

GROUNDWATER RECHARGE RISKS

Drinking Water Advisory Group
December 2, 2024

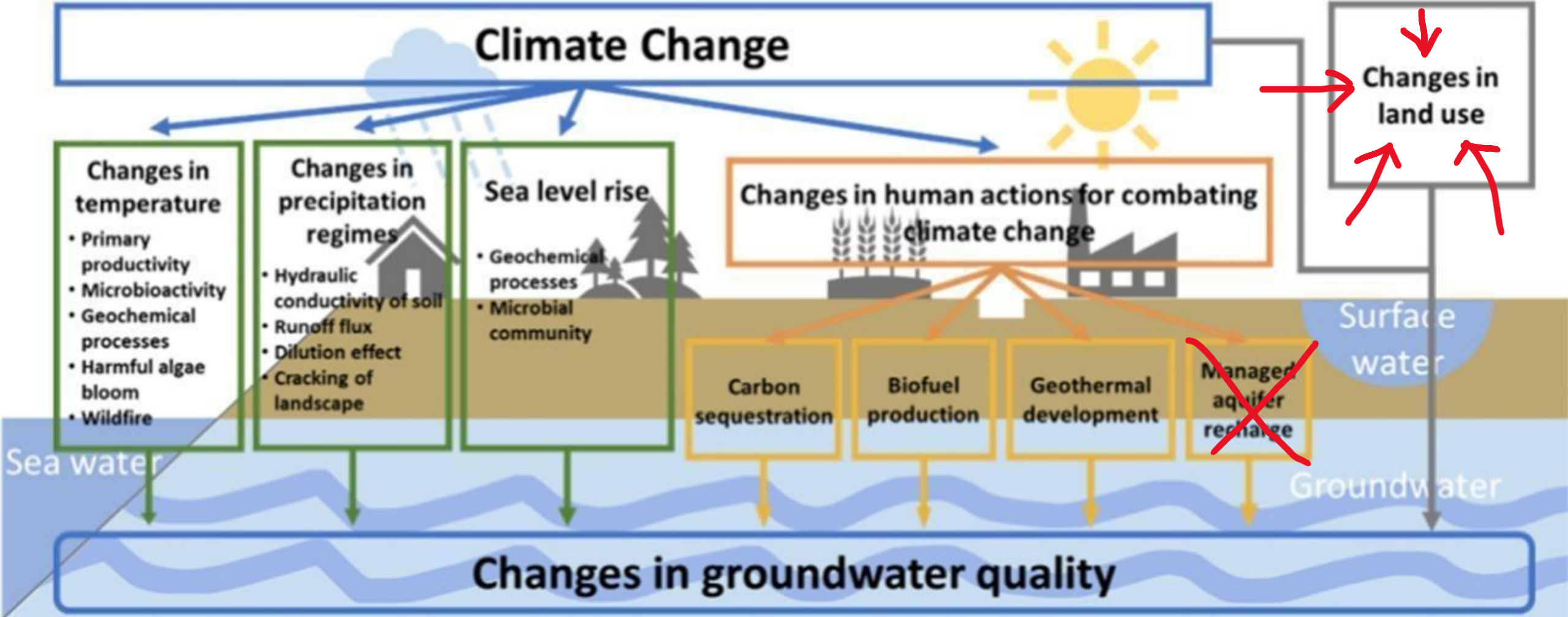
Washington State Department of Health

Office of Drinking Water
Source Water Protection Program



Deborah Johnson

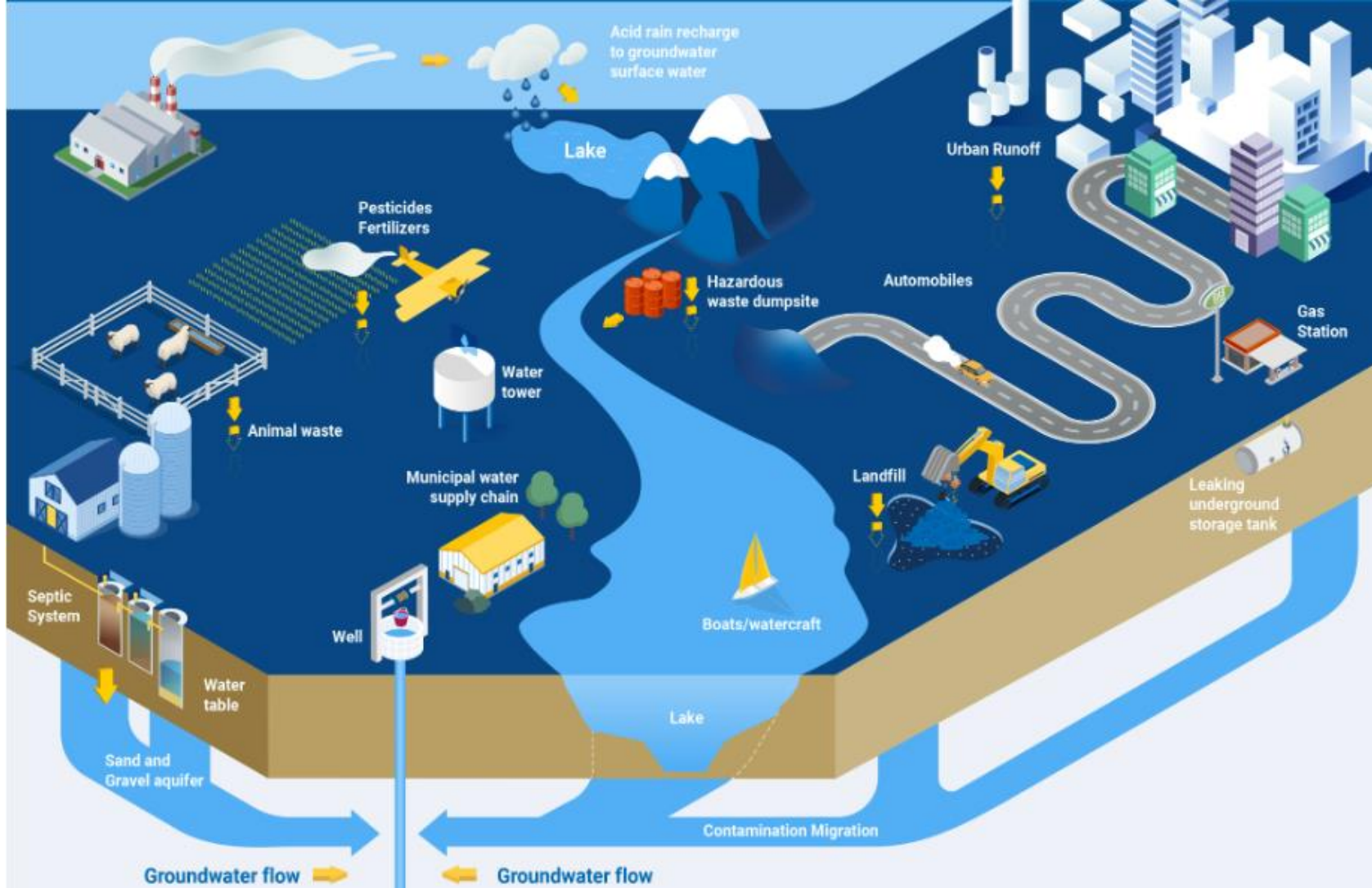
*Wellhead Protection
Program Coordinator*



Contemporary Challenges to Groundwater Quality
 (Credit: [Dao/Heuzard et al in Science of the Total Environment Journal, February 2024](#))

Aquifer Storage & Recovery/Managed Aquifer Recharge

- ASR (including drinking water) – combined (storage & use) reservoir applications
- MAR – replenishes but is not intended for storage/recovery; may also be used as mitigation
- Requirements/applications: [Washington State Dept. of Ecology](#)
- [Relationship with DOH source approval](#) ←
- Resources:
 - [EPA](#)
 - [USGS](#) - use search (case studies/research)
 - [FEMA](#) - funding for ASR
 - [Ground Water Protection Council](#)



Common Groundwater Impact Sources
 (Credit: [International Atomic Energy Agency](#))

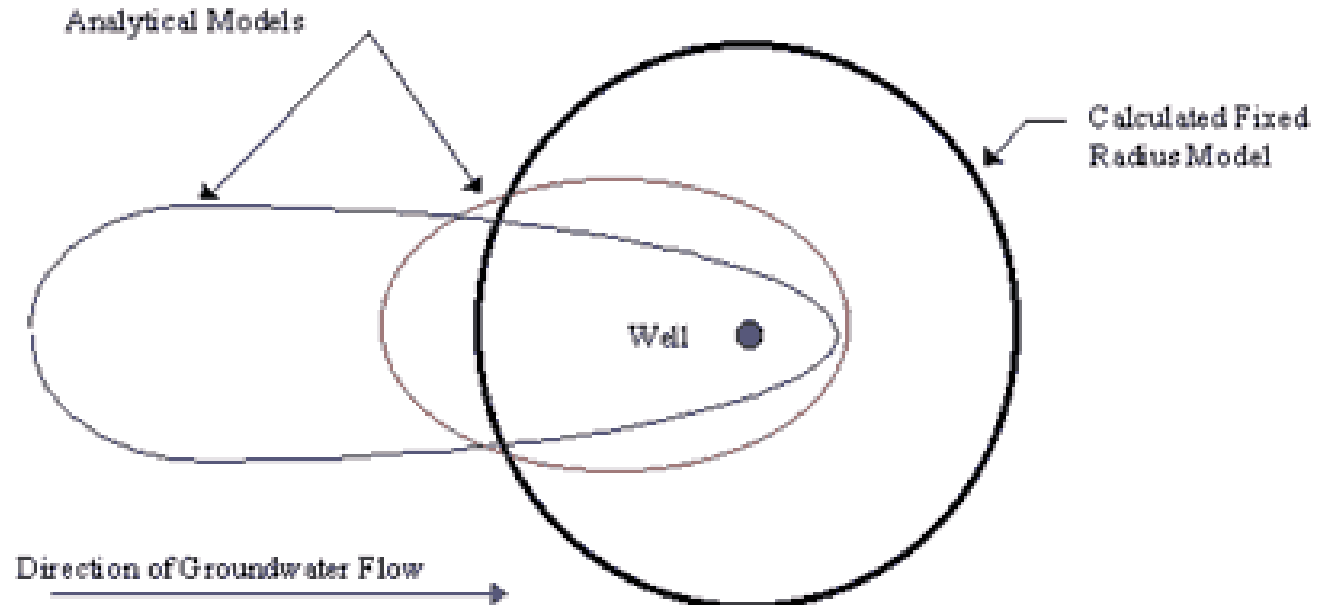
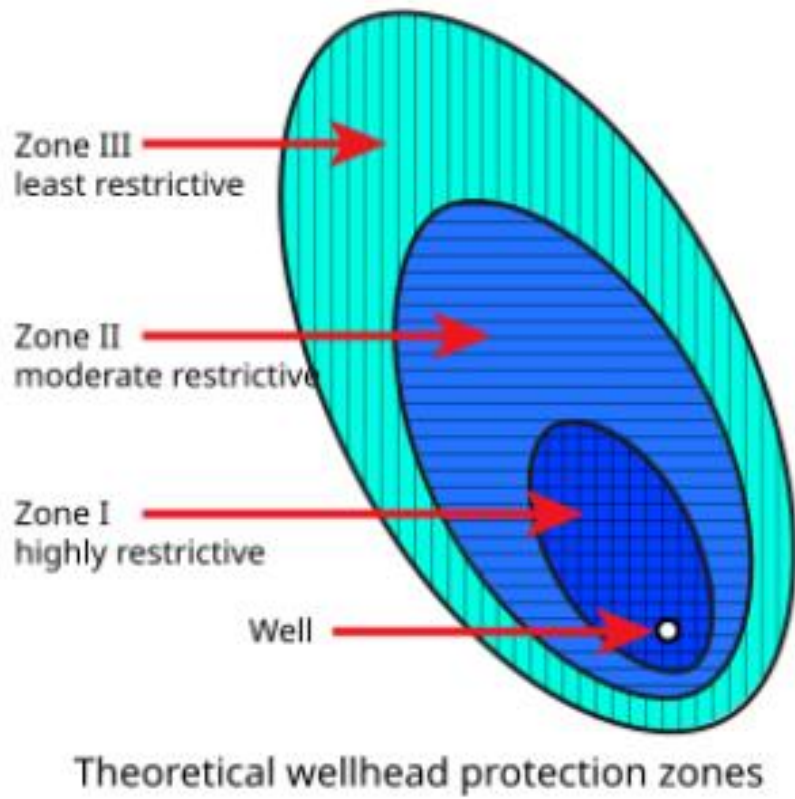
Potentially Contaminating Land Uses in Wellhead Protection Areas

- Above- & underground storage tanks
- Feedlots (“concentrated animal feeding operations” or CAFOs)
- Petroleum (gas stations, quick oil change, repair shops, refining, distributors)
- Cleaning (dry cleaners, car washes, laundromats)
- Airports & fleet facilities
- Research/chemical testing labs
- Food processors/slaughterhouses/butchery
- Junk/salvage yards
- Junk/salvage yards, landfills, materials stockpiles, waste transfer/haulers
- Golf courses/athletic fields
- Cemeteries
- Broad range of industrial uses (ex. hazardous materials used to manufacture, treat, or as byproduct of mfg. process)
- Mining, radioactive uses, associated waste
- Injection wells & OSSs/LOSSs (generally)
- Biosolids application
- Battery facilities...

Source Water Protection Requirements

[WAC 246-290-135](#) – potential contaminant inventory

- Inventory of known & potential contamination sources Notify others of findings
- Contingency planning
- Coordination with local emergency responders
- Repeat inventory & notification every two years
- Actively use your inventory to help identify problems, comment on proposed permits, & guide new source siting



Bending the CFR wellhead protection area to account for groundwater flow
 (Credits: [Wikipedia](#) & [Yakima County](#))

[DOH SWAP map](#)

Critical Aquifer Recharge Areas (CARAs)

- [Dept. of Ecology CARAs guidance](#) – “official” guidance for local-level CARAs regulations under GMA critical areas requirements (latest edition); may be used as performance measure in an appeal
- [Adaptive Management for CARAs](#) – 2021 webinar (DOE/DOH)
- [Dept. of Commerce Critical Areas Handbook](#) – includes all critical areas categories, not just CARAs
- [CARAs in VSP implementation](#) – only for counties participating in the [Voluntary Stewardship Program](#) (under Conservation Commission)
- Sample BAS document: [Thurston Co. BAS for CARAs \(old\)](#)

GMA Updates Underway & Coming Up

December 31, 2024

King, Kitsap, Pierce, Snohomish

December 31, 2025

Clallam, Clark, Island, Jefferson, Lewis, Mason, San Juan, Skagit, Thurston, Whatcom

June 30, 2026

Benton, Chelan, Cowlitz, Douglas, Franklin, Kittitas, Skamania, Spokane, Walla Walla, Yakima

June 30, 2027

Adams, Asotin, Columbia, Ferry, Garfield, Grant, Grays Harbor, Klickitat, Lincoln, Okanogan, Pacific, Pend Oreille, Stevens, Wahkiakum, Whitman



Gaa, where is this PFAS coming from?!

[Comprehensive Forensic Approach for Source Allocation of PFAS](#)

[Environmental Source Tracking of \[PFAS\] within a Forensic Context: Current & Future Techniques](#)

[Battelle 2019 bioremediation symposium \(multiple papers\)](#)

[PFAS Source Differentiation Guide for Airports](#)

[PFAS Forensics: Best Practices for Unwinding Complex PFAS Sources](#)

[Jennifer Field, Ph.D., Oregon State University](#)

In the town ‘Erin Brockovich’ made famous, residents still fear dirty water

An ongoing struggle in Hinkley, California, to remove dangerous chemicals from drinking water demonstrates how difficult contamination can be to clean up.



By [Silvia Foster-Frau](#)

December 1, 2024 at 6:00 a.m. EST

The Washington Post

“Remediation ‘is going to take hundreds of years. It’s like a wasteland.’”
~Attorney Gary Praglin

Bottom line: Implementing source water protection as part of the multi-barrier approach & maintaining good partnerships with local governments to apply protective regulations are far easier, cheaper, & more effective than cleanups once pollution occurs.

Technical Assistance

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<https://doh.wa.gov/community-and-environment/drinking-water/source-water/source-water-protection>



Questions?



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