



STATE OF THE WATER

Overview of Nitrate Challenges for Domestic Well Users in Morrow County

October 2023

Introduction

This briefing paper provides an overview of the challenges faced by domestic well users in Morrow County, Oregon, in regards to nitrate contamination in groundwater. Rural residents in Morrow County typically depend on groundwater from the alluvial and basalt aquifers for their water supply. Federal and state water quality regulations do not apply to private wells, and there are no criteria or standards for individual wells. **With limited regulatory oversight, domestic well users across Morrow County face significant financial and health risks, particularly from high nitrate concentrations in groundwater.**

The Umatilla Basin is facing significant long-term water quantity and quality issues affecting the environment, the health of Morrow County's residents, and the ability for the area to support existing and future agricultural and industrial operations and drinking water demands. State and local agencies, local water providers, landowners, and other stakeholders have been working under a regulatory framework and through voluntary activities to address these issues. Morrow County is committed to supporting actions where appropriate to address these wide-ranging water issues. This briefing paper is part of a set of four State of the Water papers prepared by the County to provide context for this effort.

The region has a decades-long history of trying to address water quantity and water quality issues affecting groundwater supplies. The state designated four Critical Groundwater Management Areas (CGWAs) in response to declining groundwater levels and the Lower Umatilla Basin Groundwater Management Area (LUBGWMA) in 1990 in response to elevated nitrate concentrations in groundwater. These broader regional issues are described further in the companion briefing papers, "Overview of Water Quantity Challenges in Morrow County" and "Overview of Water Quality Challenges in Morrow County," dated October 2023.

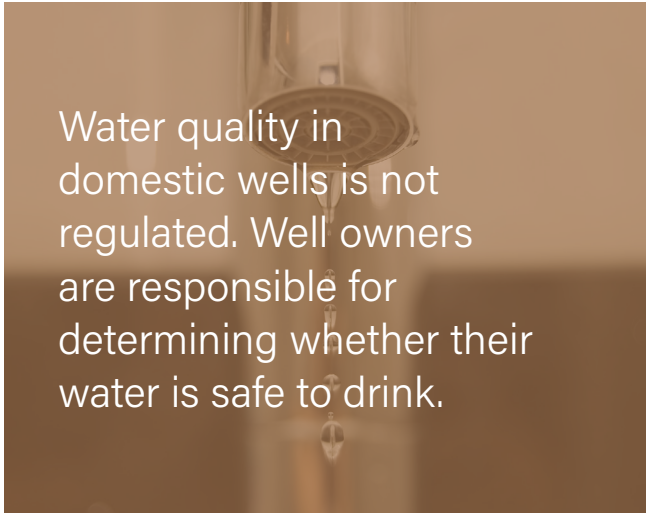
Key Takeaways

- ✓ Some domestic well users are facing serious water quality issues, especially due to nitrate contamination from agriculture and landscaping, livestock waste, failing septic tanks, uncased and shallow wells, and food processing waste reuse.
- ✓ While regulatory agencies have a responsibility to raise awareness about safe drinking water, federal and state regulations do not apply to private wells and there are no standards for individual wells.
- ✓ Well owners are ultimately responsible for determining whether their water meets drinking water quality standards and whether it is safe to drink.
- ✓ Voluntary efforts have not been effective in reducing nitrate conditions to acceptable levels.
- ✓ Recent public pressure has increased attention and garnered urgency from government officials and regulatory agencies.
- ✓ Morrow County's objective is to use recent funding to expedite access to safe drinking water in the near term and support efforts to restore and protect the groundwater resource over the long term.

Domestic Well Use and Regulation

Portland State University's (PSU's) Population Research Center estimated the population of Morrow County in 2022 at around 12,300. Slightly more than half of this population (54 percent) is concentrated in Boardman (~4,400) and Irrigon (~2,300), and 15 percent (~1,800) live in the smaller incorporated areas in southern and central Morrow County. An estimated 30 percent (~3,700) live in unincorporated areas throughout the County and can generally be assumed to use domestic wells for their source of water.

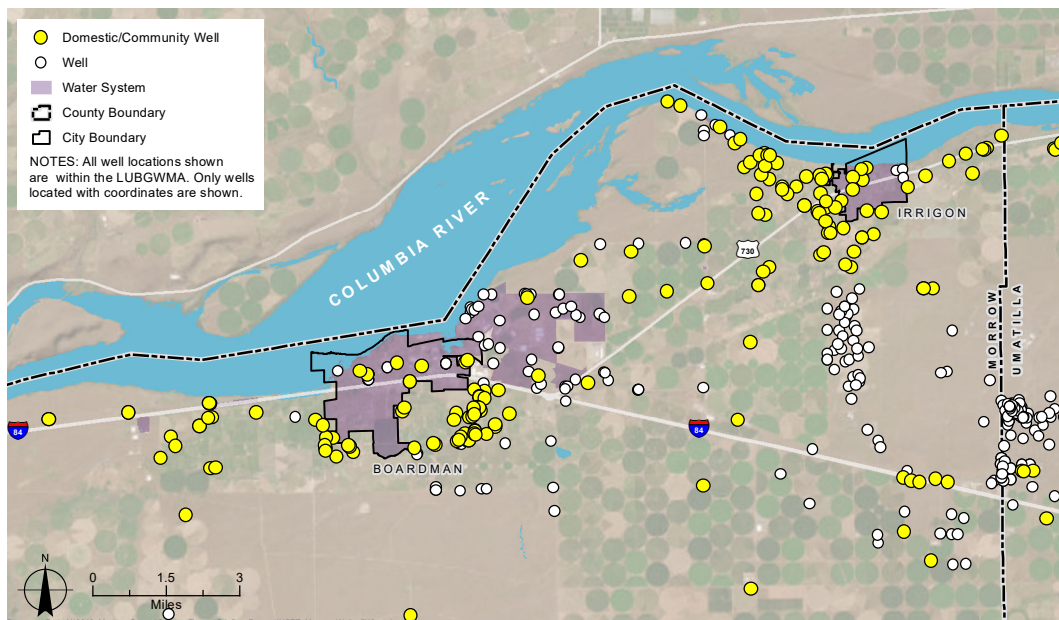
Domestic well water use is one of the exempt uses of groundwater that does not require a water use permit from the Oregon Water Resources Department (OWRD), as long as the water used for single or group domestic purposes does not exceed 15,000 gallons per day (per Oregon Revised Statute 537.545). Furthermore, water quality in domestic wells is not regulated. Well owners are responsible for determining whether their water meets drinking water quality standards and whether to drink it. The Oregon Department of Environmental Quality (DEQ), Oregon Health Authority (OHA), and local governments share responsibility to communicate awareness to the public and well owners about safe drinking water. Historically, the Oregon State University Extension Service has developed and shared educational materials about safe drinking water and domestic wells.



One challenge with domestic wells is that data on their location is inconsistent because many of these wells were constructed prior to state requirements for reporting. Currently, even though domestic wells do not require a water use permit, well drillers are required to record the construction of a well with OWRD and submit a well report with information on well construction details and location (with a map). Older reports typically do not have a map or location information.

Considering these limitations, OHA has estimated that there are approximately 400–500 domestic wells in the portion of the LUBGWMA within Morrow County. Larger concentrations of these wells are located near Boardman and Irrigon, where many small developments and rural residences exist. Morrow County estimates the LUBGWMA includes between 1,000 and 1,200 parcels with dwellings.

Location of Wells in Northern Morrow County within the LUBGWMA



Current Well Count	
Total Wells in Morrow County	564
Total wells identified as domestic or community	182
Total wells in the LUBGWMA	2,765

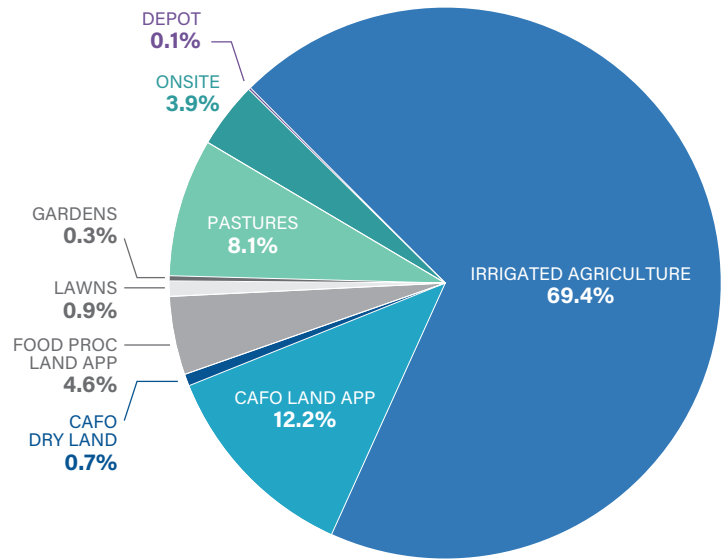
Key Issues/Impacts

Domestic well users in Morrow County face both water quantity and water quality issues. Domestic wells in Morrow County rely primarily on the alluvial aquifer and deeper basalt aquifers as water sources. From a water quantity standpoint, all the CGWAs in Morrow County continue to allow new domestic wells (exempt uses). Major groundwater level declines have occurred primarily in the deeper basalt aquifers; however, as demonstrated by groundwater levels within the Ordnance Gravel CGWA, the alluvial aquifers are also susceptible to over-pumping.

From a water quality standpoint, leaching and infiltration of contaminants from fertilizers used for agriculture or landscaping, livestock waste, failing septic tanks, small rural farms (40 acres or less), and food processing waste reuse pose a threat to groundwater. Most notably, these sources have led to elevated nitrate concentrations in some hot spots in the region. Additionally, poorly constructed or maintained wells and septic tanks on a homeowner's property or a nearby property can act as conduits for contaminants to reach groundwater.

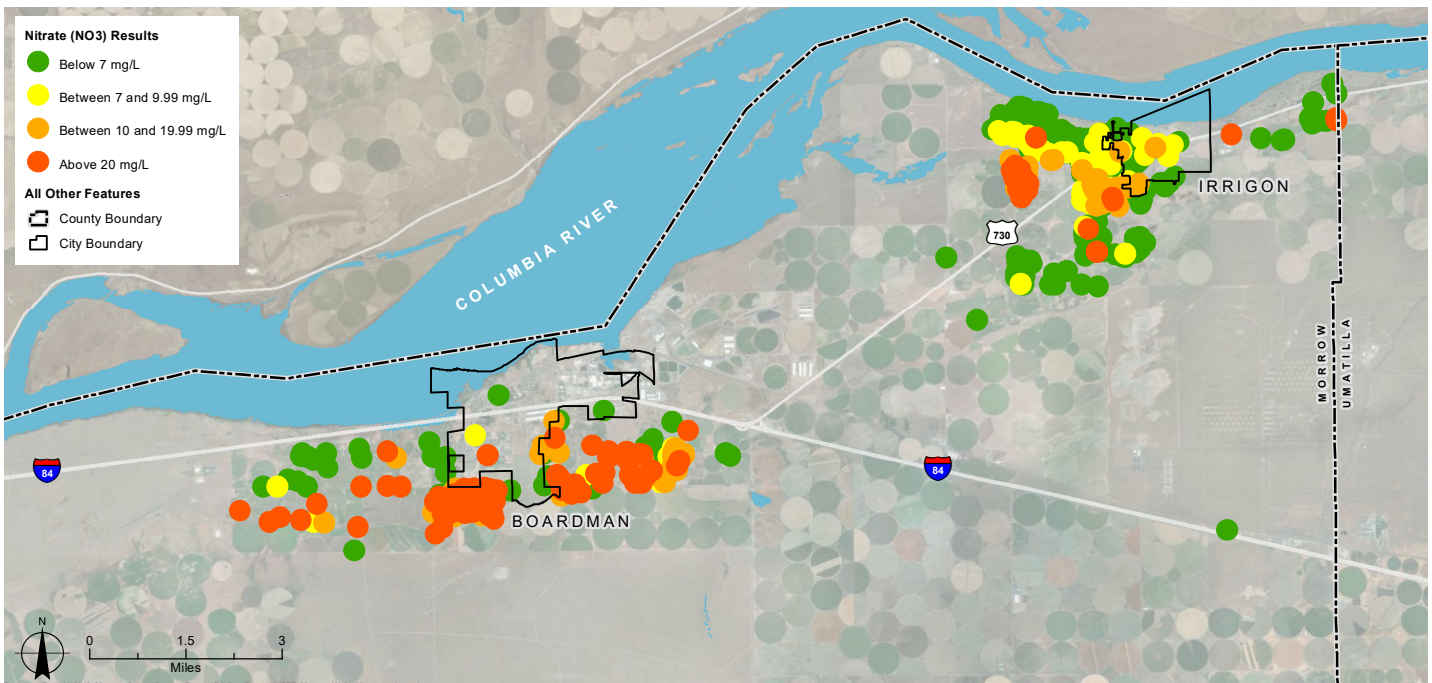
In response to high concentrations of nitrate in groundwater, DEQ declared the LUBGWMA in 1990 with the goal of reducing groundwater nitrate concentrations to below the trigger level of 7 milligrams per liter (mg/L). The LUBGWMA is overseen by the LUBGWMA Committee, which worked with DEQ to release the First Local Action Plan in 1997 and more recently the Second Local Action Plan in 2020. Both plans focused on voluntary efforts to reduce nitrate concentrations, but constraints on DEQ funding and resources resulted in a lack of action and implementation.

Estimation of Nitrogen Leached to Groundwater



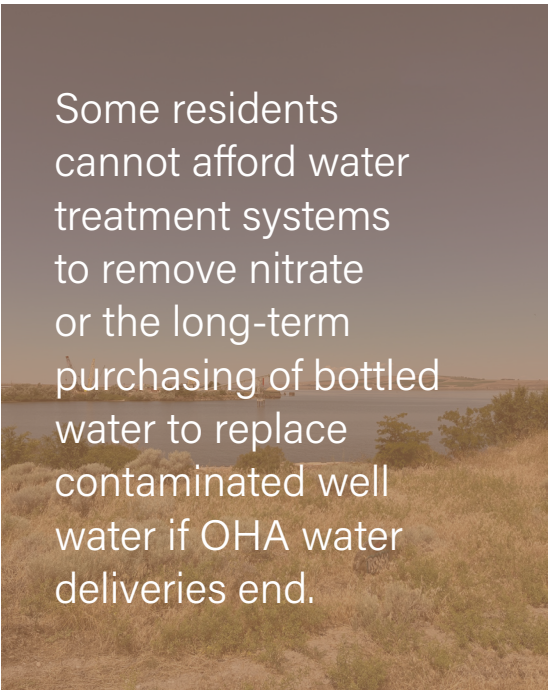
Source: Adapted from LUBGWMA Second Action Plan, 2020

Well Testing Results for Nitrate Collected by Morrow County in Summer 2022



Consequently, nitrate levels have decreased in some areas and increased in other areas in the LUBGWMA, as documented in the Second Local Action Plan. In June 2022, amidst concerns about the lack of progress and continuing health risks to domestic well users, Morrow County issued an emergency declaration to test wells and provide bottled drinking water to residents with elevated nitrate concentrations in their wells. Water deliveries have continued through a state-funded voucher program managed by OHA.

Morrow County has a relatively greater proportion of low-income residents than other parts of the state. These residents may be disproportionately affected by the nitrate issue, particularly those who cannot afford water treatment systems to remove nitrate or the long-term purchasing of bottled water to replace the use of a contaminated well if OHA water deliveries end. At the same time, Morrow County has higher annual birth rates and lower rates of health insurance than the statewide average. This is concerning because nitrate contamination poses potential health threats for infants and pregnant individuals, and residents may lack access to affordable treatment for resulting health issues.



Some residents cannot afford water treatment systems to remove nitrate or the long-term purchasing of bottled water to replace contaminated well water if OHA water deliveries end.

Select Socioeconomic Characteristics

Sources: U.S. Census Bureau, Oregon Center for Health Statistics, and PSU.

Characteristic	Oregon	Morrow County
Population	4,278,910	12,315
Median household income (2021)	\$70,084	\$61,659
Birth rate (per 1,000)	9.6	14.0
Percent of individuals without health insurance	7.3%	12.6%

Opportunities to Address Domestic Well Challenges

Stakeholders placed a greater sense of urgency on regulatory agencies and government officials after the Second Local Action Plan concluded that nitrate levels had not improved in the LUBGWMA. Various stakeholders submitted a legal petition to the U.S. Environmental Protection Agency (EPA) in January 2020 for emergency action under the Safe Drinking Water Act to address the public health issues from nitrate contamination. EPA then required DEQ to develop “minimum components” of an adequate work plan to address the immediate public health risks. As mentioned above, in June 2022, Morrow County issued an emergency declaration to test domestic wells and provide bottled drinking water to residents with elevated nitrate concentrations in their wells. Many residents were also provided reverse osmosis systems to install in their homes, but their effectiveness has been limited for wells with higher concentrations. These events in turn have motivated government officials to authorize or commit funding (in the millions of dollars) to address the public health threats to domestic well users in the near term. For example, a U.S. Congressionally Directed Spending authorization was issued to investigate connecting domestic well users to existing community water systems in Morrow and Umatilla Counties. OHA was also given funding by the state legislature to conduct domestic well testing through a state voucher program, and the Governor’s office has committed to providing additional funds to aid efforts in the region.

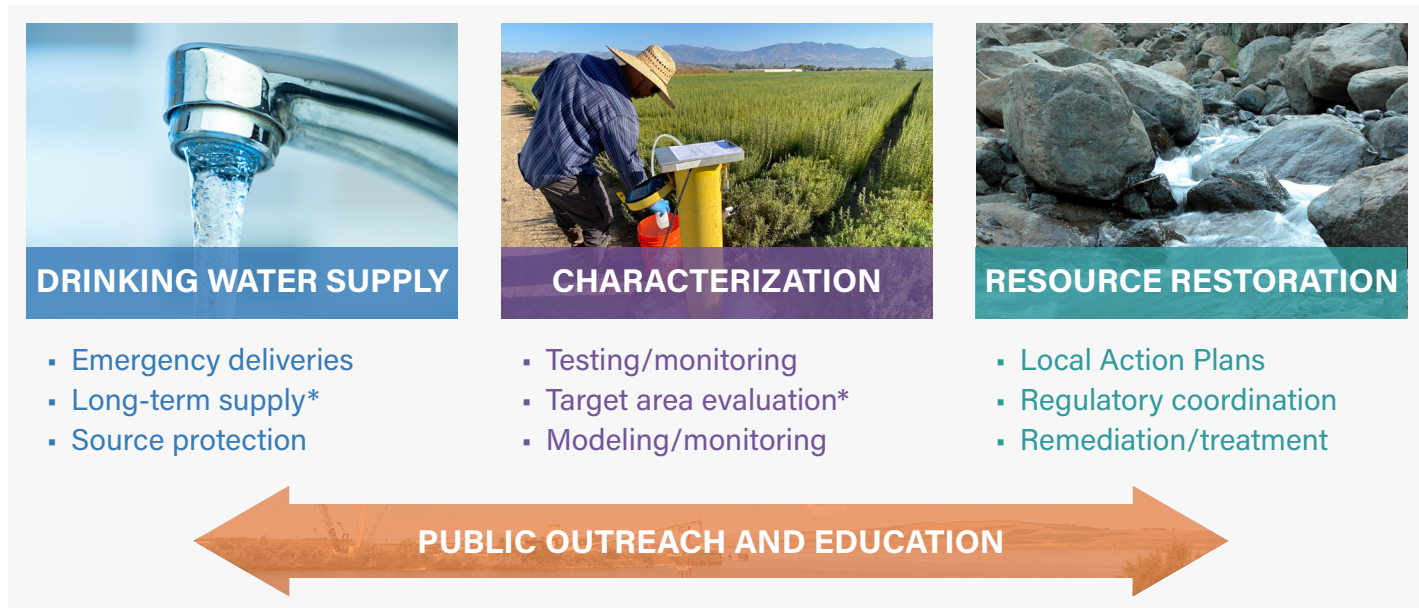
Morrow County has helped facilitate or directly lead responses stemming from these recent events. The County is now in the process of leveraging and directing funding resources to help address nitrate impacts to domestic well users. **Morrow County's objective is to prioritize use of the funding to expedite access to safe drinking water for its residents and support the restoration and protection of the groundwater resource over the long term.**

Morrow County has the opportunity to support three areas to help address the nitrate issues: (1) securing safe drinking water supply for residents; (2) characterizing conditions of nitrate impact for near-term and long-term solutions; and (3) working toward long-term restoration of the groundwater resource in the LUBGWMA. These three parts are interrelated with public outreach and education focused on domestic well users and small landowners. Federal and state funding that has already been authorized or identified will focus on supporting emergency actions, including water delivery, point-of-use treatment, and continued testing. This early funding will also be used to evaluate the feasibility and planning for alternative water supplies for domestic well users and more in-depth characterization of nitrate "hot spots" or target areas to develop the appropriate mitigation and treatment. Some of the testing and hot spot evaluation will be used to aid the long-term efforts to develop programs for groundwater restoration and source water protection. The County is not responsible for restoring the groundwater resource but can help facilitate that effort.



The groundwater quality problems in the region developed over decades and will take years and perhaps decades to fix. However, residents in the region need safe drinking water today. The urgency and focused attention on the nitrate problem in the region has been a long time coming. This is an opportunity not only to address the immediate needs, but also to plan for and facilitate long-term economical, equitable, and sustainable solutions to the nitrate problem through a collaborative approach and partnership among stakeholders and agencies.

**Involves capital investments (e.g., new wells or water treatment) where federal congressional direct spending and DEQ supplemental*
A three-part approach will be needed to help address the nitrate challenge:



environmental project funding may be applied.

This briefing paper was prepared by GSI Water Solutions, Inc., under contract with Morrow County.