PFAS Regulation and Implications for Managed Aquifer Recharge

Data Review, Regulatory Outlook, and a Case Study

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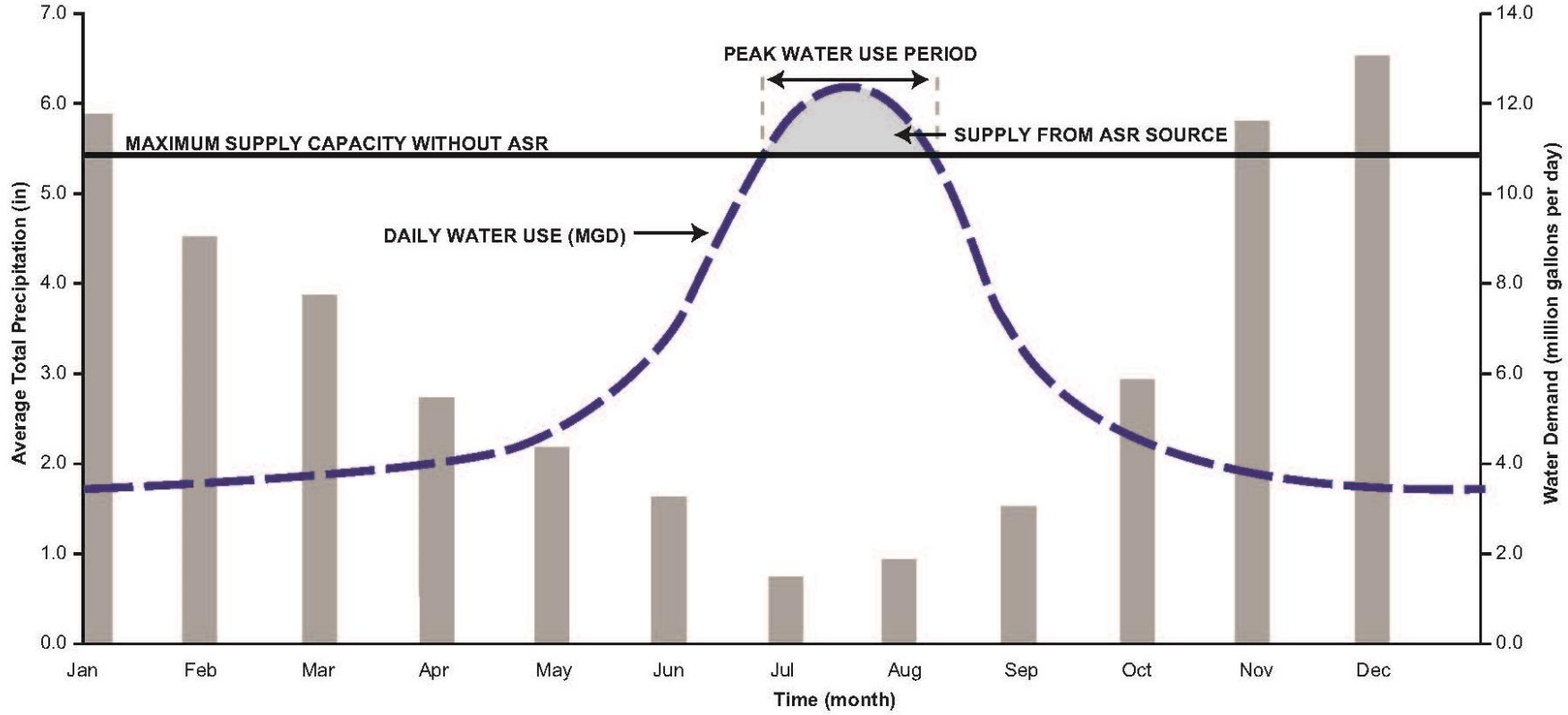
GSI Water Solutions, Inc.

Outline

- Aquifer recharge background
- PFAS in source water and DEQ regulation
- Case study

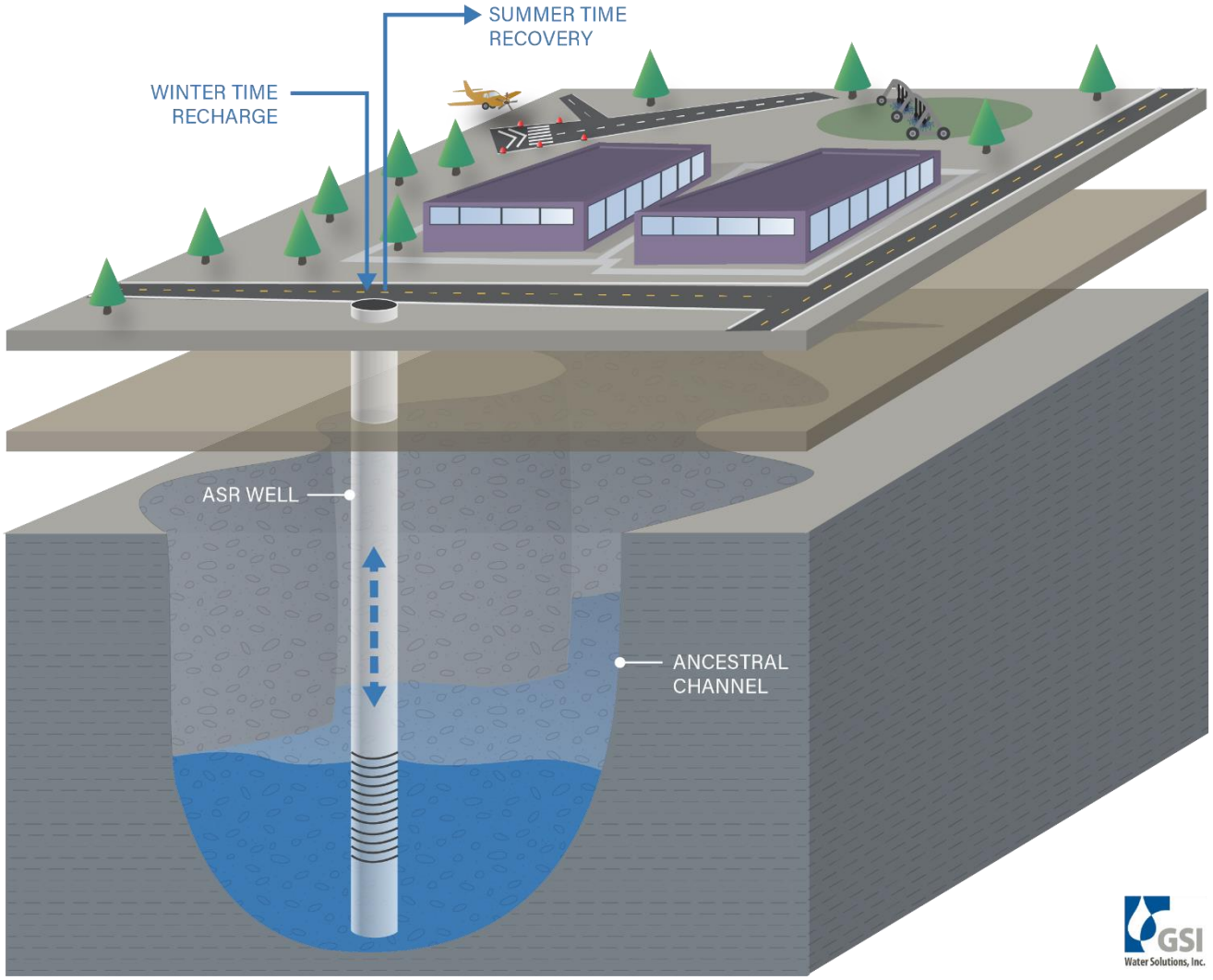
Managed Aquifer Recharge



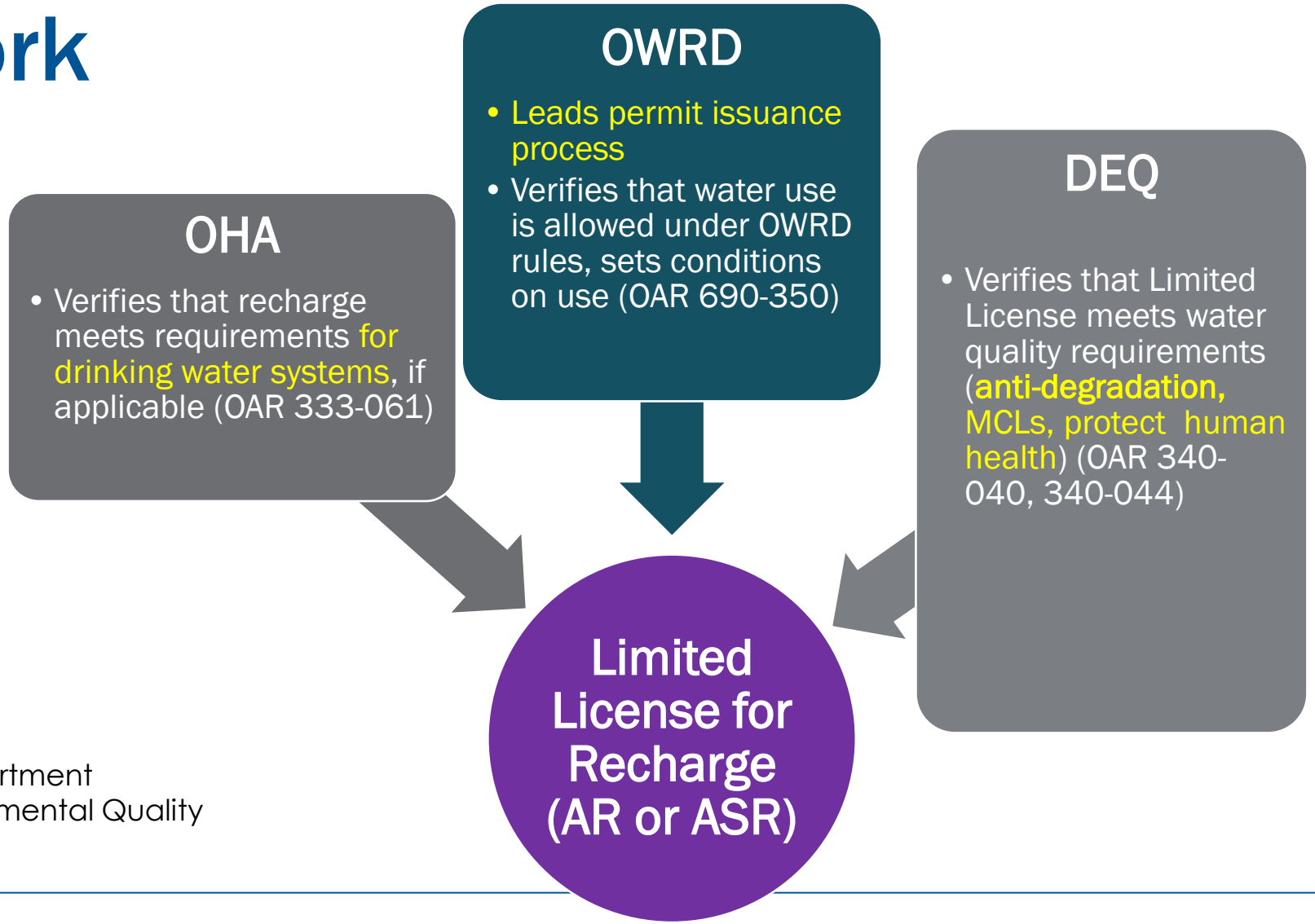
Managed Aquifer Recharge

- Recharge an aquifer during periods of high water availability and recovery during periods of low water availability
- Aquifer Storage and Recovery (ASR) vs. Aquifer Recharge (AR)
- Source water quality standards:
  - 50% of the MCLs for ASR
  - Background for AR

ILLUSTRATION OF
AQUIFER STORAGE AND RECOVERY (ASR)



Regulatory Framework



State Regulatory Agencies
Oregon Health Authority
Oregon Water Resources Department
Oregon Department of Environmental Quality

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The Potential for PFAS Concentrations in Recharge Source Water

Location	Media	PFOS Concentration (ng/L)	PFOA Concentration (ng/L)	Source
Columbia River at McNary Dam	Surface Water	< 0.05 to 0.53	0.76 to 1.22	Ecology (2010); Spring 2008 and Fall 2008 samples (N=2)
Port of Umatilla Regional Water System – Columbia River	Surface Water	ND	ND	UCMR5; N=1; June 2023 sample
City of Prineville	Groundwater	ND	ND	UCMR5; N=10
Umatilla River	Surface Water	ND	ND	UCMR3; note detection limits are 20 to 40 ng/L

DEQ and PFAS Regulation

- Cleanup Program
- UIC Permits – Gresham Applicant Review Draft permit
  - No Action Levels for PFAS in the permit, no requirement for PFAS sampling
  - Permit contains a re-opener to include PFAS at a later time
- Treated Wastewater Infiltration
  - No DEQ requirement for PFAS sampling
  - Permittee is conducting voluntary sampling
- ASR/AR – GSI's recent experience
  - September 2023 AR Limited License: DEQ verbally required sampling
  - April 2024 ASR Limited License: no requirement
  - May 2024 ASR Limited License: no requirement
  - June 2024 AR Limited License: no requirement

DEQ and PFAS Regulation

- There appear to be some obstacles in the Cleanup Program, but not necessarily in Water Quality Programs
- There does not appear to be an agency-wide coordinated approach
- PFAS appear to be addressed on a permit-by-permit basis

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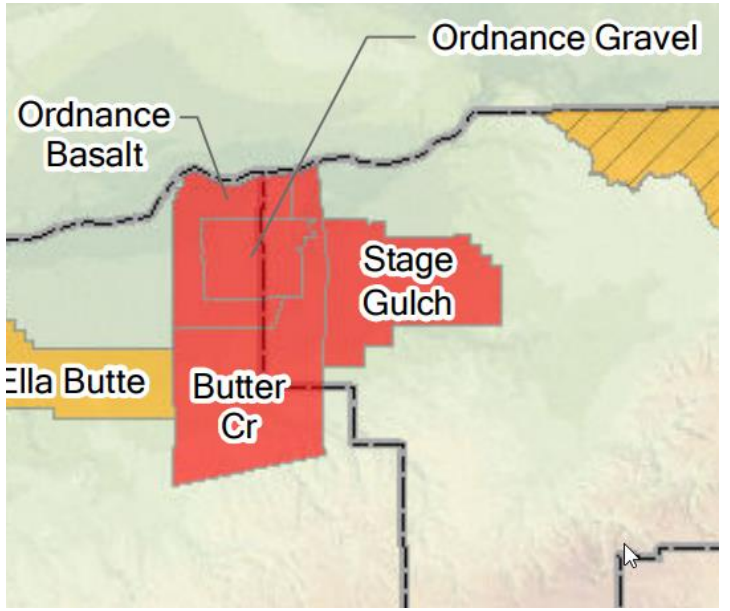
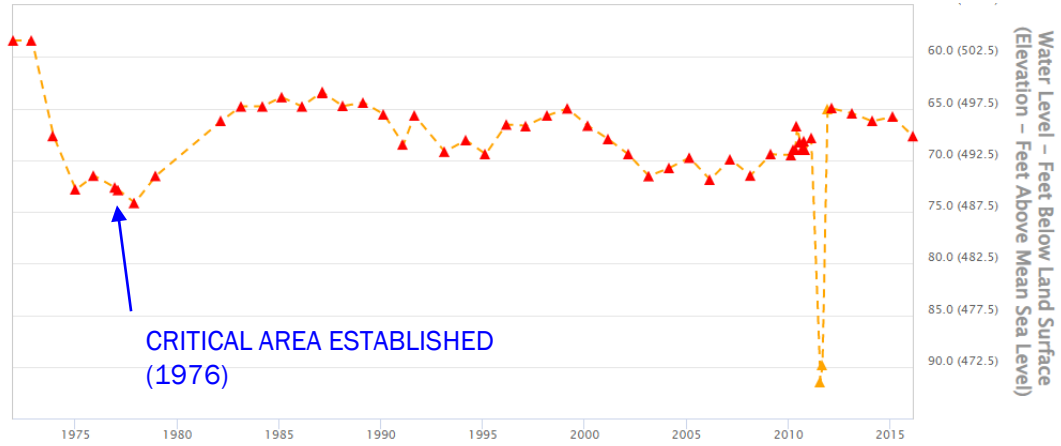
Ordnance Gravel Recharge Project

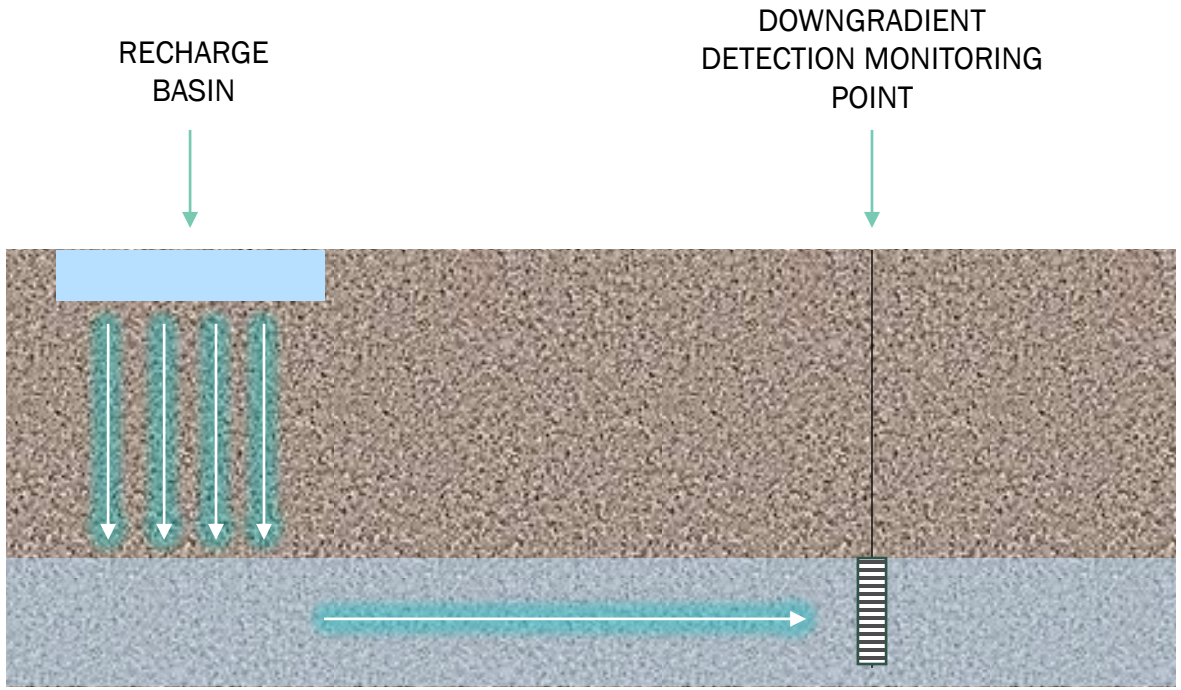
- Located in the Ordnance Gravel Critical Groundwater Area
- Artificially recharge using Columbia River water to stabilize and recover the Ordnance Critical Groundwater Area, create drought and climate resiliency, build environmental wealth in the region, and improve background groundwater quality conditions





AR Regulations in Oregon

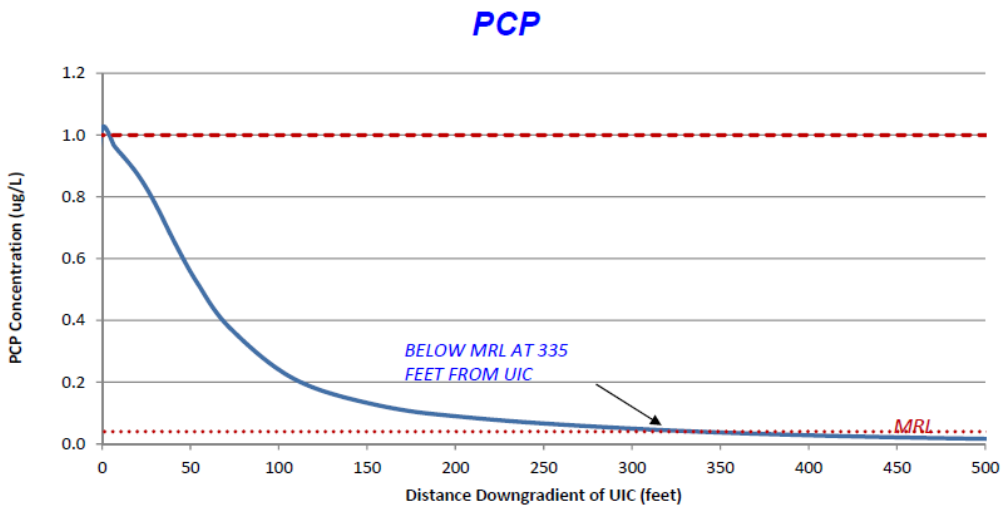
- Require that pollutant concentrations are background at a downgradient compliance point specified by DEQ
- The aquifer is allowed to provide treatment



A Reason For Optimism for AR?

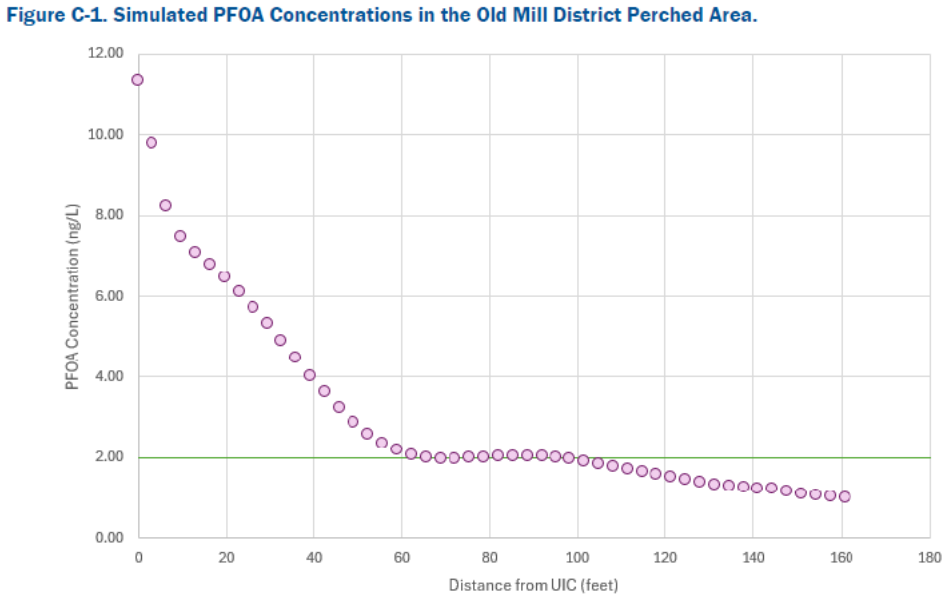
PFAS Fate and Transport Modeling

PCP Transport – City of Gresham (2013)



- Horizontal Transport Distance = 335 feet
- Concentrations must decline from 10 ppb to 0.01 ppb (three orders of magnitude)

PFAS Transport – City of Bend Drywells (2024)



- Horizontal Transport Distance = 100 feet
- Concentrations must decline from 40 ppt to 2 ppt (one order of magnitude)

Closing Thoughts . . .

- For AR projects, PFAS in source water may comply with DEQ's antidegradation rules due to low concentrations near the detection limit
- For ASR, there is little data to evaluate whether PFAS will meet the <1/2 the MCL standard. Treatment needed if it is:
  - Technically feasible
  - Practical
  - Cost effective

Questions . . .