating a dual water distribution system for landscape irrigation.⁸² That same year, Gainesville began injecting reclaimed water into the Floridan Aquifer for groundwater recharge.⁸³ Only one year later, in 1978, the Loxahatchee River Environmental Control District started its reuse program.⁸⁴ Tallahassee opened the Southeast Farm Wastewater Reuse Facility in

73. *Id.* at 510.

74. Fla. Dep't of Env'tl. Prot., *Reuse Inventory Database and Annual Report*, (Dec. 3, 2013, 9:25 AM), available at <http://www.dep.state.fl.us/water/reuse/inventory.htm> [hereinafter FDEP Reuse Inventory Database].

75. See FDEP 2012 REUSE INVENTORY, *supra* note 45, at 6.

76. *Id.*

77. See Wade, *supra* note 50.

78. *Id.*

79. Gurpal S. Toor & Donald P. Rainey, *History and Current Status of Reclaimed Water Use in Florida*, Univ. of Fla. IFAS SL308, 1-2 (2009).

80. *Id.* at 2.

81. *Id.*

82. *Id.* at 1-2.

83. *Id.* at 2.

84. *Id.*

1980.⁸⁵ From 1986 to 1987, Orlando and Orange County developed the Water Conserv II project to irrigate citrus groves and provide groundwater recharge through infiltration basins, as well as a wetlands project for 1640 acres in a public park and nature preserve.⁸⁶ In 1991, Project A Prototype Realistic Innovative Community of Today (“Project APRICOT”) was developed to allow Altamonte Springs to fund and integrate reuse into its water resource management landscape.⁸⁷ By 1992, the world’s largest residential irrigation program was developed in Cape Coral.⁸⁸

Today, only 2 out of the 67 counties in Florida do not use reclaimed water: Calhoun County and Holmes County.⁸⁹ Both Calhoun County and Holmes County have populations under 20,000 residents.⁹⁰ Florida uses more reclaimed water than any other state in the nation⁹¹ and continues to be at the forefront of reclaimed water developments. For this reason, it is important to understand the law and policy surrounding reclaimed water in the state of Florida.

C. *What are the Advantages of Reclaimed Water?*

Reducing the use of potable water for non-drinking water purposes and substituting reclaimed water helps conserve drinking water supplies.⁹² There are numerous advantages associated with reclaimed water use. The environmental benefits associated with reclaimed water use are reduced surface water and groundwater withdrawals, and improved water quality of the natural environment.⁹³ Using reclaimed water also results in economic advantages, such as the reduced need for new drinking water supplies, reduced need for new drinking water infrastructure, increased opportunity for recreational use of surface water, and decreased use of fertilizers in agriculture.⁹⁴

A major advantage of using reclaimed water is it can greatly increase the benefits obtained from limited supplies of freshwater.⁹⁵ By supplementing the water supply, using reclaimed water reduces the

85. *Id.*

86. *Id.*

87. *Id.*

88. *Id.*

89. See FDEP 2012 REUSE INVENTORY, *supra* note 45, at 9.

90. *Id.* at 11.

91. See FDEP *Reuse Inventory Database*, *supra* note 74.

92. See Martinez & Clark, *supra* note 4, at 1.

93. *Id.*

94. *Id.* at 2.

95. John Anderson, Austl. Dep’t of Pub. Works & Serv., *The Environmental Benefits of Water Recycling and Reuse*, 3 WATER SCI. & TECH.: WATER SUPPLY 1, 7 (2003).

amount of freshwater withdrawals from surface water and groundwater.⁹⁶ In 2005, 38% of the water withdrawals in Florida were from surface water, and 62% were from groundwater.⁹⁷ Rivers, streams, lakes, and other surface water sources benefit from the reduction of the amount of surface water withdrawals because said reduction maintains healthy flows and levels of the water bodies.⁹⁸ Maintaining healthy flows and levels is important for decreasing the risk of water shortages, which can be devastating to wildlife depending on these water bodies. Additionally, reducing the amount of groundwater withdrawals prevents saltwater intrusion and sinkholes.⁹⁹ “Reclaimed water can [also] be used to recharge groundwater to form a barrier between salt and fresh groundwater.”¹⁰⁰

In addition to the environmental benefits of using reclaimed water, there are also a number of economic benefits. By using reclaimed water to supplement drinking water supplies, money can be saved on new drinking water supplies and infrastructure, such as expensive storage reservoirs, desalination plants, pipelines, and water treatment plants.¹⁰¹ Not only does reducing the amount of surface water withdrawals keep water bodies healthy, it provides the opportunity for more recreational use of these water bodies.¹⁰² Recreation is a large industry and water recreation has tremendous economic value.¹⁰³ Finally, reclaimed water contains more nutrients than other water. Reclaimed water can be beneficial when applied to irrigated landscapes and can reduce the need for additional fertilizers.¹⁰⁴ In this way, reusing water helps reduce environmental degradation of lakes, rivers, streams and coastal waters by decreasing the amount of nutrients that are directly discharged into natural systems¹⁰⁵ and also saves money by eliminating the need to purchase costly fertilizers.

96. *Id.*

97. *See* Marella, *supra* note 5, fig.1.

98. BERNARD J. NEBEL & RICHARD T. WRIGHT, ENVIRONMENTAL SCIENCE: THE WAY THE WORLD WORKS 250 (4th ed. 1993).

99. *See* Martinez & Clark, *supra* note 4, at 1.

100. *Id.*

101. *Id.*

102. Anderson, *supra* note 95, at 8.

103. Elizabeth A. Stanton & Matthew Taylor, *Valuing Florida's Clean Waters*, Nov. 13, 2012, http://www.sarasota.wateratlas.usf.edu/upload/dpuments/ValuingFloridasCleanWaters_Stockholm_Enviro_Institute3.pdf.

104. *Id.* at 2.

105. *Id.*

III. THE CHALLENGES TO RECLAIMED WATER

A. Public Perception

The biggest challenge to reclaimed water use is not legal, but public perception. The idea of reusing our wastewater is unappealing to the majority of the public because reclaimed water is so closely related to human excrement. Most of the public's fears are unfounded; however, there is some merit to the concern regarding contaminants in reclaimed water.

With the media constantly referring to reclaimed water use as “toilet-to-tap,”¹⁰⁶ it is not surprising the public is afraid of drinking reclaimed water. Studies show that the public is fairly open to using reclaimed water for activities with low degrees of personal contact, such as irrigating a lawn or golf course, but the public is reluctant to use reclaimed water for activities with high degrees of personal contact, such as drinking or bathing.¹⁰⁷ Furthermore, the public prefers using desalinated water rather than reclaimed water for close-to-body uses, such as drinking, as shown by studies conducted in Australia.¹⁰⁸

Research shows that the main factors influencing community acceptance of reclaimed water are trust in authorities associated with recycled water use, knowledge and information about reclaimed water, past experience with alternative water sources, concerns with health risks, and the perception of good water quality.¹⁰⁹ For the most part, there is little basis for the public concerns with health risks and the perception of good water quality. In essence, all water is reused, as it has been recycled between organisms and ecosystems in the water cycle for the last 3.5 billion years.¹¹⁰ Furthermore, NASA recycles human urine for use as drinking water in space shuttles.¹¹¹ The technology to purify wastewater to drinking water quality exists; it is mainly public resistance that keeps the technology from being implemented.

Reclaimed water must undergo extensive treatment before it is ready

106. See generally Kix, *supra* note 60; Wade, *supra* note 60; D.J. Waldie, *Los Angeles' Toilet-to-Tap Fear Factor*, L.A. TIMES, Dec. 1, 2002, available at <http://articles.latimes.com/2002/dec/01/opinion/op-waldie1>; Kate Galbraith, *Taking the Ick Factor Out of Recycled Water*, N.Y. TIMES, July 25, 2012, available at <http://www.nytimes.com/2012/07/26/business/global/26iht-green26.html>.

107. Sara Dolnicar et al., *What Affects Public Acceptance of Recycled and Desalinated Water?*, 45 WATER RES. 933, 934 (2011), available at <http://www.sciencedirect.com/science/article/pii/S0043135410006858#>.

108. *Id.*

109. See *supra* Table 1.

110. Waldie, *supra* note 106; Galbraith, *supra* note 106.

111. Waldie, *supra* note 106.

for public use.¹¹² Advanced treatment technologies, such as reverse osmosis, treat reclaimed water to a higher quality level than other tap water is treated.¹¹³ However, even with the advances in technology, it is nearly impossible to remove all traces of hormones and pharmaceuticals from reclaimed water.¹¹⁴

B. *Water Allocation Law*

Water in Florida is regulated by the Florida Department of Environmental Protection (DEP) and the five Water Management Districts located throughout the state, the Northwest Florida, Suwannee River, St. Johns River, South Florida, and Southwest Florida Water Management Districts.¹¹⁵ The boundaries of the five Water Management Districts are delineated based on the State's watershed boundaries.¹¹⁶ The Florida Legislature established the Water Management Districts through the Florida Water Resources Act of 1972 (FWRA).¹¹⁷ Under the Act, the Water Management Districts are responsible for handling water supply issues, flood protection, water quality issues, and the protection of natural systems.¹¹⁸ Water Management Districts accomplish these tasks through two regulatory tools provided by the FWRA: consumptive use permitting (CUP) and environmental resource permitting (ERP).¹¹⁹

The Water Management Districts use ERPs to regulate the construction of surface water management systems through specific permitting criteria each system must meet in order to receive an ERP.¹²⁰ While ERPs are a useful tool, they are not used to regulate reclaimed water. Instead, the Water Management Districts regulate reclaimed water through CUPs. Accordingly, this Article focuses on the CUP.

The CUP program regulates water allocation throughout the State. Florida operates under a "regulated riparianism" model of water law.¹²¹ This hybrid form of water law combines the flexibility of the common law riparian doctrine with the stability of a permit system by allowing for as many reasonable uses of water as possible through permits restricting

112. *Id.*

113. *Id.*

114. *Id.*

115. FLA. STAT. § 373.069 (2012).

116. *Id.*

117. Florida Water Resources Act of 1972, Fla. Laws Ch. 72-299 (codified as amended at FLA. STAT. SECS. 373012–373.200 (2012)).

118. Mary Jane Angelo, *Integrating Water Management and Land Use Planning: Uncovering the Missing Link in the Protection of Florida's Water Resources?*, 12 U. FLA. J.L. & PUB. POL'Y 223, 226 (2001).

119. See FLA. STAT. §§ 373.219–413 (2014).

120. See FLA. STAT. § 373.413(1) (2014); FLA. ADMIN. C. ANN. r.62-330.010(4) (2014).

121. See Klein et al., *supra* note 1, at 410.

the amount and duration of water use.¹²² Water users are required to obtain a CUP from their respective Water Management District in order to have the right to use the water.¹²³ Water Management Districts grant permits for consumptive use if the applicant meets a three-prong test: (1) the proposed use must be a “reasonable beneficial” use; (2) the proposed use must not interfere with any presently existing legal use of water; and (3) the proposed use must be consistent with the public interest.¹²⁴

As part of the CUP program, the Florida Legislature provides that the encouragement and promotion of water conservation and reuse of reclaimed water are state objectives and considered to be in the public interest.¹²⁵ Anyone with a CUP can use reclaimed water when there is an existing utility which provides reclaimed water if the utility has determined that it has uncommitted reclaimed water capacity and has distribution facilities to transport the water to the site of the affected applicant’s proposed use.¹²⁶ Water Management Districts also have the option to allow the use of reclaimed water without a CUP in situations they deem appropriate.¹²⁷

Water is a fugitive resource in that it is constantly moving through physical, chemical, and biological processes. The water in a river moves not only where the current takes it, but also moves through processes such as evaporation, where it goes into the atmosphere and is later deposited in another area as precipitation. Due to this characteristic, ownership of water is difficult to determine. As such, virtually all states, including Florida, view water in terms of the right to use rather than ownership.¹²⁸

Florida citizens have a usufructuary right, or right to use, in the waters of the state, but they have no ownership interest in the water.¹²⁹ This concept can be confusing for some, especially when looking at the water people receive through their faucets. When paying the water bill received from a utility company, a person is not paying for the ownership rights to that water. Rather, a small portion of the water is consumed, and then the rest flows either down the drain, a toilet flush, or as runoff from our yards. An individual certainly cannot claim ownership of a specific molecule of the water received from the faucet. Instead, the individual is paying the utility company for the service of collecting the water, treating it to the necessary level, and then conveniently delivering it to homes and other buildings.

122. *See id.*

123. *See* FLA. STAT. § 373.219 (2014).

124. FLA. STAT. § 373.223(1) (2012).

125. *Id.* at (1)(a).

126. *Id.* at (3)(a).

127. *Id.* at (3)(b).

128. *See* Klein et al., *supra* note 1, at 407.

129. *See* Martinez & Clark, *supra* note 4, at 3.

C. Water Pollution Law

In Florida, the level of treatment reclaimed water receives is dependent upon how the reclaimed water will ultimately be used.¹³⁰ The three stages of wastewater treatment are primary, secondary, and tertiary treatment. In primary treatment, screening and settling remove suspended solids.¹³¹ After the suspended solids are removed, “the wastewater can then go on to receive secondary treatment, where biological decomposition reduces complex organic material into simpler forms.”¹³² The water is separated from the remaining organic material and is either disinfected and discharged or subjected to tertiary treatment.¹³³ In tertiary treatment, solids, organic material, nutrients, or other chemicals are further removed from the water through physical, chemical, or biological processes.¹³⁴ Water receiving tertiary treatment is disinfected after advanced treatment and then discharged or reused.¹³⁵

Reclaimed water receives a minimum of secondary-level treatment and disinfection at wastewater treatment plants in Florida, as required by Chapter 62-610, Fla. Admin. Code.¹³⁶ The main difference between reclaimed water that receives secondary treatment and reclaimed water that receives tertiary treatment is that tertiary treated water typically contains only 25% of the nitrogen and phosphorus contained in secondary treatment.¹³⁷

IV. THE FUTURE OF RECLAIMED WATER

A. Educating the Public

“Although the public perception of reclaimed water is improving, there are serious concerns associated with pathogens in all water.”¹³⁸ Additionally, many people still are uneasy about the idea of reusing water that was traditionally considered waste. To increase the use of reclaimed water and placate the public, education and information campaigns to educate the public about the use of reclaimed water should be undertaken. Educational campaigns can be very successful in shaping the public opinion and would be useful in a complex situation such as reclaimed

130. *Id.*

131. *See id.* at 2.

132. *Id.*

133. *Id.*

134. *Id.*

135. *Id.*

136. *Id.* at 3.

137. *Id.* at 2.

138. *See Borisova et al., supra* note 25, at 3.

water.

Ultimately, a public education program that informs the public about reclaimed water would be extremely beneficial to states trying to supplement freshwater supply with reclaimed water. Because a large part of the public's reluctance to drinking reclaimed water stems from the fear of health risks and perception of poor water quality, an education program that explains the benefits of reclaimed water could be effective. Additionally, authorities associated with reclaimed water use, such as the water provider or public policy makers, should be transparent in their reclaimed water policies to prevent trust problems with the public. These authorities should not unilaterally implement the addition of reclaimed water to drinking water, but rather should include the public in the decision-making process while trying to stress that supplementing freshwater supplies with reclaimed water is essential to a sustainable future.

B. *Preserving the Definition*

Reclaimed water rights are still uncertain in Florida. Ongoing debates between utility companies providing reclaimed water and environmentalists concerned over the potential privatization of water led the approval of House Bill 639 by Governor Rick Scott in 2012.

House Bill 639 was proposed and sponsored by Representative Dana Young (R-Tampa) during the 2012 Florida Legislative session.¹³⁹ As it was originally proposed, the bill excluded reclaimed water from the definition of "waters of the state."¹⁴⁰ Under the laws in place before the bill was proposed, after a wastewater treatment facility treats reclaimed water, it returned to the control of the Water Management Districts to be allocated throughout the state.¹⁴¹ By removing reclaimed water from the definition of "waters of the state," the bill that was originally proposed would have the effect of removing reclaimed water from public ownership and management.¹⁴² If reclaimed water is no longer legally categorized as a public resource, it is exempt from being a state asset. Control of reclaimed water under the bill that was originally proposed

139. Editorial, *Bill is a Giveaway of a Precious Resource*, TAMPA BAY TIMES, Jan. 16, 2012, available at <http://www.tampabay.com/opinion/editorials/bill-is-a-giveaway-of-a-precious-resource/1210530>.

140. *Id.*

141. Brittany A. Davis, *Tampa Mayor Bob Buckhorn Pushes Water Privatization Proposal that has its Critics*, TAMPA BAY TIMES, Jan. 18, 2012, available at <http://www.tampabay.com/news/environment/water/tampa-mayor-bob-buckhorn-pushes-water-privatization-proposal-that-has-its/1211054> [hereinafter Davis, *Buckhorn Pushes Water Privatization*].

142. Christine Stapleton, *Language Change in State Bill Would Keep Reclaimed Water in Districts' Control*, PALM BEACH POST, Feb. 1, 2012, available at <http://www.palmbeachpost.com/news/news/state-regional/language-change-in-state-bill-would-keep-reclaimed/nL3j4/>.

would be transferred from the Water Management Districts to the utility companies that treat and produce the reclaimed water, taking away the oversight role of the Water Management Districts.¹⁴³

Environmental groups such as the Florida Conservation Coalition strongly opposed the bill, fearing it would lead to the privatization of water in Florida.¹⁴⁴ Without Water Management District oversight and regulation, reclaimed water would no longer have to be used for the public benefit or for storage in case of emergency droughts. Municipalities and utility companies producing reclaimed water could sell the water to whomever they choose, most likely the bidders with the deepest pockets.¹⁴⁵ Environmental groups worried that if reclaimed water could be sold to the highest bidder, it would no longer be used for environmentally beneficial projects, such as wetland creation and restoration.¹⁴⁶ Furthermore, taxpayers were upset by the bill that was originally proposed because they put in large amounts of money to develop the infrastructure necessary to make Florida's reclaimed water system the leading system in the United States.¹⁴⁷ Finally, former Florida Governor and U.S. Senator Bob Graham strongly opposed the bill because water has traditionally been a resource that belongs to the people of Florida.¹⁴⁸

On the other hand, local governments and private utility companies producing reclaimed water say there is no incentive for them to continue treating the water.¹⁴⁹ It is expensive to treat reclaimed water and the Water Management Districts should not be allowed to force the local governments and private utilities to give the water away. Local governments and private utility companies argue they should see a profit in the work they are doing to treat the reclaimed water.¹⁵⁰

In order for the bill to pass, the two sides had to come to a compromise. To satisfy environmentalists, the originally proposed bill language that would have removed reclaimed water from the definition of "waters of the state" was eliminated.¹⁵¹ To satisfy the local governments and private utility companies, the bill included language

143. CommonDreams, *Florida Legislation Paves Ground for Water Privatization*, Jan. 10, 2012, available at <http://www.commondreams.org/headline/2012/01/10-2>.

144. Florida Conservation Coalition: GroupSpaces, Email: FCC Legislative Alert I, HB 639, available at <http://floridaconservationcoalition.org/emails/196200>.

145. See Stapleton, *supra* note 142.

146. *Id.*

147. See *Bill is a Giveaway of a Precious Resource*, *supra* note 140.

148. Brittany A. Davis, *Graham Criticizes Proposed Environmental Bills*, MIAMI HERALD (Jan. 17, 2012) [hereinafter Davis, *Graham Criticizes*], available at <http://miamiherald.typepad.com/nakedpolitics/2012/01/gov-graham-criticizes-proposed-environmental-policies.html>.

149. See Stapleton, *supra* note 142.

150. See Davis, *Graham Criticizes*, *supra* note 148.

151. *Id.*

forbidding Water Management Districts from forcing municipalities and utilities to give away the reclaimed water they treat.¹⁵² With the compromises made, House Bill 639 was approved by Governor Rick Scott on April 24, 2012 and codified as section 373.250 in the Florida statutes.¹⁵³ The new language under section 373.250 of the Florida statutes specifically states “a water management district may neither specify any user to whom the reuse utility must provide reclaimed water nor restrict the use of reclaimed water provided by a reuse utility to a customer in a permit or, unless requested by the reuse utility, in a water shortage order or water shortage emergency order.”¹⁵⁴ The definition of “water” or “waters of the state” continues to include reclaimed water through its definition of those terms to mean

any and all water on or beneath the surface of the ground or in the atmosphere, including natural or artificial watercourses, lakes, ponds, or diffused surface water and water percolating, standing, or flowing beneath the surface of the ground, as well as all coastal waters within the jurisdiction of the state.¹⁵⁵

Although the bill takes some regulatory power away from the Water Management Districts, it is a promising sign that the two groups at odds in this debate were able to reach a decision that keeps reclaimed water as a public resource in the state of Florida.

C. Ensuring the Quality

While many organic components present in reclaimed water are broken down or removed during wastewater treatment, some substances, such as pesticides and pharmaceuticals, cannot be completely degraded during treatment and may persist in even highly treated reclaimed water.¹⁵⁶ These substances, known as emerging contaminants, become a part of wastewater after being passed out of the body in the form of human waste (as is the case with pharmaceuticals)¹⁵⁷ or washed during bathing (as is the case with deodorants, mosquito repellents, and

152. *Id.*

153. Jim Turner, *Rick Scott Signs Bills on Insurance, Recycled Water Use, Public Record Exemptions*, SUNSHINE ST. NEWS (Apr. 24, 2012, 10:22 PM), <http://www.sunshinestatenews.com/blog/rick-scot-signs-bills-insurance-recycled-water-use-public-record-exemptions> (follow “HB 639” hyperlink); FLA. STAT. § 373.250 (1994).

154. FLA. STAT. § 373.250(3)(c) (1994).

155. FLA. STAT. § 373.019(22) (1972).

156. Gurpal S. Toor & Mary Lusk, *Reclaimed Water Use in Landscape: What's in Reclaimed Water and Where Does It Go?*, Univ. of Fla. IFAS SL337, 2 (2014).

157. Kathleen Doheny, *Drugs in Our Drinking Water?*, WEBMD, <http://www.webmd.com/a-to-z-guides/features/drugs-in-our-drinking-water>.

perfumes).¹⁵⁸ While the World Health Organization reports that reverse osmosis can remove more than 99% of “large pharmaceutical molecules,”¹⁵⁹ reclaimed water may contain minute levels of emerging contaminants. The effects of emerging contaminants on human health and the environment are not known; however, no research thus far has indicated they cause harmful effects.¹⁶⁰

In addition to emerging contaminants, reclaimed water may also contain traces of endocrine disrupting chemicals. Endocrine disruptors are chemicals that may interfere with the body’s endocrine system and produce adverse developmental, reproductive, neurological, and immunological effects in both humans and wildlife.¹⁶¹ Substances such as pharmaceuticals and compounds found in everyday products, including plastic bottles, metal food cans, detergents, flame-retardants, food, toys, cosmetics, and pesticides, contain endocrine disruptors.¹⁶² Endocrine disrupting chemicals can be introduced into drinking water through hormonally-active pharmaceuticals that pass through the bodies of those taking them and end up in water treatment systems and surface waters.¹⁶³ Endocrine disruption is still an emerging public health concern, thus the effects of endocrine disrupting chemicals found in drinking water on human health and the environment are uncertain.¹⁶⁴ Accordingly, more research should be conducted to determine potential adverse effects of using reclaimed water before implementing the widespread potable use of it.

CONCLUSION: TOWARD SUSTAINABLE WATER USE

In brief, using reclaimed water for non-potable uses and to supplement the drinking water supply is important for Florida to meet the state’s growing water demands. Florida historically has been successful in using reclaimed water and currently uses the most reclaimed water of any state

158. Toor & Lusk, *supra* note 156, at 2–3.

159. World Health Organization, *Information Sheet: Pharmaceuticals in Drinking Water*, available at http://www.who.int/water_sanitation_health/emerging/info_sheet_pharmaceuticals/en/index.html.

160. Toor & Lusk, *supra* note 156, at 3.

161. National Institute of Environmental Health Sciences, *Endocrine Disruptors*, <http://www.niehs.nih.gov/health/topics/agents/endocrine/> [hereinafter NIEHS, *Endocrine Disruptors*]; see also U.S. Fish & Wildlife Service, *Endocrine (Hormone) Disruptors*, <http://www.fws.gov/contaminants/Issues/EndocrineDisruptors.cfm> (last updated Feb. 13, 2013).

162. NIEHS, *Endocrine Disruptors*, *supra* note 161.

163. Linda S. Birnbaum, *Testimony on Endocrine Disrupting Chemicals in Drinking Water: Risks to Human Health and the Environment*, U.S. Dept. of Health & Human Servs., Feb. 25, 2010, <http://www.hhs.gov/asl/testify/2010/02/t20100225a.html>.

164. *Id.*

in the nation. Florida should continue on this path by increasing the use of reclaimed water and consider using reclaimed water for potable uses.

Using reclaimed water presents complicated issues regarding the treatment of reclaimed water in law and policy. Florida's reclaimed water regulatory framework provides for and encourages the use of reclaimed water, but the 2012 attempts to remove reclaimed water from the public resources shows there is still uncertainty about the legal rights associated with reclaimed water use. The fact that environmentalists and private utility companies were able to reach a compromise is promising for a future of continued reclaimed water use without privatization in Florida. Every state could learn from the successes and mistakes made by states using reclaimed water.

Overall, the western states with the most successful reclaimed water regulatory frameworks rely on a comprehensive set of rules that provide specific guidance for the quality and quantity aspects of reclaimed water use. In addition, reclaimed water treatment facilities located closer to the end user of the reclaimed water results in a less expensive conveyance of the water to the end user and an overall higher rate of reclaimed water use. Florida should keep these points in mind when increasing reclaimed water use in the future. In addition, other states can learn from Florida's innovative reclaimed water technologies, widespread use of reclaimed water, and compromises made between different interest groups, all of which contribute to Florida's status as the number one producer and user of reclaimed water.

The biggest obstacle facing reclaimed water use in Florida seems to be the public perception rather than politics or legal issues. Florida residents are reluctant to use water that is closely related to sewage for anything more than watering their lawns. Even then, users are reluctant to use reclaimed water for irrigating edible crops on their properties, such as citrus trees. In order to promote and encourage further use of reclaimed water, Florida should consider a statewide public outreach and education program to inform citizens of the benefits and safety of using reclaimed water. In addition, Florida should continue to sponsor research studies in order to determine the potential adverse effects of emerging contaminants in reclaimed water. With these changes, Florida is sure to continue leading the nation in reclaimed water use.

