

# OREGON NITRATE REDUCTION PLAN

for the Lower Umatilla Basin Groundwater Management Area

**Office of Governor Tina Kotek  
Oregon Department of Environmental Quality  
Oregon Department of Agriculture  
Oregon Water Resources Department  
Oregon Health Authority**

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## LIST OF ACRONYMS

AGWQ	Oregon Agricultural Water Quality Management Act
ATSDR	U.S. Agency for Toxic Substances and Disease Registry
AWQMS	DEQ's Ambient Water Quality Monitoring System database
AWQP	Agriculture Water Quality Program
BMP	Best Management Practices
CAFO	Confined Animal Feeding Operation
CBO	Community Based Organization
CTUIR	Confederated Tribes of the Umatilla Indian Reservation
CWA	U.S. Clean Water Act
CWSRF	Clean Water State Revolving Fund
DEQ	Oregon Department of Environmental Quality
DSL	Oregon Department of State Lands
DWS	OHA Drinking Water Services
DWSRF	Drinking Water State Revolving Fund
EPA	U.S. Environmental Protection Agency
GIS	Geographic Information System
GWMA	Groundwater Management Area
LAC	Local Advisory Committee
LPHA	Local and Tribal Public Health Authorities
LUBGWMA	Lower Umatilla Basin Groundwater Management Area
MCL	Maximum Contaminant Level
mg/L	Milligrams Per Liter
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NMP	Nutrient Management Plan
NON/POC	Notice of Noncompliance and Plan of Correction
NPDES	National Pollutant Discharge Elimination System permit
NSF/ANSI	National Sanitation Foundation/American National Standards Institute
OAR	Oregon Administrative Rule
ODA	Oregon Department of Agriculture
ODHS	Oregon Department of Human Services
OHA	Oregon Health Authority
ORS	Oregon Revised Statute
OSU	Oregon State University
OVS	Oregon Very Small Systems (drinking water)
OWRD	Oregon Water Resources Department
PWS	Public Water System
RAC	Rules Advisory Committee
REALD	Race, Ethnicity, Language and Disability

RFP	Request for Proposals
SB 85	Senate Bill 85
SDWA	Safe Drinking Water Act
SIA	Strategic Implementation Area
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
UGB	Urban Growth Boundary
WPCF	Water Pollution Control Facilities permit



# 1. EXECUTIVE SUMMARY

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The State of Oregon is committed to reducing nitrate contamination in groundwater to protect the health of people who reside in the Lower Umatilla Basin Groundwater Management Area (LUBGWMA) because high levels of nitrate in drinking water pose a serious health threat, particularly to formula-fed infants and pregnant people. The area includes parts of northern Morrow and northwestern Umatilla counties.

This Nitrate Reduction Plan outlines an unprecedented collaborative effort that spans four state agencies working in cooperation with the U.S. Environmental Protection Agency (EPA), the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), Morrow County, Umatilla County, city governments, businesses, residents and community groups. The State of Oregon is dedicated to rigorously evaluating the effectiveness of these efforts, continuously monitoring progress, and adjusting strategies as needed to ensure lasting results.

Oregon's public health agency, the Oregon Health Authority (OHA), has been charged with developing a plan to ensure that all residents in the LUBGWMA are aware of and able to access immediate, free testing (and retesting) of their private drinking water wells and subsequent water delivery or treatment installations. Oregon's natural resource state agencies: the Department of Environmental Quality (DEQ), the Department of Agriculture (ODA), and the Water Resources Department (OWRD) are working in collaboration to identify and implement key strategies to reduce groundwater nitrate concentrations to less than 7 mg/L.

Given the complexity of the problem, the plan will be continuously refined and adjusted based on ongoing data collection and analysis, ensuring that the state's approach remains responsive to the evolving needs of the LUBGWMA community. By closely monitoring these indicators, Oregon will be better equipped to make informed decisions, prioritize resources, and achieve the goal of reducing nitrate contamination in groundwater to protect public health and the environment.

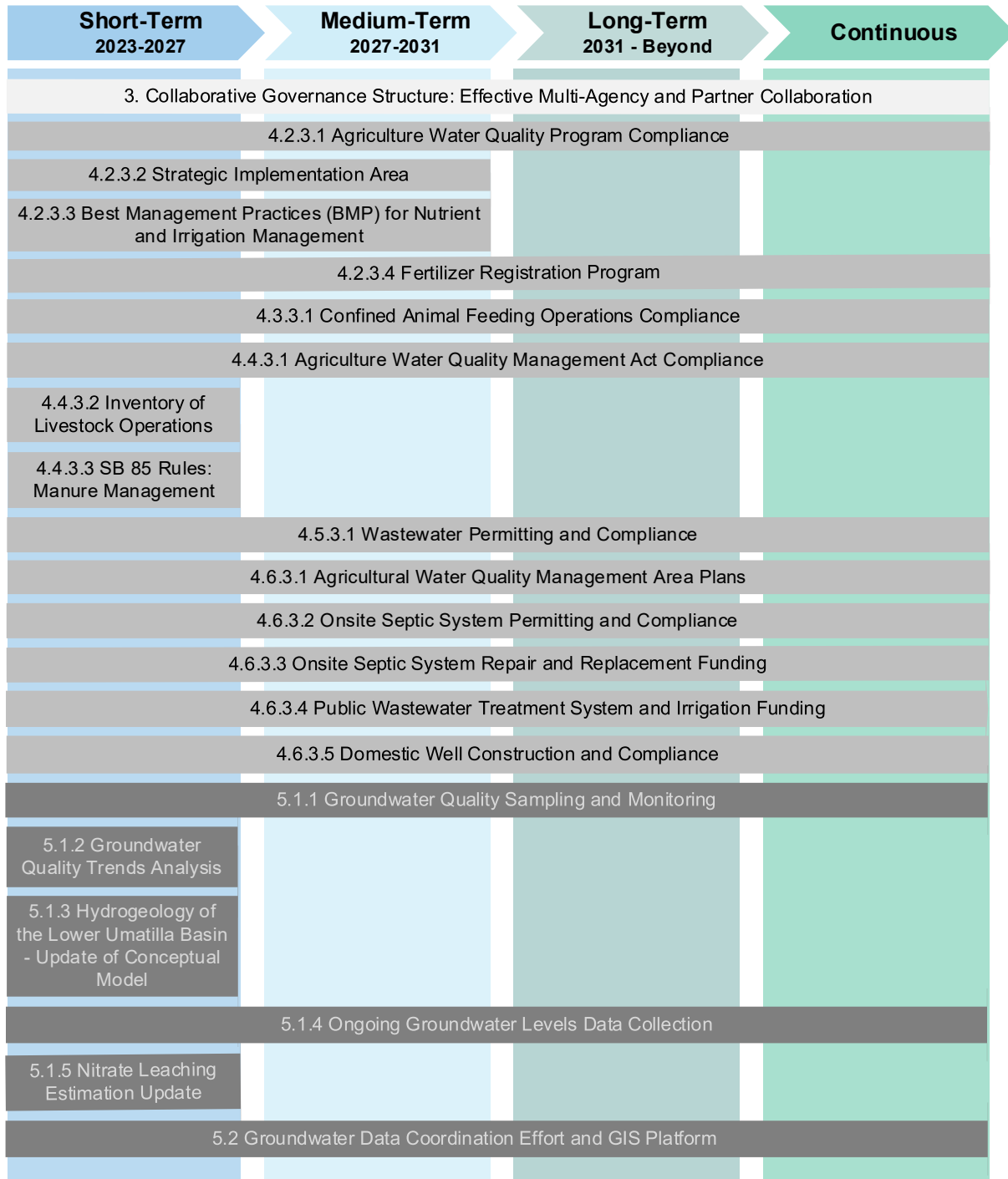
As the state embarks on this effort of collaboration, it is important to emphasize that this is a complex problem with no simple or quick solutions. Nitrate contamination is a problem for rural communities across Oregon and the entire nation. The most common sources of nitrate contamination are agricultural fertilizer, manure, septic systems, and wastewater that travels through soil and into groundwater.

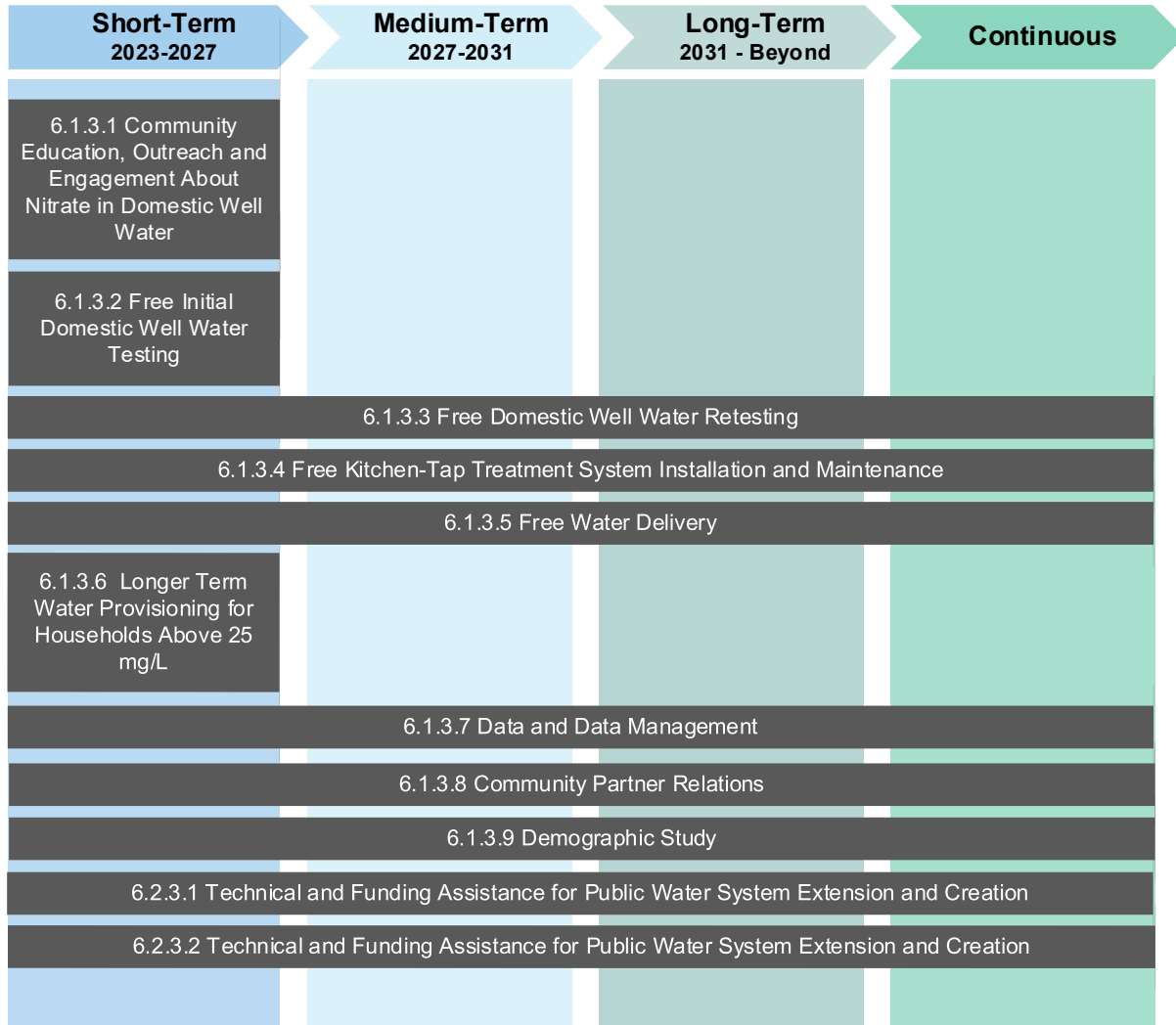
Cleaning up the area's groundwater nitrate contamination will take decades. The most effective and feasible way to clean up groundwater contamination of this scale is to control the sources of pollutants so that, over time, clean water cycles into the groundwater system, diluting and eventually replacing contaminated water.

To ensure continuous progress, it is crucial to identify funding sources to expand the capacity needed to implement the plan effectively and gather new data to inform and

refine it. To maintain transparency and accountability, the State of Oregon will produce an annual report detailing the progress of these efforts, guided by the metrics established to measure success.

The figure below summarizes the agency activities discussed throughout this plan. The number represents the section number for each strategy. The shades of gray represent section 3, 4, 5, or 6. A more detailed collection of agency activities is in section 7.

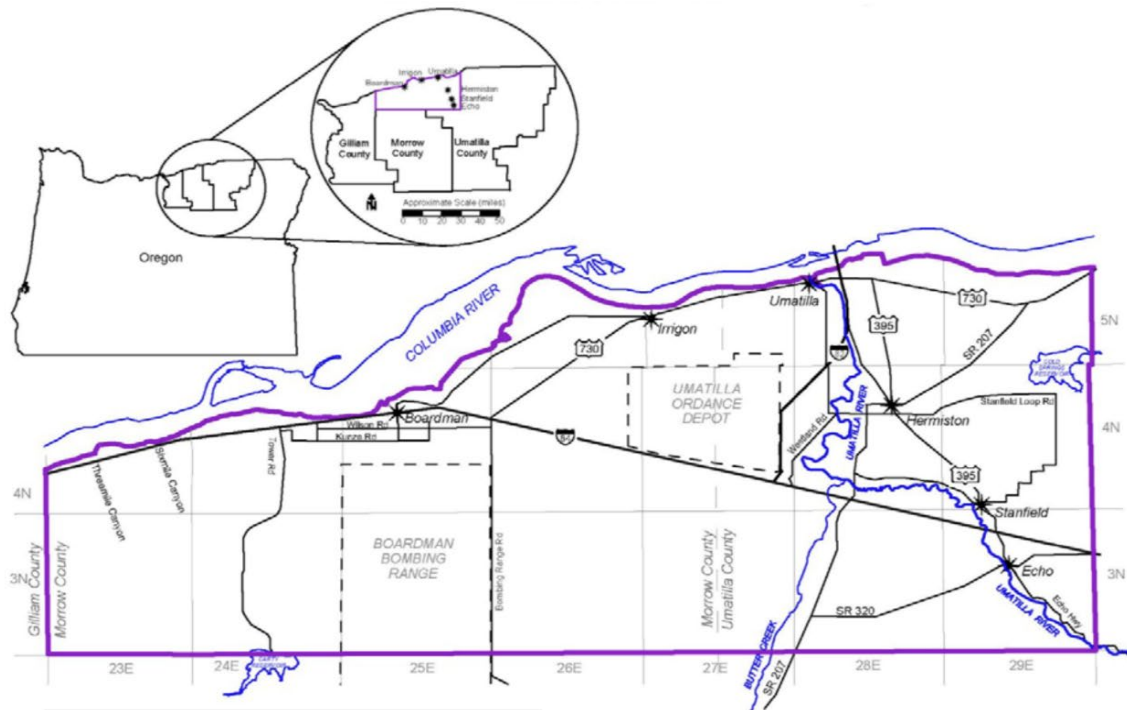




## 2. INTRODUCTION

### 2.1 Background on Nitrate Contamination and Groundwater Management Area Designation

The Lower Umatilla Basin Groundwater Management Area, or LUBGWMA, is about 550 square miles in northern Morrow and northwestern Umatilla counties that includes the communities of Hermiston, Boardman, Irrigon, Stanfield, Echo, and surrounding areas. The state has documented nitrate groundwater contamination in the area since 1990.



*Figure 1.* Location and boundaries of the Lower Umatilla Basin Groundwater Management Area.

Nitrate is a common groundwater pollutant in many areas throughout the state and country. The most common sources of nitrate contamination are agricultural fertilizer, manure, septic systems, and wastewater that travels through sediment and into groundwater. High levels of nitrate in drinking water can cause serious health effects and is particularly dangerous for formula-fed infants and pregnant women. People who drink water from private wells are the ones at risk. While water from public water systems is regularly tested and required to meet drinking water standards, private wells are not regulated. Under both federal and state law, private well users are generally responsible for monitoring their well water and ensuring it is safe to drink. The Oregon

Health Authority (OHA) recommends that private well users regularly test for nitrate, bacteria, and arsenic, all of which are common pollutants in Oregon.

Four state agencies implement most federal and state programs relating to groundwater and drinking water in Oregon: the Oregon Health Authority (OHA), Oregon Department of Environmental Quality (DEQ), Oregon Department of Agriculture (ODA), and the Oregon Water Resources Department (OWRD). For more information about their roles and responsibilities, refer to the Collaborative Governance Structure section.

In accordance with Oregon's Groundwater Quality Protection Act of 1989, DEQ declared the Lower Umatilla Basin a Groundwater Management Area in 1990. This declaration was made because regional nitrate concentrations exceeded 7 milligrams per liter (mg/L), which is 70 percent of the federal safe drinking water level of 10 mg/L. Following the declaration, an interagency group formed and conducted a hydrogeological investigation to determine the extent and potential sources of contamination. The investigation identified sources of excess nitrate in groundwater including agricultural fertilizers, animal waste, industrial food processing wastewater, onsite septic systems, lawns, and gardens.

Per Oregon statute, DEQ, in consultation with other appropriate state agencies, appointed a local committee composed of at least seven members representing a balance of interests in the area affected by the Groundwater Management Area declaration. The committee advises state agencies regarding local elements of an action plan ([ORS 468B.179-183](#)). For more information about the LUBGWMA Committee, refer to the Collaborative Governance Structure section of this document and visit <https://lubgwma.org>.

## 2.2 Land Use in the LUBGWMA

Land use within the LUBGWMA includes agricultural, industrial, commercial, and residential uses. In addition to the Columbia River, the area contains several major transportation corridors including the Union Pacific Railroad, Interstate Highways 84 and 82, and US 730 and US 395. The area is also intersected by major energy transmission lines associated with hydroelectric, wind, solar, and natural gas power production. Furthermore, irrigation delivery systems from irrigation districts are also present in the area. This infrastructure has led to major growth and changes in agriculture, along with industrial and energy development, which in turn has led to both urban and rural residential expansion.

## Agriculture

Agriculture is a major player, both in terms of footprint and economics, within the LUBGWMA. In terms of the production value, both Morrow and Umatilla counties are significant agricultural producers in Oregon. According to the 2017 USDA Economic Research Service Oregon Fact Sheet Morrow County is ranked as the second most productive agricultural county in Oregon, followed by Umatilla County in fourth place. Historically, wheat and cattle production dominated the area's agricultural production.

Approximately 83.5% of the LUBGWMA (300,448 acres) is protected under the Oregon Planning Program's Goal 3 Agricultural Lands, which designates these areas with exclusive farm use zoning. Additionally, small-scale agriculture is present in areas associated with rural residential development.

With delivery of water to the area, high-value crop production has developed in a corridor starting at the Heppner Highway (Hwy. 74) in the west, extending along the Columbia River and I-84 to an area east of the cities of Hermiston, Stanfield, and Echo. Most of the agriculture-related irrigation in this region was established prior to 1982. The majority of this irrigated agricultural landscape is within the boundaries of the LUBGWMA.

Irrigation practices have evolved and are now dominated by pivot irrigation (quarter to full sections), replacing some historical practices such as flood irrigation and wheel lines used in the 1970s and 1980s. During a period when hybrid poplar trees were grown south of I-84 between Boardman and Hermiston, drip irrigation was used on over 30,000 acres. However, this area has since converted to pivot irrigation due to a change in crops.

Since 1992, irrigated acres have expanded by about 10 percent. Approximately 32,983 acres of additional irrigated agricultural land has been established within the LUBGWMA, primarily between the north end of Towers Road and the Boardman Bombing Range (see Figure 1).

Agriculture within the LUBGWMA is diverse but primarily dominated by vegetable crops. The area offers some of the best conditions in the world for producing vegetable root crops due to its sandy loam soils, favorable terrain, climate and well-developed water availability infrastructure. Other essential agricultural infrastructure, such as fuel needs, transportation, and labor are also well established.

Major root crops grown in the area include potatoes, onions, and carrots. Additionally, the area produces seed crops, wheat, sweet corn, corn for silage, blueberries, melons, livestock, and hay. Since the Tillamook Creamery established its location at the Port of

Morrow in 2001, dairy production has increased significantly. Several “state-of-the-art” dairies have been established, sending milk to the Tillamook plant at the POM. For more information about dairy production and Confined Animal Feeding Operations (CAFOs) in the area, refer to the relevant section of this report. Small acreage farms, often associated with rural residential development, continue to use flood irrigation, static sprinklers, and wheel line practices.

## **Urban Development**

There are six cities located within the LUBGWMA. These include Hermiston, Boardman, Umatilla, Stanfield, Irrigon, and Echo. The land area within these six urban growth areas totals approximately 22,926 acres, which is 6.4% of the total LUBGWMA land area. Since 1990, each of these cities have experienced good to substantial growth in population (see section on population demographics for more information). Each city has an established urban growth boundary (UGB) and appears to have available land within their boundaries for future residential and economic growth. Large areas of unincorporated land are also present within the urban growth boundaries of these LUBGWMA cities.

The dramatic growth of urban areas within the LUBGWMA has been primarily driven by the development of industrial uses. Key infrastructure supporting industrial development in the region includes transportation, energy, and urban services like sewer and water systems. Major industries with established operations in the area include food processing, data centers, distribution and warehousing centers, and energy production. Several of these large industrial operations are significant water users and require major wastewater disposal efforts. Industrial lands are located both within and outside of the established UGBs.

## **Rural Residential and Commercial/Industrial Development**

Rural residential development in the LUBGWMA is primarily located in areas that were first platted and developed before the establishment of the Oregon Land Use Planning Program. Many of these rural residential areas support higher densities than would likely have been authorized under the current planning program. Much of the development relies on individual drinking water wells and outdated or inadequate septic systems. These “small acreage homesites” often involve agricultural practices that are not considered to be commercial farm use under water quality, tax, and land uses laws. In both counties, lands zoned for residential total approximately 9,133 acres. There are also some areas within the urban areas currently zoned similarly to rural residential zoning.

It is also important to note two large land use areas within the LUBGWMA. First is the U.S. Navy Boardman Bombing Range, which spans approximately 47,000 acres and is an active military training facility in Morrow County, south of Boardman. Large areas of irrigated agriculture are located to the east and west of the range. The second is the former U.S. Army Umatilla Chemical Depot (Umatilla Depot), covering approximately 20,000 acres. This site has been decommissioned and transferred to the Columbia Development Authority. Redevelopment plans for the area include future commercial and industrial development, with large portions also designated for wildlife habitat.

## **Morrow County**

In Morrow County, rural residential development is concentrated in two main areas. The first is a strip along US 730, running east from the Irrigon urban area and connecting with development near the City of Umatilla. The second area is located adjacent to the UGBs of each city, in large blocks located to the west and the south. These two areas are characterized by relatively higher residential densities associated with a great degree of parcelization. There are also “rural residential” areas located within unincorporated regions inside the UGB.

Within the Boardman area, a large block of higher-density, rural residential development is found outside the city but inside the UGB. This block is located adjacent to the southern municipal boundary line and north of the West Extension Irrigation Canal. Additionally, larger lot rural residential and small-scale farm uses are found in rural residential zoned areas south of I-84, along the western UGB, and to the southeast of the city between I-84 and the irrigation canal. The Boardman area also includes large blocks of industrially zoned lands located outside the Boardman UGB.

## **Umatilla County**

Substantial rural residential development occurs around and adjacent to Hermiston. The largest area is located to the northeast, straddling Highway 207. Other large blocks are located north of and adjacent to Hermiston, straddling US Highway 395. Additionally, two large blocks of rural residential development are located southwest and west of Hermiston. A corridor of rural residential development also extends west from the City of Umatilla along US 730, connecting with a similar rural residential area located in Morrow County.

All four Umatilla County cities – Echo, Stanfield, Hermiston, and Umatilla – contain large areas of unincorporated lands within their UGBs. The UGBs of Echo, Stanfield, and Hermiston merge together to form an urban corridor along US 395. Including industrially zoned land in rural areas to the north of Hermiston, this corridor of “urban” land extends from the City of Echo along US 395 to the Columbia River.



In addition, three large blocks of industrial land are also located outside the UGBs. These include lands straddling US 395 between Umatilla and Hermiston, lands north of and paralleling the Umatilla River, and a large area located north and east of the junction of I-84 and I-82.

### 2.3 Change in Irrigated Acreage Over Time

OWRD has calculated irrigation acreage changes in LUBGWMA since its designation in 1990. The results show that total irrigated acres have increased by over 30,000 acres since that time. Using mapped agricultural fields within the LUBGWMA, the summaries of total acreage from 1990 to 2021, as well as an average from 2017 to 2021 have been calculated. The table below details the sources of irrigation, with most of the increase coming from surface water sources.

*Table 1. Change in irrigated acres by source from 1990 – 2021.*

<b>Irrigation Source Type</b>	<b>1990 Acres</b>	<b>2000 Acres</b>	<b>2010 Acres</b>	<b>2017 Acres</b>	<b>2021 Acres</b>	<b>2017-21 Avg Acres</b>
Groundwater	10,177	11,436	11,146	11,202	10,603	10,936
Surface water	80,315	95,976	97,436	102,846	102,085	102,603
Ground and surface water	32,617	38,298	39,688	42,766	42,240	42,615
None	5,544	6,114	5,793	6,437	6,707	6,643
<b>All</b>	<b>128,652</b>	<b>151,824</b>	<b>154,063</b>	<b>163,250</b>	<b>161,635</b>	<b>162,798</b>

### 2.4 Population Demographics

Table 2 below presents demographic information about residents of the LUBGWMA who are expected to depend on domestic wells for their drinking water. OHA developed this information using the U.S. Census Bureau’s 2021 American Community Survey data at the block group or census tract levels. For some statistics, OHA was able to extrapolate populations that depend on domestic wells by excluding block groups within the LUBGWMA served by public water systems. For other statistics available only at the larger census tract level (denoted by shading in Table 2 below), OHA was not able to extrapolate the populations served by domestic wells versus those served by public water systems.

The demographic information highlighted in the data is particularly relevant for

assessing health risks associated with nitrate exposure in drinking water, focusing on factors such as age, gender, poverty, race, and ethnicity, which are associated with inequitable health outcomes.

The significant findings comparing the populations in the LUBGWMA likely to be served by domestic wells to the population of Oregon as a whole are:

- Infants under age one: the proportion of infants under the age of one who are highly likely to be in well-dependent households are marginally higher in the LUBGWMA.
- Women of childbearing age are represented in proportions similar to residents of Oregon overall.
- Homeowners vs renters: LUBGWMA residents are less likely to be renters and more likely to be homeowners than residents of Oregon overall.
- Hispanic/Latino population: A higher proportion of residents identify as Hispanic/Latino than the Oregon population as a whole.

The data related to income and language are available only at the larger census tract level and are reported for the LUBGWMA as a whole (i.e., the data include households served by domestic wells and those served by public water systems). A review of this data shows notable differences for cross-LUBGWMA populations compared to Oregon as a whole:

- Poverty: a slightly higher proportion of LUBGWMA residents experience poverty compared to Oregon as a whole. This is defined as those earning less than 200% of the 2021 federal poverty level of \$26,500 for a family of four (i.e., less than \$53,000).
- Language: A higher proportion of residents in the LUBGWMA speak Spanish at home and speak English less than "very well."

These data are shaded in Table 2 to denote their distinct source and relevance to the entire LUBGWMA. The socioeconomic and linguistic characteristics are associated with increased health risks and reduced access to resources, and have informed OHA's community outreach and education strategies, such as the provision of all materials in Spanish and English, and development of specialized communications (e.g., infographics, videos in a Mesoamerican language).

**Table 2. Comparisons of demographic variables and proportion of population across LUBGWMA block groups, Morrow and Umatilla Counties, and Oregon.**

Table 2. Comparisons of demographic variables and proportion of likely well-dependent population across LUBGWMA block groups, Morrow and Umatilla Counties, and Oregon.				
<b>Demographic Variable</b>	<b>LUBGWMA n (%)</b>	<b>Morrow County n (%)</b>	<b>Umatilla County n (%)</b>	<b>Oregon n (%)</b>
Total population	30,367 (–)	11,964 (–)	79,509 (–)	4,207,177 (–)
<b>Residents in Priority Age Groups</b>				
<i>Children &lt; 1<sup>a</sup></i>	348 (1.1%)	159 (1.3%)	864 (1.1%)	39,662 (1.0%)
<i>Females 15 - 44</i>	5,978 (19.7%)	2,270 (19.0%)	14,382 (18.1%)	826,615 (19.7%)
<b>Housing Characteristics</b>				
<i>Renter-Occupied Housing Units</i>	2,113 (21.8%)	1,146 (28.1%)	8,964 (33.2%)	610,926 (36.8%)
<i>Owner-Occupied Housing Units</i>	7,560 (78.2%)	2,939 (71.9%)	18,048 (66.8%)	1,047,165 (63.2%)
<b>Poverty and Income</b>				
<i>Individuals Living &lt;200% FPL<sup>b</sup></i>	18,229 (29.6R%)	4,719 (39.4%)	26,857 (33.8%)	1,183,371 (28.1%)
<i>Median household income<sup>b</sup></i>	\$63,262 (–)	\$61,745 (–)	\$66,644 (–)	\$69,356 (–)
<b>Race</b>				
<i>White</i>	24,466 (80.6%)	9,039 (75.6%)	63,203 (79.5%)	3,394,838 (80.7%)
<i>Black or African American</i>	248 (0.8%)	68 (0.6%)	763 (1.0%)	77,913 (1.9%)
<i>American Indian or Alaskan Native</i>	112 (0.4%)	136 (1.1%)	2,591 (3.3%)	46,075 (1.1%)
<i>Asian</i>	464 (1.5%)	77 (0.6%)	676 (1.0%)	186,724 (4.4%)
<i>Native Hawaiian or Pacific Islander</i>	41 (0.1%)	50 (0.4%)	91 (0.1%)	17,272 (0.4%)
<i>Other</i>	2,235 (7.4%)	946 (7.9%)	5,777 (7.3%)	158,743 (3.8%)
<i>Two or More</i>	2,801 (9.2%)	1,648 (13.8%)	6,408 (8.1%)	325,612 (7.7%)
<b>Ethnicity</b>				
<i>Hispanic/Latino</i>	9,389 (30.9%)	4,525 (37.8%)	22,084 (27.8%)	570,511 (13.6%)
<i>Non-Hispanic/Latino</i>	26,046 (69.1%)	7,439 (62.2%)	57,425 (72.2%)	3,636,666 (86.4%)
<b>Language</b>				
<i>Speak Spanish at home and speak English less than “very well”<sup>b</sup></i>	6,229 (12.8%)	1,594 (13.3%)	5,988 (7.5%)	126,370 (3.0%)

Unless noted below, all data sourced from 2021 American Community Survey (ACS) at Block Group Level. Given the geographic overlap of block groups and public water system boundaries, these data are the best estimates available, but inevitably overestimate the population expected to depend on domestic wells.

<sup>a</sup> Data source: 2020 Decennial U.S. Census.

<sup>b</sup> *Data Source: 2021 American Community Survey (ACS) at Census Tract Level. Given the geographic overlap of census tracts and public water system boundaries, these data represent all residents of the LUBGWMA (i.e., both those that are expected to depend on domestic wells and those served by public water systems).*

*General note: For context, the LUBGWMA boundary fits roughly within 10 tracts, with an approximate average of 5,258 people in each tract. The primarily well-dependent population in the LUBGWMA falls roughly within 20 block groups with an average of 1,518 people in each block group. Some census tracts and block groups extend beyond the LUBGWMA boundary.*

### 3. COLLABORATIVE GOVERNANCE STRUCTURE

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Effective collaboration across multiple state agencies, counties, cities, federal agencies, tribal government, and other partners is fundamental to reducing nitrate concentrations in the LUBGWMA.

The Oregon Groundwater Quality Protection Act establishes part of the process for collaborative governance in designating a Groundwater Management Area. Four state agencies—DEQ, ODA, OWRD, and OHA—collectively have regulatory authority over water quality and quantity issues in Oregon. One agency, OHA, has regulatory authority and plays a financing role related to public water system drinking water safety. OHA also plays a non-regulatory role related to domestic well safety. In addition, Morrow and Umatilla County governments have responsibilities for land use planning, residential septic system permitting, and local public health.

The entities play distinct but complementary roles related to nitrate reduction and safe drinking water. Because of this division of labor, they must work together to manage complexities, implement procedures to sustain nitrate reduction in groundwater, protect public health in the immediate and intermediate term, and continue to adapt to be effective in the long term. To that end, the agencies will work to formalize this collaboration, ensuring transparency and accountability.

#### 3.1 State Agencies

##### 3.1.1 Oregon Department of Environmental Quality (DEQ)

The Oregon Department of Environmental Quality is the primary regulatory agency for wastewater management and has responsibilities in collaboration with other agencies for groundwater monitoring and protection. This includes issuing and enforcing water quality permits for industrial and municipal wastewater treatment facilities (including food processing wastewater and biosolids application); groundwater quality data collection and analysis; being the designating agency for Groundwater Management Areas; appointing the groundwater management committee in consultation with other appropriate state agencies; and reviewing and accepting or remanding the local action plan back to the lead agency for further work. DEQ also has authority for onsite septic system permitting, although Umatilla County Public Health is DEQ's authorized agent for administering the residential septic system program in Morrow and Umatilla counties.

### 3.1.2 Oregon Department of Agriculture (ODA)

The Oregon Department of Agriculture is the primary regulatory agency for agricultural activities. This includes fertilizer product registration; issuing and enforcing water quality permits for CAFOs; enforcing agricultural water quality rule compliance for nonpoint source irrigated agriculture and area plans; and support and coordination for Soil and Water Conservation Districts.

### 3.1.3 Oregon Water Resources Department (OWRD)

The Oregon Water Resources Department is the state agency charged with administration of laws governing the allocation of surface water and groundwater resources. This includes collecting, analyzing, and providing data, distributing water under the system of prior appropriation, processing water rights transactions, protecting public safety, and providing planning, technical assistance, and funding to address water supply needs. Additionally, OWRD manages a well construction program to ensure wells meet current construction standards.

### 3.1.4 Oregon Health Authority (OHA)

The Oregon Health Authority is the primary regulatory agency for more than 2,500 public water systems in the state required to meet federal Safe Drinking Water Act standards or state laws regulating very small community water systems not subject to federal rules. OHA assists public water systems and communities with protecting their sources of drinking water (streams, lakes, and aquifers) from contamination through a partnership between OHA and DEQ. OHA also houses a non-regulatory Domestic Well Safety Program (DWSP) that conducts outreach and education to domestic well owners and partners with local health departments and other state agencies to assess and manage risks associated with private wells and promote domestic well safety. DWSP has also been called upon to respond to domestic well-related crises with direct aid to well owners, standing up programs for free testing of fire-impacted domestic wells after the 2020 Labor Day Fires and the LUBGWMA safe water services program described in detail below. The state's Domestic Well Testing Act (Oregon Revised Statutes 448.271) adopted in 1989 requires property sellers to test domestic wells for nitrate, *E. coli*, and arsenic, and provide results to buyers and OHA within 90 days of sale. DWSP houses this data and shares it with DEQ. However, the statute has no enforcement mechanism, and laboratory owners report anecdotally that OHA is receiving only a small percentage of these "real estate package" test results.

## Oregon State and County Government Roles and Responsibilities in LUBGWMA

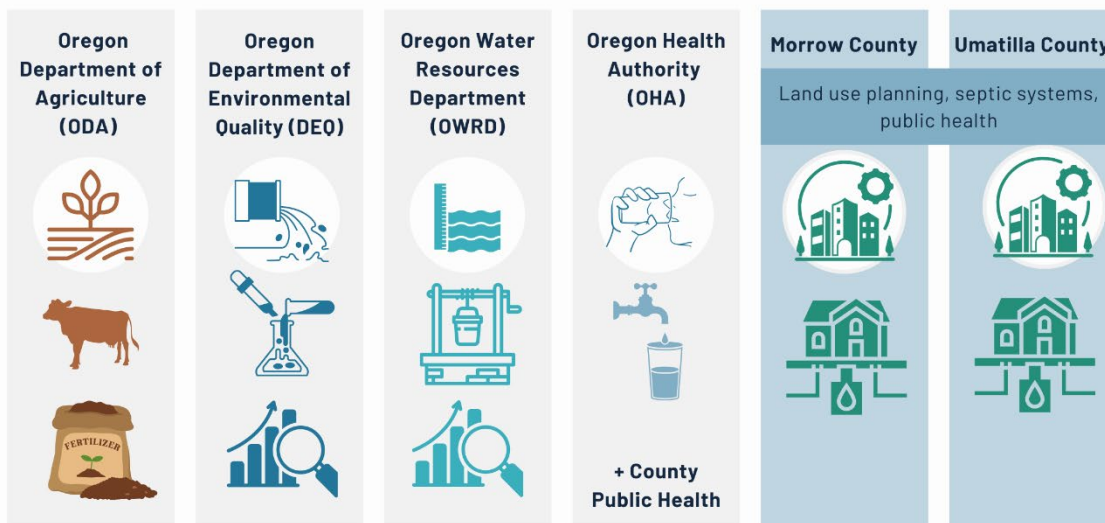


Figure 2. State and County Government Roles and Responsibilities in the LUBGWMA.

### 3.2 Interagency Agreement

The state agencies will be working to formalize their collaboration on the nitrate reduction plan in the LUBGWMA. This process will involve clearly defining and codifying each agency’s roles and responsibilities. The goal is to ensure transparency and accountability both for agencies and for the public.

### 3.3 County and City Governments

Morrow and Umatilla County governments have responsibilities related to land use planning, residential septic system permitting, and local public health. The cities that manage public water systems are responsible for water treatment to ensure their systems deliver safe drinking water to the customers that are connected to those systems by complying with federal and state drinking water standards, including those setting maximum allowable levels of nitrate and other contaminants.

### 3.3 Confederated Tribes of the Umatilla Indian Reservation (CTUIR)

The CTUIR is a federally recognized tribe headquartered in Umatilla County. Their 1855 Treaty with the U.S. Government reserves perpetual off-reservation rights to fish at usual and accustomed sites and to hunt, gather, and pasture livestock on

unclaimed lands. They ceded 6.4 million acres (including the Lower Umatilla Basin) to the federal government. The CTUIR Department of Natural Resources mission is to protect, restore, and enhance the First Foods—which includes water—for the perpetual cultural, economic, and sovereign benefit of the CTUIR. The Water Resources Program works to ensure that ground and surface waters are available to satisfy CTUIR treaty rights, the needs of CTUIR members, and the citizens of the Umatilla Indian Reservation. The First Foods Program provides proactive planning and policy analysis and development to protect, restore and enhance the First Foods and the exercise of associated rights reserved in the Treaty of 1855.

### 3.4 U.S. Environmental Protection Agency (EPA)

The U.S. EPA sets national standards for drinking water under the authority outlined in the Safe Drinking Water Act (SDWA), which includes requirements that apply to public drinking water systems. EPA defines a public drinking water system as: “A public water system provides water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year. A public water system may be publicly or privately owned.” Additionally, the EPA is charged with protecting and restoring the nation’s surface waterways under the Clean Water Act (CWA). The Clean Water Act provides requirements and protections for surface water but does not address groundwater. Protections for groundwater in Oregon are generally covered under state law, not federal law. (Note: Oregon laws also regulate smaller public water systems that are not subject to federal law.) Under both of these Acts, EPA also serves as the oversight authority for states’ implementation of these federal statutes.

### 3.5 Lower Umatilla Basin Ground Water Management Area Committee

The LUBGWMA Committee is an advisory committee to the state agencies (DEQ, ODA, and OWRD) focused on addressing environmental aspects of groundwater quality at the local level. The committee does not handle matters related to domestic well safety and public health. However, OHA monitors the committee’s work concerning groundwater sources for public water systems and makes its drinking water quality data available to the committee.

#### 3.5.1 Community representation

Per Oregon statute, DEQ, in consultation with other appropriate state agencies, appoints a groundwater management committee composed of at least seven members. The members must represent a balance of interests within the area affected by the declaration (ORS 468B.179 and 468B.182).



A local committee has been in place for the LUBGWMA since the 1990s. In 2022, DEQ worked with Morrow and Umatilla counties to restructure and establish specific membership categories for the LUBGWMA Committee. Membership categories include county, city, and tribal governments, environmental community groups, the general public (two seats), science and research, the food processing industry, irrigated agriculture industry, and the livestock/dairy/CAFO industry.

In spring 2024, state agencies contracted with Oregon Consensus, the state's public policy alternative dispute resolution program, to conduct an independent assessment aimed at improving collaboration among committee members and state agencies. This assessment is currently underway as of July 2024. Likely outcomes include recommendations for a professional third-party facilitator and collaborative governance structure for entities with jurisdiction in the area. Committee meetings are open to the public.

### 3.5.2 Action Plans

The LUBGWMA Committee finalized its first action plan in 1997 and its second action plan in 2020. The LUBGWMA Committee Second Action Plan is a local implementation plan to reduce groundwater nitrate concentrations to less than 7 milligrams per liter (mg/L). The purpose is to identify and encourage voluntary actions that will reduce the nitrate concentrations to complement DEQ and ODA issued water quality permits for point sources.

The Second Action Plan categorized sources and solutions into six categories. Many of its recommendations are currently being addressed through ongoing programs and efforts, including: DEQ's wastewater permitting program, ODA's CAFO program, ODA's water quality program via Area Plans, ODA grant funding (crop and sprinkler inventory), and ODA's new LUBGWMA Strategic Implementation Area (SIA).

### 3. Collaborative Governance Structure: Effective Multi-Agency and Partner Collaboration

OBJECTIVE: Effective collaboration across multiple state agencies, counties, cities, federal agencies, tribal government, and other partners to reduce nitrate concentrations in the LUBGWMA.

#### Continuous

- Work collaboratively across multiple state agencies, counties, cities, federal agencies, tribal government, and other partners to make progress toward reducing nitrate concentrations in the LUBGWMA.

#### Short-Term 2023-2027

- Process assessment: In spring 2024, state agencies contracted Oregon Consensus (the state's public policy alternative dispute resolution program) to conduct an independent assessment and gather process suggestions about how to enhance collaboration effectiveness among committee members and state agencies. This assessment is currently underway as of July 2024. Likely outcomes include recommendations for a professional third-party facilitator and collaborative governance structure for entities with jurisdiction in the area.

- Interagency agreement (MOU) - The state agencies will be working to formalize their collaboration on the nitrate reduction plan in the LUBGWMA to codify roles and responsibilities and demonstrate transparency and accountability for agencies and the public.

## 4. NITRATE SOURCES AND LONG-TERM REDUCTION STRATEGIES

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### 4.1 Overview of Nitrate Reduction Strategy

Nitrate groundwater contamination is a complex problem with no simple or quick solutions. Cleaning up the area's groundwater nitrate contamination will take decades. Once contamination gets into groundwater, it remains for a long time and is difficult to remove. The most effective and feasible approach to managing widespread groundwater contamination, such as that in the LUBGWMA, is to control and reduce the sources of pollutants. Over time, this will allow clean water to gradually enter the groundwater system, dilute the contaminated water, and eventually replace it with cleaner water.

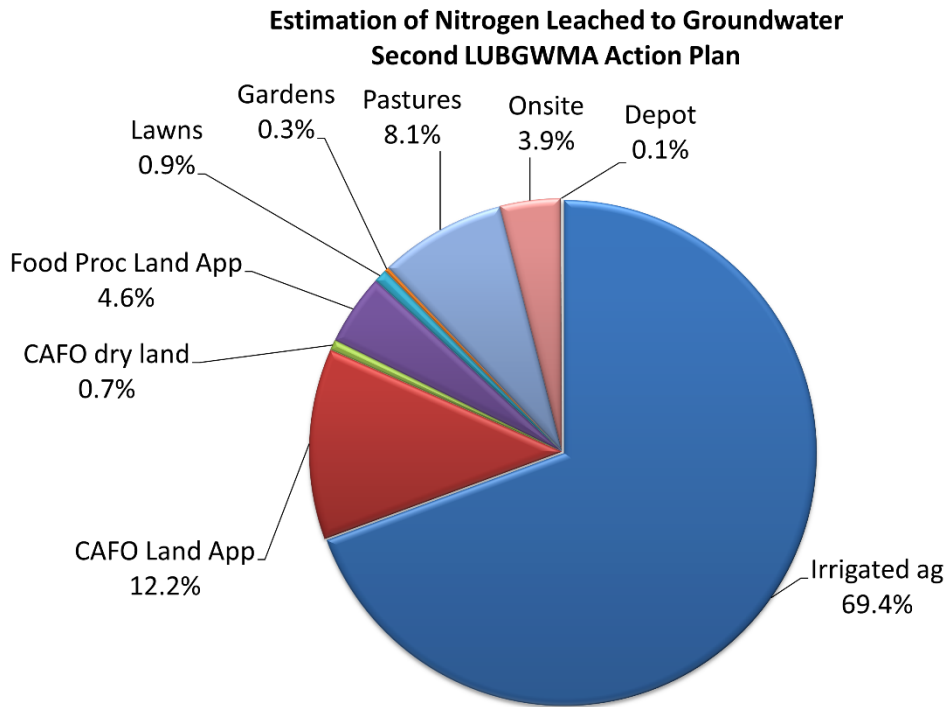
Controlling nitrate pollution involves implementing long-term strategies to reduce continued nitrate inputs to protect groundwater quality. The state intends for these strategies to evolve over time, adapting to new information and collaborative efforts. Progress requires ongoing efforts from a wide range of partners and all water users in the basin. The state has existing compliance programs addressing nitrate pollution protections and will continue to implement these as part of the long-term efforts to address nitrate pollution in the region and across the state. These programs are discussed briefly in section 3.1 and in more detail in the strategies outlined below. These existing programs are built on the current regulatory authorities of each agency and form the basis for new strategies that will evolve over time to address nitrate pollution.

#### 4.1.1 Overview of Sources

There are multiple sources of nitrate contamination in the LUBGWMA resulting in varying levels of nitrate in groundwater throughout the area. A 2011 analysis by DEQ, ODA, and OSU Extension identified the following primary estimated sources of contamination: about 70% from irrigated farmland, about 13% from large dairy and cattle farms (confined animal feeding operations or CAFOs), about 8% from animal pastures, about 5% from food processing facilities that reuse wastewater to irrigate fields, and about 5% from residential onsite septic systems and other sources.<sup>1</sup>

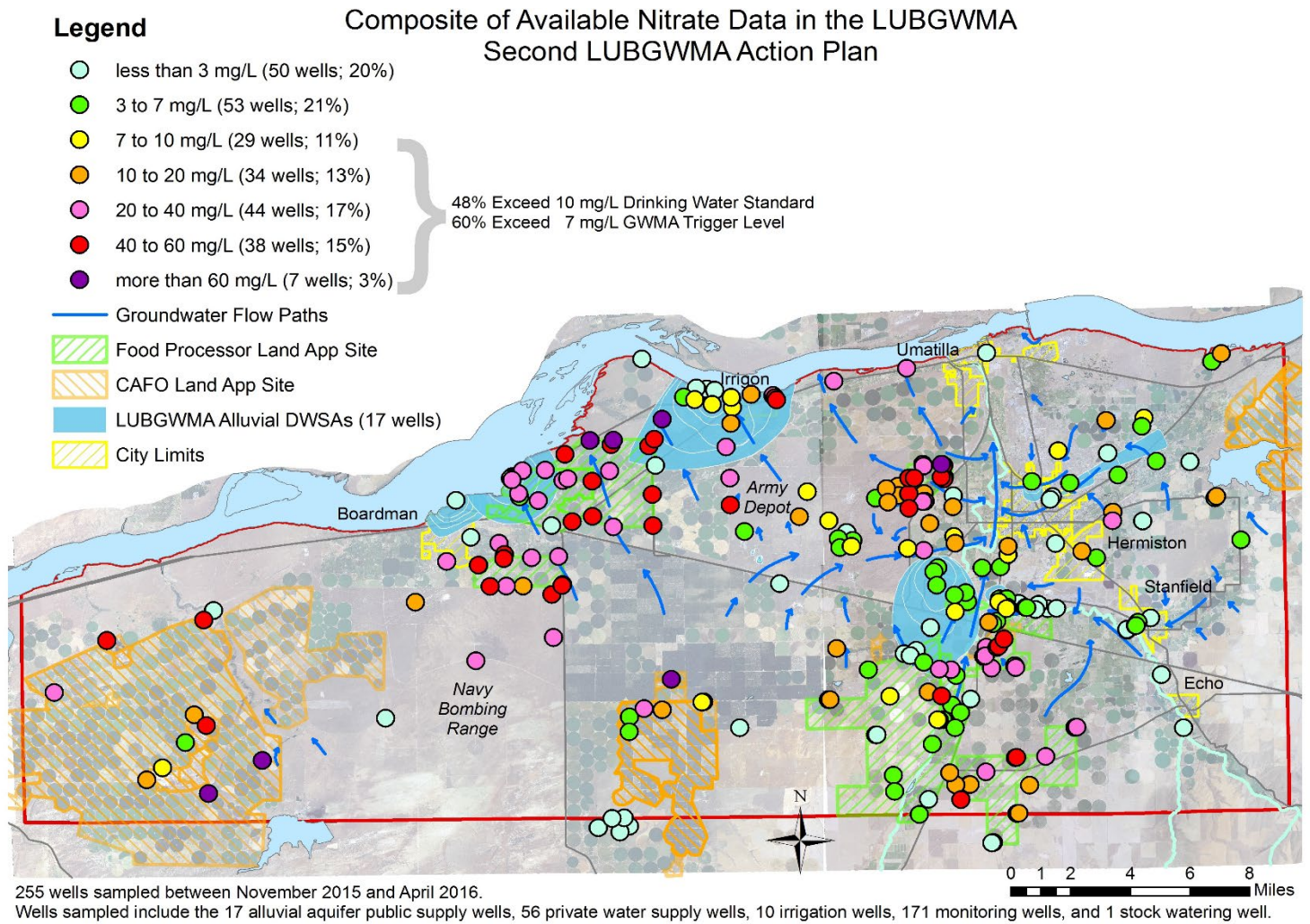
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<sup>1</sup> References: [LUBGWMA Second Action Plan, page 17](#), and [Estimation of Nitrogen Sources, Nitrogen Applied, And Nitrogen Leached to Groundwater in the Lower Umatilla Basin Groundwater Management Area \(2011\)](#). Note that in the 2011 report, CAFO land application was included under irrigated agriculture, whereas the LUBGWMA Second Action Plan pie chart lists it as a separate category.



*Figure 3.* The “Estimation of Nitrate Leached to Groundwater” analysis represents the best available information the state has at this time about estimated nitrate sources in the LUBGWMA. The state is committed to updating the data behind the analysis and having updated information to describe the sources of nitrate in the region. With additional data and resources, the agencies will conduct an updated analysis of estimated nitrate sources. Find more information about this in strategy 5.1.5.

For instance, while irrigated agriculture is identified as a primary potential source of nitrate, there have been no on-the-ground studies or sampling to determine or estimate current nutrient practices in nonpoint source irrigated agriculture and their impact on groundwater nitrate levels from these sources. ODA has plans, identified below, to obtain basic agricultural data within the LUBGWMA to identify crop quantification, rotation patterns, and irrigation system types. These data will allow the use of agronomic rate ranges within the whole LUBGWMA to get estimate loading ranges and potentials.



*Figure 4.* Compilation of Available Groundwater Quality Data from 2015-2016, created by DEQ for LUBGWMA Second Action Plan. Nitrate is found in varying levels in groundwater across the basin. DEQ samples a long-term network of about 30 wells four times per year and conducts additional synoptic large-scale sampling events. Find more information about groundwater sampling in section 5.1.1.

## 4.2 Irrigated Agriculture

### 4.2.1 Overview

In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act (AGWQ) directing ODA to create rules and plans to prevent and control water pollution from agricultural activities and achieve water quality standards. The law also requires ODA to work closely with Soil and Water Conservation Districts (SWCDs) to improve water quality.

The AGWQ program staff consists of the program manager, compliance lead, initiatives lead, monitoring lead, two compliance specialists, GIS specialist, and seven water quality specialists. The map below shows which areas each water quality specialist covers. The specialist for the LUBGWMA, shown in red, is located in La Grande.

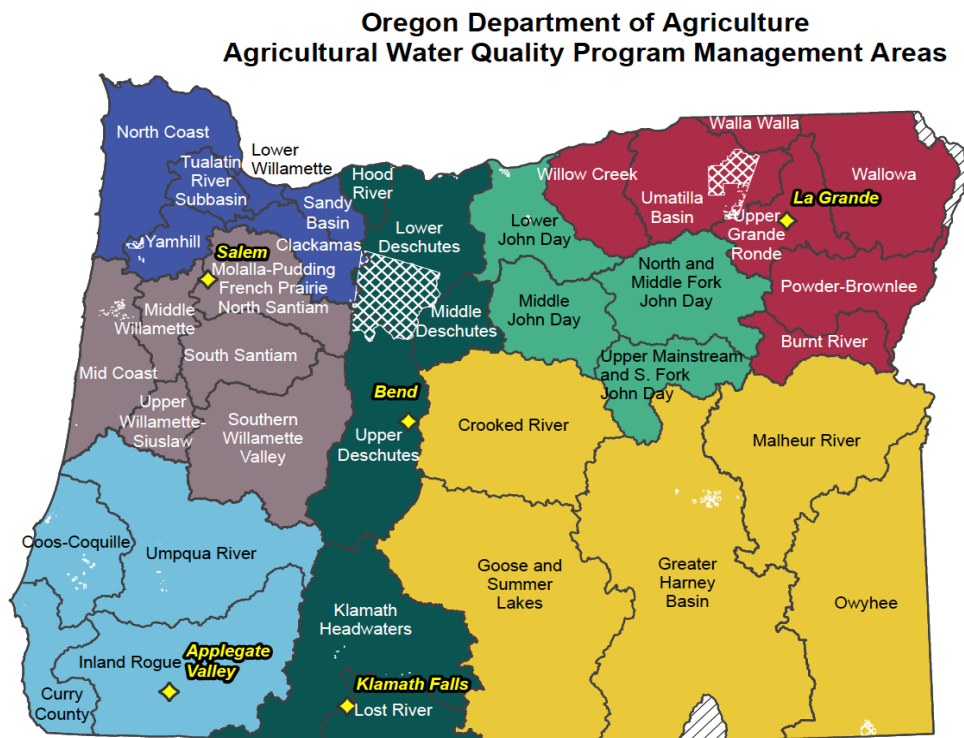


Figure 5. ODA Agricultural Water Quality Program Management Areas Map.

The AGWQ program provides financial support to SWCDs to help agricultural operations implement best management practices for water quality. This includes water conservation and manure and nutrient management. According to Oregon Revised Statute 568.225(2), SWCDs are required to work towards the goals outlined in ORS

468B.155. ORS 468B.155 states that the goal of Oregon’s people is to prevent contamination of groundwater while also conserving, restoring, and maintaining its high quality for current and future use.

ODA has established rules protecting water quality from agricultural pollution, including groundwater, in 38 management areas across the state. Oregon Revised Statute ORS 468B.025 states: “No person shall cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means” and is included in all Area Rules. Waters of the state include groundwater, offering protection that is more protective than federal regulations for waters of the United States. Additionally, all management areas include rules to protect vegetation along streamside areas. These rules ensure that vegetation provides essential functions such as shade, streambank stability, and filtering of surface runoff.

Within the LUBGWMA, there are two Agricultural Water Quality Management Areas: Willow Creek and Umatilla. Implementation of the voluntary measures from the Area Plans and compliance with the Area Rules is intended to protect water quality and prevent pollution (including groundwater). The program works with Local Advisory Committees (LACs), which include farmers, ranchers, and other interested parties, to develop and review water quality management plans for each of the management areas. The area plans recognize the diversity of crops and production practices and give agricultural operations a framework for how to comply with regulations. Ultimately, all agricultural operations must meet the regulations, but it is up to them to determine how they do it. Area Rules and Plans are reviewed on two schedules: a light review every two years and a full review every six years. ODA can also initiate a review and make changes to rules or plans as needed.

ODA has completed revisions to the two area plans inside the LUBGWMA, Willow Creek and Umatilla Area Plans, to include:

- Clearly stating and differentiating Area Rules and Voluntary Measures.
- Clearly addressing groundwater issues and remedies.
- Setting actionable goals to be implemented starting in 2024, such as inventorying livestock operations and crop and sprinkler systems. Specific actions and schedules are detailed in Section 4.2.3.2 (Strategic Implementation Area) and Section 4.4.3.2 (Inventory of Livestock Operations).

In January 2023, ODA and DEQ signed a memorandum of agreement (MOA) to coordinate efforts on water quality goals related to agricultural nonpoint source pollution. The MOA outlines how the agencies will collaborate to protect and improve water quality in Oregon's streams that are affected by agricultural activities.

The agreement specifies how ODA and DEQ will work together on:

- Total Maximum Daily Loads (TMDLs)
- Biennial Reviews of Area Plans
- Strategic Implementation Areas
- Compliance and Enforcement

The MOA aims to clarify and streamline the agencies' responsibilities and collaborative efforts in addressing water quality issues.

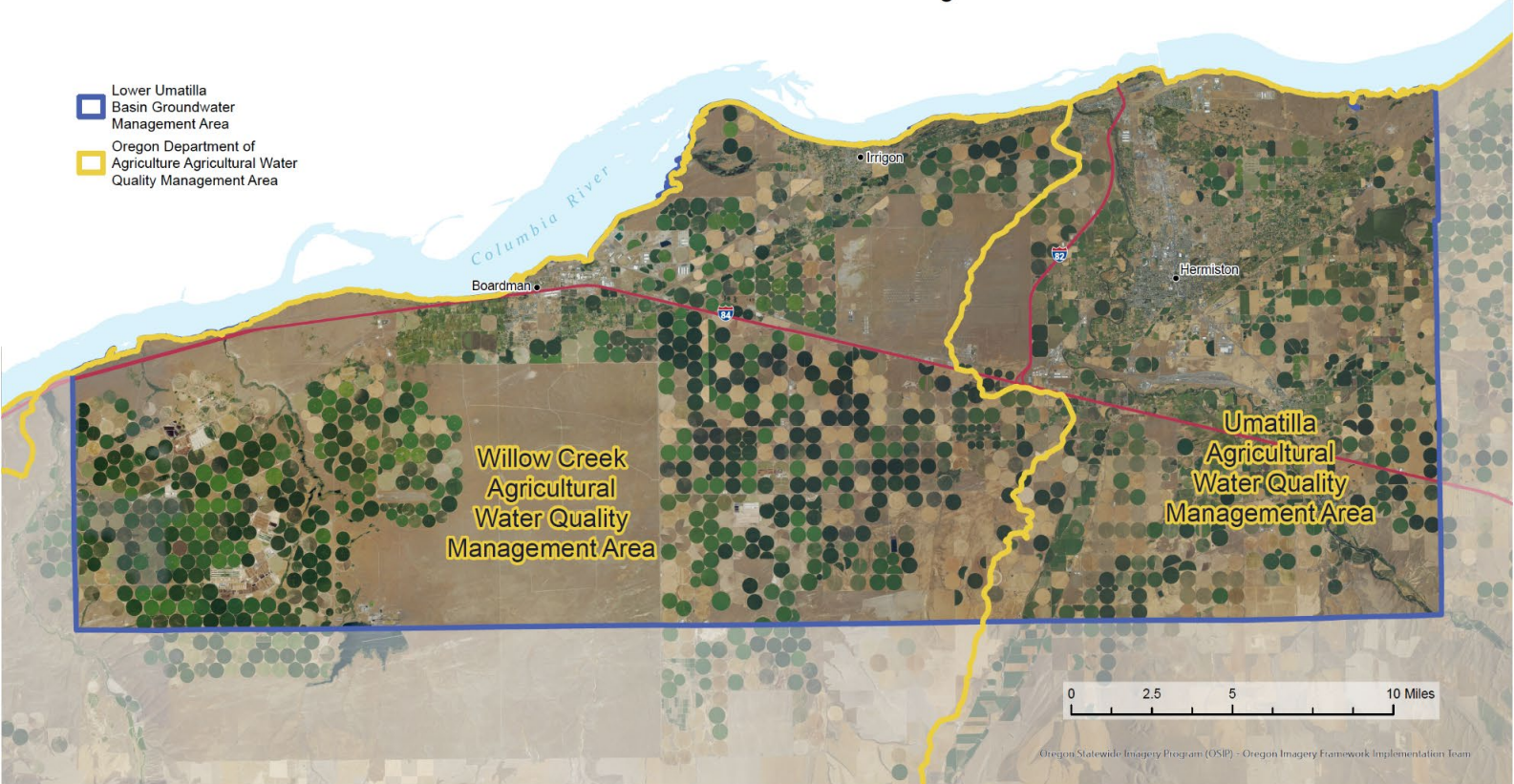
#### 4.2.2 Sources

Irrigated agriculture is the largest user of nitrogen in the region and therefore the primary potential source of nitrate. However, there have been no on-the-ground studies or sampling to determine or estimate current irrigation and nutrient practices in nonpoint source irrigated agriculture to determine the extent of nitrate contributions to groundwater from these sources.

It is estimated that the total area of agricultural production not covered under an ODA or DEQ water quality permit is approximately 93,250 acres, or about 58% of the total irrigated agricultural land in the LUBGWMA.



### Lower Umatilla Basin Groundwater Management Area



Prepared By: ODA GIS Team  
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Figure 6. Lower Umatilla Basin Groundwater Management Area Boundary Map.

# Lower Umatilla Basin Groundwater Management Area

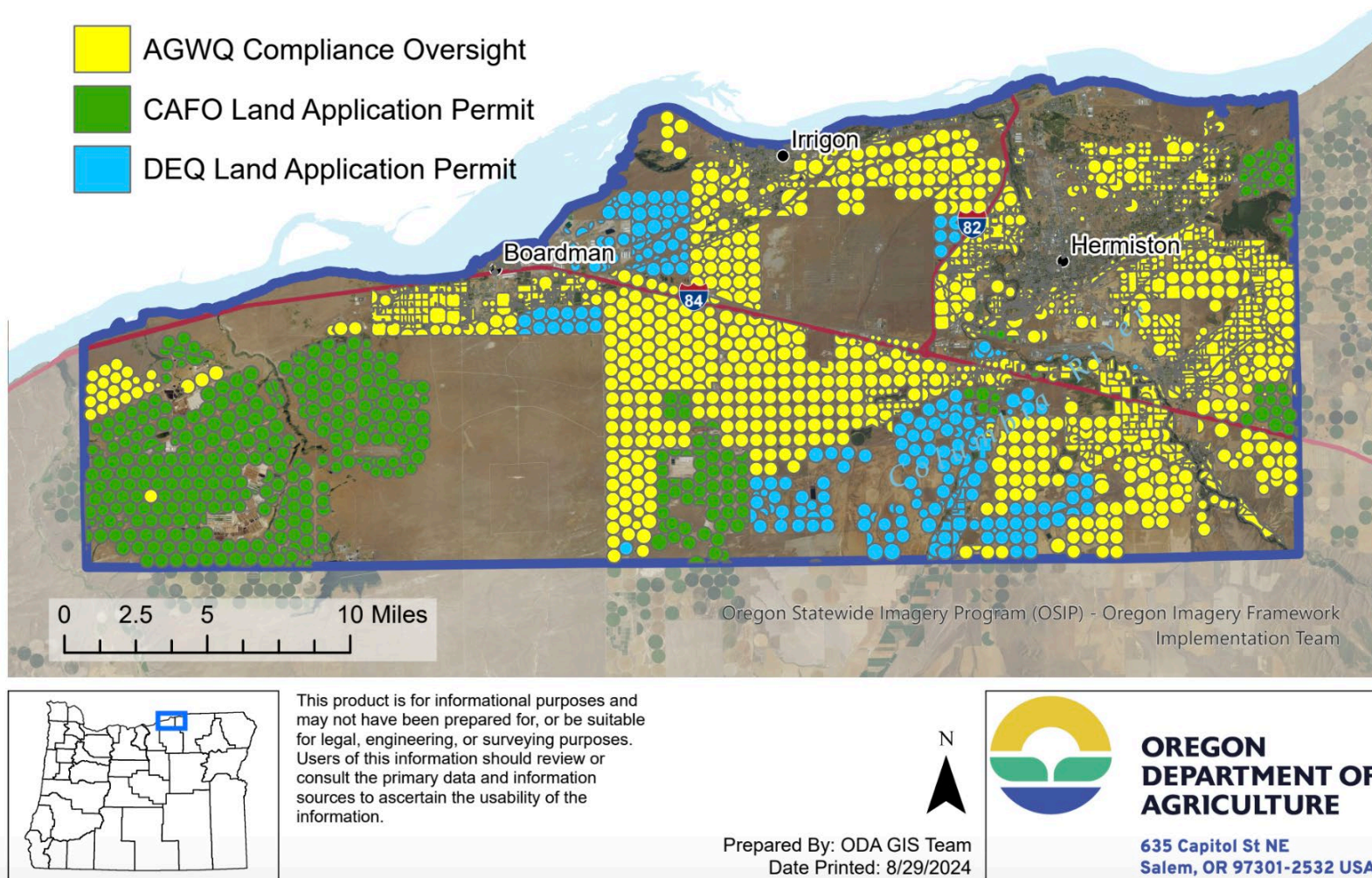


Figure 7. LUBGWMA Irrigated Agriculture (yellow areas) and Land Application Permitted Areas (green and blue areas). Note: This map is current as of January 2024.

## 4.2.3 Strategies

### 4.2.3.1 Agricultural Water Quality Program

**Objective:**

Prevent and control water pollution (including groundwater) from agricultural activities and achieve water quality standards.

ODA is committed to strengthening groundwater protection within the LUBGWMA by developing new compliance benchmarks focused on addressing nitrate levels potentially linked to irrigated agriculture. The framework being considered includes establishing specific thresholds for soil nitrate levels, requiring recordkeeping for nitrate and irrigation applications, and conducting post-harvest soil nitrate testing.

The success of implementing or increasing these compliance benchmarks depends on a phased timeline, supported by technical assistance to promote education and awareness. ODA recommends providing resources for farmers, enabling them to receive the technical assistance and tools necessary to establish a baseline and have ample time to meet compliance standards before any enforcement measures are applied.

Throughout this development process, ODA will prioritize equity, recognizing that farming operations vary in size and resources. The framework will aim to scale requirements appropriately, ensuring that farms of all sizes can comply with the regulations in a way that is both fair and manageable, while still providing adequate groundwater protection.

The process will be collaborative, with extensive public comment and stakeholder engagement planned for 2025. The timeline targets the implementation of these new rules in 2026 that will consider a phased schedule for compliance. ODA is committed to working closely with local communities to ensure the regulations are practical and effective in safeguarding groundwater resources for future generations.

**Actions:**

- Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.
- Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.

- Review Willow Creek and Umatilla Area Plans to ensure voluntary practice recommendations are protective of groundwater.
- Review Willow Creek and Umatilla Area Rules to ensure regulations are protective of groundwater.
- Develop regulatory requirements aimed at addressing nitrate contamination for irrigated agriculture operations inside the LUBGWMA designation.

**Lead Agencies:**

ODA. Partner agencies: DEQ, DSL, OWRD, Morrow SWCD, Umatilla SWCD, Local Advisory Committees for Willow Creek and Umatilla management areas.

**Schedule:**

- Continuous long-term: Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.
- Short-term: Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described in Section 4.2.3.2.
- Short-term: Area Rules are reviewed every two years. The Willow Creek and Umatilla rules were last reviewed in February 2024. Rule changes may be done anytime the agency identifies a need.
- Short to Medium-term: Area Plans are reviewed on an alternating schedule of a full (every 6 years) and light review (every two years). The Willow Creek and Umatilla area plans had a full review in February 2024.
- Medium-term: Develop regulatory requirements aimed at addressing nitrate contamination from irrigated agriculture operations inside the LUBGWMA designation. Engage with stakeholders in 2025 to target implementation of the new rules in 2026 (resources needed).

**Monitoring Progress:**

The AGWQ program tracks and reports on the number and types of compliance actions taken and receives reports from SWCDs on the achievements made to implement area plans. This data will be used to track trends of enforcement activities and engagement of area agriculture producers on achieving nitrate reductions from ag activities.

- Annual AGWQ Compliance Program Report
  - Compliance cases investigated
  - Type of Issues
  - Pre-enforcement actions
  - Enforcement actions
- Ag Water Quality Management Area SWCD Biennial Review Reports.
  - Landowner participation in outreach events
  - Landowners provided technical assistance

- Site visits
- Conservation plans written
- Funding applications submitted
- Funding applications awarded

**Description:**

ODA's Agricultural Water Quality Program was established in 1993 and is a regulatory compliance program for all nonpoint source pollution resulting from agricultural activities. The program relies on complaint-based and program-initiated investigations to ensure compliance, through inspections of operations with potential risks to surface or groundwater. Currently the program has one water quality specialist located in the LUBGWMA region to provide technical support and compliance oversight. Work in this region is also supported by additional staff to implement initiatives to address groundwater contamination such as the Strategic Implementation Area described in strategy 4.2.3.2.

The Agricultural Water Quality Management Plans are voluntary however the Area Rules are regulatory and enforceable. The Willow Creek and Umatilla Agricultural Water Quality Management Area Rules are regulatory and enforceable providing broad protection for both surface water and groundwater. Both the Willow Creek and Umatilla Area Rules include that no person "shall violate any provision of ORS 468B.025."

ORS 468B.025(1) states: no person shall:

(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.

In addition, the Umatilla Area Rules, Oregon Administrative Rule (OAR 603-095-0360(7)(a) states, "Crop nutrient applications, including manure, sludge, and commercial fertilizers must be done at a time and in a manner that does not pollute waters of the state." The Willow Creek Area Rules, OAR 603-095-2840(5) states, "...irrigation must be done in a manner that limits the amount of pollution in the runoff from the irrigated area or that leaches into groundwater."

Waters of the state include groundwater and wastes include excess nitrogen. The Area Rules require that waste is not placed where it can enter groundwater, and the rules are enforceable. ODA will review existing and consider additional Area Rules for protection of groundwater at upcoming biennial reviews.

The agricultural water quality statutes and rules include an enforcement process that requires the program to ensure agricultural operators are complying with the area rules. ODA reviews complaints for completeness and validity and will perform investigations

as needed. Complaints are typically reviewed and assigned within two business days of receipt and completed within 45 days after the site visit including any agency compliance actions as appropriate.

**Compliance and Enforcement:**

The investigation process involves an initial assessment of risk to both surface and groundwater resources. If the investigation determines there is an impact to groundwater, ODA will inform the operator of the rules and work with them to develop a plan to address the issue, so they are no longer impacting groundwater. If an operator chooses not to take action and address the issue, ODA has enforcement authority and may issue a Notice of Noncompliance and Plan of Correction (NON/POC). This includes specific actions that are required of the operator to address the issue and achieve compliance. If an NON/POC has been issued and an operator does not take action or continues to cause impacts, ODA is authorized to and will issue civil penalties.

**4.2.3.1 Agriculture Water Quality Program**

OBJECTIVE: Prevent and control water pollution (including groundwater) from agricultural activities to achieve water quality standards. *[4.2 Irrigated Agriculture]*

<p><b>Continuous</b></p>	<ul style="list-style-type: none"> <li>- Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.</li> </ul>
<p><b>Short-Term 2023-2027</b></p>	<ul style="list-style-type: none"> <li>- Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.</li> <li>- Area Rules are reviewed every two years. The Willow Creek and Umatilla rules were last reviewed in Feb 2024. Rule changes may be done anytime the agency identifies a need.</li> </ul>
<p><b>Medium-Term 2027-2031</b></p>	<ul style="list-style-type: none"> <li>- Area Plans are reviewed on an alternating schedule of a full and light review of every 6 years for full and every 2 years for a light review. The Willow Creek and Umatilla area plans were last reviewed In February of 2024.</li> <li>- Develop regulatory requirements aimed at addressing nitrate contamination from irrigated agriculture operations inside the LUBGWMA designation. Engage with stakeholders in 2025 to target implementation of the new rules in 2026 (resources needed).</li> </ul>

#### 4.2.3.2 Strategic Implementation Area

##### **Objective:**

The Strategic Implementation Area (SIA) initiative is a proactive effort to conduct outreach in the LUBGWMA regarding agricultural water quality rules, develop irrigated agriculture Best Management Practices (BMPs), and emphasize the utilization of irrigation and nutrient management plans and practices to protect groundwater.

##### **Action:**

- Conduct remote and field evaluations.
- Create outreach materials on ag water quality rules and management practices.
- Conduct outreach to growers, agricultural advisors/consultants, and the general community on irrigated agricultural BMPs.
- Conduct a community open house describing the SIA process and areas of concern.
- Contact agricultural operators within areas of concern.
- Develop region specific data informed BMPs in coordination with OSU Extension and community (see strategy 4.1.3.3).
- Cooperate with growers in obtaining in-field data from production fields for demonstration, modeling and verification of appropriate area BMPs.
- Create a 'model' irrigation and nutrient management plan for the LUBGWMA area (see strategy 4.1.3.3).

##### **Lead Agencies:**

ODA. Partners: Morrow SWCD

##### **Schedule:**

- Long-term: The SIA will be implemented over an extended period of time and can last up to 10 years from inception (2023-2033).
- Short-term: The remote evaluation was completed in February 2024.
- Short-term: The field evaluation was completed in July 2024.
- Short, Medium, and Long-term: Outreach materials will be developed and distributed throughout the SIA effort as needs are identified. Multiple SIA presentations have been made already, and more than ninety brochures of LUBGWMA SIA Activities and Rules have been distributed to date, both English and Spanish versions.
- Short, Medium, and Long-term: Community outreach will be ongoing throughout the SIA effort. Previous outreach efforts include LUBGWMA committee presentations, irrigation consultant discussion (March 2024), grower discussions (Apr-Jun,2024), Morrow County Water Advisory Committee Presentation (June 2024), and Water Resilience for Small Scale Irrigators Workshop (June 2024).

- Short-term: A community open house will be scheduled for October 2024. At this time areas of concern will be shared; specific locations will not be shared publicly, but directly with the landowner.
- Short-term: After the open house, the Morrow SWCD will contact owners of tax lots with areas of concern within one year (October 2025). All observed issues must be addressed within one year of the open house. It is then moved to ODA for compliance follow up.
- Short to Medium-term: ODA will follow up on any remaining tax lots with unresolved conditions that require regulatory action to gain compliance. If Morrow SWCD does not resolve these issues in the initial phase, ODA will contact the landowner and may start the compliance and enforcement process.
- Short-term: ODA anticipates new BMP development to be started in 2024.
- Medium to Long-term: BMPs will continue to evolve through the life of the SIA as data strengthens the BMPs.
- Short, Medium, and Long-term: In field data collection for demonstration, modeling, and verification of appropriate area BMPs will occur over the span of the project.
- Short-term: Model irrigation and nutrient management plans will be developed as a resource for grower implementation.
- Medium to Long-term: Add an additional LUBGWMA SIA every four to six years to eventually cover the entire area; the current SIA contains 60,975 acres (17%) of the 359,472 acre LUBGWMA.

### **Monitoring Progress:**

There are a number of data points that are collected through the SIA process to evaluate impacts and success of the SIA overall. This data will also be collected for the LUBGWMA SIA to track performance over time.

- Acres evaluated
- Types of issues identified
- Landowners contacted
- Landowners participating in outreach events
- Landowners provided information
- Technical assistance provided to landowners
- Grant Funding applications for landowners
- Compliance data, tax lots/fields that are:
  - Likely in Compliance (LC)
  - Restoration Opportunity (RO)
  - Compliance Opportunity (CO)
  - Potential Violation (PV)



**Description:**

ODA's Strategic Implementation Area (SIA) program, started in 2014, proactively addresses agricultural water concerns in a focused area, rather than waiting for concerns to be reported. To date, all SIAs have focused on surface water. The 2023 LUBGWMA SIA is the first to target groundwater.

An SIA is chosen based on known agricultural management issues that can be addressed in an area and the water quality parameters of concern, in this case, nitrogen. The boundaries of this LUBGWMA SIA were determined based on the number of tax lots that ODA has staff capacity to manage, the diversity of agricultural land uses, operation sizes, soil types from north (very coarse) to south (coarse), nature of the alluvial aquifer, and inclusion of both permitted and non-permitted land. The existing data on permitted acreage aids in understanding the area better.

The SIA process consists of an area assessment, starting with remote evaluation and followed by field evaluation of concerns of agricultural practices affecting water quality. The purpose of this assessment is to identify locations that may be impacting surface water or groundwater. ODA will follow-up with landowners/operators for locations that have been identified with potential to impact surface water or groundwater. ODA will first work in a voluntary manner with these landowners/operators and if needed will use compliance and enforcement.

The remote evaluation encompasses building a GIS geospatial dataset including boundaries, water bodies, tax lots, and watersheds: combined with publicly available aerial imagery over the last several years. This GIS dataset is reviewed internally by ODA to view and categorize potential water quality concerns. Surface water concerns include manure piles within reach of surface water, livestock overgrazing, bare land, vegetation cover in riparian areas. Ground water concerns to be seen from a remote review include surface water flow, erosion caused by irrigation, significant irrigation of bare land, irrigation on top of surface water, uncovered manure, and flood irrigation within the LUBGWMA. The remote evaluation is subsequently "verified" by a field evaluation, where each of the concerns is confirmed, upgraded to a higher level, or downgraded to a lower level of concern.

Table 3. Observable Agricultural Groundwater Concerns.

Concern	Groundwater Impact
Surface water flow from irrigation	Irrigation surface flow indicates an application rate that is too high for the soil and slope, meaning there is likely to be leaching locally or at a water collection point
Erosion caused by irrigation	This is evidence of 'surface water flow' described above
Significant irrigation of bare land	The LUBGWMA soils have very little soil water holding capacity, without an active crop, little irrigation water should be applied
Irrigation on top of surface water	Any irrigation on top of retained water (ponding) will result in leaching. Irrigation on top of a stream, canal, or ditch is also polluting waters of the State.
Flood irrigation	Flood irrigation in the LUBGWMA should not be utilized, as it has greater potential to leach water and nutrients to the groundwater.
Manure Storage	Uncovered manure/fertilizer piles left uncovered without an impermeable barrier is a violation of Area Rules.

All tax lots greater than 1-acre within the area are assessed and classified as follows:

- Likely in Compliance - ODA identified no likely agricultural water quality concerns.
- Restoration Opportunity - ODA identified no likely agricultural water quality regulatory concerns, but there may be an opportunity for voluntary conservation.
- Compliance Opportunity - ODA identified potential for agricultural activities to impair water quality and/or the evaluation was inconclusive because they could not be field verified.
- Potential Violation - ODA identified conditions that would warrant an ODA water quality investigation.

An open house, where the community is invited, follows the field evaluation to educate and explain results of the evaluation and desired outcomes. After the open house, outreach and technical assistance is offered to all agricultural operators with compliance opportunities and potential violations. Potential violations will be contacted within one month of the open house. Compliance opportunities that are not addressed by one year from the date of the open house will be contacted by ODA and will go through the normal compliance and enforcement process. Through this evaluation process, ODA will have assessed, reported and followed up on observable

water quality concerns at the time; as well as provided public outreach, assistance and education through ODA, the local Soil and Water Conservation District, and the local community partners.

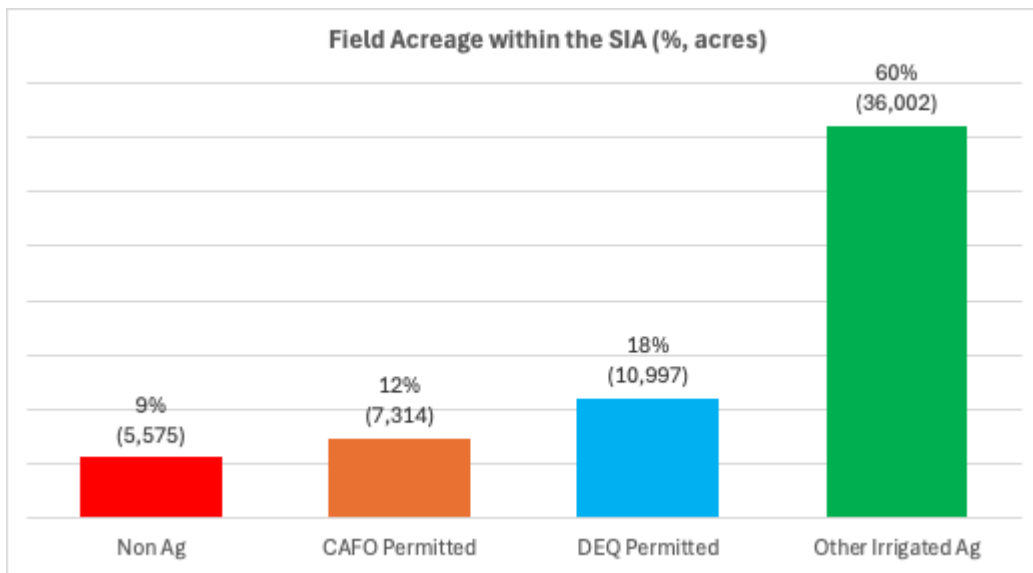


Figure 8. Strategic Implementation Area Field Acreage

Beginning in 2023, ODA, in partnership with the Morrow Soil & Water Conservation District (SWCD), began planning for a groundwater Strategic Implementation Area (SIA) in a focused area within the LUBGWMA. The groundwater SIA will provide funding to Morrow SWCD to provide technical assistance, monitoring of water quality and landscape conditions, and assisting with other project funding and cost share opportunities. Funding is secured under ODA’s existing SIA program. This new groundwater focused initiative is intended to engage operators and learn what local agricultural practices are being used and provide outreach and technical assistance on nutrient and irrigation water management. This initiative relies on local operators to participate in and share field data to demonstrate effective practices that protect groundwater.

Besides the SIA goals of achieving 100% compliance of observable agricultural water quality rules, the goals of this groundwater SIA are to:

- Learn from local irrigators and partners about local agricultural practices.
- Listen to what irrigation and nutrient management plans are being utilized.
- Demonstrate and document agricultural producers utilizing management activities and plans.

- Verify the effectiveness of the management activities and plans in fulfilling area rules.
- Ensure compliance with rules is preventing pollution from agricultural activities.
- Develop and/or document localized irrigation and nutrient management BMPs.
- Develop area 'model' irrigation and nutrient management plans.

ODA intends to work through the SIA process and achieve the goals of the SIA by December 31, 2029. ODA will develop a final SIA report that will be used to communicate to the public regarding progress toward achieving this goal. This report will also review lessons learned and utilize these as new SIAs will be implemented in the LUBGWMA. Although the report will likely not be released until 2030, ODA anticipates starting additional SIAs in the LUBGWMA prior to the completion of the initial SIA.

In early 2024, ODA conducted a remote review of the area using publicly available aerial imagery. All fields were classified as to observable levels of compliance with Area Rules, and categorized as "Likely in Compliance," "Restoration Opportunity," or "Compliance Opportunity."

The results of the remote review are as follows (Number of tax lots):

- Not evaluated (less than 1-acre): 861
- Likely in compliance: 411
- Restoration opportunity: 84
- Compliance opportunity: 41

This remote review will be followed by an on-site 'Field Verification' to further clarify the Compliance Opportunities in Summer 2024.

ODA will hold an Open House in the fall of 2024 to give an overview of the agricultural water quality program, SIAs, and available restoration and compliance opportunities. For all compliance opportunities, ODA will notify the agricultural operator of the issue found with expected outcomes. The Morrow SWCD will follow up directly with the operator to offer education and technical assistance to address the issues found. The Morrow SWCD will work on outreach and technical assistance to the community for the restoration opportunities.

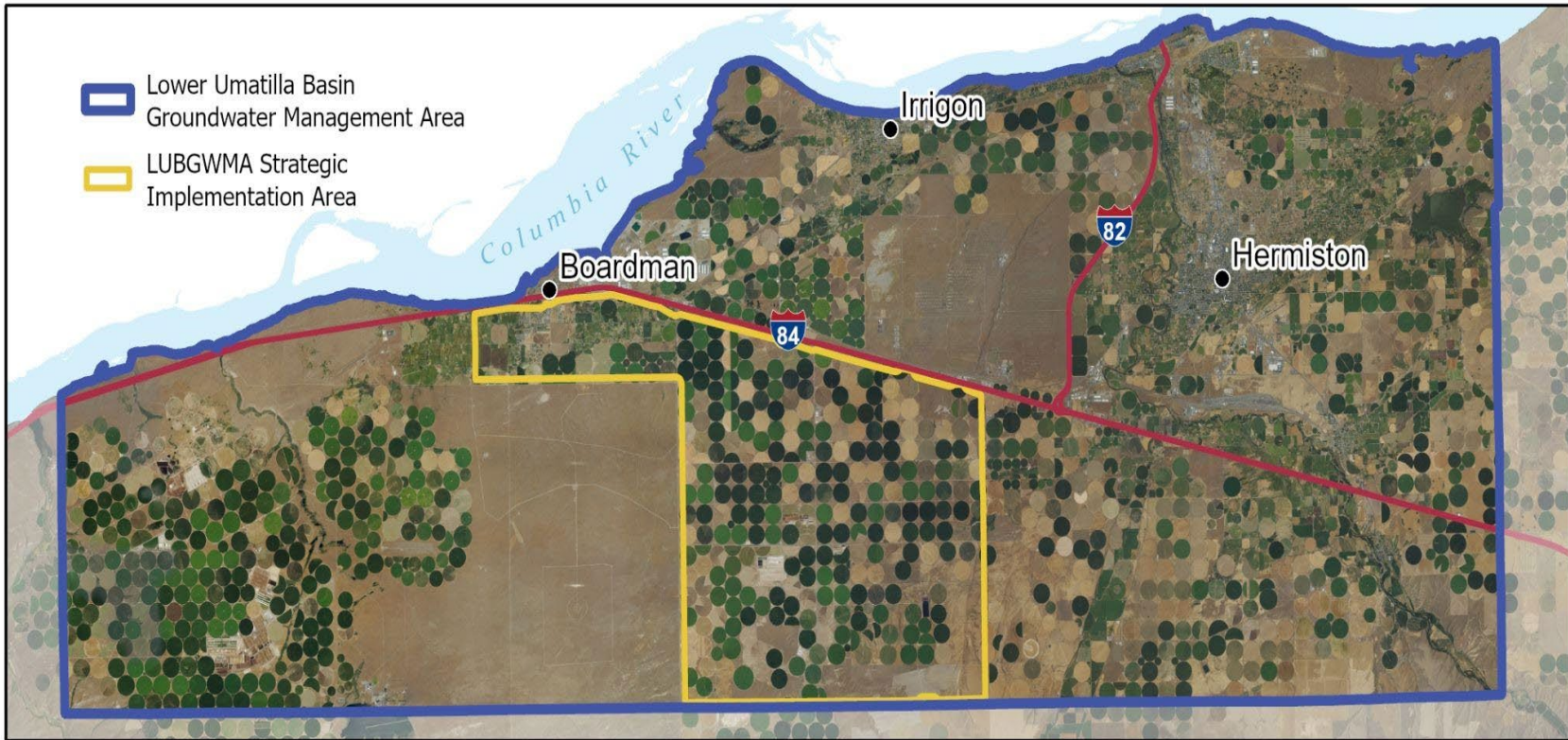
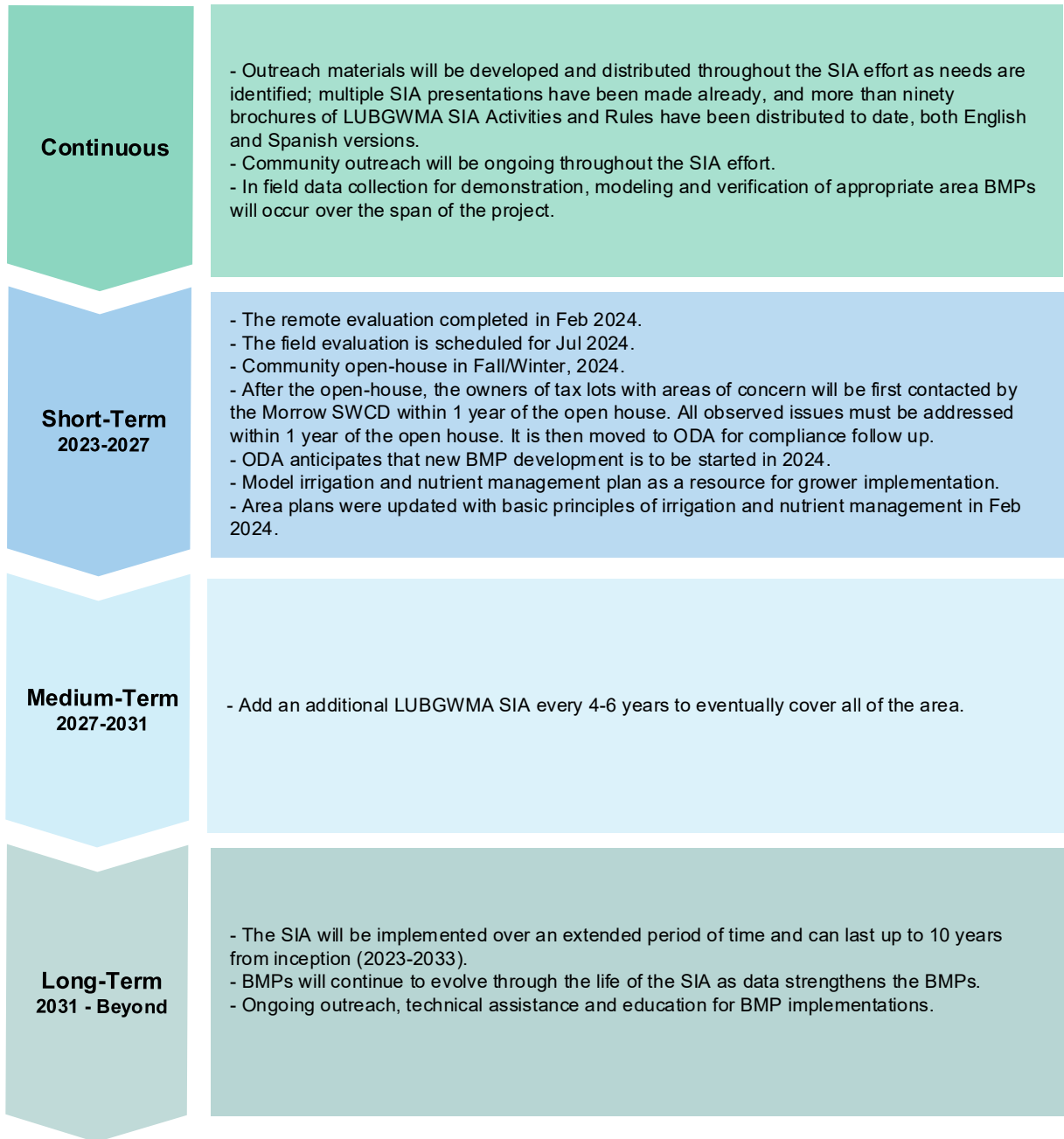


Figure 9. Strategic Implementation Area Boundary Map

### 4.2.3.2 Strategic Implementation Area

**OBJECTIVE:** The Strategic Implementation Area (SIA) initiative is a proactive effort to conduct outreach in the LUBGWMA regarding agricultural water quality rules, develop irrigated agriculture Best Management Practices (BMPs), and emphasize the utilization of irrigation and nutrient management plans to protect groundwater. Achieve 100% compliance with agricultural water quality rules within the SIA, therefore preventing pollution of waters of the state. Repeat the SIA process as needed for other areas of the LUBGWMA. *[4.2 Irrigated Agriculture]*



### 4.2.3.3 Best Management Practices (BMP) for Nutrient and Irrigation Management

**Objective:**

Use irrigation and crop nutrient management data to develop BMPs. Conduct outreach and support for implementations of model irrigation and nutrient management model plans.

**Action:**

- Modify Agricultural Water Quality Management Area Plans to include irrigation and nutrient management practices specific to preventing groundwater contamination.
- Create web and mobile application for agricultural field crop, irrigation and livestock inventory (see strategies 4.3.3.2).
- Fund Morrow SWCD to perform full inventory of LUBGWMA for basis of BMPs and priority activities; including crop type, crop rotation, irrigation type and livestock land use category.
- Outreach and collaboration with OSU Extension, growers and the community on BMPs.
- Develop and/or identify irrigation and nutrient management practices for the LUBGWMA.
- Publish irrigation and nutrient BMPs.
- Develop and publish model irrigation and nutrient best management practices.

**Lead Agencies:**

ODA. Partners: OSU, Morrow SWCD, Umatilla SWCD, LUBGWMA Committee

**Schedule:**

- Short-term: Area plans were updated with basic principles of irrigation and nutrient management in February 2024.
- Short-term: Web and mobile applications were developed for agricultural field crop, irrigation type, and livestock inventory in 2023.
- Short-term: An Agricultural Water Quality Support grant was awarded to Morrow SWCD in January 2024 to perform a crop, irrigation type, and livestock inventory in Morrow County and the LUBGWMA area. This is to be completed by December 2025.
- Medium-term: Outreach and collaboration with OSU Extension, growers and the community on BMPs. Several meetings with OSU Extension have already taken place and this will be an ongoing effort to align efforts within the LUBGWMA.
- Short to Medium-term: Identifying, developing, and publishing localized BMPs within the LUBGWMA will be an ongoing process over the next 10 years. Collaboration funds with OSU Extension will enhance this effort.

- Short-term: Create model irrigation and nutrient management plan as a resource for grower implementation.
- Long-term: Ongoing outreach, technical assistance, and education for BMP implementations.

**Monitoring Progress:**

- This is a collaborative project with partners, progress will be shown in the number of collaborative activities between parties. Additional resources needed.

**Description:**

Both of the area Agricultural Water Quality Plans (Umatilla and Willow Creek) include the statute ORS 468B.025 which states that nitrate contamination of groundwater is unlawful. Irrigated agriculture within the LUBGWMA is expected to: 1) Irrigate according to environmental demand (weather), and 2) fertilize to agronomic and crop demand.

**Area Plan emphasizing Irrigation and Nutrient Management Plans**

The Willow Creek and Umatilla Area Plans were modified in February 2024, to add language clarifying the responsibility of the agricultural operators to implement measures that prevent and control water pollution from agricultural practices including irrigation and nutrient management. This includes pollution to groundwater as well as surface water. Irrigation and Nutrient Management plans are emphasized as a necessary practice to achieve this goal. These Area Plans are used as a resource and reference by ODA and Morrow and Umatilla SWCDs for outreach, education, and technical assistance.

**Outreach and Compliance**

ODA is utilizing the combined strategies of the SIA and BMP creation for targeted outreach on irrigation management where applicable to the area rules. The agency will look for ways to broaden education and outreach, by engaging with various local organizations, identify additional partners, and leverage these relationships to effectively distribute and amplify educational resources to the ag community. In the SIA remote review, many flood irrigation systems were identified, erosion was visible from fields, and there was likely irrigation over surface water.

An outreach brochure was created to highlight the area rules and key aspects of irrigation science including:

- Only apply water at the rate at which the crop is utilizing the water.
- If irrigation water flows over land, the irrigation application rate is too high, and nutrients are being lost.
- Only apply enough water to fill the active root zone. The soil within the LUBGWMA is very coarse and will not hold much water.



- Fertilizer pushed below the crop's root zone is wasted money, and will eventually end up in groundwater, which violates water quality rules.

Applicable Irrigation and nutrient management practices were also included in the brochure:

- Know your soil moisture status through the season.
- Know your expected irrigation requirements for the season/crops.
- Irrigate according to weather and crop evapotranspiration.
- Monitor flow, soil moisture, and any overland flow conditions for adjustments.
- Keep records of irrigation quantity and timing.

### **Model Irrigation and Nutrient Management Plans**

ODA has a goal to develop model irrigation and nutrient management plans for agricultural operators to modify for their own use. These plans will be developed with current knowledge, the BMP development process, and grower community input. Projected timeline: 2024-2025 for gathering knowledge and input, 2026 for developing and completing model plans. The creation and publication of specific BMPs within the LUBGWMA is a high priority for ODA and the LUBGWMA Committee, as detailed in the LUBGWMA Second Action Plan. In order to prioritize and develop these BMPs, an accounting of crops, crop rotations, irrigation type, and livestock land use is needed. This is being done through an area-wide field assessment. This will allow ODA, OSU, and community partners to better develop and prioritize BMPs for fertilizer, irrigation use and practices, and grazing management strategies.

### **Inventory of Crop and Sprinkler Systems**

ODA, in partnership with OWRD, developed a web application (2023) for an on-site field verification and input tool to categorize each agricultural field in an area. A third party will use a computer or iPad to select each field in the LUBGWMA and fill in the date, crop type, irrigation type, land livestock use, and rough estimate of livestock numbers. These data will lead to priorities for outreach, research, and BMP development. This assessment is a process that can be repeated in the future to show transitions and adjustments.

ODA awarded Morrow SWCD an agricultural water quality support grant to complete an inventory of the LUBGWMA area and the rest of Morrow and Umatilla Counties. The goal is to have a 100% inventory completed by 2025, as well as the common crop rotations.

Table 4. Data to be Available from Field Assessment/Inventory

LUBGWMA Data from Field Assessment/Inventory
Top 10 Area Crops
Crop Type by soil type, topography, riparian proximity
Top 10 Crop Rotations
Irrigation Type percentage, and by farm size
Irrigation Type percentage, and by location, soil type, topography, riparian proximity
Pasture utilization and size
Field Livestock Use, and by farm size

### **Existing Local Irrigation Principles and Best Management Practices (BMPs)**

Irrigation principles and Irrigation BMPs are a large component of the LUBGWMA Committee’s Second Action Plan. Irrigation principles directly related to the LUBGWMA strategy of reducing groundwater contamination are being shared immediately via brochures, presentations, and one-on-one conversations.

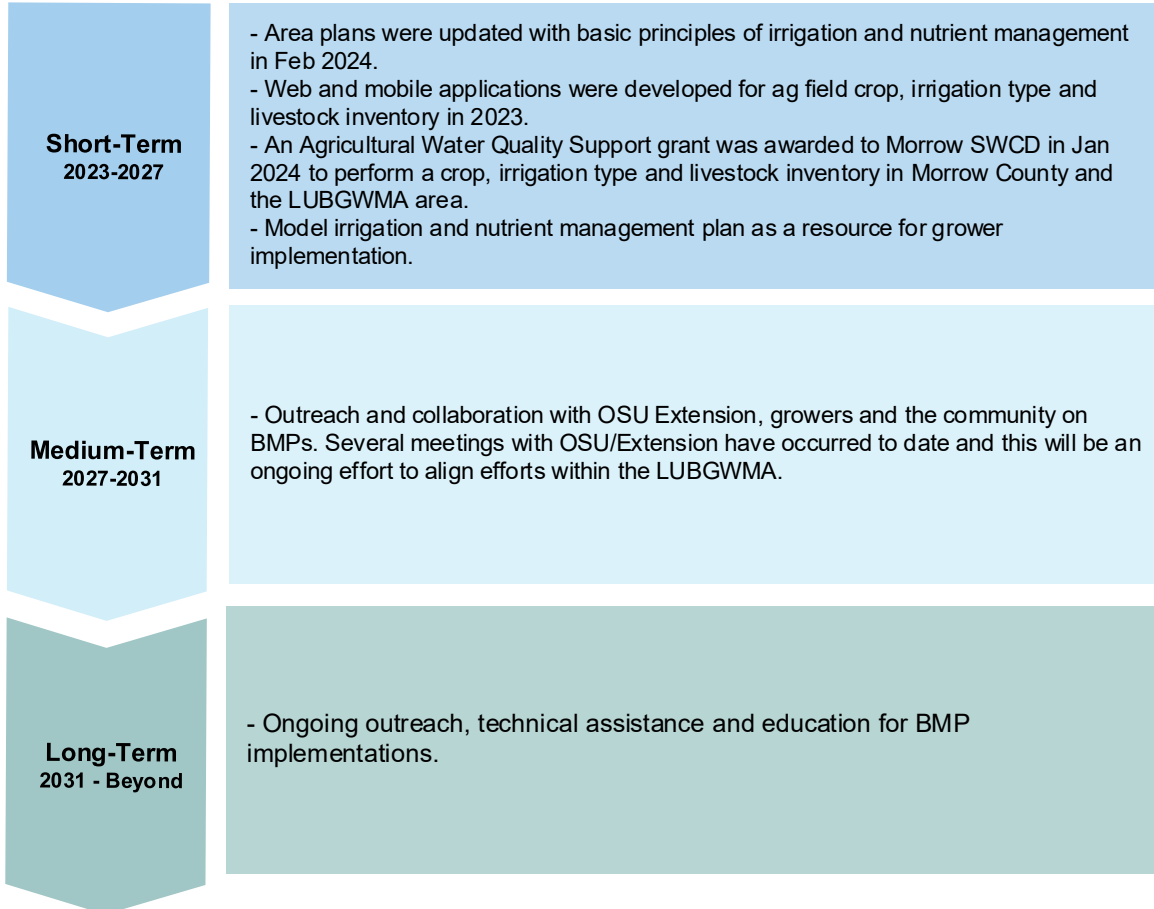
ODA is gathering existing BMPs related to irrigation, nutrient, and livestock management plans that are applicable to the LUBGWMA area. The goal is to have these BMPs gathered and organized by the end of 2024, with references made available in 2025. These BMPs will be used for outreach and technical assistance. The process will also help identify gaps in BMP development efforts.

### **Cooperation with OSU Extension Service**

OSU Extension Service is well positioned to provide applied research and experimentation to assist in development of BMPs. The field assessment data, existing BMPs, SIA data, and shared SIA field data from agricultural operators are all data sources that will be incorporated into this effort.

#### 4.2.3.3 Best Management Practices (BMP) for Nutrient and Irrigation Management

**OBJECTIVE:** Use irrigation and crop nutrient management data to develop BMPs. Conduct outreach and support for implementations of model irrigation and nutrient management model plans. [4.2 Irrigated Agriculture]



#### 4.2.3.4 Fertilizer Registration Program

**Objective:**

Provide consumer protection and ensure truth in labeling to ensure consumers are informed of the product contents and ensure all products that are sold in Oregon are registered according to requirements.

**Action:**

- Ongoing implementation of the fertilizer registration program.
- Provide competitive grants for research projects that include the interaction of fertilizing materials use and environmental outcomes.

**Lead Agency:**

ODA

**Schedule:**

- Continuous: The fertilizer registration and associated consumer protection market inspections is a well-established program. It will continue to ensure product registration meets state requirements.
- Short to medium-term: Fertilizer research and education grants are administered each year. The grants now prioritize projects focused on nitrate reductions in GWMA's.

**Monitoring Progress:**

- Refer to Section 4.2.3.1. for non-point source performance tracking related to fertilizer use.

**Description:**

The ODA fertilizer program is a consumer protection and truth in labeling program. It requires fertilizers, agricultural amendments, agricultural minerals and limes to be registered with ODA before they can be distributed within or into the state. The product registration process requires that the material cannot exceed regulatory limits for five heavy metals. ODA currently has over 12,000 products registered.

The fertilizer program provides up to \$70,000 per year via a competitive Request for Proposals (RFP) for research projects that can include the interaction of fertilizing materials use and environmental outcomes. Funded projects must present findings to growers and industry.

Funding for fertilizer research is administered by the Department to provide grants addressing the interaction of fertilizers, agricultural amendments, agricultural minerals, or lime products with ground or surface water (ORS 633.465 (3)). Funding for this specific purpose is derived from an inspection fee based on tons of fertilizer, agricultural mineral, agricultural amendment and lime products distributed into Oregon. Grant awards are made annually subject to the availability of fertilizer research funds.

Projects funded by this Request for Proposals must further the understanding of the interaction of fertilizers, agricultural amendments, agricultural minerals, or lime products with the protection of ground or surface water quality in Oregon. Project outcome must be transferable to industry advisors, consultants, and the end users of fertilizer, agricultural amendment, agricultural mineral, or lime products. Additional emphasis is given to research conducted in a Groundwater Management

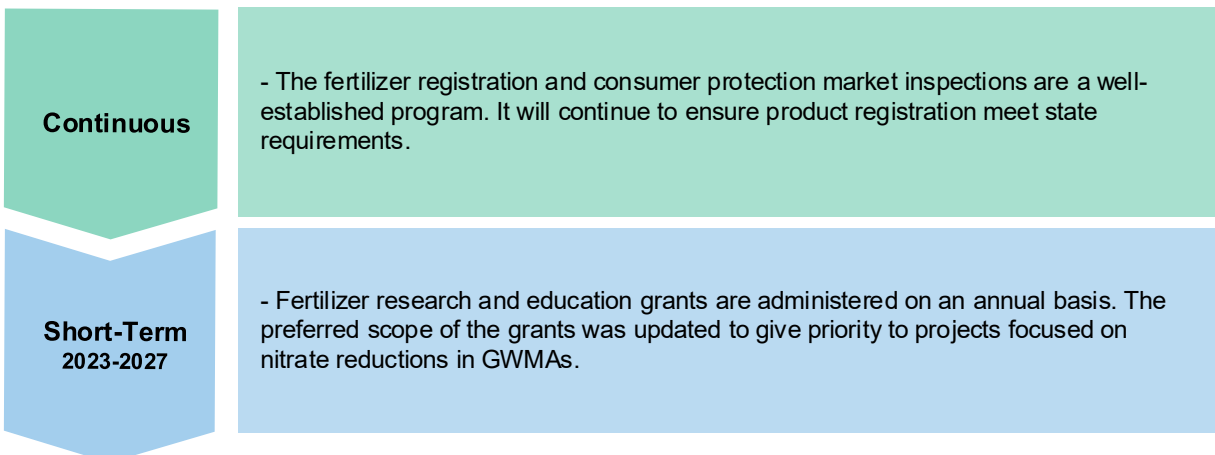
Area (GWMA) on agricultural nitrogen/nitrate fate or to research findings that help manage agricultural use of nitrogen in a recognized groundwater management area.

The program has funded an OSU proposal for 2024-2025 in the LUBGWMA that is focusing on developing a comprehensive management framework to enhance Best Management Practices (BMPs) in irrigated agriculture. The study begins with a desktop evaluation of existing BMPs, assessing their effectiveness in comparable environmental settings. It progresses with direct engagement with local farmers to gather insights into current agricultural practices and BMP implementation. Outreach will be completed using email, mail, and phone calls to delve into the practical application of the 4Rs framework in fertilizer management and to identify challenges and potential improvements in BMPs. The ultimate objective is to compile existing BMP's being utilized and looking for enhancement of BMPs aiming to strike a balance between economic viability and environmental sustainability. This study not only provides a detailed, data-driven approach to managing nitrate contamination in LUBGWMA but also contributes to broader understanding and management of environmental contaminants in agricultural settings.

More information and a list of past projects funded, including a copy of completed research, can be found on the Ground and Surface Water Research website at <https://www.oregon.gov/oda/programs/Pesticides/Fertilizers/Pages/WaterResearch.aspx>

#### 4.2.3.4 Fertilizer Registration Program

OBJECTIVE: Provide consumer protection and ensure truth in labeling to ensure consumers are informed of the product contents and ensure all products that are sold in Oregon are registered according to requirements. *[4.2 Irrigated Agriculture]*



## 4.3 Confined Animal Feeding Operations (CAFOs)

### 4.3.1 Overview

Oregon's CAFO program works with Oregon's permitted CAFOs to ensure compliance with state and federal water quality laws. The Oregon CAFO regulations exceed the federal standards in several ways, including conducting routine facility inspections every ten months, protecting waters of the state (this includes groundwater), requiring permits for facilities that would not meet the federal requirement such as facilities with lower animal numbers that do not have a documented discharge. The Oregon CAFO definition can be found in OAR 603-074-0010.

The program inspects all permitted CAFOs on 10-month intervals; reviews and approves new CAFO permit applications including construction plans and Nutrient Management Plans; reviews and approves modifications to facilities and Animal Waste Management Plans on existing operations; investigates and responds to complaints; and issues enforcement actions in case of violations.

ODA and DEQ jointly develop and issue WPCF and NPDES CAFO permits guided by a Memorandum of Understanding (MOU) approved by the Environmental Quality Commission and ODA / DEQ Directors. ODA is the primary agency for issuing and assuring compliance with CAFO permits. Both agencies are engaged in ongoing review of permits issued to facilities in the GWMA that regulate land application activities. The goal is to ensure consistency and harmony of permit requirements for both industrial facilities and CAFOs. ODA also involves EPA Region 10 NPDES permitting staff in reviewing any proposed CAFO General or Individual NPDES permits as part of EPA's Clean Water Act oversight authority. Copies of current general permits can be found at ODA's CAFO website <https://oda.direct/cafo>.

### 4.3.2 Sources

Primary sources are nitrogen from animal manure and process wastewater. Secondary sources are synthetic fertilizer and irrigation water.

CAFOs in the LUBGWMA use nitrogen from animal manure, process wastewater generated at the feeding operation, and synthetic commercial fertilizer for the beneficial use of managing and growing crops. The CAFO permit requires that an ODA-approved Nutrient Management Plan (NMP) be developed and implemented, which must describe the facility's BMPs to store, handle, and use manure in a manner that does not impact groundwater. CAFOs are required to meet state design standards for impoundments and surfaces where manure liquids and solids will be stored to prevent discharge or leaching of nutrients. The land application of manure and nutrients at CAFOs is

regulated and must be applied at or below agronomic rates. They are also required to manage irrigation (manure liquids, and fresh water) to prevent runoff and leaching of soluble nutrients (NO<sub>3</sub><sup>-</sup> and NO<sub>2</sub><sup>-</sup>). Also, CAFOs in the LUBGWMA are required to make records of crops planted, total manure nutrients applied to each field, and total additional synthetic fertilizers applied.

The current General NPDES CAFO permit and the General WPCF CAFO permit do not allow discharge of manure, litter, or processed wastewater to waters of the state. The General NPDES permit does make allowances for a 25-year 24-hour storm event when the facility is operated according to permit requirements and for engineered design seepage rates. The General WPCF permit only has allowances for engineered design seepage rates. These allowances are consistent with federal permitting requirements.

### 4.3.3 Strategies

#### 4.3.3.1 Confined Animal Feeding Operations Compliance

**Objective:**

Continue to administer regulatory oversight of CAFOs in Oregon that exceed the federal standards, including the implementation of SB 85 (2023) provisions to ensure compliance and protection of groundwater.

**Action:**

- Continue to maintain an aggressive CAFO compliance inspection frequency that exceeds EPA's suggested NPDES permit inspection frequency.
- Develop updated General NPDES permit. ODA will be contracting services to provide needed capacity and ensure a timely completion on this process.
  - Issue new General NPDES permits to existing facilities.
- Update existing Individual NPDES permits to incorporate SB 85 provision.
- Update existing Individual NPDES permits to be consistent with new General permit.
- Implement SB 85 permitting process.
  - Establish a rules advisory committee (RAC) and complete the rulemaking process (completed).

**Lead Agencies:**

ODA. Partners: DEQ

**Schedule:**

- Continuous: Implementation of the CAFO program is a continual ongoing effort. All operations that meet the definition requiring a permit are permitted and inspected at a minimum of every 10 months. This exceeds the current federal standard.
- Short-term: Development of an updated General NPDES permit is anticipated to begin fall 2024. Due to an extensive public comment process, it is difficult to identify an estimated date of completion.
- Medium-term: Once the new General NPDES permit is complete, ODA will prioritize updating CAFO permits in the LUBGWMA. From there, all other General NPDES permits will be updated by region.
- Short-term: Existing Individual NPDES and WPCF permits in the LUBGWMA will be updated to incorporate SB 85 provisions following the adoption of the SB 85 rules. Rules are anticipated to be adopted in August 2024.
- Short-term: Rulemaking to implement SB 85 provisions relating to CAFO permitting requirements is in process and anticipated to be completed in August 2024.

**Monitoring Progress:**

The CAFO program tracks program performance over time by the percent of permitted CAFOs found to be in compliance with their permit during annual inspections. This analysis is done based off data collected from Jan. 1 to Dec. 31. Additionally, we will track the status of updating permits in the LUBGWMA over time.

- Percentage of CAFOs in compliance with permit at annual inspection.
- Number of permits in LUBGWMA that have been updated.

**Description:**

As of June 2024, there are 13 CAFOs permitted in the LUBGWMA, five are on individual permits and eight are on general permits. The 13 CAFOs have a total of 44,997 acres available for land application of manure listed in CAFO Nutrient Management Plans. Not all of the acres receive manure or process wastewater each year due to crop rotations, number of animals, or no animals at some CAFOs. Each CAFO must report the total number and location of acres used for manure or process wastewater applications each year. ODA has enforcement authority to notice, penalize, or cancel CAFO permit coverage for permittees who violate CAFO permit conditions.

ODA conducts CAFO compliance inspections on a 10-month inspection frequency to assess facility compliance with the CAFO permit and ODA-approved Nutrient Management Plan. This frequency exceeds EPA's suggested NPDES permit inspection frequency. Facilities may also receive more frequent or additional inspections depending on the facility and any operational changes. For 2023, the 13 CAFOs located in the LUBGWMA received 36 inspections combined.



ODA and DEQ are in the process of renewing the CAFO General NPDES Permit. This process includes public participation and response to comment on the general permit. The public comment period is held open for 35 days and includes a public hearing for the public to submit verbal comments. Following the close of the public comment period the agencies review and respond to those comments. In addition to updating the General NPDES Permit the agencies will also be working to update existing individual WPCF and NPDES permits in the LUBGWMA. This process includes the same public participation and response process as the general permit. For information on active public notices or to sign up to receive email notifications please go to the ODA CAFO website <https://oda.direct/cafo>.

CAFO permits require that the application of all sources and amounts of nitrogen applied to crop fields on CAFOs not exceed the rate of crop removal. The agronomic application rates are calculated for each field/crop and are regulatory limits specific to each permittee. The permit also controls the amount and timing of irrigation water and process wastewater to fields to prevent leaching of nitrate into groundwater. The five CAFOs that are on individual permits have a combined total of 22 groundwater monitoring wells.

During the 2023 Oregon State Legislative Session, Senate Bill 85 (SB 85) was passed into law. Rulemaking will be done to implement the provisions of SB 85. SB 85 includes:

- A water supply plan requirement for CAFOs.
- A new limit on exempt water for stock watering.
- All new or existing CAFOs expanding to large size in GWMA are required to have an Individual CAFO permit.
- Development of new Nutrient Application Permit (NAP) for non-CAFO growers who land apply manure or process wastewater in a GWMA received from CAFOs located in a GWMA.
- New definitions and requirements for expansion of the largest CAFOs.
- Opportunity for counties to add new land use requirements on CAFO siting.
- Requirement for new, large CAFOs to attend a pre-application meeting with relevant agencies, tribes, and other partners.

### 4.3.3.1 Confined Animal Feeding Operations Compliance

OBJECTIVE: Continue to administer regulatory oversight of CAFOs in Oregon that exceed the federal standards, including the implementation of SB 85 provisions to ensure compliance and protection of groundwater. [4.3 Confined Animal Feeding Operations (CAFOs)]

<b>Continuous</b>	<ul style="list-style-type: none"><li>- Implementation of the CAFO program is a continual ongoing effort. All operations that meet the definition requiring a permit are permitted and inspected at a minimum of every 10 months. This exceeds the current federal standard.</li></ul>
<b>Short-Term 2023-2027</b>	<ul style="list-style-type: none"><li>- Development of an updated General NPDES permit is anticipated to begin fall 2024. Due to an extensive public comment process, it is difficult to identify an estimated date of completion.</li><li>- Existing Individual NPDES permits in the LUBGWMA will be updated to incorporate SB85 provision following the adoption of the SB85 rules. Rules are anticipated to be adopted in Aug 2024.</li><li>- Rulemaking to fully implement SB85 is in process and anticipated to be completed in Aug 2024.</li></ul>
<b>Medium-Term 2027-2031</b>	<ul style="list-style-type: none"><li>- Once the New General NPDES permit is complete, ODA will prioritize updating CAFO permits in the LUBGWMA. From there all other General NPDES permits will be updated by region.</li><li>- Update existing Individual NPDES permits to be consistent with new general permit is dependent on the timeline for update of the general permit.</li></ul>

## 4.4 Livestock Grazing

### 4.4.1 Overview

Livestock operations constitute an important agricultural activity in the LUBGWMA that support local markets and the economy. These operations can range from large, irrigated pastures used for year- round or rotational grazing, to small rural properties that may have a few animals year around, and seasonal grazing for crop removal.

In this action plan, livestock refers to domesticated animals being raised or fed within the LUBGWMA in pastures, rangeland, or confinement areas, except for animals in

permitted CAFOs. Livestock operations include, but are not limited to cattle and calves, horses, ponies, donkeys and mules, sheep, goats, llamas, swine, chickens, and fowl. All livestock operations are regulated by local Agricultural Water Quality Management Area Rules and are prohibited from polluting surface or groundwater.

Livestock waste (manure) can be a source of nitrate that may leach into groundwater. Generally, on well-managed irrigated pastures, the nutrients in manure are used to sustain the growing vegetation, with little available to be leached to groundwater. Areas where animals are concentrated on bare or sparsely vegetated ground, especially if irrigated or where water is ponded, pose the greatest threat for excess nutrients to leach to shallow groundwater. For additional information, see the overview for 4.2.1

#### 4.4.2 Sources

Livestock waste is a potential source of nitrate available for leaching into groundwater. Livestock management must be done in a manner that minimizes the delivery of nutrients and bacteria to groundwater. A grazing management system should promote and maintain adequate vegetative cover for protection of water quality, by consideration of intensity, frequency, duration, and season of grazing. Effective management practices for prevention and control of impacts from livestock include grazing management or scheduling based on intensity, duration, frequency, and season of use; pasture rotation including resting and deferrals; riparian pastures; vegetation management – grass seeding, weed control, controlled burning; fencing – including temporary, cross, and enclosures; watering facilities – spring development, water gaps, off-stream water (may require water rights, refer to ORS 537.141); salt and mineral distribution; waste management systems – clean water diversions; waste collection, storage, and utilization; facilities operation and maintenance; safe diversion of runoff; protection of clean water sources; lot maintenance – smoothing, mounding, seeding, filter strips, catch basins, berms.

Careful management of areas used for grazing, feeding, and handling are critical to the success of livestock operations and have potential to affect water quality by the runoff of sediment and animal wastes.

#### 4.4.3 Strategies

##### 4.4.3.1 Agricultural Water Quality Program (AGWQ)

**Objective:**

Prevent and control water pollution (including groundwater) from agricultural activities to achieve water quality standards.

**Action:**

- Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.
- Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described in Section 4.1.3.2.
- Review Willow Creek and Umatilla Area Plans to ensure voluntary practice recommendations are protective of groundwater.
- Review Willow Creek and Umatilla Area Rules to ensure regulations are protective of groundwater.
- See section 4.3.3.2 for livestock inventory information.

**Lead Agencies:**

ODA. Partner agencies: DEQ, DSL, OWRD, Morrow SWCD, Umatilla SWCD, Local Advisory Committees for Willow Creek and Umatilla management areas.

**Schedule:**

- Continuous long-term: Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.
- Short-term: Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.
- Short-term: Review Area Rules every two years. The Willow Creek and Umatilla rules were last reviewed in February 2024. Rule changes may be done anytime the agency identifies a need.
- Short to Medium-term: Review Area Plans on an alternating schedule of a full (every six years) and light review (every two years). The Willow Creek and Umatilla area plans were last reviewed In February 2024.

**Monitoring Progress:**

- See monitoring information listed in Section 4.1.3.1

**Description:**

The AGWQ program relies on a complaint-based and program-initiated system to ensure compliance, inspecting operations with potential risks to surface or groundwater. The normal pre-inspection process involves an assessment of risk to both surface and groundwater resources. The inspection process would determine if there were an impact to groundwater. If there is an impact, ODA works with the operator to develop a plan to address the issue and stop the impact. If the operator does not comply, ODA

can issue a Notice of Noncompliance and a Plan of Correction with required actions. Continued non-compliance may result in civil penalties.

4.4.3.1 Agriculture Water Quality Program (AGWQ)	
OBJECTIVE: Prevent and control water pollution (including groundwater) from agricultural activities to achieve water quality standards. <i>[4.4 Livestock Grazing]</i>	
<b>Continuous</b>	<ul style="list-style-type: none"> <li>- Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.</li> </ul>
<b>Short-Term 2023-2027</b>	<ul style="list-style-type: none"> <li>- Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.</li> <li>- Area Rules are reviewed every two years. The Willow Creek and Umatilla rules were last reviewed in Feb 2024. Rule changes may be done anytime the agency identifies a need.</li> </ul>
<b>Medium-Term 2027-2031</b>	<ul style="list-style-type: none"> <li>- Area Plans are reviewed on an alternating schedule of a full and light review of every 6 years for full and every 2 years for a light review. The Willow Creek and Umatilla area plans were last reviewed In February of 2024.</li> </ul>

#### 4.4.3.2 Inventory of Livestock Operations

**Objective:**

Inventory all livestock operations that do not meet the definition of a CAFO and are not required to seek a permit. Provide outreach and technical assistance to livestock owners to ensure compliance with groundwater protection requirements.

**Action:**

- Inventory large and small livestock operations including inventory of irrigation types, drainage paths, and manure storage.
- Inventory of irrigation types and drainage paths.
- Identify and inventory manure storage practices.
- Conduct outreach and technical assistance to livestock owners.
- Develop data in a usable GIS layer.

**Lead Agencies:**

ODA. Partners: Morrow SWCD

**Schedule:**

- Short-term: Conduct an inventory of livestock owners within the LUBGWMA. To be completed by the end of 2025.
- Short, Medium and Long-term: Outreach and technical assistance will start once the inventory is completed at the end of 2025 and will be ongoing.
- Short-term: Input inventory data into a usable GIS layer, anticipated to be completed in 2025.

**Monitoring Progress:**

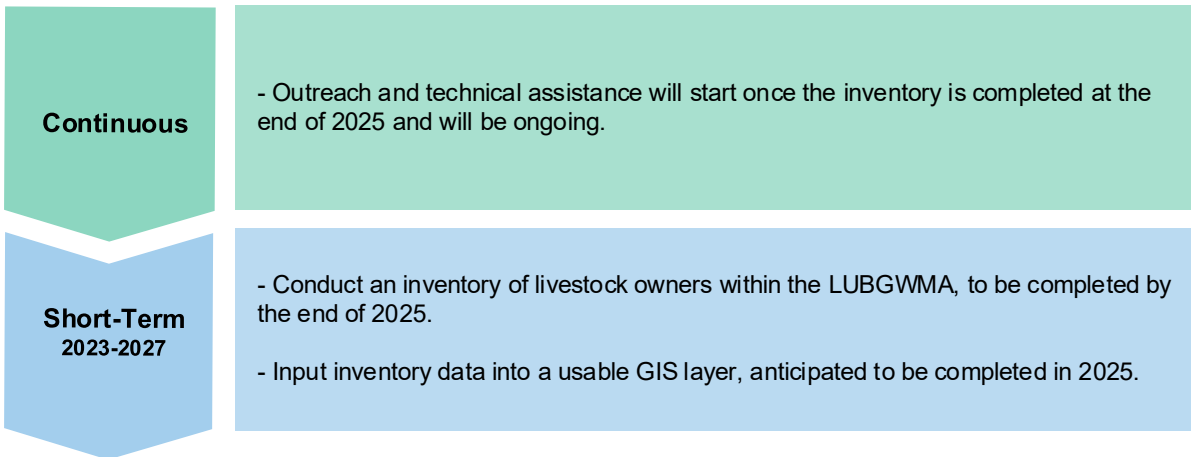
- It is estimated that the inventory project will be complete by August 2025. After completion the data will be completed to be used for outreach and technical assistance.

**Description:**

Morrow SWCD received an ODA Agricultural Water Quality Support Grant to complete an agricultural inventory including inventory of livestock operations within the LUBGWMA and the rest of Morrow County. The database and data input forms were developed by ODA. Morrow SWCD began the inventory in May of 2024. Information collected includes the presence of livestock use, classification of livestock uses, type of livestock, approximate number of livestock, acreage, irrigation, and drainage paths. This inventory is one of two goals identified in the Willow Creek and Umatilla Agricultural Water Quality Management Plans.

#### 4.4.3.2 Inventory of Livestock Operations

OBJECTIVE: Inventory all livestock operations that do not meet the definition of a CAFO and are not required to seek a permit and to do outreach and technical assistance to livestock owners to ensure compliance with groundwater protection requirements. [4.4 Livestock Grazing]



#### 4.4.3.3 SB 85 Rules: Manure Management

##### Objective:

To extend permit coverage and compliance requirements to those receiving and land applying animal nutrient exported from permitted CAFOs and land applied within a Groundwater Management Area boundary to ensure groundwater protection.

##### Actions:

- Establish a rules advisory committee (RAC) and complete the rulemaking process to develop rules governing the Nutrient Application Permit.
- Draft and implement a General Nutrient Application Permit.
- Recruit and train the Permit Coordinator and CAFO Inspector positions.

##### Lead Agency:

ODA. Partners: DEQ.

##### Schedule:

- Short-term: Establish a rules advisory committee (RAC) and complete the rulemaking process to develop rules governing the Nutrient Application Permit, anticipated to start late 2024.
- Short-term: Draft and implement a General Nutrient Application Permit. A General Nutrient Application Permit will be developed post rulemaking process. This process is anticipated to take 6-8 months.
- Short-term: Recruitment of the Permit Coordinator and CAFO Inspector positions is anticipated to begin late 2024.

### Monitoring Progress:

It is anticipated that the performance tracking used for the nutrient application permits will be similar to that of CAFO permits in evaluating the number that are in compliance with the permit on an annual basis.

- Percentage of permits in compliance with permit during routine inspection.

### Description:

The 2023 Oregon Legislature passed, and the governor signed, Senate Bill 85 that amends existing program rules and creates new CAFO program statutes. To fully implement SB 85, ODA has initiated the rulemaking process. SB 85 has provisions involving OWRD that may also require rulemaking activities.

One of the new requirements in SB 85 is that ODA create a new Nutrient Application Permit (NAP). The NAP is required for growers located in a GWMA, who land apply manure or process wastewater they import from a permitted CAFO. ODA expects the NAP rulemaking to begin late 2024. The passage of SB 85 also included two new ODA positions, a Permit Coordinator and an Inspector, to support the additional workload resulting from the new permit and permitting changes.

#### 4.4.3.3 SB 85 Rules: Manure Management

OBJECTIVE: To extend permit coverage and compliance requirements to those receiving and land applying animal nutrient exported from permitted CAFOs and land applied within a Groundwater Management Area boundary to ensure groundwater protection. *[4.4 Livestock Grazing]*

#### Short-Term 2023-2027

- Establish a rules advisory committee (RAC) and complete the rulemaking process to develop rules governing the Nutrient Application Permit, anticipated to occur late 2024.
- Draft and implement a General Nutrient Application Permit. General Nutrient Application Permit will be developed post rulemaking process, this process is anticipated to take 6-8 months.
- Recruitment of the Permit Coordinator and CAFO Inspector positions is anticipated to begin late 2024.

## 4.5 Land Application of Industrial and Domestic Wastewater

### 4.5.1 Overview

DEQ regulates wastewater discharges from industrial and domestic wastewater sources to protect groundwater and surface water. This includes collection, storage, and



treatment facilities that reuse industrial wastewater (including from food processors) and domestic wastewater containing nitrogen for crop irrigation. DEQ does this by issuing permits under authority of state law for wastewater discharge to land called a Water Pollution Control Facilities permit (WPCF). DEQ also issues permits for discharge to surface water under authority of federal law called National Pollutant Discharge Elimination System (NPDES) permits.

Reusing wastewater to grow crops is a beneficial activity that reduces the need to draw irrigation water from other sources and can also reduce the need for using other types of commercial fertilizer. WPCF and NPDES permits can allow collection, treatment, storage, and irrigation of wastewater for beneficial use or disposal. The majority of active wastewater permits that allow reuse within the LUBGWMA are WPCF permits.

#### 4.5.2 Sources

As of July 2024, there were about 22,000 acres in DEQ's WPCF land application wastewater irrigation program—this is about 13.5% of the total irrigated agricultural land in the LUBGWMA. The list below is current at the time of writing for facilities actively land applying wastewater; however, permit updates are ongoing.

##### **Permit holders for land application of industrial wastewater:**

- Port of Morrow (11,718 acres)
- Lamb Weston - Hermiston (6,018 acres)
- JR Simplot (4,415 acres). Note: This facility is no longer food processing; the wastewater is low nitrogen, and the facility currently manages land application of non-contact cooling water only from the local cogeneration plant.
- Olam West Producers (120 acres)
- General 1400B permit holders (Very small operations, max of 82,000 gallons per day. Max output equates to one field of about 20 acres or less. Most are seasonal and don't generate max output): JSH Farms, Follett's Meat Company, Starvation Ridge Farming.

##### **Permit holders for land application or groundwater disposal of domestic wastewater:**

- City of Stanfield - NPDES permit with seasonal land application (38.6 acres)
- City of Boardman - WPCF permit with seasonal land application (104 acres)
- City of Irrigon - WPCF permit with no land application, but discharge to infiltration basins year-round for treated wastewater disposal.

## 4.5.3 Strategies

### 4.5.3.1 Wastewater Permitting and Compliance

**Objective:**

Continue regulating land application of industrial and domestic wastewater to protect groundwater under state authority in the absence of applicable federal regulations.

**Action:**

- Prioritize modifications and renewals of wastewater permits in the LUBGWMA to include sufficient provisions to protect groundwater.
- Continue implementing and enforcing requirements of Water Pollution Control Facilities (WPCF) and National Pollutant Discharge Elimination System (NPDES) permits to ensure the collection, treatment, storage, disposal, and land application of wastewater is done in a manner that protects groundwater.

**Lead Agency:**

DEQ

**Schedule:**

- Short-term: Prioritize modifications and renewals of wastewater permits in the LUBGWMA to ensure protection of groundwater. WPCF permits can be issued for a term not to exceed 10 years. NPDES can be issued for a term not to exceed five years. DEQ may process permit modifications to further update conditions of permits in between renewals. Permit schedules are as follows:
  - Port of Morrow: Permit updated and renewal issued 12/1/2017; Permit modifications issued since renewal: 11/1/2022, 2/1/2024, and 6/3/2024.
  - Lamb Weston - Hermiston: Permit update and renewal is currently underway. Permit expired 1/31/2009 but permit requirements remain in effect under an administrative extension until DEQ takes renewal action. Administrative extensions are authorized by Oregon rule (OAR 340-045).
  - JR Simplot: Permit updated and renewal issued 11/1/2022. The facility has submitted a modification request to remove acreage from the land application program, which is under DEQ review as of July 2024.
  - Olam West Producers: Permit updated and renewal issued 6/1/2023.
  - General permit holders: JSH Farms, Follett's Meat Company, Starvation Ridge Farming: These facilities are under the 1400B general permit that was updated and renewed 5/21/2018.
  - City of Stanfield: Permit updated and renewal issued 10/13/2022.
  - City of Boardman: Permit updated and renewal issued 2/13/2020.
  - City of Irrigon: Permit expired 4/30/2009 and is under administrative extension. The facility completed an MAO with DEQ in 2021 that required

wastewater treatment improvements to discharge below 7 mg/L nitrate. Permit renewal is pending.

- Medium-term: Continue updating and renewing wastewater permits to ensure operations are protective of groundwater.
  - Port of Morrow: Permit expires 11/30/2027.
  - Lamb Weston - Hermiston: Permit expiration date will be 10 years from next renewal issuance date.
  - JR Simplot: Permit expires 10/31/2032.
  - Olam West Producers: Permit expires 3/31/2033.
  - JSH Farms, Follett's Meat Company, Starvation Ridge Farming: The 1400B general permit expires 5/21/2028.
  - City of Stanfield: Permit expires 9/30/2027.
  - City of Boardman: Permit expires 1/31/2030.
  - City of Irrigon: Permit expiration date will be 10 years from next renewal issuance date.
- Long-term: Continue updating and renewing wastewater permits to ensure operations are protective of groundwater.
- Continuous: Continue implementing and enforcing requirements of Water Pollution Control Facilities (WPCF) permits and National Pollutant Discharge Elimination System (NPDES) permits to ensure the collection, treatment, storage, and land application of wastewater is done in a manner that protects groundwater. Review facilities' required annual and monthly reports for compliance with permit conditions. Permits require facilities to continuously adapt operations to maintain compliance and minimize nitrate leaching potential.

### **Monitoring Progress:**

- Number of permits that have been updated via renewal or modification.
- Ensure annual compliance reports are submitted to DEQ each year. Permits require that facilities monitor groundwater nitrate fluctuations and trends at their individual sites to monitor and remediate potential impacts.
- Number of facilities on track with completing compliance schedule and order milestones.
- Number of engineering reviews completed for wastewater infrastructure improvement projects.

### **Description:**

Wastewater permits include limits on the amount of nitrogen and water that can be applied to the soil to minimize nitrate leaching to groundwater. Permits also provide limits on timing of irrigation of wastewater and system monitoring of crop nitrogen removals, soil nitrogen, groundwater monitoring, and soil moisture. If permittees violate

conditions of their permits, DEQ has enforcement authority to penalize the facilities and require compliance via enforcement orders.

Since 2020, DEQ has been in the process of reviewing and updating wastewater permits in the LUBGWMA to include and revise provisions to assure protection of groundwater. This includes a combination of permitting approaches and required management techniques that include:

- **Review and use of appropriate agronomic rates:** Agronomic rates are proposed by the permittee based upon third-party fertilizer guides (such as ones published by Oregon State University) and are not to be exceeded. DEQ requires permittees to evaluate operations and to lower agronomic rates as necessary based on actual field performance (via crop tissue testing, soil nitrogen levels, crop yields, etc.).
- **Restricting nitrogen-rich wastewater land application to growing season:** DEQ is restricting land application to the months where crops can adequately uptake the nutrients. Irrigation with untreated high nitrogen wastewater will no longer be allowed in the winter period between November and February. Limited exceptions for beneficial uses may be allowed using treated and/or low-nitrogen wastewater. Limited shoulder season beneficial uses may include field preparation, dust control, and cover crop establishment.
- **Monitoring soil moisture to minimize leaching:** Evaluation of moisture levels in soil will assist in prohibiting applications to exceed a field's soil water holding capacity. Management of irrigation within the rooting zone of a crop will minimize leaching.
- **Preventing additional wastewater streams during noncompliance:** For facilities currently out of compliance, no new sources will be allowed to be included in their wastewater streams that would add to non-compliance and nitrogen irrigation discharges until compliance is attained.
- **Requiring additional lined storage lagoons with leak detection:** Storage of wastewater in synthetically-lined lagoons to prevent leakage will be required via permit compliance schedules. Lagoons will be required to be built to accommodate winter storage needs with leak detection required on new installations.
- **Wastewater treatment prior to land application.** Implementation of primary and secondary treatment will be required where necessary to reduce nitrogen concentration in land applied wastewater to prevent agronomic rate exceedances.
- **Conveyance system maintenance:** Conveyance systems and pump stations will be required to be adequately maintained to minimize leaks and uncontrolled spills. Thorough mapping of system infrastructure, scheduled maintenance, and review from DEQ's engineers is completed as required by rule.

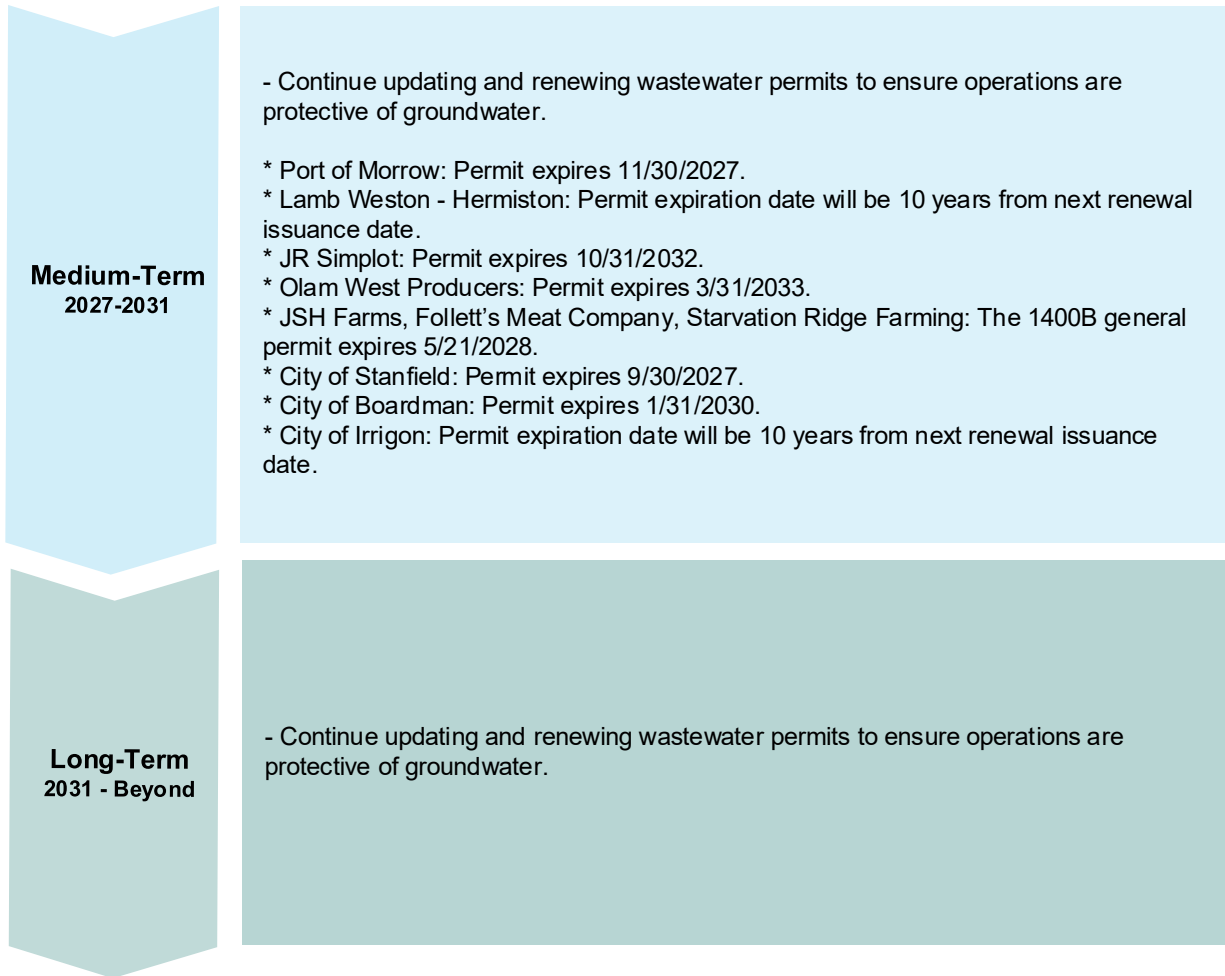
- **Remedial investigations:** Remedial Investigation/Feasibility Studies and water quality analysis reports will be required for sites with identified or suspected contamination of groundwater as applicable under DEQ rules. Implementation of remedial actions and feasibility studies will be reviewed by DEQ land application and hydrogeologist staff.
- **Required reporting:** Monthly and/or annual reporting is required to document compliance or non-compliance with conditions of each permit. Permittees must provide results of required testing of wastewater, soil, groundwater monitoring, crop tissue testing, supplemental irrigation water testing, and crop yields. Permitted facilities must work with land application partners (usually farm owners) to provide timely data reporting during crop cycles/harvest periods. Permits contain standard language to report any non-compliance that has occurred and contain a statement prohibiting violations of DEQ's groundwater protection rules.

DEQ is incorporating the provisions described above during permit renewals and modifications, the dates of which are included in the strategy's schedule above.

### 4.5.3.1 Wastewater Permitting and Compliance

**OBJECTIVE:** Continue regulating land application of industrial and domestic wastewater to protect groundwater under state authority in the absence of applicable federal regulations. [4.5 Land Application of Industrial and Domestic Wastewater]

<b>Continuous</b>	<p>- Continue implementing and enforcing requirements of Water Pollution Control Facilities (WPCF) permits and National Pollutant Discharge Elimination System (NPDES) permits to ensure the collection, treatment, storage, and land application of wastewater is done in a manner that protects groundwater. Review facilities' required annual and monthly reports for compliance with permit conditions. Permits require facilities to continuously adapt operations to maintain compliance and minimize nitrate leaching potential.</p>
<b>Short-Term 2023-2027</b>	<p>- Prioritize modifications and renewals of wastewater permits in the LUBGWMA to be more protective of groundwater. WPCF permits can be issued for a term not to exceed 10 years. NPDES can be issued for a term not to exceed five years. DEQ may process permit modifications to further update conditions of permits in between renewals. Permit schedules are as follows:</p> <ul style="list-style-type: none"><li>* Port of Morrow: Permit updated and renewal issued 12/1/2017; Permit modifications issued since renewal: 11/1/2022, 2/1/2024, and 6/3/2024.</li><li>Lamb Weston - Hermiston: Permit update and renewal is currently underway. Permit expired 1/31/2009 but permit requirements remain in effect under an administrative extension until DEQ takes renewal action. Administrative extensions are authorized by Oregon rule (OAR 340-045).</li><li>* JR Simplot: Permit updated and renewal issued 11/1/2022. The facility has submitted a modification request to remove acreage from the land application program, which is under DEQ review as of July 2024.</li><li>Olam West Producers: Permit updated and renewal issued 6/1/2023.</li><li>General permit holders: JSH Farms, Follett's Meat Company, Starvation Ridge Farming: These facilities are under the 1400B general permit that was updated and renewed 5/21/2018.</li><li>* City of Stanfield: Permit updated and renewal issued 10/13/2022.</li><li>* City of Boardman: Permit updated and renewal issued 2/13/2020.</li><li>* City of Irrigon: Permit expired 4/30/2009 and is under administrative extension. The facility completed an MAO with DEQ in 2021 that required wastewater treatment improvements to discharge below 7 mg/L nitrate. Permit renewal is pending.</li></ul>



## 4.6 Rural Residential

### 4.6.1 Overview

Rural residential zones include mixed land use practices that may include housing, gardens or small farms, onsite septic systems and drinking water wells. Agricultural activities, regardless of zoning, are regulated by the ODA Agriculture Water Quality Program. This section's objective and strategies intentionally mirrors section 4.2.3.1. The agency continually looks for ways to broaden education and outreach, by engaging with various local organizations, identifying additional partners, and leveraging these relationships to effectively distribute and amplify educational resources to the ag community.

## 4.6.2 Sources

Nitrates can come from human waste, animal waste, and lawn or garden fertilizers.

## 4.6.3 Strategies

### 4.6.3.1 Agricultural Water Quality Program

**Objective:**

Prevent and control water pollution (including groundwater) from agricultural activities to achieve water quality standards.

**Action:**

- Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.
- Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.
- Review Willow Creek and Umatilla Area Plans to ensure voluntary practice recommendations are protective of groundwater
- Review Willow Creek and Umatilla Area Rules to ensure regulations are protective of groundwater.
- See section 4.3.3.2 for livestock inventory information.

**Lead Agencies:**

ODA. Partner agencies: DEQ, DSL, OWRD, Morrow SWCD, Umatilla SWCD, Local Advisory Committees for Willow Creek and Umatilla management areas.

**Schedule:**

- Continuous long-term: Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.
- Short-term: Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.
- Short-term: Review Area Rules every two years. The Willow Creek and Umatilla rules were last reviewed in February 2024. Rule changes may be done anytime the agency identifies a need.
- Short to Medium-term: Review Area Plans on an alternating schedule of a full (every six years) and light review (every two years). The Willow Creek and Umatilla area plans were last reviewed In February of 2024.



**Monitoring Progress:**

- See monitoring information listed in Section 4.1.3.1

**Description:**

ODA's Agricultural Water Quality Program was established in 1993 and is a regulatory compliance program for all nonpoint source pollution resulting from agricultural activities. The program relies on complaint-based and program-initiated investigations to ensure compliance, through inspections of operations with potential risks to surface or groundwater. Currently the program has one water quality specialist located in the LUBGWMA region to provide technical support and compliance oversight. Work in this region is also supported by additional staff to implement initiatives to address groundwater contamination such as the Strategic Implementation Area described in strategy 4.2.3.2.

The agricultural water quality statutes and rules include an enforcement process that requires the program to ensure agricultural operators are complying with the area rules. ODA reviews complaints for completeness and validity and will perform investigations as needed. Complaints are typically reviewed and assigned within two business days of receipt and completed within 45 days after the site visit including any agency compliance actions as appropriate.

**Compliance and Enforcement:**

The investigation process involves an initial assessment of risk to both surface and groundwater resources. If the investigation determines there is an impact to groundwater, ODA will inform the operator of the rules and work with them to develop a plan to address the issue, so they are no longer impacting groundwater. If an operator chooses not to take action and address the issue, ODA has enforcement authority and may issue a Notice of Noncompliance and Plan of Correction (NON/POC). This includes specific actions that are required of the operator to address the issue and achieve compliance. If a NON/POC has been issued and an operator does not take action or continues to cause impacts, ODA will issue civil penalties.

#### 4.6.3.1 Agriculture Water Quality Program

OBJECTIVE: Prevent and control water pollution (including groundwater) from agricultural activities to achieve water quality standards. [4.6 Rural Residential Strategies Schedule]

<b>Continuous</b>	<ul style="list-style-type: none"><li>- Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.</li></ul>
<b>Short-Term 2023-2027</b>	<ul style="list-style-type: none"><li>- Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.</li><li>- Area Rules are reviewed every two years. The Willow Creek and Umatilla rules were last reviewed in Feb 2024. Rule changes may be done anytime the agency identifies a need.</li></ul>
<b>Medium-Term 2027-2031</b>	<ul style="list-style-type: none"><li>- Area Plans are reviewed on an alternating schedule of a full and light review of every 6 years for full and every 2 years for a light review. The Willow Creek and Umatilla area plans were last reviewed in Feb 2024.</li></ul>

#### 4.6.3.2 Onsite Septic System Permitting and Compliance

**Objective:**

Continue regulating onsite septic systems to protect groundwater and public health.

**Action:**

- Continue partnering with Umatilla County Public Health Department to ensure implementation of rule requirements for the construction, alteration, repair, operation, and maintenance of residential onsite septic systems.
- Continue implementing and enforcing Water Pollution Control Facilities (WPCF) Onsite permits for large onsite septic systems, such as commercial or community systems, that receive over 2,500 gallons of wastewater per day or wastewater that is stronger than residential strength.

**Lead Agencies:**

DEQ, Umatilla County Public Health Department

**Schedule:**

- Continuous: DEQ will continue partnering with Umatilla County Public Health Department to ensure implementation of rule requirements for the construction, alteration, repair, operation, and maintenance of residential onsite septic systems.
- Continuous: DEQ will continue implementing and enforcing Water Pollution Control Facilities (WPCF) Onsite permits for large onsite septic systems, such as commercial or community systems, that receive over 2,500 gallons of wastewater per day or wastewater that is stronger than residential strength.

**Monitoring Progress:**

- Track residential onsite septic system applications submitted to Umatilla County Public Health Department.
- Track number of WPCF Onsite permits issued or renewed in Morrow and Umatilla counties.
- Ensure annual WPCF discharge monitoring reports are submitted to DEQ each year when required by permit. All new and renewed WPCF permits require annual submission of discharge monitoring reports.

**Description:**

The Umatilla County Public Health Department is DEQ's authorized agent for implementing residential onsite septic system rules, permits, and inspections in both Morrow and Umatilla counties. DEQ is available to provide the health department technical assistance as requested.

DEQ retains responsibility for permitting and compliance of large onsite septic systems, such as commercial or community systems, that receive over 2,500 gallons of wastewater per day or wastewater that is stronger than residential strength. DEQ regulates these systems through a Water Pollution Control Facilities (WPCF) Onsite permit. WPCF permits have limits and conditions that are intended to be protective of ground and surface waters, as well as the environment and public health.

#### 4.6.3.2 Onsite Septic System Permitting and Compliance

OBJECTIVE: Continue regulating onsite septic systems to protect groundwater and public health. [4.6 Rural Residential Strategies Schedule]

##### Continuous

- Partner with Umatilla County Public Health Department to ensure implementation of rule requirements for the construction, alteration, repair, operation, and maintenance of residential onsite septic systems.
- Implement and enforce Water Pollution Control Facilities (WPCF) Onsite permits for large onsite septic systems, such as commercial or community systems, that receive over 2,500 gallons of wastewater per day or wastewater that is stronger than residential strength.

#### 4.6.3.3 Onsite Septic System Repair and Replacement Funding

##### Objective:

Continue providing homeowners with affordable financing options to repair or replace failing septic systems.

##### Action:

- Partner with public agencies or qualified nonprofit lender(s) to offer affordable financing options for septic system repair and replacement when funding is available for this purpose.

##### Lead Agency:

DEQ

##### Schedule:

- Continuous: Partner with public agencies or qualified nonprofit lender(s) to offer affordable financing options for septic system repair and replacement when funding is available for this purpose.

##### Monitoring Progress:

- Assess if residents in the area received financing for repair or replacement of their septic systems through DEQ managed programs.

##### Description:

DEQ partners with regional partners that work with homeowners to offer below-market rate loans to repair or replace failing septic systems. The loan can cover all eligible design, permitting and installation fees directly related to the septic system. In some cases, it can finance a connection to a nearby municipal sewer. Lower rates and deferred payment options may be available for homeowners with low or moderate

incomes. Grants also may be available to eligible borrowers, depending on funding availability. The Oregon Legislature has authority to allocate funds for loans. In addition, federal funds are currently available as of July 2024 for loans and in some cases grants.

#### 4.6.3.3 Onsite Septic System Repair and Replacement Funding

OBJECTIVE: Continue providing homeowners with affordable financing options to repair or replace failing septic systems. *[4.6 Rural Residential Strategies Schedule]*

**Continuous**

- Partner with public agencies or qualified nonprofit lender(s) to offer affordable financing options for septic system repair and replacement when funding is available for this purpose.

#### 4.6.3.4 Public Wastewater Treatment System and Irrigation Modernization Funding

**Objective:**

Continue providing public entities with low interest loans and additional subsidies to support public wastewater system upgrades or expansion and irrigation modernization.

**Action:**

- Continue supporting public entities with funding and technical resources through DEQ’s Clean Water State Revolving Fund program.

**Lead Agency:**

DEQ

**Schedule:**

- Continuous: Continue supporting public entities with funding and technical resources through DEQ’s Clean Water State Revolving Fund program. Subsidies are dependent on funding availability.

**Monitoring Progress:**

- Assess how many communities in the area have applied for funding, are on the intended use plan, or have received financing from the Clean Water State Revolving Fund.
- For communities that have received financing, include the anticipated water quality benefits of the funded projects.

**Description:**

The Clean Water State Revolving Fund (CWSRF) acts like an environmental infrastructure bank by providing below-market rate loans to eligible recipients for water infrastructure projects and other projects that protect or enhance clean water. Eligible projects include wastewater or stormwater treatment projects, nonpoint source protection, and irrigation system modernization projects. Public entities include cities, counties, sanitary districts, soil and water conservation districts, irrigation districts, tribal nations, various special districts, and certain intergovernmental entities. Loans can be used for planning, design, and construction of public wastewater infrastructure and other public water quality projects.

As of June 2024, eligible borrowers may also be available for up to \$100,000 in principal forgiveness for planning projects or up to \$2 million or 50% of a construction project, whichever is less. Principal forgiveness is an additional subsidy that reduces the amount of principal a borrower is required to pay back on a loan. Find more information about the loan program at <https://ordeq.org/CWSRF> or about principal forgiveness at <https://ordeq.org/CWSRF-PF>.

**4.6.3.4 Public Wastewater Treatment System and Irrigation Modernization Funding**

OBJECTIVE: Continue providing public entities with low interest loans and additional subsidies to support public wastewater system upgrades or expansion and irrigation modernization. *[4.6 Rural Residential Strategies Schedule]*

**Continuous**

- Support public entities with funding and technical resources through DEQ's Clean Water State Revolving Fund program. Subsidies are dependent on funding availability.

**4.6.3.5 Domestic Well Construction and Compliance**

**Objective:**

Protect groundwater resources through ensuring that new and modified wells are constructed properly, abandoned wells are properly decommissioned, providing education to the public and well drilling community, and utilizing enforcement actions when necessary.

**Action:**

- Ensure wells are properly constructed, altered, maintained, and decommissioned to prevent contamination, loss of artesian pressure, and waste of Oregon's groundwater resources.

**Lead Agency:**

OWRD

**Schedule:**

- Continuous: Ensure wells are properly constructed, altered, maintained, and decommissioned to prevent contamination, loss of artesian pressure, and waste of Oregon's groundwater resources.

**Monitoring Progress:**

- Inspect 90% of new, altered, and abandoned wells in the LUBGWMA.
- Conduct in-depth well assessments at 10 wells per year (more if federal funds are secured).

**Description:**

No state agency has regulatory authority over exempt (domestic) well water quality. OWRD does regulate well construction and compliance, authority under which domestic wells are required to meet certain construction and maintenance standards (see OAR Chapter 690, Divisions 200 - 220). These standards also include septic system setback requirements for all water supply wells, which include domestic wells. OWRD will also continue to provide education and outreach to well owners on proper well maintenance and monitoring ([https://www.oregon.gov/owrd/WRDPublications1/Well\\_Water\\_Handbook.pdf](https://www.oregon.gov/owrd/WRDPublications1/Well_Water_Handbook.pdf)).

OWRD staff have identified potential future work to further our understanding of the spatial (vertical and horizontal) extent of the nitrate contamination, including well inspections, geolocating wells and cross-referencing with existing well logs to identify well construction methods (depth, casing, etc.), and other physical well measurements (e.g. static water levels, casing above land surface). Collecting these data, in conjunction with data collected by OHA and county health departments, may help identify prudent next steps for medium- and long-term solution evaluations.

Well construction requirements have evolved over time to ensure groundwater resources are protected. Additionally, some wells have been installed improperly (e.g., not cased and sealed properly), which may allow contaminated water to move between aquifer systems. These improperly constructed wells need to be identified and funds secured to remedy well construction deficiencies as part of the long-term solution (see 5.1.4 for more information about how OWRD is collecting these data).

#### 4.6.3.5 Domestic Well Construction and Compliance

OBJECTIVE: Protect groundwater resources through ensuring that new and modified wells are constructed properly, abandoned wells are providing education to the public and well drilling community, and utilizing enforcement actions when necessary. [4.6 Rural Residential Strategies Schedule]

**Continuous**

- Ensure wells are properly constructed, altered, maintained, and decommissioned so as to prevent contamination, loss of artesian pressure, and waste of Oregon's groundwater resources.

### 4.7 Additional Remediation Considerations

Controlling the continued source of contamination is the primary remediation objective of the agencies, as discussed throughout Section 4 of this plan. Reducing continued inputs is the most effective and feasible approach to remediating widespread nitrate groundwater contamination, such as exists in the LUBGWMA. This involves addressing the sources of nitrate pollution and implementing long-term strategies to protect groundwater quality and ensure safe drinking water. The state intends for these strategies to evolve over time, adapting to new information and collaborative efforts. To the extent that additional data and research are necessary, those efforts should be initially focused on improving source control throughout the LUBGWMA.

Additional technologies, including managed aquifer recharge, have been attempted in other states where nitrate contamination has exceeded EPA's threshold level of 10 mg/L. At present, it is still uncertain whether or to what extent artificial groundwater recharge, pump and recharge, pump and treat, or other technologies might feasibly remediate widespread nitrate contamination like that in the LUBGWMA.

The affected area and volume of contaminated groundwater in the Lower Umatilla Basin alluvial aquifer are extensive and present considerable challenges when determining the viability of new technologies. For example, research from the University of California - Davis determined that "traditional pump and treat remediation to remove nitrate from large groundwater basins is extremely costly and not technically feasible." (UC Davis 2012 Nitrate Report, [https://www.waterboards.ca.gov/water\\_issues/programs/nitrate\\_project/](https://www.waterboards.ca.gov/water_issues/programs/nitrate_project/)) Other technologies, such as managed aquifer recharge, have limited impacts on this scale and may only be suitable to site-specific remediation objectives. To date, managed aquifer recharge projects in the Lower Umatilla Basin have focused on quantity, not on groundwater quality remediation.

The agencies have proposed below several initial steps and resources necessary to assess the feasibility of additional potential remediation technologies. This list is not



exhaustive but will inform future decisions on how and when other remediation technologies may be feasible in the LUBGWMA. These efforts would require additional, sustained resources to be successful.

- Complete hydrogeologic update of the alluvial aquifer and peer review (outlined in section 5.1.3).
- Conduct an analysis of field-specific consumptive water use trends from 1985 through 2023 to support identification of irrigation nitrate pollution sources in the LUBGWMA.
- Conduct well-specific assessments, including well-head protection concerns, accurate well location information, borehole geophysical data collection, static water level measurement, water quality sampling for nitrate and total dissolved solids, and analyses of existing data to tie the well to a water well log in the OWRD well log database. Wells and sampling will be selected in areas with data gaps, in areas of high nitrate contamination or other areas of interest.
- Conduct the design and construction of eight well pairs (shallow and deep wells - 16 wells total) to define stratigraphy and for water quality and groundwater level monitoring in the alluvial and shallow basalt stratigraphy in the LUBGWMA. Well locations will be chosen to fill gaps in the current monitoring network.

The agencies will continue to collect and share information as this work continues forward. Additional remediation questions and potential concepts will be evaluated in coordination with the EPA, LUBGWMA Committee, and other partners as additional data becomes available. These efforts, as well as ongoing data collection and analysis, will be foundational to ensure all remediation efforts—including source control and other technologies—are improving groundwater quality in the LUBGWMA.

#### 4.8 Performance Indicators

Agencies will evaluate efforts to reduce nitrate levels in groundwater using a combination of quantitative and qualitative measures. These performance metrics will be refined alongside the specific strategies outlined over time, allowing us to adapt and improve our approach to achieve tangible improvements in groundwater quality. Quantitative measures include current monitoring and data analysis strategies discussed in section 6, aiming for nitrate concentrations below 7 mg/L to ensure safe drinking water standards. The drinking water maximum contaminant level for nitrate is 10 mg/L. Qualitative measures may include assessing the implementation and maintenance of BMPs, compliance with agricultural water quality acts, strategic implementation areas, and other nitrate reduction strategies.

## 5. MONITORING, DATA, AND ANALYSIS

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### 5.1 Technical Work

#### 5.1.1 Groundwater Quality Sampling and Monitoring

**Objective:**

Monitor groundwater quality to understand current nitrate concentrations and track changes over time.

**Action:**

- Regularly sample long-term well network of approximately 30 wells, in addition to occasional larger scale sampling events.

**Lead Agency:**

DEQ

**Schedule:**

- Continuous: Quarterly sampling of DEQ's long-term well network of approximately 30 wells; occasional larger-scale sampling events as resources allow.

**Monitoring Progress:**

- Confirm quarterly sampling occurred and report results from previous year.
- Report results of any additional DEQ sampling events.

**Description:**

DEQ has been regularly collecting groundwater quality data in the area since the early 1990s. DEQ laboratory staff follow strict quality assurance processes to ensure data quality during sample collection and processing. DEQ has a long-term groundwater well network of approximately 30 wells the agency samples quarterly. Most of the wells in the network are private domestic wells. DEQ typically provides results via mail and/or home delivery to the well users once per year, and since 2022 has provided the results in both English and Spanish. Data from the long-term well network and occasional large-scale DEQ sampling is publicly available online in DEQ's [Ambient Water Quality Monitoring System](#) (AWQMS).

DEQ has also conducted four large-scale synoptic sampling events to-date: in 1992, 2003, 2009, and 2015. These sampling events involved DEQ taking samples at approximately 100-200 wells depending on the year. The last large-scale sampling

event in 2015 took samples at 132 monitoring, irrigation, and domestic wells across the LUBGWMA. In the 2015 sampling event, 44% of wells exceeded 10 mg/L.

DEQ and ODA also receive groundwater data from permitted facilities that report data from monitoring wells as a condition of their wastewater permit (Water Pollution Control Facilities Permit, which protects groundwater from wastewater discharges under Oregon state law). This data is submitted to DEQ and ODA in individual reports, which the agencies require to ensure compliance with permit requirements. Since this data is currently in individual facility reports, it is not as readily accessible as data directly collected by the agencies. The permit data is not currently posted online in the Ambient Water Quality Monitoring System due to limited resources and data platform capacity. DEQ hopes that a future data coordination platform will include data from permitted facilities (see Data Coordination Effort section).

OHA requires public drinking water providers to collect and report drinking water data from public water systems. Several public water systems in the area have had to install additional treatment or drill deeper wells to meet nitrate health standards. OHA and ODHS, along with Morrow and Umatilla counties and local CBOs are engaged in ongoing drinking water sampling from private wells in the LUBGWMA (see Safe Drinking Water section). This data is being collected for rapid response public health purposes and does not apply the same quality assurance practices as DEQ's groundwater data. Consequently, OHA's drinking water data is useful for immediate public health interventions—which was its intended purpose – and can inform the general understanding of water quality in the LUBGWMA but does not have the same level of accuracy or reliability as DEQ's groundwater data.

### 5.1.1 Groundwater Quality Sampling and Monitoring

OBJECTIVE: Monitor groundwater quality to understand current nitrate concentrations and track changes over time. *[5.1 Technical Work]*

#### Continuous

- Quarterly sampling of DEQ's long-term well network of about 30 wells; occasional larger-scale sampling events as resources allow.

## 5.1.2 Groundwater Quality Trends Analysis

### **Objective:**

Track fluctuations or consistencies in nitrate concentrations over time to understand how land use activities may affect groundwater quality.

### **Action:**

- Analyze groundwater quality data from DEQ long-term well network and other monitoring wells. Publish public reports to enhance understanding of groundwater quality over time and inform land use decisions.

### **Lead Agency:**

DEQ

### **Schedule:**

- Short-term: Analyze groundwater quality data from DEQ long-term well network and other monitoring wells. Publish public reports to enhance understanding of groundwater quality over time and inform land use decisions. DEQ anticipates completing and publishing an updated trends analysis for the long-term well network in 2024, then will subsequently begin work on the trends analysis using data from permitted sites.
- Continuous: Continue to track fluctuations or consistencies in nitrate concentrations over time to understand how land use activities may affect groundwater quality.

### **Monitoring Progress:**

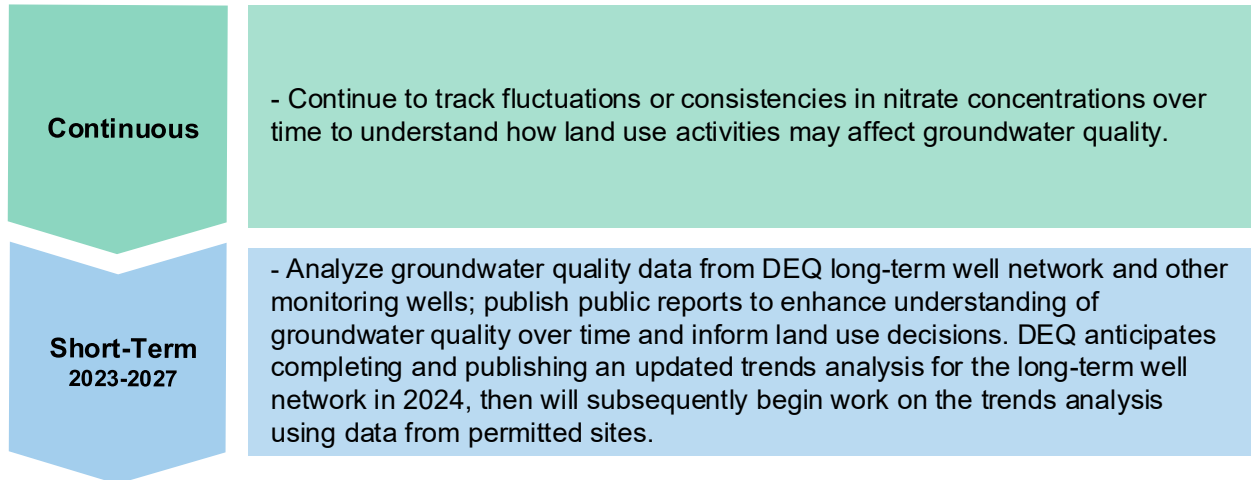
- Provide summary of any trends reports DEQ has published in the previous year.

### **Description:**

DEQ tracks and analyzes groundwater quality trends over time using groundwater quality data collected in the LUBGWMA (see 5.1.1). As of July 2024, DEQ is working on an updated trends analysis for the LUBGWMA that will show changes in water quality of individual wells and analyze overall water quality trends for the region. The analysis will include data from DEQ's long-term well network of approximately 30 wells. DEQ also plans to conduct a subsequent study to analyze trends of monitoring wells upgradient and downgradient of permitted wastewater land application and permitted CAFO sites. DEQ completed the most recent previous trends analysis for the area in 2012: [Analysis of Groundwater Nitrate Concentrations in the Lower Umatilla Basin Groundwater Management Area - Feb. 2012](#). DEQ did a partial trends analysis update to include data through 2016 for the [LUBGWMA Second Action Plan](#), pages 21-38.

### 5.1.2 Groundwater Quality Trends Analysis

OBJECTIVE: To track fluctuations or consistencies in nitrate concentrations over time to understand how land use activities may affect groundwater quality. [5.1 Technical Work]



### 5.1.3 Hydrogeology of the Lower Umatilla Basin - Update of Conceptual Model

#### Objective:

Update the Lower Umatilla Basin Groundwater Management Area technical investigation, Chapter 2: Hydrogeology section (Wozniak et al. 1995) with new data that have been collected in the three decades since the original report was released as a Final Review Draft.

#### Action:

- New datasets that will be used to update the hydrogeologic framework include more accurate wellhead elevations, years of high-frequency water level measurements, stratigraphic control from new well drilling, water quality data, and pumping test records.

#### Lead Agency:

OWRD

#### Schedule:

- Short-term: Update the Lower Umatilla Basin Groundwater Management Area technical investigation, Chapter 2: Hydrogeology section (Wozniak et al. 1995) with new data that have been collected in the three decades since the original report was released as a Final Review Draft. Planned completion by April 2025.
- Continuous: Continue working with partners to expand understanding of hydrogeology of the Lower Umatilla Basin.

**Monitoring Progress:**

- Complete update of the 1995 report by April 30, 2025.
- USGS completes peer review of updated report by October 31, 2025. If USGS is unable to complete the peer review, seek other qualified reviewers from state agencies, academic institutions, and/or other professionals as appropriate.

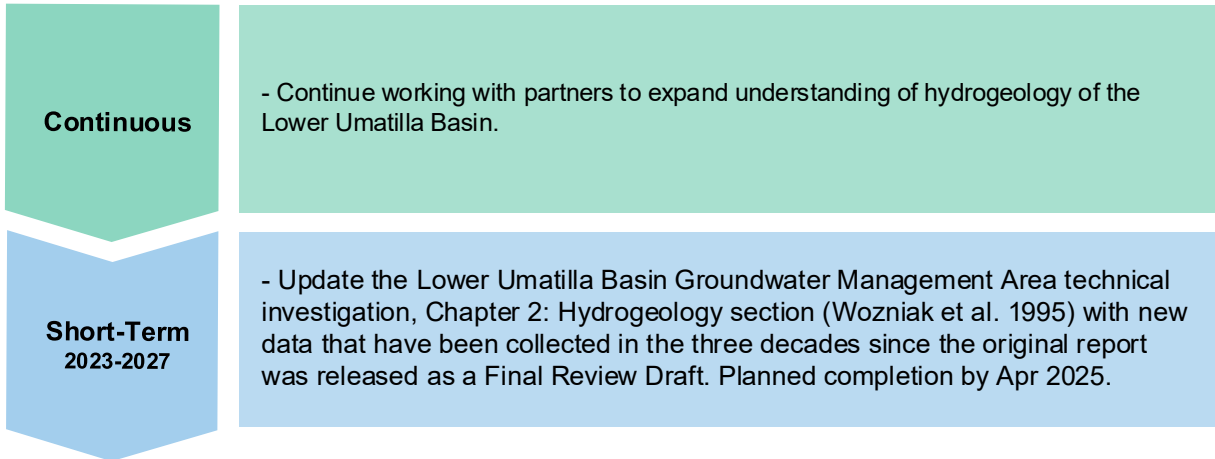
**Description:**

As discussed elsewhere in the plan, multiple state agencies are working to address nitrate contamination in the Lower Umatilla Basin, including teams collecting water quality samples from more than 1,000 wells. While the effort to date has made significant progress to identify households in need of emergency drinking water, the samples are not usually tied to well logs and therefore do not provide aquifer information. To develop solutions to protect public health, it is essential to understand where in the aquifer system contamination is known to exceed safe drinking water standards. For example, deepening domestic wells from the shallow sediments into a basalt aquifer may not result in improved drinking water quality if nitrate levels are also high in that basalt aquifer. This update to 1995 work by Wozniak et al., incorporates new data to further refine our understanding of the groundwater flow system that will support state agencies' efforts to solve this challenging problem.

Expected products will include GIS files of water level contours, long-term hydrographs, and estimates for hydraulic properties that will be used to refine the conceptual model for the sedimentary aquifer system of the Lower Umatilla Basin. Finally, the work and findings will be documented in an Open File Report, peer reviewed by USGS technical staff, and published. The anticipated date for submittal of the draft report for peer review is April 30, 2025.

### 5.1.3 Hydrogeology of the Lower Umatilla Basin - Update of the Conceptual Model

**OBJECTIVE:** The objective of this project is to update the Lower Umatilla Basin Groundwater Management Area technical investigation, Chapter 2: Hydrogeology section (Wozniak et al. 1995) with new data that have been collected in the three decades since the original report was released as a Final Review Draft. [5.1 Technical Work]



### 5.1.4 Ongoing Groundwater Levels Data Collection

**Objective:**

Track groundwater levels over time to inform understanding of the aquifer system.

**Action:**

- Collect quarterly groundwater level data through OWRD’s well monitoring network in the LUBGWMA.

**Lead Agency:**

OWRD

**Schedule:**

- Continuous: Collect quarterly groundwater level data through OWRD’s well monitoring network in the LUBGWMA.

**Monitoring Progress:**

- Continue to collect quarterly data from existing well network in the LUBGWMA.
- Conduct in-depth well assessments at 10 wells per year (more if federal funds are secured).
- Expand network to fill data gaps as funding is available.

**Description:**

OWRD collects quarterly data from over 46 wells in the LUBGWMA and this work is expected to expand over the coming years. These data are generally manual measurements collected at wells within OWRD's well monitoring network, although some wells have transducers installed that collect static water levels every 15 minutes. All data collected by OWRD staff is uploaded to the Groundwater Information System and is publicly available to other agencies and the public ([https://apps.wrd.state.or.us/apps/gw/gw\\_info/gw\\_info\\_report/Default.aspx](https://apps.wrd.state.or.us/apps/gw/gw_info/gw_info_report/Default.aspx)).

OWRD is also preparing to conduct additional detailed well assessments, including well depth, static water level, well construction, aquifer characterization, and high-definition video. This work will continue to add to the three-dimensional understanding of the nitrate contamination and provide additional information about the aquifer systems.

#### 5.1.4 Ongoing Groundwater Levels Data Collection

OBJECTIVE: Track groundwater levels over time to inform understanding of the aquifer system. *[5.1 Technical Work]*

**Continuous**

- Collect quarterly groundwater level data through OWRD's well monitoring network in the LUBGWMA.

#### 5.1.5 Nitrate Leaching Estimation Update

**Objective:**

Determine what additional data and resources would be needed to complete an updated nitrate leaching analysis.

**Action:**

- Develop a plan to identify what additional data and resources would be needed to update a nitrate leaching analysis.

**Lead Agencies:**

DEQ, in partnership with U.S. EPA, ODA, OWRD, counties, agricultural research institutions such as OSU Extension, and other local partners.

**Schedule:**

- Short-term: Develop a plan to identify what additional data and resources would be needed to update a nitrate leaching analysis.



### Monitoring Progress:

- Provide status update about plan development.

### Description:

There are multiple sources of nitrate contamination in the LUBGWMA resulting in varying levels of nitrate in groundwater throughout the area. A 2011 analysis by DEQ, ODA, and OSU Extension identified the following primary estimated sources of contamination: about 70% from irrigated farmland, about 13% from large dairy and cattle farms (confined animal feeding operations or CAFOs), about 8% from animal pastures, about 5% from food processing facilities that reuse wastewater to irrigate fields, and about 5% from residential onsite septic systems and other sources.

The 2011 analysis, [Estimation of Nitrogen Sources, Nitrogen Applied, And Nitrogen Leached to Groundwater in the Lower Umatilla Basin Groundwater Management Area](#), represents the best available information the state has at this time about estimated nitrate sources in the LUBGWMA. With additional data and resources, the agencies could conduct an updated analysis of estimated nitrate sources.

For instance, while irrigated agriculture is identified as a primary potential source of nitrate, there have been no on-the-ground studies or sampling to determine or estimate current nutrient practices in nonpoint source irrigated agriculture and their impact on groundwater nitrate levels from these sources. ODA has plans to obtain basic agricultural data within the LUBGWMA to identify crop quantification, rotation patterns, and irrigation system types. These data will allow the use of agronomic rate ranges within the whole LUBGWMA to get estimate loading ranges and potentials.

#### 5.1.5 Nitrate Leaching Estimation Update

OBJECTIVE: Determine what additional data and resources would be needed to complete an updated nitrate leaching analysis. *[5.1 Technical Work]*

**Short-Term**  
2023-2027

- Develop a plan to identify what additional data and resources would be needed to update a nitrate leaching analysis.

## 5.2 Groundwater Data Coordination Effort and GIS Platform

### **Objective:**

Coordinate and compile data from local, state, and tribal partners to build a publicly accessible GIS platform that displays groundwater data with the goal of having a common, high quality data set for the region to improve understanding of the hydrogeology, groundwater quality, and inform management and planning decisions.

### **Action:**

- *Proposed Action:* EPA uses the services of one of its third-party contractors to coordinate and compile data and build a standardized GIS platform that would display groundwater data from the various local, state, and tribal entities working in the basin.

### **Lead Agency:**

EPA is the proposed lead agency; Supporting entities: DEQ, ODA, OWRD, OHA, CTUIR, OSU, Umatilla and Morrow counties.

### **Schedule:**

- Short-term: *Proposed Action:* EPA uses the services of one of its third-party contractors to coordinate and compile data and build a standardized GIS platform that would display groundwater data from the various local, state, and tribal entities working in the basin.
- Continuous: *Proposed Action:* GIS platform would pull and readily accept data from existing disparate data repositories to display an up-to-date unified dataset to improve understanding of the hydrogeology and groundwater quality in the basin and inform planning and management decisions.

### **Monitoring Progress:**

- Provide update about status of GIS platform development.

### **Description:**

There is currently no single database or platform for compiling and displaying groundwater data collected by various local and state agencies, including Morrow and Umatilla counties, OSU, DEQ, ODA, OWRD, and OHA. This makes data-sharing difficult, increases miscommunication or misunderstanding among different parties evaluating different data sets, and hinders the ability of interested parties to engage with and analyze the information for various purposes, including source control identification, data gap analysis, remedial action planning, and drinking water management and planning.

The state proposes that EPA utilize the services of one of its third-party contractors to build a standardized GIS platform that would house groundwater data from the various entities, build upon historic and current data to analyze trends, address and map nitrate concentrations in the area, and allow for spatial analysis to identify priority areas for resource management. Collectively, the entities involved in the LUBGWMA nitrate reduction effort support EPA building this platform so that no one entity is a gatekeeper for the data. Once built, the long-term maintenance could revert to a state or local entity. [EPA has previously used contractors to build an interactive GIS database for the 2020 Oregon Wildfire Cleanup](#), has funded a [surface water project in the Klamath Basin](#) that has been successful in facilitating data sharing and multi-party collaboration, and has also previously partnered on a smaller-scale groundwater data dashboard for the [Southern Willamette Valley Groundwater Management Area](#).

### 5.2 Groundwater Data Coordination Effort and GIS Platform

**OBJECTIVE:** Coordinate and compile data from local, state, and tribal partners to build a publicly accessible GIS platform that displays groundwater data with the goal of having a common, high quality data set for the region to improve understanding of the hydrogeology and groundwater quality and inform management and planning decisions.

#### Continuous

- *Proposed Action:* GIS platform would pull data from existing disparate data portals to display an up-to-date unified dataset to increase understanding of groundwater quality in the basin and inform planning and management decisions.

#### Short-Term 2023-2027

- *Proposed Action:* EPA utilizes the services of one of its third-party contractors to coordinate and compile data and build a standardized GIS platform that would display groundwater data from the various local, state, and tribal entities working in the basin.

## 6. SAFE DRINKING WATER FOR WELL-DEPENDENT HOUSEHOLDS

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### 6.1 Immediate Safe Drinking Water Services

#### 6.1.1 Overview

OHA and its sister agency Oregon Department of Human Services (ODHS) have been directed and resourced by the Governor and Oregon legislature to provide immediate safe water services to LUBGWMA residents who depend on domestic wells for their drinking and cooking water. These services include outreach and education about potential health risks from elevated nitrate in well water, free laboratory testing of well water, and free bottled water or, where effective, free installation and maintenance of kitchen-tap water treatment systems, or both if warranted by household size. OHA is also resourcing numerous local partners to support this work through funding agreements, including Morrow and Umatilla County public health departments and multiple community based organizations (CBOs). Additional information on OHA's safe water services is available at [testmywell.oregon.gov](http://testmywell.oregon.gov) and [pruebadepozo.oregon.gov](http://pruebadepozo.oregon.gov). Note that all communications referenced below are provided in English and Spanish.

#### 6.1.2 Impacts

High levels of nitrate in drinking water can cause long-and short-term effects. Short-term exposure of infants fed baby formula mixed with nitrate-contaminated water above 10 mg/L puts babies at risk for blue baby syndrome, a condition causing decreased ability of red blood cells to carry oxygen. (Breast milk is safe for infants even if the water the mother is drinking has more than 10 mg/L nitrates.) Women who are pregnant or may become pregnant should not drink nitrate-contaminated water. There is some evidence that short-term exposures to drinking water with nitrates above 10 mg/L can increase the risks of miscarriage and certain birth defects. For everyone else, there is also weak and inconclusive evidence that long-term consumption of nitrate above 10 mg/L may increase the risk of thyroid issues and cancer of the stomach or bladder.<sup>2</sup>

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<sup>2</sup> Agency for Toxic Substances and Disease Registry (ATSDR). (2017). Toxicological Profile for Nitrate and Nitrite. Retrieved from <https://www.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=1452&tid=258>

And: Office of Environmental Health Hazard Assessment (OEHHA). (2018). Public Health Goals Nitrate and Nitrite in Drinking Water. Pesticide and Environmental Toxicology Branch, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency. Retrieved from <https://oehha.ca.gov/media/downloads/water/chemicals/phg/nitratephg051118.pdf>.

## 6.1.3 Strategies

### 6.1.3.1 Community Education, Outreach and Engagement About Nitrate in Domestic Well Water

#### **Objective:**

Ensure all residents who depend on a domestic well for drinking water understand there are potential health risks from elevated nitrates in their well water, that safe water services are available to them, and how and whom to contact to access needed services and support.

#### **Action:**

- Maintain updated OHA health risk communication materials and pathways like fact sheets, OHA [testmywell.oregon.gov](http://testmywell.oregon.gov) and [pruebadepozo.oregon.gov](http://pruebadepozo.oregon.gov) websites, and outreach resources for community partners available online.
- Continue to implement mass communication strategy (e.g., radio, newspaper and social media advertising, direct mail). See the OHA LUBGWMA Domestic Well Water Public Health Program website [testmywell.oregon.gov](http://testmywell.oregon.gov) for current communications plan.
- Continue to resource two local public health authorities (LPHAs) and four community-based organizations to integrate nitrate health risk materials in their outreach and education activities (e.g., websites, community events, bulletins, emails).
- Identify and implement innovative new outreach strategies (e.g., communication via WhatsApp groups, collaboration with Medicaid health care providers, collaboration with Oregon State University Extension services).
- Obtain review of existing communications and outreach materials by OHA's contract strategic communications consultant, Metropolitan Group, to identify opportunities for improvement.
- Hire a Domestic Well Safety Program Strategic Communications and Project Management Lead to implement existing and new communications and outreach strategies.

#### **Lead Agencies:**

OHA

#### **Schedule:**

- Continuous: Maintain and as needed, develop new outreach and education materials and pathways, including updates to the OHA website, fact sheets and outreach materials. Partner with LPHAs and CBOs to carry out community engagement and education.

- Short term: Executed grant awards running through June 30, 2025, to renew funding of three CBOs (Douglas Latinas, Eastern Oregon Center for Independent Living, and National Center for Alternatives to Pesticides).
- Short term: By September 30, 2024, finalize a scope of work for a client services agreement with the CBO Euvalcree and by October 30 execute the contract backdated to July 1, 2024.
- Short term: Completed July 1, 2024 annual funding agreements with Morrow and Umatilla County Public Health Departments through June 30, 2025.
- Short term: Posted by July 31, 2024 maps presenting household well test results in a format that protects privacy of individual households to [testmywell.oregon.gov](https://testmywell.oregon.gov) and [pruebadepozo.oregon.gov](https://pruebadepozo.oregon.gov).
- Short term: Added by July 31 an interested party email sign up to OHA LUBGWMA websites, and an archive of OHA press releases related to the domestic wells public health project.
- Short term: By September 15, 2024, finalize a scope of work with strategic communication consultants the Metropolitan Group to review and provide recommendations for improvements to OHA website and CBO engagement.
- Short term: By September 30, 2024, begin publishing a monthly bulletin for dissemination via email and on the website.

#### **Monitoring Progress:**

- OHA to receive quarterly work reports from funded community based organizations.
- OHA to receive and provide update on outreach needs and activities at biweekly partner meetings.

### 6.1.3.1 Community Education, Outreach and Engagement About Nitrate in Domestic Well Water

OBJECTIVE: Ensure all residents who depend on a domestic well for drinking water understand there are potential health risks from elevated nitrates in their well water, that safe water services are available to them, and how and whom to contact to access needed services and support. [6.1 Immediate Safe Drinking Water Services]

<b>Continuous</b>	<ul style="list-style-type: none"><li>- Maintain and as needed, develop new outreach and education materials and pathways, including updates to the OHA website, fact sheets and outreach materials. Partner with LPHAs and CBOs to carry out community engagement and education.</li></ul>
<b>Short-Term 2023-2027</b>	<ul style="list-style-type: none"><li>- Executed grant awards running through June 30, 2025, to renew funding of three CBOs (Douglas Latinas, Eastern Oregon Center for Independent Living, and National Center for Alternatives to Pesticides).</li><li>- By September 30, 2024, finalize a scope of work for a client services agreement with the CBO Euvalcree and by October 30 execute the contract backdated to July 1, 2024.</li><li>- Completed July 1, 2024 annual funding agreements with Morrow and Umatilla County Public Health Departments through June 30, 2025.</li><li>- Posted by July 31, 2024 maps presenting household well test results in a format that protects privacy of individual households to <a href="https://testmywell.oregon.gov">testmywell.oregon.gov</a> and <a href="https://pruebadepozo.oregon.gov">pruebadepozo.oregon.gov</a>.</li><li>- Added by July 31 an interested party email sign up to OHA LUBGWMA websites, and an archive of OHA press releases related to the domestic wells public health project.</li><li>- By September 15, 2024, finalize a scope of work with strategic communication consultants the Metropolitan Group to review and provide recommendations for improvements to OHA website and CBO engagement.</li><li>- By September 30, 2024, begin publishing a monthly bulletin for dissemination via email and on the website.</li></ul>

### 6.1.3.2 Free Initial Domestic Well Water Testing

#### Objective:

By June 30, 2025, complete testing of 30%, or 420 of the 1,400 domestic wells that remain untested as of July 1, 2024.

#### Action:

- Mail at-home nitrate test strips to unreached households (no trespassing/guard dogs/not home households) to encourage them to request free state domestic well water sample collection and testing if their test strip turns pink.
- Develop and implement with community partners a project to canvass unreached households that do not receive mail at their physical address with a special

“fence hanger” that attaches securely to the perimeter of properties with no trespassing signs/guard dogs. This approach targets residences where the post office has returned mail containing the test strips.

- Send a tailored outreach letter to households that refused testing during summer 2023 door-to-door canvassing. The letter will renew the offer of free testing of their domestic well water and include an “opt-out” return postcard for those who wish to decline future communications on this topic.

**Lead Agency:**

OHA

**Schedule:**

- Short term: By June 30, 2024, completed a minimum of two mailings of at-home nitrate test strips to unreached households (no trespassing/guard dogs/not home households).
- Short term: By November 30, 2024, complete canvassing of unreached households that do not receive mail at their physical address.
- Short term: By December 31, 2024, complete a mailing to households whose residents refused testing in summer 2023, renewing the free testing offer and including an “opt-out” return mailer to request no further communication.

**Monitoring Progress:**

- OHA will regularly (generally a weekly or biweekly basis) log new initial water quality test results from its contract laboratory to OR-Wells database.
- OHA will update tabular data for well water nitrate testing and mapped data for highest nitrate results monthly on the English and Spanish versions of its website ([testmywell.oregon.gov](http://testmywell.oregon.gov) and [pruebadepozo.oregon.gov](http://pruebadepozo.oregon.gov); click on “Data and News”/“Datos y Noticias”)

**Description:**

Unreached households consist of residences identified during the summer 2023 door-to-door canvassing testing campaign that were unreachable due to no trespassing signs or guard dogs, or that were visited three times with residents not home. This objective recognizes that domestic well testing is not compulsory and therefore some residents may continue to opt-out of testing. OHA is directly and repeatedly contacting untested households and engaging partners in developing effective strategies to do so. Note that the 1,400 untested wells noted above comprises the 900 unreached households plus 500 households where residents refused testing during the summer 2023 door-to-door canvassing campaign. Excluding these households would increase the rate to 46%, or 420 of 900 unreached households.



### 6.1.3.2 Free Initial Domestic Well Water Testing

OBJECTIVE: By Jun 30, 2025, complete testing of 30%, or 420 of the 1,400 domestic wells that remain untested as of Jul 1, 2024. [6.1 Immediate Safe Drinking Water Services]

#### Short-Term 2023-2027

- By Jun 30, 2024, completed a minimum of two mailings of at-home nitrate test strips to unreached households (no trespassing/guard dogs/not home households).
- By Nov 30, 2024, complete canvassing of unreached households that do not receive mail at their physical address.
- By Dec 31, 2024, complete a mailing to households whose residents refused testing in summer 2023 renewing the free testing offer and including an “opt out” return mailer to request no further communication.

### 6.1.3.3 Free Domestic Well Water Retesting

#### Objective:

Ensure households with initial nitrate test results below 10 mg/L are monitored and provided alternate water sources if nitrate in their domestic well water rises above the action level due to seasonal fluctuations and still-increasing nitrate concentrations in groundwater in the LUBGWMA.

#### Action:

- By June 30, 2024, mailed all households that completed their initial tests prior to June 2024 a general letter describing retesting protocols and pathways for retesting by nitrate level.
- By June 30, 2024, mailed a second, individualized letter to households that completed their initial tests prior to June 2024. This letter provided the specific household’s test results, corresponding testing schedule, and details about the sample collection scheduling.
- By June 30, 2024, incorporated well retesting information into the post-initial-testing letter OHA sends to newly tested households interpreting the results sent directly to households by OHA’s contract laboratory and providing health and next steps information.
- By June 30, 2025, carry out one year of quarterly well water re-testing of 75% of households identified as being at highest risk of exceeding 10 mg/L nitrate (i.e., households between 5 mg/L - 9.99 mg/L) as of June 30, 2024. OHA will shift households that have four quarterly tests under 10 mg/L to an annual testing schedule.
- Maintain on an ongoing basis a quarterly well water test completion rate of 75% for newly identified households in the 5 mg/L - 9.99 mg/L range. OHA will shift

households that have four quarterly tests under 10 mg/L to an annual testing schedule.

- For these households at high risk of exceeding 10 mg/L, implement a program of OHA direct mailings, followed by ODHS repeat phone calls to schedule and carry out water sample collection and deliver samples to the OHA contract laboratory for testing.
- For households with initial tests below 5 mg/L or above 25 mg/L, offer access to self-sampling by picking up and dropping off test kits at county public health department for ODHS to deliver to OHA contract laboratory, except that ODHS will provide sample collection assistance upon request.

**Lead Agency:**

OHA

**Schedule:**

- Short term: By June 30, 2024, completed a mailing to all households describing retesting protocols and pathways for retesting depending on their nitrate level.
- Short term: By June 30, 2024, mailed a second, individualized letter to households that completed their initial tests prior to June 2024. This letter provided the specific household's test results, corresponding testing schedule, and details about the sample collection scheduling.
- Short term: By June 30, 2024, incorporated retesting information into post-initial-test-results letter OHA mails to newly tested households.
- Short term: By December 31, 2024 develop a new reporting template to post to the OHA LUBGWMA websites with information about retesting progress.
- Short term: By June 30, 2025, complete quarterly well water re-testing of 75% of households identified as being at highest risk of exceeding 10 mg/L nitrate (i.e., households between 5mg/L - 9.99mg/L) and maintain this completion rate as new households are identified in this range.
- Continuous: For these households at high risk of exceeding 10 mg/L range, implement a program of OHA direct mailings, followed by ODHS repeat phone calls to schedule and carry out water sample collection and deliver samples to the OHA contract laboratory for testing.
- Continuous: For households with initial tests below 5 mg/L or above 25 mg/L, offer access to self-sampling by picking up and dropping off test kits at county public health department for ODHS to deliver to OHA contract laboratory, except that ODHS will provide sample collection assistance upon request.

**Monitoring Progress:**

- OHA will regularly (generally a weekly or biweekly basis) log new water quality retesting results from its contract laboratory to OR-Wells database.

- OHA will post tabular data for well water nitrate retesting on a monthly basis on the English and Spanish versions of its website ([testmywell.oregon.gov](http://testmywell.oregon.gov) and [pruebadepozo.oregon.gov](http://pruebadepozo.oregon.gov); click on “Data and News”/“Datos y Noticias”). (Note: this monitoring action to be implemented once OHA adds a retesting report to the webpage.)

**Description:**

OHA categorizes households into four groups with the following retesting protocols:

- Tier 1 (0 mg/L-4.99 mg/L): Annual self-sample collection or assisted sampling by request
- Tier 2 (5 mg/L-9.99 mg/L): Quarterly retesting for one year, annual testing thereafter if no result above 10 mg/L
- Tier 3 (10 mg/L-25 mg/L): Post-filtration testing at time of water treatment system installation
- Tier 4 (Above 25 mg/L): Annual self-sample collection or assisted sampling by request

### 6.1.3.3 Free Domestic Well Water Retesting

**OBJECTIVE:** Ensure households with initial nitrate test results below 10 mg/L are monitored and provided alternate water sources if nitrate in their domestic well water rises above the action level due to seasonal fluctuations and still-increasing nitrate concentrations in groundwater in the LUBGWMA. [6.1 Immediate Safe Drinking Water Services]

<b>Continuous</b>	<ul style="list-style-type: none"><li>- For these households at high risk of exceeding 10 mg/L range, implement a program of OHA direct mailings, followed by ODHS repeat phone calls to schedule and carry out water sample collection and deliver samples to the OHA contract laboratory for testing.</li><li>- For households with initial tests below 5 mg/L or above 25 mg/L, offer access to self-sampling by picking up and dropping off test kits at county public health department for ODHS to deliver to OHA contract laboratory, except that ODHS will provide sample collection assistance upon request.</li></ul>
<b>Short-Term 2023-2027</b>	<ul style="list-style-type: none"><li>- By June 30, 2024, completed a mailing to all households describing retesting protocols and pathways for retesting depending on their nitrate level.</li><li>- By June 30, 2024, mailed a second, individualized letter to households that completed their initial tests prior to June 2024. This letter provided the specific household's test results, corresponding testing schedule, and details about the sample collection scheduling.</li><li>- By June 30, 2024, incorporated retesting information into post-initial-test-results letter OHA mails to newly tested households.</li><li>- By December 31, 2024 develop a new reporting template to post to the OHA LUBGWMA websites with information about retesting progress.</li><li>- By June 30, 2025, complete quarterly well water re-testing of 75% of households identified as being at highest risk of exceeding 10 mg/L nitrate (i.e., households between 5mg/L - 9.99mg/L) and maintain this completion rate as new households are identified in this range.</li></ul>

### 6.1.3.4 Free Kitchen-Tap Treatment System Installation and Maintenance

**Objective:**

Provide safe drinking water to households whose domestic well water test results are 10-25 mg/L nitrate.

**Action:**

- Arrange for free installation and maintenance of point-of-use (i.e., kitchen tap) reverse osmosis water filtration systems meeting NSF/ANSI Standard 58 with a third-party verified nitrate reduction, and which have a maintenance indicator for filter replacement (e.g., automatic shutoff at 500 gallons) in households with domestic well water that tests between 10 and 25 mg/L nitrate.
- Provide language support for Spanish-speaking households.
- Recruit additional plumbing vendors to speed the rate of installations.

**Lead Agency:**

OHA

**Schedule:**

- Short term: By December 31, 2024, reduce by 50% the backlog of eligible households waiting for installation of treatment systems as of June 30, 2024.
- Short term: By June 30, 2025, reduce by 100% the backlog of eligible households waiting for installation of treatment systems as of June 30, 2024.
- Continuous: Newly tested households with levels between 10-25 mg/L nitrate are immediately started on bottled water delivery and added to the list for treatment system installation.
- Continuous: Households with OHA-installed systems are provided 6 months' worth of replacement filters that are replenished as needed. They can either install filters themselves or call OHA's vendor to perform maintenance. OHA's contract with vendors requires installation of systems with automatic shutoff or an indicator that filters must be replaced, and for ongoing maintenance services (subject to OHA receiving continued funding from the legislature).
- Continuous: OHA vendor conducts post-system-installation nitrate test to confirm nitrate reduction.

**Monitoring Progress:**

- OHA will regularly (generally a weekly or biweekly basis) update its tracking Smartsheet of new installations and post tabular data on a monthly basis on the English and Spanish versions of its website ([testmywell.oregon.gov](https://testmywell.oregon.gov) and [pruebadepozo.oregon.gov](https://pruebadepozo.oregon.gov); click on "Data and News"/"Datos y Noticias").

**Description:**

Currently 15% of completed domestic well water nitrate tests in the LUBGWMA fall in the range (up to 25 mg/L) for which there are a point-of-use treatment systems certified to reduce nitrate below 10 mg/L. Assuming this rate is consistent across all 3,300 well-dependent LUBGWMA households, this means installation of roughly 500 systems, a figure that can rise along with rising nitrate concentrations in groundwater. As of June 30, 2024, OHA's vendors installed 111 systems, with an additional 180 eligible

households awaiting installation. Reverse osmosis is the only technology for filtration of nitrates certified by NSF/ANSI Standard 58. Whole house systems, in addition to being much more costly than the \$2,500 per system cost through OHA’s vendor (includes equipment, installation and maintenance and Spanish language support), are destructive to septic systems. This damage can potentially further exacerbate onsite nitrate and other contamination. OHA must follow state rules requiring a licensed plumber or holder of a specialty water treatment installation license install these systems. However, there are no specialty license holders in Morrow or Umatilla or any nearby counties. Despite repeated mailings to all licensed plumbers in those and surrounding counties, there has been limited success. OHA currently has two vendors and is working with the Governor’s office and Department of Consumer and Business Services to explore alternative solutions to speed up the installation process.

#### 6.1.3.4 Free Kitchen-Tap Treatment System Installation and Maintenance

OBJECTIVE: Provide safe drinking water to households whose domestic well water test results are 10 mg/L to 25 mg/L nitrate. [6.1 Immediate Safe Drinking Water Services]

##### Continuous

- Newly tested households with levels between 10-25 mg/L nitrate are immediately started on bottled water delivery and added to the list for treatment system installation.
- Households with OHA-installed systems are provided 6 months worth of replacement filters which they can install themselves or call OHA’s vendor to perform maintenance.
- OHA vendor conducts post-system-installation nitrate test to confirm nitrate reduction.

##### Short-Term 2023-2027

- By Dec 31, 2024, reduce by 50% the backlog of eligible households waiting for installation of treatment systems as of Jun 30, 2024.
- By Jun 30, 2025, reduce by 100% the backlog of eligible households waiting for installation of treatment systems as of Jun 30, 2024.

### 6.1.3.5 Free Water Delivery

**Objective:**

Provide safe drinking water to households with domestic well water test results at or above 10 mg/L nitrate.

**Action:**

Arrange for free delivery of bottled water and dispensers or pumps to households with domestic well water that tests at or above 10 mg/L nitrate.

**Lead Agencies:**

ODHS, OHA, Morrow and Umatilla Counties Public Health Departments

**Schedule:**

- Continuous: County health departments contact households to sign them up for bottled water delivery as soon as possible after receiving test results from OHA's contract laboratory. Counties invoice ODHS for reimbursement.
- Short term: By September 20, 2024, ODHS to complete surveys of all households receiving water deliveries as of June 30, 2024, to confirm their needs are being met. Continue to survey households at least twice yearly to ensure ongoing needs are met for these and newly added households.
- Short term: By January 31, 2025, ODHS and OHA to develop and implement a protocol to assess, communicate, and reduce or eliminate water deliveries to households that have had point of use water treatment systems installed.

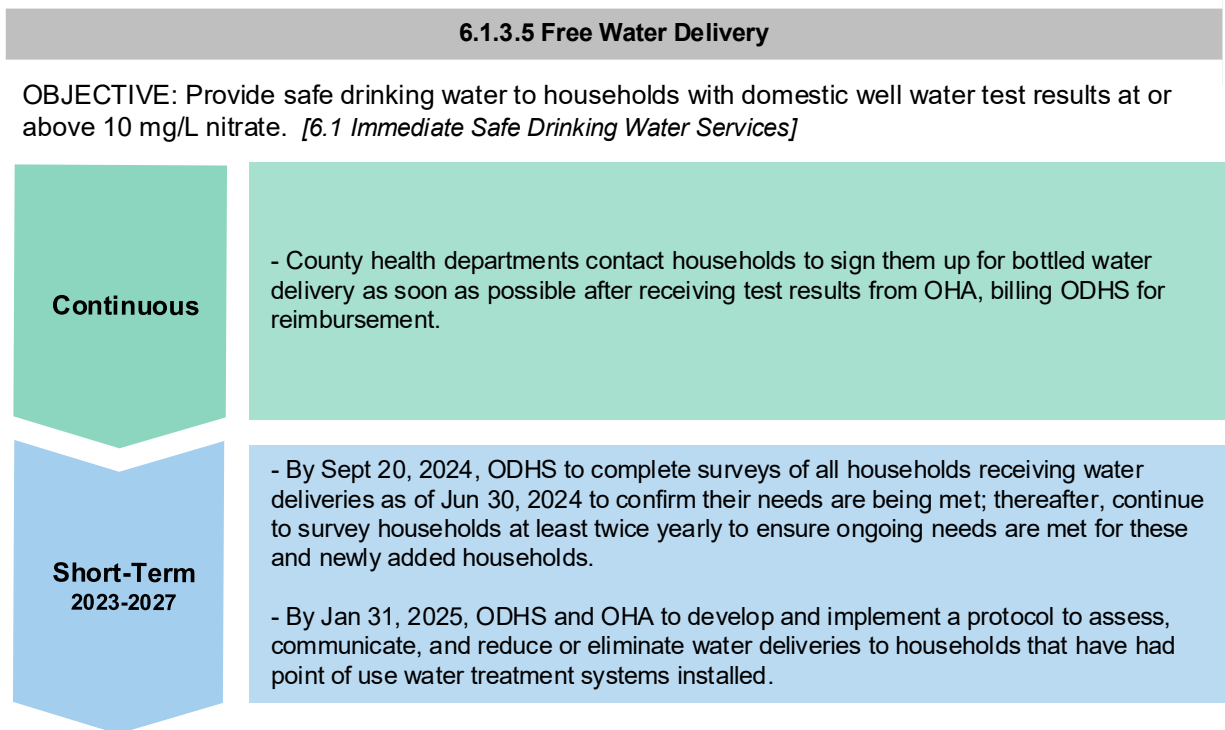
**Monitoring Progress:**

- ODHS will regularly log information about residents receiving water deliveries in its case management database, DLAN and Morrow and Umatilla Counties will maintain their spreadsheet tracking of residents signed up for water deliveries.
- OHA will post tabular data on residents receiving potable water deliveries on a monthly basis on the English and Spanish versions of its website ([testmywell.oregon.gov](http://testmywell.oregon.gov) and [pruebadepozo.oregon.gov](http://pruebadepozo.oregon.gov); click on "Data and News"/"Datos y Noticias").

**Description:**

ODHS, which is the state agency charged with providing water for household use in emergency situations, established reimbursement contracts with Morrow and Umatilla County public health departments for bottled water services. Each county has in turn contracted with two local bottled water companies (Desert Springs and Blue Mountain). OHA strives to provide laboratory test results to the counties within one business day of receipt for households testing at or above 10 mg/L nitrate.

County staff then call residents to sign them up for water delivery and a dispenser or pump from their preferred company. Each household starts with 20 gallons of water (four 5-gallon bottles) delivered every two weeks, with the option to adjust the amount based on their needs. Water delivery will be a longer-term service for households with well water testing over 25 mg/L nitrate until more durable solutions are identified, resourced, and implemented by local jurisdictions (public water systems or new wells). As households between 10 mg/L-25 mg/L have treatment systems installed, OHA and ODHS will reduce or eliminate water deliveries depending on household size.



### 6.1.3.6 Longer Term Water Provisioning for Households Above 25 mg/L

**Objective:**

Provide an alternative to bottled water delivery to households with domestic well water test results above 25 mg/L nitrate.

**Action:**

Identify alternatives to reverse osmosis systems for households with nitrate in well water above 25 mg/L.

**Lead Agencies:**

ODHS



**Schedule:**

- Short term: By December 31, 2024, ODHS to issue a Request for Information to solicit public or private sector solutions for providing drinking water to households with well water over 25 mg/L nitrate where reverse osmosis filters are not certified to remove nitrate to safe drinking water levels.

**Monitoring Progress:**

- ODHS to report on progress issuing and results at biweekly LUBGWMA partner meetings.

**6.1.3.6 Longer Term Water Provisioning for Households Above 25 mg/L**

OBJECTIVE: Provide an alternative to bottled water delivery to households with domestic well water test results above 25 mg/L nitrate. [6.1 Immediate Safe Drinking Water Services]

**Short-Term  
2023-2027**

- By December 31, 2024, ODHS to issue a Request for Information to solicit public or private sector solutions for providing drinking water to households with well water over 25 mg/L nitrate where reverse osmosis filters are not certified to remove nitrate to safe drinking water levels.

**6.1.3.7 Data and Data Management**

**Objective:**

Maintain and as needed build out OHA and ODHS databases as the systems of record for all household data related to safe water services to support delivery of services and transparent communications about households served and awaiting service.

**Action:**

- OHA to maintain and build out OR-Wells relational database for all well water testing-related household records.
- OHA to maintain a Smartsheet-based system to queue and track completion of treatment system installations.
- ODHS to maintain water delivery information as a component of its case management system.

**Lead Agencies:**

OHA, ODHS

**Schedule:**

- Continuous: Data systems are maintained on an ongoing basis.

**Monitoring Progress:**

- OHA will run routine database queries on a monthly basis and special queries to address non-routine information needs, and post updates to the OHA LUBGWMA websites and respond to public record requests.

**Description:**

To deliver safe drinking water services and information, OHA had to identify all LUBGWMA households at risk for elevated nitrate levels and seek to test, or meaningfully offer to test, their domestic well water. This required OHA and partners to carry out an intensive campaign of outreach via door-to-door canvassing over the summer of 2023 that identified approximately 3,300 households in the area, a previously unknown number. In addition to collecting about 1,000 well water samples, OHA and ODHS created temporary databases to house well-dependent household addresses, water test results, communications to households, bottled water delivery, treatment system installation, and more. Over the fall and winter of 2023-2024, the agencies built out existing permanent relational databases to accommodate and import records and carry out a painstaking process to correct extensive data errors (e.g., laboratory test results for the same household submitted more than once, incorrectly entered addresses and testing voucher numbers). In April 2023, OHA published comprehensive summary data based on cleaned records to [testmywell.oregon.gov](https://testmywell.oregon.gov) and [pruebadepozo.oregon.gov](https://pruebadepozo.oregon.gov) along with an explanatory memo about the data release in [English](#) and [Spanish](#).

Key purposes of databases are to:

- Support case management, including mailings, emails, and calls to households regarding safe water services.
- Share information related to domestic wells with local, state, and federal government agencies, community partners, and the public.
- Analyze program participant and test result data to develop specific outreach strategies for types of households and priority populations.
- Provide information to local government partners to help identify clusters of households that could be eligible for connection to existing or new public water systems.

### 6.1.3.7 Data and Data Management

**OBJECTIVE:** Maintain and as needed build out OHA and ODHS databases as the systems of record for all household data related to safe water services to support delivery of services and transparent communications about households served and awaiting service. [6.1 Immediate Safe Drinking Water Services]

**Continuous**

- Data systems are maintained on an ongoing basis.

### 6.1.3.8 Community Partner Relations

**Objective:**

Maintain partnerships with local community-based organizations and local governments and fund these partners to inform the design and implementation of OHA’s domestic well safety activities in the LUBGWMA. This includes community education and outreach about health risks and how residents can access safe water services.

**Action:**

- OHA and ODHS meet regularly with partnering LPHAs and CBOs to request input on development and implementation of program components, co-development of culturally and linguistically appropriate outreach and education materials, review of communications to residents, integration of safe water services information in partners’ own outreach activities and elevating concerns from residents to OHA.
- OHA to fund partners to carry out the above activities.

**Lead Agencies:**

OHA

**Schedule:**

- Continuous: Meet biweekly or as agreed upon with partners to carry out the actions outlined above.
- Continuous: OHA to execute annual funding agreements with Morrow and Umatilla County LPHAs and CBOs noted in the “Description” below.

**Monitoring Progress:**

- OHA will provide and receive updates at biweekly LUBGWMA partner meetings.

**Description:**

Starting in January 2023, OHA convened a biweekly “LUBGWMA Public Health Project” partners group consisting of OHA, ODHS, Morrow and Umatilla County LPHAs, and Oregon Rural Action. OHA executed funding agreements with county partners for July 2023 through June 2024 and again for July 2024 through June 2025. In June 2023 a number of CBOs that were existing OHA Public Health Equity grantees joined as partnering organizations. OHA provided supplemental funding to support their work in the LUBGWMA for the funding period from July 2023 through June 2024.

The CBOs are: Doulas Latinas International; Eastern Oregon Center for Independent Living; Euvalcree (as a subrecipient to primary grantee Willamette Partnership); and National Center for Independent Living. Three of these CBOs applied for and received renewed Public Health Equity Grants funding for the July 2024 through June 2025 period. Euvalcree did not independently apply to the grant program and OHA is currently working with the organization to resource them through a client services agreement contract. OHA offered a contract to Oregon Rural Action on multiple occasions in 2023 but the organization declined to enter into this funding agreement. Outreach materials co-created by the agencies and partners are available on [testmywell.oregon.gov](http://testmywell.oregon.gov) in English and Spanish on the “Resources for Partners” page.

**6.1.3.8 Community Partner Relations**

OBJECTIVE: Maintain partnerships with local community-based organizations and local governments and fund these partners to: inform the design and implementation of OHA’s LUBGWMA domestic well safety activities and perform community education and outreach regarding health risks and how residents can access safe water services. [6.1 Immediate Safe Drinking Water Services]

**Continuous**

- Meet biweekly or as partners agree to carry out the actions above.
- OHA to execute annual funding agreements with Morrow and Umatilla County LPHAs and CBOs noted in the “Description” below.

**6.1.3.9 Demographic Study**

**Objective:**

Survey LUBGWMA residents receiving safe water services to assess whether the program is equitably serving the community and comply with the state requirements to ask individuals receiving health services about their race, ethnicity, language, and disability status.

**Action:**

Mail a paper race, ethnicity, language and disability (REALD) survey with self-addressed stamped envelope to LUBGWMA households receiving safe water services with explanatory cover letter that includes a request that the “head of household” respond to the survey on behalf of the household and a QR code to allow the recipient to answer the survey online.

**Lead Agencies:**

OHA

**Schedule:**

- Short term: June 30, 2024, OHA sent mass emailing to all households receiving services before that date.
- Short term: By December 31, 2024, OHA will complete a preliminary analysis of responses.
- Continuous: OHA will continue to survey newly added households.

**Monitoring Progress:**

- OHA will track via project management tracking and demonstrate completion of initial analysis by publication on OHA’s LUBGWMA websites, with periodic updates.

**Description:**

OHA has a statutory requirement to send individuals who receive health services from OHA a confidential, voluntary survey requesting information about their race, ethnicity, language and disability (REALD) status.

### 6.1.3.9 Demographic Study

OBJECTIVE: Survey LUBGWMA residents receiving safe water services to assess whether the program is equitably serving the community and comply with the state requirements to ask individuals receiving health services about their race, ethnicity, language and disability status. [6.1 Immediate Safe Drinking Water Services]

<b>Continuous</b>	- OHA will continue to survey newly added households.
<b>Short-Term 2023-2027</b>	- By Jun 30, 2024, OHA sent mass emailing to all households receiving services before that date.  - By Dec 31, 2024, OHA will complete a preliminary analysis of responses.

## 6.2 Intermediate Term Public Water Systems Solutions

### 6.2.1 Overview

Public Water Systems (PWSs) in the LUBGWMA are regulated under the Safe Drinking Water Act (SDWA), Oregon Revised Statutes and accompanying Oregon Administrative Rules. OHA- Drinking Water Services (DWS) administers and enforces drinking water quality standards for public water systems in the state of Oregon. Under the SDWA a Public Water System (PWS) is a water system with 15 or more connections or serving at least 25 people. DWS also regulates small water systems under state law: Oregon Very Small Systems (OVS) with four to 14 connections or serving 10 to 24 people. DWS has interagency agreements with LPHAs and ODA to provide regulatory oversight for small PWSs with groundwater sources. DWS, along with Business Oregon, administers the Drinking Water State Revolving Fund (DWSRF). The DWSRF provides low-cost loans to community and nonprofit non-community water systems for planning, design and construction of drinking water infrastructure improvements. The Bipartisan Infrastructure Law of 2021 provided OHA with additional general supplemental funding for DWSRF eligible public water system infrastructure projects through 2026. OHA also emphasizes prevention of contamination through source water protection, provides technical assistance to water systems, and provides water system operator training.

### 6.2.2 Public Water System Requirements

Public Water Systems in the LUBGWMA must meet federal and state requirements for providing drinking water with nitrate levels below the maximum contaminant level (MCL)

of 10 mg/L. Public water systems in the LUBGWMA currently treat water to meet SDWA maximum contaminant level for nitrates. To ensure residents of the LUBGWMA continue to have access to safe drinking water under the nitrate MCL, OHA advises public water systems and local government in Morrow and Umatilla counties seeking to extend current public water system lines, to consolidate public water systems, or create new water systems to include households that currently rely on private domestic wells. Getting households that rely on private domestic wells hooked up to public water systems lines will greatly reduce the risk that household members are exposed to high levels of nitrate. Creation of new water systems and extending lines of existing water systems are eligible activities for DWSRF.

### 6.2.3 Strategies

#### 6.2.3.1 Technical and Funding Assistance for Public Water System Extension and Creation

**Objective:** To provide technical and funding assistance to counties and PWSs so that public water system service lines are extended, or new systems are created to provide safe drinking water to residents with high nitrate levels in their private domestic wells.

**Action:**

- Morrow and Umatilla Counties, with congressionally directed funding through EPA, are carrying out a Drinking Water Investigation to lay the groundwork for the design and planning of possible public water system solutions for areas currently relying on nitrate contaminated domestic wells.
- Counties, with an engineering consultant, conduct feasibility studies of public water system service area extensions or new public water systems.
- OHA's Domestic Well Safety Program delivering water testing services has entered into a data use agreement with the two counties to provide continuous access to OHA's database of nitrate and other analyte results to inform the work of the Drinking Water Investigation team.
- OHA's Drinking Water Services will reach out, encourage and guide counties and local PWSs to apply for federal funding, i.e., Drinking Water State Revolving Fund (DWSRF) and Bipartisan Infrastructure Law (BIL) funding.
- OWRD share data and provide technical assistance to the counties and their consultant.

**Lead Agencies:**

OHA, OWRD

**Schedule:**

- Short-term: Counties, with congressionally directed funding through EPA, carry out a Drinking Water Investigation to lay the groundwork for the design and planning of possible public water system solutions for areas currently relying on contaminated domestic wells.
- Short-term: Counties, with an engineering consultant, conduct feasibility studies of public water system service area extensions or new public water systems.
- Continuous: OHA entered into a data use agreement with the two counties to provide counties access to OHA’s database of nitrate and other analyte results to inform the work of the counties’ Drinking Water Investigation team.
- Short-term: Counties or local PWS reach out to DWS for feasibility study grant (~\$20K) for line extension or PWS creation.
- Short-term: Counties or local PWS submit Letters of Interest (LOI) to OHA-DWS by Q1 2025 or Q1 2026 to be considered for funding for service line extensions or creation of new PWS.
- Continuous: OHA’s Drinking Water Services will reach out, encourage and guide counties and local PWSs to apply for DWSRF/BIL funding.

*Table 5. Timeline to apply for DWSRF*

Timeline	Q1 2025	Q2 2025	Q3 2025	Q4 2025	Q1 2026	Q2 2026	Q3 2026	Q4 2026	Q1 2027	Q2 2027
<b>DWS Federal Infrastructure Funding</b>	LOI: DWSRF and BIL-GS FY25			Application: DWSRF and BIL-GS FY25	LOI: DWSRF and BIL-GS FY26 (last year)	Funding award: DWSRF and BIL-GS FY25		Application: DWSRF and BIL-GS FY26		Funding award: DWSRF and BIL-GS FY26
<b>GSI objectives (from Scope of Work)</b>	Complete service area extension feasibility (line extension)				Feasibility for new PWSs; Feasibility of extension based on new data					

**Monitoring Progress:**

- OHA will reach out to county planners and engineering consultant to see if Letters of Interest (LOI) for funding for service line extensions or PWS creation are ready to be submitted in Q1 2025 and Q1 2026. Also, OHA to see if any data or technical assistance are needed.



### 6.2.3.1. Technical and Funding Assistance for Public Water System Extension and Creation

OBJECTIVE: To provide technical and funding assistance to Counties and Public Water Systems so that public water system service lines are extended or new systems are created to provide safe drinking water to residents with high nitrate levels in their private domestic wells. [6.2 Intermediate Term Public Water Systems Solutions]

#### Continuous

- OHA entered into a data use agreement with the two counties to provide counties access to OHA's database of nitrate and other analyte results to inform the work of the counties' Drinking Water Investigation team.
- OHA's Drinking Water Services will reach out, encourage and guide counties and local PWSs to apply for DWSRF/BIL funding.

#### Short-Term 2023-2027

- Counties, with congressionally directed funding through EPA, carry out a Drinking Water Investigation to lay the groundwork for the design and planning of possible public water system solutions for areas currently relying on contaminated domestic wells.
- Counties, with an engineering consultant, conduct feasibility studies of public water system service area extensions or new public water systems.
- Counties or local PWS reach out to DWS for feasibility study grant (~\$20K) for line extension or PWS creation.
- Counties or local PWS submit Letters of Interest (LOI) to OHA-DWS by Q1 2025 or Q1 2026 to be considered for funding for service line extensions or creation of new PWS.

### 6.2.3.2 Identifying Public Water Systems Not Currently under OHA Oversight

**Objective:** Ensure all Public Water Systems in the LUBGWMA are identified and meeting federal and state requirements for monitoring and treating nitrate.

**Action:**

- OHA, with local public health authorities in Umatilla and Morrow counties, ODA and Oregon Occupational Safety and Health (OR-OSHA), identify and regulate any PWS that are currently not under state oversight.

**Lead Agencies:**

OHA

**Schedule:**

- Short-term/Continuous: By December 31, 2024, OHA to meet with county and state agency partners to strengthen outreach to identify PWS not under state oversight. Include criteria and requirements in annual trainings with local and state partners to identify new or previously unknown PWS.

**Monitoring Progress:**

- Reach out to local and state agency partners to identify previously new or unknown PWSs.
- Identified PWSs are listed in OHA-DWS online database and are complying with federal and state requirements.

**Description:**

DWS has interagency agreements with local (county) public health authorities and ODA to identify water systems that meet the criteria to be regulated under federal and state law.

**6.2.3.2 Identifying Public Water Systems Not Currently under OHA Oversight**

OBJECTIVE: Ensure all Public Water Systems in the LUBGWMA are identified and meeting federal and state requirements for monitoring and treating nitrate. [6.2 Intermediate Term Public Water Systems Solutions]

**Continuous**

- By December 31, 2024, OHA to meet with county and state agency partners to strengthen outreach to identify PWS not under state oversight. Include criteria and requirements in annual trainings with local and state partners to identify new or previously unknown PWS.

## 7. SUMMARY AND TIMELINE OF AGENCY ACTIONS

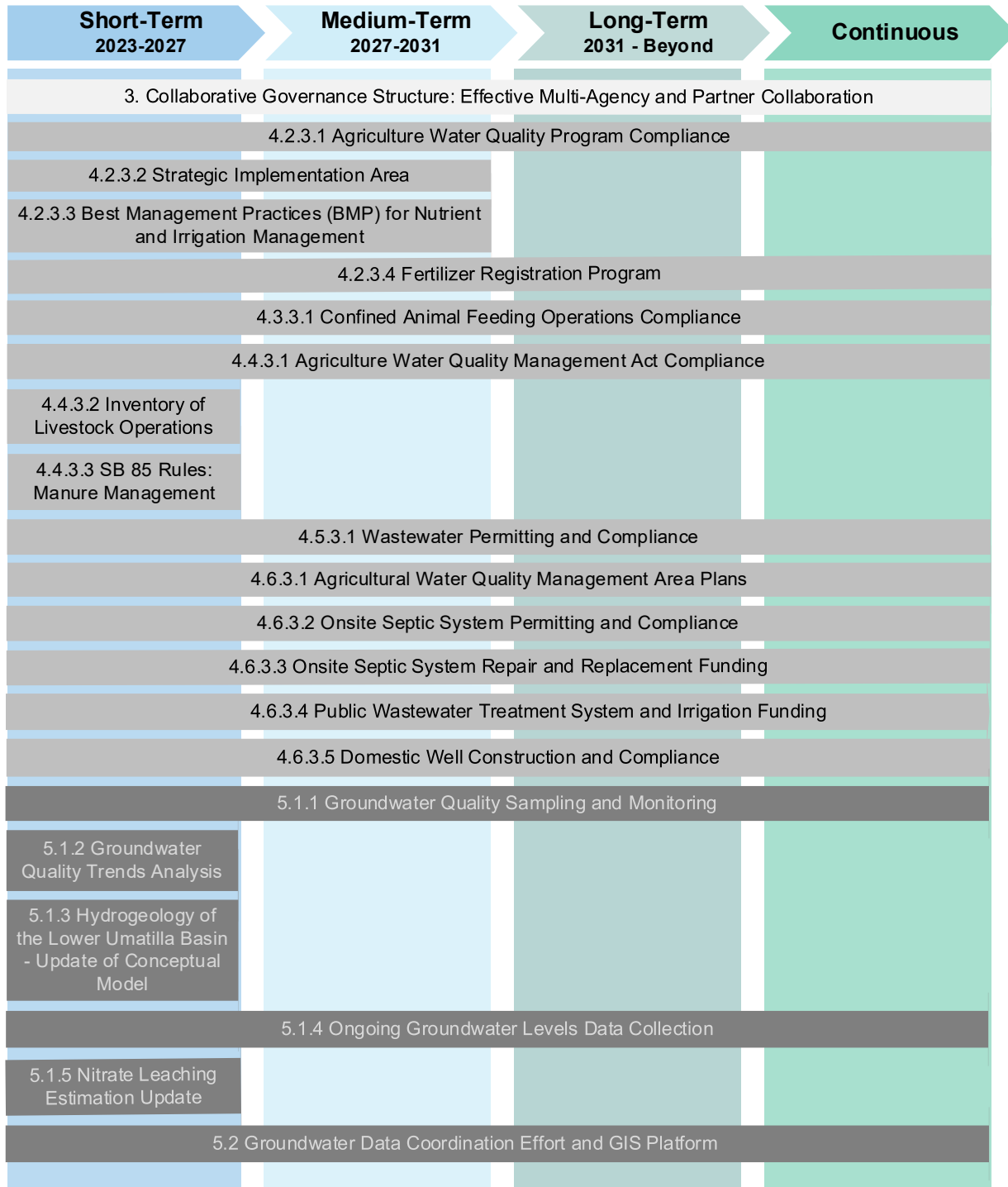


Figure 10. Summary and timeline of agencies actions in sections 3, 4, 5, and 6.

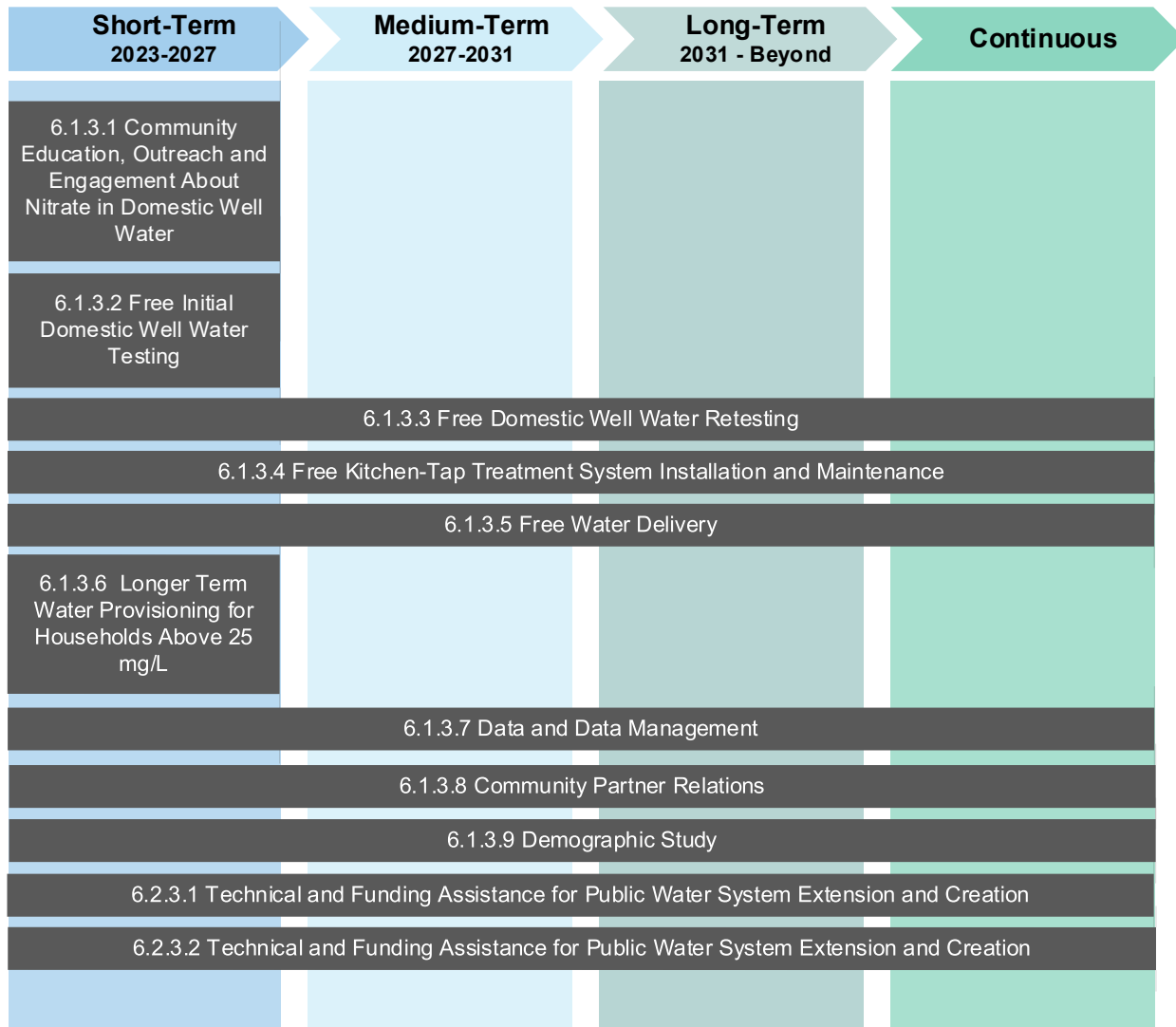


Figure 10. (cont.) Summary and timeline of agencies actions in sections 3, 4, 5, and 6.

# Combined List of Agency Actions

## 3. COLLABORATIVE GOVERNANCE STRUCTURE

### 3. Collaborative Governance Structure: Effective Multi-Agency and Partner Collaboration

OBJECTIVE: Effective collaboration across multiple state agencies, counties, cities, federal agencies, tribal government, and other partners to reduce nitrate concentrations in the LUBGWMA.

<b>Continuous</b>	<ul style="list-style-type: none"><li>- Work collaboratively across multiple state agencies, counties, cities, federal agencies, tribal government, and other partners to make progress toward reducing nitrate concentrations in the LUBGWMA.</li></ul>
<b>Short-Term 2023-2027</b>	<ul style="list-style-type: none"><li>- Process assessment: In spring 2024, state agencies contracted Oregon Consensus (the state's public policy alternative dispute resolution program) to conduct an independent assessment and gather process suggestions about how to enhance collaboration effectiveness among committee members and state agencies. This assessment is currently underway as of July 2024. Likely outcomes include recommendations for a professional third-party facilitator and collaborative governance structure for entities with jurisdiction in the area.</li><li>- Interagency agreement (MOU) - The state agencies will be working to formalize their collaboration on the nitrate reduction plan in the LUBGWMA to codify roles and responsibilities and demonstrate transparency and accountability for agencies and the public.</li></ul>

## 4. NITRATE SOURCES AND LONG-TERM REDUCTION STRATEGIES

### 4.2 Irrigated Agriculture

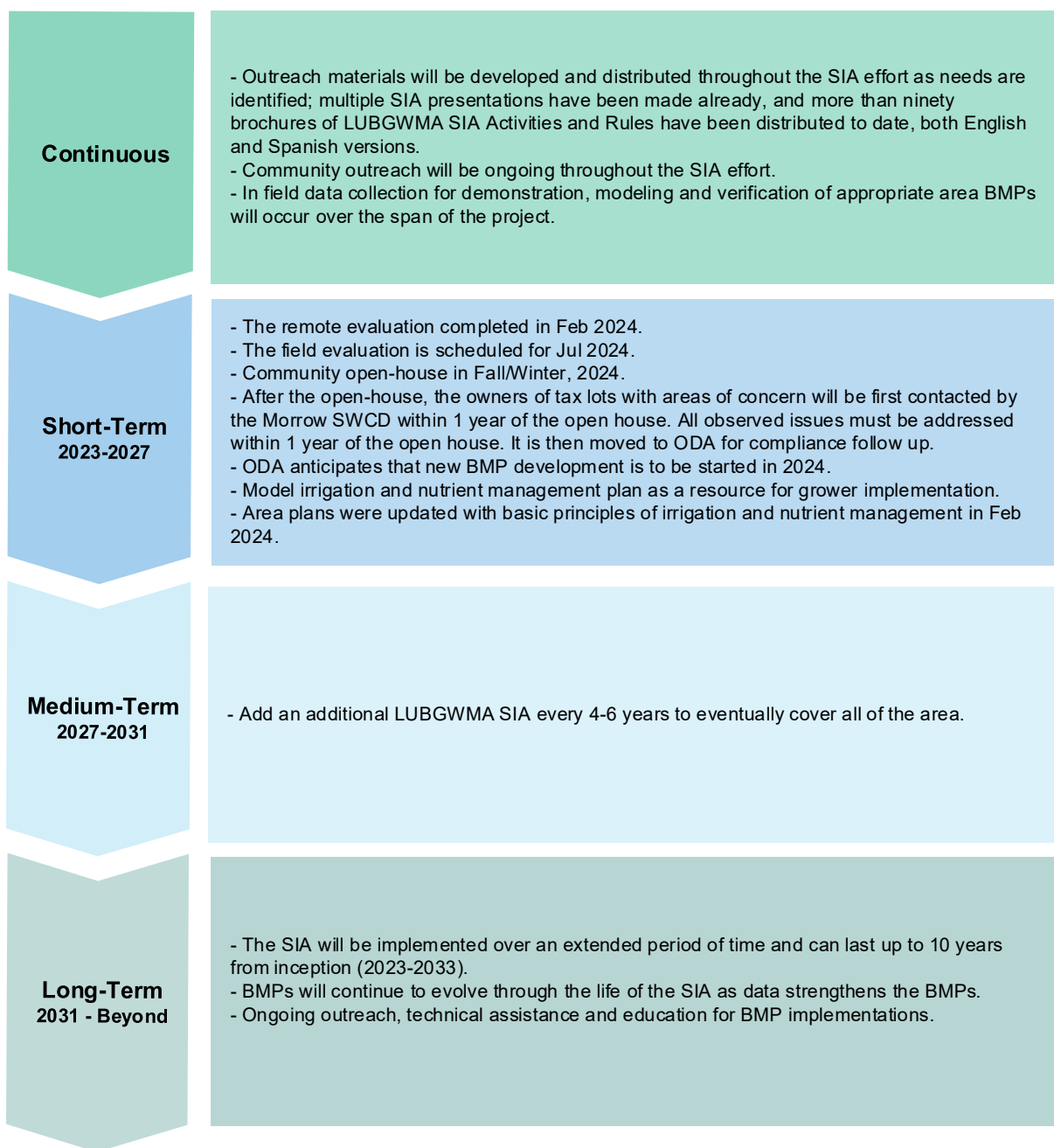
#### 4.2.3.1 Agriculture Water Quality Program

OBJECTIVE: Prevent and control water pollution (including groundwater) from agricultural activities to achieve water quality standards. [4.2 Irrigated Agriculture]

<b>Continuous</b>	<ul style="list-style-type: none"><li>- Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.</li></ul>
<b>Short-Term 2023-2027</b>	<ul style="list-style-type: none"><li>- Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.</li><li>- Area Rules are reviewed every two years. The Willow Creek and Umatilla rules were last reviewed in Feb 2024. Rule changes may be done anytime the agency identifies a need.</li></ul>
<b>Medium-Term 2027-2031</b>	<ul style="list-style-type: none"><li>- Area Plans are reviewed on an alternating schedule of a full and light review of every 6 years for full and every 2 years for a light review. The Willow Creek and Umatilla area plans were last reviewed In February of 2024.</li><li>- Develop regulatory requirements aimed at addressing nitrate contamination from irrigated agriculture operations inside the LUBGWMA designation. Engage with stakeholders in 2025 to target implementation of the new rules in 2026 (resources needed).</li></ul>

### 4.2.3.2 Strategic Implementation Area

**OBJECTIVE:** The Strategic Implementation Area (SIA) initiative is a proactive effort to conduct outreach in the LUBGWMA regarding agricultural water quality rules, develop irrigated agriculture Best Management Practices (BMPs), and emphasize the utilization of irrigation and nutrient management plans to protect groundwater. Achieve 100% compliance with agricultural water quality rules within the SIA, therefore preventing pollution of waters of the state. Repeat the SIA process as needed for other areas of the LUBGWMA. *[4.2 Irrigated Agriculture]*



#### 4.2.3.3 Best Management Practices (BMP) for Nutrient and Irrigation Management

OBJECTIVE: Use irrigation and crop nutrient management data to develop BMPs. Conduct outreach and support for implementations of model irrigation and nutrient management model plans. [4.2 Irrigated Agriculture]

<b>Short-Term</b> 2023-2027	<ul style="list-style-type: none"><li>- Area plans were updated with basic principles of irrigation and nutrient management in Feb 2024.</li><li>- Web and mobile applications were developed for ag field crop, irrigation type and livestock inventory in 2023.</li><li>- An Agricultural Water Quality Support grant was awarded to Morrow SWCD in Jan 2024 to perform a crop, irrigation type and livestock inventory in Morrow County and the LUBGWMA area.</li><li>- Model irrigation and nutrient management plan as a resource for grower implementation.</li></ul>
<b>Medium-Term</b> 2027-2031	<ul style="list-style-type: none"><li>- Outreach and collaboration with OSU Extension, growers and the community on BMPs. Several meetings with OSU/Extension have occurred to date and this will be an ongoing effort to align efforts within the LUBGWMA.</li></ul>
<b>Long-Term</b> 2031 - Beyond	<ul style="list-style-type: none"><li>- Ongoing outreach, technical assistance and education for BMP implementations.</li></ul>

#### 4.2.3.4 Fertilizer Registration Program

OBJECTIVE: Provide consumer protection and ensure truth in labeling to ensure consumers are informed of the product contents and ensure all products that are sold in Oregon are registered according to requirements. [4.2 Irrigated Agriculture]

<b>Continuous</b>	<ul style="list-style-type: none"><li>- The fertilizer registration and consumer protection market inspections are a well-established program. It will continue to ensure product registration meet state requirements.</li></ul>
<b>Short-Term</b> 2023-2027	<ul style="list-style-type: none"><li>- Fertilizer research and education grants are administered on an annual basis. The preferred scope of the grants was updated to give priority to projects focused on nitrate reductions in GWMA's.</li></ul>



## 4.3 Confined Animal Feeding Operations (CAFOs)

### 4.3.3.1 Confined Animal Feeding Operations Compliance

OBJECTIVE: Continue to administer regulatory oversight of CAFOs in Oregon that exceed the federal standards, including the implementation of SB 85 provisions to ensure compliance and protection of groundwater. [4.3 Confined Animal Feeding Operations (CAFOs)]

<b>Continuous</b>	<ul style="list-style-type: none"><li>- Implementation of the CAFO program is a continual ongoing effort. All operations that meet the definition requiring a permit are permitted and inspected at a minimum of every 10 months. This exceeds the current federal standard.</li></ul>
<b>Short-Term 2023-2027</b>	<ul style="list-style-type: none"><li>- Development of an updated General NPDES permit is anticipated to begin fall 2024. Due to an extensive public comment process, it is difficult to identify an estimated date of completion.</li><li>- Existing Individual NPDES permits in the LUBGWMA will be updated to incorporate SB85 provision following the adoption of the SB85 rules. Rules are anticipated to be adopted in Aug 2024.</li><li>- Rulemaking to fully implement SB85 is in process and anticipated to be completed in Aug 2024.</li></ul>
<b>Medium-Term 2027-2031</b>	<ul style="list-style-type: none"><li>- Once the New General NPDES permit is complete, ODA will prioritize updating CAFO permits in the LUBGWMA. From there all other General NPDES permits will be updated by region.</li><li>- Update existing Individual NPDES permits to be consistent with new general permit is dependent on the timeline for update of the general permit.</li></ul>

## 4.4 Livestock Grazing

### 4.4.3.2 Inventory of Livestock Operations

OBJECTIVE: Inventory all livestock operations that do not meet the definition of a CAFO and are not required to seek a permit and to do outreach and technical assistance to livestock owners to ensure compliance with groundwater protection requirements. *[4.4 Livestock Grazing]*

<b>Continuous</b>	<ul style="list-style-type: none"> <li>- Outreach and technical assistance will start once the inventory is completed at the end of 2025 and will be ongoing.</li> </ul>
<b>Short-Term</b> 2023-2027	<ul style="list-style-type: none"> <li>- Conduct an inventory of livestock owners within the LUBGWMA, to be completed by the end of 2025.</li> <li>- Input inventory data into a usable GIS layer, anticipated to be completed in 2025.</li> </ul>

### 4.4.3.1 Agriculture Water Quality Program (AGWQ)

OBJECTIVE: Prevent and control water pollution (including groundwater) from agricultural activities to achieve water quality standards. *[4.4 Livestock Grazing]*

<b>Continuous</b>	<ul style="list-style-type: none"> <li>- Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.</li> </ul>
<b>Short-Term</b> 2023-2027	<ul style="list-style-type: none"> <li>- Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.</li> <li>- Area Rules are reviewed every two years. The Willow Creek and Umatilla rules were last reviewed in Feb 2024. Rule changes may be done anytime the agency identifies a need.</li> </ul>
<b>Medium-Term</b> 2027-2031	<ul style="list-style-type: none"> <li>- Area Plans are reviewed on an alternating schedule of a full and light review of every 6 years for full and every 2 years for a light review. The Willow Creek and Umatilla area plans were last reviewed In February of 2024.</li> </ul>

#### 4.4.3.3 SB 85 Rules: Manure Management

OBJECTIVE: To extend permit coverage and compliance requirements to those receiving and land applying animal nutrient exported from permitted CAFOs and land applied within a Groundwater Management Area boundary to ensure groundwater protection. *[4.4 Livestock Grazing]*

#### Short-Term 2023-2027

- Establish a rules advisory committee (RAC) and complete the rulemaking process to develop rules governing the Nutrient Application Permit, anticipated to occur late 2024.
- Draft and implement a General Nutrient Application Permit. General Nutrient Application Permit will be developed post rulemaking process, this process is anticipated to take 6-8 months.
- Recruitment of the Permit Coordinator and CAFO Inspector positions is anticipated to begin late 2024.

## 4.5 Land Application of Industrial and Domestic Wastewater

### 4.5.3.1 Wastewater Permitting and Compliance

OBJECTIVE: Continue regulating land application of industrial and domestic wastewater to protect groundwater under state authority in the absence of applicable federal regulations. [4.5 Land Application of Industrial and Domestic Wastewater]

<p><b>Continuous</b></p>	<p>- Continue implementing and enforcing requirements of Water Pollution Control Facilities (WPCF) permits and National Pollutant Discharge Elimination System (NPDES) permits to ensure the collection, treatment, storage, and land application of wastewater is done in a manner that protects groundwater. Review facilities' required annual and monthly reports for compliance with permit conditions. Permits require facilities to continuously adapt operations to maintain compliance and minimize nitrate leaching potential.</p>
<p><b>Short-Term 2023-2027</b></p>	<p>- Prioritize modifications and renewals of wastewater permits in the LUBGWMA to be more protective of groundwater. WPCF permits can be issued for a term not to exceed 10 years. NPDES can be issued for a term not to exceed five years. DEQ may process permit modifications to further update conditions of permits in between renewals. Permit schedules are as follows:</p> <ul style="list-style-type: none"> <li>Port of Morrow</li> <li>Lamb Weston</li> <li>JR Simplot</li> <li>Olam West Producers</li> <li>General permit holders: JSH Farms, Follett's Meat Company, Starvation Ridge Farming</li> <li>City of Stanfield</li> <li>City of Boardman</li> <li>City of Irrigon</li> </ul>
<p><b>Medium-Term 2027-2031</b></p>	<p>- Continue updating and renewing wastewater permits to ensure operations are protective of groundwater.</p> <ul style="list-style-type: none"> <li>Port of Morrow</li> <li>Lamb Weston</li> <li>JR Simplot</li> <li>Olam West Producers</li> <li>JSH Farms, Follett's Meat Company, Starvation Ridge Farming</li> <li>City of Stanfield</li> <li>City of Boardman</li> </ul>
<p><b>Long-Term 2031 - Beyond</b></p>	<p>- Continue updating and renewing wastewater permits to ensure operations are protective of groundwater.</p>

## 4.6 Rural Residential

### 4.6.3.1 Agriculture Water Quality Program

OBJECTIVE: Prevent and control water pollution (including groundwater) from agricultural activities to achieve water quality standards. *[4.6 Rural Residential Strategies Schedule]*

<p><b>Continuous</b></p>	<ul style="list-style-type: none"> <li>- Investigate water quality complaints of agricultural activities with impacts to waters of the state. This includes irrigation and nutrient application practices that may be causing pollution to waters of the state.</li> </ul>
<p><b>Short-Term 2023-2027</b></p>	<ul style="list-style-type: none"> <li>- Investigate locations identified through the Strategic Implementation Area assessment with potential to impact groundwater, as described below in Section 4.1.3.2.</li> <li>- Area Rules are reviewed every two years. The Willow Creek and Umatilla rules were last reviewed in Feb 2024. Rule changes may be done anytime the agency identifies a need.</li> </ul>
<p><b>Medium-Term 2027-2031</b></p>	<ul style="list-style-type: none"> <li>- Area Plans are reviewed on an alternating schedule of a full and light review of every 6 years for full and every 2 years for a light review. The Willow Creek and Umatilla area plans were last reviewed in Feb 2024.</li> </ul>

### 4.6.3.2 Onsite Septic System Permitting and Compliance

OBJECTIVE: Continue regulating onsite septic systems to protect groundwater and public health. *[4.6 Rural Residential Strategies Schedule]*

<p><b>Continuous</b></p>	<ul style="list-style-type: none"> <li>- Partner with Umatilla County Public Health Department to ensure implementation of rule requirements for the construction, alteration, repair, operation, and maintenance of residential onsite septic systems.</li> <li>- Implement and enforce Water Pollution Control Facilities (WPCF) Onsite permits for large onsite septic systems, such as commercial or community systems, that receive over 2,500 gallons of wastewater per day or wastewater that is stronger than residential strength.</li> </ul>
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### 4.6.3.3 Onsite Septic System Repair and Replacement Funding

OBJECTIVE: Continue providing homeowners with affordable financing options to repair or replace failing septic systems. *[4.6 Rural Residential Strategies Schedule]*

<p><b>Continuous</b></p>	<ul style="list-style-type: none"> <li>- Partner with public agencies or qualified nonprofit lender(s) to offer affordable financing options for septic system repair and replacement when funding is available for this purpose.</li> </ul>
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#### 4.6.3.4 Public Wastewater Treatment System and Irrigation Modernization Funding

OBJECTIVE: Continue providing public entities with low interest loans and additional subsidies to support public wastewater system upgrades or expansion and irrigation modernization. [4.6 Rural Residential Strategies Schedule]

**Continuous**

- Support public entities with funding and technical resources through DEQ's Clean Water State Revolving Fund program. Subsidies are dependent on funding availability.

#### 4.6.3.5 Domestic Well Construction and Compliance

OBJECTIVE: Protect groundwater resources through ensuring that new and modified wells are constructed properly, abandoned wells are providing education to the public and well drilling community, and utilizing enforcement actions when necessary. [4.6 Rural Residential Strategies Schedule]

**Continuous**

- Ensure wells are properly constructed, altered, maintained, and decommissioned so as to prevent contamination, loss of artesian pressure, and waste of Oregon's groundwater resources.

## 5. MONITORING, DATA, AND ANALYSIS

### 5.1 Technical Work

#### 5.1.1 Groundwater Quality Sampling and Monitoring

OBJECTIVE: Monitor groundwater quality to understand current nitrate concentrations and track changes over time. *[5.1 Technical Work]*

##### Continuous

- Quarterly sampling of DEQ's long-term well network of about 30 wells; occasional larger-scale sampling events as resources allow.

#### 5.1.2 Groundwater Quality Trends Analysis

OBJECTIVE: To track fluctuations or consistencies in nitrate concentrations over time to understand how land use activities may affect groundwater quality. *[5.1 Technical Work]*

##### Continuous

- Continue to track fluctuations or consistencies in nitrate concentrations over time to understand how land use activities may affect groundwater quality.

##### Short-Term 2023-2027

- Analyze groundwater quality data from DEQ long-term well network and other monitoring wells; publish public reports to enhance understanding of groundwater quality over time and inform land use decisions. DEQ anticipates completing and publishing an updated trends analysis for the long-term well network in 2024, then will subsequently begin work on the trends analysis using data from permitted sites.

### 5.1.3 Hydrogeology of the Lower Umatilla Basin - Update of the Conceptual Model

OBJECTIVE: The objective of this project is to update the Lower Umatilla Basin Groundwater Management Area technical investigation, Chapter 2: Hydrogeology section (Wozniak et al. 1995) with new data that have been collected in the three decades since the original report was released as a Final Review Draft. [5.1 Technical Work]

**Continuous**

- Continue working with partners to expand understanding of hydrogeology of the Lower Umatilla Basin.

**Short-Term  
2023-2027**

- Update the Lower Umatilla Basin Groundwater Management Area technical investigation, Chapter 2: Hydrogeology section (Wozniak et al. 1995) with new data that have been collected in the three decades since the original report was released as a Final Review Draft. Planned completion by Apr 2025.

### 5.1.4 Ongoing Groundwater Levels Data Collection

OBJECTIVE: Track groundwater levels over time to inform understanding of the aquifer system. [5.1 Technical Work]

**Continuous**

- Collect quarterly groundwater level data through OWRD's well monitoring network in the LUBGWMA.

### 5.1.5 Nitrate Leaching Estimation Update

OBJECTIVE: Determine what additional data and resources would be needed to complete an updated nitrate leaching analysis. [5.1 Technical Work]

**Short-Term  
2023-2027**

- Develop a plan to identify what additional data and resources would be needed to update a nitrate leaching analysis.



## 5.2 Groundwater Data Coordination and Effort and GIS Platform

### 5.2 Groundwater Data Coordination Effort and GIS Platform

**OBJECTIVE:** Coordinate and compile data from local, state, and tribal partners to build a publicly accessible GIS platform that displays groundwater data with the goal of having a common, high quality data set for the region to improve understanding of the hydrogeology and groundwater quality and inform management and planning decisions.

**Continuous**

- *Proposed Action:* GIS platform would pull data from existing disparate data portals to display an up-to-date unified dataset to increase understanding of groundwater quality in the basin and inform planning and management decisions.

**Short-Term  
2023-2027**

- *Proposed Action:* EPA utilizes the services of one of its third-party contractors to coordinate and compile data and build a standardized GIS platform that would display groundwater data from the various local, state, and tribal entities working in the basin.

## 6. SAFE DRINKING WATER FOR WELL-DEPENDENT HOUSEHOLDS

### 6.1 Immediate Safe Drinking Water Services

#### 6.1.3.1 Community Education, Outreach and Engagement About Nitrate in Domestic Well Water

OBJECTIVE: Ensure all residents who depend on a domestic well for drinking water understand there are potential health risks from elevated nitrates in their well water, that safe water services are available to them, and how and whom to contact to access needed services and support. [6.1 Immediate Safe Drinking Water Services]

#### Continuous

- Maintain and as needed, develop new outreach and education materials and pathways, including updates to the OHA website, fact sheets and outreach materials. Partner with LPHAs and CBOs to carry out community engagement and education.

#### Short-Term 2023-2027

- Executed grant awards running through June 30, 2025, to renew funding of three CBOs (Douglas Latinas, Eastern Oregon Center for Independent Living, and National Center for Alternatives to Pesticides).
- By September 30, 2024, finalize a scope of work for a client services agreement with the CBO Euvalcree and by October 30 execute the contract backdated to July 1, 2024.
- Completed July 1, 2024 annual funding agreements with Morrow and Umatilla County Public Health Departments through June 30, 2025.
- Posted by July 31, 2024 maps presenting household well test results in a format that protects privacy of individual households to [testmywell.oregon.gov](https://testmywell.oregon.gov) and [pruebadepozo.oregon.gov](https://pruebadepozo.oregon.gov).
- Added by July 31 an interested party email sign up to OHA LUBGWMA websites, and an archive of OHA press releases related to the domestic wells public health project.
- By September 15, 2024, finalize a scope of work with strategic communication consultants the Metropolitan Group to review and provide recommendations for improvements to OHA website and CBO engagement.
- By September 30, 2024, begin publishing a monthly bulletin for dissemination via email and on the website.

### 6.1.3.2 Free Initial Domestic Well Water Testing

OBJECTIVE: By Jun 30, 2025, complete testing of 30%, or 420 of the 1,400 domestic wells that remain untested as of Jul 1, 2024. [6.1 Immediate Safe Drinking Water Services]

#### Short-Term 2023-2027

- By Jun 30, 2024, completed a minimum of two mailings of at-home nitrate test strips to unreached households (no trespassing/guard dogs/not home households).
- By Nov 30, 2024, complete canvassing of unreached households that do not receive mail at their physical address.
- By Dec 31, 2024, complete a mailing to households whose residents refused testing in summer 2023 renewing the free testing offer and including an “opt out” return mailer to request no further communication.

### 6.1.3.3 Free Domestic Well Water Retesting

**OBJECTIVE:** Ensure households with initial nitrate test results below 10 mg/L are monitored and provided alternate water sources if nitrate in their domestic well water rises above the action level due to seasonal fluctuations and still-increasing nitrate concentrations in groundwater in the LUBGWMA. [6.1 Immediate Safe Drinking Water Services]

#### Continuous

- For these households at high risk of exceeding 10 mg/L range, implement a program of OHA direct mailings, followed by ODHS repeat phone calls to schedule and carry out water sample collection and deliver samples to the OHA contract laboratory for testing.
- For households with initial tests below 5 mg/L or above 25 mg/L, offer access to self-sampling by picking up and dropping off test kits at county public health department for ODHS to deliver to OHA contract laboratory, except that ODHS will provide sample collection assistance upon request.

#### Short-Term 2023-2027

- By June 30, 2024, completed a mailing to all households describing retesting protocols and pathways for retesting depending on their nitrate level.
- By June 30, 2024, mailed a second, individualized letter to households that completed their initial tests prior to June 2024. This letter provided the specific household's test results, corresponding testing schedule, and details about the sample collection scheduling.
- By June 30, 2024, incorporated retesting information into post-initial-test-results letter OHA mails to newly tested households.
- By December 31, 2024 develop a new reporting template to post to the OHA LUBGWMA websites with information about retesting progress.
- By June 30, 2025, complete quarterly well water re-testing of 75% of households identified as being at highest risk of exceeding 10 mg/L nitrate (i.e., households between 5mg/L - 9.99mg/L) and maintain this completion rate as new households are identified in this range.

#### 6.1.3.4 Free Kitchen-Tap Treatment System Installation and Maintenance

OBJECTIVE: Provide safe drinking water to households whose domestic well water test results are 10 mg/L to 25 mg/L nitrate. [6.1 Immediate Safe Drinking Water Services]

##### Continuous

- Newly tested households with levels between 10-25 mg/L nitrate are immediately started on bottled water delivery and added to the list for treatment system installation.
- Households with OHA-installed systems are provided 6 months worth of replacement filters which they can install themselves or call OHA's vendor to perform maintenance.
- OHA vendor conducts post-system-installation nitrate test to confirm nitrate reduction.

##### Short-Term 2023-2027

- By Dec 31, 2024, reduce by 50% the backlog of eligible households waiting for installation of treatment systems as of Jun 30, 2024.
- By Jun 30, 2025, reduce by 100% the backlog of eligible households waiting for installation of treatment systems as of Jun 30, 2024.

#### 6.1.3.5 Free Water Delivery

OBJECTIVE: Provide safe drinking water to households with domestic well water test results at or above 10 mg/L nitrate. [6.1 Immediate Safe Drinking Water Services]

##### Continuous

- County health departments contact households to sign them up for bottled water delivery as soon as possible after receiving test results from OHA, billing ODHS for reimbursement.

##### Short-Term 2023-2027

- By Sept 20, 2024, ODHS to complete surveys of all households receiving water deliveries as of Jun 30, 2024 to confirm their needs are being met; thereafter, continue to survey households at least twice yearly to ensure ongoing needs are met for these and newly added households.
- By Jan 31, 2025, ODHS and OHA to develop and implement a protocol to assess, communicate, and reduce or eliminate water deliveries to households that have had point of use water treatment systems installed.

### 6.1.3.6 Longer Term Water Provisioning for Households Above 25 mg/L

OBJECTIVE: Provide an alternative to bottled water delivery to households with domestic well water test results above 25 mg/L nitrate. [6.1 Immediate Safe Drinking Water Services]

**Short-Term**  
2023-2027

- By December 31, 2024, ODHS to issue a Request for Information to solicit public or private sector solutions for providing drinking water to households with well water over 25 mg/L nitrate where reverse osmosis filters are not certified to remove nitrate to safe drinking water levels.

### 6.1.3.7 Data and Data Management

OBJECTIVE: Maintain and as needed build out OHA and ODHS databases as the systems of record for all household data related to safe water services to support delivery of services and transparent communications about households served and awaiting service. [6.1 Immediate Safe Drinking Water Services]

**Continuous**

- Data systems are maintained on an ongoing basis.

### 6.1.3.8 Community Partner Relations

OBJECTIVE: Maintain partnerships with local community-based organizations and local governments and fund these partners to: inform the design and implementation of OHA's LUBGWMA domestic well safety activities and perform community education and outreach regarding health risks and how residents can access safe water services. [6.1 Immediate Safe Drinking Water Services]

**Continuous**

- Meet biweekly or as partners agree to carry out the actions above.  
- OHA to execute annual funding agreements with Morrow and Umatilla County LPHAs and CBOs noted in the "Description" below.

### 6.1.3.9 Demographic Study

OBJECTIVE: Survey LUBGWMA residents receiving safe water services to assess whether the program is equitably serving the community and comply with the state requirements to ask individuals receiving health services about their race, ethnicity, language and disability status. [6.1 Immediate Safe Drinking Water Services]

#### Continuous

- OHA will continue to survey newly added households.

#### Short-Term 2023-2027

- By Jun 30, 2024, OHA sent mass emailing to all households receiving services before that date.
- By Dec 31, 2024, OHA will complete a preliminary analysis of responses.

## 6.2 Intermediate Term Public Water systems Solutions

### 6.2.3.1. Technical and Funding Assistance for Public Water System Extension and Creation

OBJECTIVE: To provide technical and funding assistance to Counties and Public Water Systems so that public water system service lines are extended or new systems are created to provide safe drinking water to residents with high nitrate levels in their private domestic wells. [6.2 Intermediate Term Public Water Systems Solutions]

#### Continuous

- OHA entered into a data use agreement with the two counties to provide counties access to OHA's database of nitrate and other analyte results to inform the work of the counties' Drinking Water Investigation team.
- OHA's Drinking Water Services will reach out, encourage and guide counties and local PWSs to apply for DWSRF/BIL funding.

#### Short-Term 2023-2027

- Counties, with congressionally directed funding through EPA, carry out a Drinking Water Investigation to lay the groundwork for the design and planning of possible public water system solutions for areas currently relying on contaminated domestic wells.
- Counties, with an engineering consultant, conduct feasibility studies of public water system service area extensions or new public water systems.
- Counties or local PWS reach out to DWS for feasibility study grant (~\$20K) for line extension or PWS creation.
- Counties or local PWS submit Letters of Interest (LOI) to OHA-DWS by Q1 2025 or Q1 2026 to be considered for funding for service line extensions or creation of new PWS.

### 6.2.3.2 Identifying Public Water Systems Not Currently under OHA Oversight

OBJECTIVE: Ensure all Public Water Systems in the LUBGWMA are identified and meeting federal and state requirements for monitoring and treating nitrate. [6.2 Intermediate Term Public Water Systems Solutions]

#### Continuous

- By December 31, 2024, OHA to meet with county and state agency partners to strengthen outreach to identify PWS not under state oversight. Include criteria and requirements in annual trainings with local and state partners to identify new or previously unknown PWS.



## 8. APPENDIX: GEOLOGY AND HYDROGEOLOGY OF THE LUBGWMA

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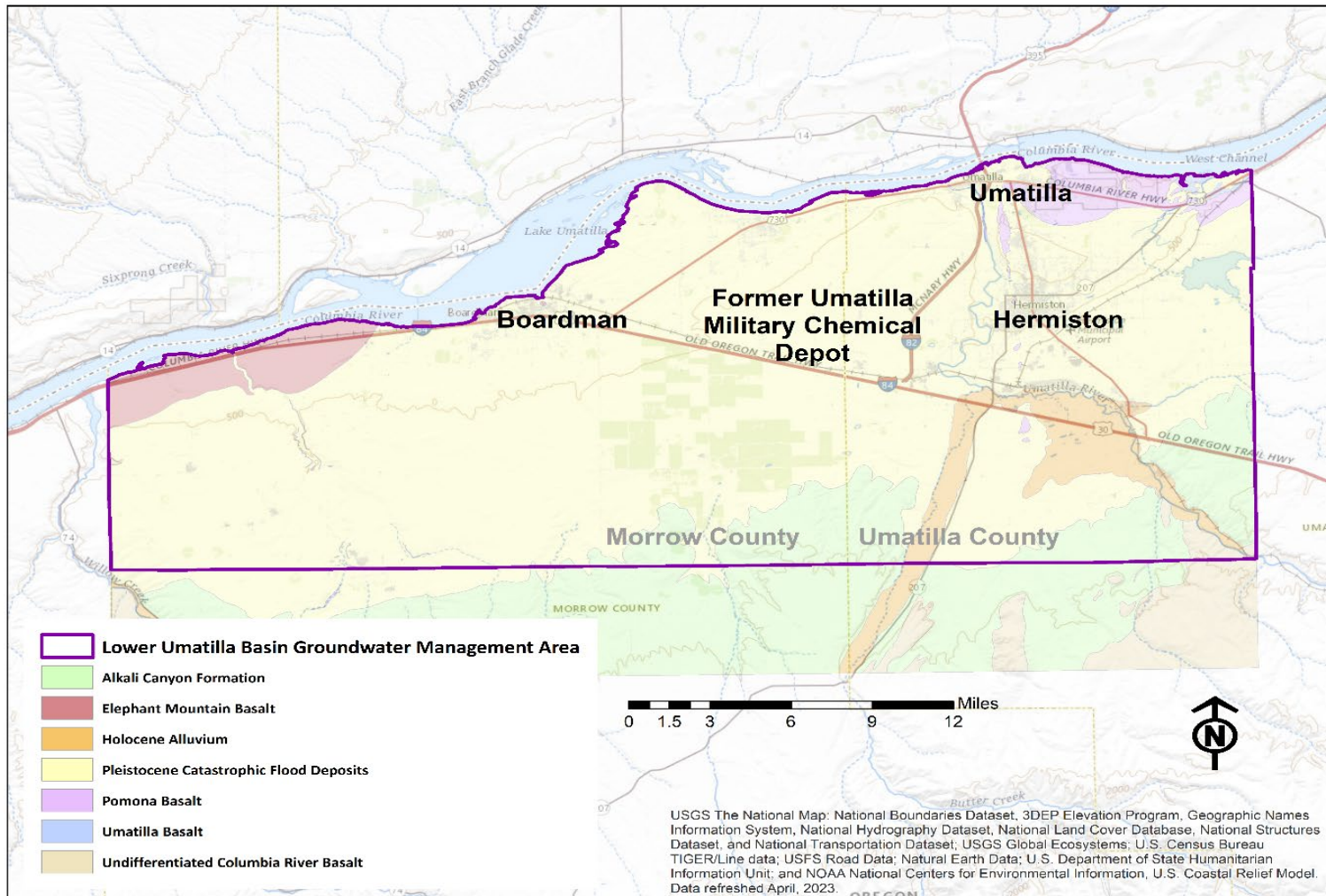
### Geologic Setting

The Lower Umatilla Basin, located in northern Morrow and Umatilla Counties of Oregon, is a landscape shaped by massive basalt flows, ice age floods, river processes, and tectonic activity. The basin is a topographic and geologic structural trough between the Columbia Hills of Washington and the Blue Mountains of Oregon. It is within the Yakima Fold Belt structural region of the Columbia Plateau, which is characterized by a series of east-west trending anticlinal ridges and synclinal basins. It is drained by the Umatilla River, which has headwaters in the Blue Mountains and discharges to the Columbia River near the City of Umatilla. The entire basin is underlain by the Columbia River Basalt Group (CRBG). The basalt is thousands of feet thick and sediments overlie the basalt sequence ranging up to 250 feet thick (see Figure 1).

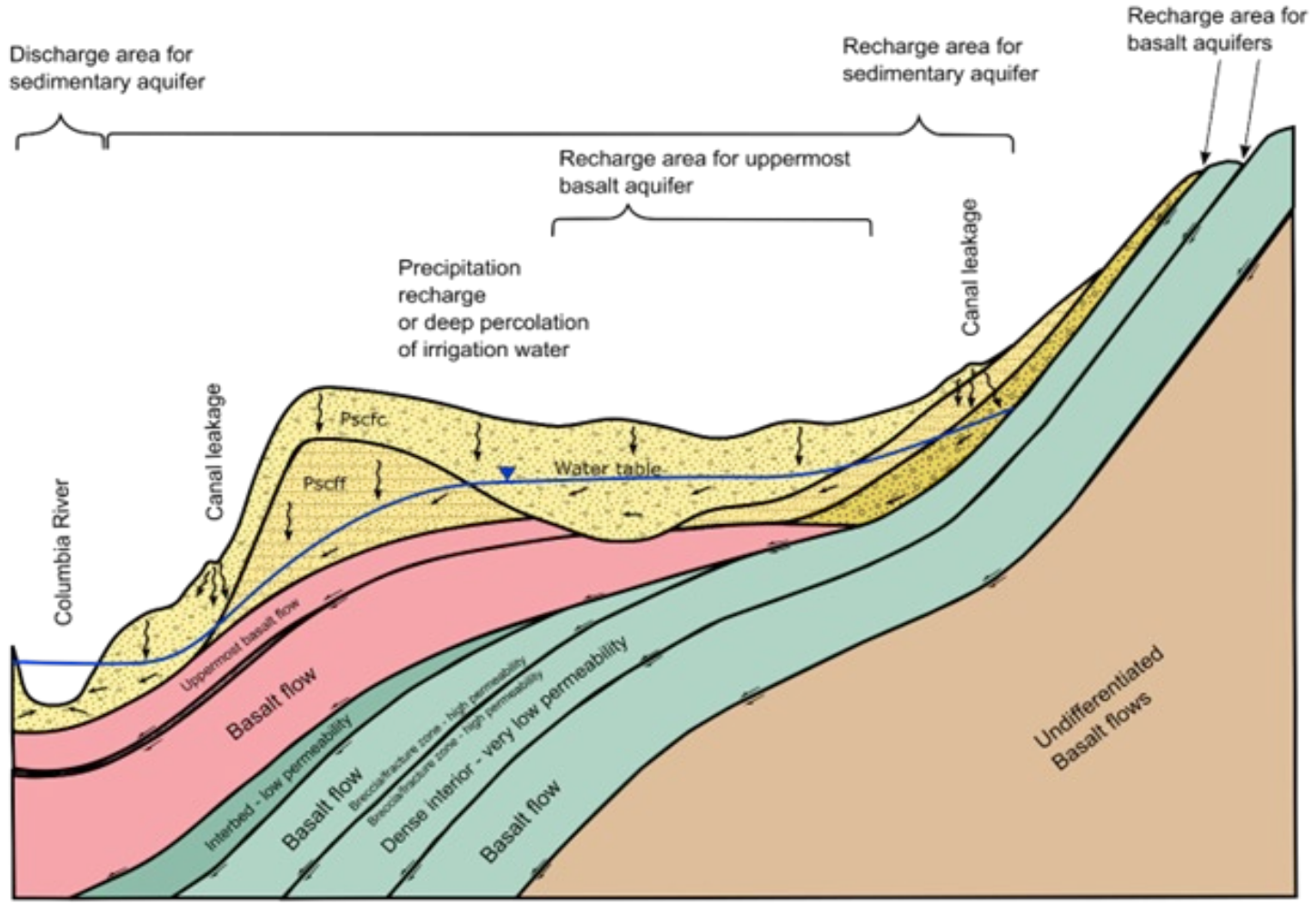
### Hydrogeology

The Lower Umatilla Basin receives less than 10 inches of rain annually. Geologic materials control how water enters the groundwater system, moves through the area and discharges to wells and rivers. As shown in Figure 2, natural recharge to deep and extensive basalt aquifers primarily occurs in the uplands where interflow zones are exposed, while recharge to the uppermost basalt flows occurs lower in the basin. Recharge to the sedimentary system occurs through infiltration of precipitation, deep percolation of irrigation water, and canal leakage.

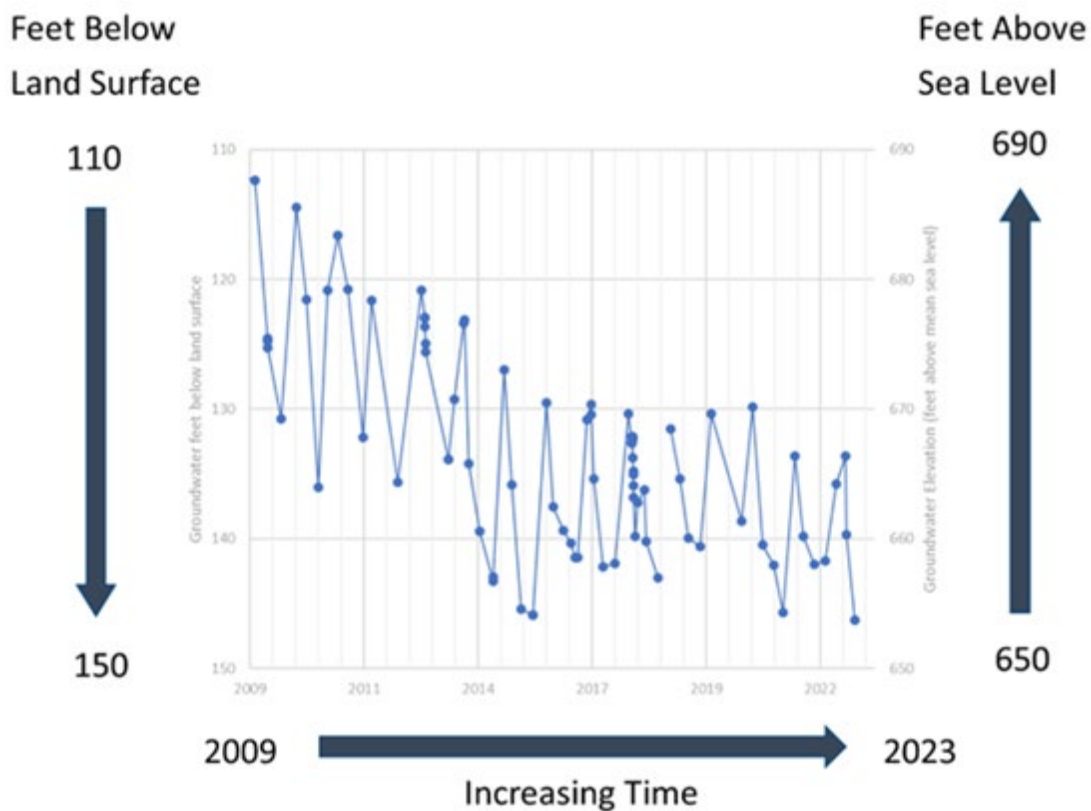
Groundwater level data are assessed to determine the direction of groundwater flow at a point in time and to assess long-term trends related to inputs and outputs. Groundwater levels are measured over time to detect changes. A water level is obtained by dropping a measuring tape down a well until it hits the top of the water column in the well. The same well, measured each year in the same season, can tell a story. For example, if the water level is decreasing year over year, more water is being removed from the system than is being recharged. OWRD staff measure hundreds of wells in the Umatilla Basin each year. Groundwater level data are displayed in this report in hydrographs as explained in Figure 3.



Appendix Figure 1. Geologic Map of the lower Umatilla Basin. This map depicts the kinds of rocks exposed at the surface.



Appendix Figure 2. Cross Sectional diagram of the groundwater flow systems in the LUBGWMA per Wozniak (1995). Abbreviations: Pscfc = coarse-grained catastrophic flood deposits; Pscff = fine-grained catastrophic flood deposits.

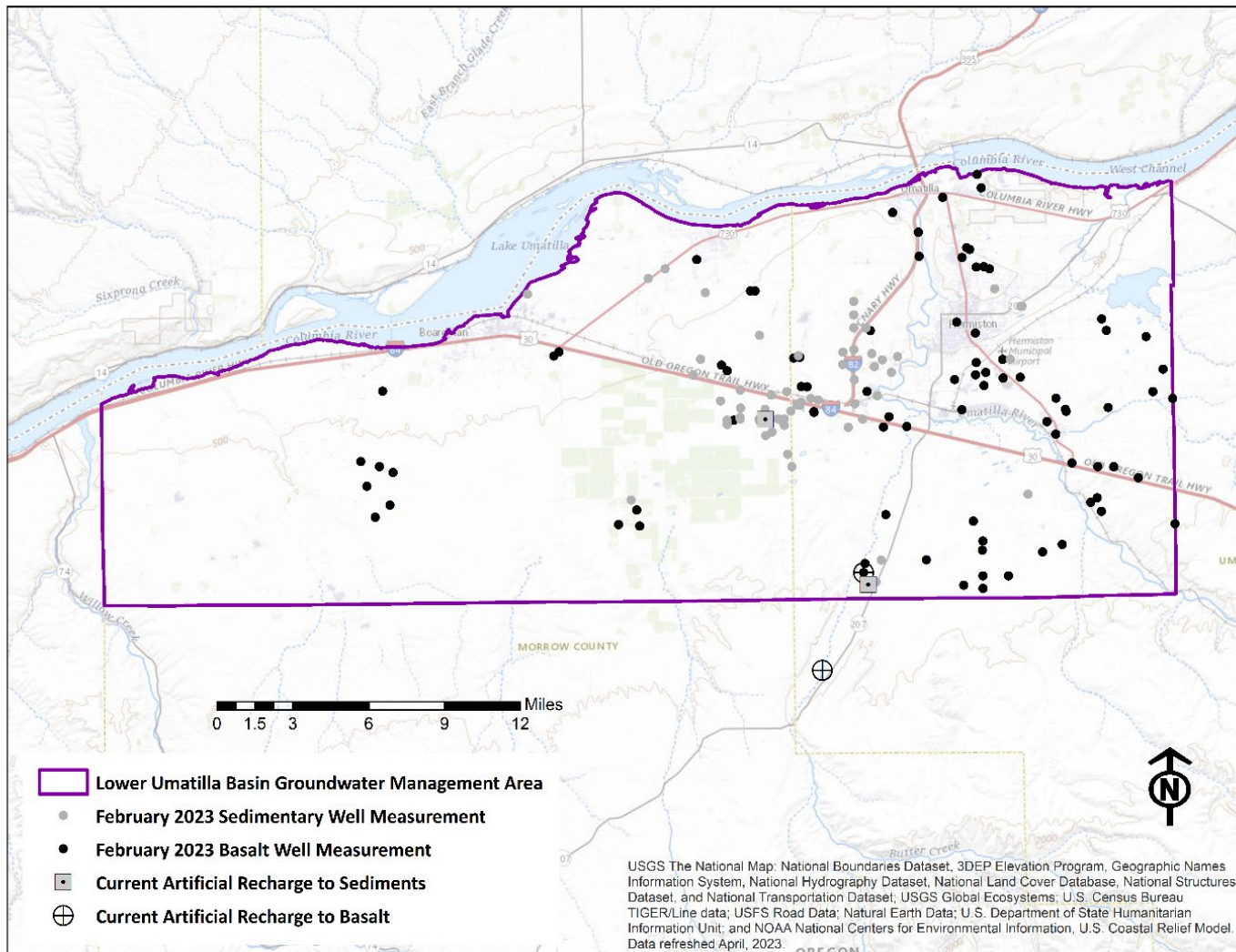


Appendix Figure 3. How to read a groundwater hydrograph.

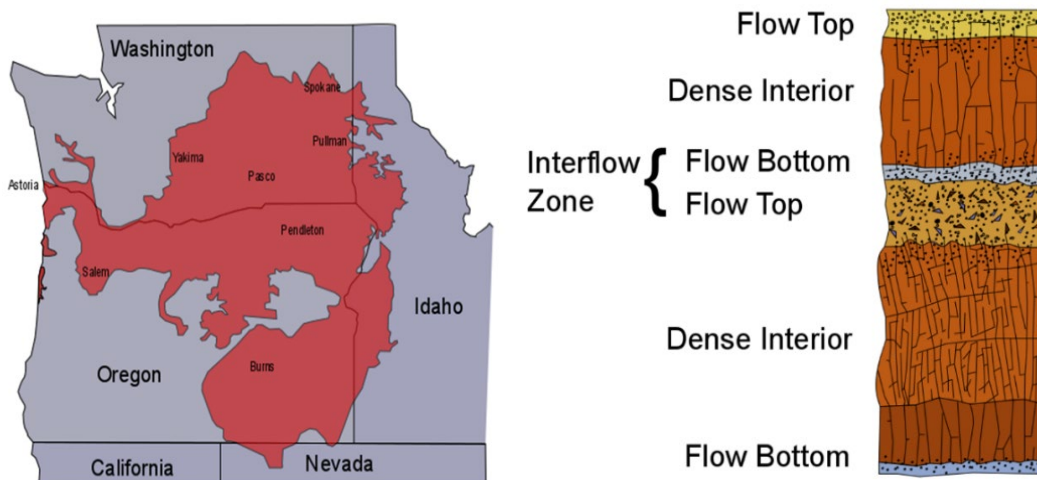
Groundwater levels represent the location of the top of groundwater in a given aquifer. This can be represented as feet below land surface or in feet above mean sea level. Either method allows assessment of long-term trends. Normalizing measurements to elevation in feet above sea level enables multiple wells to be assessed on the same hydrograph for similarities and differences.

### Columbia River Basalt Group Aquifer System

The deepest wells in the Lower Umatilla Basin access the Columbia River Basalt Group (CRBG), a series of flood basalt units that erupted in NE Oregon, SE Washington, and SW Idaho from 16.7 to 5.5 million years ago (Reidel et al., 2013). During that time, lava flowed across the Columbia Basin in horizontal sheets, traveling as far as the Oregon coast. As shown in Figure 5, the CRBG covers approximately 81,000 square miles. Individual lava flows range from tens to hundreds of feet thick, with over 350 individual lava flows identified to date and a cumulative thickness ranging up to 10,000 feet in the Columbia Plateau.



Appendix Figure 4. Groundwater level measurements by aquifer system collected in February 2023 and location of current artificial groundwater recharge projects.



*Appendix Figure 5.* Extent of Columbia River Basalt Group and cross-sectional diagram of typical CRBG flows.

A lava flow within the CRBG has a three-part internal structure created during emplacement that controls groundwater flow (see Figure 5). The flow top can be brecciated, rubbly and vesicular. The dense flow interior ranges from smooth to jointed; these zones are often visible in outcrop as columnar jointing. The flow bottom ranges from thin and glassy to vesicular. The combination of a flow top, sediments deposited in the time between sequential flow emplacement, and the overlying flow bottom is referred to as the interflow zone. The interflow zone is usually the most permeable section of a basalt flow and is often characterized as an individual aquifer, defined by a unique groundwater head or chemistry. Interflow zones usually represent 1 to 5% of the total CRBG thickness. These thin, highly transmissive interflow zones allow wells to pump at high rates. While they may produce high yields, interflow zones have a low storage capacity and long-term pumping usually leads to declining groundwater levels.

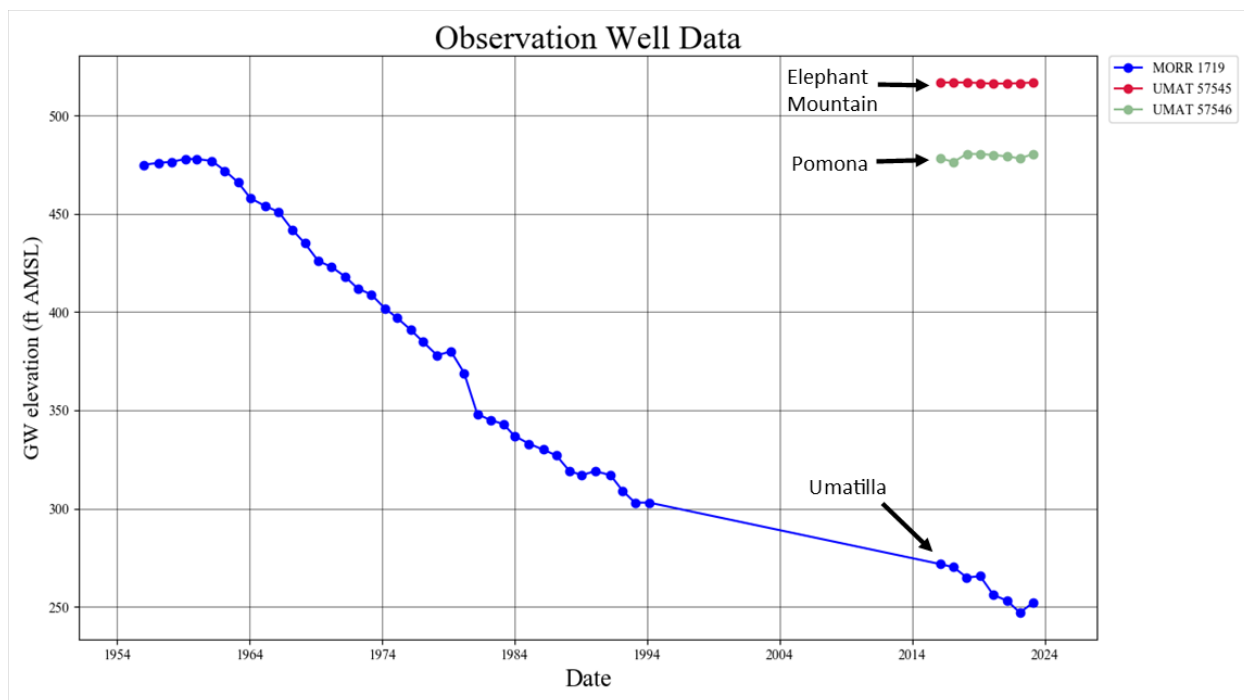
The primary basalt units accessed by wells in the Lower Umatilla Basin are members of the Saddle Mountains CRBG Formation. From youngest to oldest, these include the basal Elephant Mountain, including the Rattlesnake interbed; basal Pomona including the Selah interbed, and multiple flows within the Umatilla member (see Figure 6). In this area, these three units each have unique water level elevations and trends as shown in Figure 7. The tabular nature of CRBG manifests as where the horizontal hydraulic conductivity (hydraulic conductivity is the rate of groundwater flow per unit area under a unit hydraulic gradient, symbolized as  $K$ ) of interflow zones is 2 to 10 orders of magnitude greater than vertical hydraulic conductivity of dense flow interiors. Reported values of horizontal  $K$  in the Columbia Plateau Saddle Mountain Basalt Formation range from 0.007 to 1900 feet/day, while vertical  $K$  is reported from 0.000012 to 0.0002 feet/day (Whiteman et al., 1994; Davies-Smith, 1988, Kahle et al., 2011).

Geologic Unit*						Hydrogeologic Unit	
System	Series	Group	Formation	Age (m.y.)	Member or Unit	Aquifer or Confining Bed	
Quaternary	Holocene		Surficial Sediments		Wind-blown Silt and Sand	Alluvial Aquifer	
			Holocene Alluvium		Alluvial Flood Plain Sediments		
	Pleistocene		Catastrophic Flood Deposits	0.13 - ?	Fine-grained Sediments		Coarse-grained Sediments
					Erosional Unconformity		
Tertiary	Pliocene	Alkali Canyon	— ? — ? —		Undifferentiated Sediments	Undifferentiated Columbia River Basalt Aquifers	
			— ? — ? —		Erosional Unconformity		
			— ? — ? —		Erosional Unconformity		
	Miocene	Columbia River Basalt Group	Saddle Mountains Basalt	10.5	Elephant Mountain Basalt		Confining Bed
					<i>Rattlesnake Ridge Interbed<sup>†</sup></i>		Basal Elephant Mountain Aquifer
				12	Pomona Basalt		Confining Bed
					<i>Selah Interbed<sup>†</sup></i>		Basal Pomona Aquifer
					Umatilla Basalt		Confining Bed
	<i>Mabton Interbed<sup>†</sup></i>	Basal Umatilla Aquifer					
	Wanapum Basalt	14.5 - 15.6	Undifferentiated Columbia River Basalt	Confining Bed			
	Grande Ronde Basalt	15.6 - 16.5					

\*Modified from Tolan and Others, 1989

<sup>†</sup>Ellensburg Formation

Appendix Figure 6. Stratigraphy and hydrostratigraphy of the LUBGWMA from Wozniak (1995).



Appendix Figure 7. Unique groundwater elevations correlate with stratigraphy in the LUBGWMA CRBG.

## Sedimentary Aquifer System

The oldest sediments in the Lower Umatilla Basin directly overlie the CRBG. They consist of tuffaceous silts and sands and indurated gravels of the Alkali Canyon Formation. The Alkali Canyon sediments were deposited by alluvial processes during Blue Mountain uplift in the Miocene and Pliocene epochs (10 to four million years ago). This unit ranges from 250 feet thick in the northern basin, thinning to zero thickness towards the south.

The Pleistocene epoch (20,000 to 14,000 years ago) brought a series of glacial flood events. As glaciers located northeast of the Umatilla Basin melted, ice and debris accumulated in the canyons of the Columbia River and the Clark Fork River near Missoula, Montana. These dams retained water and debris ranging up to 1,200 feet deep. The dams failed over 100 times, releasing tremendous volumes of water, ice, and debris that scoured the landscape near the modern Columbia River Canyon (O'Connor, 2020). The floods eroded the CRBG and deposited thick quantities of sediments. Many of the modern landscape features in the Lower Umatilla Basin were created by these catastrophic floods.

Catastrophic flood deposits range from clay and silt to sands, gravels, cobbles, and boulders. They are divided into a coarse-grained and fine-grained facies per Wozniak

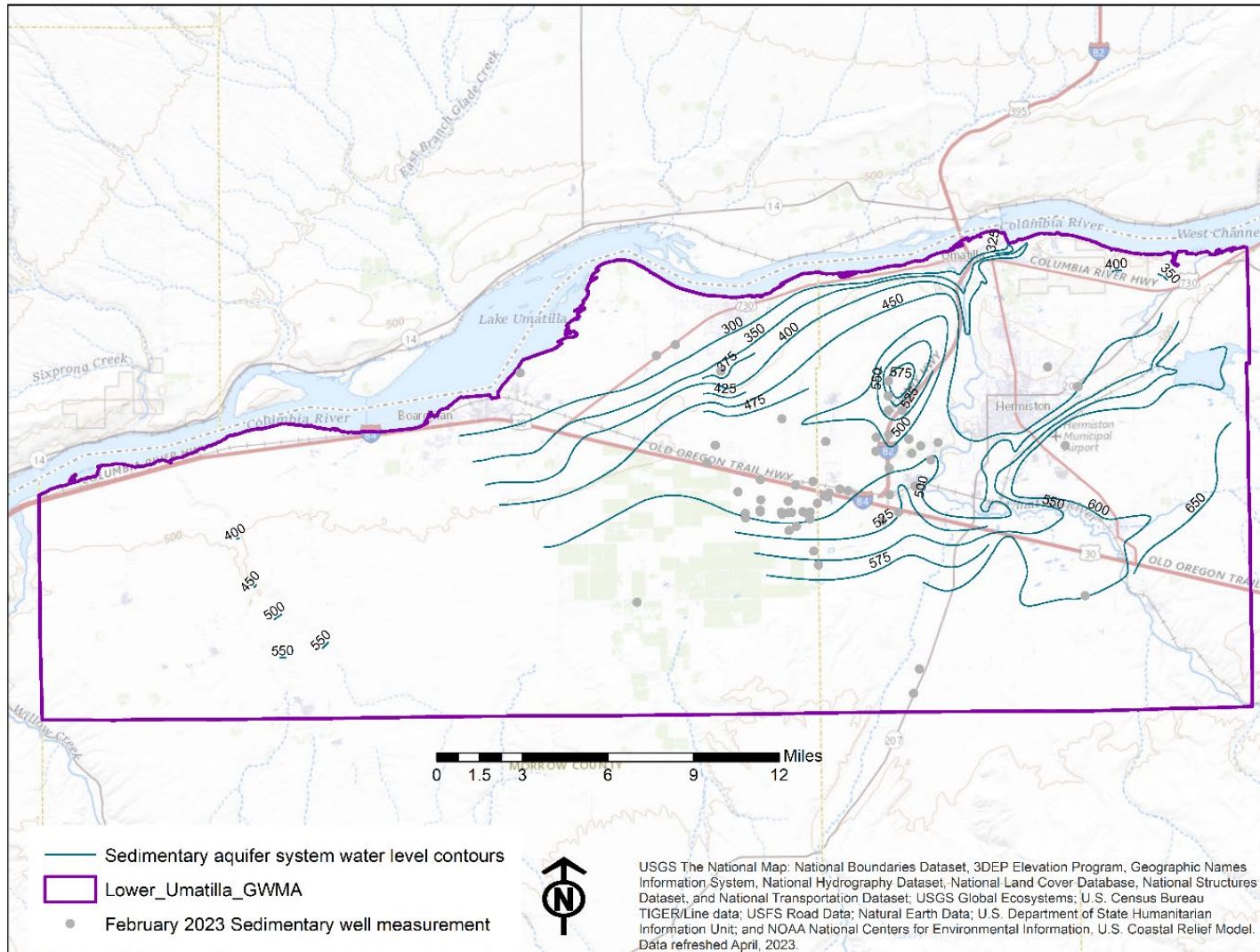


(1995). Grain size influences the rate of groundwater flow and the yield to wells located in the various sediments across the Umatilla basin. Where saturated, the coarse-grained flood deposits (primarily sand and gravel) yield hundreds to thousands of gallons per minute (gpm). Reported horizontal hydraulic conductivity ranges from 585 to 7,020 feet per day, and storage coefficient ranges from 0.2 to 0.37 (Wozniak, 1995, GSI, 2023). As mapped by Wozniak (1995), saturated coarse-grained deposits overlie the CRBG in an oblong erosional feature extending from approximately the western edge of the former Umatilla Depot east into the City of Hermiston. Saturated coarse-grained sediments also occur along the Columbia River. In addition to domestic wells, large production wells used for irrigation and industry access the coarse-grained flood deposits.

Saturated fine-grained deposits (silts, sandy silt, and clays) typically yield less than 100 gpm. Wells located north of Bridge Road or south of I-84 and the Westland Road typically access either fine-grained flood deposits or Columbia River Basalt Group aquifers. Reported horizontal hydraulic conductivity ranges from 27 to 178 feet per day with a storage coefficient of 0.00025 (Wozniak, 1995).

While there are facies changes in the saturated flood deposits, long-term water level data indicate the sediments act as a connected system. As shown in Figure 8, water level elevations in the sedimentary aquifer system transition smoothly over the LUBGWMA as expected in a water table aquifer. Groundwater flow direction varies by location and season. Canal leakage is the primary recharge to the sediments, with annual high groundwater levels occurring when the canals are full. This is typically during irrigation season, but also in the early spring months near the artificial recharge project located south of the former Umatilla Military Chemical Depot. Water level lows occur near the Columbia River. One remarkable feature of this hydrogeologic system is that the high permeability of the coarse-grained sediments creates a very flat-water table where they are saturated. Pumping and artificial recharge signals create a reversal of horizontal flow direction between seasons. Vertical well head elevation control is essential to accurately characterize this system, and recently available LIDAR data will allow better resolution of these features in the near future.

OWRD water level data collection is currently focused within or near the Critical Groundwater Areas. Expansion of the well monitoring network north and west of the Umatilla Depot and east of the Umatilla River would improve our understanding of the current state of the LUBGWMA groundwater system. Recent additions to the well network will allow refining of these contours and may suggest the need to expand the monitoring network to fill data gaps. Currently, OWRD water level collection is focused on the eastern half of the LUBGWMA, where intensive groundwater use has led to groundwater quantity-related regulation.



Appendix Figure 8. Water level contours in the coarse and fine-grained catastrophic flood deposits (Wozniak, 1995).

## **Hydraulic Connection between the Basalts and Sedimentary Aquifer**

Although much of the CRBG was emplaced over large areas as coherent flows, subsequent faulting and erosional features created by ice age catastrophic floods juxtapose sediments against interflow zones in some places. Faults, erosional features, wells without proper seals, and the pinching out of individual basalt flows can create flow pathways between CRBG units, or between the CRBG and overlying sediments. Wells that penetrate multiple aquifers and are not adequately sealed to prevent flow between aquifers create artificial vertical connections between aquifers. When there is a difference in head between aquifers, the pressure differential causes water to flow through the borehole between permeable zones. Over time, this commingling can result in a composite head and a chemical mix of the two aquifers' waters. Well construction requirements in the State of Oregon have become more stringent over time. However, there are legacy wells that pre-date construction standards and remain open to multiple aquifers. The vertical hydraulic gradient between the catastrophic flood deposits and underlying CRBG units is currently downward across most of the LUBGWMA, indicating the hydraulic potential for downward flow.

A local example of a naturally occurring connection between aquifers can be seen in the uppermost basalt, Elephant Mountain, which shows seasonal and long-term water level trends similar to the sedimentary aquifer. Recent analysis of the drill cuttings near Westland Road indicates that the Elephant Mountain unit was incised along the deepest section of the erosional trough by glacial-outburst floods. Since the vertical hydraulic gradient in this location is downward, this erosional window in the basalt represents a location where groundwater in the sediments could enter an interflow zone located at the base of the Elephant Mountain unit.

The complexity of aquifers in the LUBGWMA indicates an essential need to tie groundwater sample results to the water well logs. This will facilitate connecting groundwater quality data to specific aquifers. Understanding the depth and distribution of water quality throughout the hydrogeologic system is key to developing solutions and monitoring progress in contaminant reduction.

## **Groundwater Level Trends**

Without human impact, groundwater levels respond to seasonal and climatic trends. In this area, water use patterns add another layer of complexity to both short- and long-term groundwater level trends.

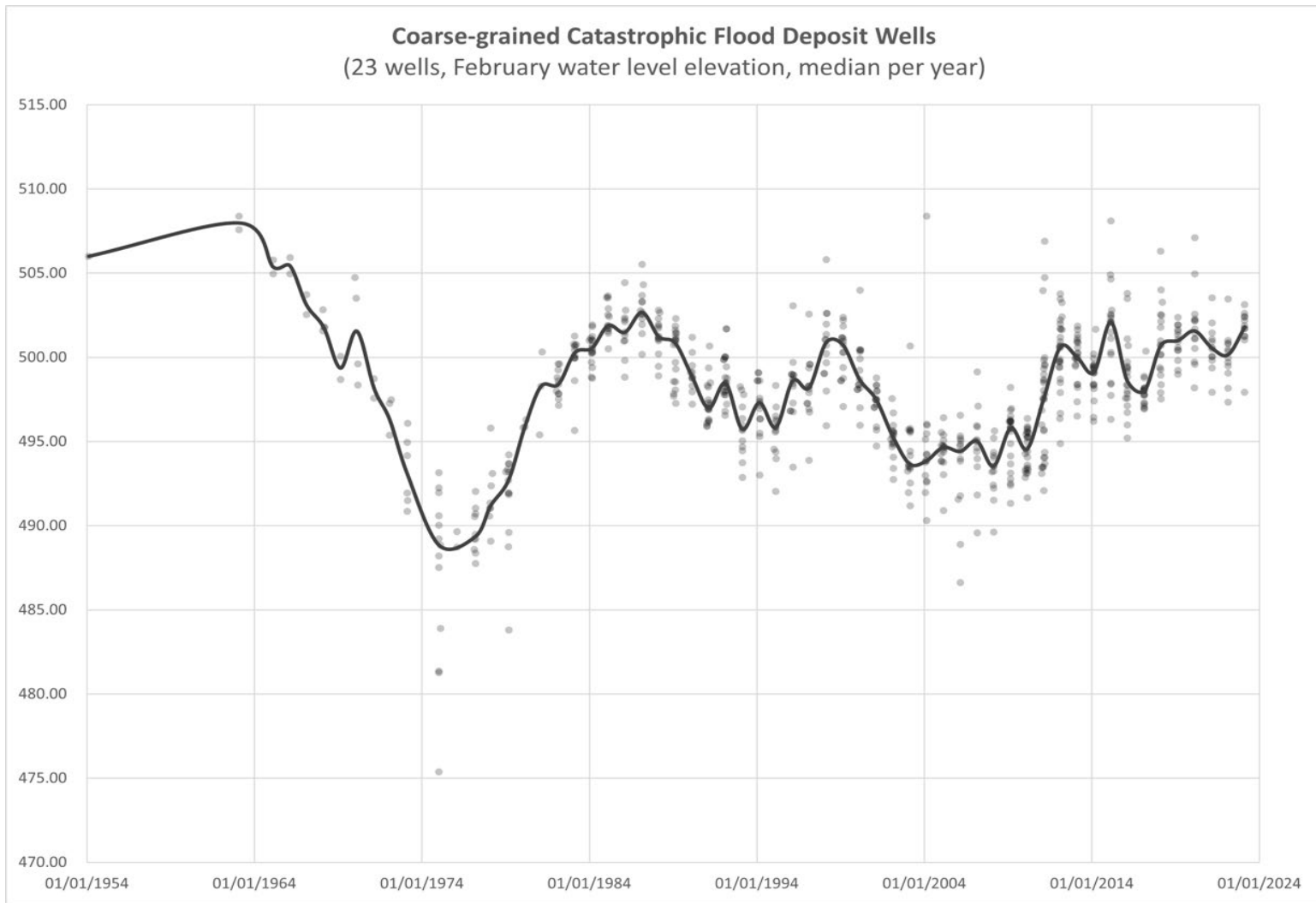
The CRBG and sedimentary aquifers are fully allocated across much of this area. Surface water is imported from both the Columbia River and the Umatilla River, flowing

through miles of irrigation district canals before reaching crops. Many of the canals are unlined and leak significant volumes of water into the sedimentary aquifer. This annual impact is visible in local hydrographs where the annual high groundwater level coincides with irrigation canal season. Large food processors reuse water multiple times within local factories, then use it to irrigate lands near Bridge Road and I-82, and near Butter Creek. This reclaimed water represents an additional recharge source to the groundwater system. A groundwater mound is visible in the water level data from the North Farm reclaimed water use site (see Figure 9).

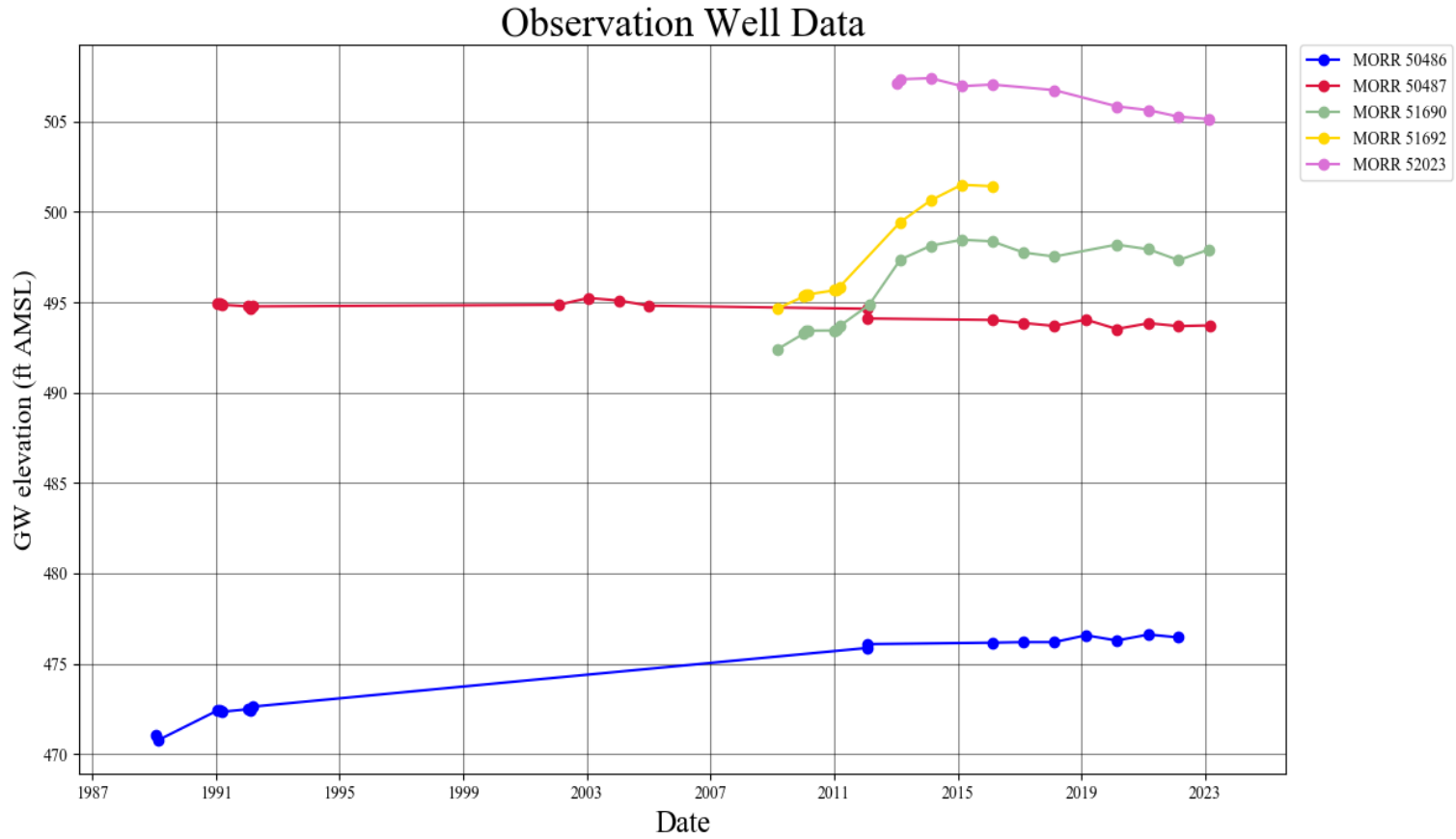
There are large groundwater pumping centers located south and east of the Umatilla Depot. These create seasonal drawdown during summer and fall months in both the sedimentary and basalt aquifers. An artificial groundwater recharge project, operating since 1976 south of the Umatilla Depot, creates an annual high in nearby wells that occurs between February and June each year. Water level changes from the recharge manifest in wells greater than two miles to the east and west.

Long-term trends in the sediments are variable and dependent on use, proximity to surface water, and proximity to unlined canals. The coarse-grained sediments (Figure 10) south of the Umatilla Depot show a decline between 1950 and 1976 as development increased for irrigation, followed by a marked increase in water levels beginning in 1977 and continuing until the mid-1980s. This increase is correlated to artificial groundwater recharge that began in 1976. Since the mid-1980s, water levels have risen and fallen with climatic cycles and the availability of surface water to apply to the artificial groundwater recharge project. Water levels in the vicinity of the recharge project are currently equivalent to those observed in the 1950s, at the beginning of development by wells. It is notable that over the last decade more water has been recharged than recovered. However, continuing water level increases in the coarse-grained deposits are not apparent. This suggests that the erosional trough in the basalt that is filled with sediments may be “full” and the additional water added by artificial groundwater recharge is flowing out of the area. Increasing water levels in the fine-grained catastrophic flood deposits to the west and north (Figure 10) suggest a possible flow path, but further investigation is needed.

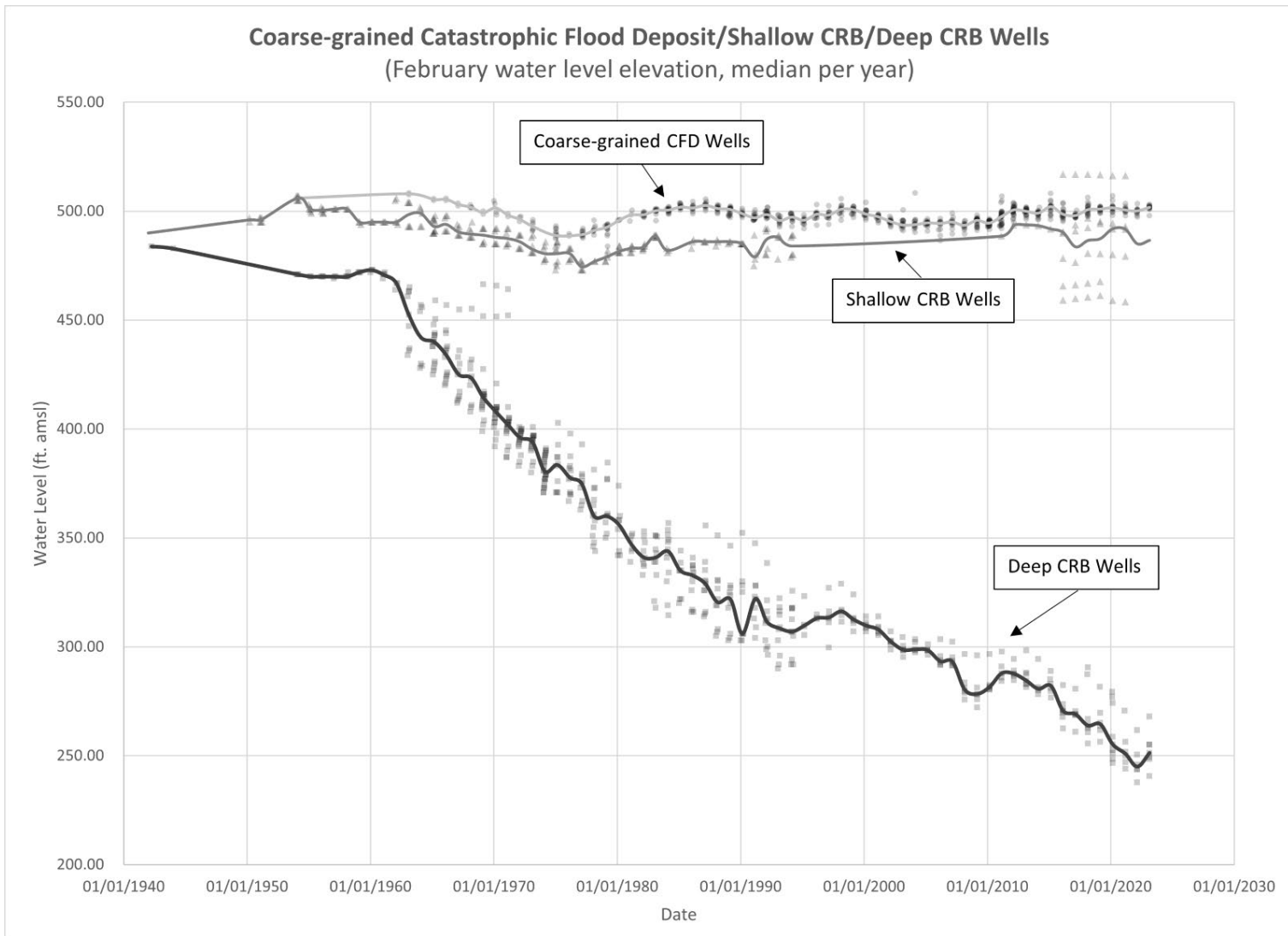
Long-term trends in the shallow basalt units (Elephant Mountain and Pomona flows) reflect the sedimentary aquifer. Water levels declined between 1965 and 1977, then began a muted upward trend similar to that observed in the overlying sediments. Long-term trends in the deepest basalt wells show a significantly different trend. They have been declining since 1970, with total decline exceeding 200 feet over the period of record (see Figure 11).



*Appendix Figure 9.* Groundwater level data in the coarse-grained catastrophic flood deposits.



Appendix Figure 10. Water level trends in fine-grained catastrophic flood deposits are mixed.



*Appendix Figure 11.* Groundwater level trends vary by aquifer system in the LUBGWMA. Sediments and shallow basalts show similar trends while deep CRBG wells diverge significantly.

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