

Overview of Draft Surface Water Augmentation Regulations



Fred Gerringer, D.Env, P.E., BCEE

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What is Surface Water Augmentation?

- Intentional placement of recycled water into a reservoir that supplies drinking water



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Groundwater Augmentation

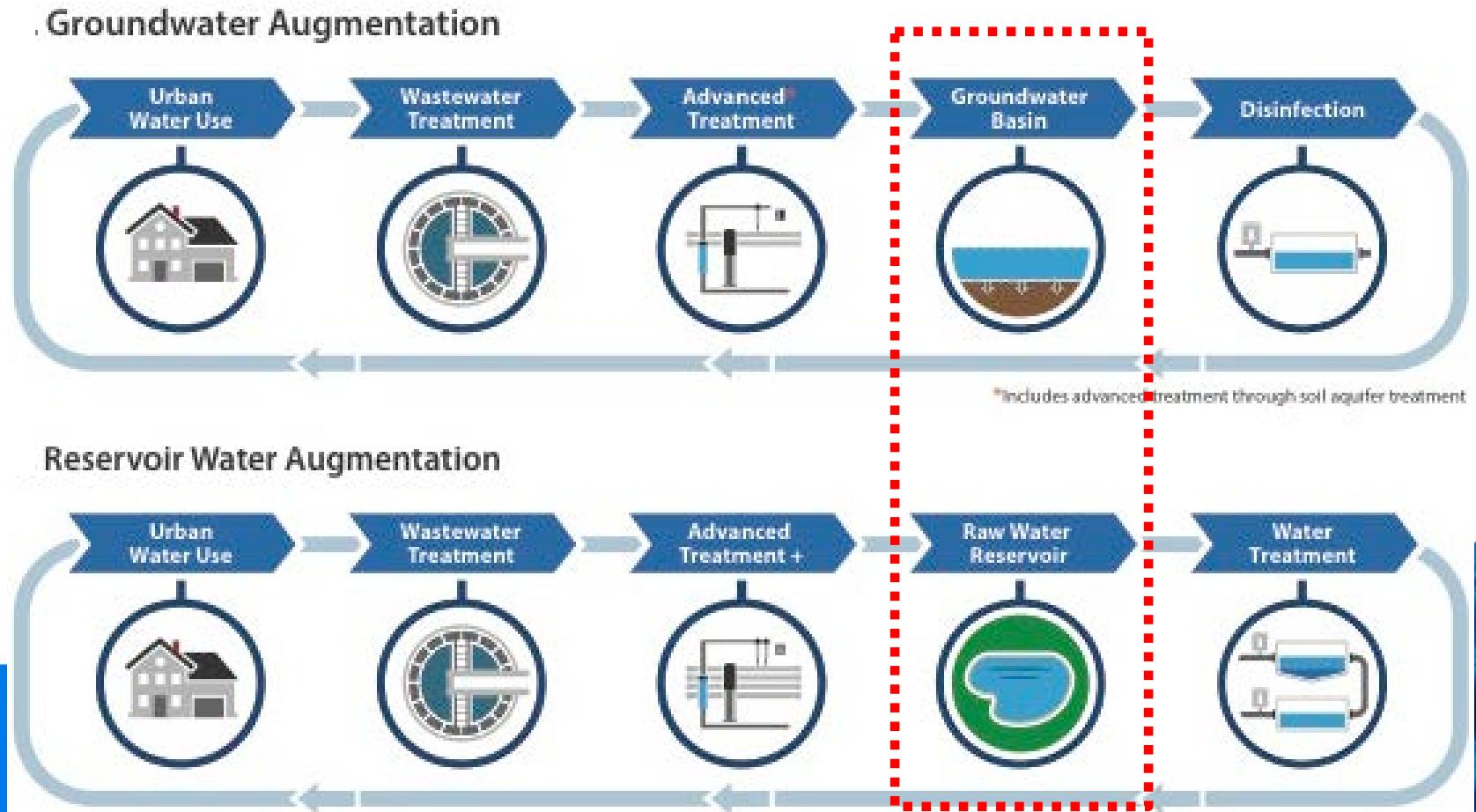


Reservoir Water Augmentation



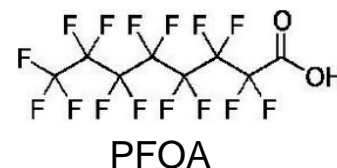
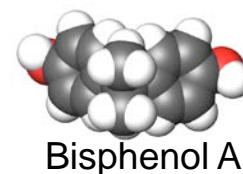
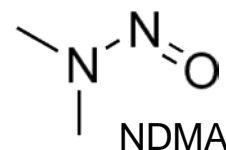
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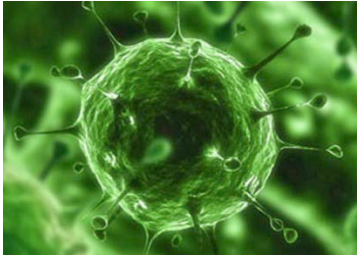


Chemical Requirements

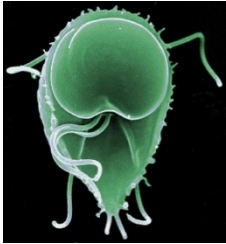
- Satisfy drinking water standards
 - Maximum Contaminant Levels
 - Notification Levels
- Control of unregulated chemicals
 - Pharmaceuticals
 - Personal care products
 - Fire retardants
- No degradation of existing water source



Pathogen Requirements



Virus: 12-log removal → 99.99999999999%



Giardia: 10-log removal → 99.999999999%



Crypto: 10-log removal → 99.999999999%



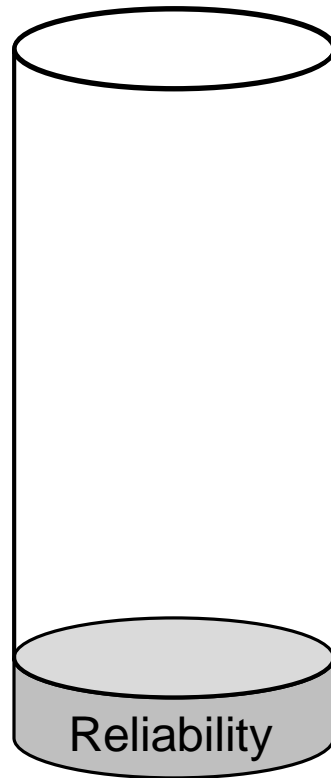
Treatment Requirements

- Full advanced treatment
 - Reverse osmosis
 - Advanced oxidation
- Multiple barriers
 - Maximum of 6-log removal for a single process
 - Minimum of 3 processes with ≥ 1.0 -log removal



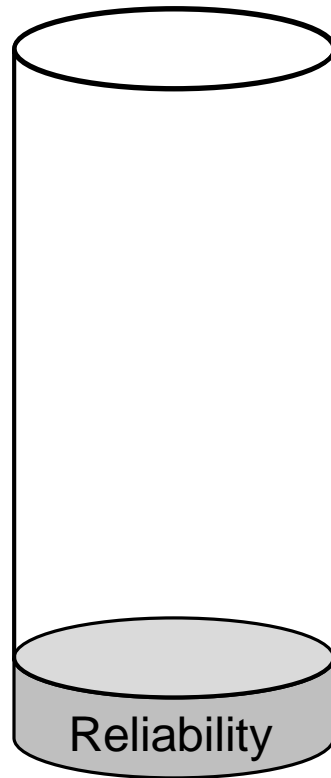
Reservoir-Specific Considerations

How do we make
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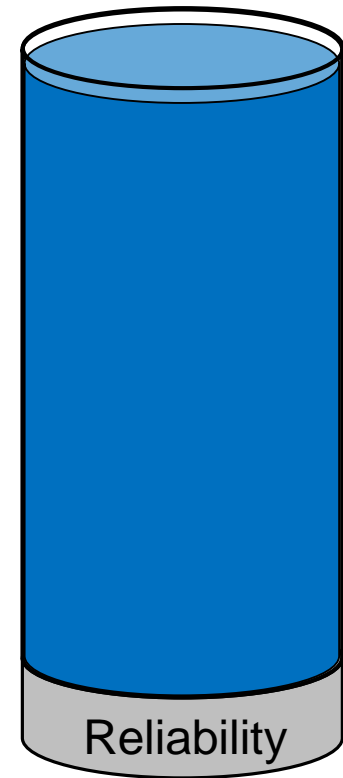


Reservoir-Specific Considerations

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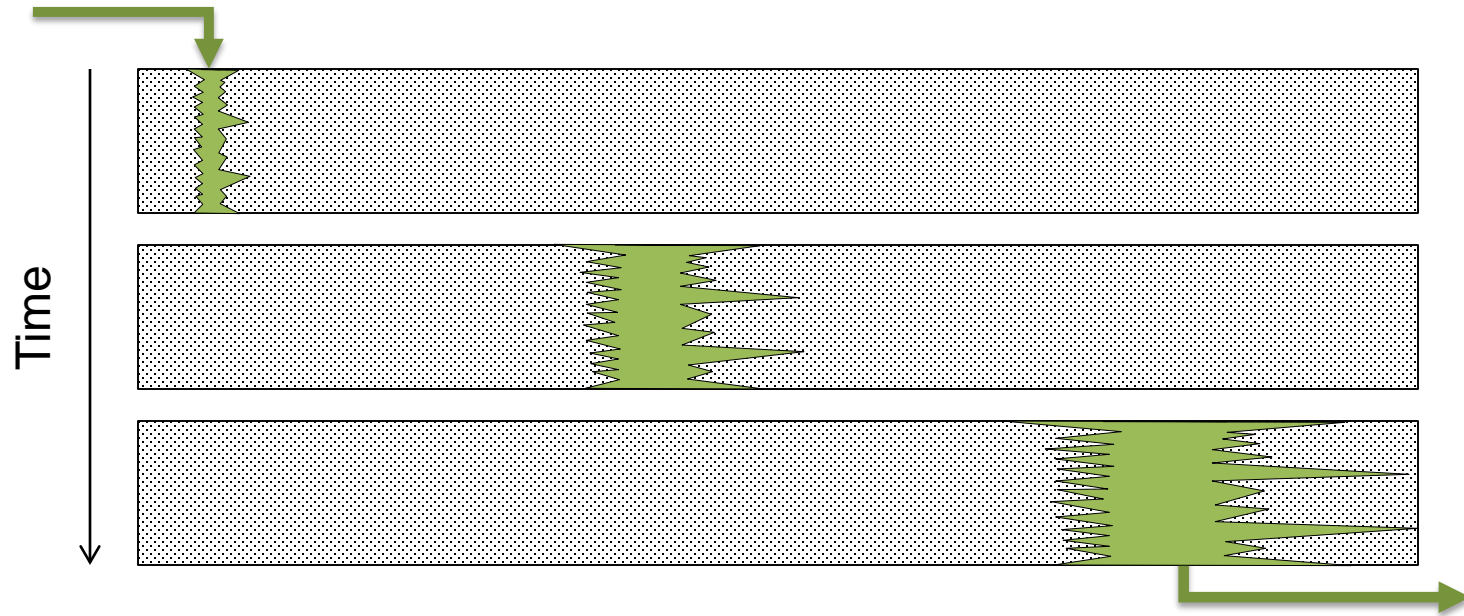


...is **full**?



Addressing Failure in Groundwater Recharge

- Plugs of off-spec water spend long periods (i.e., months) in the environmental buffer



- Aquifer provides time to detect and respond to treatment issues



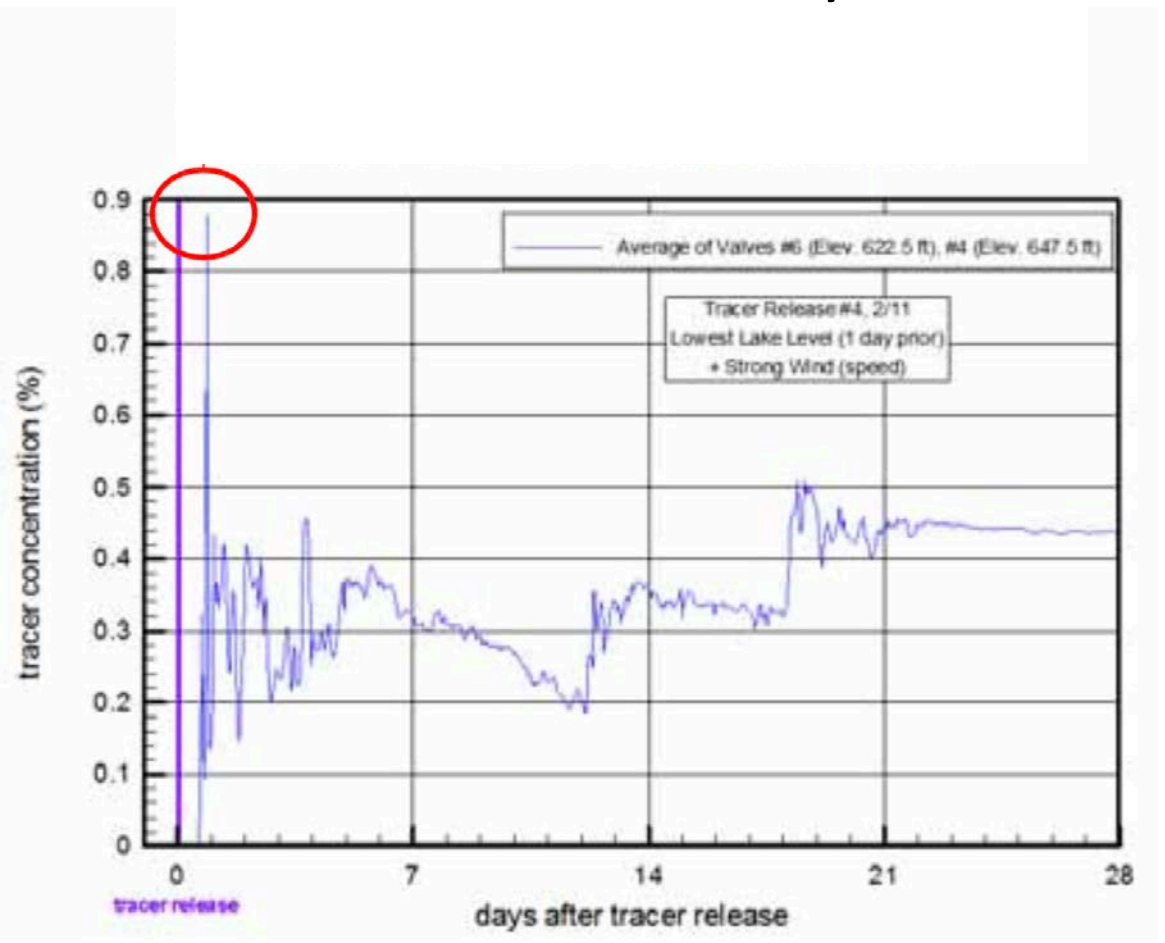
Addressing Failure in Reservoir Augmentation

- Despite long residence times (V/Q_{out}), peaks can be seen at the reservoir outlet shortly after failures



Addressing Failure in Reservoir Augmentation

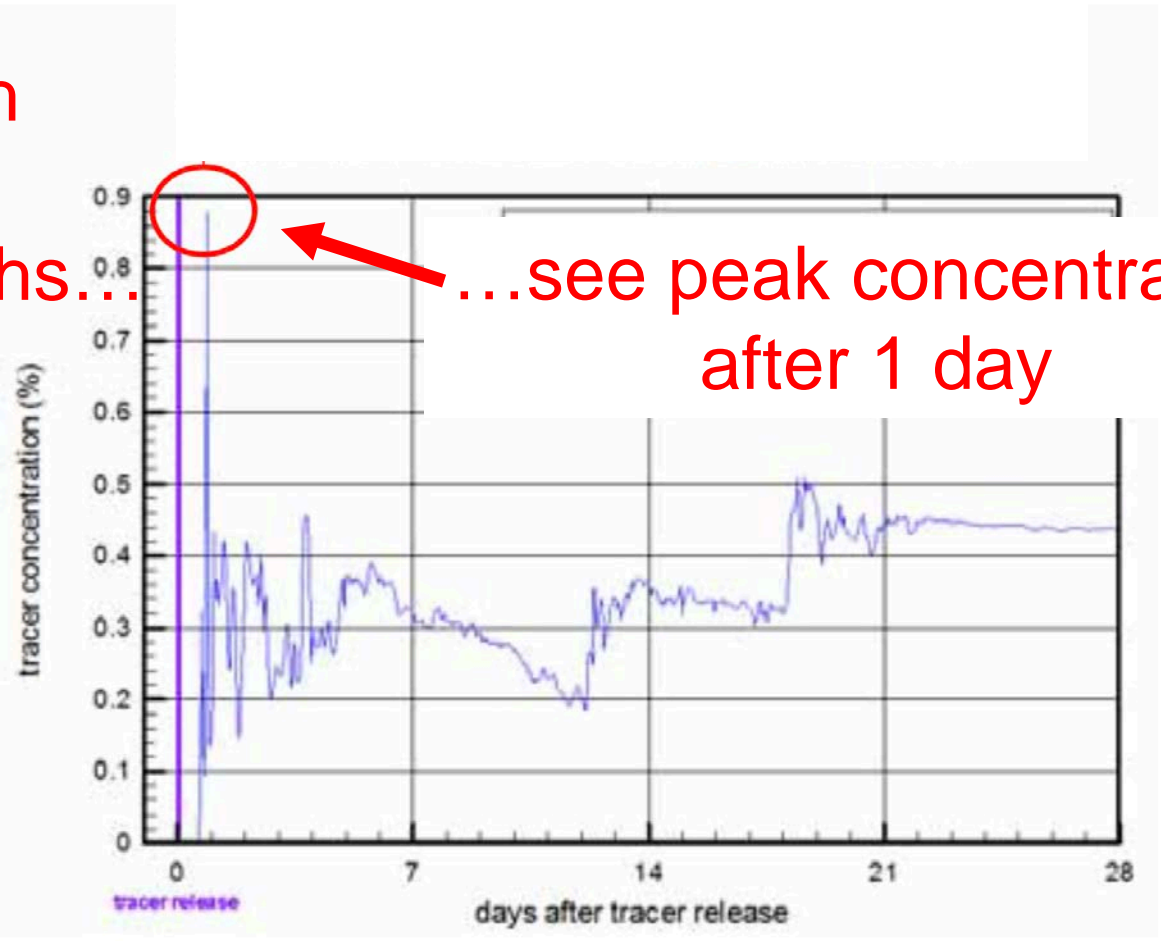
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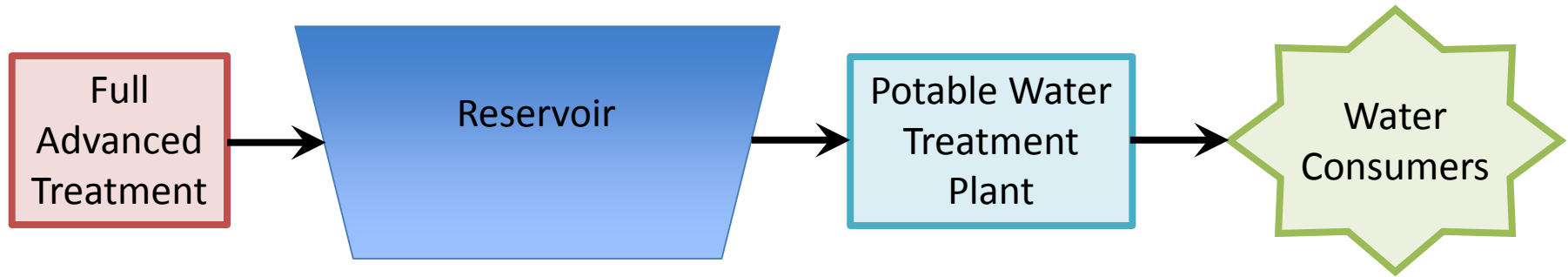
Addressing Failure in Reservoir Augmentation

- Despite long residence times (V/Q_{out}), peaks can be seen at the reservoir outlet shortly after failures

Even with
 V/Q_{out} of
4-6 months...

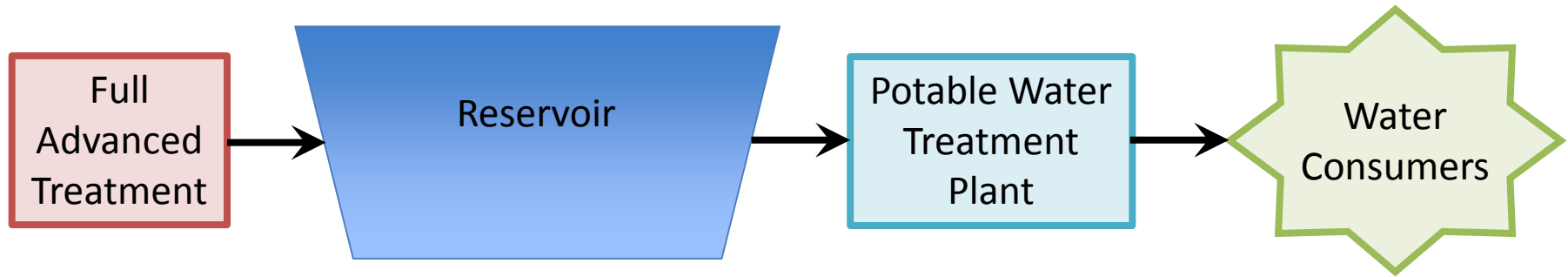


Reservoir-Specific Considerations



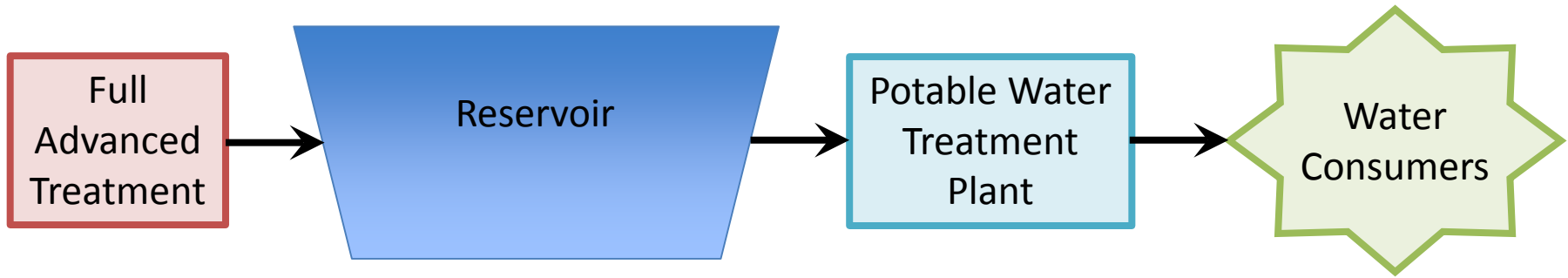
- Retention time (V/Q_{out})
 - Default of 180 days
 - DDW can approve V/Q_{out} as low as 60 days
 - Additional 1-log removal required if < 120 days
- Dilution at reservoir outlet
 - 100:1 dilution (max 1% inlet flow at outlet)
 - 10:1 dilution w/ +1 log removal (max 10% inlet flow at outlet)

Reservoir-Specific Considerations



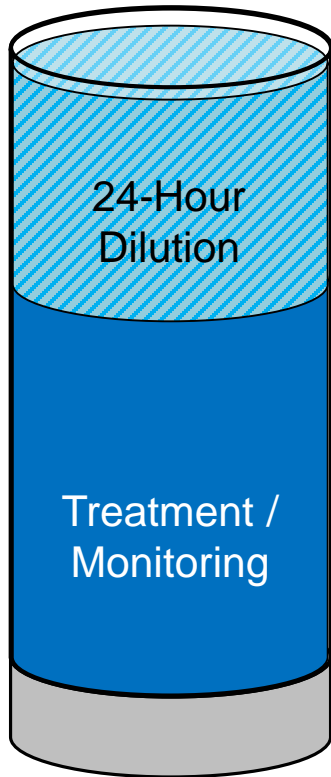
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- WaterReuse achievement

Reservoir-Specific Considerations



- Credit for drinking water treatment plant
 - 12/10/10 for virus/*Giardia*/*Crypto*
 - Drinking water treatment credits of 4/3/2 included
 - Advanced treatment requirements
 - 8/7/8 V/G/C removal with 100:1 dilution
 - 9/8/9 V/G/C removal with 10:1 dilution

SWA Regulations Summary



- Builds off groundwater recharge regulations
- Adds requirements for using a reservoir
 - Minimum retention time (V/Q_{out})
 - Minimum 24-hr dilution (100:1 or 10:1)
- Include DWTP log removal

Public comments accepted until September 12



Questions?



fredg@trusselltech.com