

Upper Yaquina Watershed TMDL Implementation Plan 2025-2029

Oregon Department of Agriculture

Date: March 1, 2025

Designated Management Agency: Oregon Department of Agriculture

Subbasin: Upper Yaquina River Watershed (HUC 1710020401)

Receiving Waterbodies: All perennial and intermittent streams in the Upper Yaquina Watershed

Applicable TMDLs to your jurisdiction: Upper Yaquina
County: Lincoln

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Introduction

The U.S. Environmental Protection Agency (EPA) is responsible for implementing the Clean Water Act (CWA) in the United States. The EPA delegated authority to Oregon Department of Environmental Quality (DEQ) to implement the federal CWA in Oregon. DEQ is the lead state agency with overall authority to implement the CWA in Oregon. DEQ works with other state agencies, including Oregon Department of Agriculture (ODA) and Oregon Department of Forestry, to meet the requirements of the CWA. DEQ sets water quality standards that are protective of beneficial uses and develops Total Maximum Daily Loads (TMDLs) for impaired waterbodies, which ultimately are approved or disapproved by the EPA. The Upper Yaquina Watershed TMDL was developed in cooperation between DEQ and EPA. The Environmental Quality Commission (EQC) serves as DEQ's policy and rulemaking board.

A TMDL includes an assessment of conditions (based on water quality data, land condition data, and/or computer modeling) and describes a plan to achieve water quality standards. Beneficial uses describe the activities that a water body supports. Water quality standards are established to protect the most sensitive beneficial uses of the state's waters. TMDLs specify the daily amount of pollution a waterbody can receive and still meet water quality standards. In this case, the pollutants are bacteria (*E. coli*) from animal waste (wildlife and domestic animals) and human waste from septic systems, and key pollutants that negatively impact dissolved oxygen, including excess solar radiation and total phosphorus. The Basin-Specific Beneficial Uses to Be Protected in the Mid Coast Basin are identified in OAR 340-041-0220⁵ which include fish and aquatic life; water contact recreation; and public and private domestic water supply; and livestock watering. Aquatic life uses to be protected for the Upper Yaquina River Watershed are salmonid spawning periods between October 15 to May 15 of each year and the cold-water aquatic life period of May 16 to October 14.

All data can be found in the DEQ Upper Yaquina Watershed TMDLs and supporting documents. Links can be found in Appendix A.

ODA is the designated management agency (DMA) to implement TMDLs for the agricultural sector in Oregon. ODA is required to develop and implement this five-year Upper Yaquina Watershed Implementation Plan beginning in 2025 followed by annual reporting and adaptive ODA Upper Yaquina Watershed 5-Year TMDL Implementation Plan 2025-2029

management to achieve the necessary pollution reductions in bacteria, phosphorous, and solar radiation applicable to the agricultural sector.

Successful implementation of this plan will require both voluntary and regulatory water quality management strategies and programs, which are outlined in this plan.

To minimize increased regulation and oversight, the agricultural community must show progress toward meeting TMDL implementation goals to achieve and maintain water quality standards. This plan addresses the broad processes and discussions required to obtain the data, funding, and presentation methods ODA needs to show agricultural water quality progress is being made.

ODA does not currently have the funding and staff to fully implement all the tasks listed.

Therefore, ODA will prioritize its activities to achieve measurable progress towards stated objectives of the plan.

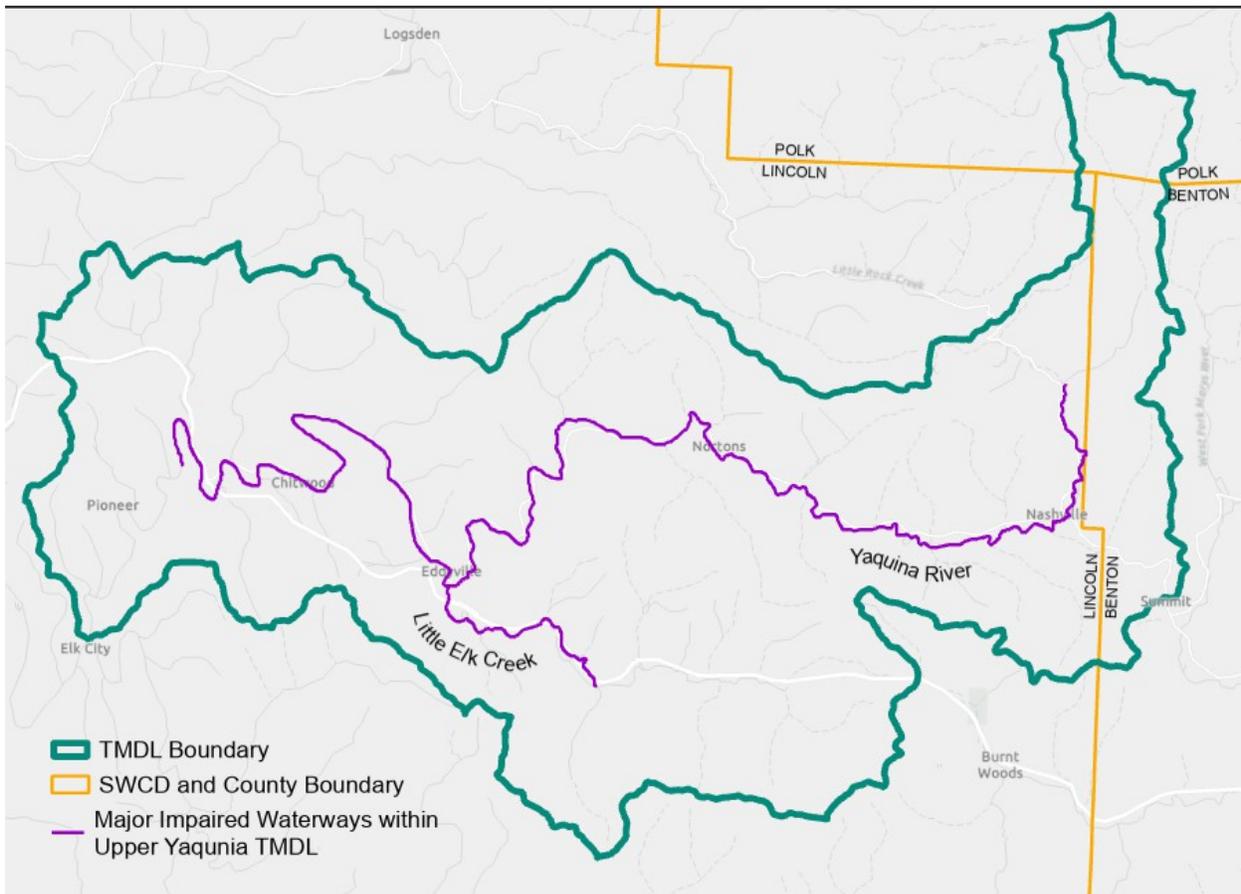
The qualifications are noted within each water quality management strategy. Where ODA lacks the funding to complete tasks, funding requests will be made within ODA, in some cases in partnership with other agencies, to obtain the required funding. ODA also will pursue external federal grants, where available.

Geographic Information

The Upper Yaquina Watershed Phosphorous and E.coli TMDLs applies to all perennial and intermittent streams in the Upper Yaquina Watershed (HUC 1710020401), the load allocations for dissolved oxygen apply to the mainstem Upper Yaquina River and Little Elk Creek. The Upper Yaquina Watershed is within the Mid Coast Agricultural Water Quality Management Area, and intersects portions of three counties: Benton, Lincoln, and Polk (see Figure 1).

Agricultural Water Quality Management Areas (MA) are ODA's primary planning and reporting areas for inputs, outputs, and outcomes. The Upper Yaquina Watershed is within the Siletz Yaquina Subbasin (17100204).

Figure 1. Upper Yaquina Watershed TMDL Area and SWCD Regions



Waterbodies and TMDL Pollutants

Water quality standards are adopted to protect the beneficial uses of waters of the state. Beneficial uses within the Upper Yaquina Watershed TMDLs are many and are named in Table 1 below.

Table 1. Beneficial Uses within Upper Yaquina Watershed TMDLs

Beneficial Uses for All Streams
Public Domestic Water Supply
Private Domestic Water Supply
Industrial Water Supply
Irrigation
Livestock Watering
Fish and Aquatic Life
Wildlife and Hunting
Fishing
Boating
Water Contact Recreation
Aesthetic Quality
Hydropower

Aquatic life uses are also protected for salmonid spawning periods between October 15 to May 15 of each year and the cold-water aquatic life period of May 16 to October 14.

Dissolved Oxygen

Dissolved oxygen (DO) is one of the most important indicators of water quality; it is essential for the survival of fish and other aquatic organisms. Oxygen dissolves in surface water through wind, water turbulence, as well as a byproduct of aquatic plant photosynthesis.

The pollutants for decreased DO is solar radiation and phosphorous. DO has an inverse relationship with water temperature, as cold water holds more oxygen than warm water. The surrogate measure for solar radiation is effective shade on the stream. To

decrease water temperature, there is a need to increase the effective shade on the stream. Phosphorus and nitrogen are important nutrients in surface waters. However, excessive levels of nutrients in surface waters can lead to eutrophication, which occurs when the environment becomes enriched with nutrients, increasing the amount of plant and algae growth. When these organisms die, the decomposition process consumes oxygen, leading to lower dissolved oxygen levels.

Effective shade is the percent of the stream that is blocked from solar radiation by vegetation and topography. Effective shade is used as a surrogate for solar radiation because not all stream-adjacent vegetation is equally successful at cooling streams. Channel morphology and near-stream vegetation characteristics greatly influence effective stream shade and cooling. Stream width, orientation, and incision are all qualities of channel morphology that alter effective shade. Near-stream vegetation characteristics such as canopy height, buffer width, density, and placement also play a critical role in shading streams.

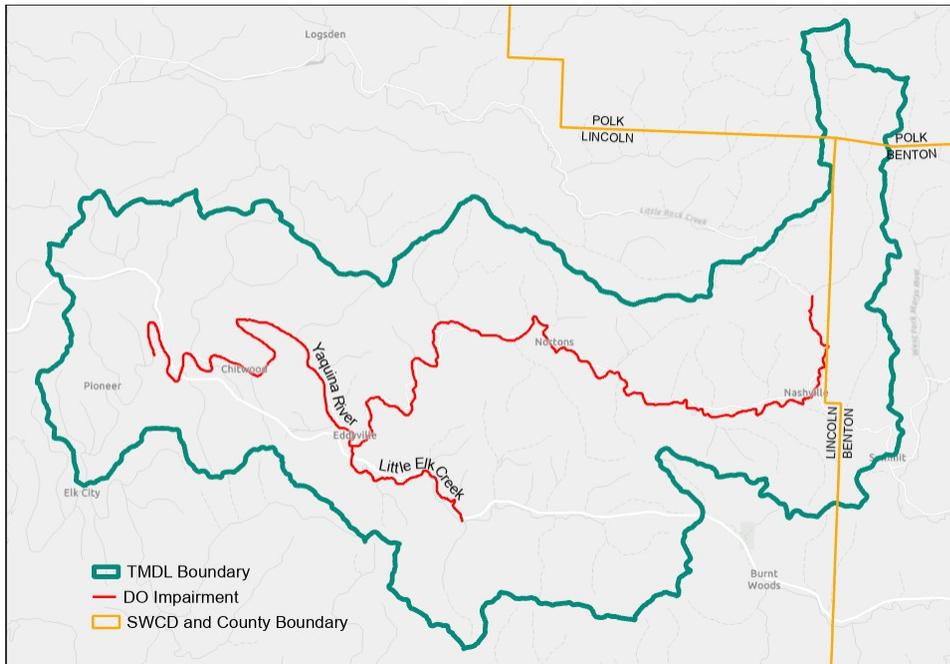
A 76 percent reduction in solar radiation on the Yaquina River and Little Elk Creek are needed to reduce temperatures to meet water quality standards. Table 2 below lists the effective shade needed on Yaquina River and Little Elk Creek to meet TMDL requirements and reduce excess solar radiation associated with dissolved oxygen processes and stream temperatures.

Table 2. Effective Shade needed on Yaquina River and Little Elk Creek

Stream Width (ft)	Deciduous			Coniferous			Mixed		
	Stream Orientation			Stream Orientation			Stream Orientation		
	N - S	NW-NE-SW-SE	E - W	N - S	NW-NE-SW-SE	E - W	N - S	NW-NE-SW-SE	E - W
10	95%	95%	97%	97%	97%	98%	96%	96%	98%
20	90%	88%	92%	94%	94%	96%	93%	92%	95%
30	85%	82%	88%	92%	91%	95%	90%	88%	92%
40	81%	76%	81%	90%	88%	93%	87%	83%	89%
50	78%	72%	73%	88%	85%	91%	84%	79%	86%
60	71%	68%	65%	86%	82%	89%	82%	76%	81%
70	72%	65%	58%	84%	80%	86%	79%	74%	75%
80	69%	62%	53%	83%	78%	83%	77%	71%	70%
90	66%	60%	49%	81%	76%	80%	75%	69%	66%
100	64%	57%	45%	80%	74%	76%	74%	67%	62%

Figure 2 shows the low dissolved oxygen contaminated streams.

Figure 2. Contaminated Waterways for Dissolved Oxygen



Based on DEQ’s analyses, excess phosphorous comes primarily from livestock manure (57 percent) and runoff (42 percent) from roads and fields, including phosphorus sorbed to sediment. Higher temperatures increase the release of phosphorous from sediment, biological disturbance, and microorganism activity. The target measure for phosphorous is Total Phosphorous, with units of mg/L. Table 3 lists the primary phosphorous agricultural sources, relative contributions, and reduction in pollutant needed.

Table 3. Phosphorus Contributions and Amount Allowed

	Existing Load (lb/day)	Relative Contribution	Allowed (lb/day)	Relative Allowed	Reduction Needed
Livestock Manure	2.46	57%	1.21	56%	50%
Runoff and background	1.8	42%	0.88	41%	50%
Failing septic	0.03	1%	0.01	1%	50%

ODOT Stormwater	-*	-*	0.02	1%	-*
Reserve	-	-	-	1%	-
Total		100%	2.13	100%	-
*Covered under separate ODOT non-point source allocations					

Bacteria

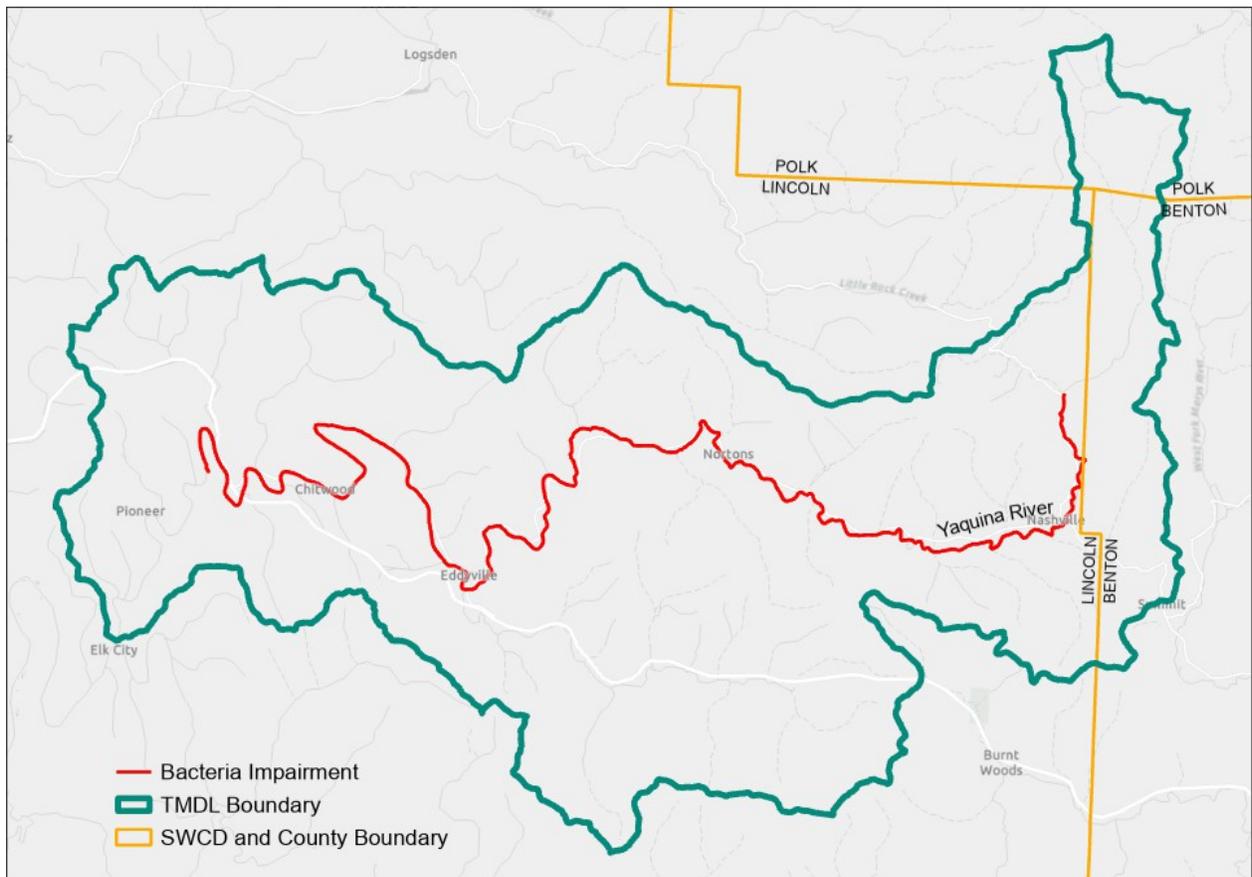
Sources of bacteria in the Upper Yaquina Watershed include agriculture, residential land use, and wildlife. Within agriculture, livestock manure is the largest source. The major potential residential source is failing septic systems. Wildlife is a source but is considered a background source and is assumed to be negligible within this watershed. However, additional evaluation of background loads from livestock are encouraged during TMDL implementation.

E. coli, a type of fecal coliform bacteria are a fecal indicator that are measured to assess fecal contamination of a waterbody. The *E. coli* criterion is established to protect the beneficial use of human contact of waters for recreational purposes.

Water with high levels of fecal contamination also pose disease risks to livestock and wildlife. Fecal contamination of irrigation water also raises the risk of produce crop contamination.

See Figure 3 below to see waterways with bacteria contamination.

Figure 3. Contaminated Waterways for Bacteria



Water Quality Standards

Table 4. Water Quality Standards

Parameter	Standard Summary	Applicable Water	Most Sensitive Beneficial Use
Bacteria	<p>(A) 90-day geometric mean (of 5 or more samples) of 126 <i>E. coli</i> organisms per 100mL</p> <p>(B) No single sample may exceed 406 <i>E. coli</i> organisms per 100 mL</p>	Freshwater	Water contact recreation
Dissolved Oxygen	<p>(a) Not less than 11.0 mg/L</p> <p>(b) Not less than 95% of saturation</p>	Designated spawning Areas and periods	Fish and aquatic life (Salmon and steelhead)

	(c) Spatial median of intergravel DO not below 8.0mg/L		spawning and salmon and trout rearing and migration)
	(a) Not less than 8.0 mg/L (b) Not less than 95% of saturation (c) Spatial median of intergravel DO not below 8.0 mg/L	Salmon and trout rearing and migration and cold water areas	
Dissolved Oxygen – Antidegradation	Up to 0.1 mg/L DO decrease from up to down-stream ends of a reach	All streams	
Statewide Narrative Criteria	The highest and best practicable treatment and/or control of wastes, activities, and flows must in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor and other deleterious factors at the lowest possible levels.	All waters of the state	

Pollutant Source and On-Farm Management: Bacteria, Phosphorous, and Solar Radiation

Solar radiation is the driving force of photosynthesis and growing vegetation. However, stream water, especially in the summer, becomes very low and direct sunlight on the water has raised the water temperature above Oregon’s water quality standards. Agriculture needs to allow and encourage streamside vegetation and trees to grow and establish overstory for shading the stream.

Table 5 lists the pollutant, agricultural source of the pollutant, the reduction needed of the pollutant to meet the TMDLs, and associated practices to reduce the pollution.

Table 5. Pollutants, Reduction Needed, and Management Practices

Pollutant	Agricultural Source	Reduction Needed	Management Practices
Solar Radiation	Insufficient height and density of riparian vegetation. Altered bank and channel topography.	76%	Riparian tree planting Riparian vegetation planting Riparian vegetation management Riparian invasive plant control Riparian fencing/livestock exclusion Large wood placement/beaver
Bacteria	Livestock in and around streams. Runoff from agricultural roads. Livestock grazing and management.	83%	Livestock management Upland erosion control Riparian fencing/livestock exclusion Water gap development Livestock off channel watering
Total Phosphorous	Livestock grazing and management. Runoff from agricultural roads.	50%	Livestock sacrifice area improvements Stream crossing improvements Livestock stream access/crossing Nutrient loading and management

Table 6. On-Farm Management: Livestock and Grazing

LIVESTOCK and GRAZING			
Problem	Practice	Resource Concerns Addressed	Benefits/Costs to Landowner
Livestock grazing limiting riparian vegetation growth	Exclude livestock access and grazing of riparian/wetland vegetated areas, springs, and streams (surface water). Establish off-stream watering facilities.	Sediment, TSS, pollutants bound to sediment (e.g., mercury, phosphorus), nutrient uptake (nitrogen, phosphorus, etc.), bacteria, stream temperature, dissolved oxygen, algae growth (chlorophyll a)	Clean livestock water; improved livestock health; less time/cost managing livestock in challenging conditions (soil (mud), water, slope, flooding); increased fencing and watering costs; increased invasive weeds if vegetation not maintained; potential increased wildlife conflicts.
	Limit/Rotational graze vegetated riparian/wetland areas when vegetation is palatable and not sensitive to browse, and soils are not saturated or sensitive to compaction and erosion. Establish off- stream watering facilities to lure livestock from stream. Provide temporary fencing of stream during grazing if		Similar benefits/costs as exclusion except: Increased land used for grazing and time/costs managing/rotating livestock; potentially decreased weeds if properly grazed.

	necessary to protect streambank.		
	Establish off-stream watering facilities to lure livestock from streams, springs, and saturated areas. Harden access points to saturated areas as needed. (off-stream water, no fence)		Maintains most land for grazing; increased livestock water quality and maybe livestock health; increased cost of maintaining watering facilities and preventing damage to wet soils; and partial decrease in time/costs managing livestock in streams.
Protect streams and groundwater from livestock waste runoff and leaching	Livestock waste storage facility. Composting facility.		Increased costs for installation and managing waste (collecting, storing, removal, spreading); improved livestock health; less time/costs managing livestock in challenging soil-mud-manure conditions.

	Roofs and covers for livestock waste.		
	Establish sacrifice area for wet use to protect other wet ground. Collect livestock waste. Prevent		Increased costs for collecting/managing waste; improved pasture conditions.

	runoff and leaching.		
	Nutrient Management (waste and nutrient management).		Increased/decreased costs of nutrient management; potential improved vegetation growth/health.

Table 7. On-Farm Management: Streamside, and Road Vegetation and Maintenance

<i>STREAMSIDE and ROAD VEGETATION AND MAINTENANCE</i>			
Problem	Practice	Resource Concerns Addressed	Benefits/Costs to Landowner
Promote vegetation in riparian areas	Increase herbaceous/vegetation cover in riparian areas along streams and in wetlands. Include trees and tall shrubs for shading perennial streams.	Increase nutrient plant uptake, filter pollutants from runoff, prevent surface erosion, increase infiltration, reduce soil compaction, and sequester carbon to improve soil moisture holding capacity and reduce carbon gas emission.	Increased time/cost to plant and maintain native, site-capable vegetation and remove/prevent invasive vegetation; potential increase in wildlife conflicts; potential decrease in farmable land; potential decrease in costs associated with stabilizing streambanks.
Riparian vegetation approach for intermittent streams/ditches	Create two-stage drainage ditch/stream channel.		Increased time/cost to establish (could be integrated with ditch cleaning); may increase time/cost to maintain vegetation (grass) in waterway depending on management goals (e.g., mow and maintain grasses to compete with reed canary grass and other weeds); may decrease farmable land if additional width is needed for side-slopes; increase/decrease time/cost maintaining ditches depending on current practices.

Riparian vegetation approach for ephemeral channels	Establish/Expand a grassed waterway.		May increase time/cost to maintain vegetation (grass) in waterway depending on management goals (e.g., mow and maintain grasses to compete with reed canary grass and other weeds); may decrease farmable land if additional width is needed for side-slopes; increase/decrease time/cost maintaining ditches depending on current practices.
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Riparian vegetation and streambank stability	Stream corridor, water conveyance, channel bank stability improvement.	Increase nutrient plant uptake, and filter pollutants from runoff. If reducing storm flows, may reduce streambank erosion, prevent surface erosion, and increase infiltration.	Same as above but with increased cost associated with permitting, installing, and maintaining stream structures.
Install site-specific erosion control practices	Erosion barriers, Utilization of Compost Filter Socks, Wattles, Silt Fences, Filtering Devices with Activated Carbon or Compost Amendments		Increased time/costs to install when and where they are needed. Decreased soil loss through erosion. Decrease cost to maintain drainage infrastructure due to decreased sediment load. Increased labor demand.
Promote mowable vegetation in road drainage ditches	Vegetate farm road drainage ditches, install filter strips and drain to field instead of directly to stream, modify back-slopes to allow for vegetation	Filters sediment and pollutants from runoff, reduces surface erosion.	Increased time/costs to install when and where they are needed. Decreased soil loss through erosion. Decrease cost to maintain drainage infrastructure due to decreased sediment load. Increased labor demand.
Install farm road infrastructure to reduce erosion and slow drainage	Farm road improvement to reduce erosion – sizing culverts, water bars and cross drains,	Filters sediment and pollutants from runoff, reduces surface erosion, prevents infrastructure from	Increased time/costs to install when and where they are needed. Decreased soil loss through erosion. Decrease cost to maintain drainage infrastructure due to decreased sediment load. Increased labor demand.

	surfacing, vegetating roadsides, filter drainage	scouring and damage during extreme events.	
Harden and stabilize heavy use areas	Heavy use area protection to stabilize ground surface that is frequently/intensively used by people, animals, or vehicles	Filters sediment and pollutants from runoff, reduces surface erosion.	Increased costs to install/maintain. Decreased overall maintenance costs and preventing sediment and nutrient runoff.

Table 8. On-Farm Management: Water Management and Conveyance

<i>WATER MANAGEMENT and CONVEYANCE</i>			
Problem	Practice	Resource Concerns Addressed	Benefits/Costs to Landowner
Catch, divert and/or slow water	Water retention systems — retention pond, sediment basins, catch basins, sediment	Increase nutrient plant uptake, and filter pollutants from runoff. If reducing storm	Increased costs to establish and maintain — to include removing and spreading or hauling off sediment; may not decrease farmable land depending on locations; decreased costs of maintaining drainage ditches and
	traps, and berms, dikes, and levees.	flows, may reduce streambank erosion, prevent surface erosion, and increase infiltration.	infrastructure because it concentrates sediment delivery into one or fewer places.

<p>Modify landscape surface to reduce erosion</p>	<p>Diversion — channel constructed across hillslope to intercept surface and shallow subsurface flow to reduce runoff and erosion, divert water away from sensitive areas, conservation practices, agricultural waste systems, infrastructure, and other improvements. Collect or direct water for storage, water spreading, water- harvesting systems, or treatment.</p>	<p>Design dependent — Increase nutrient plant uptake, prevent surface erosion, increase infiltration.</p>	<p>Increased costs to install and maintain; may provide alternative water source; may decrease maintenance costs due to decreased erosion and sediment delivery; additional time/costs for permitting.</p>
<p>Drain land areas to prevent erosion</p>	<p>Subsurface tile drains with/without controlled outlet, Irrigation tailwater return systems — all facilities utilized for the collection, storage, and transportation of irrigation tailwater, rainfall runoff, field drain water, or combination.</p>	<p>Nutrient, pH, and organic matter management using soil tests, crop-specific analytical methods (e.g., leaf analysis), and precision ag technology (measurement, application).</p>	<p>Increased costs to install and maintain; may provide alternative water source; may decrease maintenance costs due to decreased erosion and sediment delivery; additional time/costs for permitting.</p>

Table 9. On-Farm Management: Crop Management

CROP MANAGEMENT			
Problem	Practice	Resource Concerns Addressed	Benefits/Costs to Landowner
Nutrient management and nutrient management plans	Nutrient, pH, and organic matter management using soil	Maximizes nutrient uptake efficiency, water infiltration, soil-	Increased time/costs for taking samples and analysis; improved yield and crop health; may increase/decrease costs of nutrients, lime, etc.

	tests, crop-specific analytical methods (e.g., leaf analysis), and precision ag technology (measurement, application).	water holding capacity and carbon sequestration, while minimizing soil compaction, nutrient and pollutant losses (leaching, volatilization).	
Vegetation strips	In-field vegetative strips — inter-row vegetated strips; strip cropping; alley cropping; contour buffer strips, vegetative barrier (occurring in a contoured field)	Increase nutrient plant uptake, filter pollutants from runoff, prevent surface erosion, increase infiltration, reduce soil compaction, and sequester carbon to improve soil moisture holding capacity and reduce carbon gas emission.	Increased time/costs for seeding and maintenance.; improved crop health; may increase/decrease costs of nutrients, lime, etc.
Irrigation Water Management	Irrigation Water Management - Use of soil moisture sensors/evapotranspiration meters with center pivots & sprinklers; above ground drip tape, drip emitters; micro- sprinklers; Surface and Subsurface. Below tarp irrigation, below ground drip tape.	Irrigation Water Management - Use of soil moisture sensors/evapotranspiration meters with center pivots & sprinklers; above ground drip tape, drip emitters; micro- sprinklers; Surface and Subsurface. Below tarp irrigation, below ground drip tape.	May increase irrigation costs (including energy costs) to install and time/costs to maintain depending on current infrastructure. Increased crop production quantity and quality. Increased crop options. May decrease production costs of water, energy and labor.

ODA Strategies for Bacteria Reductions and Increases in Dissolved Oxygen

ODA has identified and evaluated 17 strategies to reduce bacteria and improve dissolved oxygen (DO) in the Upper Yaquina Watershed. The strategies described in this section are broken up into three categories:

- 1) Communications and Focused Activities
- 2) Compliance
- 3) Monitoring and Assessment

The underlying ODA Implementation Matrix is shown in Appendix B) ODA Upper Yaquina Watershed TMDL Implementation Matrix.

Communications and Focused Activities

Strategy 1) Engage Partners to Discuss ODA Approach to Upper Yaquina TMDL

Share the background, data, environmental need, and the associated TMDL rules and measurable goals with ODA partners. These partners include, but are not limited to, the Oregon Association of Conservation Districts, Soil and Water Conservation Commission, Oregon Farm Bureau, landowner advisory councils, Soil and Water Conservation Districts, Oregon Cattlemen's Association, and other interested parties.

ODA plans to share a minimum of two presentations per year entirely on the Upper Yaquina Watershed TMDLs.

The goal of the presentations is to share the history, progress, and implementation of the Upper Yaquina Watershed TMDL, develop and gather input from partners on agricultural measurable objectives, and further refine ODA's implementation path. This will be an ongoing process in which ODA will track the number of presentations and participants in attendance to measure progress with this strategy.

A longer-term goal is to have a partner web portal hub that communicates TMDL background, data, environmental need, and associated TMDL rules and measurable goals.

Strategy 2) Public Messaging and Ag Solutions

Ultimately, success will come from a combination of voluntary and compliance efforts on the ground. Excess bacteria coming from streamside farms and the condition and characteristics of riparian vegetation are the two predominant factors in the area affecting water quality. The problem, area rules, implementation practices, and funding sources will be shared with the community. The focus of the implementation plan will be shared with partners and the public.

Public input indicated a need to frame the current water quality issues with the backdrop of historical flows and land use. ODA will gather, summarize, and include this historical perspective within its outreach efforts.

ODA's goals and TMDL benchmarks can be partially achieved through public education on the Upper Yaquina Watershed TMDL. The ODA Water Quality Program will utilize ODA public relations staff to strategize a public messaging campaign. ODA, under current staffing, will develop a public information sheet for sharing through social media, the SWCD network, and other outreach platforms. If staffing has time, a targeted community survey will periodically be performed to assess effectiveness, which will also lead to public education.

Public messaging will include the following messages:

- 1) History of the problem and monitoring results.
- 2) Livestock manure is a pollutant.
- 3) Streamside vegetation is needed for slowing and filtering runoff.
- 4) Streamside vegetation and overstory is necessary for to reduce solar gain and stream cooling.

The first goal of the public messaging strategy is to create a two-page info sheet on the Upper Yaquina Watershed TMDL to be a basis for discussions and outreach.

A second goal is to have a list of agricultural solutions to combat the TMDL. This list will initially be within a document, but the ultimate goal is to have the ag solution list available publicly online and filterable by desired activity type, such as livestock grazing, streamside erosion, etc.

Table 10. Five-year Goals and Timelines

Step	Activity	Year
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1	Create Upper Yaquina Watershed TMDL info sheet.	2026
2	Consolidate pertinent and up-to-date associated ag solutions to a list.	2027
3	Prioritize ag solutions based on monitoring and analysis.	2027
4	Make the list available to the public, and filterable.	2028

Riparian vegetation agricultural solutions will include:

- Vegetation planting and establishment
- Vegetation protection (enhancement, maintenance, and growth)
- Vegetation thinning and management

Bacteria and phosphorous agricultural solutions will include:

- Livestock manure and pasture management
- Minimizing livestock access to streams
- Providing erosion control strategies for reducing, slowing, and filtering runoff

All ag solutions/practices to be prioritized according to Monitoring and Assessment Strategies 11-16, described below.

A longer-term goal is to have a public web portal hub that communicates TMDL background, data, environmental need, and associated TMDL rules and measurable goals. This accomplishment would depend on receiving additional resources in personnel and money.

Strategy 3) Agricultural Water Quality Area Plan Updates and Measurable Objectives

The Mid Coast Agricultural Water Quality Management Area Plan (Area Plan) will be reviewed and updated entirely every sixth year (three biennium’s). Every second year (biennium) accomplishments, progress, and impediments are assessed, as well as considering if modification to implementation strategies is needed to further progress toward goals outlined in the Area Plan. These updates and reviews are done through conversations with a Local Advisory Committee (LAC), ODA, DEQ, NRCS, watershed councils, the local SWCDs and other participants.

Following approval of the ODA Upper Yaquina Watershed TMDL Implementation Plan, ODA will update the Area Plan to show progress and implementation toward meeting water quality standards. This can be measured by the status of Area Plan adjustments that have the updated Upper Yaquina Watershed TMDL section included in the plan, along with reference to the implementation plan and inclusion of implementation measures.

ODA will conduct an area-wide assessment to determine the pertinent available bacteria and phosphorous monitoring locations, as well as the area vegetation assessment (see Monitoring Strategies 11-16). After the Upper Yaquina Assessment, specific ag practices and monitoring priorities will be included in the Area Plans.

An additional step will be to include measurable objectives (MO) within the Area Plan as a specific target for the Management Area. The MOs may be based on specific *E. coli* targets at locations and vegetation or shade assessment outcomes.

ODA's goal is to have Upper Yaquina Watershed TMDL Measurable Objectives in the Water Quality Management Plan, or 'noted' for submission in the next Plan full review by 2029.
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To minimize increased regulation and oversight, the agricultural community must show progress toward meeting TMDL implementation goals to achieve and maintain water quality standards.

Streamlining the agricultural data flow and data presentation associated with Area Plans to show restoration efforts, data, and MOs will be discussed with the Soil and Water Conservation Commission, Oregon Farm Bureau, LACs, SWCDs, and all partners. This TMDL comes with a requirement for DMAs to track, manage, and annually report on TMDL implementations and status. The timing of this data streamlining will depend on staffing and prioritization of ODA program processes.

Separation of Area Plan static text into a web story map, and data, goals, and progress into a map-focused web application would allow online publication of routine data and progress separately from the more static text of the Area Plan. Both could be communicated within one ArcGIS Experience Builder application.

Strategy 4) Landowner Engagement – ODA Scope of Work and Strategic Implementation Area

The Soil and Water Conservation Districts, through the Agricultural Water Quality Scope of Work (SOW), engage landowners in voluntary agricultural improvements and management practices that are protective of water quality. Additionally, through the SOW, SWCDs provide technical assistance and seek funding for implementing agricultural water quality practices. As a result of the Upper Yaquina Watershed TMDL, ODA will emphasize bacteria reduction practices and riparian vegetation efforts be prioritized within the SOW. Progress toward meeting the Upper Yaquina Watershed TMDL will be tracked by using the SOW inputs and outputs, including number of events, landowners present, technical assistance, site visits, funding proposals, and conservation plans written. It will be imperative that this data be available and visible to monitor progress.

Strategic implementation Areas (SIAs) are a tool to improve water quality utilizing watershed assessments, landowner communication, and compliance activities. The scale and scope of the Upper Yaquina Watershed TMDL is larger than the intent of an SIA. However, the SIA methodology can be utilized in a focused area for TMDL related progress. This progress would be captured in SIA reporting mechanisms. Discussions regarding the scale and scope of the SIA surrounding a TMDL will be addressed, such that the SIA continues to be a useful tool throughout the state.

ODA's data collection from SOWs and SIAs are undergoing a process to be automated such that the inputs and outputs are easily and remotely entered directly by partners, available as collected, and fed into ODA's reporting structures. The timing of this effort will depend on prioritization and resources available.

Strategy 5) Practices Implemented – ODA Scope of Work and Strategic Implementation Areas

SWCDs, through the SOW and the SIA, engage landowners in implementing on-the-ground practices. As a result of the Upper Yaquina Watershed TMDL, ODA will emphasize that sediment reduction and runoff filtration practices be prioritized within these programs.

ODA's goal is to make the local efforts (inputs) and practices implemented (outputs) visible to the local agencies, such that individual goals and strategies can be developed.

Progress with Strategy 5 will come directly from SOW and SIA reporting and will be categorized by bacteria and riparian practices: remedies for this TMDL. These practice groups will include activities such as irrigation water management, fencing, tree/shrub establishment, and heavy use area protection. Also included are riparian activities such as tree/shrub establishment, fencing, and off-channel livestock watering.

Standardization toward Natural Resources Conservation Service (NRCS) practice codes as equivalence to agricultural water quality practices will continue, and the importance of getting best management practices (BMPs) documented. This documentation can be through NRCS, Conservation Reserve Enhancement Program (CREP), SOW, SIA, or Oregon Watershed Restoration Inventory (OWRI). ODA is exploring the addition of a voluntary restoration activity reporting mechanism such that restoration projects can be tracked.

ODA's data collection from SOWs and SIAs are undergoing a process to be automated such that the data is easily and remotely entered directly by partners, available as collected, and fed into ODA's reporting structures. Future efforts will allow Structured Query Language (SQL) and GIS story maps to be developed around upland activities (irrigation, fence, woody planting, cover planning, heavy use area) and riparian activities (woody planting, fencing, livestock watering).

Strategy 6) Practices Implemented – NRCS, FSA, and OWRI

Monitoring the progress within the agricultural areas will require documenting the practices implemented that are external to ODA such as NRCS implementations, CREP, and state or voluntarily recorded efforts through OWRI. To understand and monitor the larger picture of agricultural efforts and results, agencies need to report on all agricultural improvements and practices that prevent and control sedimentation into surface waters.

The data will come through appropriate data agreements and be filtered by practices that affect the bacteria and dissolved oxygen TMDLs. Progress will be monitored via the number and type of restorations reported.

This strategy is only achievable if the agencies are willing to provide the data.

Compliance

Strategy 7) ODA Compliance Activities

ODA has jurisdiction for enforcement of water quality rules for agricultural activities in Oregon. ODA's Agricultural Water Quality (AgWQ) Compliance Program's mission is to help landowners prevent and control water pollution from agricultural activities, including bacteria, phosphorous, and solar radiation in a manner consistent with agricultural viability. Although the AgWQ Program's philosophy is to encourage voluntary approaches, program statutes and administrative rules allow the program to use compliance and enforcement actions when needed to correct violations of Oregon's water quality laws. Compliance cases may be initiated from a complaint, staff observation, or notification from another agency. Additionally, ODAs AgWQ Program may actively identify potential problems and self-initiate compliance cases or utilize methodology from the SIA process to create a case.

The AgWQ Compliance Program regulates two common rules statewide: the streamside vegetation rule and the waste rule (ORS 468B.025). The streamside vegetation rule requires that agricultural activities allow riparian vegetation to establish and grow to provide three main functions: bank stability, filtration of overland flow, and shade. The streamside vegetation rule is pertinent for the filtration and shading, the waste rule is pertinent to the bacteria and phosphorous. The waste rule prohibits causing pollution or placing wastes where they are likely to escape or be carried into waters of the state. It addresses a wide variety of water quality issues, including manure and fertilizer runoff. The AgWQ Compliance Program is responsible for enforcing the waste rule with respect to agriculture. Farm roads (private roadways on agricultural lands used for agricultural purposes) are included in ODA's compliance oversight; ODA will document expectations and BMPs for farm roads.

Progress and monitoring of compliance cases are tracked through the number of cases open, number brought into compliance, already in compliance, pre-enforcement notifications, notice of noncompliance, and civil penalties.

The ODA Process Management System tracks the efficiency of compliance with goals of case reviews performed within 30 days and site visits to agency action within 45 days.

Restoration efforts, and on-the-ground practices achieved as the result of the AgWQ Compliance Program need to be incorporated into ODA's standard data flow. This is more specifically addressed with Strategy 9 ODA Compliance and Cooperative Data.

There are no landscape goals or targets associated with compliance cases.

Strategy 8) Area Rule Review

ODA must evaluate the Area Rules to address their adequacy for the Upper Yaquina Watershed TMDL. ODA will review Area Rules within the Management Areas to assess whether they are sufficient in providing guidance and incentive in accomplishing the requirements of the Upper Yaquina Watershed TMDL. ODA must be clear: livestock manure and agricultural runoff is a pollutant and cannot enter, or be placed where it is likely to enter, waters of the state, as defined in ORS 468B.025. Pollutions of waters of the state are not allowed.

E. coli and phosphorous are directly measurable and can be compared to non-agricultural areas for reference. Direct outreach and education on the data can be made clear, and resulting effects become evident with monitoring.

Dissolved oxygen is a complex standard to enforce with rules, as this parameter is affected by multiple factors, including water temperature, nutrients, instream reaeration processes, vegetation, water utilization, water availability, upstream activities, and changes in climate. The water temperature, shade gap, and dissolved oxygen issue within agriculture will be continuously evaluated over time as the agricultural community learn to cope and implement practices to handle this widespread issue.

After partner and public outreach, ODA will work through an internal process to strategically review Area Rules. If deemed necessary, a formal process will be initiated to review and update

the Area Rules.

Following are the questions to ask:

1. Are voluntary efforts sufficient, without additional rules, to meet the TMDL allocations?
2. Are the current Area Rules specific enough for bacteria and phosphorous that producers and hobby farms correlate the rule with specific agricultural land management practices?
3. Is the obstacle for successful, widespread adoption of bacteria and riparian practices largely due to lack of specificity in Area Rules, available money/resources for agricultural water quality improvements, or lack of knowledge of the problem?

ODA will develop and recommend area implementation practices as staffing and funding allows. Area Rules will be reviewed by 2029.

Strategy 9) ODA Compliance and Cooperative Data

Currently, ODA does not have the staff capacity to track agricultural water quality improvement efforts that occur based on compliance activities. These efforts may occur cooperatively without assistance, or may be coordinated through local agencies such as SWCD's, NRCS, etc. ODA needs to develop a data path, such that these activities are tracked just like all ODA's other program data. The data must be tied to a compliance visit or activity, logged in a baseline database such as SOW, NRCS, or OWRI, and traceable to the activity effects (e.g., livestock practices).

Agricultural water quality practices are sometimes completed without being recorded in a baseline database. For example, an exclusion fence might be erected without going through the SWCD or NRCS. ODA must develop a pathway for this data to be recorded in a baseline database or create an extension to a new cooperative database tied to its baseline SOW database.

This strategy will likely be done either in conjunction with Strategy 14) Data Flow and Reporting, or at the end of completing that strategy.

ODA's goal is to have landscape actions resulting from compliance activities accounted for in its general data flow by 2029.

This timeline is dependent on available resources and could be done sooner with implementation funds.

Strategy 10) Strategic Implementation Area (SIA) Compliance Evaluation

ODA conducts a pre- and post-compliance evaluation for all SIAs. Bare ground, riparian conditions, livestock activity, and farm roads are the main factors that are reviewed for sedimentation purposes. This evaluation has a tracking metric of LC – likely in compliance, RO – restoration opportunity, CO – compliance opportunity, and PV – potential violation. These are visible and published in the Area Plans.

As designed, the standard SIA program is not large enough to influence the long-term TMDL alone and does not include enough staffing or monitoring dollars. However, ODA continues to seek long-term funding for TMDL implementation, as well as the impending TMDLs coming into the agricultural arena in Oregon.

The current Upper Yaquina Watershed TMDL can be followed by a subsequent SIA within the TMDL to capture a different area, if deemed appropriate in relation to other area efforts.

Monitoring and Assessment

Strategy 11) Effective Shade, Outreach, and Field Verification Process

Effective management and success in this large-scale effort will require data collection, GIS analysis and/or model(s) to assess and prioritize restoration efforts within the watershed.

ODA will utilize the DEQ stream shade modeling to prioritize efforts on the ground and provide outreach materials about the dissolved oxygen TMDL. ODA will utilize DEQ's effective shade calculations as a first step in analysis, to be solidified with an ODA modeling and field verification process. These numeric values can be utilized to 'color code' a geographic map on the priority level of landscapes for restoration. Any such modeling effort will require an effort of on-the-ground verification in initial stages.

ODA is building GIS analysis tools for evaluating and prioritizing vegetation riparian areas. This analysis includes vegetation height and cover, soil, slope, and normalized difference vegetation index (NDVI), or the measure of the greenness of vegetation, alongside watershed features.

ODA has built an agricultural inventory tool for partners to perform a ‘windshield’ assessment of all ag fields within an area. This tool allows for crop type, irrigation type, and livestock land-use assessment within each agricultural field.

The combination of ODA’s remote vegetation assessment, ag inventory tool, and DEQ’s catchments and streamside area priority assessments (Source Area’s Section 2, DEQ WQMP Upper Yaquina TMDL; 9/2023) will allow accurate prioritization of efforts within the TMDL area.

Additional resources will be needed to make significant progress with this strategy, including an additional GIS Specialist, as the existing GIS specialist is quickly becoming fully allocated. A Riparian Specialist is needed for landscape assessments and model verification. Most of the infrastructure needs are being upgraded through ODAs IT Strategic Plan, but a dedicated GIS computational computer is likely needed for the complex modeling calculations.

Onsite field verification processes and procedures need to be developed such that an SWCD or partner could provide on-site assistance. This will require research and time to develop. ODA has set a goal to have a usable field procedure to educate around the effective shade measurement and physical parameters effecting the parameter.

Table 11. Goals and Timelines for Strategy 11

Step	Activity	Year (completion)
1	DEQ effective shade model data incorporation into GIS and internal messaging.	2026
2	Prioritization of landscape areas.	2027
3	Field verification and analysis.	2029

Strategy 12) Vegetative Cover Assessments in Winter and Summer

Prioritizing and tracking vegetation will be required, such that a baseline and progress can be

made in the long term. Utilizing GIS tools will be the most effective method of monitoring the vegetation due to the cost of labor. The use of the DEQ canopy height/density layer will be utilized in the analysis.

A similar process is being developed for erosion in the Willamette Mercury TMDL. ODA has prioritized that GIS development and will pursue this analysis after that effort. This analysis should provide at a minimum: 1) A vegetation coverage index, 2) A vegetation height index that can be ‘scored’ in relation to a standard riparian priority area.

Riparian priority areas are to be determined with effective shade and topography.

The process must be developed such that climate and cultural differences in winter and summer are accounted for. Public messaging will need to be developed utilizing the combination of efforts of effective shade, field verification, and priority areas and goals.

Table 12. Goals and Timelines for Strategy 12

Step	Activity	Year
1	Complete initial assessment protocol.	2027
2	Complete messaging.	2028

Load reductions from solar radiation will come slowly due to the nature of overstory growth and implementation hurdles. Table 13 below lists goals for future solar reductions. Ten years was added to the suggested timelines, as those listed were not reasonable due to planning, prep, and implementation realities. Even the reductions listed in Table 13 will be difficult to attain.

Table 13. Solar Radiation Reduction Goals

Assessment Year	Solar load reduction (%)
2034	0 - 8 %
2044	8 - 14%
2054	22 - 37%
2064	38 - 60%
2074	55 - 76%
2084	65 - 86%
2094	74 - 91%
2104	81 - 95%
2114	86 - 97%

Additional resources will be needed to make significant progress with this strategy. Resources needed include an additional GIS Specialist, as the existing GIS specialist is quickly becoming fully allocated. A Riparian Specialist is needed for landscape assessments. Most of the infrastructure needs are being upgraded through ODA's IT Strategic Plan, but a dedicated GIS computational computer will be needed for any complex modeling calculations.

Strategy 13) Area Livestock Land Use Assessment

Livestock and use within the Upper Yaquina Watershed TMDL will be a priority to manage with effective targeted efforts. Utilizing ODA's ag land use assessment tool, an assessment can systematically be completed by the SWCD. This data will show the location and extent of livestock within the area, which can be evaluated with the combined landscape GIS layers for prioritization of area outreach efforts.

Following are the steps and approximate timelines for completion: Table 14.

Goals and Timelines for Strategy 13

Step	Activity	Year
1	Complete assessment protocol.	2026
2	Complete livestock assessment.	2027
3	Landscape analysis.	2028
4	Outreach material and outreach.	2029

Strategy 14) Data Flow and Reporting

ODA is required to update this implementation plan and to report annually on activities that reduce pollution and improve water quality for this TMDL, as well as outputs and landscape outcomes on agricultural lands. Agricultural lands in the Upper Yaquina are homogenous, being predominately pasture for livestock and hay for crop production.

ODA's restoration efforts are wholistic, coming from cooperation among many sources, including ODA programs, SWCDs, NRCS, OWEB, others, and voluntary efforts. It is important that all restoration efforts be reported via some reporting mechanism, such that ODA can track

progress and effectiveness for the agricultural community.

ODA has recently begun to streamline its programs' data flow, such that it is easier to input, track, and report. Those data sources include Scope of Work, Strategic Implementation Areas, Focus Areas, Compliance, and Voluntary. Each of those data sources can be considered a milestone, and ODA's goal is to complete the data flow process for each of them by the end of the five-year implementation period (2029).

Since ODA comingles efforts with other state and federal agencies, ODA must also be able to report on efforts made via those sources, namely NRCS, CREP, and OWRI. Data agreements and structures are being pursued to facilitate ease of data sharing. The efforts on agricultural lands can't be evaluated or prioritized unless ODA views the whole efforts and monitoring of the watershed community. There have been bottlenecks in getting this data shared among agencies and resolving this hurdle is a large part of this strategy being effective.

This effort will largely be achieved with existing resources. There will be some contracted Database Management Systems (DBMS) efforts needed, for which some grants are being pursued regarding getting this work done. In the longer term, an SQL Database administrator will be needed to satisfy all ODA's program needs.

Strategy 15) State Agency Collaborative Monitoring

The monitoring of vegetative assessments, erosion, and water quality is a requirement to measure the progress, or lack of progress, in reducing bacteria, sediment-borne phosphorus, and solar radiation pollution within the area. There is only one long-term ambient monitoring site in the Upper Yaquina River that will help with the assessment, but those sites are not adequate to determine progress.

Vegetation analysis and computation can be time-consuming and expensive. A common approach with shared resources would allow for shared expenses and efforts toward the same goal. The monitoring requirement comes from the Clean Water Act, via EPA through the Oregon DEQ; however, there was no money that came with the scope of monitoring needed to fulfill the TMDL responsibilities.

It is essential that the major parties involved, DEQ, ODA, and ODF at a minimum, do the following:
ODA Upper Yaquina Watershed 5-Year TMDL Implementation Plan 2025-2029

1) Have a combined approach such that the parties' efforts and data complement each other, and 2) Solicit the State Legislature in a coordinated effort to obtain funds adequate to address the monitoring and restoration efforts required to make effective progress on improving Yaquina bacteria and dissolved oxygen conditions.

A milestone will be joint state agency meeting(s) to discuss the approach and scope of alignment necessary to develop coordinated messages and boundaries.

Strategy 16) SWCD Monitoring of Bacteria and Phosphorous on Ag Lands

ODA has three initiatives in which bacteria and phosphorus monitoring can be achieved: the Scope of Work (SOW), the Strategic Implementation Area (SIA), and the Focus Area, as well as being supplemented with ODA's biennial AgWQ Support Grants. Within the Upper Yaquina, Mid Coast Management Area, coordination of these programs through the lens of the Upper Yaquina Watershed TMDL will offer the greatest, most effective benefit for water quality.

Data flow and interoperability is discussed in Strategy 14) Data Flow and Reporting. The focus and need of the monitoring will be determined by Strategies 12) Vegetative Cover Assessments in Winter and Summer, 13) Area Livestock Land Use Assessment, and 15) State Agency Collaborative Monitoring.

Pollution reduction goals are listed in Table 15 below. These goals are delayed by five years from the TMDL, as there is little baseline information to base goals, and time will be needed for prioritization and planning.

Monitoring and timeline goals for *E. coli* and phosphorous are included in Table 15.

Table 15. *E.coli* and phosphorous reduction goals

Assessment Year	E. coli load reduction (%)	Phosphorous load reduction (%)
Year 5 (2029)	0-15%	0-30%
Year 10 (2034)	15-60%	30-41%
Year 15 (2039)	40-90%	55-65%
Year 20 (2044)	50-95%	79-80%
Year 25 (2049)	60-98%	89-100%

There is currently no funding for extra monitoring associated with the Upper Yaquina Watershed TMDL; ODA will need to utilize existing grant opportunities to fund the monitoring.

The first water quality monitoring efforts are being conducted via the Upper Yaquina SIA (Strategy 10) and a funded ODA Water Quality Assurance Plan utilizing strategic points within the watershed via a DEQ-approved monitoring plan and Quality Assurance Project Plan.

Strategy 17) ODA Annual Reporting Web Map Publication

An individual annual report for each TMDL in the state is not sustainable with current staffing and resources. Reporting of activities and achievements made within the Upper Yaquina Watershed TMDL area, specific to increasing dissolved oxygen and reducing bacteria is a more powerful, visual, useful, and sustainable product. This can be done with a combined web map and application. The reporting tool will be built such that reporting for specific management practices and TMDLs can be performed.

This strategy is dependent on Strategy 14) Data Flow and Reporting.

Milestones will be:

1. Stakeholder engagement in publicly discussing Management Area efforts, outputs, and outcomes.
2. Creation of a visual web map display with associated permissions and viewing of aggregations or blurring of activities

ODA's goal is to create a web map that shows activities and progress toward meeting Upper Yaquina Watershed TMDL goals.

Resources needed to complete this web map will create additional workload for the GIS Specialist, such that this adds to the requirement for additional resources.

Compliance with Land Use Rules

All strategies within this plan are designed to educate, encourage, assist, document, and/or monitor land use strategies for lands that are in compliance with land use rules and achieve statewide land use goals. Improving water quality is a long-term process with many moving parts and the long-term goals will be achieved through a process of education, strategic implementation, monitoring, and adaptive management within the constraints of the land use rules.

Performance Monitoring and Adaptive Management

The ODA Upper Yaquina Watershed Implementation Matrix (Appendix B) contains the core key components of the five-year implementation plan. Each of the strategies contains assessment parameters, milestones, and/or goals. Annually, the ‘Adaptive Management’ and ‘Status’ columns will be updated to monitor progress with each of the strategies. Some of the strategies require, or assume, additional funding resources.

Therefore, progress on these elements will be affected by acquisition of funds. Results of this funding acquisition will also be included within the annual report.

A complementary piece to the annual report will be a web map showing the status, results, and efforts within the agricultural areas of the Upper Yaquina Watershed TMDL. ODA’s IT Strategic Plan will allow this annual data presentation, but there are intermediate milestones that must be completed prior to this annual reporting mechanism. Prioritization and funding will determine the timeline of this deliverable but will likely be toward the end of this five-year cycle, if not the beginning of the next cycle.

Re-evaluation of the key implementation strategies will be reviewed every five years. At this time, each strategy will be reviewed for effectiveness, further refinement, or deletion. Additional strategies to be added will also be considered at this time. This is also the time when a revised five-year Upper Yaquina Watershed TMDL Implementation Plan will be developed and submitted to DEQ for review. Any ODA TMDL Implementation Plan revisions will be considered at this time.

Resource Analysis

The Federal Clean Water Act Upper Yaquina Watershed TMDL Rule came to the Oregon Department of Agriculture with no money for staffing or on-the-ground restoration efforts. Full implementation of this plan requires additional resources.

Through evaluation of the strategies contained within this plan, there are shortages in staffing, resources, and operational facilities to complete this work in a timely fashion.

Staffing

A Riparian Specialist is needed for overall watershed assessments, evaluations, and on-the-ground analysis for TMDLs implementation in multiple watersheds. This Natural Resource Specialist 4 would complement and work directly with the Monitoring Specialist, Initiatives Coordinator, and the GIS Specialist.

Duties would be reviewing and analyzing watersheds via images, photos, and on-the-ground reviews. This hire must have GIS background and experience, preferably with landscape assessments using remote analysis. The hire also would review and assess restoration activities, as well as follow-up and check-in on success/failure/status of past restorations. The employee also would assist in development and review of implementation plans, strategies, and monitoring objectives for riparian plans.

Implementing the Upper Yaquina Watershed TMDL itself will not require a full time equivalent (FTE) in the long term. However, the same position is needed for other TMDLs, namely the Willamette Mercury TMDL and the completed and future revised temperature TMDLs. Currently, this function is being done as a team effort, and therefore the goals are smaller than can be achieved, and projects are often postponed due to higher prioritization of current staff's primary job functions.

An SQL Database Administrator is needed to achieve ODA's goal of efficient shared data among all Natural Resource Division programs and partners, where applicable. The impending web maps and web applications require an underlying SQL Database Administrator to keep data flowing from partners, to ODA, and across ODA programs. ODA currently has one person on staff with this capability, but this is not this employee's core job function, and therefore a large bottleneck to the implementation plan. Currently, ODA is seeing delays in project implementation, that will only be greater with further needs put on the ODA program.

An additional GIS Specialist, Natural Resource Specialist 3, will be required to handle the workload of not only this TMDL, but all the TMDLs impacting the state agricultural lands. The GIS Specialist will have duties in creating maps and drawings, performing imaging calculations, and updating SIA maps and base field maps. As with the Riparian Specialist, a full FTE is not needed specifically for the Upper Yaquina Watershed TMDL, but the with training the first year would be a full FTE. Currently, ODA can maintain its GIS maps and structures but adding application support and data flow responsibilities to ODA's current one position is not sustainable and will lead to delays in implementation.

A key component to success in all the new TMDLs is education and outreach of the issues, getting the word out, documenting BMPs, organizing meetings and messages, and social media messaging. To provide adequate outreach to the public and landowners, the program needs additional staffing of a Public Relations Specialist, Natural Resource Specialist 3, for performing these important duties. ODA currently has program-wide publicity personnel to offer direction and support, but there are no staff to help with content creation, maintenance, and monitoring.

A plan to expand the Strategic Implementation Area (SIA) program to accommodate TMDLs is needed. The existing SIA structure is not adequate to handle TMDLs effectively. Management of these new SIAs will require staff to manage the SIAs, facilitate cooperation with landowners, evaluate funding sources, and be a resource to the local SWCDs and NGO groups. ODA estimates three new Regional Water Quality staff (NRCS3) will be needed for this enhanced program. There is an additional funding component associated with this request also, referenced below. The current staffing levels accommodate only four SIAs per biennium statewide. However, this does not meet the needs of greatly expanding efforts for the TMDLs across the state. Therefore, actual progress will be much slower than the goals published within the TMDL.

Staffing Needs Estimate

1 Position / 1 FTE (Natural Resource Specialist 4) – Riparian 1

Position / 1 FTE (Natural Resource Specialist 3) – GIS

3 Position / 3 FTE (Natural Resource Specialist 3) – Water Quality

1 Position / 1 FTE (Natural Resource Specialist 3?) – Public Relations

1 Position/1 FTE (Information Technology Platforms and Systems Manager 3) - (SQL Database Administrator)

Implementation Resources

The agricultural community is diverse, broad, and made up of many small businesses and family farms. Approaching this agricultural community with requirements, and no money available to offset the costs of implementation, will not maximize effective results.

Full implementation of riparian vegetation improvements necessary to attain effective shade targets identified in The Upper Yaquina Watershed TMDLs is potentially a multi-million-dollar investment. DEQ estimated approximately \$1.60 million will be needed for establishing the ODA Upper Yaquina Watershed 5-Year TMDL Implementation Plan 2025-2029

needed riparian vegetated buffer to meet load allocations (DEQ, 2023). As described above, resource needs for the implementation activities must be addressed in many forms and different approaches to be successful. All approaches require funds to be successful, and all must be governed or monitored to ensure effective use.

ODA continually evaluates programs to optimize use of funds, as well as request additional funds for program needs. Following are three gaps in funding resources to adequately address the Upper Yaquina Watershed TMDL, Willamette Mercury TMDL, and upcoming revised temperature TMDLs.

1. Increased SIA funding to expand efforts in a larger geographic area with the required monitoring. These increased funds will be needed for both landscape resource restoration and monitoring.
2. Increased ODA WQ Grant funding: ODA's community partners have the resources and needs to implement additional monitoring and restoration activities, as evidenced by the current successful implementation of ODA WQ Grants. This TMDL, and the pending TMDLs, will put more pressure, opportunities, and need on the conservation communities.
3. A multi-state agency budget allocation for restoration activities on the ground related to the TMDL activities. This is a state problem, not just an ODA problem. A common voice among partner agencies in a joint funding request for restoration money in the Upper Yaquina Watershed TMDL or statewide TMDL Implementation would be more successful than disparate requests. Successful implementation of this funding source could be the model funding source for future TMDLs also.

Without additional resources, progress will be much slower than targeted within the Upper Yaquina Watershed TMDL. The need is there, but it requires a commitment from society to fund this change.

ODA Facilities and Operations

For efficient completion of these water quality management strategies, hardware and software will be required to complete implementation. These include dedicated imagery computational computer and software, which can be tied up for days performing analysis. It is important that these computers are standalone, such that routine updates and maintenance do not interfere

with multi-day model calculation processes. There are also skillsets required in which it is more efficient to hire components of the work done, for example ESRI contracting for GIS work, and relational database structural completion for integration to GIS. ODA continues to improve its resources in this area, but this is a long-term process, which means those facilities aren't all available currently. This results in a longer timeframe for implementation than desired.

Publication

The Agricultural Water Quality Management Plans are currently and will continue to be updated and posted on the ODA website on a rigorous schedule, described in Strategy 3) Agricultural Water Quality Area Plan Updates and Measurable Objectives.

ODA will have the current five-year implementation plan published on the ODA website as revised on the five-year schedule.

Annually, a report will be created that abbreviates the Implementation Plan within an Implementation Matrix as shown in Appendix B) ODA Upper Yaquina Watershed Implementation Matrix, and the Status column will be updated for each implementation strategy. An accompanying web map showing relevant data will be published along with the annual report. The web map component will begin to be published after completion and verification of accurate data; targeted completion is by 2029, but its completion is contingent on ODA available resources.

Appendix A. References and Links

- 1) Upper Yaquina Watershed TMDL home page:
<https://www.oregon.gov/deq/wq/tmdls/pages/upperyaquina.aspx>
- 2) EPA Final Upper Yaquina Watershed TMDL, September 2023
<https://www.oregon.gov/deq/wq/Documents/UpperYaquinaBacTMDLs.pdf>
- 3) DEQ Upper Yaquina Watershed TMDL Water Quality Management Plan, September 2023
<https://www.oregon.gov/deq/wq/Documents/UpperYaquinaWQMP.pdf>
- 4) DEQ Upper Yaquina Watershed TMDL Technical Support Document, September 2023
<https://www.oregon.gov/deq/wq/Documents/UpperYaquinaBacDOW-appendices.pdf>
- 5) OAR 340-041-0
<https://secure.sos.state.or.us/oard/view.action?ruleNumber=340-041-0220>

Appendix B. ODA Upper Yaquina Watershed Implementation Matrix

Communications and Focused Activities

POLLUTANT: Bacteria & Dissolved Oxygen (DO)				ODA Ag Water Quality Program			TIME FRAME: Annual Reporting and 5-Year Planning (2025-2029)			
S#	SOURCE	STRATEGY	HOW	FISCAL ANALYSIS	MEASURE	TIMELINE	MILESTONE	ADAPTIVE MGMT	STATUS	
Strat-egy #	What sources of this pollutant are under your jurisdiction?	What is being done, or what will you do, to reduce and/or control pollution from this source?	Specifically, how will this be done?	Existing resources (most strategies need additional resources; this is addressed in the 5-year plan)	How will you quantitatively or qualitatively demonstrate successful implementation or completion of this strategy?	When do you expect it to be completed?	What intermediate goals do you expect to achieve, and by when, to know progress is being made?	Indicate how strategies have changed with annual review reports	Include summary and date (with annual report notes)	
Monitoring Strategy Question 1 - Inputs and Outputs										
Q1. What activities are being done to help achieve desired land conditions and water quality?										
S1	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Inputs (ODA Stakeholder Outreach): Engage stakeholders to discuss ODA approach to Yaquina TMDL	Present ODA approach to statewide and local stakeholders and solicit input	Existing \$: current ODA staff	(1) # presentations, by year (2) # non-ODA attendees, by year	Ongoing	(1) 2 presentations per year (note: presentations at LAC meetings are not counted here; see Strategy 11)	Develop and refine messages for external audiences	2026- first annual report	
S2	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Public Messaging: Develop and implement effective messaging to reduce livestock access and overstory needs to the public	ODA work with partners to identify or develop effective messaging; utilizing existing staff	1) Existing \$: current ODA staff All options would need additional \$ for publications, materials, surveys	Targeted community surveys of message recognition and knowledge	Ongoing	TMDL Infosheet Produced - 12/2025; Summarize monitoring history to include - 12/2025; Ag Solutions List 2026 Online Ag Solutions List 2028	message recognition and knowledge	2026- first annual report	
S3	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Area Plan Updates & Measurable Objectives Conduct biennial reviews of MC Area Plan	DEQ-ODA presentation and LAC discussion; update Area Plan during "full" reviews only; add TMDL MO's in Area Plan	Existing \$: current ODA budget will cover this work	For Upper Yaquina basin: (1) # full reviews completed w/ DEQ-ODA & LAC (2) # light reviews w/ DEQ-ODA & LAC (3) MO's, E.Coli and Effective Shade in 100% of Area Plans/or noted for insertion at next Full Review	(1) First Plan Cycl - add Yaquina(Bacteria/DO/P) TMDL text to all Area Plans (2) Next cycle insert one or more TMDL measurable objectives	Progression of Area Plans within the TMDL area	Area plans will be updated as needed with any Area Rule changes	2026- first annual report	
S4	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Inputs (SOW & SIA -LO Engagement, TA, Seeking Funding): SWCDs engage LO and provide TA; SWCDs seek funding for practices Focus on bacteria and vegetation	Inform LO of link between overstory and temp/livestock and bacteria, beneficial management practices, assistance available; SWCDs seek funding and align efforts with partners	Existing \$: (1) OWEB SOW funding for SWCD (2) OWEB SIA TA funding for SIAs	By MA, by year: (1) # events that actively engage LO (2) # LO at these events (3) # LO provided with TA (4) # site visits (5) # funding proposals submitted (6) # funding proposals awarded (7) # conservation plans written	Ongoing; it will take decades to engage and assist LO; SIA process is 4-10 years	2025 to 2029: milestones will be developed based on previous annual results	Reporting by MA and identification of bacteria and riparian (remedy) specific practices	2026- first annual report	
S5	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Outputs (SOW & SIA - Practices Implemented): SWCDs implement on-the-ground practices Focus on bacteria and DO	SWCDs and partners help LO implement practices that reduce livestock impacts and improve condition of riparian vegetation	Existing \$: (1) Lincoln SWCDs efforts, Ag WQ Support Grants, SIA Restoration Grants, voluntary (2) Other funding (NRCS/FSA, OWEB, DEQ 319 grants)	By MA, by year: (1) Practice Groups (Upland = Irrigation, Fence, Woody PI, Cover PI, Heavy Use Area; Riparian = Woody PI, Fence, Livestock W); acres, feet, # (2) # Practices (Upland, Riparian, Total), from Practice Group data (3) Make data visible locally such that local entity can make goals and see progress	(1)(2) Ongoing; it will take decades to achieve TMDL targets	2025 to 2029: milestones will be developed based on previous annual results	Reporting by MA and identification of bacteria and riparian (remedy) specific practices	2026- first annual report	
S6	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Outputs (NRCS and FSA-CREP Practices Implemented): NRCS and FSA implement on-the-ground practices Focus on Livestock, Riparian Access and Riparian Vegetation	(1) NRCS, FSA, and partners help LO implement practices that reduce bacteria and solar inputs to water bodies (2) OWRI Data Extraction Automation	Existing \$: (1) NRCS/FSA Farm Bill conservation programs; FSA = CREP (2) Existing Staff	By MA, by year: (B) Practice Groups (Upland = Irrigation, Fence, Woody PI, Cover PI, Heavy Use Area; Riparian = Woody PI, Fence, Livestock W); in acres, feet, # (2) # Practices (Upland, Riparian, Total), from Practice Group data (3) OWRI Data by Ag/MA/TMDL automated	Ongoing; it will take decades to achieve TMDL targets	(1);2025 to 2029: milestones will be developed based on previous annual results (2) OWRI data reporting by TMDL/MA automated	2025 - Need to formalize agreements with NRCS and CREP to get annual data	2026- first annual report	

Compliance

POLLUTANT: Bacteria & Dissolved Oxygen (DO)									
ODA Ag Water Quality Program					TIME FRAME: Annual Reporting and 5-Year Planning (2025-2029)				
S#	SOURCE	STRATEGY	HOW	FISCAL ANALYSIS	MEASURE	TIMELINE	MILESTONE	ADAPTIVE MGMT	STATUS
Strat-egy #	What sources of this pollutant are under your jurisdiction?	What is being done, or what will you do, to reduce and/or control pollution from this source?	Specifically, how will this be done?	Existing resources (most strategies need additional resources; this is addressed in the 5-year plan)	How will you quantitatively or qualitatively demonstrate successful implementation or completion of this strategy?	When do you expect it to be completed?	What intermediate goals do you expect to achieve, and by when, to know progress is being made?	Indicate how strategies have changed with annual review reports	Include summary and date (with annual report notes)
Monitoring Strategy Questions 2 & 3 - Compliance Rate									
Q2. What percent of agricultural uplands are in compliance with the Waste Rule?									
Q3. What percent of stream miles on agricultural lands are in compliance with the Streamside Vegetation Rule?									
S7	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Inputs & Outputs (ODA Compliance Cases): Ensure compliance with relevant Ag WQ regulations (Area Rules)	ODA conduct investigations to ensure or achieve compliance with: waste rule, riparian rule, sediment rule (if applicable)	Existing \$: current ODA staff	(1) Inputs: By MA, by year: # cases open (sediment, riparian, both) (2) Outputs: For Upper Yaquina, by year: agency actions taken: # Already in compliance # Brought into compliance # Pre-enforcement notification # Notice of Noncompliance # Civil Penalty (3) Outputs: For Upper Yaquina, by year: % of cases achieving PMS timelines	Ongoing, in response to complaints, agency notifications, and in SIAs	(1) No milestone (2) No milestone (3) 90% of cases achieve timelines identified in PMS (case review <= 30 days, site visit to agency action <= 45 days)		2026- first annual report
S8	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Area Rules: Analyze & Possibly Change Area Rules - are they adequate to ensure achievable water quality goals	ODA evaluates Area Rules and Adequacy, gathers input from Stakeholders, proceed with changes as necessary (factors related to livestock and vegetation: stream access bare ground, riparian conditions)	Existing \$: current ODA staff	(1) ODA Review Milestone (2) # of Area Rule Presentations (3) Beginning Process of Area Rule Changes	Any Area Rule changes to be evaluated at the 5yr review cycle	(1) Completion of ODA Area Rule Review (2) No Milestone (3) Start of Area Rule Change Process (if reqd)	Extent of regulation changes has forced this ODA evaluation	2026- first annual report
S9	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	ODA Compliance & Voluntary Data: ODA standardize Compliance Outcomes with ODA (NRCS) Practice Codes AND implementing method for entry of Voluntary Practices implemented in the field	ODA creates Outcomes Entry Method within Compliance Process. AND create Voluntary Practices entry method	Existing \$: current ODA staff Contract \$ Needed: Database creation would speed implementation from contracted resource	By MA or Date, have the implemented practices available, both by Compliance and Voluntary	This is a new procedural practice to fall after the standardization of our basic internal data, goal to be complete by 2029; dependant on contract \$	The data flow diagram, path, and process is to be created first; goal to have this done by 12/2026	The TMDL requires quantification of livestock remediation and solar reduction practices and outcomes on an annual basis	2026- first annual report
S10	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	ODA SIA Compliance Evaluation: ODA conducts Compliance Evaluation at start of SIA process and updates data, currently Upper Yaquina SIA	ODA evaluates likely compliance via public domain summer imagery and field verification from public venues (factors related to livestock & vegetation: bare ground, livestock access, riparian conditions)	Existing \$: current ODA staff	By MA, by SIA, # (%) tax lots at start and end of ODA SIA process: (1) LC = Likely in Compliance (2) RO = Restoration Opportunity (3) CO = Compliance Opportunity (4) PV = Potential Violation	Compliance evaluation is completed at beginning and updated at end of ODA SIA process (compliance generally 4 years, followed by uplift and monitoring)	By the end of the ODA SIA compliance process, all ag taxlots are LC (Likely in Compliance) or RO (Restoration Opportunity)		2026- first annual report

Monitoring and Assessment

POLLUTANT: Bacteria and Dissolved Oxygen (Upper Yaquina)			ODA Ag Water Quality Program			TIME FRAME: Annual Reporting and 5-Year Planning		
#	SOURCE	STRATEGY	HOW	FISCAL ANALYSIS	MEASURE	TIMELINE	MILESTONE	ADAPTIVE MGMT
Strategy #	What sources of this pollutant are under your jurisdiction?	What is being done, or what will you do, to reduce and/or control pollution from this source?	Specifically, how will this be done?	Existing resources (most strategies need additional resources; this is addressed in the 5-year plan)	How will you quantitatively or qualitatively demonstrate successful implementation or completion of this strategy?	When do you expect it to be completed?	What intermediate goals do you expect to achieve, and by when, to know progress is being made?	Indicate how strategies have changed with annual review reports
Monitoring Strategy Question 8 - Water Quality Monitoring								
Q8. How are water quality status and trends related to changes in agricultural upland and streamside vegetation conditions?								
S11	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Outputs (DEQ- Calculation of Effective Shade Modeling, use for prioritization, and field verification): Utilizing GIS Analysis/modeling of stream shading for prioritization of outreach/efforts; ODA will need a field verification and analysis process	DEQ calculated effective shade from landscape parameters derived from Lidar, ODA to utilize data for shade prioritization ODA's role is to utilize the tool or components for outreach and priority	Existing \$: current DEQ staff conducted the analysis and reported to ODA, current staff will prioritize To implement a field verification and analysis process, ODA has limited staff availability	The first 5 years implementation will be monitored by development of the processes: effective shade detail, prioritization, field verification process	Effective Shade Outreach: 2026 Prioritization: 2027 2029: Field Verification Process	Intermediate goal of utilizing the effective shade modeling in conjunction with other GIS layers, ODA's remote vegetation assessment, and ODA's Ag Inventory Tool, in development of field processes Next will be ground verification Followed by outreach	
S12	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Outcomes (Vegetative Cover Evaluation of Ag Lands in Winter & Summer): Assess upland ag conditions that reduce erosion	ODA conduct remote assessments of cover on ag lands in winter: (1) Coarse visual assessment (2) Remote sensing automated analysis	Existing \$: (1) Current ODA staff (2) Current ODA staff will conduct pilot(s); unlikely that ODA has the capacity to scale this up without more staffing Needs: Riparian Specialist & additional GIS Specialist	(1) By MA: HUC-12s with more or less winter cover - classes TBD (#, %) (2) By MA: ag lands with cover (acres, %)	Pilot Assessments to be available 2027 and expected to improve with ODA Staffing	Milestones will be developed if/when results are available	DEQ-funded statewide riparian analysis (veg cover and height)
S13	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Outcomes (Livestock Use of Ag Lands): Assess riparian and upland ag land use that may contribute to E.Coli	ODA fund monitoring to support land use classification and mapping	Existing \$: (1) Current ODA staff (2) SWCD Staff and AG WQ Support Grants	(1) Completing an Ag/Livestock Assessment for the Area utilizing the ODA Ag Inventory Tool	Baseline data by 2029	The first milestone will be to complete the ODA Assessment, this to be followed by analysis and prioritization Followed by outreach	
S14	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Outcomes (Data Flow & Reporting): Make All Data common, contained in database, allowing direct entry & reporting	Standardize internal (SOW, SIA, FA, Compliance, Voluntary) & provide gateway for external data (OWRI, NRCS, CREP)	Existing \$: This progression is within our Strategic Plan, but funding resources will accelerate the implementation of this strategy	(1) percentage of data contained in databases (2) Percent of data reported from databases	The timeline will depend on funding sources, but pilot stages will be completed in 2023-25 biennium Goal to have internal data processes complete by 2029	Each data source implemented in a database is a milestone	The TMDL Requirements necessitate data being reported from a database
S15	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Outcomes (WQ Monitoring of bacteria and P): Monitoring bacteria and P on ag lands, and in conjunction with other State DMAs and DEQ	(1) Discussions with other State DMAs regarding coordinated TMDL Monitoring/Utilizing common tools (ODF,DEQ) (2) Develop Plan Outline (3) Request Legislative Funding	Existing \$:	Documentation of Discussions, Plan Outline and Funding Request	The full-cycle of discussions, plan outline and funding request to be completed by 2029 (5yrs)	Multi-agency plan for monitoring data	The TMDL Requirements necessitate a cooperative State arrangement
S16	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Outcomes (WQ Monitoring of bacteria and P): SWCDs monitor bacteria and P on ag lands	(1) Prioritize Existing Ambient Sites for Ag & Identify Gaps (2) SWCDs in SIAs (3) SWCDs in Focus Areas (4) AqWQ Support Grants	Existing \$: (1) Monitoring Specialist (2) OWEB SIA monitoring grants (3) OWEB SOW for Focus Area (4) AgWQ Biennial Grants	By MA, by year: maximum E.Coli cfu/100ml, maximum P (mg/L), and/or trends as data allows and is available	(1) Ongoing (2) SIAs up to 10 years of monitoring (3) Focus Area monitoring timeline is undefined (4) Ongoing	Milestones are the E.Coli and phosphorous targets listed in the TMDL	
S17	(1) Manure entering stream, E.Coli and phosphorous (2) Riparian vegetation & overstory	Outcomes (ODA Annual Reporting Web Map Publication): ODA create a visible map of bacteria and effective shade objectives and monitoring results	Utilize currently developing ODA infrastructure to report and visualize Area goals and progress	Existing \$ and program strategies will get us most of the way there, additional funding via grants and/or legislature will be used for specific aspects of Area Plan Reporting Strategy	Through visible publication of results on the website maximum E.Coli in cfu/100ml	This project will be prioritized within our ODA IS Strategic Implementation Plan	(1) Hardware and software installed via Strategic Imp Plan (2) Data use, visualization and entry projects pilots beginning in 2024	Momentum of technology, integrated reports, SWCD interest in technology use, and TMDL requirements require this modernization