May 6-8 2026
PNWS-AWWA Section Conference – Tacoma, WA



ASR Regulatory Frameworks of the Pacific Northwest

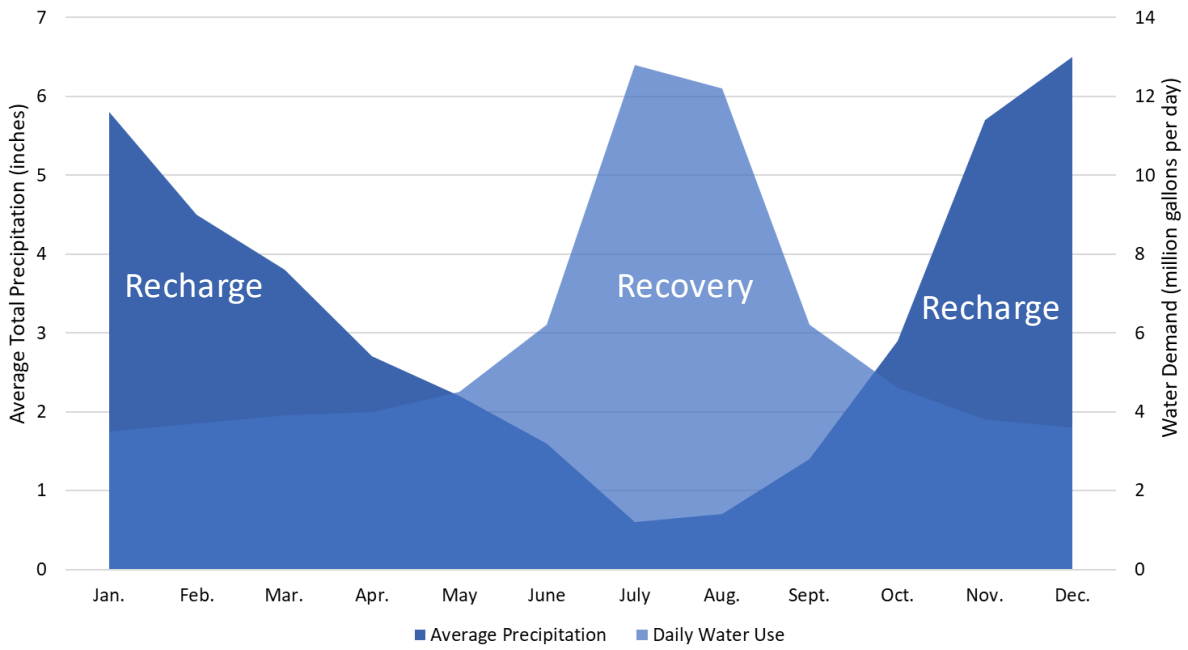
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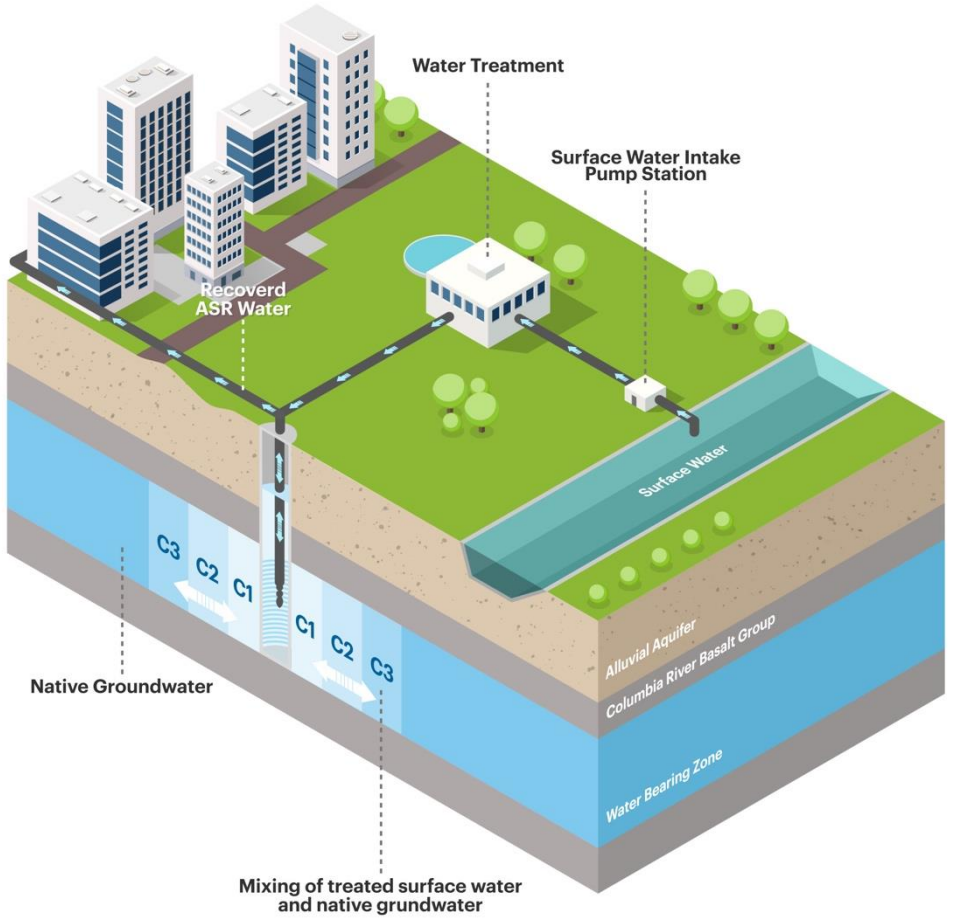
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Overview

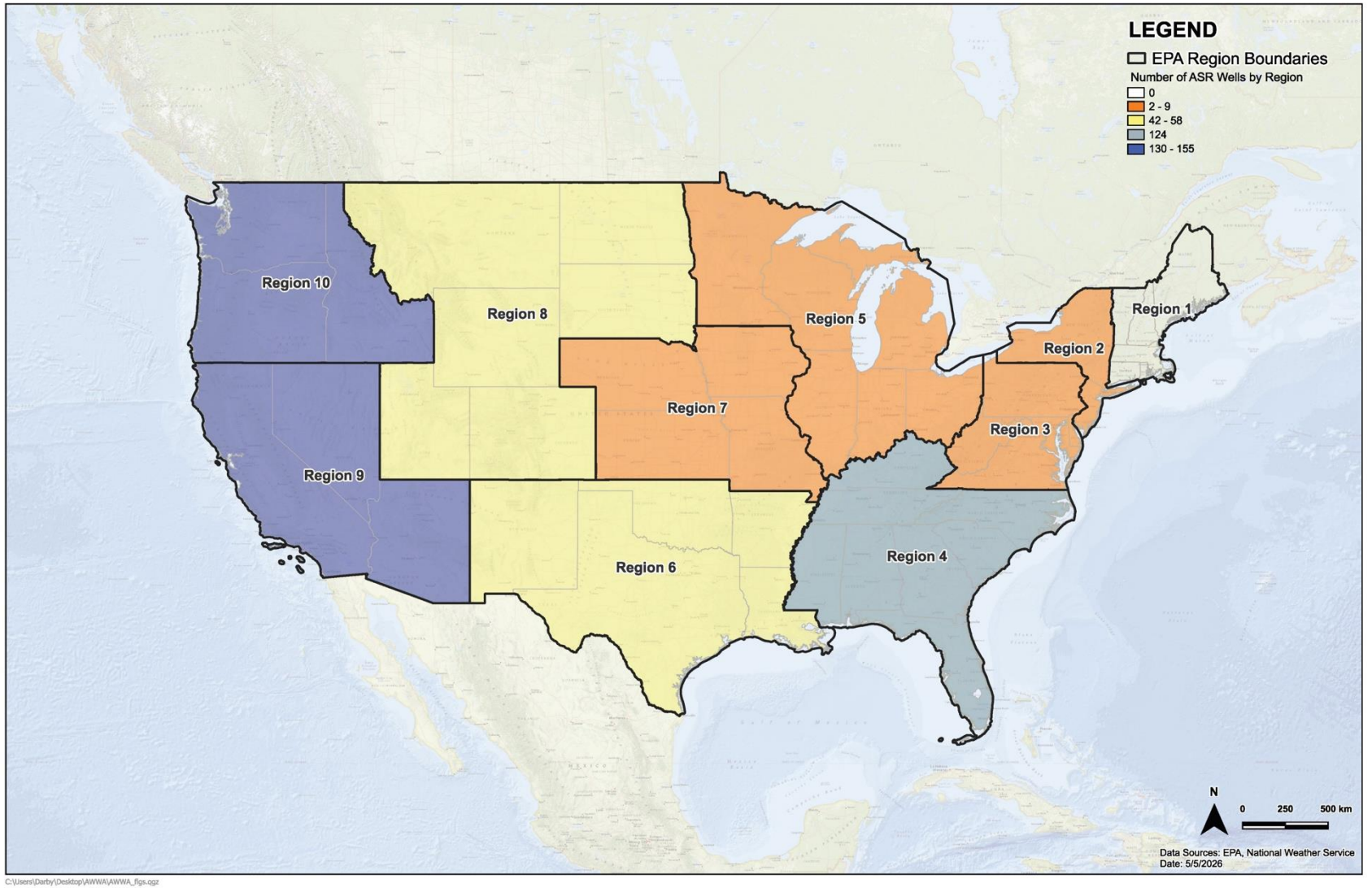
- **Background**
  - **ASR Implementation Factors**
    - **Source Water Availability**
    - **Aquifer Storage Capacity**
    - **Cost Benefit**
- **Pacific Northwest ASR Implementation**
- **Comparison of Regulatory Framework**
  - **Oregon**
  - **Washington**
  - **Idaho**
- **Conclusions**

Background – ASR Basics





Background – ASR Implementation



EPA. https://19january2017snapshot.epa.gov/uic/aquifer-recharge-and-aquifer-storage-and-recovery_.html

Background – ASR Implementation Factors



Water Availability

- Seasonal variability of supply and demand



Aquifer Storage

- Hydrogeologic constraints



Cost Benefit

- ASR project benefits > costs

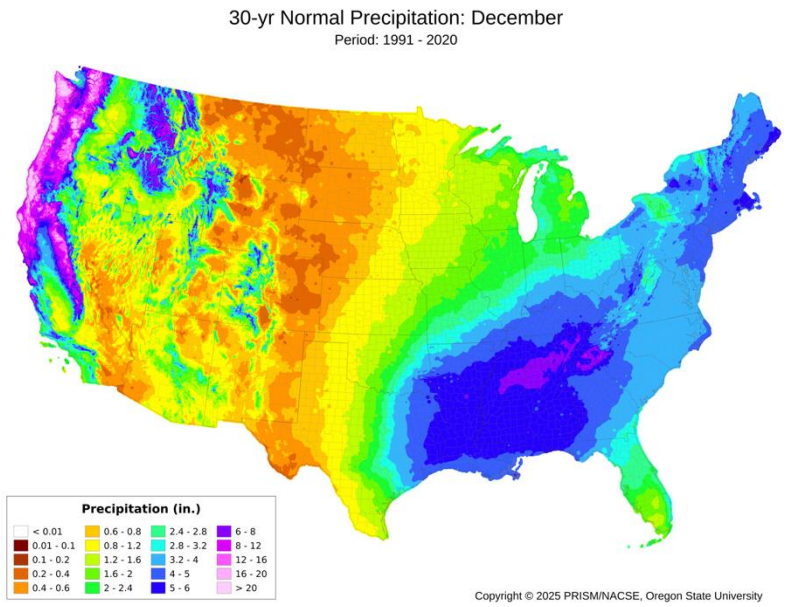


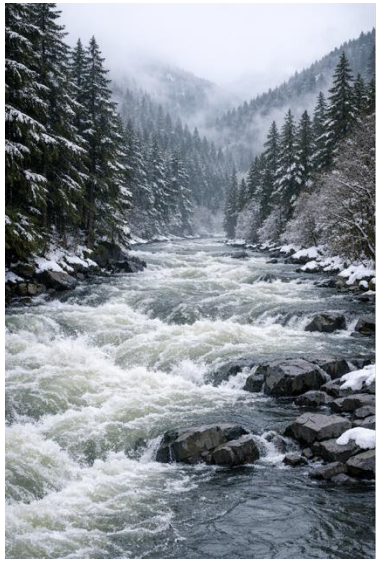




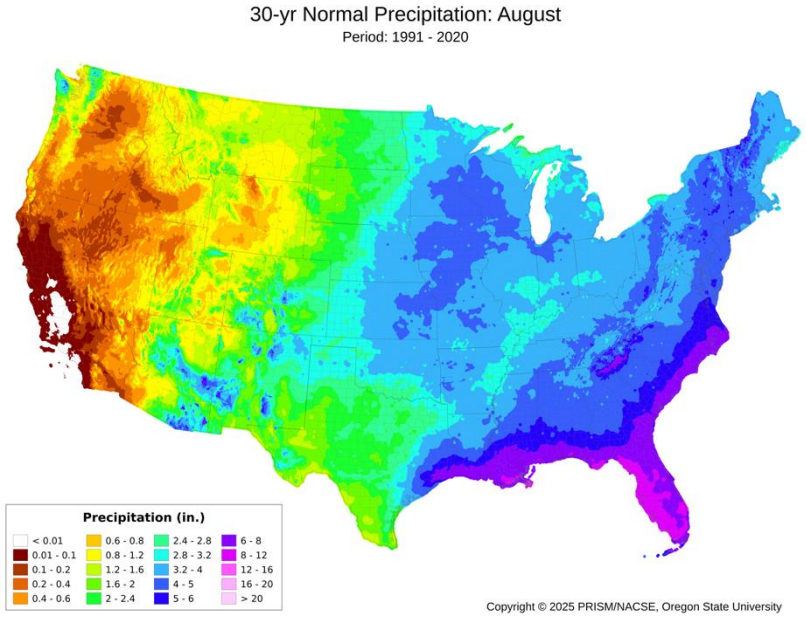
ASR Implementation Factors – Water Availability

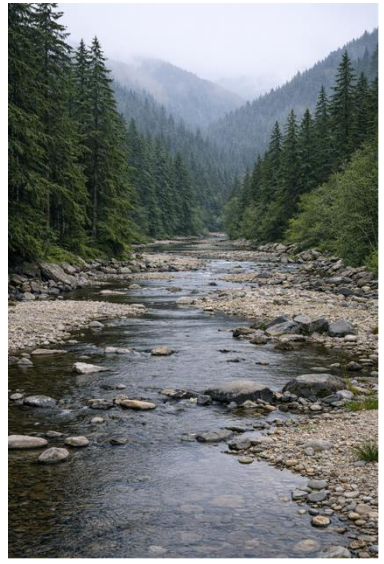
December Precipitation – Low Demand





August Precipitation – High Demand





ASR Implementation Factors - Storage



Confined Aquifer

- Not required but higher potential for loss of stored water

High Yield = Larger Storage Volume

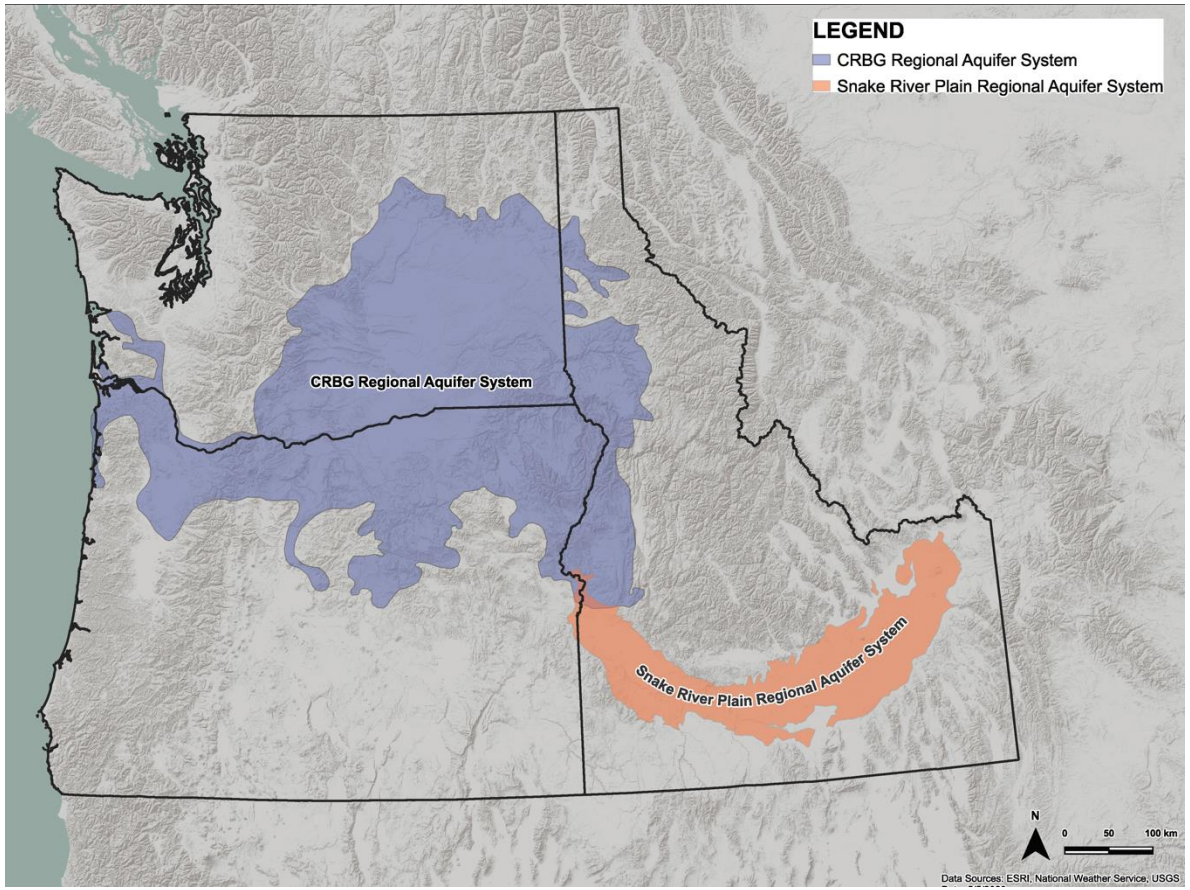
- 100 gpm = 26 MG
- 1,000 gpm = 260 MG

Neutral Water Quality

- Preferred to limit potential negative chemical interactions

Depth to Water

- Recharge under pressure possible, but requires well seal and wellhead design considerations

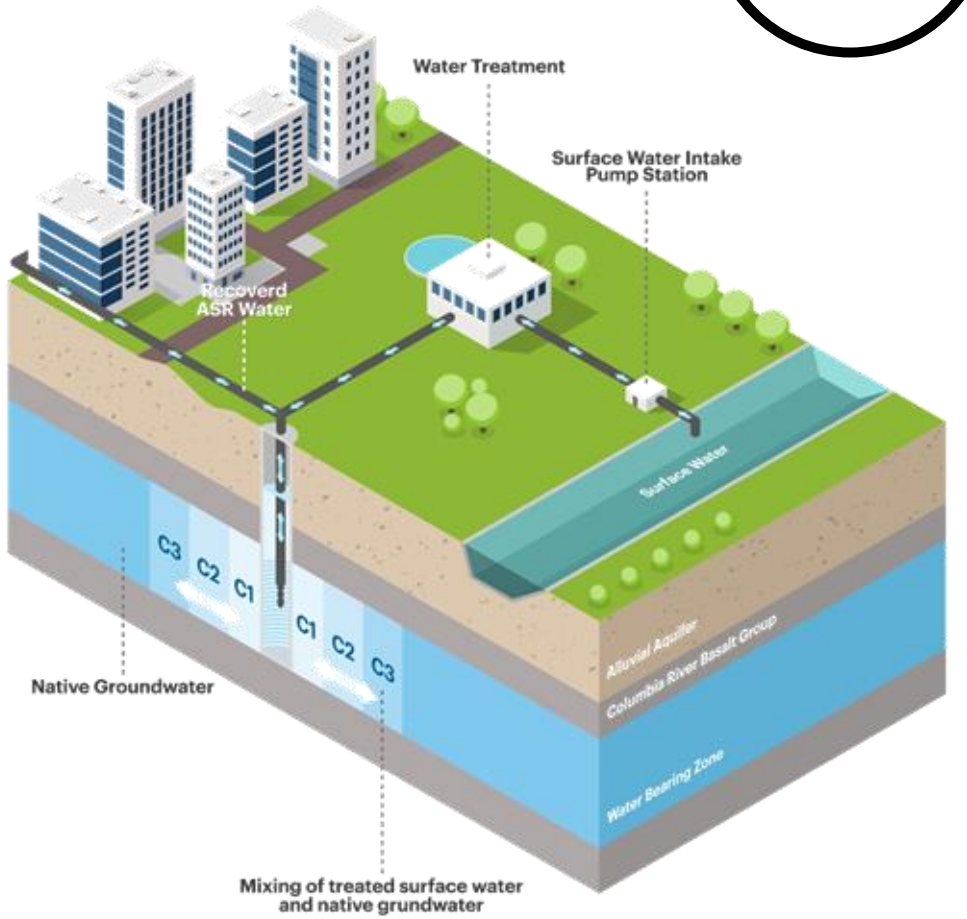


ASR Implementation Factors – Cost Benefit



Economic Considerations

- Source water diversion and treatment
- ASR well construction
  - Depth
  - Diameter
  - Seal depth
  - Casing materials
- Conveyance
- Operation and maintenance
  - Source water treatment
  - Water quality and groundwater level monitoring
  - Regulatory reporting
- **Regulatory Constraints = Risk = Cost**



ASR Implementation

Oregon (late 1990's)

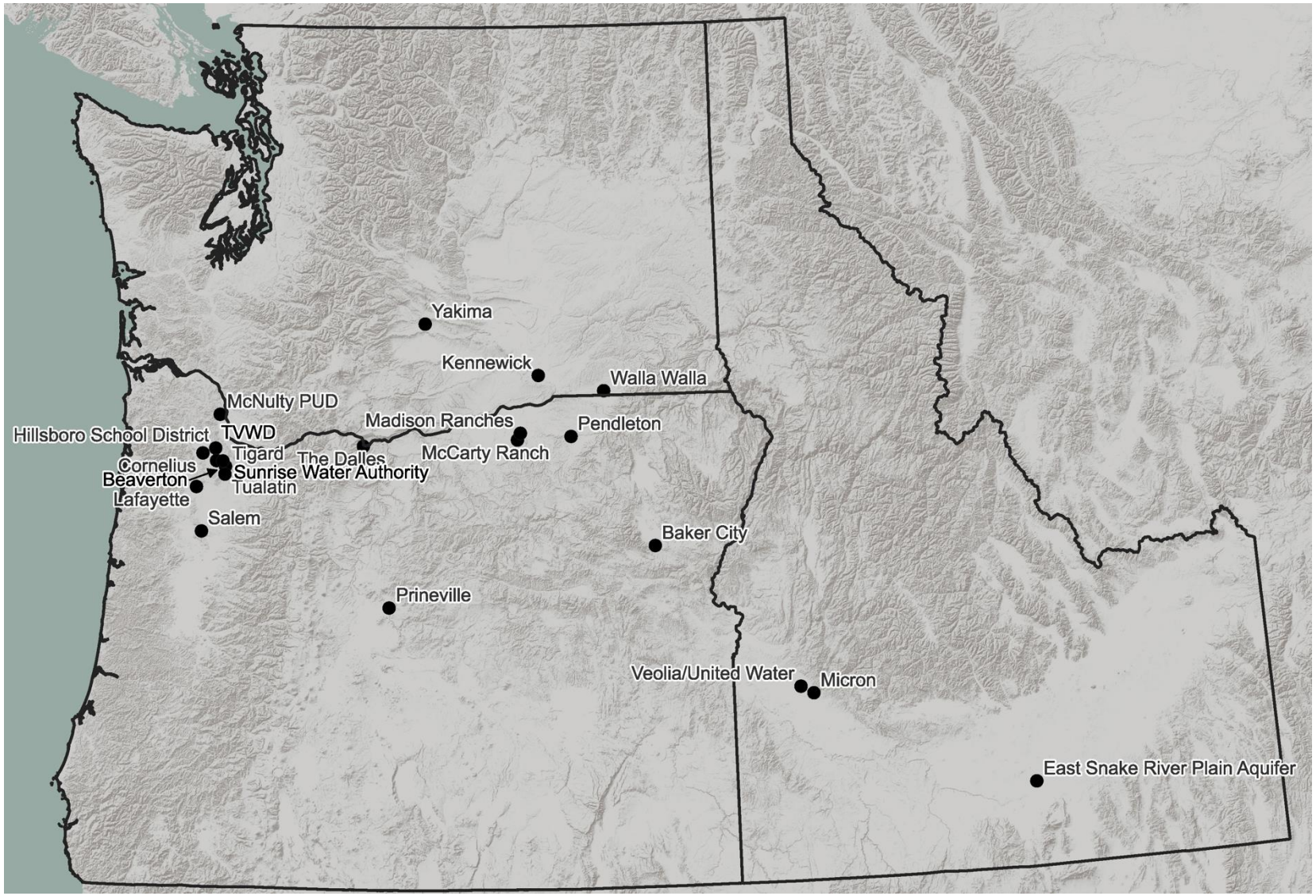
- 16 permitted and operational ASR projects
- Several additional in planning

Washington (early 2000's)

- 3 permitted and operational ASR projects
- Several additional in planning

Idaho (early 2000's)

- 3 permitted, 2 operational ASR projects
- East Snake River Plain
- Additional in planning

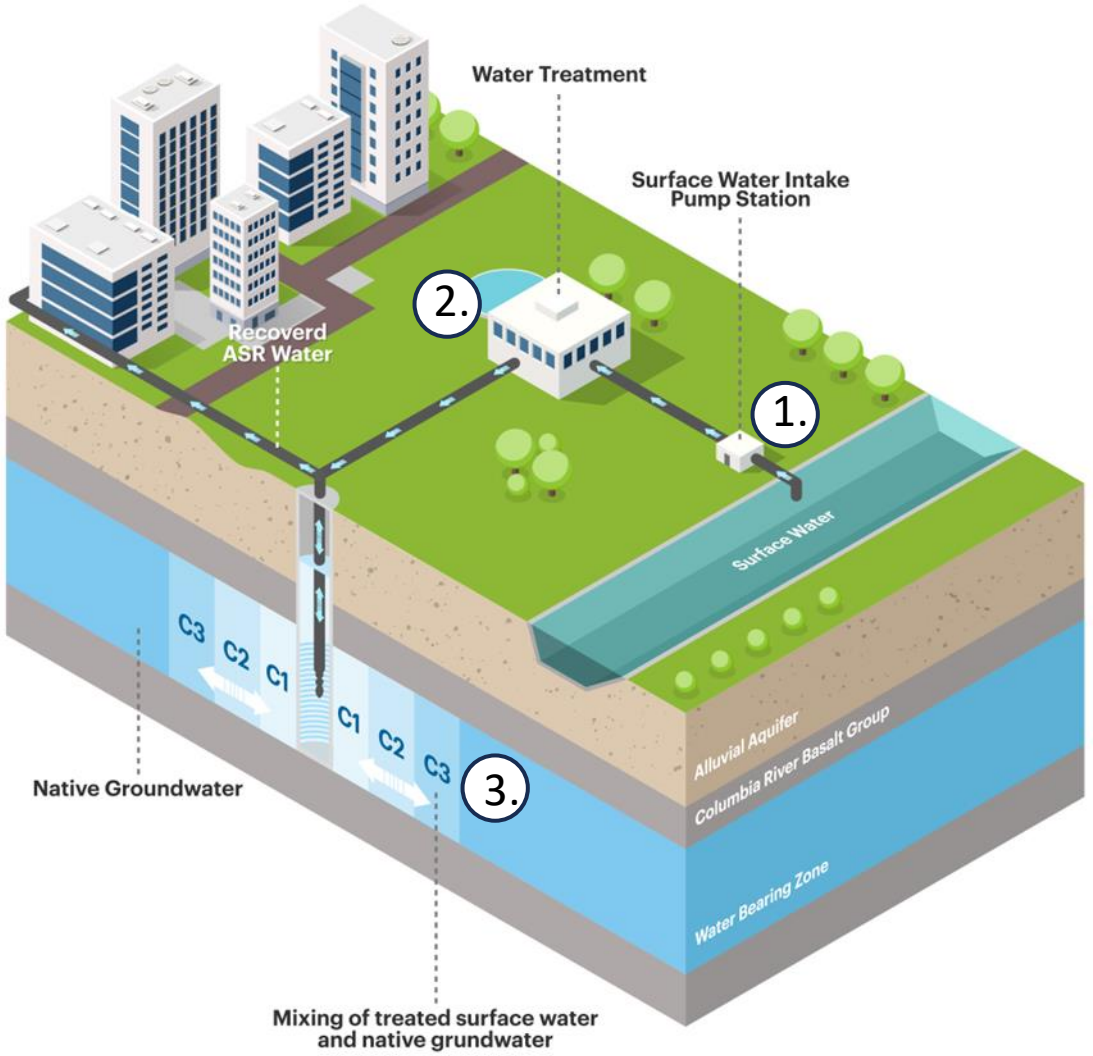


ASR Regulatory Framework Comparison



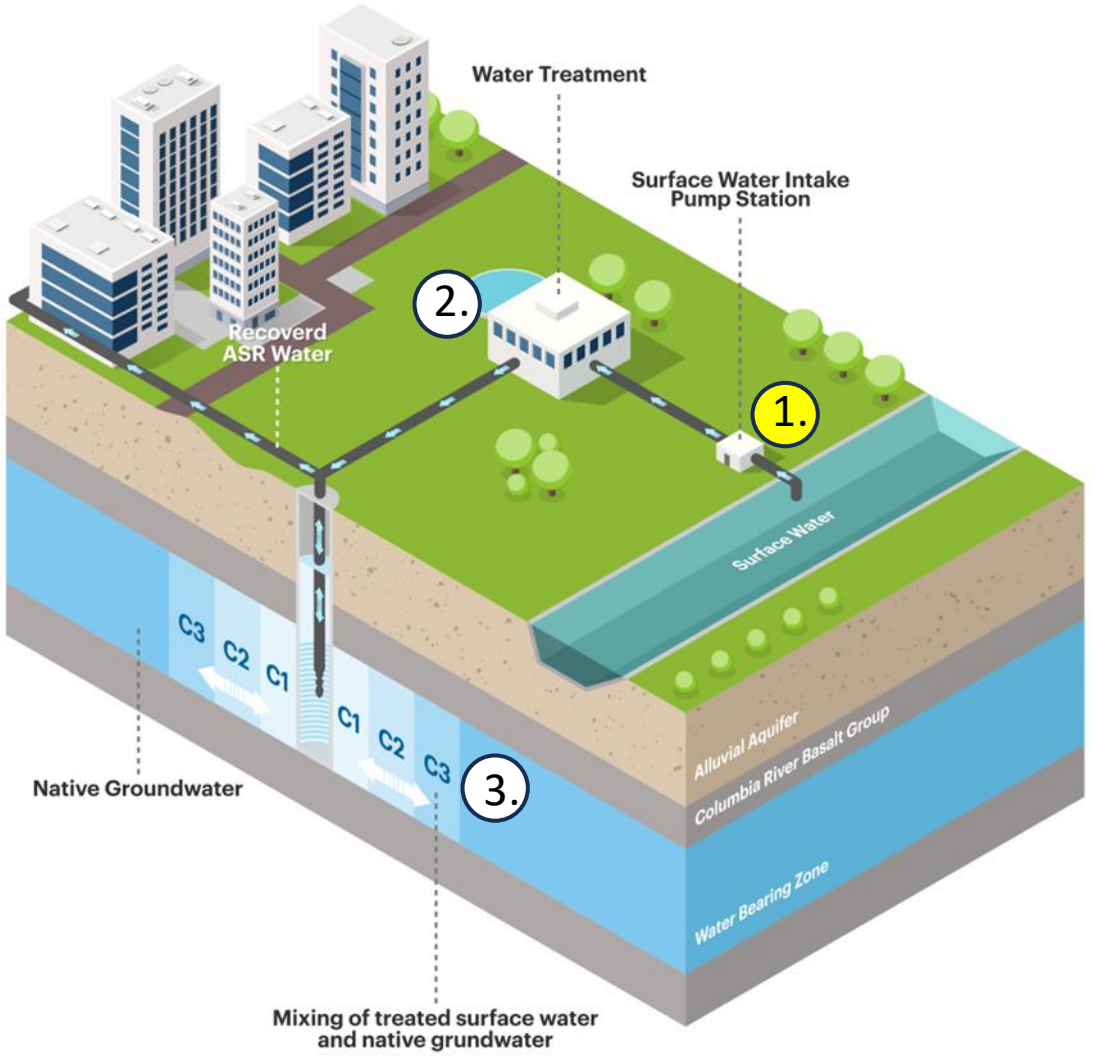
Regulatory Framework Comparison

1. Authorization for Source Water Diversion
2. Water Quality of Source Water Compared to Storage Aquifer
3. Stored Water Recoverability Limitations



Regulatory Framework Comparison

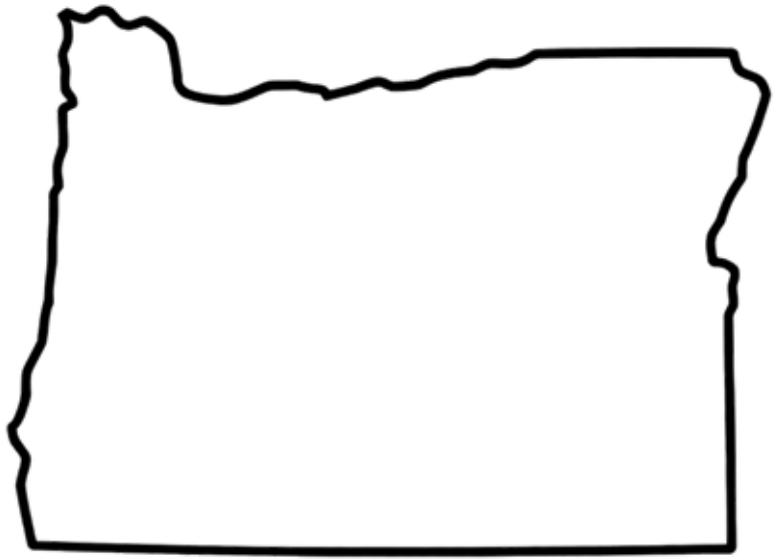
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Regulatory Framework Comparison - Oregon

Authorization for Source Water Diversion

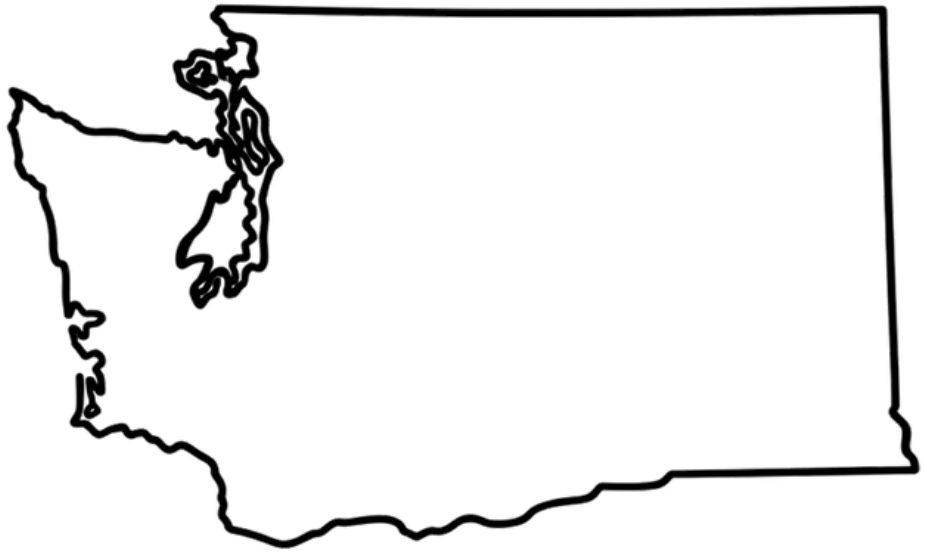
- ASR inherent beneficial use in all water rights
  - Utilizes an existing water right
  - Use (Muni, Irrigation, etc.) doesn't change
  - No change in priority date
- Limited license
  - 5 year authorization, unlimited renewals
  - Permit for permanent authorization



Regulatory Framework Comparison - Washington

Authorization for Source Water Diversion

- Source Water Right
- Reservoir Permit
  - Up to 3 year preliminary authorization for feasibility, construction, ASR pilot testing
  - Temporary permits can be issued beyond 3 years
  - Information from preliminary authorization included in final decision for issuance of permit
  - Schedule included to fully develop project and issuance of Reservoir Certificate
- Secondary Permit
  - Required to recovery stored water for a different use than source water right



Regulatory Framework Comparison - Idaho

Authorization for Source Water Diversion

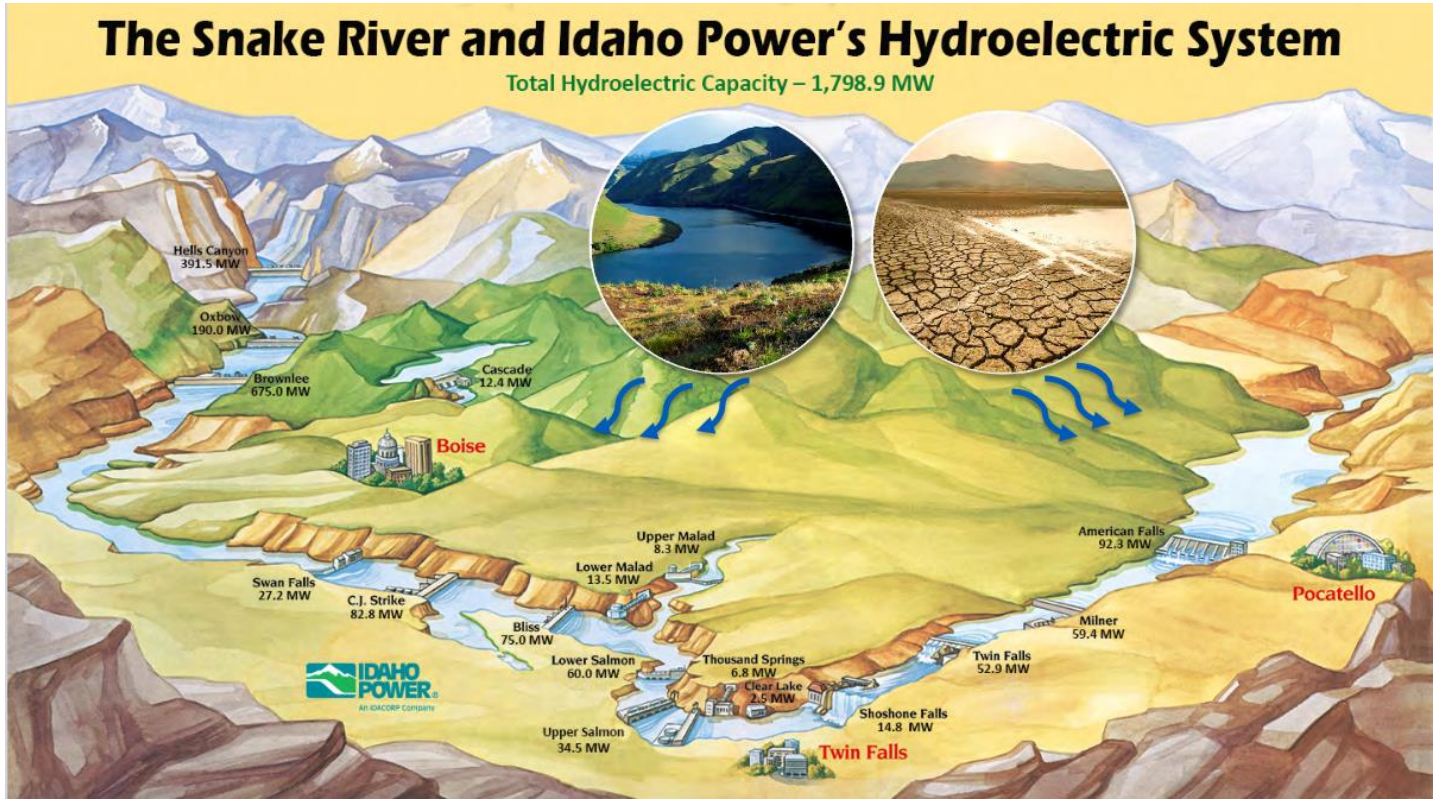
- New Permit for Source Water
  - Use identified for groundwater recharge
  - 5 year authorization
- New Permit for Recovery of Stored Water
  - Recharge is characterized as a mitigation
  - 5 year authorization
- License issued for Permanent Authorization



Regulatory Framework Comparison - Idaho

Authorization for Source Water Diversion

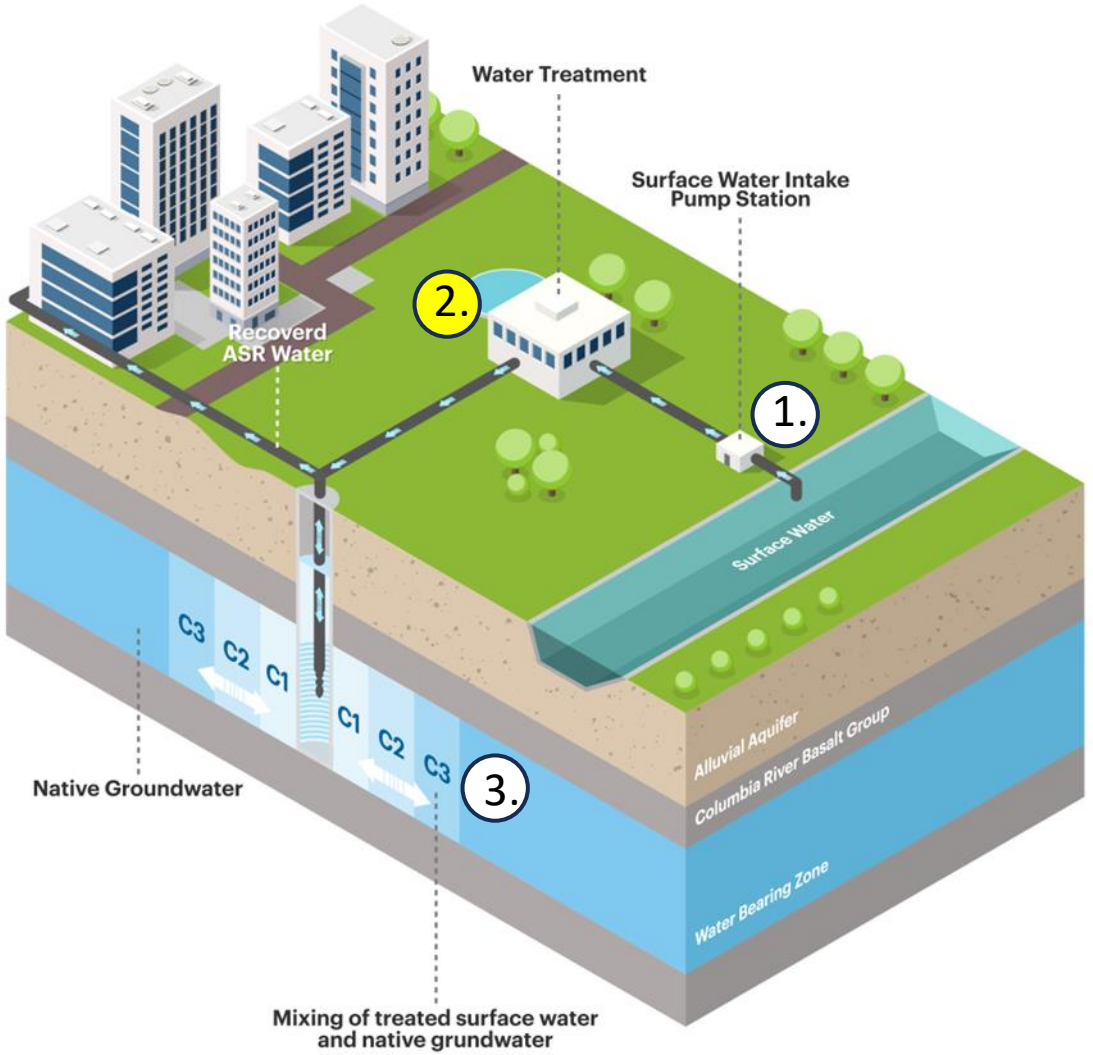
- Idaho Power senior surface water rights on Snake River and Boise Rivers for power generation





Regulatory Framework Comparison

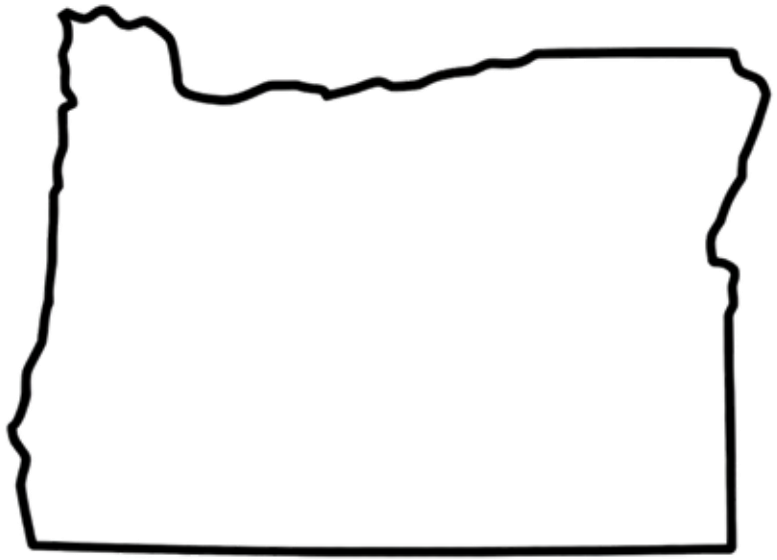
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Regulatory Framework Comparison - Oregon

Source Water Quality Compared to Storage Aquifer

- Safe Drinking Water Act (SDWA) based water quality requirements for source water
  - Defined by rule
  - ½ of the maximum contaminant limit (MCL)
  - Up to secondary maximum contaminant limit (SMCL) and disinfection by products (DBPS)
- Oregon DEQ Underground Injection Control (UIC) – Class V
- Recovery water quality requirements dependent on use
  - Municipal drinking water is SDWA administered by OHA-DWP



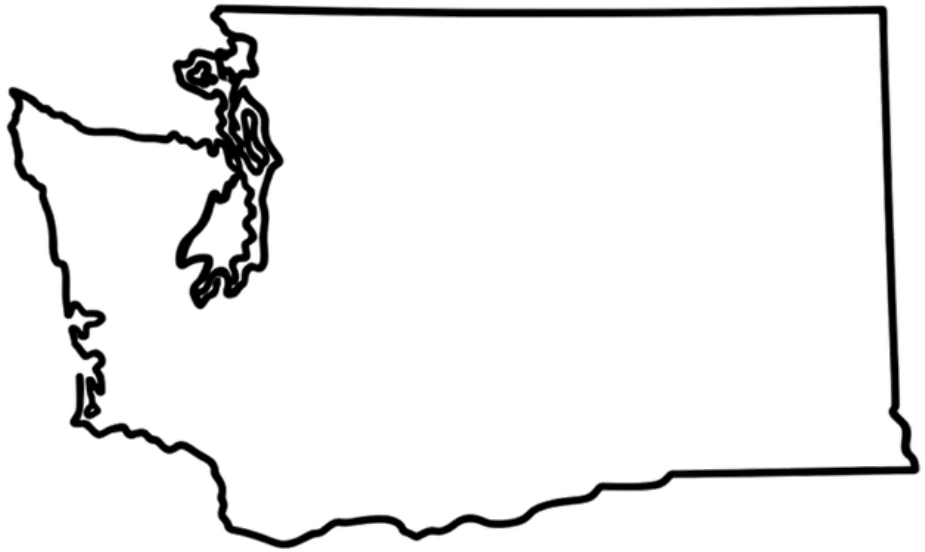
Regulatory Framework Comparison - Washington

Source Water Quality Compared to Storage Aquifer

- Anti-degradation based
  - Source water cannot degrade quality of groundwater
  - Issue for DBP's from drinking water systems
- Requires overriding considerations of the public interest (OCPI)
- Requires analysis of all known, available, and reasonable methods of treatment (AKART)
- Washington Ecology (primacy) UIC – Class V







Regulatory Framework Comparison - Idaho

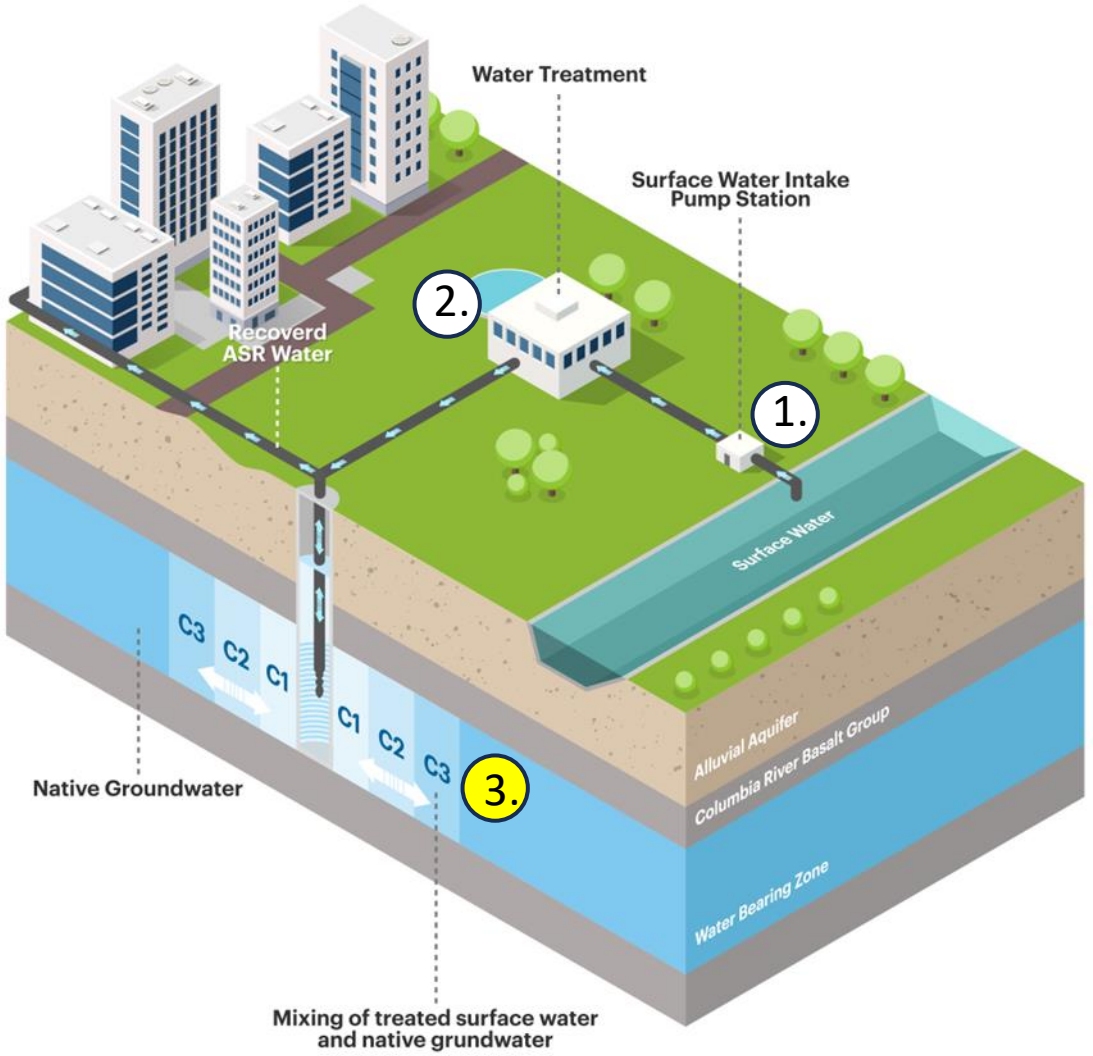
Source Water Quality Compared to Storage Aquifer

- Idaho DEQ (primacy) UIC – Class 5
- Aquifer categorization
  - Sensitive
  - General
  - Other
- Source water quality must meet groundwater quality standards
- Groundwater quality standards are SWDA based and are set at drinking water MCL's



Regulatory Framework Comparison

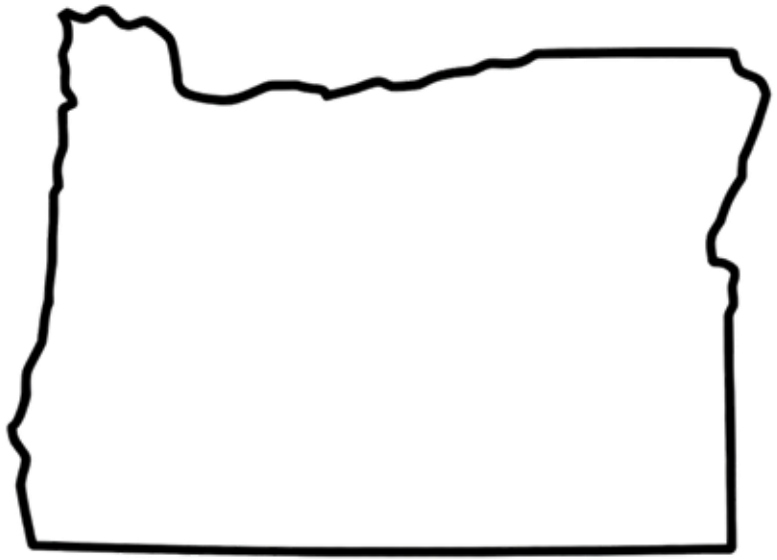
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Regulatory Framework Comparison - Oregon

Stored Water Recoverability Limitations

- ASR pilot testing data to determine if stored water is lost through migration or displaced groundwater is "irretrievably lost"
- Default start is 95% recovery and may allow up to 100% recovery of stored water
- Evaluation generally based on aquifer response to recharge and recovery
- Most recover 95%, with some projects up to 98%
- Carryover storage reduced 5% per year



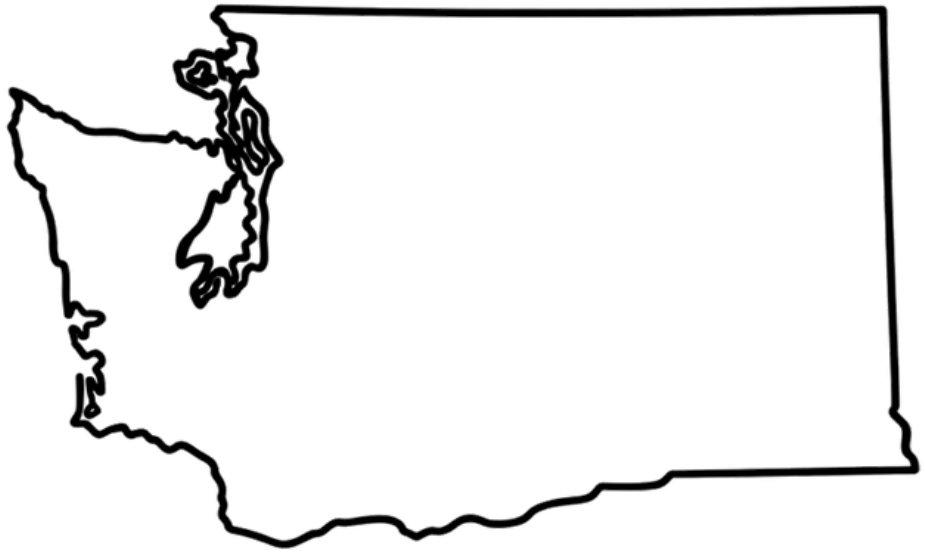
Regulatory Framework Comparison - Washington

Stored Water Recoverability Limitations

- Project specific evaluation based on physical stored water possible for recovery
- If stored water mixes with groundwater or migrates, considered unrecoverable
- “Molecule recharged/molecule recoverable” approach
- Results in generally low recoverability with highest at 92% and lowest at 60%
- Carryover storage reduced by 8-10% per year







Regulatory Framework Comparison - Idaho

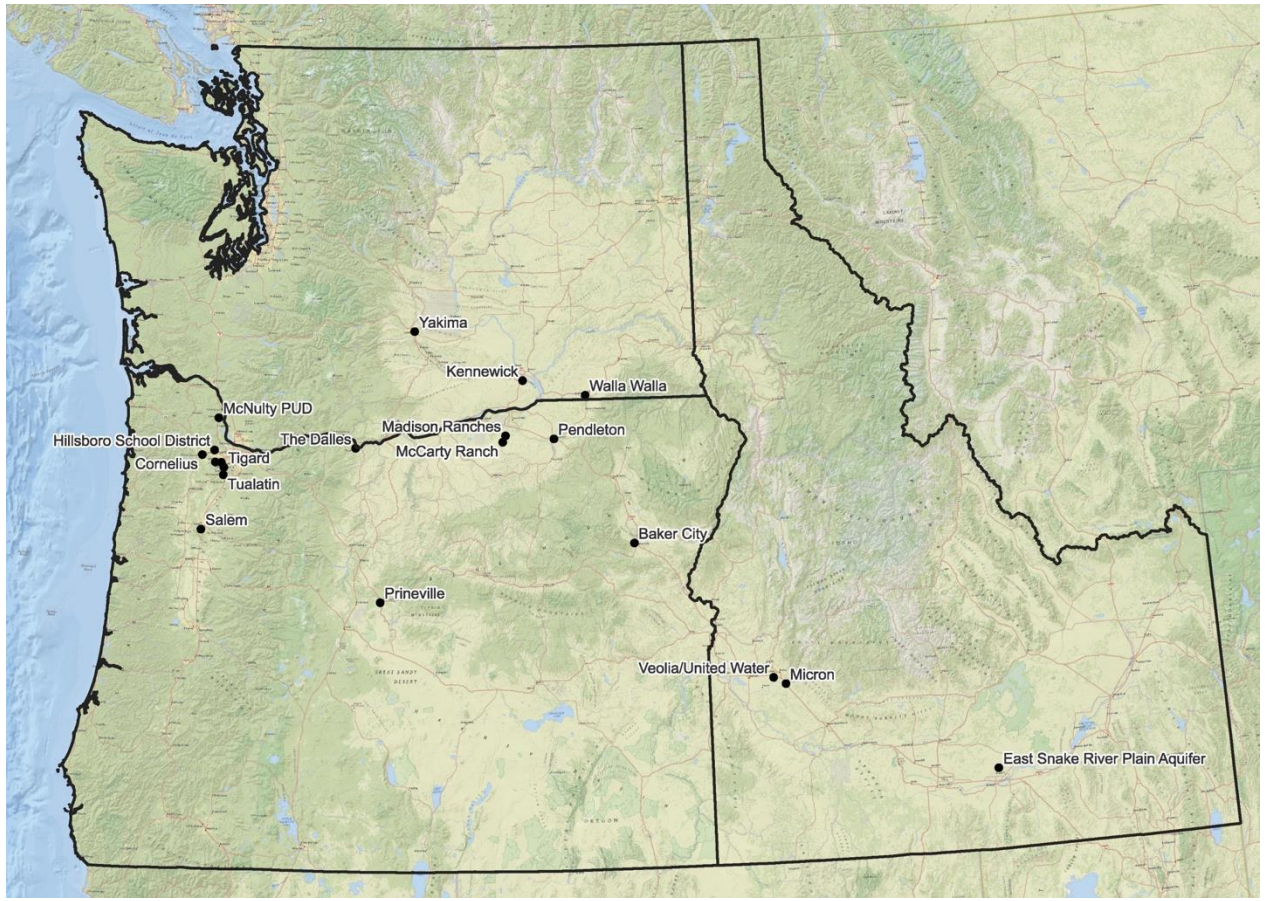
Stored Water Recoverability Limitations

- Recovery by mitigation of a new groundwater permit
- Mitigation plan describes proposed recovery percentage
- Recovery allowed up to 100% within 12 months of storage
- Carryover storage requested in mitigation plan
  - No carryover allowed Chobani/Twin Falls project



Conclusions

- Despite relative similarities between Oregon and Washington, much less development of ASR projects in Washington
  - High cost and risks associated with source water quality OCPI/AKART evaluation based on regulatory requirements
  - Low recoverability challenges based on regulatory framework
- Idaho ASR project development also relatively limited relative to Oregon
  - Likely related to source water availability and senior power generation water right holders





Questions?

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summit WATER RESOURCES

Regulatory Framework Comparison

Oregon	Washington	Idaho
Oregon Water Resources Department	Department of Ecology, State of Washington	Idaho Department of Water Resources
State of Oregon Department of Environmental Quality (DEQ)		Idaho Department of Environmental Quality
Oregon Health Authority	Washington State Department of Health	