

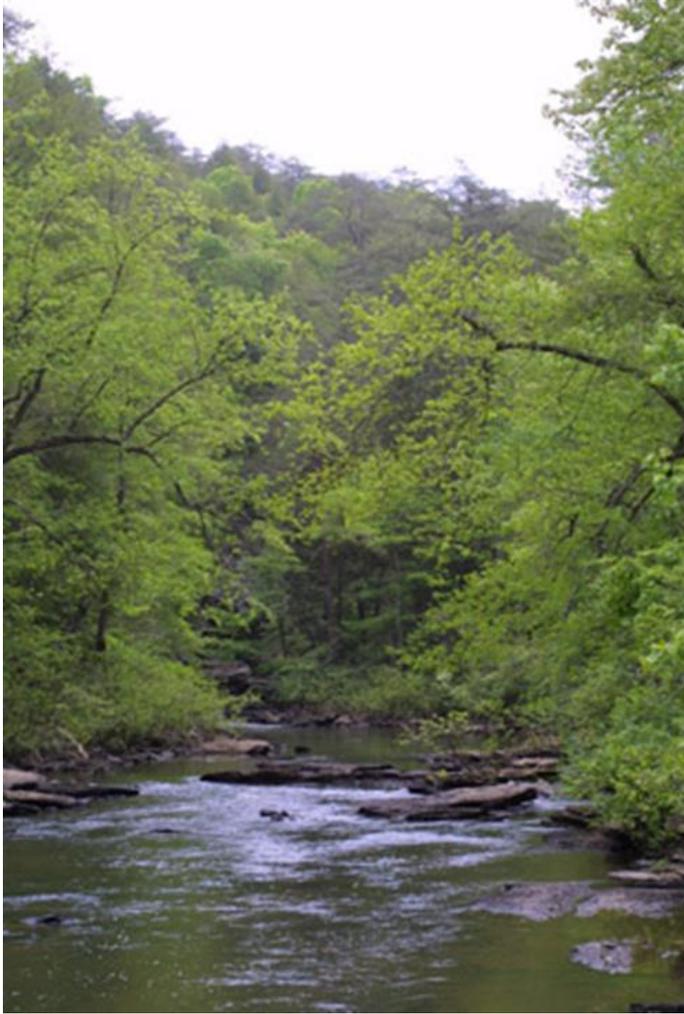


(Waste)Water ReUse in TN

April 20, 2016 – Gatlinburg, Tennessee
Environmental Show of the South

George C Garden, P.E. BCEE, Chief Engineer for Water Resources

Mission – Division of Water Resources



To protect and improve waters of the state and to safeguard public health for all Tennessean's through regulatory activities, education and outreach implemented by a professional workforce.

“Our” Challenge:

Protect Public Health; and
Protect and Improve the Environmental Resources we have been
given and entrusted.

In the wastewater world we have to preserve and improve the
ASSIMILATIVE CAPACITY of our assets for wastewater treatment. In
Commissioner Martineau’s terms we have to **use data and good
science** about the business of:

- Improving treatment (wherever it makes sense)
- Understanding and maximizing the assimilative capacity of our
assets.

Our quality of life, economy and health depend on for our children
and their children.



Existing Legal Mandate

- TCA Section 69-3-108 → TDEC authority to issue NPDES and SOP permits
- TCA Section 69-3-105 → Board of Water Quality, Oil & Gas:

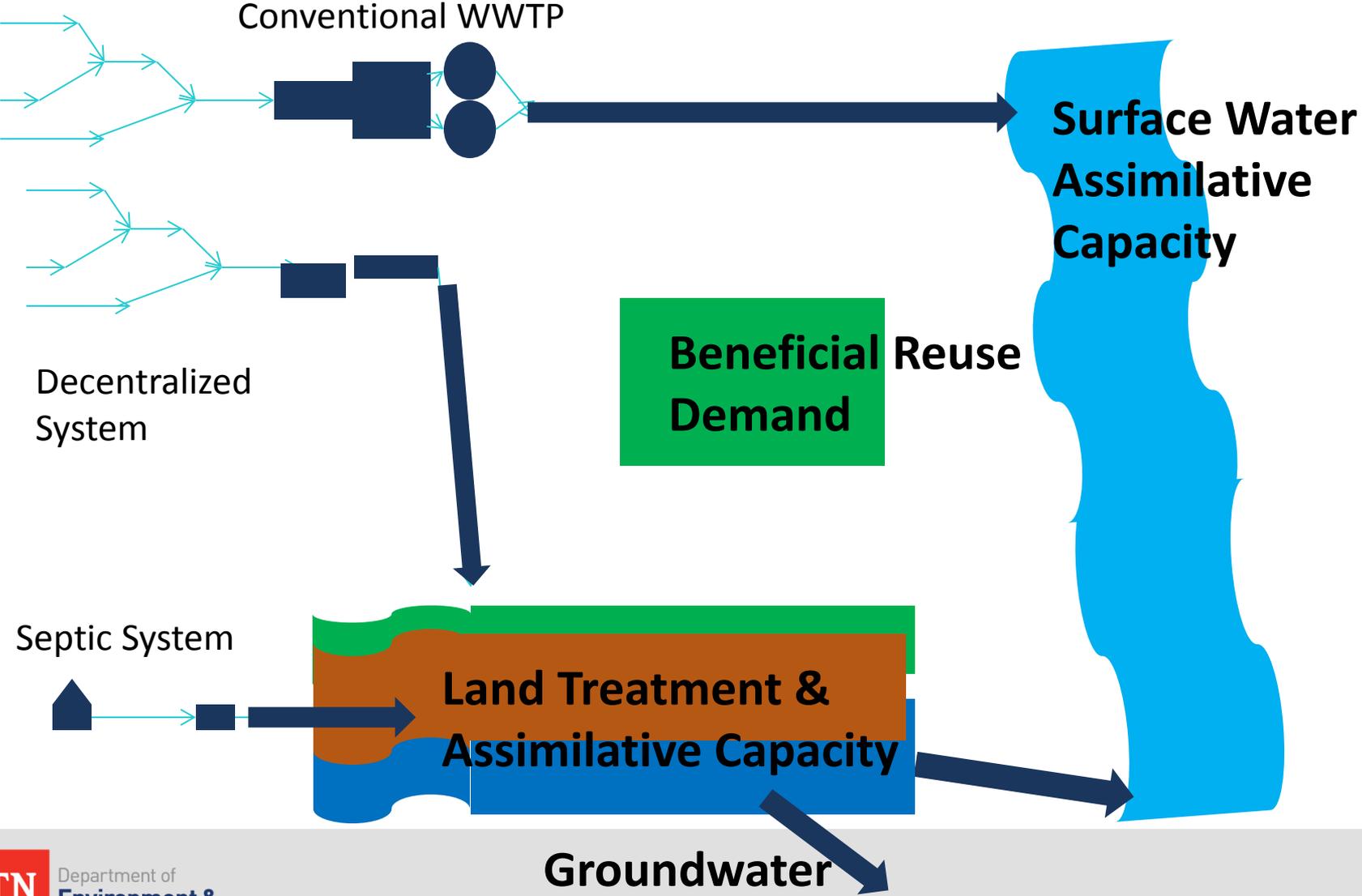
“The Board has and shall exercise the power to adopt rules creating a system of **incentives for alternatives** to discharges to s such as **land application** and **beneficial reuse** of the wastewater”

- TCA Section 68-221-1003 → facilities engaged in wastewater reclamation and reuse qualify for SRF funding.

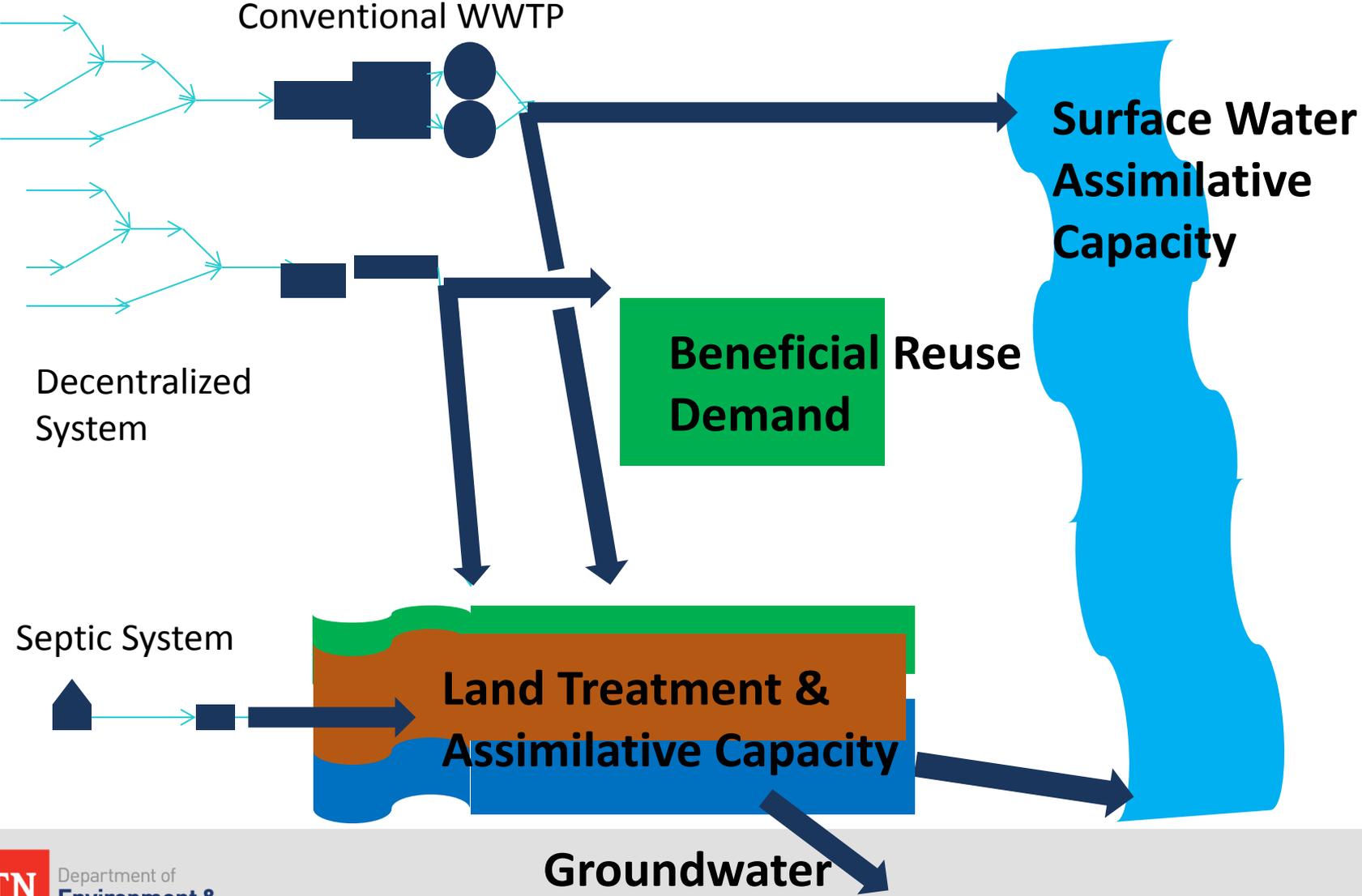
“Wastewater facility’ means any facility, including the reserve capacity thereof, whose purpose is to collect, store, treat, neutralize, stabilize recycle, **reclaim** or dispose of wastewater, including treatment or disposal plants, interceptors, outfall, and outlet sewers, pumping stations, equipment and furnishings thereof and their appurtenances which are necessary to accomplish the foregoing purposes.”



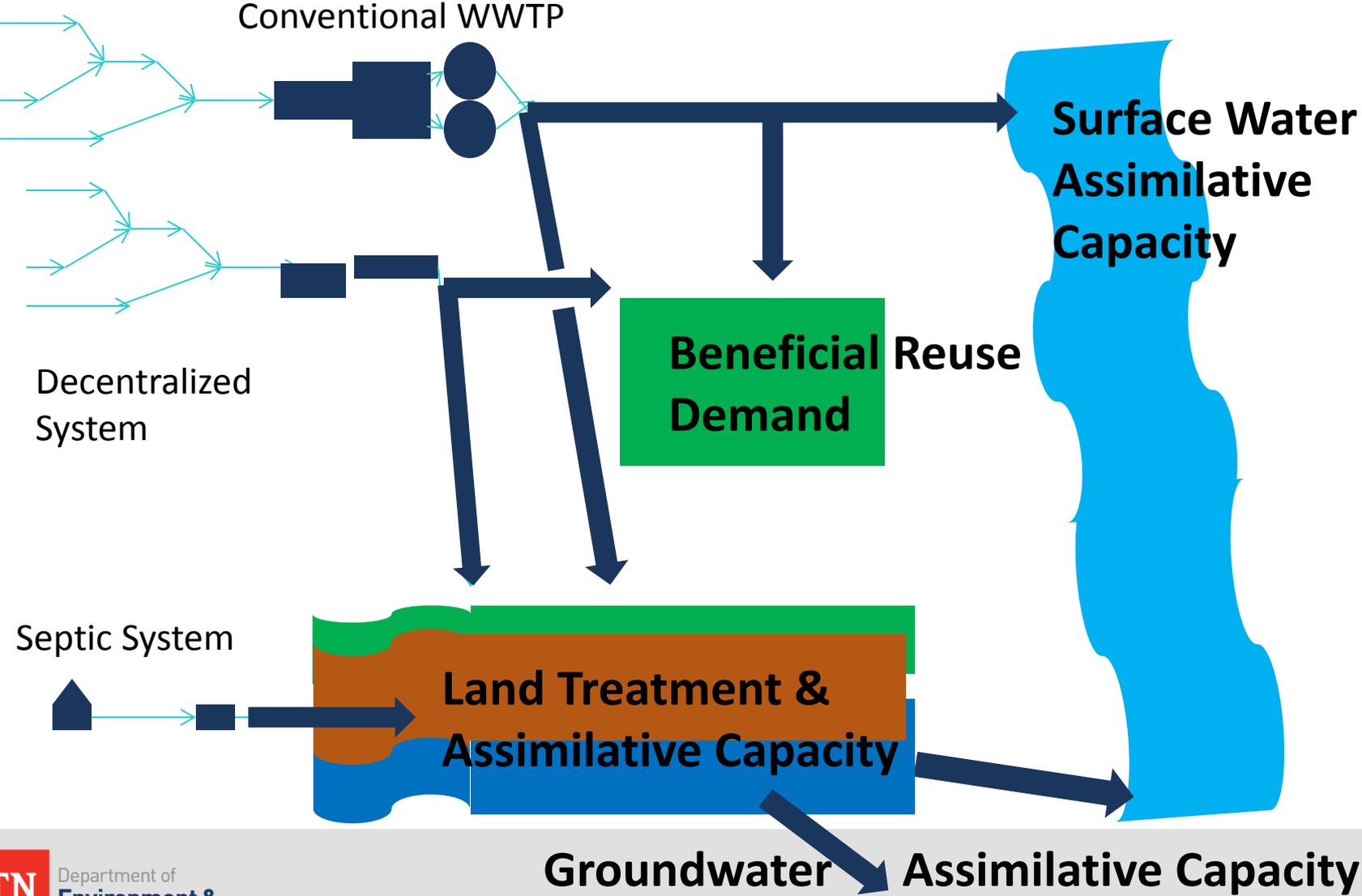
Wastewater Options



Wastewater Options



Wastewater Options



Drivers and Roadblocks



Main Drivers in Tennessee for ReUse:

- Receiving stream assimilative capacity/TMDLs – treatment \$\$\$\$
- Land application options – land \$\$\$\$
- Efficient resource use – water \$\$\$\$

Challenges:

- No federal regulations (only guidelines: USEPA 2004 and 2012 Guidelines) → jurisdiction falls to states
- Some current NPDES and SOP permits issued by DWR include Water Reclamation and ReUse *already including waste load allocation.*



That's a fail, huh?

Water ReUse Project-Summary



- A. At TDEC:
 - 1. Working Group (12 months)
 - 2. Internal Advisory Group
 - 3. External Advisory Group
- B. Bottom line: Start with *EPA 2012 Guideline for Water Reuse*
 - 1. Classifications →
 - 2. Recommended water quality standards and sampling →
 - 3. ReUser's needs and public health ultimately determines criteria.
- C. Already have 4-6 reuse projects with some waste load allocation associated with the reuse function → *Need guidance, policy, permitting standards and criteria!*

EPA 2012 Water ReUse Categories-Probable

CATEGORY OF REUSE		DESCRIPTION	TN?
Urban Reuse	Unrestricted	Non-potable applications; public access not restricted; e.g., public irrigation	YES (currently permitted as reuse)
	Restricted	Public access restricted; e.g., flushing water	not yet (currently allowed by Code)
Agricultural Reuse	Food crops	Crops intended for humans	not yet
	Processed food crops & non-food crops	Processed before being fed to humans or not for humans	not yet
Industrial		Consumed in industrial process; not just recycled	not yet
Potable ReUse	Indirect Potable Reuse (IPR)	WWTP → buffer → WTP	(<i>de facto</i>)
	Direct Potable Reuse (DPR)	(DPR)	not yet

EPA 2012 Water ReUse Categories- Remote

CATEGORY OF REUSE		DESCRIPTION	TN?
Impoundments	Unrestricted	No limitations to bodily contact	Not anticipated
	Restricted	Body contact limited	Not anticipated
Environmental Reuse		To create, enhance, sustain or augment water bodies including wetlands, aquatic habitats, or stream flow	Secondary factor
Groundwater Recharge		Recharge aquifers that are NOT a potable water resource	Not anticipated

EPA Recommended Treatment Level 1

Quality	Monitoring	ReUse Categories
pH = 6.0 – 9.0	pH: weekly	<ul style="list-style-type: none"> • Urban Reuse (Unrestricted Access) • Agricultural Reuse (Food crops) • Impoundments (Unrestricted Access)
BOD (CBOD5) = NTE 10 mg/L	BOD (CBOD5): weekly	
TSS (or equivalent) = NTE 2 NTU	Turbidity: continuous	
<i>e. coli</i> . Presence = Non detectable	<i>e. coli</i> : daily	
Chlorine residual = 1 mg/L	Chlorine residual: continuous	

EPA Recommended Treatment Level 2

Quality	Monitoring	ReUse Categories
pH = 6.0 – 9.0	pH: weekly	<ul style="list-style-type: none"> • Urban Reuse (Restricted Access) • Agricultural Reuse (Processed food crops or non-food crops) • Industrial Reuse (or case by case basis)
BOD (CBOD5) = LTE 30 mg/L	BOD (CBOD5): weekly	
TSS (or equivalent) = LTE 30 mg/L TSS	TSS = weekly	
<i>e. coli</i> . Presence = LTE 200 <i>e. coli</i> /100 ml	<i>e. coli</i> : daily	
Chlorine residual = 1 mg/L	Chlorine residual: continuous	

Treatment Level 3

Quality	Monitoring	ReUse Categories
		<ul style="list-style-type: none">• Environmental Reuse• Impoundments (Restricted Access)
BOD (CBOD5) = LTE 10 mg/L	BOD (CBOD5): weekly	
TSS (or equivalent) = LTE 30 mg/L TSS	TSS: daily	
<i>e. coli</i> . Presence = LTE 200 <i>e. coli.</i> /100 ml	<i>e. coli</i> : daily	

Treatment for Drinking Water?

Quality	Monitoring	ReUse Categories
Drinking Water Source Requirements (+ D/DBP level + P/PCP levels + ???)	Some continuous; others at various frequencies	Indirect Potable Reuse (not de facto IPR but the line between existing circumstances and envisioned IPR is not yet defined.)
Drinking Water Source Requirements + D/DBP + P/PCP levels + ??? after extensive pilot plant operations and analysis	Some continuous; others at various frequencies	Direct Potable Reuse

Water ReUse: Overarching Considerations for Potential Framework

- **Voluntary** R&R of domestic, municipal, and industrial wastewater. **Gray water, harvested rainwater, and stormwater currently excluded.**
- R&R requirements to **be implemented through existing water permit programs—NPDES and SOP**
- **End users** of reclaimed water not required to obtain permit, but will be required to enter into a service **agreement or contract with reclaimed water agents.**
- R&R of industrial wastewater effluent **internally on-site** not required to obtain a permit so long as applicable federal and state occupational safety and health standards are addressed.
- Treatment of wastewater or sewage only deemed water reclamation if it is reclaimed for purpose of **subsequent reuse; disposal or unauthorized discharge of reclaimed water is not reuse.**



Water ReUse: Overarching Considerations for Potential Framework

- **Cumulative Impact Analysis** may be required at time of application.
- Permit always to apply limits based on **“reuser’s” requirements**
- R&R application requirements
 - Water reclamation **NPDES/SOP application addendum**
 - **Reclaimed water management plan** describing in detail methods of reclaiming and managing wastewater and provision to end user(s)
 - **Contingency plan** (i.e., demonstration of capacity to treat and dispose of permitted flow)
 - Documentation of **service agreement or contract** with all end users which will receive reclaimed water
- **Currently** no disposal credit **will be** provided for reuse; in the future, TDEC **may consider waste allocation credit; with factors such as:**
 - **Contingency plan** in the event reuse water disposition is lost?
 - **Ownership of the land or process** of disposition providing a reasonable permanence to the reuse plan?
 - Establish **agronomic basis** for loading? and/or
 - Observed and **recorded appropriate reuse disposition for an adequate period of time** to establish reasonably consistent use **with a safety factor** applied?



TN Water ReUse: What's the schedule?

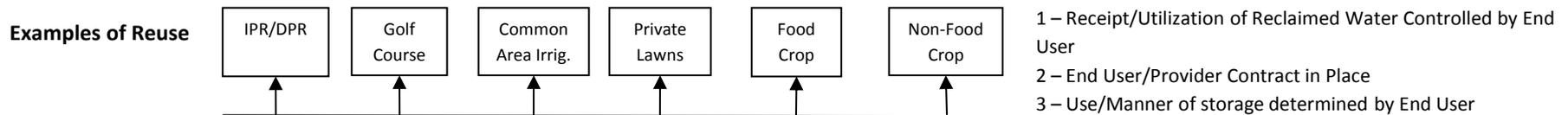
- First phase of water reuse to focus on **water reclamation and reuse (R&R)** within context of:
 - **Major/minor WWTP/STP (NPDES)**
 - **Major/minor industrial* (NPDES)**
 - **Decentralized systems (SOP)**
 - All other contexts currently out of scope but may be revisited in future
- **Scoping documentation** – currently being finalized
- **Permit writers guidance** – late May 2016
- **Permit language template** – mid summer 2016
- **Design criteria** – late 2016/early 2017



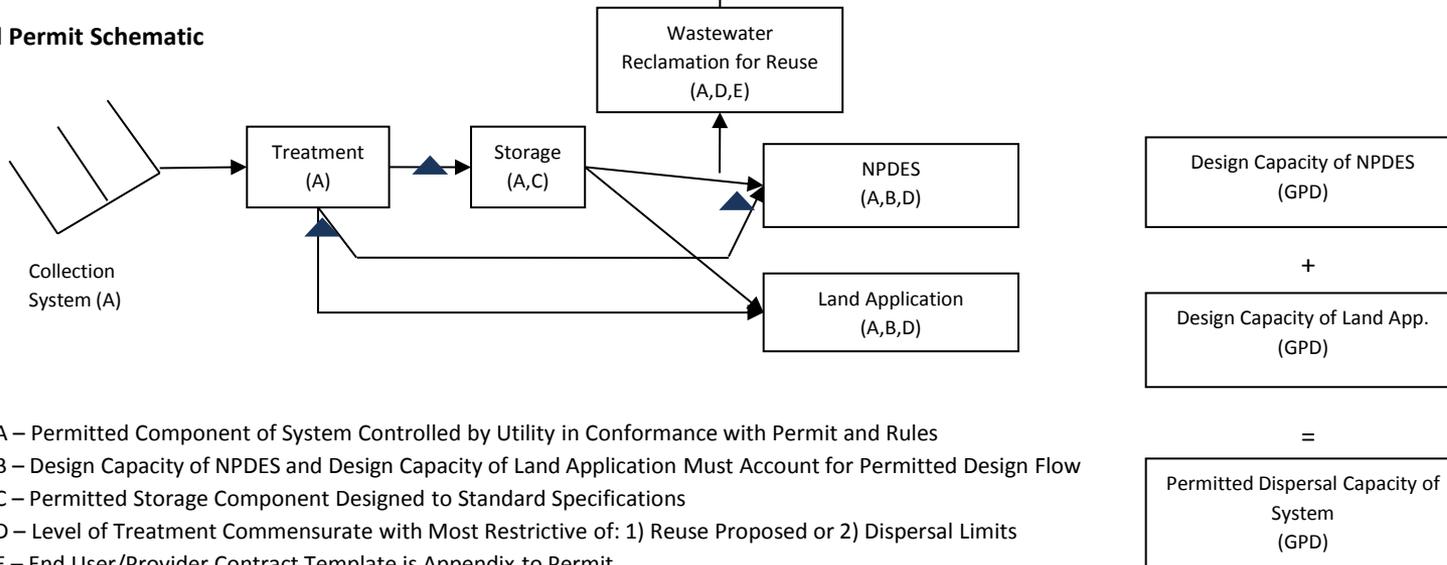
*Included in scope only if industrial entity plans to provide reclaimed water to different end user.

General Water Reuse Permit Schematic

▲ Potential monitoring point



Typical Permit Schematic



Water ReUse Topics Under Investigation:

- Fees associated with R&R permit work
- Requirements for Reuser Contract?
- Storage and delivery standards?
- Responsibility for public health standards possessed by the reuser?
- Loss of revenue factors.

Questions?

George Garden, P.E. BCEE

Chief Engineer for Division of Water Resources - TDEC

George.Garden@tn.gov

615-253-9934

615-416-0164 (mobile)