#9 FACTSHEET

Peak Water on Whidbey

Peak Water: the point where water use, recharge, and water quality limits begin to constrain growth and ecosystem health. Extraction exceeds recharge.

Whidbey Island is moving into an **early peak-water** condition in its most vulnerable areas: coastal lenses, rain-shadowed basins, and places with heavy summer pumping. Peak water does not mean the island runs out of water everywhere at once; it means some parts of the groundwater system begin hitting their practical limits first, especially where recharge is limited and seawater intrusion is already a risk.

The key point is simple: Whidbey's groundwater is a finite sole-source aquifer, replenished by rainfall and return flow (e.g septic tank contribution), and that balance is being stressed by growth, irrigation demand, climate change, and outdated management tools.

What Peak Water Means

Peak water is the point where a water system is no longer governed by abundance, but by constraint. On Whidbey, that means groundwater use begins to press against natural recharge, and coastal wells face increasing risk of saltwater intrusion as the freshwater lens thins.

This is not a theory about someday. It is a practical warning about places where summer demand, low recharge, and sea-level rise are already converging.

Whidbey's Water Balance

Groundwater recharge is driven primarily by local rainfall, with roughly 20% to 34% of annual precipitation infiltrating to aquifers depending on soils, geology, vegetation, and impervious surface cover. Recharge also includes return flows from human water use, particularly from onsite septic systems, which are designed to infiltrate a portion of indoor water back into the subsurface. However, the relative contribution of rainfall versus return flow is not directly measured on an island-wide basis, and both are sensitive to land-use change, development patterns, and summertime withdrawal rates. Grading, paving, vegetation loss, and concentrated pumping can significantly reduce effective recharge even where average rainfall remains unchanged.

USGS recharge work for Whidbey and Camano remains the main quantitative baseline, but it is based on water years 1998 and 1999 and was published in 2003. That means we are still using a

framework built from last-century data and older measuring technologies to guide 2026 decisions.

That matters because the island's climate, land cover, development pattern, and summer water demand have all changed since then.

Climate Stressors

Climate change is tightening the vise on Whidbey's aquifers in two ways: hotter, drier summer conditions reduce recharge exactly when demand peaks, and sea level rise pushes saltwater upward into coastal groundwater systems. NOAA-based projections for Puget Sound indicate roughly 6-8 inches of sea-level rise by 2040, with 10 to 12 inches expected by 2050.

For coastal aquifers, even small sea-level increases matter because the freshwater lens floats on denser saltwater. Under the Ghyben-Herzberg relationship, a 6-inch rise in sea level can reduce freshwater thickness by roughly 20 feet in the subsurface, making coastal wells more vulnerable even if pumping stays the same.

That is why shoreline areas like Maxwelton, Cultus Bay, Useless Bay, and parts of Coupeville/Ebey's Prairie are especially fragile.

Why Old Data Is a Problem

Whidbey's main recharge estimate still comes from a 2003 USGS study using 1998–1999 water-year data. Island County's watershed planning documents themselves acknowledge that the aquifer system is complex and that regional groundwater protection decisions were difficult even two decades ago.

The problem is not that the old work is useless. The problem is that it is not enough for current conditions. We now have more people, longer summer dry periods, more intense winter rain events, more hard surfaces, more demand for local food production, and higher sea levels than the old models assumed.

In other words, we are managing a 21st-century water problem with 20th-century snapshots.

Local Hot Spots

Whidbey's early peak-water risk is not uniform. It concentrates in a few fragile bands:

- **South coastal lenses**: Maxwelton, Cultus Bay, Useless Bay, where shallow freshwater floats on saltwater and summer irrigation can quickly cause drawdown.
- **Central rain-shadow areas**: Penn Cove and Ebey's Landing, where rainfall is lower and recharge is tighter, but agricultural demand can be high.
- **North coastal belts**: shoreline zones where coastal pumping and rising sea levels increase intrusion risk.

These are the places where peak water appears first as seasonal brackish wells, lower summer water tables, and greater ecological stress.

Septic and Return Flows

Indoor water use is not the same as net loss to the aquifer. Conventional septic systems return a portion of indoor water back to groundwater through drainfields, and EPA describes septic systems as infiltration systems by design.

But the exact islandwide return-flow percentage is not directly measured on Whidbey. So any scenario using 40%, 60%, or 80% return flow is a planning assumption, not a field-measured islandwide fact.

That means the honest water-budget conversation has to distinguish between:

- gross pumping, extraction amount
- net depletion, the recharge amount
- and where that water returns, if it returns at all.

Governance Fragmentation

Whidbey has a single aquifer system, but not a single governing authority for the aquifer as a whole. Island County manages land use and some recharge-area protections; Ecology handles water rights; health agencies handle septic and water quality; public systems manage their own service areas.

The result is fragmented oversight. Current institutions can review a project, regulate septic, or issue a water right, but no one agency appears to have clear basin-wide authority to set and enforce aquifer-wide pumping limits or to manage the island's groundwater as one connected system.

That governance gap is a major reason peak-water risk keeps growing even when the science is already clear enough to justify caution.

From Extraction to Stewardship

The old mentality was that groundwater could be treated as an open-ended supply. The new reality is that Whidbey needs a regenerative aquifer partnership mindset: use less, recharge more, store winter water, protect vulnerable recharge zones, and coordinate across landowners and agencies.

That means:

- protecting recharge areas,
- encouraging low-impact development,
- retrofitting existing built environment to be water-wise
- limiting summer irrigation in fragile basins,
- using winter cisterns, ponds, and storage,

- and building local agreements that treat groundwater as shared infrastructure rather than private concern.
- Whidbey's best future is not unlimited extraction. It is a managed balance between people, farms, ecosystems, and the aquifer that supports them

Bottom Line

Whidbey is entering an early peak-water era in its most fragile places. The warning signs are stronger because the science base is old, the climate is shifting, sea level is rising, and governance is fragmented. **The island does not need a crisis to begin acting. It needs a new water ethic now: one that treats the aquifer as a living system to steward, not a reserve to drain.**