Department of Environment & Conservation

Water Reuse in the Duck River Watershed

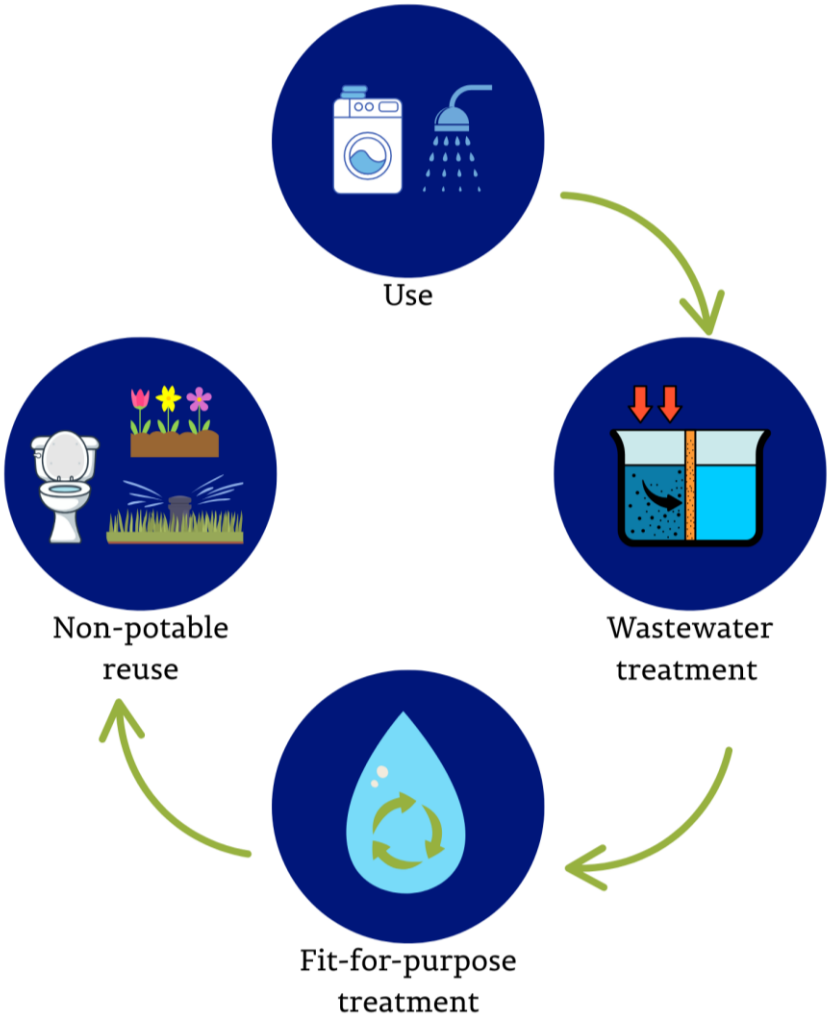
Office of Policy and Planning and Division of Water Resources

What is Water Reuse?

Water reuse is the use of reclaimed water which is treated effluent from a wastewater treatment system for beneficial purposes.

A common source of reclaimed water is treated municipal wastewater effluent, which then undergoes additional "fit-for-purpose" treatment, that is appropriate for the intended beneficial end use.

Effluent: Wastewater that is discharged from various sources, such as sewers or industrial outfalls, into surface waters, either untreated or treated.



Types of Water Reuse

- There are **two primary types** of water reuse:
  - Non-potable: non-drinking water purposes
  - Potable: drinking water

Non-Potable Water Reuse

"A conservation activity that replaces the use of more highly treated water, especially potable drinking water, with wastewater treated to a lesser, but sufficient, degree for safe and efficacious reuse."

*(T.C.A. § 0400-40-06-.10(1)(a)

- irrigation of lawns, parks, and golf courses
- toilet flushing

Why Reuse?

Reduce strain on freshwater sources

- Water reuse reduces the amount of freshwater that needs to be withdrawn from sources like rivers, lakes, and aquifers.
- This can help to preserve these vital resources for other important uses, such as supporting aquatic ecosystems.

Reduce nutrients entering waterways

- Wastewater often contains nutrients like nitrogen and phosphorus
- Reusing wastewater can help to reduce the amount of these nutrients that enter streams and rivers, preventing harmful algal blooms and protecting aquatic life

Non-Potable Reuse in Tennessee

- Tennessee law* requires applicants for a new or expanded wastewater discharge to surface waters to consider alternatives to discharge, including land application and **beneficial reuse of treated wastewater**

*(T.C.A. § 69-3-108(e))

- Beneficial reuse of treated wastewater is regulated under Rule 0400-40-06-.10 which enables non-potable reuse for restricted and unrestricted urban uses
  - Restricted: Public access is controlled through fences and access restrictions
  - Unrestricted: Public access is not controlled (irrigation, flushing)

Reuse Requirements

- Rule 0400-40-06-.10 further requires:
  - Reclaimed wastewater reused for irrigation shall not be applied in excess of the evaporation rate plus the uptake rate of vegetation in the immediate distribution area to ensure there is no unpermitted discharge

- Special Conditions for Reuse of Reclaimed Wastewater
  - The reclaimed wastewater must be fit for use by the end user, as defined by the required end user service agreement
  - Notwithstanding any less stringent provisions established in the end user service agreement, the permittee shall comply with the minimum standards and monitoring frequency outlined in the rule

Landscape of Existing Permitted Sites Using Reuse

Individual National Pollutant Discharge Elimination System (NPDES) Permit	State Operating Permit (SOP)
• 6 permitted systems	• 10 permitted systems

Individual NPDES Permits & Flows to the Duck River Watershed

EFO Name	Permittee	Actual Flow Rate (MGD)
Columbia	Tyson Farms, Inc.	1.085
Columbia	Tennessee Wildlife Resources Agency (TWRA)	3.6
Columbia	Limestone Water Utility Operating Company, LLC	0.05
Columbia	Remedial Holdings, LLC	0.99
Columbia	Town of Chapel Hill	0.17
Columbia	Tennessee Department of Correction	0.4
Columbia	City of Columbia	10
Columbia	Town of Centerville	0.75
Columbia	City of Manchester	4.3
Columbia	Mersen USA GSTN Corp.	0.6645
Columbia	Shelbyville Power, Water & Sewerage System	6.5

HEC-RAS Modeling of Reuse Scenarios

- HEC-RAS model developed by U.S. Army Corps of Engineers converts a given flow within the Duck River into a water surface elevation. Can depict water levels in the Duck River based on a variety of water withdrawal and discharge scenarios.
- TDEC plans to run illustrative modeling scenarios to explore effects on Duck River water levels of diverting flows into the Duck for reuse. Modeling will focus solely on water quantity rather than wasteload allocation, which must also be addressed in reuse permitting.
- TDEC also interested in modeling the effect of water levels from reducing withdrawal rates in reuse scenarios.

Potential Applications of Reuse in the Duck River Watershed

- Integrating water reuse into new residential development through purple pipes for landscaping and irrigation.
  - Consider requiring purple pipes if new communities require green lawns.
- Prioritizing water reuse for new data center development in the region.
  - xAI data center in Memphis proposing 13 MGD water reuse project utilizing treated effluent from Memphis T.E. Maxson STP.
  - Reclaimed water would be used in data center, TVA Allen Combined Recycle Plant, and Nucor Steel.

Thank you!