North Coast Basin Agricultural Water Quality Management Area Plan

Includes: Sauvie Island, and West Multnomah, Clatsop, Columbia, and Tillamook Counties

April 2024

Developed by the

Oregon Department of Agriculture

and the

North Coast Local Advisory Committee

with support from the

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Columbia Soil and Water Conservation District
Tillamook Soil and Water Conservation District
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Acronyms and Terms

Ag Water Quality Program – Agricultural Water Quality Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
CAFO – Confined Animal Feeding Operation
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
LMA – Local Management Agency
Management Area – Agricultural Water Quality Management Area
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ORS – Oregon Revised Statute
OWEB – Oregon Watershed Enhancement Board
OWRI – Oregon Watershed Restoration Inventory
PSP – Pesticide Stewardship Partnership
SIA – Strategic Implementation Area
SWCD – Soil and Water Conservation District
TMDL – Total Maximum Daily Load
US EPA – United States Environmental Protection Agency

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Foreword

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing water quality related to agricultural activities in the Agricultural Water Quality Management Area (Management Area). The Area Plan identifies strategies to prevent and control water pollution from agricultural lands through a combination of outreach programs, suggested land treatments, management activities, compliance, and monitoring.

The Area Plan is neither regulatory nor enforceable (Oregon Revised Statute (ORS) 568.912(1)). The Area Plan refers to associated Agricultural Water Quality Management Area Rules (Area Rules). The Area Rules are Oregon Administrative Rules (OARs) and are enforced by the Oregon Department of Agriculture (ODA).

Required Elements of Area Plans

Area Plans must describe a program to achieve the water quality goals and standards necessary to protect designated beneficial uses related to water quality as required by federal and state law (OAR 603-090-0030(1)).

Plan Content

Chapter 1: Agricultural Water Quality Program Purpose and Background. Presents consistent and accurate information about the Ag Water Quality Program.

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, Area Rules, and potential practices to address water quality issues.

Chapter 3: Implementation Strategies. Describes activities to make and track progress towards the goals of the Area Plan. Presents goals, measurable objectives, strategic initiatives, proposed activities, and monitoring efforts.

Chapter 4: Progress and Adaptive Management. Describes progress toward achieving Area Plan goals and measurable objectives by summarizing accomplishments and monitoring results.

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Chapter 1: Agricultural Water Quality Program

1.1 Purpose of Agricultural Water Quality Program and Applicability of Area Plans

As part of Oregon's Agricultural Water Quality Program (Ag Water Quality Program), the Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing water quality issues related to agricultural activities. The Area Plan identifies strategies to prevent and control "water pollution from agricultural activities and soil erosion" (ORS 568.909(2)) on agricultural and rural lands within the boundaries of this Management Area (OAR 603-090-0000(3)) and to achieve and maintain water quality standards (ORS 561.191(2)). The Area Plan has been developed and revised by ODA and the Local Advisory Committee (LAC), with support and input from the SWCD and the Oregon Department of Environmental Quality (DEQ). The Area Plan is implemented using a combination of outreach, conservation and management activities, compliance with Area Rules, monitoring, evaluation, and adaptive management.

The provisions of the Area Plan do not establish legal requirements or prohibitions (ORS 568.912(1)).

Each Area Plan is accompanied by Area Rules that describe local agricultural water quality regulatory requirements. ODA will exercise its regulatory authority for the prevention and control of water pollution from agricultural activities under the Ag Water Quality Program's general regulations (OAR 603-090-0000 to 603-090-0120) and under the Area Rules for this Management Area (OAR 603-095-0800 through 603-095-0860). The general regulations guide the Ag Water Quality Program, and the Area Rules for the Management Area are the regulations with which landowners must comply. Landowners are encouraged through outreach and education to implement conservation and management activities.

The Area Plan and Area Rules apply to all agricultural activities on non-federal and non-Tribal Trust land within this Management Area including:

- Farms and ranches,
- Rural residential properties grazing animals or raising crops,
- Agricultural lands that lay idle or on which management has been deferred,
- Agricultural activities in urban areas,
- Agricultural activities on land subject to the Forest Practices Act (ORS 527.610).

Water quality on federal land in Oregon is regulated by DEQ and on Tribal Trust land by the respective tribe, with oversight by the United States Environmental Protection Agency (US EPA).

1.2 History of the Ag Water Quality Program

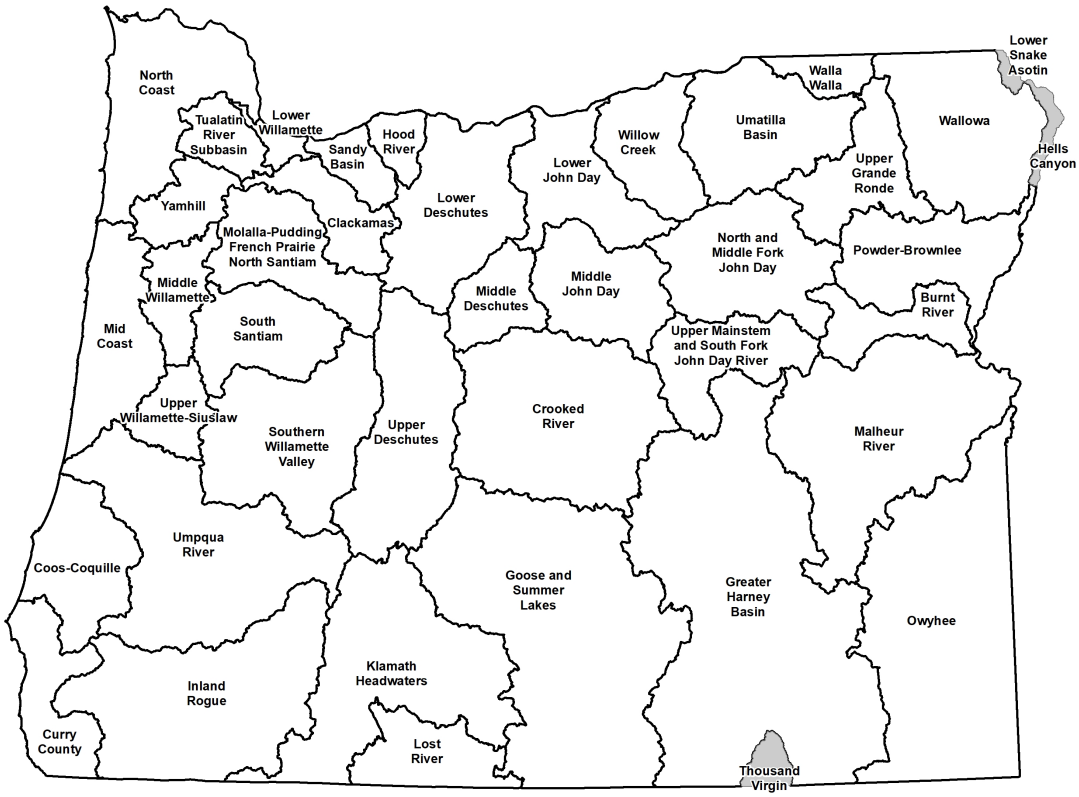
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act directing ODA to develop plans to prevent and control water pollution from agricultural activities and soil erosion and achieve water quality standards and to adopt rules as necessary (ORS 568.900 through ORS 568.933). The Oregon Legislature passed additional legislation in 1995 to clarify that ODA is the lead agency for regulating agriculture with respect to water quality (ORS

561.191). The Area Plan and Area Rules were developed and subsequently revised pursuant to these statutes.

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and Area Rules in 38 watershed-based Management Areas across Oregon (Figure 1.2). Since 2004, ODA, LACs, SWCDs, and other partners have focused on implementation including:

- Providing education, outreach, and technical assistance to landowners,
- Implementing projects to improve agricultural water quality,
- Investigating complaints of potential violations of Area Rules,
- Conducting biennial reviews of Area Plans and Area Rules,
- Monitoring, evaluation, and adaptive management,
- Developing partnerships with state and federal agencies, tribes, watershed councils, and others.

Figure 1.2 Map of 38 Agricultural Water Quality Management Areas*



*Gray areas are not included in Ag Water Quality Management Areas

1.3 Roles and Responsibilities

1.3.1 Oregon Department of Agriculture

ODA is the agency responsible for implementing the Ag Water Quality Program (ORS 568.900 to 568.933, ORS 561.191, OAR 603-090, and OAR 603-095). The Ag Water Quality Program was established to develop and implement water quality management plans for the prevention

and control of water pollution from agricultural activities and soil erosion. State and federal laws that drive the establishment of an Area Plan include:

- State water quality standards,
- Load allocations for agricultural or nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the federal Clean Water Act (CWA), Section 303(d),
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA),
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if DEQ has established a GWMA in the Management Area and an Action Plan has been developed).

ODA bases Area Plans and Area Rules on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and Area Rules. If and when other governmental policies, programs, or rules conflict with the Area Plan or Area Rules, ODA will consult with the appropriate agencies to resolve the conflict in a reasonable manner.

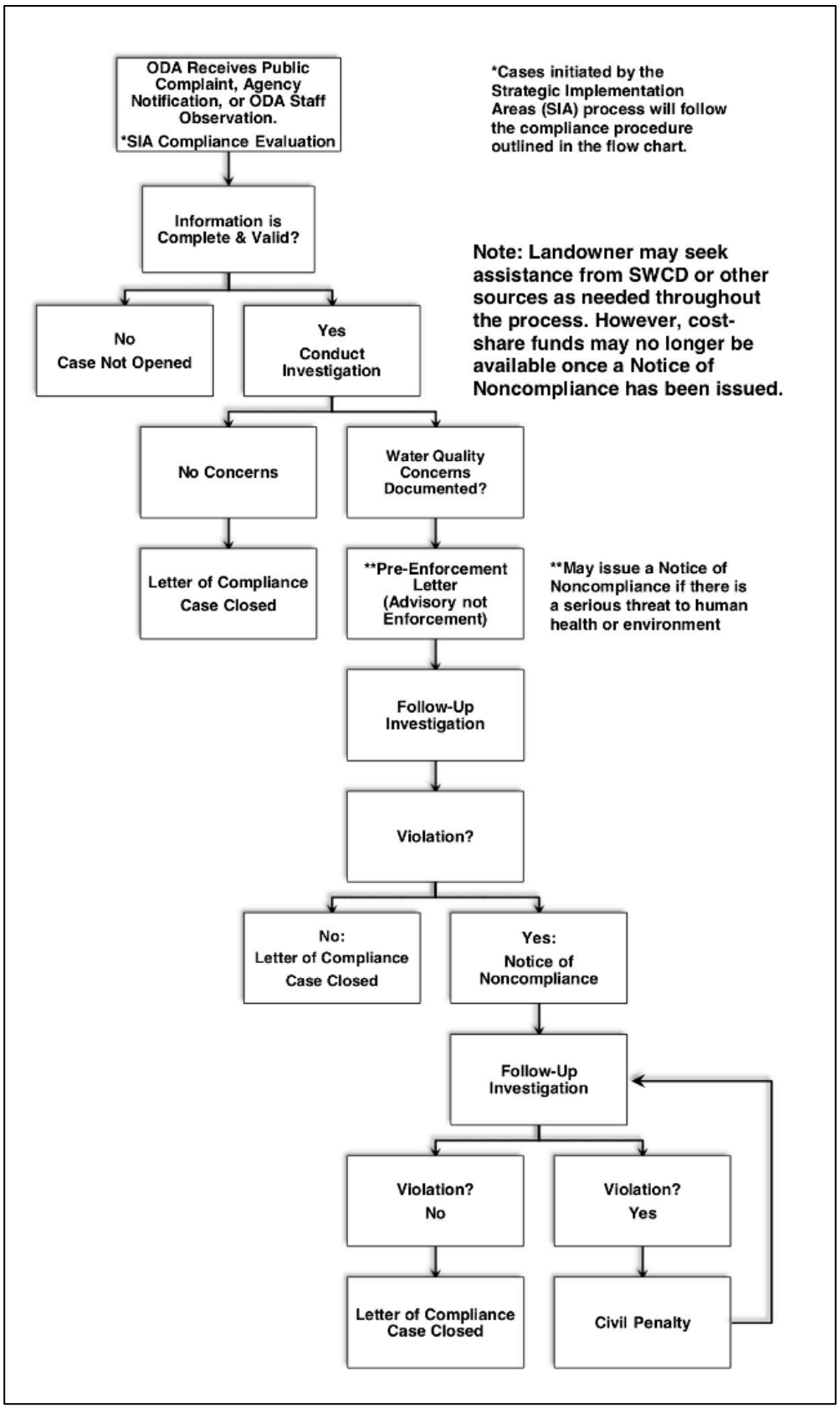
1.3.1.1 ODA Compliance Process

ODA is responsible for any actions related to enforcement or determination of noncompliance with Area Rules (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give ODA the authority to adopt rules that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

The Area Rules are a set of standards that landowners must meet on all agricultural or rural lands. “Landowner” includes any landowner, land occupier, or operator per OAR 603-95-0010(24). All landowners must comply with the Area Rules. ODA will use enforcement where appropriate and necessary to achieve compliance with Area Rules. Figure 1.3.1 outlines ODA’s compliance process. ODA will pursue enforcement action only when reasonable attempts at voluntary solutions have failed (OAR 603-090-0000(5)(e)). If a violation is documented, ODA may issue a pre-enforcement notification or an enforcement order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, ODA will direct the landowner to remedy any conditions through required corrective actions under the provisions of the enforcement procedures outlined in OAR 603-090-060 through OAR 603-090-120. If a landowner does not implement the required corrective actions, ODA may assess civil penalties for continued violation of the Area Rules.

Any member of the public may file a complaint, and any public agency may file a notification of a potential violation of the Area Rules. ODA also may initiate an investigation based on its own observation or from cases initiated through the Strategic Implementation Area process (See Figure 1.3.1.1).

Figure 1.3.1.1 Compliance Flow Chart



1.3.2 Local Management Agency

A Local Management Agency (LMA) is an organization designated by ODA to assist with the implementation of an Area Plan (OAR 603-090-0010). The Oregon Legislature intended that SWCDs be LMAs to the fullest extent practical, consistent with the timely and effective implementation of Area Plans (ORS 568.906). SWCDs have a long history of effectively assisting landowners to voluntarily address natural resource concerns. Currently, all LMAs in Oregon are SWCDs.

The day-to-day implementation of the Area Plan is accomplished through an Intergovernmental Grant Agreement between ODA and each SWCD. Every two years, each SWCD submits a scope of work to ODA to receive funding to implement the Area Plan. Each SWCD implements the Area Plan by providing outreach and technical assistance to landowners. SWCDs also work with ODA and the LAC to establish implementation priorities, evaluate progress toward meeting Area Plan goals and objectives, and revise the Area Plan and Area Rules as needed.

1.3.3 Local Advisory Committee

For each Management Area, the director of ODA appoints an LAC (OAR 603-090-0020) with up to 12 members. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. The role of the LAC is to provide a high level of citizen involvement and support the development, implementation, and biennial reviews of the Area Plan and Area Rules. The LAC's primary role is to advise ODA and the LMA on local agricultural water quality issues as well as evaluate the progress toward achieving the goals and objectives of the Area Plan. LACs are composed primarily of agricultural landowners in the Management Area and must reflect a balance of affected persons.

The LAC is convened at the time of the biennial review; however, the LAC may meet as frequently as necessary to carry out its responsibilities, which include but are not limited to:

- Participate in the development and subsequent revisions of the Area Plan and Area Rules,
- Recommend strategies necessary to achieve the goals and objectives in the Area Plan,
- Participate in biennial reviews of the progress of implementation of the Area Plan and Area Rules,
- Submit written biennial reports to the Board of Agriculture and the ODA director.

1.3.4 Agricultural Landowners

The emphasis of the Area Plan is on voluntary action by landowners to control the factors affecting water quality in the Management Area. In addition, each landowner in the Management Area is required to comply with the Area Rules. To achieve water quality goals or compliance, landowners may need to select and implement an appropriate suite of measures. The actions of each landowner will collectively contribute toward achievement of water quality standards.

Technical assistance, and often financial assistance, is available to landowners who want to work with SWCDs or other local partners, such as watershed councils, to achieve land conditions that contribute to good water quality. Landowners may also choose to improve their land conditions without assistance.

Under the Area Plan and Area Rules, agricultural landowners are not responsible for mitigating or addressing factors that are caused by non-agricultural activities or sources, such as:

- Hot springs, glacial melt water, unusual weather events, and climate change,
- Wildfires and other natural disasters,
- Septic systems and other sources of human waste,
- Public roadways, culverts, roadside ditches, and shoulders,
- Dams, dam removal, hydroelectric plants, and non-agricultural impoundments,
- Housing and other development in agricultural areas,
- Impacts on water quality and streamside vegetation from wildlife such as waterfowl, elk, and feral horses,
- Other circumstances not within the reasonable control of the landowner.

However, agricultural landowners may be responsible for some of these impacts under other legal authorities.

1.3.5 Public Participation

The public was encouraged to participate when ODA, LACs, and SWCDs initially developed the Area Plan and Area Rules. In each Management Area, ODA and the LAC held public information meetings, a formal public comment period, and a formal public hearing. ODA and the LACs modified the Area Plan and Area Rules, as needed, to address comments received. The director of ODA adopted the Area Plan and Area Rules in consultation with the Board of Agriculture.

ODA, LACs, and LMAs conduct biennial reviews of the Area Plan and Area Rules. Partners, stakeholders, and the general public are invited to participate in the process. Any revisions to the Area Rules will include a formal public comment period and a formal public hearing.

1.4 Agricultural Water Quality

The federal CWA directs states to designate beneficial uses related to water quality, decide on parameters to measure to determine whether beneficial uses are being met, and set water quality standards based on the beneficial uses and parameters.

1.4.1 Point and Nonpoint Sources of Water Pollution

There are two types of water pollution. Point source water pollution emanates from clearly identifiable discharge points or pipes. Point sources are required to obtain permits that specify their pollutant limits. Agricultural operations regulated as point sources include permitted Confined Animal Feeding Operations (CAFOs), and all permitted CAFOs are subject to ODA's CAFO Program requirements. Irrigation return flow from agricultural fields may drain through a defined outlet, but is exempt under the CWA and does not currently require a permit.

Nonpoint-source water pollution originates from the general landscape and is difficult to trace to a single source. Nonpoint water pollution sources include runoff from agricultural and forest lands, urban and suburban areas, roads, and natural sources. In addition, groundwater can be polluted by nonpoint sources including agricultural amendments (fertilizers and manure).

1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses related to water quality are defined by DEQ for each basin. The most sensitive beneficial uses usually are fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses generally are the first to be impaired because they are affected at lower levels of pollution. While there may not be severe impacts on water quality from a single source or sector, the combined effects from all sources can contribute to the impairment of beneficial uses in the Management Area. Beneficial uses that have the potential to be impaired in this Management Area are summarized in Chapter 2.4.1.1.

Many waterbodies throughout Oregon do not meet state water quality standards. The most common water quality concerns statewide related to agricultural activities are temperature, bacteria, biological criteria, sediment, turbidity, phosphorous, nitrates, algae, pH, dissolved oxygen, harmful algal blooms, pesticides, and mercury. Water quality impairments vary across the state; they are summarized for this Management Area in Chapter 2.4.

1.4.3 Impaired Waterbodies and Total Maximum Daily Loads

Every two years, DEQ is required by the CWA to assess water quality in Oregon, resulting in the "Integrated Report." CWA Section 303(d) requires DEQ to identify "impaired" waters that do not meet water quality standards. The resulting list is commonly referred to as the "303(d) list" (http://www.oregon.gov/deq/wq/Pages/WQ-Assessment.aspx). In accordance with the CWA, DEQ must establish TMDLs for pollutants on the 303(d) list. For more information, visit www.oregon.gov/deq/wq/tmdls/Pages/default.aspx.

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. TMDLs specify the daily amount of pollution a waterbody can receive and still meet water quality standards. TMDLs generally apply to an entire basin or subbasin, not just to an individual waterbody on the 303(d) list. In the TMDL, point sources are assigned waste load allocations that are then incorporated into National Pollutant Discharge Elimination System permits. Nonpoint sources (agriculture, forestry, and urban) are assigned a load allocation to achieve.

As part of the TMDL process, DEQ identifies Designated Management Agencies and Responsible Persons, which are parties responsible for submitting TMDL implementation plans. TMDLs designate ODA as the lead agency responsible for implementing the TMDL on agricultural lands. ODA uses the applicable Area Plan(s) as the implementation plan for the agricultural component of the TMDL. Biennial reviews and revisions to the Area Plan and Area Rules must address agricultural or nonpoint source load allocations from relevant TMDLs.

The 303(d) list, the TMDLs, and the agricultural load allocations for the TMDLs that apply to this Management Area are summarized in Chapter 2.4.1.

1.4.4 Oregon Water Pollution Control Law – ORS 468B.025 and 468B.050

In 1995, the Oregon Legislature passed ORS 561.191. This statute states that any program or rules adopted by ODA "shall be designed to assure achievement and maintenance of water quality standards adopted by the Environmental Quality Commission."

To implement the intent of ORS 561.191, ODA incorporated ORS 468B.025 and 468B.050 into all 38 sets of Area Rules.

ORS 468B.025 (prohibited activities) states that:
"(1) Except as provided in ORS 468B.050 or 468B.053, 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.
(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.
(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050."

ORS 468B.050 identifies the conditions when a permit is required. A permit is required for CAFOs that meet minimum criteria for confinement periods and have large animal numbers or have wastewater facilities. The portions of ORS 468B.050 that apply to the Ag Water Quality Program state that:
"(1) Except as provided in ORS 468B.053 or 468B.215, without holding a permit from the Director of the Department of Environmental Quality or the State Department of Agriculture, which permit shall specify applicable effluent limitations, a person may not:
(a) Discharge any wastes into the waters of the state from any industrial or commercial establishment or activity or any disposal system."

Definitions used in ORS 468B.025 and 468B.050:

" 'Pollution' or 'water pollution' means such alteration of the physical, chemical, or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof" (ORS 468B.005(5)).

" 'Water' or 'the waters of the state' include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or affect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction" (ORS 468B.005(10)).

" 'Wastes' means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances, which will or may cause pollution or tend to cause pollution of any waters of the state.' (ORS 468B.005(9)). Additionally, the definition of 'wastes' given in OAR 603-095-0010(53) "includes but is not limited to commercial fertilizers, soil amendments, composts, animal wastes, vegetative materials or any other wastes."

1.4.5 Streamside Vegetation and Agricultural Water Quality

Across Oregon, the Ag Water Quality Program emphasizes streamside vegetation protection and enhancement. Streamside vegetation can provide three primary water quality functions: shade to reduce stream temperature warming from solar radiation, streambank stability, and filtration of pollutants. Other water quality functions from streamside vegetation include water

storage in the soil for cooler and later season flows, sediment trapping that can build streambanks and floodplains, narrowing and deepening of channels, and biological uptake of sediment, organic material, nutrients, and pesticides. In addition, streamside vegetation provides habitat for numerous species of fish and wildlife. Streamside vegetation conditions can be monitored to track progress toward achieving conditions that support water quality.

Site-Capable Vegetation

The Ag Water Quality Program uses the concept of "site-capable vegetation" to describe the streamside vegetation that can be expected to grow at a particular site, given natural site factors (e.g., elevation, soils, climate, hydrology, wildlife, fire, floods) and historical and current human influences that are beyond the program's statutory authority (e.g., channelization, roads, modified flows, previous land management). Site-capable vegetation can be determined for a specific site based on current streamside vegetation at the site, streamside vegetation at nearby reference sites with similar natural characteristics, Natural Resources Conservation Service (NRCS) soil surveys and ecological site descriptions, and/or local or regional scientific research.

The goal for Oregon's agricultural landowners is to provide the water quality functions (e.g., shade, streambank stability, and filtration of pollutants) produced by site-capable vegetation along streams on agricultural lands. The Area Rules for each Management Area require that agricultural activities allow for the establishment and growth of streamside vegetation to provide the water quality functions equivalent to what site-capable vegetation would provide.

Occasionally, mature site-capable vegetation such as tall trees may not be needed along narrow streams. For example, shrubs and grass may provide shade, protect streambanks, and filter pollutants. However, on larger streams, mature site-capable vegetation is needed to provide the water quality functions.

In many cases, invasive, non-native plants, such as introduced varieties of blackberry and reed canarygrass, grow in streamside areas. This type of vegetation has established throughout much of Oregon due to historic and human influences and may provide some of the water quality functions of site-capable vegetation. ODA's statutory authority does not require the removal of invasive, non-native plants, however, ODA encourages landowners to remove these plants voluntarily. In addition, the Oregon State Weed Board identifies invasive plants that can impair watersheds. Public and private landowners are responsible for eliminating or intensively controlling noxious weeds, as described in state and local laws. For more information, visit www.oregon.gov/ODA/programs/weeds.

1.4.6 Soil Health and Agricultural Water Quality

An increasingly important concept in Oregon and across the United States is soil health. The Ag Water Quality Program promotes soil health to reduce erosion and keep sediment out of surface waters, thereby helping to maintain and improve water quality. Healthy soils have relatively high organic matter and well-formed soil structure. These characteristics may resist erosion and increase water infiltration, leading to less surface runoff and greater groundwater recharge; the resultant groundwater flows in some cases can help moderate stream water temperatures. (Note that the beneficial effects on water quality vary based on factors such as soil type and ecoregion.) According to the NRCS and others, there are four soil health principles that together build highly productive and resilient soils: minimize disturbance; and maximize cover, continuous living roots, and diversity above and below the surface.

Building soil health increases resiliency to extreme weather, protects water quality, and helps keep farms and ranches viable. Incorporating soil health practices can help landowners adapt and reduce risks. For more information, visit www.nrcs.usda.gov/wps/portal/nrcs/detail/or/soils/health.

1.5 Other Water Quality Programs

The following programs complement the Ag Water Quality Program and are described here to recognize their link to agricultural lands.

1.5.1 Confined Animal Feeding Operation Program

ODA is the lead state agency for the CAFO Program, which was developed to ensure that operators do not contaminate ground or surface water with animal manure or process wastewater. The CAFO Program coordinates with DEQ to issue permits. These permits require the registrant to operate according to a site-specific, ODA-approved, Animal Waste Management Plan that is incorporated into the CAFO permit by reference. For more information, visit oda.direct/CAFO.

1.5.2 Groundwater Management Areas

Groundwater Management Areas (GWMAs) are designated by DEQ where groundwater is polluted from, at least in part, nonpoint sources. After designating a GWMA, DEQ forms a local groundwater management committee comprised of affected and interested parties. The committee works with and advises the state agencies that are required to develop an action plan to reduce groundwater contamination in the area.

Oregon DEQ has designated three GWMAs because of elevated nitrate concentrations in groundwater: Lower Umatilla Basin, Northern Malheur County, and Southern Willamette Valley. Each GWMA has a voluntary action plan to reduce nitrates in groundwater. After a scheduled evaluation period, if DEQ determines that voluntary efforts are not effective, mandatory requirements may become necessary.

Any GWMA in this Management Area is described in Chapter 2.4.1.5. Any Measurable Objectives for the GWMA will be described in Chapter 3.1.5.

1.5.3 The Oregon Plan for Salmon and Watersheds

In 1997, Oregonians began implementing the Oregon Plan for Salmon and Watersheds, referred to as the Oregon Plan (www.oregon-plan.org). The Oregon Plan seeks to restore native fish populations, improve watershed health, and support communities throughout Oregon. The Oregon Plan has a strong focus on salmonids because of their great cultural, economic, and recreational importance to Oregonians, and because they are important indicators of watershed health. ODA's commitment to the Oregon Plan is to develop and implement Area Plans and Area Rules throughout Oregon.

1.5.4 Pesticide Management and Stewardship

ODA's Pesticides Program holds the primary responsibility for registering pesticides and regulating their use in Oregon under the Federal Insecticide, Fungicide, and Rodenticide Act.

ODA's Pesticide Program administers regulations relating to pesticide sales, use, and distribution, including pesticide operator and applicator licensing as well as proper application of pesticides, pesticide labeling, and registration.

In 2007, Oregon formed the interagency Water Quality Pesticide Management Team to expand efforts to improve water quality in Oregon related to pesticide use. This team facilitates and coordinates activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The team relies on monitoring data from the Pesticide Stewardship Partnership (PSP) program and other federal, state, and local monitoring programs to assess the possible impact of pesticides on Oregon's water quality. Pesticide detections in Oregon's streams can be addressed through multiple programs and partners, including the PSP.

Through the PSP, state agencies and local partners work together to monitor pesticides in streams and to improve water quality (www.oregon.gov/ODA/programs/Pesticides/Water/Pages/PesticideStewardship.aspx). ODA, DEQ, and Oregon State University Extension Service work with landowners, SWCDs, watershed councils, and other local partners to voluntarily reduce pesticide levels while improving water quality and crop management. Since 2000, the PSPs have made noteworthy progress in reducing pesticide concentrations and detections.

Any PSPs in this Management Area are described in Chapter 3.1.4.

ODA led the development and implementation of a Pesticides Management Plan (PMP) for the state of Oregon (www.oregon.gov/ODA/programs/Pesticides/water/pages/AboutWaterPesticides.aspx). The PMP, completed in 2011, strives to protect drinking water supplies and the environment from pesticide contamination, while recognizing the important role that pesticides have in maintaining a strong state economy, managing natural resources, and preventing human disease. By managing the pesticides that are approved for use by the US EPA and Oregon in agricultural and non-agricultural settings, the PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water.

1.5.5 Drinking Water Source Protection

Oregon implements its drinking water protection program through a partnership between DEQ and the Oregon Health Authority. The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. DEQ and the Oregon Health Authority encourage preventive management strategies to ensure that all public drinking water resources are kept safe from current and future contamination. For more information, visit www.oregon.gov/deq/wq/programs/Pages/dwp.aspx.

1.5.6 Oregon's Coastal Management Program

The mission of the Oregon Coastal Management Program is to work in partnership with coastal local governments, state and federal agencies, and other partners and stakeholders to ensure that Oregon's coastal and ocean resources are managed, conserved, and developed consistent with statewide planning goals. Oregon's Coastal Nonpoint Pollution Control Program (CNPCP) has been developed to comply with requirements of Section 6217 of the federal CZARA. The US EPA and the National Oceanic and Atmospheric Administration administer CZARA at the federal level. The federal requirements are designed to restore and protect coastal waters from

nonpoint source pollution and require coastal states to implement a set of management measures based on guidance published by the US EPA. The guidance contains measures for agricultural activities, forestry activities, urban areas, marinas, hydro-modification activities, and wetlands. In Oregon, the Department of Land Conservation and Development and DEQ coordinate the program. The geographic boundaries for the CNPCP include the North Coast, Mid-Coast, South Coast, Rogue, and Umpqua basins. Oregon has identified the ODA coastal Area Plans and Area Rules as the state's strategy to address agricultural measures. The Area Plan and Area Rules are designed to meet the requirements of CZARA and to implement agriculture's part of Oregon's CNPCP. For more information, visit www.oregon.gov/lcd/OCMP/Pages/Coastal-Zone-Management.aspx.

1.6 Partner Agencies and Organizations

1.6.1 Oregon Department of Environmental Quality

The US EPA delegated authority to 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 ODA and the Oregon Department of Forestry to meet the requirements of the CWA. DEQ sets water quality standards and develops TMDLs for impaired waterbodies, which ultimately are approved or disapproved by the US EPA. In addition, DEQ develops and coordinates programs to address water quality including National Pollutant Discharge Elimination System permits for point sources, the CWA Section 319 grant program, the Source Water Protection Program (in partnership with the Oregon Health Authority), the CWA Section 401 Water Quality Certification, and Oregon's Groundwater Management Program. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans.

A Memorandum of Agreement between DEQ and ODA recognizes that ODA is the state agency responsible for implementing the Ag Water Quality Program. ODA and DEQ updated the Memorandum of Agreement in 2023 (www.oregon.gov/oda/shared/Documents/Publications/NaturalResources/WaterQualityGoalsMOA.pdf).

The Environmental Quality Commission, which serves as DEQ's policy and rulemaking board, may petition ODA for a review of part or all of any Area Plan or Area Rules. The petition must allege, with reasonable specificity, that the Area Plan or Area Rules are not adequate to achieve applicable state and federal water quality standards (ORS 568.930(3)(a)).

1.6.2 Other Partners

ODA and SWCDs work in close partnership with local, state, and federal agencies and other organizations, including: DEQ (as described above), the NRCS and United States Department of Agriculture Farm Service Agency, watershed councils, Oregon State University Agricultural Experiment Stations and Extension Service, tribes, livestock and commodity organizations, conservation organizations, and local businesses. As resources allow, SWCDs and local partners provide technical, financial, and educational assistance to individual landowners for the design, installation, and maintenance of effective management strategies to prevent and control agricultural water pollution and to achieve water quality goals.

1.7 Measuring Progress

Agricultural landowners have been implementing effective conservation projects and management activities throughout Oregon to improve water quality for many years. However, it has been challenging for ODA, SWCDs, and LACs to measure progress toward improved water quality. ODA is working with SWCDs, LACs, and other partners to develop and implement strategies that will produce measurable outcomes. ODA is also working with partners to develop monitoring methods to document progress.

1.7.1 Measurable Objectives

A measurable objective is a numeric long-term desired outcome to achieve by a specified date. Milestones are the interim steps needed to make progress toward the measurable objective and consist of numeric short-term targets to reach by specific dates. Together, the milestones define the timeline and progress needed to achieve the measurable objective.

The Ag Water Quality Program is working throughout Oregon with SWCDs and LACs toward establishing long-term measurable objectives to achieve desired conditions. ODA, the LAC, and the SWCD will establish measurable objectives and associated milestones for each Area Plan. Many of these measurable objectives relate to land conditions and primarily are developed for focused work in small geographic areas (Chapter 1.7.3). ODA's longer-term goal is to develop measurable objectives, milestones, and monitoring methods at the Management Area scale.

The State of Oregon continues to improve its ability to use remote-sensing technology to measure current streamside vegetation conditions and compare these to the conditions needed to meet stream shade targets. As the State's use of this technology moves forward, ODA will use the information to help LACs and LMAs set measurable objectives for streamside vegetation. These measurable objectives will be achieved through implementing the Area Plan, with an emphasis on voluntary incentive programs.

At each biennial review, ODA and its partners will evaluate progress toward measurable objectives and milestone(s) and why they were or were not achieved. ODA, the LAC, and LMA will evaluate whether changes are needed to continue making progress toward the measurable objective(s) and will revise strategies to address obstacles and challenges.

The measurable objective(s) and associated milestone(s) within the Management Area are in Chapter 3.1 and progress toward achieving the measurable objective(s) and milestone(s) is summarized in Chapter 4.1.

1.7.2 Land Conditions and Water Quality

Land conditions can serve as useful surrogates (indicators) for water quality parameters. For example, because shade blocks solar radiation from warming the stream, streamside vegetation, or its associated shade, generally is used as a surrogate for water temperature. In some cases, sediment can be used as a surrogate for pesticides or phosphorus, which often adhere to sediment particles.
The Ag Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- Landowners can see land conditions and have direct control over them,
- Improved land conditions can be documented immediately,

- Water quality impairments from agricultural activities are primarily due to changes in land conditions and management activities,
- It can be difficult to separate agriculture's influence on water quality from other land uses,
- There is generally a lag time between changes on the landscape and the resulting improvements in water quality,
- Extensive monitoring of water quality would be needed to evaluate progress, which would be expensive and may not demonstrate improvements in the short term.

Water quality monitoring data will help ODA and partners to measure progress or identify problem areas in implementing Area Plans. However, as described above, water quality monitoring may be slower to document changes than land condition monitoring.

1.7.3 Focused Implementation in Small Geographic Areas

Focus Areas

A Focus Area is a small watershed with water quality concerns associated with agriculture. The Focus Area process is SWCD-led, with ODA oversight. The SWCD delivers systematic, concentrated outreach and technical assistance. A key component is measuring conditions before and after implementation to document the progress made with available resources. The Focus Area approach is consistent with other agencies' and organizations' efforts to work proactively in small watersheds.

Focus Areas have the following advantages: a proactive approach that addresses the most significant water quality concerns, multiple partners that coordinate and align technical and financial resources, a higher density of projects that may lead to increased connectivity of projects, and a more effective and efficient use of limited resources.

Any Focus Areas in this Management Area are described in Chapter 3.1.2. SWCDs will also continue to provide outreach and technical assistance to the entire Management Area.

Strategic Implementation Areas

Strategic Implementation Areas (SIAs) are small watersheds selected by ODA, in consultation with partners, based on a statewide review of water quality data and other available information. ODA conducts an evaluation of likely compliance with Area Rules and contacts landowners with the results and next steps. The Oregon Watershed Enhancement Board (OWEB) and other partners make funding and technical assistance available to support conservation and restoration projects. These efforts should result in greater ecological benefit than relying solely on compliance and enforcement. Landowners have the option of working with the SWCD or other partners to voluntarily address water quality concerns. ODA follows up, as needed, to enforce the Area Rules. Finally, ODA completes a post-evaluation to document progress in the SIA.

Any SIAs in this Management Area are described in Chapter 3.1.3.

1.8 Progress and Adaptive Management

1.8.1 Biennial Reviews

The ODA, LAC, LMA, and partners evaluate progress of Area Plan implementation through the biennial review process. At each biennial review, they discuss: 1) Progress toward meeting measurable objectives and implementing strategies, 2) Local monitoring data from other agencies and organizations, including agricultural land conditions and water quality, and 3) ODA compliance activities. As a result of these discussions, ODA and partners revise implementation strategies and measurable objectives in Chapter 3 as needed.

ODA provides information from the Oregon Watershed Restoration Inventory (OWRI) on restoration project funding and accomplishments at biennial reviews and uses the information for statewide reporting. The majority of OWRI entries represent voluntary actions of private landowners who have worked in partnership with federal, state, and local groups to improve aquatic habitat and water quality conditions. OWRI is the single largest restoration information database in the western United States. For more information, visit www.oregon.gov/oweb/data-reporting/Pages/owri.aspx.

1.8.2 Agricultural Water Quality Monitoring

In addition to monitoring land conditions, ODA relies on water quality monitoring data where available. These data may be provided by other state or federal agencies or local entities; ODA seldom collects water quality samples outside of compliance cases.

As part of monitoring water quality status and trends, DEQ regularly collects water samples every other month throughout the year at more than 130 sites on more than 50 rivers and streams across the state. Sites are located across the major land uses (forestry, agriculture, rural residential, and urban/suburban). Parameters measured include alkalinity, biochemical oxygen demand, chlorophyll a, specific conductance, dissolved oxygen, bacteria (*E. coli)*, ammonia, nitrate and nitrite, pH, total phosphorus, total solids, temperature, and turbidity.

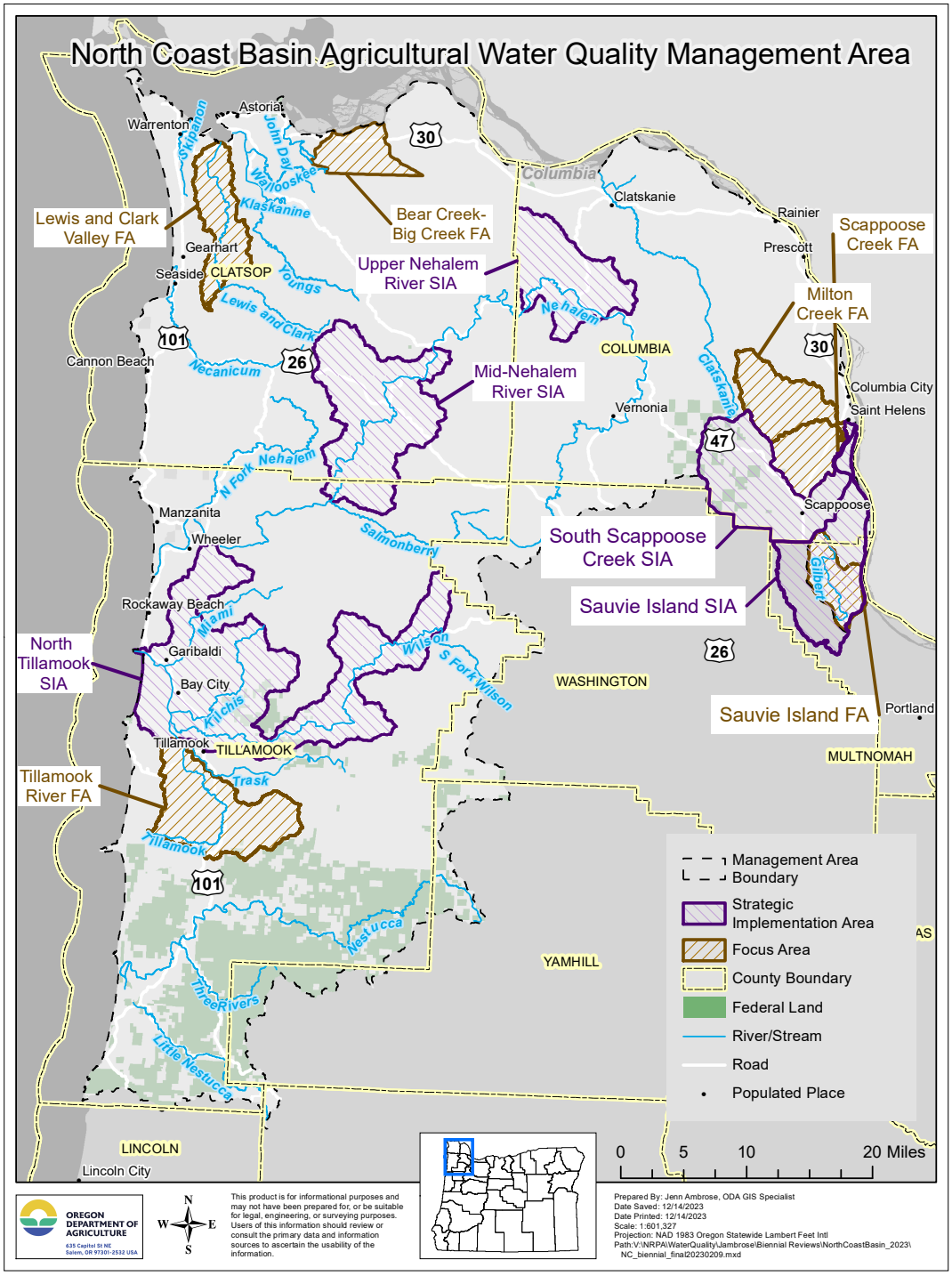
DEQ provides status and trends reports for selected parameters in relation to water quality standards. ODA will continue to work with DEQ to summarize the data results and how they apply to agricultural activities.

Water quality monitoring efforts in this Management Area are described in Chapter 3, and the data are summarized in Chapter 4.

Chapter 2: Local Background

Chapter 2 provides the local geographic, water quality, and agricultural context for the Management Area. It also describes the water quality issues, Area Rules, and potential practices to address water quality issues.

Figure 2 North Coast Basin Management Area



2.1 Local Roles

2.1.1 Local Advisory Committee

The LAC was formed to assist with the development of the Area Plan and Area Rules and with subsequent biennial reviews. Table 2.1.1 lists the current members of the LAC.

Table 2.1.1 Current LAC members

Name	Geographic Representation	Description
Kay C. VanNatta (Chair)	Columbia	Timber, livestock/beef, SWCD
Mike Seppa (Vice-Chair)	Clatsop	Dairy, SWCD
Casey Storey	Tillamook	Dairy
Kristi Foster	Tillamook	Conservation
John Seymour	Tillamook	Livestock, dairy, timber
Karl Zweifel	Tillamook	Livestock, hay, row crops
Margaret Magruder	Columbia	Rancher, sheep, Lower Columbia River Watershed Council (LCWC)
Robert Bradley	North Coast	Fisheries representative
Ted Warila	Clatsop	Timber, livestock/beef, SWCD
Vacant		
Vacant		
Vacant		

2.1.2 Local Management Agency

SWCDs implement Area Plans through OWEB capacity grants, with details negotiated between ODA and each SWCD. The resulting Scopes of Work define the SWCDs as the LMAs for implementation of the Ag Water Quality Program in specific Management Areas. The LMAs for this Management Area are Tillamook, Columbia, Clatsop, and West Multnomah SWCDs. These SWCDs were also involved in development of the Area Plan and Area Rules.

The LMAs implement the Area Plan by conducting activities detailed in Chapter 3, which are intended to achieve the goals and objectives of the Area Plan.

2.2 Area Plan and Area Rules: Development and History

The director of ODA approved the initial Area Plan and Area Rules in 2000.

Since approval, the LAC has met biennially to review the Area Plan and Area Rules. The biennial review process includes an assessment of progress toward achieving the goals and objectives in the Area Plan.

2.3 Geographical and Physical Setting

North Coast Basin

Location and Land Use
The North Coast Basin Management Area encompasses far northwest Oregon, including Tillamook, Clatsop, and Columbia counties as well as Sauvie Island, which straddles the

Columbia County and Multnomah County line (Figure 2). The Management Area is bounded by the Pacific Ocean to the west, the crest of the Coast Range to the east, Neskowin Creek, and Little Nestucca River watersheds to the south, and by the confluence of the Willamette and Columbia rivers to the north, where the Columbia River flows west around the northern tip of the Coast Range.

The North Coast Basin is a diverse area characterized by forested mountains, foothills, productive agricultural lands, several estuaries and bays, marine terraces, and dune areas. The largest urban centers include Tillamook, Astoria, and St. Helens, with populations of 5,277, 10,167, and 15,009, respectively in 2015 (https://www.pdx.edu/population-research/population-estimate-reports). They also serve as the county seats of Tillamook, Clatsop, and Columbia counties, respectively.

With a land base of almost 1.5 million acres, forestry is the largest commercial activity in the North Coast Basin (Table 2.3a). Tourism, hunting, fishing, and agriculture represent significant economic producers as well. Table 2.3b provides an overview of agricultural production in Clatsop, Columbia, and Tillamook counties.

Table 2.3a Land Use in the North Coast Management Area by State Zoning (Acres)
Data: 2017 - Oregon Department of Land Conservation and Development
See Figure 2: Map of the North Coast Basin Management Area

Zones:	Clatsop	Columbia	Tillamook	*Sauvie Island +	MA Total
Farm Use	14,492	29,959	37,551	11,522	**93,524**
Mixed Farm Forest	22,415	13,852	9,150	No data	**25,243**
Forest Private and Federal	428,076	323,560	602,615	No data	**1,354,251**
Commercial	2,264	846	904	2	**4,014**
Industrial	3,292	5,329	2,151	No data	**10,772**
Mineral and Aggregates	162	1,750	13	No data	**1,925**
Public Use/ Parks/ Open Space	14,335	12,651	11,370	28	**38,384**
Rural Residential	16,544	25,474	15,684	4,010	**61,712**
Low-High Density Residential	8,110	5,881	7,084	No data	**21,075**
Beaches/ Dunes/ Shoreline/ Estuarine	8,048	153	17,712	No data	**25,913**
Other	1,368	1,111	76	No data	**2,555**

*Zone acreage is only of those areas inside the North Coast Basin Management Area found in Multnomah and Washington Counties and includes Sauvie Island.

Sauvie Island Agriculture: For the first 100 years after European-Americans settled the area, dairy farming was the island's largest agricultural producer. Today, Sauvie Island has 11,800 acres in farm use and produces more than 30 percent of Multnomah County's agricultural products. Agricultural lands are found on the southern end of the island and includes several century farms still bearing the name of early pioneers. Major crops are berries, orchard fruits,

grass seed, wheat, field vegetables and fruits, pumpkins, Christmas trees, and fresh flowers and herbs. Truck farms and u-pick operations are common as well as an organic CSA (community supported agriculture) and a farmer's market (https://sauvieisland.org/visitor-information/history/). The northern half of the island is in the Sauvie Island Wildlife Management Area.

Soil Resources

Soils found in the North Coast are diverse. Forested mountain and foothill soils dominate the North Coast Basin and have developed in colluvium or residuum weathered from parent materials such as siltstone, sandstone, basalt, and tuff. Floodplain soils have developed in recent alluvium deposited by the area streams. Tidal floodplain soils developed in recent estuarine deposits. Terrace soils have developed in older alluvial deposits of stream or marine origin. Dune soils have developed in recent to slightly older wind deposits of sand.

Table 2.3b Agricultural Production in Clatsop, Columbia, and Tillamook Counties (2017)

* 2017 US Census of Agriculture: www.agcensus.usda.gov (last accessed 1/24/2024)

** Data from Oregon Department of Agriculture, Confined Animal Feeding Operation Program 2016

***** Data withheld to avoid disclosing data for individual farms (from NASS)**

* Production	Clatsop County	Columbia County	Tillamook County
Total Land in Agricultural Production (acres)	15,070	43,379	32,936
Number of Farms	226	789	293
Average Size of Farms (acres)	67	55	112
Irrigated land (acres)	1,876	2,210	3,647
Total Cropland (acres)	4,367	12,646	12,014
Land in Pasture-All Types (acres)	7,730	18,956	13,920
** Dairy Cattle and Milk Production	4	1	100
Farms in the USDA National Organic Prog.	0	1	5
*** Livestock (# farms with:)**			
# farms with Beef Cows	67	313	76
Milk Cows	4	15	83
Equine: Horses, Ponies, Mules, and Donkeys	86	215	66
Layers/ Poultry/ Turkey	74	217	53
Goats: Milk/ Angora/ Meat	34	98	24
Sheep and Lambs	52	65	16
Hogs and Pigs	19	63	12
Llamas	5	5	4
Alpacas	7	17	0
Total Bee Colonies in	23	73	101
*** Crops (acres)**			
Hay, Haylage, Grass Silage and Greenchop	2,422	6,914	8,525
Vegetable Row Crops	18	40	45
*** Orchards and Berries (acres)**			
Land in Orchards	9	90	6

Land in Christmas Trees	22	271	***
Land in Berries	60	24	6
***Greenhouse/ Nurseries (acres)**			
Nurseries	***	***	6.13

North Coast Basin watersheds are disturbance driven systems. Large pulses of sediment are delivered into North Coast Basin waterways due to a high density of naturally occurring landslides in the basin. These disturbances erode streambanks and alter established channels, resulting in river systems naturally high in sediment movement.

Tillamook soils are unique, with high phosphate and nitrate retention capability. Much of the upper Tillamook watersheds have Andisol soils, a very rare and young soil type. It is expected that this is what gives some of the terrace and floodplain agricultural soils their unique characteristics.

North Coast Basin agriculture is located primarily on the rich alluvial floodplains of the area's many river systems. The steep slopes of the uplands provide naturally high levels of sediment and organic material to the alluvial plains. Mainly derived from basalt, tuff, sandstone, and siltstone bedrock, level floodplain soils have developed in sediments deposited by the region's waterways. These alluvial floodplains encompass the most fertile soils in the region. However, some areas are influenced by tides and require drainage and diking for maximum agricultural production. In the 1850s, European-American settlers recognized the great agricultural potential of the lowlands and began clearing the forest lands, installing drainage ditches, dikes, levees, and tide gates. These actions made the rich soils available for row crops and pasture. Significant lowland areas and intertidal and freshwater wetlands were cleared by the early 1900s. This made much land available for agricultural production but changed the water flow, sedimentation patterns, and fish habitat.

For detailed information about soils in the North Coast Basin Management Area, refer to United States Department of Agriculture Natural Resource Conservation Service (USDA NRCS) Web Soil Survey at https://websoilsurvey.nrcs.usda.gov/app/.

Water Resources

The climate of the North Coast Basin is influenced by proximity to the Pacific Ocean and elevation. Climatic conditions can vary considerably, a function of influence and ocean effects. Annual average precipitation ranges from 40 to 150 inches, mostly rain, with about 80 percent falling between October and April. The greatest precipitation events occur during November, December, and January. Precipitation as high as 200 inches annually has been reported for northeastern Tillamook County at an elevation of over 3,000 feet at the headwaters to the North Fork Wilson River. This represents the highest precipitation in Oregon (https://wrcc.dri.edu/summary/Climsmor.html).

Localized flooding is common in the North Coast Basin. Heavy lowland rain combined with heavy mountain rain on snow causes severe flooding throughout the North Coast Basin, especially Tillamook County, resulting in significant economic and environmental damage.

Dominant westerly winds from the Pacific Ocean moderate coastal temperatures. These winds are almost continuous and can reach gale force in the winter. The mean annual temperature is 50°F, with the average minimum in the low 40s. Snowfall is common on the higher uplands and rare in the lowlands. Lowland areas often experience growing conditions the entire year, interspersed with freezes. Summers are cool and relatively drier, punctuated by easterly winds

that can create episodes of extreme dry weather. The average summer maximum temperature is about 60°F, with normal summer highs between 70°F and 80°F.

The North Coast Basin includes five major hydrologic areas as described by the U.S. Geological Service and are named for their major rivers. Moving north to south, they are:

Lower Columbia - Clatskanie	301.9 square miles
Lower Columbia - Youngs	323.6
Nehalem	850.4
Necanicum	129.1
Wilson-Trask-Nestucca	964.1

In the North Coast Basin floodplains, the groundwater is often near the soil surface from late fall through late spring. In the lowlands, floodwaters erode and scour the alluvial topsoil and create channels. Because streambanks in the floodplain are non-cohesive and friable, streambanks naturally erode easily during flooding. Without riparian vegetation, this process can be exacerbated, but it may occur even if riparian vegetation is present.

Clatsop County

Major subwatersheds in Clatsop County are the Youngs River and the Nehalem River. The Necanicum River is the major waterway in the southwest of the county and drains into the Pacific Ocean. These and other Clatsop County waterways have high volume, and fast and flashy winter flows with low and slow summer flows. The Brownsmead tidal flats along the Columbia River are a primary agricultural pasture area.

The Nehalem River flows easterly from steep gradient headwaters in eastern Tillamook County into Washington County, then north and west into and through Columbia County into Clatsop County; near its junction with Highway 26 it slows. Through much of Clatsop County, the Nehalem River is a flat, wide, slow-moving waterway with large winter flows. In the summer, it flows narrow and with little volume. In wide floodways, the channels are often too wide for existing riparian vegetation to provide significant shade.

In wide floodways, the Nehalem has low flows and warmer stream temperatures. These characteristics continue as the Nehalem flows south into Tillamook County and into Nehalem Bay where stream temperatures are moderated by tidal influence.

There are 16 drainage improvement districts in Clatsop County, located primarily along the Columbia River. Drainage districts have been established to maintain agricultural production. Winter storm runoff is controlled via large tide gates. These drainage districts encompass much of Clatsop County's productive agricultural soils.

Columbia County

The major subbasins in Columbia County are the Clatskanie River watershed and the Nehalem River watershed. Columbia County waterways typically have high volume, and fast and flashy winter flows with low and slow summer flows. Land use along the Clatskanie River and Nehalem River revolve around timber, with beef cattle and hay making up the bulk of agricultural land use.

There are 13 districts in the Columbia County Drainage Improvement Districts that manage drainage mainly along the Columbia River. Drainage districts, formed to protect and drain agricultural lands, cover approximately 15,000 to 20,000 acres. Winter storm runoff is drained

mainly via large pumps. These districts encompass much of Columbia County's agricultural production and most of its most productive soils.

Sauvie Island
Sauvie Island straddles the county line shared by Columbia and Multnomah counties. The Willamette River flows toward Sauvie Island from the south. Flowing west, the Columbia River converges with the Willamette River at Sauvie Island, and the Multnomah Channel forks from the Willamette and flows around the west side of the island and then meets the Columbia at the northern end (Figure 2).

In 1995, the original Sauvie Island Drainage District was reorganized as an Oregon nonprofit corporation now known as the Sauvie Island Drainage Improvement Company. It is responsible for managing and maintaining the 18 miles of levee and more than 30 miles of canals and ditches used to drain excess water from the district. In addition, the company operates five pumping facilities, with a main pumping plant built in 1941 that uses four high-voltage 250 to 300 horsepower pumps. These pumps have the capability to discharge 125,000 gallons of water per minute from inside the district into the Multnomah Channel (Sauvie Island Community Association 2016).

Tillamook County
Major subbasins in Tillamook County are the Nehalem as it enters from Clatsop County in the north; the Tillamook Bay Basin and its five major rivers; and the Nestucca subbasin. Of the five rivers in the Tillamook watershed, the Tillamook River flows through the most agricultural acres of the five Tillamook coastal plain rivers. It is also the slowest with the most meanders, making its way through the area's poorest drained soils. The other four major rivers emanate from steeper watersheds and move much faster through the system to the bay. Most dairies are in the Tillamook Basin, with fewer in the lower end of the Nestucca watershed centered around the town of Cloverdale. There are nine drainage districts in Tillamook County incorporating several hundred acres in tidal lands. It is estimated that at least one quarter of Tillamook agricultural lands are in these drainage districts.

Aquatic Life
The plight of salmon is well documented. In the late 1800s, over-fishing caused a rapid decline of Chinook salmon in Oregon. Today, Coho, Chinook, steelhead, and coastal cutthroat trout populations in the North Coast Basin show similar signs of trouble (Table 2.3e). Human population growth, dams and other river modifications, agriculture, industry, logging, mining, and grazing have all played a part in the salmon’s decline.

The effect of these factors on the health of salmon has accentuated the impact of predator populations and poor ocean conditions. In some cases, human activity has actually aided predator ability to feed on salmon as they migrate to or from the ocean. Aiding and restoring salmon and salmon habitat is a complex issue with many factors. Improving the health of Pacific salmon populations will require a broad-based action plan and the commitment of the entire community. This Area Plan outlines how the agricultural community will address these issues and how it will work toward salmon recovery.

North Coast Basin agriculture has an important role to play in water quality improvements and salmon recovery. North Coast Basin crop and pasturelands are mainly located in the lowland floodplains where stream flow is slow and streambanks are formed by alluvial deposits. These areas contain a diverse collection of water dependent animal and plant species. These agricultural lands often encompass river mainstem reaches that are vital salmon rearing habitats

and migration routes, particularly for species like Chinook and chum that spend time in tidal areas.

Tables 2.3e and 2.3f review the major salmonid (salmon as well as steelhead and sea run cutthroat trout) species of the North Coast Basin and their habitat requirements. Current science indicates that salmon require cold water free of excessive sediment, streams with deep pools, large woody debris, off-channel habitat (including tidal channels), sufficient waterflow, clean gravel, and streambanks with trees and shrubs that provide food and important hiding places for young salmon.

Grazing and pasture management can affect salmonid habitat and water quality. Livestock can congregate in riparian areas and cause damage. Damage to riparian areas can increase sediment in the water which is a pollutant (https://extension.oregonstate.edu/crop-production/pastures-forages/grazing-management-options-riparian-areas). Riparian areas are vital for fish habitat by providing shade, providing woody debris for fish cover, and providing habitat for water loving insects which are fish food.

The effects of cropping in and near riparian areas can be more severe that those of grazing. Cropping in and near riparian areas can cause sediment to enter waterways, which is a pollutant. Soil particles that erode from farm fields often carry contaminants. In addition, a lack of riparian vegetation can increase stream temperatures anywhere from 2-23 degrees Fahrenheit. (https://www.oregon.gov/oda/programs/NaturalResources/AgWQ/Pages/AgWQResources.aspx).

Table 2.3e State Status of Salmon Species in Oregon

Fish Species	Oregon Coast	Lower Columbia River
Coho	Threatened	Threatened
Chum	Not Listed	Threatened
Chinook	Not Listed	Threatened
Steelhead	Species of Concern	*Threatened
* Except in the SW Washington Evolutionary Significant Unit of the Columbia River at Gnat Creek		

Table 2.3f Salmonid Habitat Requirements for Northern Oregon Coastal Streams

Adapted from Salmon Habitat Requirements for Northern Oregon Coastal Streams Tillamook Bay National Estuary Project 1997; Updated 2024 ODFW

This information is general and will vary throughout the North Coast Basin.

Species	Life Cycle	Location	Water Temperature			Fry Habitat	Juvenile Habitat
			Spawning	Incubation	Rearing		
Chinook – Spring	Migration Apr – Jun Spawning Sep – Oct	Upper mainstem streams	42°F – 57°F (5.5°C – 13.8°C)	32°F – 68°F (0°C – 20°C)	45°F-58°F; growth stops @ 69°F/ 20°C lethal @ 77°F/ 25°C	Stream; river edges	Deeper water in main river channel
Chinook-Fall	Migration Sep – Dec Spawning Oct – Jan	Mainstem and large tributaries	42°F – 57°F (5.5°C – 13.8°C)	32°F – 68°F (0°C – 20°C)	45°F-58°F; growth stops @ 69°F/ 20°C lethal @ 77°F/ 25°C	Stream; river edges	Deeper water in main river channel
Chum	Migration Nov – Dec Spawning Nov –Dec	Lower mainstem and tributaries	45°F – 55°F (7.2°C – 12.7°C)	40°F – 56°F (4.4°C – 13.3°C)	44°F-48°F; growth stops @ 69°F/ 20°C lethal @ 77°F/ 25°C	Move directly to estuary, stream edges	High sediment will kill
Coho	Migration Sep – Jan Spawning Oct – Jan	Small tributaries	40°F – 57°F (4.4°C – 13.8°C)	40°F – 56°F (4.4°C – 13.3°C)	53°F-48°F; growth stops @ 69°F/ 20°C lethal @ 78°F/ 25.5°C	Backwater pools & stream edges	Pools, off-channel alcoves, large wood
Sea Run Cutthroat Trout	Migration Jun – Oct Spawning Dec – Feb	Small headwater tributaries	43°F – 63°F (6.1°C – 17.2°C)	43°F – 63°F (6.1°C – 17.2°C)	49°F-55°F; growth stops @ 69°F/ 20°C lethal @ 73°F/ 22.7°C	Stream edges and backwater pools, large wood	Pools and side channels
Steelhead – Summer (nonnative)	Migration May – Jul Spawning Jan – Apr	Small tributaries	39°F – 49°F (3.8°C – 9.4°C)	40°F – 56°F (4.4°C – 13.3°C)	45°F-58°F; growth stops @ 69°F/ 20°C lethal @ 75°F/ 23.8°C	Stream edges	Pools, riffles, and runs of tributaries large woody debris
Steelhead – Winter	Migration Nov – May Spawning Jan – May	Small tributaries	39°F – 49°F (3.8°C – 9.4°C)	40°F – 56°F (4.4°C – 13.3°C)	45°F-58°F; growth stops @ 69°F/ 20°C lethal @ 78°F/25.5°C	Stream edges	Pools, riffles, and runs of tributary streams, large woody debris

Management changes in other land uses will also be needed if this area's water quality is to improve. Some of the nonagricultural sources of water pollution include municipal sewage treatment plants, leaking on-site septic systems in rural areas, forest roads, legacy issues, and residential homes located too close to streams.

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

2.4.1.1 Beneficial Uses

Multiple beneficial uses in the North Coast Management Area require clean water, including fish, drinking water, recreational activities, aquatic life, and agriculture (www.oregon.gov/deq/wq/Pages/WQ-Standards-Uses.aspx).

Primary beneficial uses of concern in the Management Area include salmonid fish rearing and spawning, resident fish and aquatic life, boating, fishing, and water contact recreation.

While there may not be severe impacts on water quality from a single source or activity, the combined effects from all sources contribute, along with impacts from other land uses and activities, to the impairment of beneficial uses of the North Coast water.

2.4.1.2 Water Quality Parameters of Concern

Temperature and bacteria are the major water quality parameters of concern in the North Coast Basin Management Area. These parameters are repeated in multiple TMDLs, as well as identified in the DEQ Integrated Report.

According to the 2022 Integrated Report, there are several water quality parameters of concern for agriculture (https://www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx), listed below.

Temperature
Compliance with the temperature standard is determined by comparison to numeric and narrative criteria designed to minimize detrimental impacts to salmonid fishes. The standard specifies that “no measurable surface water temperature increase resulting from anthropogenic activities is allowed” where the temperature exceeds migration and rearing or spawning and incubation criteria, where threatened cold water salmonids reside, where dissolved oxygen concentrations are limited, and in other situations. The stream temperature standards are applied based on fish use (https://www.oregon.gov/deq/FilterRulemakingDocs/figure230a.pdf).

The current standards address the migration and rearing (18°C), core cold water habitat (16°C) and spawning (13°C) for aquatic life. The critical period for these TMDLs is summer through early fall, when low flows coincide with maximum heat loading, resulting in high instream temperatures.

The temperature standard (OAR 340-041-0028) provides numeric and narrative temperature criteria. Determining whether the stream temperature is above or below the temperature standard is based on a moving average of the maximum daily water temperatures for a given fish use criteria, for a consecutive seven-day period during the year. Water temperature measurements must be taken with continuous recording temperature sensors in well-mixed and representative stream locations.

A one-time measurement above the standard is not a violation of the standard. When stream flow is exceptionally low or air temperature is exceptionally high, the temperature criterion is waived (an example is when the flow is less than the expected 10-year low flow or the air temperature is above the 90th percentile of a seven-day average).

Several river/stream segments in the North Coast have been declared “impaired” by the Department of Environmental Quality (DEQ) under Section 303(d) of the CWA. Temperature is the most common listing and one of the easiest to quantify as well as the most difficult to affect.

Sediment
Sediment includes fine silt and organic particles suspended in the water column, settled particles, and larger gravel and boulders that move at high flows. Sediment movement and deposition is a natural occurrence, but high levels of sediment can degrade fish habitat by filling pools, creating a wider and shallower channel and covering spawning gravels. Suspended sediment or turbidity in the water can cause physical damage to fish and other aquatic life, modify behavior, and increase temperature by absorbing incoming sunlight. Sediment comes from erosion on range, forestland and croplands, erosion from streambanks and streambeds, and runoff from roads and developed areas. Nutrients, pesticides, and toxic substances can also be attached to sediment particles.

pH and Dissolved Oxygen
Extremes in water pH and low levels of dissolved oxygen can harm fish and other aquatic life. Both conditions can be caused by the availability of nutrients, warm temperatures, and light, all of which stimulate aquatic plant or algae growth. Excessive aquatic plant growth can increase water pH, which may harm fish. The death and subsequent decomposition of aquatic plants can deplete the water of dissolved oxygen resulting in the death of fish and other aquatic animals as well. These conditions are usually aggravated by low stream flow. For waters identified as providing cold-water aquatic life, the dissolved oxygen shall not fall below 8.0 mg/l unless environmental conditions (barometric pressure, altitude, and temperature) preclude attainment (OAR 340-041-0016). The water quality standard for pH (hydrogen ion concentrations) values ranges from 6.5 to 9.0. (OAR 340-041-0315).

Bacteria
Bacteria counts are used to determine the safety for human contact recreation, aquaculture, and domestic water supplies. When high levels of bacteria are present in the water people have a great risk of experiencing severe gastric illness and even death. Potential sources of bacteria include wild and domestic animal manure and septic systems. Streams may be listed as violating this criterion on a seasonal bases, during the summer period (the highest use period for water contact recreation), for the fall-winter-spring period, or year-round. The DEQ standard sets a maximum level allowable over a 90-day period based on five consecutive samples, as well as a single sample maximum. The different types of bacteria are measured based on water use and water characteristics.

<u>Freshwater Recreational Use - (Fishing, Swimming, Boating)</u>
A 90-day geometric mean of 126 *E. coli* bacteria per 100 ml, based on a minimum of five samples; and no single sample shall exceed 406 *E. Coli* per 100 ml.

<u>Marine Water Recreational Use - (Fishing, Swimming, Boating)</u>
A 90-day geometric mean of 35 Enterococcus per 100 ml, based on a minimum of five samples; and no sample greater than 130 Enterococci per 100 ml.

<u>Commercial Shellfish Harvest – (Eating raw oysters)</u>
A 90-day geometric mean of 14 fecal coliform per 100 ml, based on a minimum of five samples; and no sample greater than 43 fecal coliform per 100 ml.

Biological Criteria
Biological criteria refer to the support of plants and animals that live at least part of the life cycle in water. Factors that affect biological criteria are stream disturbances, excessive heat inputs, and excessive sediment. The biologic condition is assessed through sampling and quantifying of streambed insect communities compared with reference conditions.

Waters of the state shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities (OAR 340-041-0011).

Aquatic Weeds and Algae
Both rooted aquatic plants and algae are a natural part of stream systems. They grow by taking in nutrients from the water column and sunlight. When water temperatures are warm enough and sufficient nutrients are present, excessive growth can occur; this can be a problem for both aquatic life and recreational beneficial uses. Excessive growth can affect aquatic life in several ways. During sunlight hours, plants and algae remove carbon dioxide from the water column as part of photosynthesis. With excessive growth, this can result in increased pH (alkaline conditions). During the night, plant growth removes oxygen from water and releases carbon dioxide, resulting in both low pH (acidic conditions) and low dissolved oxygen. In addition, when algae die and decompose, they remove oxygen from the surrounding water. Low dissolved oxygen can lead to decreased fish habitat and even fish kills. Additionally, low dissolved oxygen levels can lead to changes in water chemistry that allow mercury to be more able to enter the food chain. Algal blooms also often create odors and coloration that are objectionable to recreational users.

Harmful algal blooms (HABs) occur when excessive amounts of the naturally occurring blue-green algae, cyanobacteria, reach levels that create toxins that can be dangerous to animals and humans.

Cyanobacterial blooms cause taste and odor problems, decreased aesthetics, depleted dissolved oxygen, and harmful toxins. Physical factors that contribute to the creation of HABs include the availability of light, meteorological conditions, alteration of water flow, vertical mixing, and temperature. Chemical factors include pH changes, nutrient loading (principally in various forms of nitrogen and phosphorus), and trace metals.

Toxics
Toxic contaminants are naturally occurring or manufactured chemicals that can be harmful to fish, wildlife, and people. Many toxic contaminants break down slowly and can accumulate in the environment and concentrate in plants, wildlife, and people through bioaccumulation/ magnification. For the purposes of this document, toxic contaminants are defined as metals, pesticides and their breakdown products, and/or organic or inorganic compounds that are known to negatively affect the health of fish, wildlife, and human health.

Toxics in the North Coast Basin Management Area are primarily in the Columbia River, including arsenic, copper, polychlorinated biphenyls (PCB), and DDE 4,4 (degradate of DTT).

2.4.1.3 TMDLs and Agricultural Load Allocations

Table 2.4.1.3 Pollutants with Approved TMDLs* and Load Allocations for the North Coast Basin Management Area
Bacteria, Temperature, Biological Criteria: Applies to waterbodies within the Nehalem River, the Necanicum River, the Lower Columbia/Young's River, and the Lower Columbia/ Clatskanie River Subbasins area. **Load Allocation:** Bacteria: Nehalem watershed storm runoff concentrations: Low pasture 95% reduction in bacteria, Upper Pasture 55% reduction. Necanicum River Subbasin storm runoff concentrations: Pasture 88% reduction in bacteria. Clatskanie River Subbasin storm runoff concentrations: Pasture 30% reduction in bacteria. Temperature: All nonpoint sources collectively (agriculture's allocation is not separate): background solar radiation loading based on system potential vegetation near the stream. **Surrogates:** Temperature: Effective shade and system potential vegetation. Bacteria: *E. coli.* Biocriteria: Based on improvements from temperature. **Timeline:** Bacteria: Achieve water quality standards in the rivers and bays/estuaries by 2010. Temperature: Milestone 1: Measurable increases in instream shade by 2020. Milestone 2: Achieve instream temperatures that meet salmonid requirements by 2050. **Current TMDL:** North Coast Subbasins Total Maximum Daily Load, August 2003 **For more information**: https://www.oregon.gov/deq/FilterDocs/NCStmdl.pdf
Temperature, Sediment, Bacteria: Applies to waterbodies within the Nestucca watershed. **Load Allocation:** Bacteria: Antidegradation policy does not allow unnecessary degradation from nonpoint sources of pollution. Sediment: <20% fines in streambed area in riffle and glide reaches, nonpoint sources collectively (agriculture's allocation is not separate) Temperature: All nonpoint sources collectively (agriculture's allocation is not separate): background solar radiation loading based on system potential vegetation near the stream. **Surrogates:** Temperature: Effective shade and system potential vegetation. Bacteria: Fecal coliform and *E. coli* Sediment: (Nestucca): % fines

Timeline:

Bacteria: Achieve water quality standards in the rivers and bay by 2010.

Temperature: Achieve instream temperatures that meet salmonid requirements by 2050.

Sedimentation: Achieve Streambed fines target throughout watershed by 2020.

Current TMDL: Nestucca Bay Watershed Total Maximum Daily Load, May 2002

For more information: https://www.oregon.gov/deq/FilterDocs/NCnesttmdlwqmp.pdf

Temperature and Bacteria: Applies to waterbodies within the Tillamook Bay watershed and includes five major drainages (rivers) that discharge to Tillamook Bay: Miami, Kilchis, Wilson, Trask, and Tillamook rivers

Load Allocation:

Bacteria:

Miami River: 96% reduction in bacteria

Kilchis River: 85% reduction in bacteria

Wilson River: 94% reduction in bacteria

Trask River: 97% reduction in bacteria

Tillamook River: 99% reduction in bacteria

Temperature:

All nonpoint sources collectively (agriculture's allocation is not separate): background solar radiation loading based on system potential vegetation near the stream.

Surrogates:

Temperature: Effective shade and system potential vegetation.

Bacteria: *E coli*

Timeline:

Bacteria and Temperature:

Achieve water quality standards in the rivers and bays/estuaries by 2010.

Current TMDL: Tillamook Bay Watershed Total Maximum Daily Load, June 2001

For more information: https://www.oregon.gov/deq/FilterDocs/NCtilltmdl.pdf

Temperature: Applies to perennial and/or fish bearing waterbodies in the Willamette Basin portion of the Management Area.

Load Allocation: All nonpoint sources collectively (agriculture's allocation is not separate): background solar radiation loading based on system potential vegetation near the stream; maximum increase of 0.05°C.

Surrogate: Effective shade.

Timeline: Achieve instream temperatures that meet salmonid requirements by 2050.

Current TMDL: Lower Willamette Subbasin TMDL, Chapter 5 (DEQ; approved 2006).

TMDL Revisions: DEQ is under a court order to update and replace the Willamette Basin temperature TMDL to be consistent with current temperature standards:

- DEQ will present the Willamette Basin Subbasins Temperature TMDL to the Environmental Quality Commission for proposed rule adoption in July 2024, and submitted to EPA for its approval determination by Sept. 15, 2024. Rulemaking website: www.oregon.gov/deq/rulemaking/Pages/willamettetempTMDL.aspx.
- DEQ will present the Willamette Basin Mainstem Temperature TMDL to the Environmental Quality Commission for proposed rule adoption in November 2024, and submitted to EPA for

its approval determination by Feb. 28, 2025. The Rules Advisory Committee is expected to meet twice in Feb. and April 2024. Project website: https://www.oregon.gov/deq/wq/tmdls/Pages/tmdlRwillmainstem.aspx
Bacteria (*E. coli*): Applies to streams providing recreational contact beneficial uses in the Willamette Basin portion of the Management Area. **Load Allocation:** All nonpoint sources collectively (agriculture's allocation is not separate): bacteria loading determined through the development of load duration curves that determine the maximum bacteria load that will achieve the 126 *E. coli* organisms per 100 ml water quality criteria under all flow conditions. **Surrogate:** 78% reduction of *E. coli*. **Timeline:** Achieving water quality standards for bacteria will take approximately 20 years (from 2006). **Current TMDL:** Lower Willamette Subbasin TMDL, Chapter 5 (DEQ; approved 2006). **For more information:** https://www.oregon.gov/deq/FilterDocs/chpt5lowerwill.pdf

The TMDL allocations (Table 2.4.1.3) have been specifically designed so that when attained, waterbodies of the North Coast and Willamette Basin portion of the Management Area will meet water quality standards. Plans to meet TMDL allocations are required for industry, municipalities, forestry, and agriculture to improve water quality so that all beneficial uses are supported. Overall, the goal of developing a TMDL is to end up with an implementation plan or a watershed plan designed to meet water quality standards and restore impaired waterbodies.

2.4.1.4 Drinking Water

DEQ summarizes drinking water issues in each Management Area prior to biennial reviews. DEQ's full report is available at https://www.oregon.gov/deq/wq/programs/Pages/Nonpoint-Implementation.aspx.

Public drinking water systems in the North Coast Basin Agricultural Water Quality Management Area utilize groundwater and surface water sources to serve approximately 103,043 persons regularly with another 434,515 people served by systems outside the Management Area with water partially sourced from within the Management Area. Contaminants in water supplies potentially related to agriculture occur near human populations, agricultural land uses, and aquifers susceptible to contaminant infiltration. Agricultural land uses (e.g., berries, orchard fruits, grass seed, wheat, field vegetables and fruits, pumpkins, Christmas trees, fresh flowers, and herbs) are present near many of the public water system wells and springs in the Management Area. DEQ recommends ODA work with the appropriate SWCDs to implement best management practices (BMPs) in and around private domestic and public drinking water wells to reduce high nitrate levels. BMPs to reduce nitrate levels are beneficial in helping communities reduce long term costs associated with treatment, operations, maintenance, and sustainability.

An alert for elevated nitrate concentrations is generated by Oregon Health Authority when nitrate sample results for public water systems exceed 5 mg/L. Within the North Coast Basin Management Area, five public water systems had an alert for elevated nitrate results in the past 10 years: Bailey Nursery, Columbia Acres Water Association, Deer Island Village Mobile Home Park, Dyno Nobel, Inc., and Shell Star Mart. None of the public water systems had maximum contaminant level (MCL) violations for nitrate in the past 10 years (the MCL for nitrate is 10 mg/L). These contaminants are often related to animal and cropland agriculture. The locations of nitrate contamination of private domestic wells and public drinking water sources are near

agricultural land use, mostly in the northeastern portion of the area. Of the soils assessed in the North Coast Basin Management Area, most have high nitrate leaching potential, according to the NRCS National Cooperative Soil Survey. Nitrate leaching potential is based on the area's slope, precipitation, and land use. Nitrate from fertilizers and septic systems can readily penetrate aquifers used for drinking water when leaching potential is high. Additionally, bacteria removal through soil filtration can be less effective in sandy soils. Measures to reduce leachable nitrate in soils would reduce risk to groundwater sources of drinking water.

Other contaminants found related to agriculture include a Diquat alert reported at the Columbia Pacific Bio-Refinery, an 1,2,4-Trichlorobenzene alert reported at Oceanside Water District, an Endothall alert reported at the City of Rainier, and a monochlorobenzene alert reported at Rainier School District #13.

2.5 Regulatory and Voluntary Measures

2.5.1 Area Rules

All landowners or operators conducting activities on lands in agricultural use must be in compliance with the Area Rules. A landowner is responsible for only those conditions caused by activities conducted on land managed by the landowner or occupier. Conditions resulting from unusual weather events or other circumstances not within the reasonable control of the landowner or operator are considered when making compliance decisions. An example of reasonable control of the landowner means that technically sound and economically feasible measures are available to address conditions described in prevention and control measures. ODA may allow temporary exceptions when a specific integrated pest management plan is in place to deal with certain weed or pest problems. The Area Rules will be applied with consideration of agronomic and economic impacts.

Landowners should review the Area Rules and refer to the Voluntary Measures to determine the best method to achieve compliance within the scope of their operation. The Voluntary Measures are intended to be flexible in a way that landowners can use site specific adaptive management to achieve desirable land conditions to improve water quality.

(1) Healthy Riparian Streambank Condition

OAR 603-095-0840

(2) Healthy Riparian Streambank Condition. Effective upon rule adoption.

(a) Allow the natural and managed regeneration and growth of riparian vegetation -- trees, shrubs, grasses, and sedges – along natural waterways (as defined in OAR 141-085-0010(27)) to provide shade to moderate water temperatures and bank stability to maintain erosion near background levels.

(b) The technical criteria to determine compliance with OAR 603-095-0840(2)(a) are:

(A) Ongoing renewal of riparian vegetation that depends on natural processes (including processes such as seed fall, seed bank in soil, or sprouting from roots, rhizomes, or dormant crowns) is evident.

(B) Ongoing growth of riparian vegetation that has a high probability of remaining or becoming vigorous and healthy is evident.

(C) Management activities minimize the degradation of established native vegetation while allowing for the presence of nonnative vegetation.

(D) Management activities maintain at least 50% of each year's new growth of woody vegetation both trees and shrubs.

(E) Management activities are conducted in a manner so as to maintain streambank integrity through 25-year storm events.

(c) Exemptions:

(A) Levees and dikes are exempt from the Healthy Riparian Streambank Condition OAR 603-095-0840(2)(a) and (b), except for areas on the river-side of these structures that are not part of the structures and which can be vegetated without violating U.S. Army Corps of Engineers vegetation standards.

(B) Drainage areas where the only connection to other waterbodies are through pumps shall be exempt from the Healthy Riparian Streambank Condition OAR 603-095-0840(2)(a) and (b).

(C) Access to natural waterways for livestock watering and stream crossings are allowed such that livestock use is limited to only the amount of time necessary for watering and crossing the waterway.

(D) Drainage and irrigation ditches managed in compliance with OAR 603-095-0840(3) are exempt from the Healthy Riparian Streambank Condition OAR 603-095-0840(2)(a) and (b).

(2) Drainage Ditches

OAR 603-095-0840

(3) Drainage and irrigation ditches (channels legally constructed). Effective upon rule adoption.

(a) Construction, maintenance, and use of surface drainage ditches shall not result in sediment delivery to waters of the state from soil erosion caused by excessive channel slope, unstable channel cross section, or placement of disposed soils.

(b) Ditch bank vegetation shall be present to stabilize earthen ditch banks.

(c) Technical criteria to determine compliance with OAR 603-095-0840(3)(a) and (b) are:

(A) Construction and maintenance of drainage and irrigation ditches utilize ditch slope and ditch cross section that are appropriate to the site.

(B) Disposed soils from construction and maintenance of drainage and irrigation ditches are placed such that sediment delivery to waters of the state from the placement of these soils is consistent with natural background sediment delivery from these sites.

(d) Exemptions:

(A) Bank vegetation damaged and soils exposed during maintenance (as defined in OAR 141-085-0010(22)) and construction, in accordance with Department of State Lands rules. Bank vegetation must be reestablished as soon as practicable after construction and maintenance are completed. However, sediment delivery to waters of the state shall not result from inappropriate ditch slope and cross section or from placement of disposed soils.

(3) Tide Gates

OAR 603-095-0840

(4) Tide Gates. Effective upon rule adoption.

(a) Tide gates shall open and close as designed.

(4) Erosion and Sediment Control from Sources Beyond Streambanks

OAR 603-095-0840

(5) Erosion and Sediment Control. Effective upon rule adoption.

(a) No cropland erosion in excess of the soil loss tolerance factor (T) for the subject field, as determined by the Revised Universal Soil Loss Equation (RUSLE) for soil loss will occur.

(A) Exceptions: The department shall establish an alternate erosion control standard for croplands which the department determines cannot practically or economically achieve the soil loss tolerance factor. Any alternate erosion control standard for croplands established by the department shall assure that delivery of sediment to adjacent water sources is reduced to the maximum extent practicable.

(b) Private roads that traverse rural lands or private roads used for agricultural activities shall be constructed and maintained such that road surfaces, fill and associated structures are designed and maintained to limit contributing sediment to waters of the state. All private roads on agricultural lands not subject to the Oregon Forest Practices Act are subject to this regulation.

(A) Exceptions: Roads subject to the Oregon Forest Practices Act.

(c) Agricultural lands shall be managed to prevent and control runoff of sediment to public road drainage systems.

(d) Except for operations governed by the Oregon Forest Practices Act, no activities related to the conversion of woodland to non-woodland agricultural uses that require removal of the majority of woody material from a parcel of land, such that the land no longer meets the definition of woodland, shall be conducted in a manner which results in the placement of soil, the delivery of sediment or the sloughing of soil into waters of the state, the initiation or aggravation of streambank erosion, or the loss of a healthy riparian streambank condition as defined in OAR 603-095-0840(2)

(5) Manure, Nutrients and Other Waste

OAR 603-095-0840

(6) Manure, Nutrients, and Other Waste. Effective upon rule adoption.

(a) No person conducting agricultural land management 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.

(b) No person conducting agricultural land management shall discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

(c) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050.

(d) Exceptions:

(A) Access to natural waterways for livestock watering and stream crossings are allowed such that livestock use is limited to only the amount of time necessary for watering and/or crossing the waterway.

(6) Livestock and Grazing

OAR 603-095-0840

(2) Healthy Riparian Streambank Condition. Effective upon rule adoption.

(a) Allow the natural and managed regeneration and growth of riparian vegetation -- trees, shrubs, grasses, and sedges -- along natural waterways (as defined in OAR 141-085-0010(27)) to provide shade to moderate water temperatures and bank stability to maintain erosion near background levels.

(b)Technical criteria to determine compliance:

(A) Ongoing renewal of riparian vegetation that depends on natural processes (seed fall, seed bank in soil, or sprouting from roots, rhizomes, or dormant crowns) is evident.

(B) Ongoing growth of riparian vegetation that has a high probability of remaining or becoming vigorous and healthy is evident.

(C) Management activities minimize the degradation of established native vegetation while allowing for the presence of nonnative vegetation.

(D) Management activities maintain at least 50% of each year's new growth of woody vegetation -- both trees and shrubs.

(E) Management activities are conducted in a manner so as to maintain streambank integrity through 25-year storm events.

(c)Exemptions -- any of the following are exempted:

(A) Levees and dikes are exempt from the Healthy Riparian Streambank Condition rules, except for areas on the river-side of these structures that are not part of the structures and can be vegetated without violating U.S. Army Corps of Engineers vegetation standards.

(B) Drainage areas where the only outlet to other waterbodies is through pumps shall be exempt from the Healthy Riparian Streambank Condition OAR 603-095-0840(2)(a)(b).

(C) Access to natural waterways for livestock watering and stream crossings are allowed such that livestock use is limited to only the amount of time necessary for watering and crossing the waterway.

(D) Drainage and irrigation ditches managed in compliance with OAR 603-095-0840(3) are exempt from the Healthy Riparian Streambank Condition rules.

(6) Manure, Nutrients, and Other Waste. Effective upon rule adoption.

(a) No person conducting agricultural land management 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.

(b) No person conducting agricultural land management shall discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

(c) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050.

(d) Exceptions:

(A) Access to natural waterways for livestock watering and stream crossings are allowed such that livestock use is limited to only the amount of time necessary for watering and/or crossing the waterway.

(7) Pesticide Management

603-095-0840

(7) Pesticide Management

(a) Pesticides shall be used in accordance with label requirements as required in ORS 634 (Oregon Pesticide Control Law).

Statutory Authority: ORS 568.909

Stats. Implemented: ORS 568.900-568.933

2.5.2 Voluntary Measures

These voluntary measures have been developed to help agricultural operators reduce agricultural water pollution. The voluntary measures have been designed to support implementation of the agricultural measures required by Section 6217(g) of the Coastal Zone Act Reauthorization Act (CZARA). Voluntary measures provide flexible management solutions to protect water quality in the North Coast Basin Management Area.

Landowners should develop their own site-specific adaptive management strategy to meet conditions described in this Area Plan. The voluntary measures are intended to be flexible enough for landowners to develop feasible and affordable approaches to meet water quality standards. Resources and partners such as the SWCDs are available to provide technical assistance for this work.

(1) Healthy Riparian Streambank Condition

Benefits of a Healthy Riparian Streambank Condition
In the landscape, riparian areas comprise a small percentage of total land area but are essential for maintaining water quality and quantity, for ground water recharge, and for dissipating stream energy. It is anticipated that the Healthy Riparian Streambank Condition (HRSC) will assist with drainage and flood control.

Landowners benefit from riparian streambank stabilization through soil deposition on streambanks and vegetative bank stabilization, prevention or rate reduction of crop and pasture land damaged or lost to floods, and prevention or reduction of flood debris deposited on fields. The environmental benefits of a HRSC include more shade to improve water temperature moderation and reduce heating, enhanced habitat for wildlife, and a reduction in the quantity of sediment, chemicals, bacteria, and nutrients contained in surface water runoff reaching a stream.

General Description of Healthy Riparian Streambank Condition
A stream in Healthy Riparian Streambank Condition provides the following benefits:

- Shade at a sufficient quantity to help maintain cool water temperatures,
- Streambank stabilization and protection,
- Filtering of sediment, animal waste, and chemicals in surface runoff,
- Sources of food, hiding, and resting places for fish including large wood for fish habitat.

To provide these benefits, North Coast Basin riparian areas needs complex vegetation structure and diverse species composition. Riparian areas support a diverse assortment of plants, trees, shrubs/groundcover, in two or more vertical layers. Riparian areas should be dominated by native species with a diverse age class distribution. Where suitable, conifers are the preferred dominant tree species.

The Conservation Reserve Enhancement Program (CREP) is a state-federal partnership that provides a modest rental payment and substantial cost share to encourage protection of riparian areas on agricultural lands. Participation in this program can help achieve the HRCS. Landowners are encouraged to contact the local SWCD or USDA NRCS office for information.

(2) Drainage and Irrigation Ditches

Benefits of drainage and irrigation ditches
Ditches provide important drainage functions for agricultural lands. Appropriate construction, use, and maintenance of ditches will protect waters of the state from erosion, sediment delivery, and sloughing from ditches. The environmental benefits of proper drainage and irrigation ditch operation include a reduction in sediment and bacteria conveyance to the state's waters.

General description of satisfactory drainage and irrigation ditch conditions
Ditches are protected from erosion, sediment delivery, and sloughing with appropriate vegetation.

Ditches that provide important drainage functions for agricultural land require periodic maintenance. Although ditch bank vegetation may be damaged during maintenance, care should be taken to minimize this damage and provide for re-vegetation.

A joint permit from the U.S. Army Corps of Engineers and the Department of State Lands (DSL), or a General Authorization permit from DSL, must be obtained to dig new ditches. A Notice from the Oregon Department of Agriculture may be sufficient for cleaning ditches.

(3) Tide Gates

Benefits of Tide Gates
Tide gates allow freshwater to flow into the estuaries but prevent the upstream movement of brackish estuarine waters during high tidal swings while still allowing fish to pass.

It is anticipated that this measure will improve water quality upstream of tide gates where it is degraded and also improve fish passage. This measure will also improve the drainage and flood management functions of malfunctioning tide gates.

Tide gates in satisfactory condition serve several key functions. Tide gates that open and close as designed improve drainage, protect water quality, support agricultural flood management, and provide the means for fish to access habitat and refuge areas that may be present behind the gate. Poorly operating tide gates can reduce water column exchange that results in stream and slough water that does not meet water quality standards, most notably those for temperature and dissolved oxygen.

This measure does not require the replacement of existing tide gates. However, it does encourage landowners to replace malfunctioning and “fish unfriendly” tide gates in a time and manner determined by the landowner. Landowners are encouraged to replace poorly operating tide gates with “fish friendly” tide gates that provide improved fish access to vital rearing and winter habitat that may be present upstream of the tide gate. Landowners should be aware that when they replace a tide gate, state rules for fish passage will apply. Landowners are encouraged to participate with local watershed councils and SWCDs to obtain cost-share funding to utilize the best “fish-friendly” tide gates available. Contact the local SWCD for more information.

General description of tide gates in satisfactory condition
Tide gates in satisfactory condition are those that open and close as designed and are maintained regularly. They provide a healthy water column exchange where appropriate, such as in sloughs, though this may not be desired in drainage canals. Lightweight aluminum tide gates function at lower tides and mimic natural drainage patterns better than older, heavy, iron, and steel gates.

(4) Erosion and Sediment Control from Sources Beyond Streambanks

General description of satisfactory erosion and sediment control
Agricultural managers are encouraged to:

- Utilize erosion control management alternatives such as maintenance of healthy and vigorous pasture, cover, and green manure cropping, no till, conservation tillage, and other activities that reduce the detachment and movement of soil.
- Utilize sediment control management alternatives such as strip cropping, vegetative filter strips, straw bales, grass-lined waterways, and catch basins.

- Plant or till perpendicular to slope following elevation contour lines.
- Utilize soil health principles and avoid leaving your soil bare or uncovered. Plant a cover crop. USDA Soil Health Website: www.nrcs.usda.gov/wps/portal/nrcs/main/national/soils/health/
- Under certain farming conditions, sub-soiling or deep ripping a field can improve water infiltration.

Benefits of satisfactory erosion and sediment control
It is anticipated that this measure will reduce sedimentation of streams while economically protecting the most valuable agricultural resource — the soil.

Proper erosion and sediment control from agricultural activities retains important soil resources on the farm and minimizes the opportunity for excess sediment to enter waterways. Normal or natural levels of sediment are vital for aquatic systems and proper river functions. However, excess sediment levels are harmful to humans and fish. Agricultural erosion and sediment control protect drinking water quality.

(5) Manure, Nutrients, and Other Waste

Appropriate manure and nutrient use can help save operators money through considering more efficient utilization of nutrients that minimize leaching from the plant root zone and losses from surface runoff and tile drainage. Reducing leaching and surface runoff will also reduce groundwater and surface water pollution from agricultural activities.

Benefits of manure and nutrients
Manure and fertilizers are important nutrient sources for crop and pasture production. This measure is designed to decrease nutrient and bacteria contamination of water resulting from agricultural activities. It is a goal of this measure to minimize nutrient and bacteria contributions while allowing managed riparian grazing and providing limited livestock crossing and water access.

Appropriate manure and nutrient use can help save operators money through considering more efficient utilization of nutrients that minimize leaching from the plant root zone and losses from surface runoff and tile drainage. Reducing leaching and surface runoff will also reduce groundwater and surface water pollution from agricultural activities.

General description of appropriate manure and nutrient control
Manure and nutrients are most efficiently tracked and utilized through the development and implementation of a nutrient management plan. Landowners are encouraged to develop a nutrient management strategy that provides guidance to:

- Apply nutrients at rates necessary to achieve realistic crop yields.
- Improve the timing of nutrient applications. Avoid nutrient applications during periods with a high potential for leaching or runoff, identify timing and application methods to provide nutrients at rates necessary to achieve realistic crop yields, and reduce losses to the environment.
- Use agronomic crop production technology to increase nutrient use efficiency.
- Identify the limiting nutrient and manage to not exceed application of that nutrient (e.g., nitrogen, phosphorus, potassium) greater than the recommended rate.
- Properly calibrate and operate nutrient application equipment.

- Land application of manure and fertilizer should ensure all nutrients are applied in the proper amounts and in a way that controls movement of soil.
- Tillage, crop residue management, grazing management, and other agricultural activities are performed in a manner that minimizes movement of soil, organic materials, nutrients, and bacteria to surface and groundwater.
- Livestock barnyards, feedlots, dry-lots and other non-pasture areas should not be located adjacent to natural waterways unless a runoff control system is installed and maintained so that suspended solids are kept from waters of the state.
- A functional and effective vegetative buffer or equally effective pollution control application should be established adjacent to waters of the state to minimize soil and manure transport to waters of the state.

(6) Livestock and Grazing

Benefits of appropriate livestock and grazing strategies
It is anticipated that this measure will minimize the impact of livestock and protect riparian vegetation, maintain stable streambanks, encourage alternative and off-stream water sources, and protect and improve water quality. It is also a goal of this measure to provide for livestock crossing and water access such that large numbers of livestock do not loiter in natural waterways, while allowing managed riparian grazing.

Appropriate livestock and grazing management can benefit landowners through developing healthy and vigorous pasture grass. Utilizing grazing management alternatives can protect and improve riparian habitat, stabilize streambanks and reduce sedimentation, and minimize nutrient and bacteria access to waterways.

General description of appropriate livestock and grazing strategies
Landowners are encouraged to develop livestock control and grazing strategies that protect water quality, streambanks, stream channels, wetlands, estuaries, ponds, lakeshores, riparian soils and vegetation, and upland areas. Some examples of suitable strategies may include:

- Manage in-stream crossings to minimize erosion beyond background or normal conditions.
- Manage in-stream crossings so that fish passage is not impeded as provided by ORS 498.351: Fish Passage required for artificial obstruction across body of water.
- Where riparian grazing occurs, use improved grazing management techniques such as riparian pasture delineation and management to control the timing of grazing to keep livestock off stream banks and out of waterways when they are most vulnerable to damage.
- Maintain any pasture in the riparian area in a healthy and vigorous condition, with adequate growth going into the wet season to filter surface water.
- Maintain a strip of pasture on upland of the riparian area with adequate growth going into the wet season to filter surface water.
- Install off stream water systems and riparian exclusion fencing if a healthy riparian streambank condition cannot be maintained through techniques listed above.

(7) Pesticide Management

Benefits of appropriate pesticide use
It is anticipated that this measure will encourage the appropriate management of pesticides and support the application of pesticides when economically beneficial to the producer while reducing the risk of pesticide contamination of surface water and groundwater.

Carefully following label instructions and implementing integrated pest management (IPM) strategies can generally reduce pesticide use, increase yields, increase net returns, minimize surface and groundwater exposure to pesticides, and decrease economic risk.

General description of appropriate pesticide use
Proper pesticide use begins with reading the label on the container and following the instructions. As required by ORS 634, users of pesticides must follow label recommendations for both restricted and non-restricted use pesticides.

Agricultural users of pesticides are encouraged to:

a. Evaluate pest problems, previous pest control measures, and cropping history of the site
b. Evaluate the soil and physical characteristics of the site including mixing, loading, and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found to occur, steps should be taken to prevent further contamination
c. Use IPM strategies that:
    1. Apply pesticides when there is an economic benefit to the producer
    2. Apply pesticides according to label requirements efficiently and at times when runoff losses are unlikely
    3. Periodically calibrate pesticide spray equipment and use anti-backflow devices on pesticide tank-filling equipment

(8) Irrigation and Water Use

Nutrients and pesticides can be transported in irrigation tail water and can contribute to impairments listed on the 303(d) list for the North Coast Basin waters. Furrow irrigation is rare in the North Coast Basin and most irrigation occurs via sprinklers on pasturelands. There are no required and prohibited conditions for this measure.

Benefits of appropriate irrigation and water use
It is anticipated that this measure will reduce nonpoint pollution of waterways from sediment, particulate-bound nutrients, chemicals and metals, soluble nutrients, and bacteria while maintaining the economic feasibility of irrigation where irrigation water is applied.

Appropriate irrigation and water use benefit the environment by reducing irrigation water run-off, leaching, and total pollutant discharge from an irrigation system. Landowners benefit from appropriate irrigation and water use by maximizing water use efficiency and minimizing waste.

General description of appropriate irrigation and water use
Agricultural irrigators are encouraged to:

- Operate irrigation systems so that the timing and amount of irrigation water applied match crop water needs according to an Irrigation Management Plan.
- Operate chemigation systems to meet crop water needs and have any necessary tailwater management system according to a Nutrient Management Plan.
- Screen all irrigation intake openings in natural waterways to prevent the uptake or death of fish.
- Incorporate irrigation monitoring to determine uniform application rates.

Chapter 3: Implementation Strategies

Chapter 3 describes efforts to make and track progress toward the goals of the Area Plan. It presents the goals, measurable objectives, strategic initiatives, proposed activities, and monitoring efforts.

Goal

Prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.

The following conditions on agricultural lands contribute to good water quality in this Management Area:

1. Sufficient site-capable vegetation is established along streams to stabilize streambanks, filter overland flow, and moderate solar heating,
2. Crop lands are covered throughout the year with either production crops, crop residues, or cover crops,
3. Pastures have minimal bare ground,
4. Irrigation runoff does not deliver sediment, nutrients, or chemicals to streams,
5. Leachate and residues from livestock manure are not entering streams or groundwater.
6. Livestock access to riparian areas is restricted.

3.1 Measurable Objectives and Strategic Initiatives

Measurable objectives allow the Ag Water Quality Program to evaluate progress toward meeting water quality standards and TMDL load allocations. Any measurable objectives are stated here. Progress is reported in Chapter 4.1.

3.1.1 Management Area

ODA is working with SWCDs and LACs throughout Oregon toward establishing long-term measurable objectives to achieve desired conditions. Currently, ODA and the SWCDs are using Focus Area and SIA measurable objectives to show progress in this Management Area. These are described below. There are currently no Management Area-wide measurable objectives in the North Coast Basin Management Area.

3.1.2 Focus Areas and Other Coordinated Efforts in Small Watersheds

3.1.2.1 Lewis and Clark Valley Focus Area: Clatsop SWCD (Closed)

The Lewis and Clark Valley Focus Area is part of ODA's Focus Area strategic initiative. The Lower Lewis and Clark Watershed is approximately 39,360 acres at the 6th Field HUC (17080060207) level. Land use in the watershed is approximately 4 percent agriculture, 1 percent developed, 77 percent industrial forest, and 14 percent non-industrial forest. The main agricultural uses include dairy cow production, beef cattle, small livestock, horses, and small acreage crop production. There are 131 stream miles throughout the watershed.

The North Coast Subbasin TMDL was developed in 2003 and addresses temperature and bacteria for the Lewis and Clark rivers. Water quality monitoring data from the Youngs Bay Watershed Assessment of 2000 illustrates that temperature and pH are moderately impaired.

Other areas of concern include levels of nitrogen and phosphorus year-round, temperature during summer months, and turbidity from sedimentation. Clatsop SWCD will improve water quality for these parameters by working with landowners to remove streamside agriculture impacts to allow desired riparian vegetation to establish, improve upland forage, and reduce nutrient inputs into streams and ground water.

Assessment Method: Streamside vegetation was evaluated with ODA's Streamside Vegetation Assessment (SVA) to characterize the type of ground cover within 35 feet of the stream. The metric is the number and percent of acres of different types of land cover viewed on aerial photographs. Categories are agricultural infrastructure; water; and bare ground, grass, shrubs, and trees (designated as agricultural or not).

Class I: Conservation techniques are being used addressing livestock impacts on water quality, no mud/manure drainage problems are present due to conservation techniques. (i.e. Heavy Use Area, Manure Compost Facility, etc.)

Class II: Some Conservation Techniques are being used to address livestock impacts on water quality, but mud/manure and drainage problems are still present.

Class III: No conservation techniques are being used to address livestock impacts on water quality, mud/manure and drainage issues are major concerns and/or grassed sacrificed areas are being used near or around perennial streams.

Measurable Objectives and Associated Milestones:

2015-2017 Lewis and Clark Valley Focus Area Milestone and Timeline

2015 Condition: As of June 30, 2015, there were 75.73 total acres in the Grass Ag and Bare Ag SVA mapping categories; 15.9% of the assessed area.

Milestone: By June 30, 2017: Decrease Grass Ag and Bare Ag acreage along agricultural streams in the Lewis and Clark Valley subwatershed by 10.73 acres (0.4%) and reduce to 65 Grass Ag and Bare Ag acres; 14% of the assessed acreage.

2017-2019 Lewis and Clark Valley Focus Area Current Milestone and Timeline

2017 Condition: As of June 30, 2017, there are 36.4 total acres in the Shrub SVA mapping category; 9% of the assessed area.

Milestone: By June 30, 2019: Increase Shrub acreage along agricultural streams in the Lewis and Clark Valley subwatershed by 2 acres (0.4%) to achieve 38.4 Shrub acres; 42.4% of the assessed area.

Note: Clatsop SWCD adapted its strategy and decided to increase the Shrub category instead of decreasing Grass Ag and Bare Ag acreage.

3.1.2.2 Milton Creek Focus Area: Columbia SWCD (Closed)

The Milton Creek Focus Area is part of ODA's Focus Area strategic initiative. Milton Creek watershed is 16,282 acres at the 6th Field HUC (17090012043) level and has approximately 45 total stream miles starting at the headwaters in the interior of Columbia County and draining into the Columbia River within the city of St. Helens. Land use throughout the HUC is roughly 35 percent forest, 30 percent rural residential, 25 percent agriculture, and 5 percent urban. The main agriculture uses are livestock and small acreage agriculture. There are about 2,400 landowners in the HUC, with about 600 landowners in some form of agriculture.
Milton Creek is covered by the Willamette TMDL completed in 2006. The main concern for this area is land condition and livestock impact to water quality. Roadside visual assessments were conducted along Milton Creek to determine land conditions.

Assessment Method: The SWCD completed a pre-assessment, classifying land conditions within the Focus Area using the livestock impact classification. The assessment was completed through visual assessments, aerial photography, and voluntary surveys sent to landowners. Classifications were given dependent on livestock amounts, mud and drainage property condition, and data available at the time and will continue to develop and change as more conservation techniques are completed on the ground after the pre-assessment. The classes are described as follows:

- **Class I:** Conservation techniques are being used addressing livestock impacts on water quality, no mud/manure drainage problems are present due to conservation techniques. (i.e., heavy use area, manure compost facility, etc.)
- **Class II:** Some conservation techniques are being used to address livestock impacts on water quality but mud/manure and drainage problems are still present.
- **Class III:** No conservation techniques are being used to address livestock impacts on water quality, mud/manure and drainage issues are major concerns and/or grassed sacrificed areas are being used near or around perennial streams.
- **Class IV:** Non-agricultural land or forest land with no known livestock.

Measurable Objectives and Associated Milestones:

2015-2017 Milton Creek Focus Area Milestone and Timeline

2015 Condition:	As of June 30, 2015, there are 4,381 total acres in Class II and III; 21% of the assessed area.
Milestone:	By June 30, 2019: Decrease Class II and III acreage by 1,095 acres; 25% of the assessed area to increase Class I acreage to 3,213. From 10% to 15% of the total assessed area.

2017-2019 Milton Creek Focus Area Current Milestone and Timeline

2017 Condition:	As of June 30, 2017, there are 2,214 total acres in Class I; 52% of the assessed area.
Milestone:	By June 30, 2019: Increase Class I acreage by 222 acres (10% of assessed area) to achieve 2,436 Class I acres; 61% of the assessed area.
Note:	Columbia SWCD adapted its strategy and decided to increase the Class I category instead of decreasing Class II and Class III acreage. They also re-assessed in 2017 the total acreage and had to change Class I, II and III acreage counts due to new information.

3.1.2.3 Sauvie Island Focus Area: West Multnomah (Closed)

The Sauvie Island Focus Area is part of ODA's Focus Area strategic initiative. The Sauvie Island Focus Area coincides with the Sauvie Island Drainage Improvement Company (SIDIC) boundary which is the 18-mile federal levee that encircles that jurisdiction. Sauvie Island, located 12 miles from downtown Portland and at the junction of the Willamette and Columbia rivers, contains most of the agricultural land within the West Multnomah SWCD. Most of the agricultural lands on the 25,000-acre island are located on the southern half which is contained within levees and drained by the SIDIC. Farms on Sauvie Island can produce every type of cash crop grown in Oregon.

The Sauvie Island Focus Area was chosen because of the threat of excess nutrients and other pollutants entering groundwater and open waters. Groundwater within the SIDIC is always near the surface. Most of the cropped lands see groundwater fluctuations from zero (at the surface) in the wintertime to a low of around 5-10 feet below the surface. In addition, soil drainage varies

from poorly drained to well and even excessively well drained. The poorly drained soils coincided with old lake bottoms and are subject to groundwater near the surface. While the higher elevations of the island are much farther from groundwater, the soils there are typically excessively well drained owing their origins as ancient sand dunes. As a result, most areas with the Sauvie Island Focus Area pose a potential risk to groundwater quality.

Additionally, all the drainage/irrigation canals are hydraulically connected to groundwater. Most of the canals show significant biological activity during the summer months likely due to excess nutrients. While the island is relatively flat, it is still important for farmers to properly buffer canals and waterways. These buffers can filter water before it enters the canals and separate pesticide applications from open waters

Assessment Method: The SWCD completed a pre-assessment — classifying land conditions within the Focus Area by visually assessing, using GIS, and on-the-ground observations — of the potential for farming activities to negatively impact water quality within the Focus Area. Parcels were evaluated remotely using GIS and aerial photography to determine the "potential to impact water quality." Two primary data sets were used.

1. Soils: This will be used for drainage class as well as a surrogate for depth to ground water based on the known soil forming factors on Sauvie Island.
2. Aerial photography: This will be used to determine proximity of practices that have a likelihood to impact water quality to open waters.

All parcels were evaluated based on, drainage class, depth to groundwater (closer to the water tables = higher likelihood) and proximity to waters of the state (closer = higher likelihood). Once pre-assessment was completed, evaluations will be based on site visits by SWCD, NRCS, or OSU staff and participation in programs aimed at reducing negative impacts from farming activities on water quality. The classes are described as follows:

Class I: Low potential for impact to water quality (appropriate buffers, low fertilizer/pesticide inputs) OR has comprehensive nutrient management plan and practices to minimize movement of nutrients and pollution to ground water or waterways.

Class II: Medium likelihood of negative impacts to water quality. Minimal buffers and practices to reduce impacts OR high impact operations far away from open water and well above ground water tables.

Class III: High likelihood to impact water quality. No buffers, high impact operation with shallow groundwater. No practices to reduce negative impacts to water quality.

Class IV: Not ag land.

Measurable Objectives and Associated Milestones:

2015-2017 Sauvie Island Focus Area Milestone and Timeline:

2015 Condition: As of June 30, 2015, there were 945.5 total acres in Class I; 7.4% of the assessed area.

Milestone: By June 30, 2017: Increase Class I acreage by 120 acres (10% of the assessed area) to achieve 1,065.5 Class I acres; 17.4% of the assessed area.

2017-2019 Sauvie Island Focus Area Current Milestone and Timeline

2017 Condition: As of June 30, 2017, there are 1,039.5 total acres in Class I; 8.8% of the assessed area.

Milestone: By June 30, 2019: Increase Class I acreage by 100 acres (10% of the assessed area) to achieve 1,140 Class I acres; 18.8% of the assessed area.

3.1.2.4 Tillamook River Focus Area: Tillamook SWCD (Closed)

The Tillamook River Focus Area is part of ODA's Focus Area strategic initiative. The Tillamook River is approximately 17 miles long and 38,000 acres. Land use in the watershed is approximately 73 percent forest, 19 percent agriculture, 3 percent urban, 3 percent rural residential and 2 percent agriculture/forest. The main agricultural uses include dairy, beef cows, horses, and chickens. There are approximately 160 agricultural tax lots in this area.

A TMDL for temperature and bacteria applies to the Tillamook River watershed. The Tillamook River mainstem from the mouth to the headwaters and Fawcett Creek from the mouth of the headwaters were both identified as water quality limited under section 303(d) of the CWA. In addition, the 2012 Oregon Water Quality Index shows a 10-year average status of 64 (poor), with bacteria and nitrogen being specific concerns. The Tillamook SWCD will improve water quality by working with landowners to reduce streamside agricultural impacts to allow streamside vegetation to establish and grow.

Assessment Method: Stream temperature was evaluated using riparian vegetation condition as a surrogate. For the pre-assessment, aerial photos and field verification were used to evaluate riparian vegetation condition using Classes I, II, and III and to determine if the vegetation is adequate to provide the functions as identified in the Area Plan and Rules. The post assessment will involve reclassifying properties where improvements have been made. The classes are described as follows:

Class I: Vegetation likely sufficient to moderate solar heating, stabilize streambanks, and filter out pollutants consistent with site capability.

Class II: Agricultural activities not impairing riparian growth, but vegetation likely insufficient to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability.

Class III: Agricultural activities likely not allowing vegetation to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability.

Class IV: Non-agricultural activities, e.g., state highway, likely not allowing vegetation to moderate solar heating, stabilize streambanks, or filter out pollutants consistent with site capability.

Measurable Objectives and Associated Milestones:

2013-2017 Tillamook River Focus Area Milestone and Timeline

2013 Condition: As of June 30, 2013, there are 14.0 stream miles in Class I; 30% of assessed area.

Milestone: By June 30, 2017: Increase Class I agricultural stream miles in the Tillamook River subwatershed by 7.3 (17.8%) stream miles to achieve 21.3 Class I stream miles; 47.8% of the assessed area.

2017-2019 Tillamook River Focus Area Current Milestone and Timeline

2017 Condition: As of June 30, 2017, there are 15.2 stream miles in Class I; 37% of the assessed area.

Milestone: By June 30, 2019: Increase Class I (vegetation likely sufficient to moderate solar heating, stabilize streambanks, and filter out pollutants consistent with site capability) agricultural stream miles in the Tillamook River subwatershed by 7.3 (17.8%) stream miles to achieve 22.5 Class I stream miles; 55% of the assessed area.

3.1.2.5 Bear Creek-Big Creek Focus Area: Clatsop SWCD (Closed)

The Bear Creek-Big Creek Focus Area is part of ODA's Focus Area strategic initiative. The Bear Creek-Big Creek Focus Area covers approximately 44 stream miles and 24,406.85 acres. The main agricultural uses include horse and small animal husbandry. This geographic area is experiencing a lot of growth. This area tends to have larger tax lots (2-5 acres). Many of the larger landowners have passed away or left the area and the large tax lots are being subdivided to as little as a half-acre. There are also many streams flowing directly into the Columbia River.

Assessment Method: Mud and manure were assessed visually. SWCD looked for livestock exclusion from streams, uncovered manure piles, and visible bare ground. Pre-assessment was completed by looking at Google Earth and utilizing local knowledge. The assessment area was within 500-600 feet of streams. Assessed areas were classified as I, II, III, or IV. Post assessment will reclassify assessed area to see if improvements were made.

Class I: Not a livestock operation or no livestock observed; or farm animals are excluded from near-stream area; or little to no collected manure; or manure piles are located away from waterways and covered. Streams have native vegetation.

Class II: Manure piles are placed away from waterways, but not covered; or manure piles are located near waterways and covered. Some native vegetation along streams, but more would be better. Bare ground visible on the property, but not near the stream.

Class III: Manure or uncovered manure piles are located near waterways and/or are being carried into waterways; animals are not excluded from near-stream area. Bare ground near streams.

Class IV: Not ag land (residential or forest).

Measurable Objectives and Associated Milestones:

2019-2021 Bear Creek Focus Area Milestone and Timeline

2019 Condition: As of July 1, 2019, there are 704.25 acres in Class II and III of area assessed.

Milestone: By June 30, 2021, reduce Class II and III by 5% (35 acres). Class II and III acreage will decrease to 669 acres.

3.1.2.6 Scappoose Creek Focus Area: Columbia SWCD (Closed)

The Scappoose Creek Focus Area is part of ODA's Focus Area strategic initiative. The Scappoose Creek Focus Area is approximately 14,286 miles with 27 stream miles. The primary types of agriculture are livestock, hay, and pasture management. The SWCD worked with partners (Scappoose Bay Watershed Council) to determine the Focus Area. The SBWC has

also done extensive outreach in the area and has identified landowners that are willing to use conservation techniques on their properties but lack the needed technical assistance. The SWCD has been working in this area on weed control and riparian health and has the contacts to continue to work on riparian function in these areas.

Assessment Method: ODA's Streamside Vegetation Assessment (SVA) method was chosen as the assessment method of this Focus Area but was never completed due to staffing shortages.

Measurable Objectives and Associated Milestones:

2019-2021 Scappoose Creek Focus Area Milestone and Timeline
2019 Condition: Pre-assessment was never conducted.

Milestone: By June 30, 2021, no change identified due to staffing shortages and lack of pre-assessment.

3.1.3 Strategic Implementation Areas (SIA)

SIA Compliance Evaluation Method:
ODA evaluated all agricultural tax lots within each SIA to identify opportunities to improve water quality and ensure compliance with Area Rules. The evaluation considered the condition of streamside vegetation, areas of bare ground, and potential livestock impacts (including manure management). The process involved both a remote evaluation and field verification from publicly accessible areas. For further information see: https://www.oregon.gov/oda/shared/Documents/Publications/NaturalResources/SIAProgressReport.pdf

Opportunity levels:

- **Likely in Compliance (LC):** ODA identified no likely agricultural water quality regulatory concerns.
- **Compliance Opportunity (CO):** ODA identified no likely agricultural water quality regulatory concerns, but there may be an opportunity for improvement through voluntary measures to reach the goals of the Area Plan.
- **Restoration Opportunity (RO):** ODA identified that agricultural activities may impair water quality or evaluation was inconclusive.
- **Potential Violation (PV):** ODA observed during the Field Evaluation a potential violation of the Area Rules.

3.1.3.1 Sauvie Island SIA (2023) – West Multnomah SWCD

Sauvie Island within West Multnomah County consists of approximately 16,096 agricultural acres of the watershed that consist mostly of landscape nurseries, conventional ag such as field and row crops, small ranches with horses and cattle, and direct-to-market vegetables. Water quality concerns in the watershed have been identified mainly for fish and aquatic life impacts, aesthetics, and nitrates in the groundwater.

Measurable Objective:
By November 30, 2027, all 16 tax lots identified as a Potential Violation or Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.

Monitoring: Monitoring plan forthcoming.

3.1.3.2 North and South Scappoose Creeks SIA (2023) – Columbia SWCD

North Scappoose and South Scappoose watersheds and Multnomah Channel within Columbia and West Multnomah counties consist of approximately 22,514 agricultural acres. Agricultural areas of the watershed consist mostly of landscape nurseries, conventional agriculture including field and row crops, lifestyle or hobby farms with horses, and direct-to-market vegetable crops on small farms. Water quality concerns in the watershed have been identified mainly for fish and aquatic life impacts, aesthetics, and nitrates in the groundwater.

Measurable Objective*:*
By November 29, 2027, all 10 tax lots identified as a Potential Violation or Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.

Monitoring: Monitoring plan forthcoming.

3.1.3.3 North Tillamook SIA (2020) – Tillamook SWCD

The North Tillamook SIA includes eight 12th field HUCs: Foley Creek, Lower Trask River, Upper Wilson River, Middle Wilson River, Lower Wilson River, Little South Fork Kilchis River, Lower Miami River, and Tillamook Bay. The primary agricultural operations of the SIA are dairies, livestock, pasture, hay, and small farms. In total, 11,258 agricultural acres and 145 miles of stream miles adjacent to agricultural properties were evaluated. Concerns identified in this SIA include unmanaged livestock access to streamside areas, manure management, soil erosion, and lack of streamside vegetation. Water quality concerns are stream temperature, bacteria/ *E. coli*, sediment, and nutrients.

Measurable Objective:
By July 20, 2024, all 25 tax lots identified as a Potential Violation or Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.

Monitoring: No monitoring associated with this SIA.

3.1.3.4 Mid-Nehalem River SIA (2017) – Clatsop SWCD

The Humbug Creek, Cow Creek-Nehalem River, Cronin Creek-Nehalem River watersheds within Clatsop County consist of approximately 2,488 agricultural acres. Agricultural areas of the watershed consist mostly of hay, livestock (beef cows), small family farms, and ranches with horses. Water quality concerns in the watershed have been identified mainly for temperature.

Measurable Objective:
By March 16, 2022, all 12 tax lots identified as a Potential Violation or Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.

Monitoring: No monitoring associated with this SIA.

3.1.3.5 Upper Nehalem River SIA (2015) – Columbia SWCD

The Upper Nehalem River SIA includes three 6th field HUCs: Lundgren Creek, Calvin Creek, and Fishhawk Creek. The agricultural portion is approximately 675 acres and consists mainly of pasture. Water quality concerns in the watershed are limited to temperature and nutrients but is limited to the data available.

Measurable Objective:
By August 29, 2019, all 9 tax lots identified as a Potential Violation or Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.

Monitoring: Some post-project implementation effectiveness monitoring occurred in this SIA by the Columbia SWCD and the Upper Nehalem Watershed Council.

3.1.4 Pesticide Stewardship Partnerships (PSP)

There are no PSPs in this Management Area.

3.1.5 Groundwater Management Area (GWMA)

There is no GWMA in this Management Area.

3.2 Proposed Activities

ODA, the LAC, the LMA, and other partners have identified the following priority activities to track progress toward meeting the goals and objectives of the Area Plan (Table 3.2).

Table 3.2 Planned Activities for 2024-2029 throughout the Management Area

Activity	6-year Target	Description
Table key: Clatsop, Columbia, Tillamook, and West Multnomah.		
Landowner Engagement		
# events that actively engage landowners (workshops, demonstrations, tours)	20 7 6-10 30	4 AgWQ related workshops. 12 outreach booth events. 4 outreach events for Ag landowners. Host one AgWQ workshop a year. Topics could include practices that: manage animal waste (prescribed grazing, waste storage, and management), fight erosion (cover crops, crop rotation), water friendly management (integrated pest management, nutrient management), improve filtration (filter strip, riparian forest buffer). One farm tour co-hosted with NRCS.
# landowners participating in active events	840 70 60-120 40	Conservative estimate based on past participation: 80 AgWQ related workshops. 360 for outreach booth engagement. 400 for outreach events. 10 participants at each workshop, 10 participants in farm tour.
Technical Assistance (TA)		
# landowners provided with TA (via phone/walk-in/email/booth/site visit)	1,200 288 200 231	An average one landowner a week with AgWQ concerns.
# site visits	30 72	An average of one site visit a month.

	150 231	
# conservation plans written*	0 0 15-20 8	No certified conservation planner at this time. No conservation planners currently on staff.
On-the-ground Project Funding		
# funding applications submitted	15 6 6-10 6	Approximately one per year (OWEB - SIA, OWEB – other projects including small grants, OSWB weed grants, etc.)
* Definition: any written management plan to address agricultural water quality concerns, such as: nutrients, soil health, grazing, irrigation, and streamside vegetation. Can include farm and ranch plans (including small acreages) and NRCS-certified plans. Excludes projects with weak connection to agricultural water quality.		

3.3 Agricultural Water Quality and Land Condition Monitoring

Monitoring water quality and landscape conditions, for the purposes of the Area Plan, is recommended as an activity to be carried out and collaborated on by the ODA, the LMA and Management Area partners. Currently, water quality monitoring is occurring throughout the North Coast Basin by DEQ, the North Coast Watershed Association, Columbia SWCD, Tillamook Estuaries Partnership, and the Lower Columbia Estuary Partnership. Each group has additional resources that compliment DEQ's ongoing Status and Trends monitoring.

North Coast Watershed Association (Temperature):
https://www.clatsopwatersheds.org/temperature-monitoring-sites/

Columbia SWCD:
https://www.columbiaswcd.com/water-quality-monitoring-program

Tillamook Estuaries Partnership (Bacteria):
https://www.tbnep.org/maps/

Lower Columbia Estuary Partnership:
https://www.estuarypartnership.org/our-work/monitoring

3.3.1 Water Quality

DEQ monitors water quality in the Management Area as part of its ambient monitoring network.

3.3.2 Land Conditions

There is no current land condition monitoring.

Results of monitoring activities are presented in Chapter 4.3.

Chapter 4: Progress and Adaptive Management

Chapter 4 describes progress toward achieving Area Plan goals and measurable objectives by summarizing accomplishments and monitoring results. Tracking activities is straightforward; monitoring water quality or land conditions takes more effort; relating changes in land conditions to changes in water quality is important but more challenging.

4.1 Measurable Objectives and Strategic Initiatives

The following tables provide the assessment results and progress toward measurable objectives and milestones in the past six years (2018-2023). See Chapter 3.1 for background and assessment methods.

4.1.1 Management Area

There are no Management Area-wide Measurable Objectives.

4.1.2 Focus Areas and Other Focused Efforts in Small Watersheds

Table 4.1.2.1 Lewis and Clark Valley Focus Area

Measurable Objective

N/A: This Focus Area closed in 2019.

Milestones

- By June 30, 2017: Decrease Grass Ag and Bare Ag acreage along agricultural streams in the Lewis and Clark Valley sub-watershed by 10.73 acres (0.4%) and reduce to 65 Grass Ag and Bare Ag acres; 14% of the assessed acreage.
- By June 30, 2019: Increase Shrub acreage along agricultural streams in the Lewis and Clark Valley sub-watershed by 2 acres (0.4%) to achieve 38.4 Shrub acres; 42.4% of the assessed area.

Current Conditions

Progress Toward Measurable Objectives and Milestones (acres)

Class	2017: Pre-Assessment	2019: Post-Assessment
I	2,214	No change
II	1,890	No change
III	1,82	No change

Assessment Results

The assessment class chosen to show progress is shrub. The goal was to increase shrubs by 2 acres or 0.4%. At the end of the biennium in 2019, there was no change in conditions.

Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	1
# landowners/operators participating in active events	12
Technical Assistance (TA)	
# landowners/operators provided with TA	15
# site visits	6
# conservation plans written	0
Ag Water Quality Practices Implemented in the Focus Area	
Heavy Use Area Protection	1
Roof Runoff Structure	1

Adaptive Management Discussion
Clatsop SWCD reported low attendance and low interest in the Focus Area by landowners. The district continues to work on landowner engagement. This district did not use the Measurable Objectives and Milestones measurement tables. There were staffing and meeting space challenges in this Focus Area.

Table 4.1.2.2 Milton Creek Focus Area

Measurable Objective

N/A: This Focus Area closed in 2019.

Milestones

- By June 30, 2019: Decrease Class II and III acreage by 1,095 acres; 25% of the assessed area to increase Class I acreage to 3,213. From 10% to 15% of the total assessed area.
- By June 30, 2019: Increase Class I acreage by 222 acres (10% of assessed area) to achieve 2,436 Class I acres; 61% of the assessed area.

Current Conditions

Progress Toward Measurable Objectives and Milestones (acres)

Class	2017: Pre-Assessment	2019: Post-Assessment
I	2,344	2,455
II	1,760	1,710
III	182	121

Reasons for change include ground truthing and positive conservation techniques.

Activities and Accomplishments

Community and Landowner Engagement	
# active events that target landowners/ operators	1
# landowners/operators participating in active events	27
Technical Assistance (TA)	
# landowners/operators provided with TA	56
# site visits	34
# conservation plans written	0
Ag Water Quality Practices Implemented in the Focus Area	
	0

Adaptive Management Discussion

Columbia SWCD reported the Focus Area made positive headway and look forward to continue working in the area.

Table 4.1.2.3 Sauvie Island Focus Area

Measurable Objectives

Achieve upgrading of 1,300 acres to Class I – Low impact potential to surface or groundwater quality. This Focus Area closed in 2023.

Milestones

- 1 Achieved – 1,274 acres in Class I, an 11% increase from 2015.

Progress Toward Milestones (acres)

Class	2021: Conditions at Beginning of Biennium	2023: Actual Conditions at Milestone Year
I	1,169.75	1,274
II	10,509.35	10,405
III	31.4	31.4

Current Conditions

Progress Toward Measurable Objectives and Milestones

Total of 1,274 acres is near 2023 goal of 1,300 acres in Class I acreage.

Assessment Results

The WMSWCD Focus Area increased Class I Acres 11%, or 104 acres through outreach, conservation planning and implementation.

Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	1
# landowners/operators participating in active events	30
Technical Assistance (TA)	
# landowners/operators provided with TA	129
# site visits	77
# conservation plans written	6
Ag Water Quality Practices Implemented in the Focus Area	
Cover Crops	13 acres
Tree and Shrub Establishment	16.15 acres
Adaptive Management Discussion	
Outreach efforts were hampered through the pandemic. The district decided to transform this Focus Area effort into an SIA to begin 2023.	

Table 4.1.2.4 Tillamook River Focus Area

Measurable Objective

N/A: This Focus Area closed in 2019.

Milestones

- By June 30, 2017: Increase Class I agricultural stream miles in the Tillamook River sub-watershed by 7.3 (17.8%) stream miles to achieve 21.3 Class I stream miles; 47.8% of the assessed area.
- By June 30, 2019: Increase Class I (Vegetation likely sufficient to moderate solar heating, stabilize streambanks, and filter out pollutants consistent with site capability) agricultural stream miles in the Tillamook River sub-watershed by 7.3 (17.8%) stream miles to achieve 22.5 Class I stream miles; 55% of the assessed area.

Assessment Results (2013-2019)

Class	2019: Pre-Assessment (or conditions at beginning of Biennium)	2021: Post-Assessment (or conditions at end of Biennium)
I	15.78	16.43
II	3.82	3.17
III	21.4	21.4

Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	0
# landowners/operators participating in active events	0
Technical Assistance (TA)	
# landowners/operators provided with TA	10
# site visits	13
# conservation plans written	2
Ag Water Quality Practices Implemented in the Focus Area	
Aquatic Organism Passage	90 feet
Shoreline and Streamside Protection	122 feet
Tree Shrub Establishment	1.2 acres
Forest Stand Improvement	2.8 acres
Woody Residue Treatment	2.8 acres
Access Road	306 feet
Livestock Pipeline	1,495.5 feet
Watering Facility	1
Fence	1,377 feet
Adaptive Management Discussion	
The Tillamook SWCD reported many successes and continue to work on the ground with landowners.	

Table 4.1.2.5 Bear Creek-Big Creek Focus Area

Measurable Objectives	
N/A: This Focus Area closed in 2021.	
Milestones	
• Class II and III will decrease to 669 acres.	
Current Conditions	

Class	**2019: Pre-Assessment (or Conditions at beginning of Biennium) ***	**2021: Post-Assessment (or conditions at end of Biennium)**
I	1029.02	1030.52
II/III	704.25	702.75

Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	2
# landowners/operators participating in active events	12
Technical Assistance (TA)	
# landowners/operators provided with TA	21
# site visits	5
# conservation plans written	0
Ag Water Quality Practices Implemented in the Focus Area	
Riparian forest buffer	1.5 acres
Integrated pest management	1.5 acres
Adaptive Management Discussion	
Clatsop SWCD reported difficulties with outreach events due to the Covid-19 pandemic, but overall had success in the concept of a Focus Area.	

Table 4.1.2.6 Scappoose Creek Focus Area

Measurable Objective	
N/A: This Focus Area closed in 2021.	
Milestones	
• N/A	
Current Conditions	
Assessment Results No pre-assessment was completed due to staffing shortages.	
Activities and Accomplishments	
Community and Landowner Engagement	
# active events that target landowners/ operators	N/A
# landowners/operators participating in active events	N/A
Technical Assistance (TA)	
# landowners/operators provided with TA	36
# site visits	27
# conservation plans written	N/A
Ag Water Quality Practices Implemented in the Focus Area	
	N/A
Comments: Columbia SWCD reports staff shortages and the Covid-19 pandemic as struggles for this Focus Area.	
Adaptive Management Discussion	
Became an SIA in 2023. This district did not use the Measurable Objectives and Milestones measurement tables.	

4.1.3 Strategic Implementation Areas

Table 4.1.3.1 2023 Sauvie Island SIA

Evaluation Results		
As of November 30, 2023, 16 tax lots were identified as either a Potential Violation or a Compliance Opportunity. PV = 2, CO = 14, RO = 83, LC = 571		
Measurable Objective		
By November 30, 2027, all 16 tax lots identified as a Potential Violation or a Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.		
Adaptive Management Discussion		
The SIA is open and SIA compliance work continues. An adaptive management discussion will be available at the next biennial review.		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	16,097	
# stream miles evaluated	84	
# landowners at Open House	N/A	Open House has not yet been held.
# landowners receiving outreach materials	N/A	
SWCD and Conservation Partners		
# landowners provided with technical assistance	N/A	
# site visits	N/A	
# conservation plans written	N/A	
SIA and Project Funding		
# funding applications submitted	N/A	$125,000 OWEB Grant for TA and monitoring

Table 4.1.3.2 2023 North and South Scappoose Creeks SIA

Evaluation Results		
As of November 29, 2023, 10 tax lots were identified as either a Potential Violation or a Compliance Opportunity. PV = 2, CO = 8, RO = 94, LC = 1,183		
Measurable Objective		
By November 29, 2027, all 10 tax lots identified as a Potential Violation or a Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.		
Adaptive Management Discussion		
The SIA is open and compliance work continues. An adaptive management discussion will be available at the next biennial review.		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	12,819	
# stream miles evaluated	119	
# landowners at Open House	Not yet occurred	Open House has not yet been held.
# landowners receiving outreach materials	Not yet occurred	
SWCD and Conservation Partners		
# landowners provided with technical assistance	Not yet occurred	
# site visits	Not yet occurred	
# conservation plans written	Not yet occurred	
SIA and Project Funding		
# funding applications submitted	1	$125,000 OWEB Grant for TA and monitoring

Table 4.1.3.3 2020 North Tillamook SIA

Evaluation Results		
As of July 20, 2020, tax lots were identified as either a Potential Violation or a Compliance Opportunity. PV = 2, CO = 23, RO = 148, LC = 864		
Measurable Objective		
By July 20, 2024, all 25 tax lots identified as a Potential Violation or a Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.		
Adaptive Management Discussion		
The SIA is open and compliance work continues. This SIA has had willing and communicative landowners and successful projects implemented.		
Monitoring Activities		
None		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	11,258	
# stream miles evaluated	145	
# landowners at Open House	N/A	Letters sent as result of COVID-19.
# landowners receiving outreach materials	333	
SWCD and Conservation Partners		
# landowners provided with technical assistance	26	
# site visits	23	
# conservation plans written	4	
SIA and Project Funding		
# funding applications submitted	3	SWCD did not take the SIA Technical Assistance grant funding. Instead utilized Scope of Work Capacity Grant Funding.
# funding applications awarded		

Table 4.1.3.4 2017 Mid-Nehalem River SIA

Evaluation Results		
As of March 16, 2018, 12 tax lots were identified as either a Potential Violation or a Compliance Opportunity. PV = 1, CO = 11, RO = 10, LC = 204		
Measurable Objective		
As of March 16, 2022, all 12 tax lots identified as a Potential Violation or a Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.		
Post Evaluation		
As of December 3, 2018, all 12 tax lots identified as a Potential Violation or a Compliance Opportunity were downgraded to Restoration Opportunity or Likely in Compliance. PV = 0, CO = 0, RO = 22, LC = 204. The measurable objective was achieved.		
Adaptive Management Discussion		
The compliance phase of the SIA is closed and compliance work is completed. ODA and partners met their measurable objective. SIA provided an opportunity to connect with landowners and align goals toward compliance. This created opportunities to work with neighboring landowners to support SIA efforts. Challenges that faced in this SIA were impacts on person-to-person connecting because of Covid in a rural setting where virtual contact/cell service is not possible or hampered; responsiveness of landowners; landowner change over; locating operators of leased lands with out of state owners; landowners dealing with difficult times; SWCD staff change/reduction; and lack open public place to meet during Covid restrictions.		
Monitoring Activities		
None		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	3,545	

# stream miles evaluated	18	
# landowners at Open House	25	
# landowners receiving outreach materials	179	
SWCD and Conservation Partners		
# landowners provided with technical assistance	16	12 identified by SIA and 4 neighboring landowners not identified.
# site visits	7	
# conservation plans written	0	
SIA and Project Funding		
# funding applications submitted	2	SWCD did not take the SIA Technical Assistance grant funding. Used ODA capacity grant funding to do work in the SIA boundary.
# funding applications awarded		

Table 4.1.3.5 2015 Upper Nehalem River SIA

Evaluation Results		
As of October 8, 2015, 9 tax lots were identified as either a Potential Violation or a Compliance Opportunity. PV = 2, CO = 7, RO = 21, LC = 104		
Measurable Objective		
As of October 8, 2019, all 9 tax lots identified as a Potential Violation or a Compliance Opportunity will be downgraded to Restoration Opportunity or Likely in Compliance.		
Post Evaluation		
As of August 29, 2019, all 9 tax lots identified as a Potential Violation or a Compliance Opportunity were downgraded to Restoration Opportunity or Likely in Compliance. PV = 0, CO = 0, RO = 23, LC = 111. The measurable objective was achieved.		
Adaptive Management Discussion		
The compliance phase of the SIA is closed and compliance work is completed. ODA and partners met their measurable objective. This SIA resulted in one riparian planting/fencing project and one in-stream habitat restoration project funded by OWEB. The projects were successful. Numbers provided in the accomplishments table were extrapolated from planting plans and collaboration with the Upper Nehalem Watershed Council as there has been turnover in the Columbia SWCD staff since the time of the SIA.		
Monitoring Activities		
The CSWCD is actively monitoring one project and has two more monitoring reports remaining. The Upper Nehalem Watershed Council has completed monitoring tasks on its project.		
Activity	**Accomplishment**	**Description**
ODA		
# acres evaluated	3,674	
# stream miles evaluated	11	
# landowners at Open House	20	
# landowners receiving outreach materials	103	
SWCD and Conservation Partners		
# landowners provided with technical assistance	6	CSWCD has records to show that at least 6 landowners received TA.
# site visits	6	No records show that CSWCD staff went to more than six of the 11 properties.
# conservation plans written	4	Four conservation projects were drafted.
SIA and Project Funding		
# funding applications submitted	2	

# funding applications awarded	2	$125,000 OWEB Grant for TA and monitoring. Two projects were submitted and funded.

4.1.4 Pesticide Stewardship Partnerships

There are no PSPs in this Management Area.

4.1.5 Groundwater Management Area

There is no GWMA in this Management Area.

4.2 Activities and Accomplishments

ODA, the LAC, the LMA, and other partners identified the following priority activities to track progress toward meeting the goals and objectives of the Area Plan.

Future Area Plans will compare results and targets in Table 4.2a.

Table 4.2a Activities conducted in 2018-2023 throughout the Management Area

Activity	6-year results	Description
Table key: Clatsop, Columbia, Tillamook, and West Multnomah		
Landowner Engagement		
# events that actively engage landowners (workshops, demonstrations, tours)	11 20 4 13	6 outreach events & 3 outreach booth. Columbia County Fair, Salmon Festival, Earth Day, Scappoose Farmers Markets, Clatskanie Pollinator Festival. Soil School + on workshop. Targeted outreach campaign to focus on riparian benefits for ag lands (including permitted CAFOs), Tillamook County Fair.
# landowners participating in active events	1,102 530 601 1,168	524 outreach events and 32 for outreach booth. Landowners contacted at all events. Conducted riparian benefit workshops for landowners/operators. Conducted tours highlighting conservation practices on ag/rural lands.
Technical Assistance (TA)		
# landowners provided with TA (via phone/walk-in/email/booth/site visit)*	210 190 347 171	Wetland habitat improvement conservation, soil health, pasture management, riparian maintenance of livestock exclusion areas, natural resource conservation on ag operations, heavy use areas, riparian invasive weed concerns, erosion prevention, culvert replacement for ag land access. Provided verbal, in-person, and written material. Riparian restoration and associated weed eradication; irrigation efficiency; pasture management; manure management;

		cover crops; soil health. On-site training for volunteers who are helping with project implementation (e.g., riparian planting).
# site visits	36 137 533 173	Performed initial site visits and consultations to explain Area Rule requirements, suggest conservation practices, arrange for technical and financial cost share assistance and develop or update conservation plans (including design, layout, inspection, etc.) if applicable. Provide project management and oversight to agriculture landowners/operators with implementation of conservation practices.
# conservation plans written**	0 0 14 16	No certified conservation planner. No conservation planners currently on staff. All CAFO.
On-the-ground Project Funding		
# funding applications submitted	9 2 11 6	1 Riparian Forest Buffer, NRCS Technical Assistance, Riparian Buffer. OWEB Small Grant for a manure compost facility and revegetation. OWEB Small Grant for riparian restoration and filter strip. Funding request for animal exclusionary fencing and riparian planting.
# funding applications awarded***	2 2 9 3	1 Riparian Forest Buffer, NRCS Technical Assistance. OWEB Small Grant for a manure compost facility and revegetation. OWEB Small Grant for riparian restoration and filter strip. Applied for 2 OWEB small grants. Applied for Tillamook County Creamery Stewardship Grant to match the OWEB grant out on subject property.

* Number reported likely double counts some landowners due to tracking methods.
** Definition: any written management plan to address agricultural water quality concerns, such as: nutrients, soil health, grazing, irrigation, and streamside vegetation. Can include farm and ranch plans (including small acreages) and NRCS-certified plans. Excludes projects with weak connection to agricultural water quality.
***Applications submitted and awarded may not match due to reporting timelines

Table 4.2b and 4.2c summarize information from the OWRI on restoration project funding and accomplishments on agricultural lands in the Management Area. The majority of OWRI entries represent voluntary actions of private landowners who have worked in partnership with federal, state, and local groups to improve aquatic habitat and water quality conditions. OWRI results are provided annually in January after a year of proofing and GIS management.

Table 4.2b Implementation funding (cash and in-kind) for projects on agricultural lands reported 1997-2020 (OWRI data include most, but not all projects, implemented in the Management Area.)

Landowners	OWEB	DEQ	NRCS*	Federal Agencies	ODF	Lower Columbia River Estuary Trust	All other sources**
$4,444,115	$10,563,278	$621,828	$884,632	$10,865,132	$8,401,568	$1,253,082	$8,638,539
							TOTAL $45,672,174

* This table may not include all NRCS funding due to privacy concerns.
**Includes city, county, tribal, other state and federal programs, and non-profit organizations. There were too many entities to list.

Table 4.2c Miles and acres treated on agricultural lands reported 1997-2020 (OWRI data include most, but not all projects, implemented in the Management Area.)

Activity Type*	Miles	Acres	Count**	Activity Description
Upland		311		Acres of improved uplands.
Road	255		2,191	Miles by rocking or surface drainage improvements.
Streamside Vegetation	466	2,073		Acres of riparian areas treated/improved (plantings, weed control, fencing, etc.).
Wetland		1,853		Acres of improved wetlands (includes restored, improved, or created wetlands).
Instream Habitat	91			Miles treated for instream habitat, not flow.
Instream Flow	0		0 cfs	Water flow acquired and total stream miles protected for adequate flow.
Fish Passage	208		202	Miles opened up by removing barriers at road crossings/barriers removed.
TOTAL	765	3,926		

* This table may not include all NRCS projects due to privacy concerns.
** # hardened crossings, culverts, etc.

4.3 Agricultural Water Quality and Land Condition Monitoring

4.3.1 Water Quality

DEQ analyzed data for dissolved oxygen, *E. coli*, pH, total phosphorus, temperature, and total suspended solids in the Management Area. (DEQ. 2022 Oregon Water Quality Status and Trends Report; https://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx).

Data are from DEQ, US EPA, and USGS databases for 2001 through 2020. DEQ determined status for stations in five-year periods and trends for stations with at least eight years of data collected at the same time of year.

The following locations have sufficient data to calculate recent status and trends and are most likely to help characterize agricultural water quality in the Management Area (Table 4.3.1), although all these locations are lower in watersheds with forested headwaters. All are DEQ ambient monitoring sites.

Table 4.3.1 Attainment of water quality standards for 2016-2019, and 2000-2019 trends						
Site Description	**Parameter**					
	E. coli	**pH**	**Dissolved Oxygen**	**Temperature**	**Total Phosphorus (mg/L)**	**Total Suspended Solids (mg/L)**
	Attainment Status and Trend				median; maximum[1]	median; maximum[2]
Clatskanie River at Hwy 30 (Clatskanie) 11434-ORDEQ	-	Yes	Yes ↑	-	0.04; 0.06	2; 38↑
Nehalem River at Hwy 202 (Birkenfeld) 34019-ORDEQ	Yes -	Yes	Yes	-	0.04; 0.07	3; 201
Necanicum River at Forest Lake RV Camp 10521-ORDEQ	-	Yes	Yes	-	0.008; 0.02	0.5; 8
Miami River at Moss Ck Rd 13411-ORDEQ	No ↑	Yes	Yes↑	Yes	0.01; 0.06	1; 27
Wilson River at Hwy 6 13424-ORDEQ	Yes	Yes ↓	Yes↑	-	0.01; 0.07	0.5; 29↑
Tillamook River at Bewley Creek Rd 13440-ORDEQ	No↑	Yes	Yes↑	No	0.02; 0.04	2; 18↑

[1] DEQ has no benchmark for total phosphorus in this Management Area; ODA benchmark for potential water quality concerns = 0.08 mg/L
[2] DEQ has no benchmark for total suspended solids in this Management Area
↑ Statistically significant improving trend
↓ Statistically significant degrading trend
↓ Statistically significant, though barely discernable, degrading trend

These results suggest few issues at these locations except for significant *E. coli* and temperature concerns. The Status and Trends Report does report temperature data from multiple sites in the forests throughout the Management Area that show nonattainment of temperature standards upstream of agricultural lands.

There are significant *E. coli* concerns in Tillamook, Nestucca, and Nehalem watersheds, with more than 90 percent showing non-attainment. Tillamook area streams although not showing attainment many are showing an improving trend. Conversely, Nehalem area streams are not attaining and showing a declining trend. Nestucca area streams are showing non-attainment, and not showing any trend.

Sedimentation (total suspended solids), especially in the Tillamook area, is showing an improving trend.

There are many additional monitoring locations in this Management Area for which data are available but inadequate for DEQ status and trends assessment. It would be helpful to have a comprehensive evaluation of all data, including those not provided to DEQ, and develop and implement a monitoring plan for determining agricultural water quality and identifying issues throughout the Management Area.

4.3.2 Land Conditions

There is no land condition monitoring.

4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMA, and other partners met on April 11, 2024, to review implementation of the Area Plan and provided recommendations for the future (Tables 4.4a and 4.4b).

Table 4.4a Summary of biennial review discussion

Progress
• Landowners in this Management Area are routinely in compliance and are proud of work done in tandem with SWCD outreach and technical assistance. • Tillamook Creamery Association is a great cooperative to ensure environmental and dairy brand protection. • Riparian plantings are a well-received and successful strategy in the Management Area. • There are many groups, nonprofits, and partnerships providing more real-time monitoring results for practitioners to reference in addition the DEQ Status and Trends Report. DEQ highlighted the monitoring done by Tillamook Estuaries Partnership.
Impediments
• High cost and low economic feasibility to replace tide gates, especially from drainage districts. • Frustration in current solutions resulting in non-target species population growth. • Environmental factors impeding vegetation plantings, e.g., heat dome/drought events. • Size and scale of repair for bank stabilization (large bank calving, geological events) is economically prohibitive for private landowners. • Tide gate improvement process is not streamlined between agencies. Many landowners give up on updating due to difficulty.
Recommended Modifications and Adaptive Management
• Useful to develop landowner self-reporting tool to report conservation/uplift (paper and digital). • More eDNA sampling would help clarify bacteria sources.

Table 4.4b Number of ODA compliance activities in 2021-2023

Location	Cases		Site Visits	Agency Actions				
				Letter of Compliance		Pre-Enforcement Notification	Notice of Noncompliance	Civil Penalty
	New	Closed		Already in compliance	Brought into compliance			
Outside SIA	7	6	9	3	0	4	0	0
Within SIA	3	2	5	2	0	2	0	0

References

Sauvie Island Community Association. (2016, June 24). “The Sauvie Island Drainage Improvement Company”. Retrieved from www.sauvieisland.org.

Appendix A: Pollution Prevention and Control Program for Oregon's Coastal Waters — Coastal Zone Act Reauthorization Amendments of 1990 Management Practices

Developed to meet the requirements of Section 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990.

This state program was developed to meet the requirements of Section 6217(g) of the Coastal Zone Act Reauthorization Amendments (CZARA) of 1990. It was submitted to the federal government by the DEQ and the Oregon Department of Land Conservation and Development.

The US EPA explains the history and reasoning for the CZARA in part as follows:

On November 5, 1990, Congress enacted the CZARA of 1990. These Amendments were intended to address several concerns, a major one of which is the impact of nonpoint source pollution on coastal waters.

Nonpoint source pollution is increasingly recognized as a significant factor in coastal water degradation. In urban areas, storm water and combined sewer overflow are linked to major coastal problems, and in rural areas, runoff from agricultural activities may add to coastal pollution.

To address more specifically the impacts of nonpoint source pollution on coastal water quality, Congress enacted section 6217, “Protecting Coastal Waters,” which was codified as 16 U.S.C. -1455b. This section provides that each state with an approved coastal zone management program must develop and submit to EPA and the National Oceanic and Atmospheric Administration for approval a Coastal Nonpoint Pollution Control Program. The purpose of the program “shall be to develop and implement management measures for nonpoint source pollution to restore and protect coastal waters, working in close conjunction with other state and local authorities."

Under “A Pollution Prevention and Control Program for Oregon’s Coastal Waters,” to meet the requirements of the CZARA of 1990 6217(g), the following management measures for agriculture were developed, based upon the original measures provided in the US EPA's "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters.”

MANAGEMENT MEASURES FOR AGRICULTURE

1. Erosion and Sediment Control Management Measure

Apply the erosion component of a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the USDA NRCS to minimize the delivery of sediment from agricultural lands to surface waters; or

Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a 10-year, 24-hour frequency.

2. Facility Wastewater and Runoff from Confined Animal Facility Management

Guidance Management Measure (Large Units)

Limit the discharge from the confined animal facility to surface waters by:

1. Storing both the facility wastewater and the runoff from confined animal facilities that is caused by storms up to and including a 25-year, 24-hour frequency storm. Storage structures should:
    a. Have an earthen lining or plastic membrane lining, or
    b. Be constructed with concrete, or
    c. Be a storage tank; and,

2. Managing stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

Guidance Management Measure (Small Units):

Design and implement systems that collect solids, reduce contaminant concentrations, and reduce runoff to minimize the discharge of contaminants in both facility wastewater and in runoff that is caused by storms up to and including a 25-year, 24-hour frequency storm. Implement these systems to substantially reduce significant increases in pollutant loadings to ground water. Manage stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

3. Nutrient Management Measure

Develop, implement, and periodically update a nutrient management plan to: (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely. Nutrient management plans contain the following core components:

A. Farm and field maps showing acreage, crops, soils, and waterbodies.
B. Realistic yield expectations for the crop(s) to be grown based primarily on the producer's actual yield history, State Land Grant University yield expectations for the soil series, or NRCS Soils-5 information for the soil series.
C. A summary of the nutrient resources available to the producer, which at a minimum include:
    1. Soil test results for pH, phosphorus, nitrogen, and potassium;
    2. Nutrient analysis of manure, sludge, mortality compost (birds, pigs, etc.), or effluent (if applicable);
    3. Nitrogen contribution to the soil from legumes grown in the rotation (if applicable); and
    4. Other significant nutrient sources (e.g., irrigation water).
D. An evaluation of field limitations based on environmental hazards or concerns, such as:
    1. Sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential,
    2. Lands near surface water,
    3. Highly erodible soils, and
    4. Shallow aquifers.
E. Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation.

F. Identification of timing and application methods for nutrients to provide nutrients at rates necessary to achieve realistic crop yields; reduce losses to the environment; and avoid applications as much as possible to frozen soil and during periods of leaching or runoff.
G. Provisions for the proper calibration and operation of nutrient application equipment.

4. Pesticide Management

To reduce contamination of surface water and ground water from pesticides:

A. Evaluate the pest problems, previous pest control measures, and cropping history;
B. Evaluate the soil and physical characteristics of the site including mixing, loading, and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found to occur, steps should be taken to prevent further contamination;
C. Use integrated pest management strategies that:
    1. Apply pesticides only when an economic benefit to the producer will be achieved (i.e., applications based on economic thresholds); and
    2. Apply pesticides efficiently and at times when runoff losses are unlikely;
    3. When pesticide applications are necessary and a choice of registered materials exists, consider the persistence, toxicity, runoff potential, and leaching potential of products when making a selection;
    4. Periodically calibrate pesticide spray equipment; and
    5. Use anti-backflow devices on hoses used for filling tank mixtures.

5. Grazing Management

I. Riparian Areas: Implement one or more of the following as necessary to protect water quality, streambanks, stream channels, wetlands, estuaries, ponds, lakeshores, and riparian soils and vegetation:
    (A) For privately owned lands, implement (1) or (2) below:
        (1) Implement one or more of the following:
            a) Provide stream crossings or hardened watering access for drinking;
            b) Provide alternative drinking water locations away from the stream channel and sensitive areas;
            c) Locate salt and additional shade, if needed, away from sensitive areas;
            d) Use improved grazing management techniques including the application of scientifically sound grazing systems. The following are some examples of such techniques:
                1. Include riparian areas in separate pastures and manage them under separate objectives and strategies, including periodic rest.
                2. Fence or, where appropriate, herd livestock out of riparian areas for as long as necessary to avoid negative impacts to streambanks.
                3. Control the timing of grazing in riparian areas to (1) protect streambanks when they are most vulnerable to damage; and (2) coincide with the physiological needs of key plant species.
                4. Add rest, as needed, to the grazing cycle to increase plant vigor and encourage more desirable plant species composition.
                5. Limit grazing intensity, frequency, and duration to a level that will maintain desired plant species composition and vigor.
                6. Manage livestock away from riparian areas that are at high risk or with poor recovery potential.
            e) Exclude livestock from sensitive areas.
        (2) Implement a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the USDA Natural Resource Conservation Service (NRCS) by applying the progressive planning approach of the USDA NRCS.

(B) For publicly owned or managed lands, maintain rangelands, pasturelands, and other grazing lands in accordance with plans established by the responsible agency such as the USDI Bureau of Land Management, the USDA Forest Service.

II. Uplands: To protect water quality from grazing impacts on upland areas that are not protected under (I),
(A) For privately owned lands, implement (1) or (2) below:
(1) Implement one or more of the following:
a) Locate livestock watering facilities away from sensitive areas such as springs and seeps;
b) Locate salt and additional shade, if needed, away from sensitive areas;
c) Use improved grazing management techniques including the application of scientifically sound grazing systems. The following are some examples of such techniques:
1. Control the timing of grazing to (1) protect soils and vegetation when they are most vulnerable to damage; and (2) coincide with the physiological needs of key plant species.
2. Add rest to the grazing cycle to increase plant vigor or encourage more desirable plant species composition.
3. Limit grazing intensity, frequency, and duration to a level that will maintain desired plant species composition and vigor.
(2) Implement a CMS as defined in the Field Office Technical Guide of the USDA NRCS by applying the progressive planning approach of the USDA NRCS.
(B) For publicly owned or managed lands, maintain rangelands, pasturelands, and other grazing lands in accordance with plans established by the responsible agency such as the USDI Bureau of Land Management, the USDA Forest Service.

6. Irrigation Water Management

To reduce nonpoint source pollution of surface waters caused by irrigation:

A. Operate the irrigation system so that the timing and amount of irrigation water applied matches crop water needs. This will require, as a minimum: (a) the accurate measurement of soil-water depletion volume and the volume of irrigation water applied, and (b) uniform application of water.
B. When chemigation is used, include backflow preventers for wells, minimize the harmful amounts of chemigated waters that discharge from the edge of the field, and control deep percolation. In cases where chemigation is performed with furrow irrigation systems, a tailwater management system may be needed.

The following limitations and special conditions apply:

A. In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. In these special cases, on-site reuse could be precluded and would not be considered part of the management measure for such locations.
B. By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or human health may be adversely affected and where other management measures (nutrients and pesticides) do not reduce concentrations in the discharge, increasing water use efficiency would not be considered part of the management measure.

C. In some irrigation districts, the time interval between the order for and the delivery of irrigation water to the farm may limit the irrigator's ability to achieve the maximum on-farm application efficiencies that are otherwise possible.
D. In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone.
E. Where leakage from delivery systems or return flows supports wetlands or wildlife refuges, it may be preferable to modify the system to achieve a high level of efficiency and then divert the "saved water" to the wetland or wildlife refuge. This will improve the quality of water delivered to wetlands or wildlife refuges by preventing the introduction of pollutants from irrigated lands to such diverted water.
F. In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection and applied water should remain on-site.