



University of Connecticut: Early Adopter of Sustainability Practices

**NEWEA Water Reuse Specialty Conference
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COMMITMENT & INTEGRITY DRIVE RESULTS

Presentation Outline

- Where does UConn fit within the water reuse landscape?
- Drivers for UConn's reuse
- UConn's current & future water reuse plans

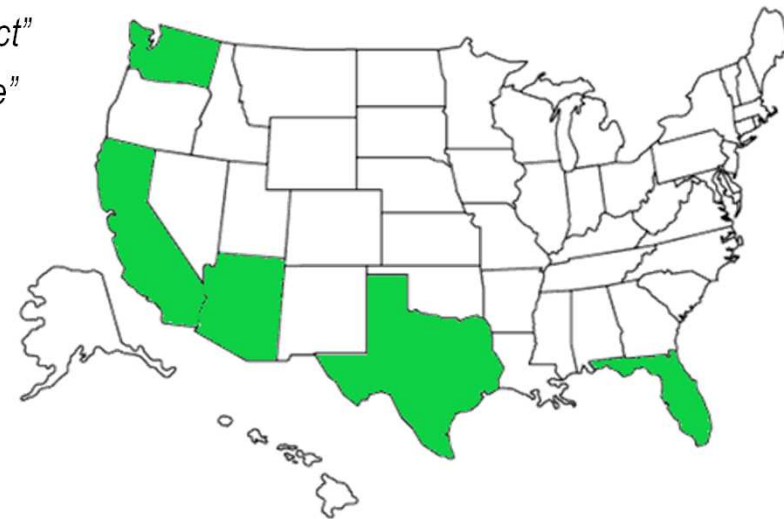


The Water Reuse Landscape...



Brief History of US Reuse Regs

- 1983 – Florida “Land Application of Domestic Wastewater Effluent in Florida”
- 1986 – Arizona “Arizona Environmental Quality Act”
- 1990 – Texas “Administrative Code Chapter 310”
- 1991 – California “Water Recycling Act”
- 1992
 - Washington “Reclaimed Water Act”
 - EPA “Guidelines for Water Reuse”
- 2000s – Many states follow



The Connecticut challenge...

- Only 5 states still don't have reuse guidelines / regulations
 - Kentucky, Mississippi, Louisiana, **Connecticut**, Maine



Statistics on water usage...

- US Water use is 210 Billion gallons per day
 - Public supply, irrigation, power, etc.
- Since 1950, water use has tripled while the population has doubled
- US Population to increase by 50% by 2060



Statistics on wastewater...

- >33 Billion gallons of wastewater treated daily
- 12 Billion gallons of treated wastewater is discharged directly to an ocean or estuary daily (equal to 27% of public water supply)



Fun Fact: Recycled Water could supply 100% of the water used for beer making annually in the United States...



The National reuse landscape...

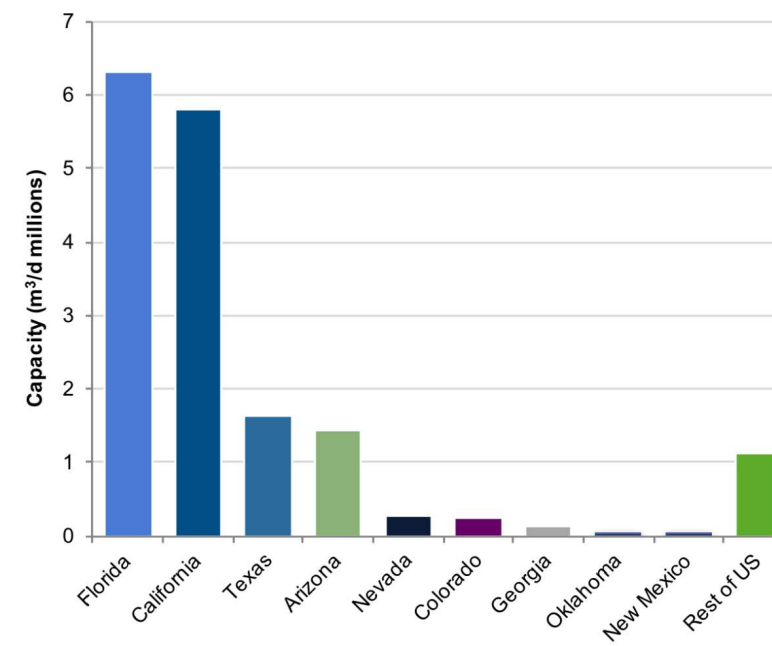
Attractiveness of Reuse by state

	Policy Drivers	Available Funding	Historical Experience	Water Scarcity	Market Attractiveness
California	Market Driver	Market Driver	Improving Conditions	Market Driver	High
Florida	Improving Conditions	Market Driver	Market Driver	Limited Impact	High
Texas	Improving Conditions	Market Driver	Improving Conditions	Limited Impact	High
Arizona	Limited Impact	Improving Conditions	Limited Impact	Limited Impact	Medium
Colorado	Limited Impact	Limited Impact	Limited Impact	Limited Impact	Medium
Georgia	Limited Impact	Limited Impact	Limited Impact	Limited Impact	Medium
Oklahoma	Limited Impact	Limited Impact	Limited Impact	Limited Impact	Medium
Nevada	Limited Impact	Limited Impact	Limited Impact	Limited Impact	Low
New Mexico	Limited Impact	Limited Impact	Limited Impact	Limited Impact	Low

Market Inhibitor	Limited Impact	Improving Conditions	Market Driver



Water reuse capacity by state

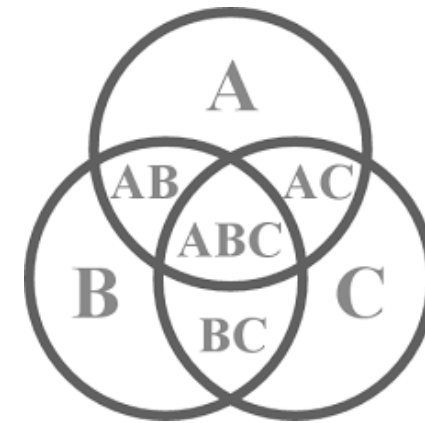


Source: Bluefield Research

When does reuse make sense?

A. Water scarcity

- Limited water sources
- Frequent droughts & weather variability
- Sustainability goals limiting usage



But also...

B. Economic conditions

- Water purchased from public utility
- Need to fund additional sources
- Grant opportunities

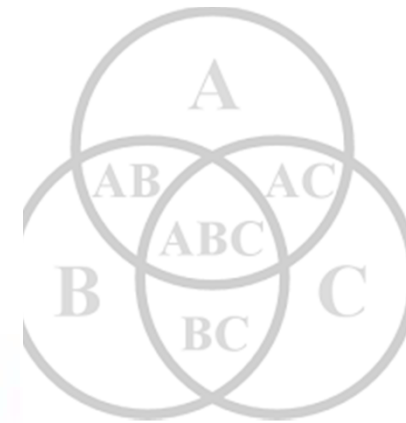
But also...

C. Supportive regulations

- Regulatory constraints limiting water withdrawal
- Permitting limitations for discharge
- Statewide reuse mandates



Perhaps the most important driver!



But

B. E

- V
- M
- G

D. Political Will

- Statewide reuse mandates

regulations

straints limiting water

ions for discharge



Drivers for UConn to do reuse...



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UConn Water History...

...water scarcity drivers

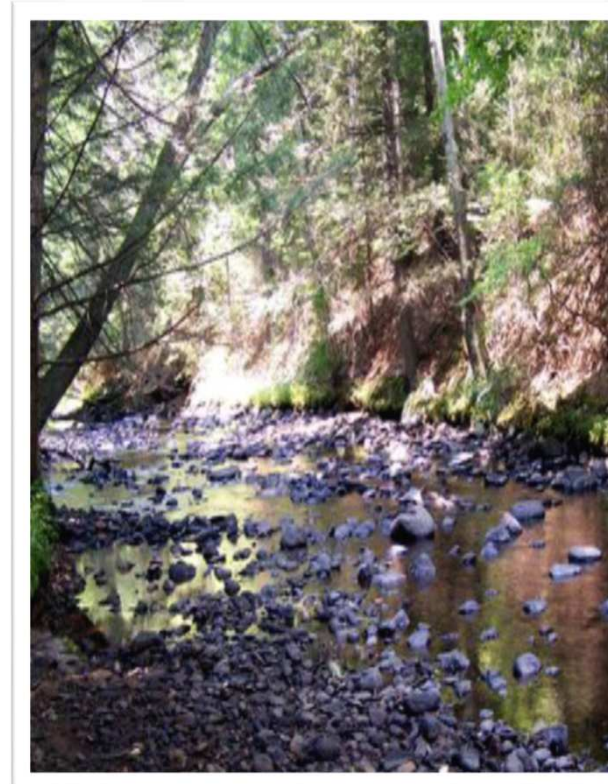
- Rapid campus growth 1995-present
 - 1995 – 20,000 enrolled
 - 2002 – 26,000 enrolled
 - 2013 – 30,500 enrolled
- ~15% of water usage is off-campus
- Major investment in University from State
 - \$2.3 billion planned over 20 years
- All drinking water comes from Fenton & Willimantic River well-fields



A Watershed Event...

...water scarcity driver

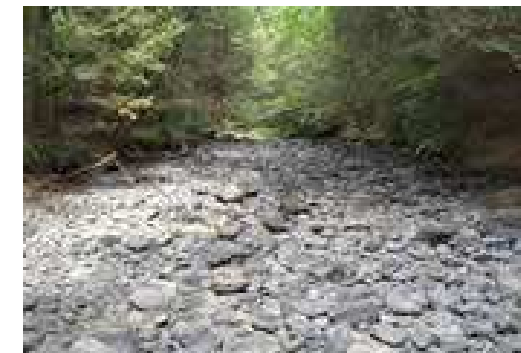
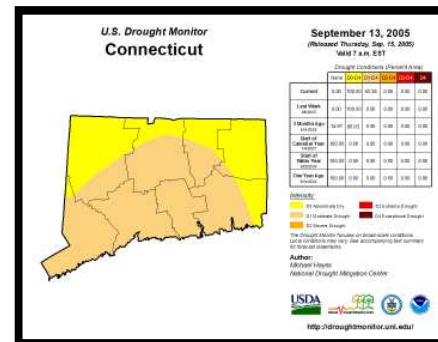
- September 2005 – a segment of the Fenton River along the UConn well field is desiccated
- As a result of this environmental concern UConn reacts very proactively:
 - Strong investment in their water infrastructure
 - Greater outreach promoting water conservation
 - Development of Sustainable Design Guidelines for any new on-campus construction
 - Reductions in the Fenton River well field withdrawal rates based on streamflow



Reuse Drivers...

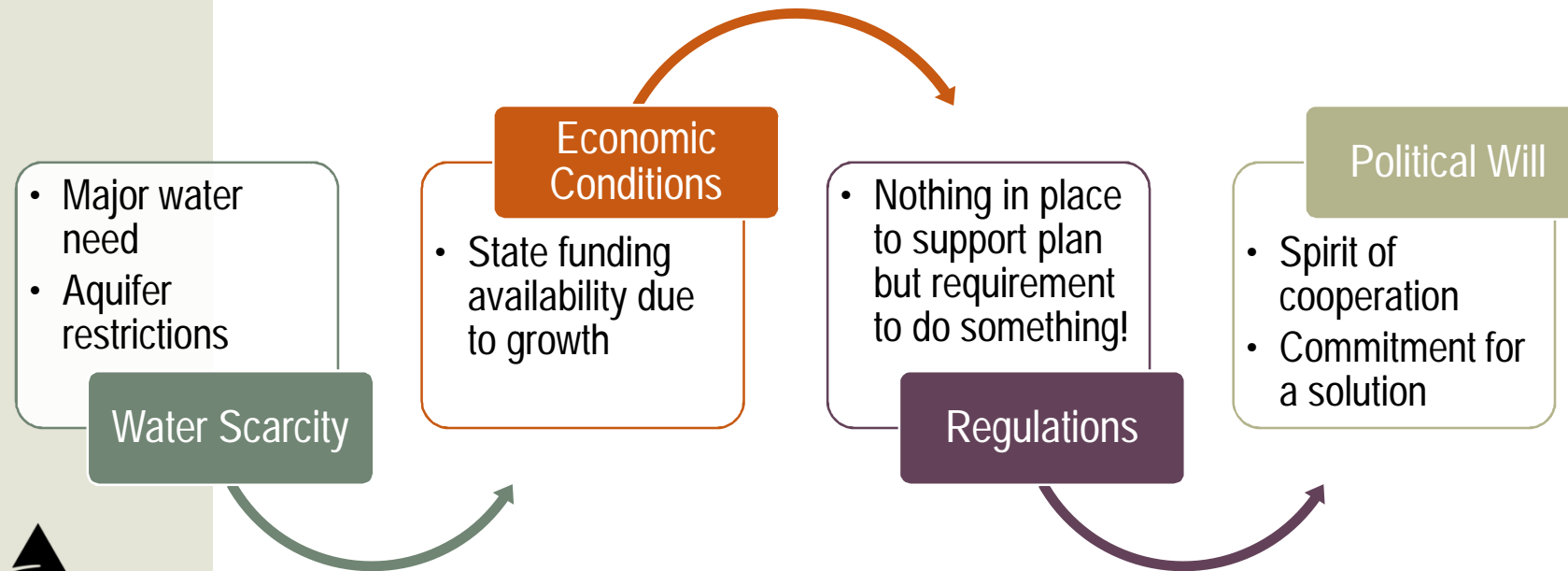
Scarcity, Regulation, Economics & Political Will

- Drought in 2005
 - A segment of the Fenton River along the UConn well field is desiccated
- State mandates UConn reduce water withdrawal rates by 1/3
- University implements conservation, sustainable design standards, reduces withdrawals
 - Not enough conservation available to meet goal



Reuse Drivers...

Scarcity, Regulation, Economics & Political Will



UConn's Reaction...

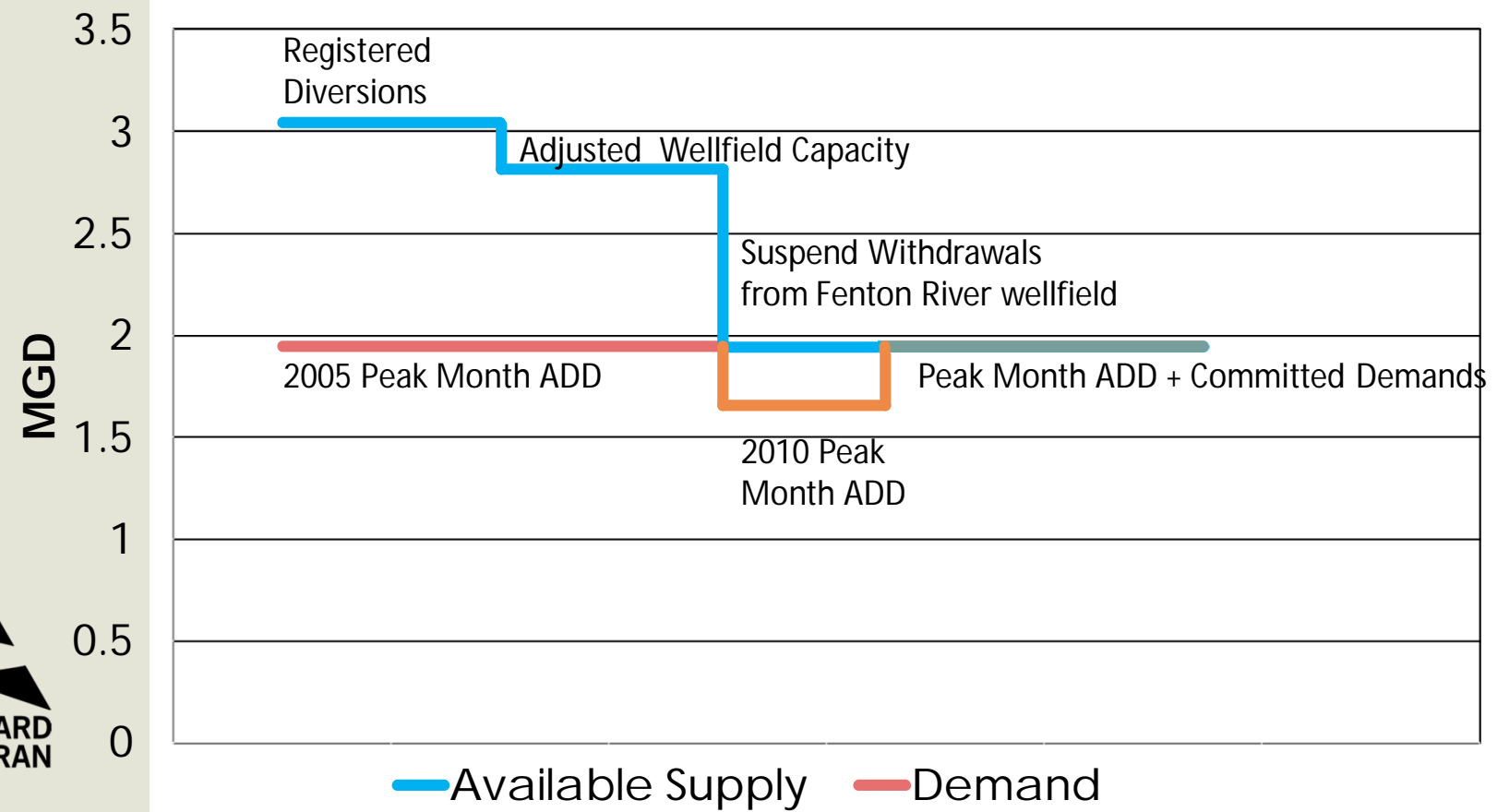
Reduce water withdrawal by 1/3 (1 MGD):

Alternatives considered:

- **Water Conservation**
 - While there was room for more conservation measures, it was unlikely to meet the State mandate
- **Additional wells in the existing well fields**
 - These would be too close to the other wells to prevent streamflow impacts
- **New well fields**
 - This would require a complicated & lengthy diversion permitting process



Margin of Safety...



Why Water Reuse?

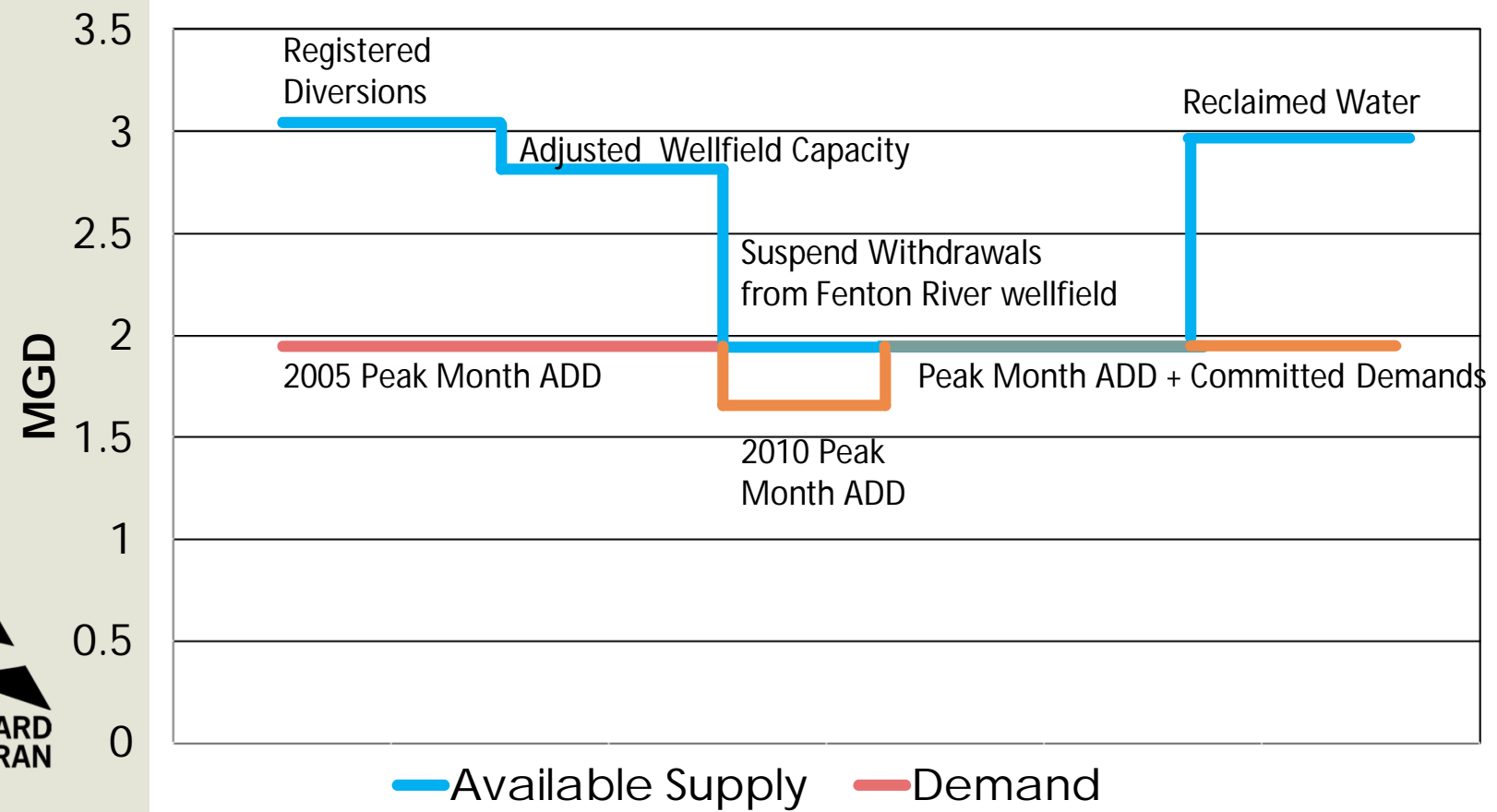
Abundant supply of treated wastewater was available at the UConn WPCF outfall that could be redirected to a Reclaimed Water Facility for advanced treatment & reuse



3.0 MGD Secondary Wastewater Treatment Facility



Margin of Safety...



The UConn Reclaimed Water Facility



Plant Start-up in 2013



Project at-a-Glance...



UCONN Water Reclamation Facility, Storrs, CT

Owner	State of Connecticut
Capacity	1 MGD
Secondary treatment technology	Oxidation ditch
Tertiary treatment technology	Microfiltration (membrane)
Disinfection technology	Ultraviolet then Chloramines
Water use	Cooling water, toilet flushing, irrigation, plant makeup & much more
Year commissioned	2013
Cost	\$28M
Current Operator	Woodard & Curran
Operations staffing	4 licensed operators

Primary reclaimed water user

Central Utility Plant (CUP)

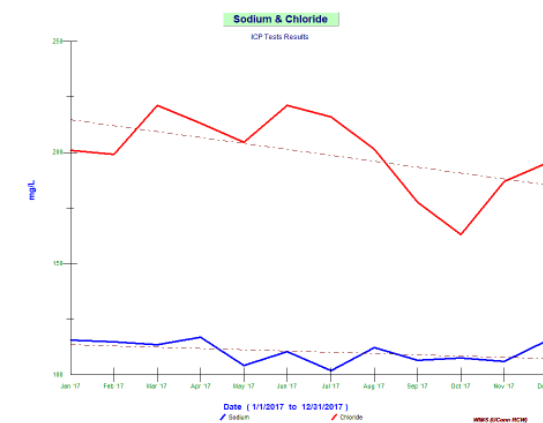
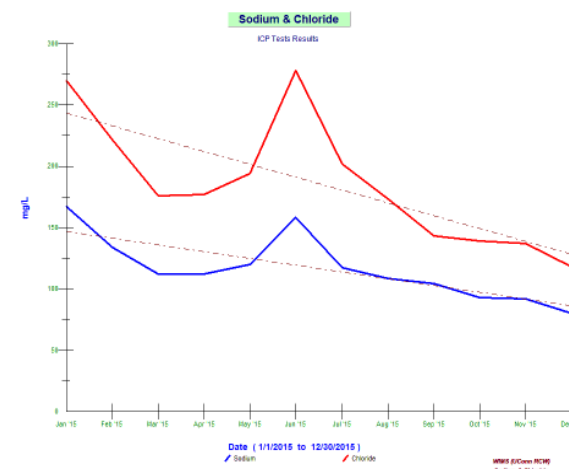
- Processed water goes to the UCONN CUP for steam generation & cooling tower operations
 - High quality water is critical to the CUP
 - Conductivity (hardness) can be challenging for the CUP
 - Implemented water softening but...



The Conductivity Challenge...

...at the Central Utility Plant (CUP)

- As expected, conductivity cycles up in a closed loop system...
- Softening at CUP was proving to be problematic whereas sequestering & blending showed significant improvement...



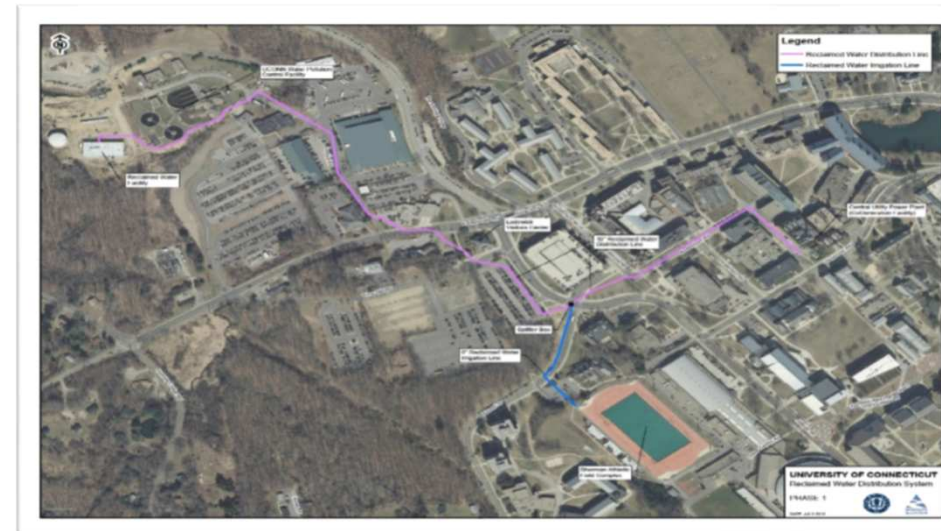
- Blending, sequestering & Irrigation discharge are expected to significantly reduce conductivity cycling in the current system...



Current uses...

...of Reclaimed Water

- Central Utility Plant
 - Major user as much as 1 MGD seasonally
- Building uses
 - Toilet flushing
 - Cooling blowdown
- WPCF
 - Plant makeup water
- Collection System
 - Jetting, pipelining



Future Uses...

...of Reclaimed Water

- Irrigation – permit being submitted!
 - Campus grounds
 - Flower beds
- Agricultural
 - Currently pilot testing different options
- Potable uses?
 - Very unlikely option right now
- Artificial Turf
 - 7,000 gallons/practice
 - 15,000 gallons/game





THANK YOU



QUESTIONS &
ANSWERS

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