Coos and Coquille Agricultural Water Quality Management Area Plan

October 2020

Developed by the

Oregon Department of Agriculture

and the

Coos and Coquille Local Advisory Committee

with support from the

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Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Program
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
BLM - Bureau of Land Management
CAFO – Confined Animal Feeding Operation
CNPCP – Coastal Nonpoint Pollution Control Program
CWA – Clean Water Act
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
DMA – Designated Management Agency
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
LMA – Local Management Agency
Management Area – Agricultural Water Quality Management Area
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODF – Oregon Department of Forestry
ODFW – Oregon Department of Fish and Wildlife
OHA – Oregon Health Authority
ORS – Oregon Revised Statute
OSU - Oregon State University
OWEB – Oregon Watershed Enhancement Board
OWRI – Oregon Watershed Restoration Inventory
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
SIA – Strategic Implementation Area
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TMDL – Total Maximum Daily Load
US ACE – Army Corps of Engineers
US EPA – United States Environmental Protection Agency
USDA – United States Department of Agriculture
WPCF – Water Pollution Control Facility
WQPMT – Water Quality Pesticides Management Team

Foreword

This Agricultural Water Quality 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.

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).

Nothing in the Coos and Coquille Agricultural Water Quality Management Area Plan or in OARs 603-095-1500 through 603-095-1560 will allow the department to implement this Plan or Rules in a manner that is in violation of the U. S. Constitution, the Oregon Constitution or other applicable state laws.

As you begin to read through this document, please bear in mind that it is in no way the intent of the Local Advisory Committee (LAC) to suggest that any one group of individuals is responsible for the change in water quality. It is rather the goal of this Committee, and this document, to attempt to provide the strategies to improve water quality. Every attempt was made, during the writing of this Area Plan, to respect the rights of private property owners to use their land as they desire and to develop their own positive techniques from these guidelines. We hope that the results of our time and energy will be beneficial to all parties involved.

Applicability

This Area Plan will affect any agricultural activities on all non-Federal and non-Tribal lands in the Coos and Coquille Area. See Chapter 2 for a map of the area. These lands may be actively used, lying fallow, or in deferred management. The definition of agricultural use is: "the use of land for the raising or production of livestock or livestock products, poultry or poultry products, milk or milk products, fur-bearing animals, or for the growing of crops such as, but not limited to, Christmas trees, grains, small grains, fruit, vegetables, forage grains, nursery products; or any other agricultural or horticultural use or animal husbandry or any combination thereof. Wetlands, pasture, and woodlands accompanying land in agricultural use are also defined as agricultural use areas." (OAR 603-95-0010(4))

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 state and federal law (OAR) 603-090-0030(1)).

Plan Content

Chapter 1: Agricultural Water Quality Management 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. Presents goal(s), measurable objectives, strategic initiatives, proposed activities, and monitoring.

Chapter 4: Progress and and Adaptive Management. Describes progress toward achieving the goal of the Area Plan and summarizes results of water quality and land condition monitoring.

Chapter 1: Agricultural Water Quality Program

Chapter 1 of the Area Plan was developed by Oregon Department of Agriculture. The Local Advisory Committee and the Local Management Agency did not develop or participate in the development of Chapter 1. ODA developed Chapter 1 to have consistent and accurate information about the Ag Water Quality Program statewide.

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), this 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 for the area within the boundaries of the 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, the 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 and education, conservation and management activities, compliance with Area Rules, monitoring, evaluation, and adaptive management.

The provisions of this 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 (OARs 603-090-0000 to 603-090-0120) and under the Area Rules for this Management Area (OARs 603-095-1540). 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.

This Area Plan and Area Rules apply to all agricultural activities on non-federal and non-Tribal Trust land within the 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

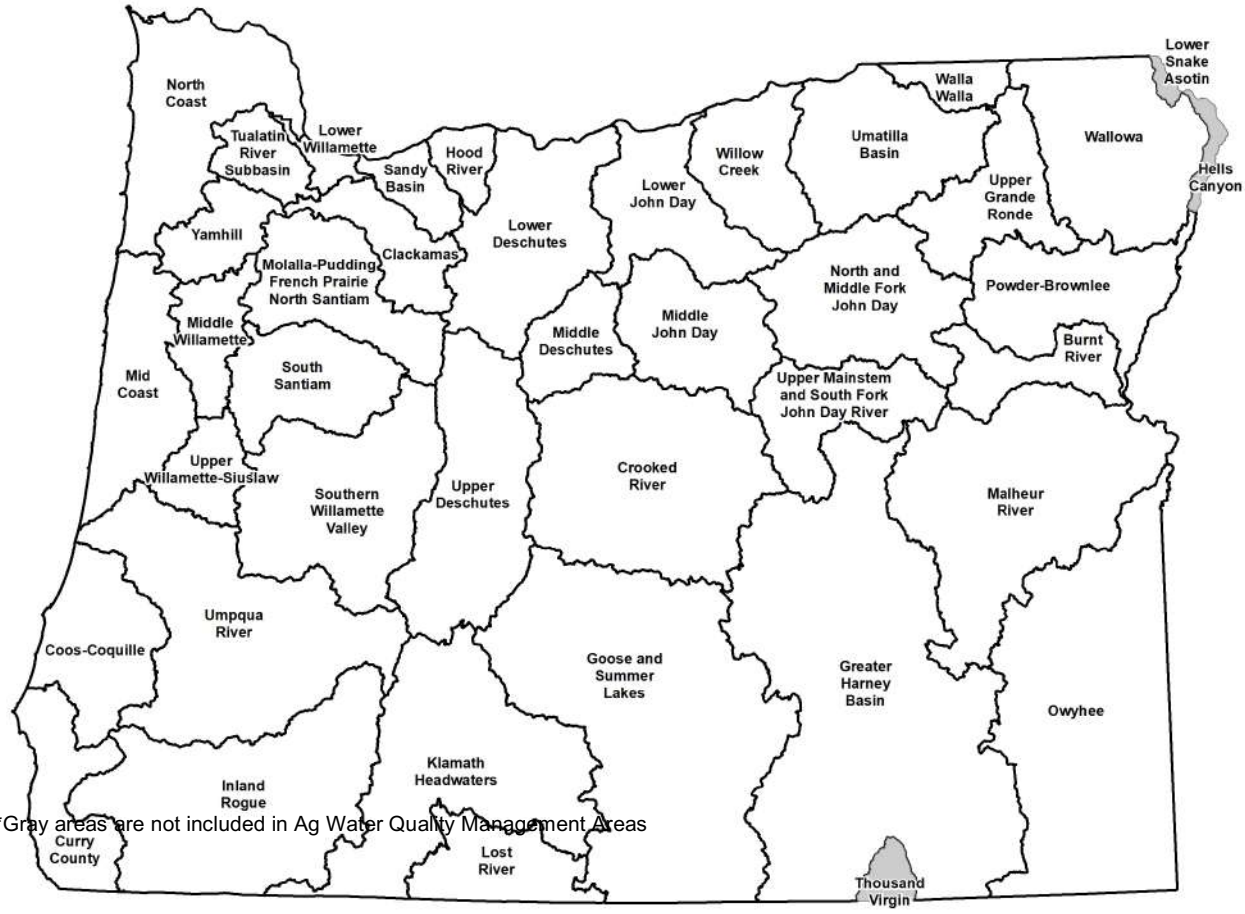
In 1993, the Oregon Legislature passed the Agricultural Water Quality Management Act, directing ODA to develop plans to prevent and control water pollution from agricultural activities

and soil erosion, and to achieve water quality standards (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).

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). 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)

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).

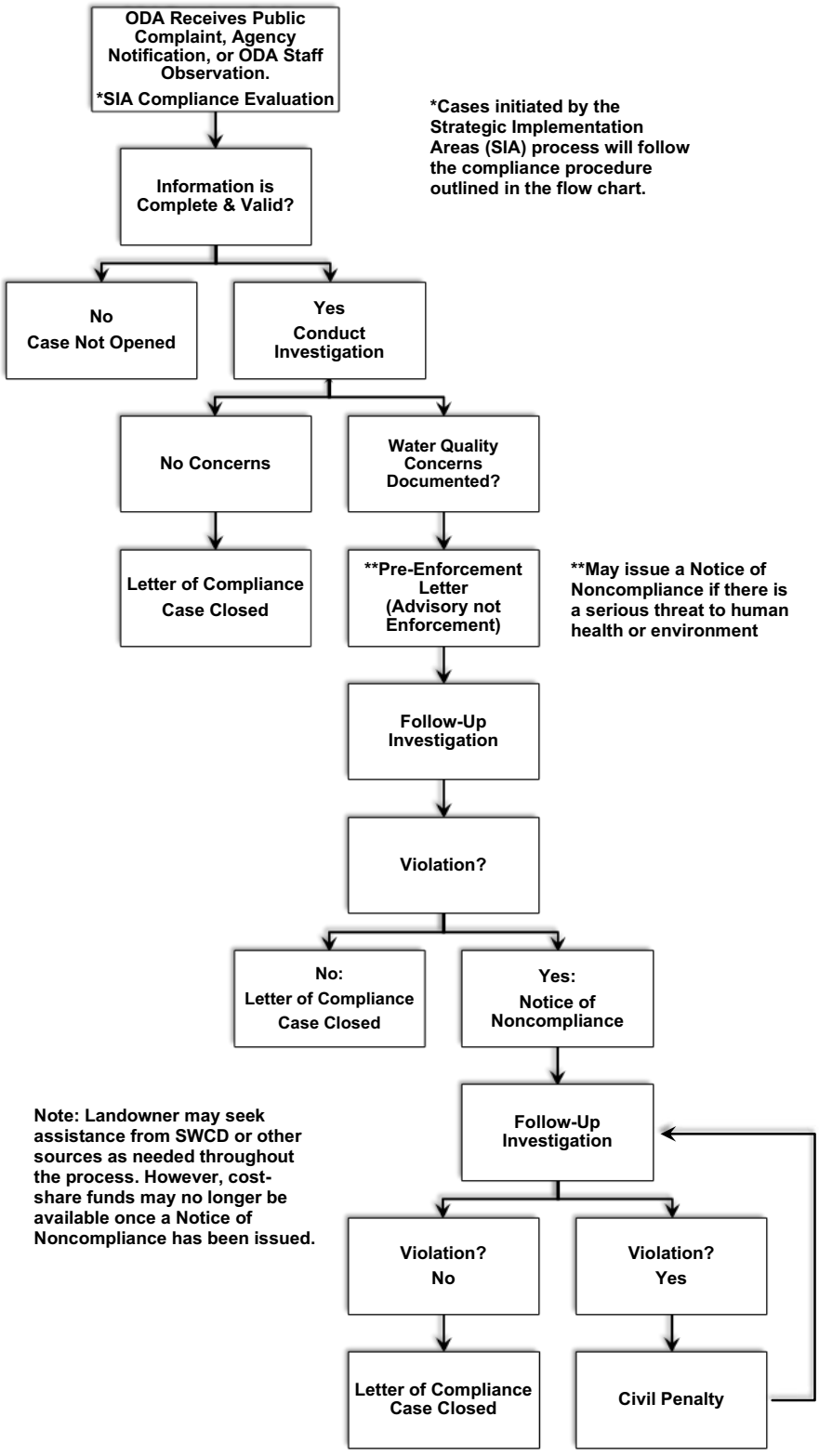
ODA bases Area Plans and Area Rules on scientific information (ORS 568.909). ODA works in partnership with SWCDs, LACs, DEQ, and other partners to implement, evaluate, and update the Area Plans and Area Rules. If and when other governmental policies, programs, or rules conflict with the Area Plan or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

ODA is responsibile 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).

Figure 1.3.1 Compliance Flow Chart



1.3.2 Local Management Agency

A Local Management Agency (LMA) is an organization desginated by ODA to assist with 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 in 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 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, may meet as frequently as necessary to carry out their 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 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 with 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:

- Conditions resulting from unusual weather events,
- Hot springs, glacial melt water, and climate change,
- 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

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 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 from 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 impacted in this Management Area are summarized in Chapter 2.

Many water bodies 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 and 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.

1.4.3 Impaired Water Bodies and Total Maximum Daily Loads (TMDLs)

Every two years, the 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 a list of waters that do not meet water quality standards. The resulting list is commonly referred to as the "303(d) list" (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 that a water body 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 (NPDES) permits. Nonpoint sources (agriculture, forestry, and urban) are assigned a load allocation.

As part of the TMDL process, DEQ identifies the 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.

1.4.4 Oregon Water Pollution Control Law – ORS 468B.025 and ORS 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 and 468B.050 into all 38 of the Area Rules in Oregon.

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.

"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.

"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. Additionally, 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. 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.

Healthy soils make farms and ranches more resilient. The western United States is experiencing higher temperatures, more weather variability, and greater storm intensity. Forecasts predict continued high-intensity storms in the winter and spring, combined with more frequent droughts, which may result in more erosion, especially on bare ground. 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 Agricultural Water Quality Management Program and are described here to recognize their link to agricultural lands.

1.5.1 Confined Animal Feeding Operation (CAFO)

ODA is the lead state agency for the CAFO Program, which was developed to ensure that operators and producers 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 (GWMAs)

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 the voluntary approach is not effective, mandatory requirements may become necessary.

If there is a GWMA in this Management Area, it is described in Chapter 2.

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

The ODA Pesticides Program holds the primary responsibility for registering pesticides and regulating their use in Oregon under the Federal Insecticide Fungicide 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 (WQPMT) to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT facilitates and coordinates activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The WQPMT relies on monitoring data from the Pesticides 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 Program, 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.

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 United States Environmental Protection Agency (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 (OHA). The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. DEQ and OHA 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 U.S. 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 U.S. EPA. The guidance contains measures for the following areas: agricultural activities, forestry activities, urban areas, marinas, hydro-modification activities, and wetlands. The geographical boundaries for the CNPCP include 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 requirments 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 has 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 Oregon Department of Forestry (ODF), to meet the needs of the CWA. DEQ sets water quality standards and 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 NPDES permits for point sources, the CWA Section 319 grant program, the Source Water Protection Program (in partnership with OHA),, 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 2012 and reviewed and confirmed it in 2018 (http://www.oregon.gov/ODA/shared/Documents/Publications/NaturalResources/DEQODAmoa.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 indicated above), the United States Department of Agriculture (USDA) NRCS and 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 also is 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 (section 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 and progress toward achieving the measurable objective(s) and milestone(s) is summarized in Chapter 4.

1.7.2 Land Condition 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, is generally used as a surrogate for water temperature. In some cases, sediment can be used as a surrogate for pesticides or phosphorous, 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 or 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 land 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.

The current Focus Area for this Management Area is described in Chapter 3.

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.

1.8 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 achieving measurable objectives and implementating 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 Water Quality Monitoring

In addition to monitoring landscape 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 over 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 (BOD), chlorophyll a, specific conductance, dissolved oxygen (DO), DO percent saturation, bacteria (E. coli), ammonia, nitrate and nitrite, pH, total phosphorus, total solids, temperature, and turbidity.

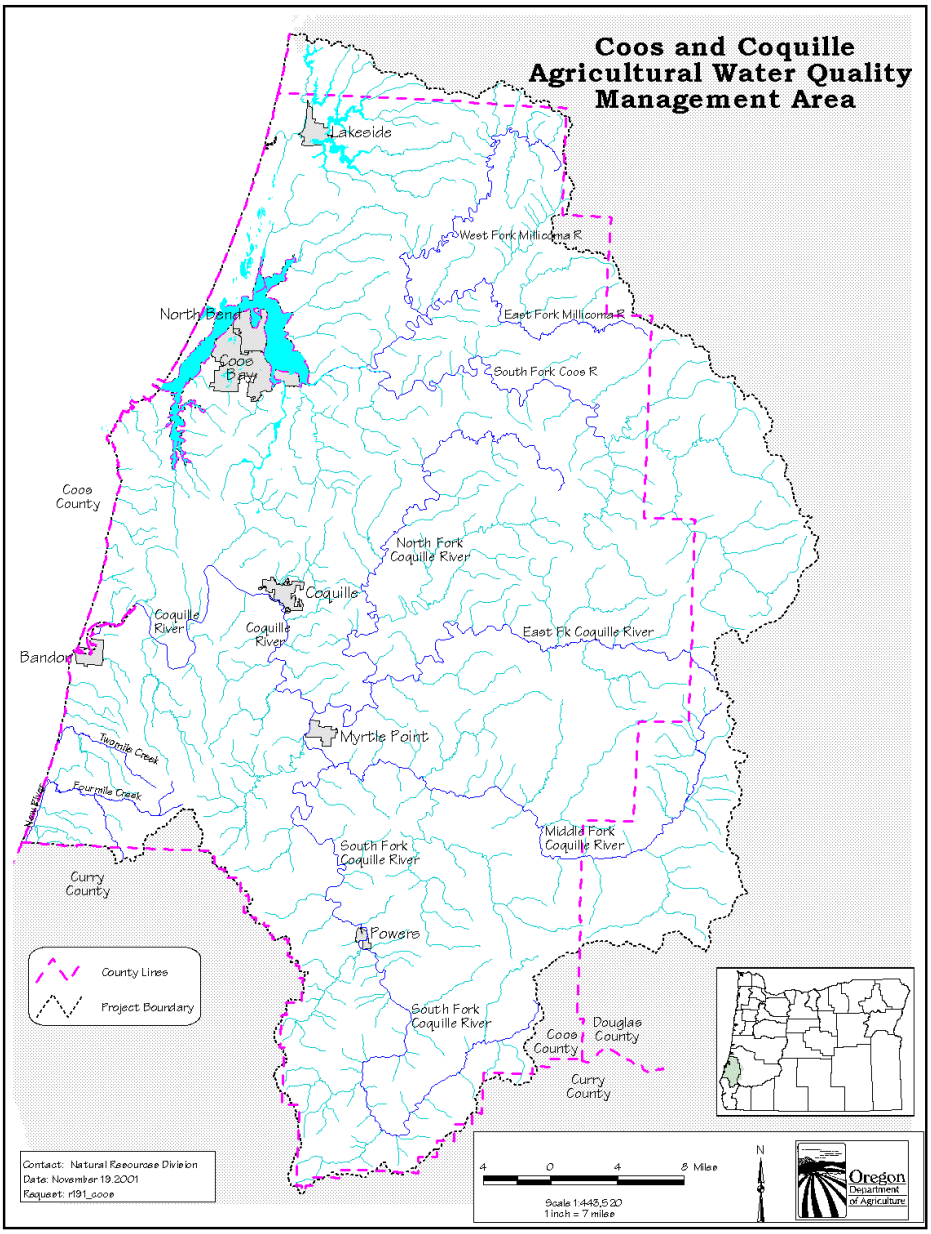
DEQ provides status and trends reports for selected parameters in relation to water quality standards. ODA will continue to work with DEQ to summarize the data results and how they apply to agricultural activities.

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

The Coos LAC requests that all future changes to Chapter 2 are subject to review and approval/rejection by the Coos LAC.

The Coos and Coquille Agricultural Water Quality Management Area is comprised of the Coos and Coquille drainages, the Tenmile drainage, the Twomile drainage, the Fourmile drainage (including the headwaters of South Fork Fourmile Creek), and those lands within Coos County that lie north of the county line west of its junction with Bethel Mountain Road. See Appendix H for maps of subbasins.



2.1 Local Roles

2.1.1 Local Advisory Committee (LAC)

This Area Plan was developed with the assistance of a LAC. The LAC was formed in 1999 to assist with the development of the Area Plan and Area Rules and with subsequent biennial reviews. Table 2.1.1 lists the current and past members of the LAC.

Table 2.1.1 Current & Past LAC members

Name	Geographic Representation	Agricultural Product or Interst Representation
Current 2020 Members:		
Chair: Joan Mahaffy *	Coos Bay	Beef Cattle
JoAnn Mast *	Coquille	Sheep
Sharon Waterman	Bandon	Sheep & Cattle
Dan Pierce	Bandon	Cattle
Cassie Bouska	Myrtle Point	OSU Extension
Michael Clary	South Fork Coquille	Small farm, sheep/goat grazing
Carter Thomas	Coos County	Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians (CTCLUSI)
Former LAC Members:		
Dave Messerle *	Coos Bay	Former Chair: Beef Cattle
Roland Ransdell *	Coquille	Organic Grower
Jordan Utsey *	Myrtle Point	Beef Cattle
Eric Aasen *	Bandon	Cranberries
Jeff Cochran *	Coquille	Dairy Cattle
Steve Cooper *	Myrtle Point	Beef Cattle
Heath Hampel *	Charleston	Oysters
Jolly Hibbits *	Bandon	Horses & Llamas
Monty Lund	Myrtle Point	Cattle & sheep
Ken Hershey	Bandon	Cattle
Bonnie Joyce *	Myrtle Point	Small Woodlot
Tom Johnson *	North Bend	Dairy Cattle

* Denotes members at time of Plan adoption (2002)

2.1.2 Local Management Agency

Implementation of the Area Plan is accomplished through an Intergovernmental Grant Agreement between ODA and the Coos County SWCD. This Intergovernmental Grant Agreement defines the SWCD as the Local Management Agency for implementation of

the Ag Water Quality Program in this Management Area. The SWCD was also involved in development of the Area Plan and Area Rules.

The LMA implements the Area Plan by conducting the 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 initially approved the Area Plan and Area Rules in 2006.

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

2.3 Geographical and Physical Setting

2.3.1 Agriculture

Agriculture in the Coos, Coquille, and Twomile and Fourmile Watersheds Agriculture has been a part of the Coos and Coquille watersheds for over a century. The estuaries in the watershed provide access to miles of navigable river and adjacent flat bottomlands. Surveys conducted in the late 1800s describe extensive marshes and wetlands that were later diked, drained, and converted to fertile agricultural lands (Benner, 1992).

Pasture and hay lands remain the main use of lands in the valleys. River bottom pastures are mainly grazed and/or hayed from late spring to fall. Many of these areas are flooded in winter. Beef cattle, sheep, and dairy are the main livestock enterprises in Coos County. Coos County ranks sixth in Oregon for sheep production (USDA, 2017) and ninth in number of dairy cows (ODA, 2020). In 2017, there were 15 dairies (USDA, 2017); Most milk is sold to an organically certified processor. All dairies have waste management plans and are regulated under the ODA Confined Animal Feeding Operation (CAFO) program. Coos County is also home to other livestock such as, horses and goats (USDA, 2017).

Coos County is a major producer of cranberries in the state. Most cranberry growers belong to the Ocean Spray Cooperative. Both independent buyers and Ocean Spray have receiving stations located in the County. Some cranberry growers produce organic cranberries. Most cranberry beds are constructed in sandy soils lined with clay. Cranberry vines are perennial, and once established, will produce annually for an indefinite period. The first beds were planted in Hauser in 1893 and are still producing fruit.

Cranberry production uses water for frost protection, irrigation, weed and pest control, and for harvest. The preferred method of harvest is to flood the beds and beat the vines to separate the berries from the vine. Dry harvest is also used but is not a preferred method. Cranberry growers possess water rights to apply water and have constructed

reservoirs to hold the water that they need. The recycling of water through a series of beds is employed by the majority of growers, reducing use of water from springs and creeks.

Recreational and commercial shellfish harvesting is widespread in the Coos and Coquille estuaries. To ensure food safety, both water quality and oyster meats are regularly checked by the ODA.

Nursery crops such as dahlias, holly, ornamental grasses, bedding plants, garlic, blueberries, hay, small vegetable, and orchard crops are grown on local farms. Additionally, cannabis, in the form of hemp or marijuana is a newer agricultural crop in the area.

Agriculture in the Tenmile Watershed
Most of the agricultural land found in the watershed is located on the alluvial areas associated with the lower reaches of the six major headwater tributaries flowing into North Tenmile River or the Tenmile Lakes. These lands were some of the first that were settled in the late 1800s and early 1900s. Before settlement, these areas were primarily wetlands. To use these low gradient areas for agriculture, the settlers straightened and channeled the lower reaches and drained the land. Over time, the wetland vegetation was reduced and forage species such as reed canary grass were introduced. In most areas, trees were cut to increase grazing potential. For a time, dairying was the major use of these lands. Milk was delivered by boat to Lakeside and sold to the creamery. There are approximately 2,650 acres of farmland in use today, which is four percent of the watershed area (Tenmile Lakes Watershed Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP, 2007). Most agricultural land is used for grazing cattle and other livestock. Some hay is produced here in the summer months.

2.3.2 Climate

Coos County has a marine climate, mild and humid, resulting from the moderating influences of the Pacific Ocean and from the rainfall induced by the coast range. Rainfall along the coast averages about 60 inches a year increasing inland with elevation to as much as 100-inches or more at points in the coast range. Rainfall comes throughout the year with the least amounts in July and August. Rainfall data from Coquille shows that January, February, and March average 7.4-inches of rainfall each month. April, May, and June average rainfall is 2.7-inches each. July, August, and September average rainfall is 1.0-inch per month. October, November, and December average rainfall is 7.2-inches per month. The heaviest one-day rainfall during the 1951 - 1978 period was 4.54-inches at North Bend on November 24, 1960.

In Coquille, average maximum temperature is 55°F with a 36°F average minimum temperature in January, February, and March. April, May, and June average temperatures are 64°F and 43°F. July, August, and September averages are 71°F with lows of 48°F. October, November, and December averages are 60°F with lows of 38°F. Extreme high or low temperatures are rare.

From March through October, the coastal area is subject to prevailing winds from the northwest. From November through February, winds are mainly from the southwest. In most winters, one or two storms over the shore area bring strong and sometimes damaging winds, and in some years, the accompanying heavy rains cause serious flooding.

The growing season averages 200 days along the coast and in the river valley areas and decreases with higher elevation dropping to about 150 days along the eastern boundary of the county. Dates of last frost in spring and first frost in fall are not very useful because of the cool, rainy climate. Average late frost date in spring is March 30, and average first frost date in fall is October 30.

Main sources of information:

- Oregon State University, Coos County Extension Service website. 2002
- Soil Survey of Coos County, Oregon, USDA. 1989

2.3.3 Fish in the Coos, Coquille, and Tenmile Watersheds

The Coos, Coquille, Twomile, Fourmile, and Tenmile watersheds are known statewide for their high fishery production, and the existing conditions give hope for the successful restoration and enhancement of a viable fishery. A complete list of fish and shellfish species present in the watersheds can be found in Appendix D.

Many factors have a role in the decline of native populations of salmonids in the Management Area and statewide. The relative influence of these factors varies between species and regions, but they include rearing and spawning area degradation, reduction in summer streamflow, passage impacts, adverse ocean habitat conditions, and over-fishing. Hatchery programs have also been indicated in the decline and extinction of wild Coho salmon populations (Oregon Department of Fish and Wildlife (ODFW), 1995). Fish life histories can be found in Appendix E.

Salmonids evolved in freshwater ecosystems that historically had a high degree of structural complexity including large woody debris jams in streams, flood plains, large spawning gravel reserves, wetlands, braided channels, beaver ponds, and in some areas of the watershed, lake systems. Human activities have altered the traditional salmonid freshwater habitat.

The El Nino effect and the past 15 years of adverse ocean conditions have also taken their toll on salmonid populations. The ongoing decline in ocean productivity appears to be part of a long term, apparently natural cycle in ocean conditions that is outside the realm of fisheries management. These ongoing declines in numbers have collided with the large numbers of hatchery-released stocks, causing a decline in native stocks. At the time that ocean productivity is low, it is of critical importance that freshwater habitats be protected and enhanced to support future age classes of fish. There are many actions that agriculture operators can take to minimize their impacts on salmonids and freshwater habitat that will be discussed later in this Area Plan.

2.3.4 The Watershed as an Ecosystem

An ecosystem is an interdependent community of living and non-living elements, including humans. Ecosystems do not always have definite boundaries. An ecosystem is a natural ecological system composed of living and non-living elements working together to maintain the conditions that support life.

Physically, a watershed is any area of land that drains water to a specific point, such as a lake, river, or ocean. Like ecosystems, watersheds may be as large as the basin of the Mississippi River or as small as the basin of a pond. All land is in a watershed, since precipitation falls everywhere and drains somewhere. Energy inputs of sunlight, wind, and the water cycle interact with the landforms and the living species in ways that affect both the quality and quantity of water.

In ideal conditions, water is captured by infiltration into the spongy layer of topsoil in the watershed. Some of it is held by soil capillary action and is available for use by plants. The remainder percolates down through the soil profile to recharge the groundwater supplies. The primary watershed process is the capture, storage, and slow release of water. This process helps to prevent flooding in winter and provides water in times of drought. Where there is no topsoil, or where topsoil has been compacted, eroded, covered over by asphalt, or over-saturated, water is not captured but is allowed to runoff over the surface of the ground. Flooding is increased and water may not be available during drier times. The quality of water is improved by the passage through topsoil, which acts as a filter and adds minerals.

Different landscape types within the watershed have different roles in the capture, storage, and slow release of water. For example, wetlands and floodplains slow down the movement of water allowing time for groundwater recharge. Vegetation, especially forests, holds the topsoil in place and is crucial providers of humus in the form of decaying plant material. Healthy topsoil is not only the source of our food supply it also provides clean, abundant water.

2.3.5 Physical Setting

The Coos Watershed
The South Fork Coos and the Millicoma drain the majority of the Coos watershed (Appendix H). These rivers meet lower in the watershed to form the Coos River, which flows westward four miles to empty into Coos Bay. Stream flow rates vary widely between winter and summer, and since little snow falls in the watershed, stream flows mainly vary with rainfall (Table 1.1). There are more than 30 direct tributaries to the bay. Twelve of these streams become "sloughs" (10-12 miles in length) as they enter the estuary. In an undisturbed state, these sloughs are shallow inlets fringed with marshland vegetation and they are very productive areas for fish and wildlife.

The Coos Bay estuary is the largest estuary in Oregon. The tidal influence extends upriver to mile 37 of the South Fork Coos River, and to river mile 34 on the Millicoma River. The river and slough valleys in the lower watershed are relatively narrow. Most of the low gradient areas are, or were wetlands, and the bay and sloughs were historically surrounded by freshwater wetlands. The estuary and the lower watershed contain a wide assortment of productive habitats including eelgrass beds, mud flats, sandy beaches, fresh and saltwater marshes, as well as seasonal wetlands, which include farmed wetland pastures (Harris, 1998). South Slough, located at the less populated west end of the bay, is an important natural area and the site of the South Slough Estuarine Research Reserve.

Table 2.3.5a - Comparison of the Management Area watersheds

Watershed	Size (square miles)	Range in Precipitation, inches	Range of Average Flow, cfs
Coos	586.00	55 - 80	90 – 5,500
Coquille	1,059.00	50 - 120	100 – 8,000
Fourmile	18.50	60 - 100	1.5 - 175
Tenmile	85.90	60 - 100	18 - 875
Twomile	15.40	60 - 100	5 - 210

The original natural estuarine environments have been altered by the community's dependence on wetland and estuarine resources and the need for flat dry land. Diking, draining, and filling of marshes began in the 1870s to create the present city of Coos Bay, expand rail and road routes, and to accommodate more ranches and homes. In 1970, when only 15 percent of the original marsh area remained, state and federal laws slowed the conversion process (Coos Watershed Association, 1996).

The eastern two-thirds of the Coos watershed is sparsely populated and is made up of steep forested slopes. This area has been managed exclusively for timber since the late 1800s and the majority is second growth in various stages. Eighty percent of the Coos watershed is forestland. These timbered areas support populations of wildlife and freshwater and anadromous fish species. The most densely populated areas are on the flood plains along the main stem, four forks, and larger order streams. Land uses in this area include urban industrial (five percent of watershed) and residential sites, commercial and service businesses, and gravel extraction. Agriculture uses 15 percent of the land. In some areas, pasturelands extend into the hills above the flood plains.

Currently, about 36,000 people live in the Coos watershed, with the bulk of the population clustered about the eastern half of the estuary and the lower riverbanks (Table 1.2). Until the late 1980s, the area was heavily reliant on natural resource extraction, such as timber production, fishing, and agricultural activities. Many family wage jobs have been lost as these industries saw a decline in availability of resources. The area is struggling with a transition to utilize other economic opportunities such as tourism.

The Coquille Watershed

The Coquille River has three major tributaries, the North Fork (including the East Fork), the Middle Fork, and South Fork (Appendix H). All three forks join the main stem of the Coquille River within a few miles of the town of Myrtle Point and then flow into the Pacific Ocean at Bandon. The Coquille River is 99 miles long from the headwaters in the South Fork Coquille to the mouth. The majority of the watershed is located in Coos County and the remainder is located in Douglas County.

The lower bay of the Coquille is long and narrow, containing 763 acres. The estuary includes 380 acres of tidelands and 383 acres of permanently submerged lands (Coquille Watershed Association, 1997). The bay ecosystems are divided into eelgrass beds, wetlands, and tidal flats, which provide feeding, nesting, spawning, breeding and nursery areas for many species of terrestrial and aquatic life. The lower Coquille River area continues to be a very important rearing area for juvenile salmonids. The steep hill slopes above the Coquille Valley are sparsely populated. Timber production, agriculture, and aggregate extraction are the predominant uses; approximately 70 percent of the watershed is forested. Private industrial forest holdings make up 40 percent of the watershed. The remaining 30 percent of forested lands in the watershed

are federal, state, and county lands. Two federal agencies, the Bureau of Land Management (BLM) and the U.S. Forest Service, administer the largest of these public holdings. The remaining 30 percent of the watershed is smaller, non-industrial holdings, or agricultural operations. (Coquille Watershed Association, 1994)

The Tenmile Lakes Watershed

The Tenmile Lakes watershed is located on the southern Oregon coast between the Umpqua River and Coos Bay and covers approximately 86 square miles in size (Appendix H). There are ten lakes that make up five percent of the watershed. These lakes and their drainage areas can be subdivided into three subbasins: Eel Lake, Saunders Creek, and Tenmile.

The watershed is predominantly forested uplands (36 percent private and 61 percent public forest). Most of the steep upper forested slopes and their forested headwater streams are found in the Elliott State Forest, which is managed by the Oregon Department of Forestry. The Elliott State Forest is the largest landowner in the watershed.

The native fishery in the Tenmile Lakes was primarily Coho salmon, steelhead, and sea-run cutthroat trout. In the 1930s, yellow perch, smallmouth bass, brown bullhead catfish, and other non-native fish were introduced to the lakes. Human population around the lakes increased from one dwelling in 1850 to approximatly 500 dwellings in 2007.

In 1996, the Tenmile lakes were placed on the DEQ's 303(d) list for water quality problems with bacteria, aquatic weeds, temperature, and algae. In 2007, the Environmental Protection Agency (EPA) approved DEQ's Tenmile Lakes Watershed TMDL, which set sediment load allocations and targets for phosphorus and nitrogen reduction.

The Twomile and Fourmile Watersheds

This area is located in the extreme southwestern part of Coos County and borders Curry County (Appendix H). It is considered part of the Management Area. Twomile Creek currently flows into New River slightly northwest of Laurel Lake. The configuration of New River and Twomile Creek has changed over the last 25 years. The mouth of New River has moved north and the mouth of Twomile Creek has moved south until it met the New River in the past few years. Twomile Creek is approximately six miles long and has three tributary streams: lower Twomile Creek, South Twomile Creek, and Redibaugh Creek. The drainage area is approximately 15 square miles in size.

Fourmile Creek currently flows into the New River slightly southwest of Laurel Lake and approximately one mile from the New River mouth at the Pacific Ocean. Fourmile Creek is approximately 10 miles long with two tributary streams: South Fork Fourmile Creek and North Fourmile Creek. The drainage area covers 19 square miles.

Table 2.3.5b - Populations of Incorporated Cities (PSU, 1997)

Bandon	2,790
Coos Bay	15,635
Coquille	4,235
Lakeside	1,675
Myrtle Point	2,727
North Bend	9,885
Powers	695

2.3.6 Historical Perspective

Historically, marshes and wetlands provided critical habitat for juvenile salmonids. In 1870, early surveyors noted that 70 percent or 14,440 acres of bottomlands were marshy in nature and contained countless pools due to beaver dams (Benner, 1992). After 1870, most of the marshes had been converted to farmlands, and the beaver dams were destroyed. Tidegates, a device to allow fresh water to drain off the lands but prevent saltwater from entering at high tide, were installed along most of the main river and sloughs. The historic connection between rivers and their floodplains was further reduced by levees and dikes with a resultant loss of natural ecosystem function and biological production.

Impacts from agriculture range greatly and are dependent upon the activity and the time in which the activity occurs. Collectively, the physical and chemical changes that result from agriculture change the ecology of stream systems in many ways. Ditching, a common practice in both watersheds, results in an increase in the amount of grazing or pastureland but also causes loss of aquatic and riparian area habitat. Streams that have retained their natural channels and those that have not been ditched suffer less bank erosion and transport less sediment. Streams were dredged and converted to deep, narrow ditches with little habitat complexity.

Loss or reduction of riparian vegetation is another common consequence of increasing the amount of production on agricultural lands. Producing lumber products also had an effect on the bays and the rivers that drain into the watersheds. Splash dams, a common practice in the early 1900s to facilitate getting cut logs to mills downstream, were constructed across streams and rivers to create temporary log ponds. When the splash dams were removed, the logs rushed downstream completely scouring all the riparian vegetation and the bottoms of streambeds and scraping the riparian vegetation from the banks. These effects can still be seen along some tributaries.

2.4 Agricultural Water Quality

2.4.1 Water Quality Issues

2.4.1.1 Beneficial Uses

Beneficial uses (OAR 340-041-0300) are designated by the Oregon Water Resources Department and refer to the purpose or benefit to be derived by the waterbody.

Table 2.4.1.1 Beneficial Uses

Beneficial Uses	Estuaries and Adjacent Marine Waters	All Streams and Tributaries Thereto
Public Domestic Water Supply Supply		X
Private Domestic Water Supply		X
Industrial Water Supply	X	X
Irrigation		X
Livestock Watering		X
Fish and Aquatic Life	X	X
Wildlife and Hunting	X	X
Fishing	X	X
Boating	X	X
Water Contact Recreation	X	X
Aesthetic Quality	X	X
Hydro Power		X
Commercial Navigation and Transportation	X	

2.4.1.2 WQ Parameters and 303(d) list

After each stream's beneficial uses are identified, its water quality is evaluated against the standards set for these particular uses and the 303(d) listing criteria by DEQ. The condition and availability of water in the Management Area is affected by both natural and human activities. Water quality standards, as defined by the Clean Water Act, have two elements. Those elements are 1) the beneficial use being protected and 2) the specific "water quality parameter," which represents the quality of water for a beneficial use.

The parameters that are listed as water quality limited in the Management Area are aquatic weeds or algae, bacteria (E.coli and Fecal Coliforms), dissolved oxygen, chlorophyll a, sedimentation, temperature, and biological criteria as determined by DEQ. See Appendix J - 303(d) Listed Waterbodies from 2012 Integrated Report

A. Algae or Aquatic Weeds

Elevated levels of nutrients can cause algae to reproduce and grow at high rates in what is often called an "algal bloom." When these blooms die back, the process of decomposition begins and dissolved oxygen levels in the water can drop sharply. The lowered dissolved oxygen levels stress fish and other aquatic organisms present in the system. Some strains of blue green algae can also release toxic substances as they bloom. Algal growth at levels that have adverse effects on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation, or industry are not allowed. Monitoring has shown that water quality in the Tenmile Lakes Watershed does not meet state water quality standards at all times of the year for aquatic weeds and algae.

Because blue green algae are able to utilize atmospheric nitrogen and cannot be limited by nitrogen, a reduction in lake water total phosphorus is often used as a water quality target which has direct linkages to nuisance algal blooms. Phosphorus is present in the lake during the summer months from multiple sources including; summertime lakefront activities as well as

internal lake cycling (sediments, fishery, weeds, etc). Because discrete loads from these sources are elusive to define, total phosphorus is proposed as a target, to work towards.

Neither Oregon nor EPA has set a criterion for phosphorus. EPA has recognized the relationship between phosphates, as major nutrients, and excessive aquatic weed and algae growth, and lake and reservoir eutrophication.. Limnologists and lake managers have developed a general consensus about freshwater lake responses to nutrient additions, that essentially an ambient total phosporus concentration of greater than about 0.01 mg/L and or a total nitrogen of about 0.15 mg/L is likely to predict blue-green algal bloom problems during the growing season.

When an abundance of invasive, non-native macrophytes (those listed on the "A" or "B" Noxious Weed List maintained by the Department of Agriculture) are documented to dominate the lake assemblage of plants, significantly reduce the surface area available for lake usage, or impair other beneficial uses, a waterbody is determined to be water quality limited for weeds. In these situations the photosynthetic process can lead to large daily fluxuations in pH and dissolved oxygen.

The complete Algae and Weed criteria is in OAR 340-041-007(11).

B. Bacteria (Escherichia coli (*E coli*))
The bacteria standard protects human health during recreation in streams, rivers, and lakes by setting safe levels for bacteria. In Oregon, *E. coli* bacteria are used as an indicator of fecal contamination. *E. coli* are found in the feces of humans and other warm blooded animals. These bacteria can enter waterways through wildlife, livestock waste, failing residential septic systems, wastewater treatment plant malfunctions, rural residential runoff, and urban runoff. DEQ water quality monitoring shows that bacterial pollution concentrations increase as river flows increases, which suggests that much of the bacteria is associated with landscape runoff.

Not all *E. coli* bacteria are pathogenic. Pathogenic organisms include bacteria, viruses, and parasites that cause diseases and illnesses. In infected individuals, pathogenic organisms are found along with *E. coli* bacteria. If *E. coli* bacteria counts are high in a river, there is a greater chance that pathogenic organisms are also present. A person swimming or in contact with waters with high counts of fecal bacteria has a greater chance of getting sick from disease causing organisms or pathogens.

E. coli bacteria standards are expressed as a 30-day log mean of 126 *E. coli* organisms per 100 ml, based on a minimum of five samples, with no single sample exceeding 406 *E. coli* organisms per 100 ml. A waterbody is considered water quality limited if more than 10 percent of the samples exceed 406 organisms per 100 ml or the 30-day log mean is greater than 126 organisms per 100 ml.

In order to ensure that streams, rivers and lakes are safe for water contact recreation, DEQ determines flow based targets for bacteria concentrations that, if met, will result in attainment of water quality standards. Often large bacteria reduction targets are applied to high and peak flow storm events where surface runoff is greatest. For the Coquille Subbasin, available data indicates that the geometric mean freshwater criterion is generally met at the South Fork, Middle Fork and North Fork at ambient monitoring stations, but that the freshwater maximum criterion is occasionally exceeded. At the Coquille Estuary ambient station at rivermile 23, both geometric mean and maximum freshwater criteria are exceeded during high to peak flow conditions, which indicates that significant bacteria loads enter the system downstream from South Fork, Middle Fork and North Fork ambient monitoring stations.

In areas where recreational or commercial shellfish harvest is occurring, fecal coliform median concentrations should not exceed 14 organisms per 100 ml, with not more than 10 percent of the samples exceeding 43 organisms per 100 ml. This bacterial standard is established to assure that shellfish meats have acceptable bacterial levels and are safe for human consumption. Marine and shellfish growing criteria are exceeded during high flows at the Coquille Estuary ambient station (RM 23). Modeling and observed data indicate that large reductions in river bacteria loads are needed to meet shellfish criteria downstream from rivermile 10 during high to peak flow periods.

No sewage may be discharged into or allowed to enter the waters of the State unless such sewage has been treated in a manner approved by DEQ. Waste-water treatment plants are required to improve treatment to comply DEQ rules. Likewise, the runoff of domesticated animal wastes should be minimized and treated to the maximum extent practicable before it is allowed to enter waters of the state. Bacterial pollution or other conditions deleterious to waters used for domestic purposes, livestock watering, irrigation, bathing, or shellfish propagation or otherwise injurious to public health are not allowed. The complete bacteria standard is in OAR 340-041-0009.

C. Chlorophyll a

Chlorophyll a is a by-product of the photosynthesis of algae and is a measurement of the amount of algae growing in a waterbody. High values of this substance indicate large populations of algae and other aquatic vegetation. Average Chlorophyll a values are used to identify waterbodies where phytoplankton may impair the recognized beneficial uses (DEQ, 1998). Within the Coquille Subbasin, high concentrations of algae within the watershed contributes to a total organic carbon imbalance that in turn is a driver for the low dissolved oxygen observed in the mainstem of the Coquille River, which threatens aquatic life. Management strategies are needed to lower the available organic matter that can contribute to oxygen deficit as it decays. The complete Chlorophyll a standard is in OAR 340-041-0019.

D. Dissolved Oxygen

Dissolved oxygen refers to the amount of oxygen that is dissolved in water. High concentrations of dissolved oxygen in water are essential for fish and macro-invertebrate communities. Salmon and trout are especially vulnerable to problems caused by a lack of dissolved oxygen during their early life histories (egg development and juvenile rearing stages). Higher oxygen levels are needed to support salmonid spawning until fry emergence from the gravel. When other environmental conditions (barometric pressure, altitude and naturally occurring temperatures) preclude attainment of the dissolved oxygen standard oxygen levels shall not be less than 95 percent saturation (DEQ, 1998).

Dissolved oxygen levels can vary over the course of the day based on available nutrients. This up and down cycle is heavily influenced by algae growth and other excess sources of organic matter. Wide swings in daily dissolved oxygen levels make respiration difficult for aquatic life. Temperature and dissolved oxygen exhibit an inverse relationship; as water temperatures rise, dissolved oxygen levels fall; as water temperature falls, dissolved oxygen levels rise. Higher oxygen levels are needed to support salmonid spawning until fry emergence from the gravel. This is why attainment of the dissolved oxygen standards depends upon riparian buffer enhancement and reducing solar radiation loading of surface waterbodies. Where conditions of barometric pressure, altitude, and naturally occurring temperatures preclude attainment of the dissolved oxygen standard oxygen levels shall not be less than 95 percent saturation (DEQ, 1998). The complete Dissolved Oxygen standard can be found at OAR 340-041-0016.

E. Habitat Modification

Substantial amounts of habitat in the watersheds have been altered from what they were historically. An example of this is ditching and draining of marshlands to provide a drier pasture situation. Streams that historically meandered across valleys were ditched and pushed to one side of the valley to create more pasture. This modification impacted many of the aquatic organisms and fish, and caused the stream to lose many different types of habitat present historically. Urbanization has also had a big impact on modifying habitat. Habitat modification is identified as a water quality impairment not needing a total maximum daily load. This is because a pollutant does not cause the water bodies' habitat impairment. Habitat modification does closely relate to other water quality parameter impairments such as temperature, bacteria, and sedimentation.

TMDLs may incorporate habitat and modified channel improvements and alternative management measures in areas where modifications directly contribute to pollutant delivery.

F. pH

The pH of water is a measurement of acidity and alkalinity present. Low pH waters are considered acidic and high pH waters are considered basic. The pH of water can affect the availability of and toxicity of metals, ammonia, and other substances. High pH values are harmful to salmon and may cause death. Western Oregon streams naturally have a low pH buffering capability. This is partly because of the high precipitation rates and acidic coniferous forests. The complete pH standard can be found at OAR 340-041-0021.

G. Sedimentation

The formation of bottom deposits harmful to fish or other aquatic life or injurious to public health, recreation are not be allowed.

Streams carrying excessive sediment loads are a major problem in the Management Area. Many areas in Coos County have high natural sediment production rates due to the geology, steep terrain, and rainfall of the area (Ricks, 1992) (DEQ, 1992). These conditions combined with thinly soiled slopes on unstable bedrock leave the area prone to surface erosion, soil creep, debris flows, and flash flooding.

Some of these sedimentation problems are outside the landowner's control. One example of this is if a landowner owns property that adjoins lands where mismanagement is occurring. A landowner can experience large deposits of sediment flow onto their lowlands and streams from upland activity. If the point of origination is upstream, the landowner would not be responsible if sediments are found in their ditches or waterbodies.

High sediment loads can blanket stream gravels and cause fish eggs and juveniles to suffocate. Sediment loads reduce oxygen in the streambed, makes finding food difficult for macro-invertebrates and fish, fills pool habitat, and at high levels can cause gill abrasions and other chronic problems for fish. Higher sediment concentrations also make water treatment expensive and ineffective for human consumption and can fill in storage reservoirs more rapidly than planned (Johnson et. al., 1992).

Increases in upland sediment loading have resulted in increased rates of lake filling. Invasive weeds quickly colonize areas where water depth allows for bottom rooting in areas where depth is shallow enough for sunlight to penetrate. Phosphorus, because of its tendency to attach to soil particles and organic matter, is primarily transported in surface runoff with eroded sediments. Phosphorus present in sediment stored in a lake can be released through time and sedimentation

ties directly to lake filling, a primary driver for the expansion of nuisance weeds. The 2007 Tenmile TMDL primarily targets sediment and phosphorus load reductions to address the Aquatic Weeds and Algae 303(d) listings there.

Turbidity is used as measurement of the increased presence of sediment in water. It is often measured to determine the impacts a given project may be having on the stream. No more than a ten percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activity. However, limited duration activities necessary to address an emergency or accommodate essential dredging, construction, or other legitimate activities may be authorized provided all practicable turbidity controls have been applied. Work conducted in stream often requires permitting from other entities. There cannot be resulting adverse effects on sensitive beneficial uses (drinking water, and fishery).

The complete turbidity standard can be found at OAR 340-041-0036.

H. Temperature

The purpose of the temperature criteria is to protect designated temperature-sensitive, beneficial uses, including specific salmonid life cycle stages in waters of the State. Salmonids and other coldwater aquatic organisms require cool water temperatures to be productive. High temperature waters carry less oxygen than cold waters. The temperature standard that applies to the Coos Coquille Plan area protects salmon and trout throughout their life histories: spawning, rearing, and migration. DEQ has designated fish-bearing streams as either core cold-water habitat or rearing and migration habitat (Map 300A). Spawning areas and times have been determined for streams in the basin as well (Map 300B). A simplified summary of the temperature standard would state that the temperature criteria sets seven-day maximum average temperature targets based upon the most sensitive designated beneficial use. Temperature targets by beneficial use are; 60.8° Fahrenheit for cold water areas, 64.4° Fahrenheit in salmon and trout rearing areas, 55.4° Fahrenheit when fish are spawning, and 68.0° Fahrenheit for areas identified as migration corridors. Migration corridors must have coldwater refugia that are sufficiently distributed so as to allow salmon and steelhead migration without significant adverse effects from higher water temperatures in the migration corridor. As part of the TMDL process, predictive temperature modeling is often utilized to simulate stream temperatures under natural conditions with appropriate riparian cover. Some streams, even under natural or site potential vegetation conditions, are not expected to meet the criteria listed above. After implementing pollution controls temperature criteria may be developed for individual streams.

Water temperatures are influenced by solar radiation, stream shade, ambient air temperatures, channel morphology, groundwater inflows, and stream velocity, volume, and flow. In many areas of the South Coast Basin, a major source of stream warming is the removal of near-stream vegetation leading to increased solar radiation reaching the water. Removal of near-stream vegetation has resulted from near-stream logging, splash damming, early river commerce, various agricultural practices, and urban/rural development. Other activities that contribute to the warming of surface waters include heated wastewater discharges, channel modification, reservoirs, water withdrawals, and return irrigation flows.

In most areas, improvements in stream temperatures are expected when all sources meet their thermal pollution limits, which includes restoration and enhancement of near-stream site potential vegetation. Even if streams do not meet the temperature criteria under site potential conditions, reductions in the amount of time the criteria are exceeded are expected.

Natural lakes, oceans and bays may not be warmed by more than 0.5° Fahrenheit above the ambient condition unless a greater increase would not reasonably be expected to adversely affect fish or other aquatic life.

Where waters of the state that have temperatures below the criteria cited above, they may not be warmed by more than 0.5° Fahrenheit above the colder water ambient temperature. This provision applies to all sources taken together at the point of maximum impact where salmon and steelhead are present.

A point source that discharges into or above salmon and steelhead spawning waters that are colder than the spawning criterion, have limits on how much stream heating is allowed.

The cold water protection criteria does not apply if: there are no threatened or endangered salmonids currently inhabiting the waterbody, the waterbody has not been designated as critical habitat; and colder water is not necessary to ensure that downstream temperatures achieve and maintain compliance with the applicable temperature criteria.

For farming or ranching operations on state or private lands, water quality standards are intended to be attained and are implemented through the Agricultural Water Quality Management. Therefore, farming and ranching operations that are in compliance with the Agricultural Water Quality Management Act requirements will not be subject to DEQ enforcement under this rule. Agriculture and forestry activities conducted on federal land must meet the requirements of this rule and are subject to - DEQ jurisdiction.

The complete Temperature Criteria can be found at OAR 340-041-0002 (definitions) and 0028.

I. Toxics

Toxic substances are chemicals and other substances, such as heavy metals, that are harmful to humans and aquatic life. Pesticides fall into this category High mercury levels have been documented in some waterbodies. Mercury can occur as a by-product of legacy gold mining activity and also occurs naturally in some waterbodies.

Toxic substances cannot be introduced above natural background levels in the waters of the state or in amounts which may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bio-accumulate in wildlife or aquatic life to levels that adversely affect public health, safety, or welfare; aquatic life, wildlife, or other designated uses (DEQ, 1998). The standard goes on to reference tables of criteria for certain toxic substances.

The complete Toxics Water Quality Standard can be found at OAR 340-041-0033.

J. Biological Criteria

Freshwater macroinvertebrates include insects, crustaceans, snails, clams, worms, mites, etc. DEQ identifies sites in a given region that are least disturbed by anthropogenic activities and uses these as reference sites. Biological assessment tools use information from these reference sites to predict the variety and number of aquatic life species expected in Oregon streams and to make inferences about the biological condition of the waters.

Detrimental changes in resident biological communities are a form of pollution. Biological community assessments can be used as an indicator for aquatic life beneficial use support. Numeric benchmarks have been developed to evaluate the integrity of aquatic biological communities. Biological assessments look at conditions in the biological communities, but do

not by themselves indicate if changes are related to pollutants, or identify which pollutant should be addressed by point source or other controls through a TMDL.

DEQ has developed the PREDictive Assessment Tool for ORegon, or PREDATOR, to assess the macroinvertebrate communities in Oregon's perennial, wadeable streams. PREDATOR analyzes data from reference sites grouped into three regions in Oregon and models the expected assemblage. Information from a sampling site can be compared to the macroinvertebrate assemblage predicted by the model and an assessment made about how different the observed assemblage is from the expected or reference assemblage. Data collected at a sampling site is used to generate a number for the observed versus expected (O/E) macroinvertebrate taxa. This number represents the "missing" taxa at a site and can be expressed as "% taxa loss."

The complete Biological Criteria Water Quality Standard can be found at OAR 340-041-0011.

2.4.1.3 TMDLs and Agricultural Load Allocations

As mentioned elsewhere in the Area Plan, many water bodies in Oregon do meet water quality standards for various pollutants at certain times of the year. In the Coos and Coquille basins, including Twomile, Fourmile, and Tenmile watersheds, temperature, bacteria, pH, Dissolved Oxygen (DO), aquatic weeds, algae, habitat modification, chlorophyll a and sedimentation have been identified as water quality limitations. The Total Maximum Daily Load (TMDL) for each pollutant is determined by scientific data collection and analysis to determine how much of a pollutant a waterbody can receive and still meet water quality standards. Water quality standards are intended to protect the most sensitive beneficial uses in a waterbody.

Water bodies that do not meet water quality standards are placed on a state 303(d) list of impaired water bodies (https://www.deq.state.or.us/wq/assessment/rpt2012/search.asp). Rivers, streams, or lakes that are on the list require the development of a TMDL. In the Coos and Coquille basins, the TMDL process began in Tenmile Lake Watershed with the completion of its TMDL in 2007. The Coquille Subbasin TMDL should be completed in early 2021. The Coos Subbasin TMDL is scheduled to begin development after the EPA approval of the Coquille Subbasin TMDL.

Tenmile Lakes Watershed

The Tenmile Lakes Watershed is water quality limited for aquatic weeds, algae, pH and habitat modification. The Tenmile Lakes Watershed TMDL addresses aquatic weeds and algae as DEQ proposes to remove the listing for pH. Although habitat modification is identified as a water quality limitation, it is not a direct result of pollution. Because a pollutant is not the cause, the concept of establishing loading capacity and allocations do not apply to habitat modification and therefore no TMDL will be developed for habitat modification.

Testing in both North and South Tenmile Lakes has revealed concentrations of microcystin, a toxin produced by algae, in the lake. Algae and toxin levels have triggered repeated health advisories since 1997 related to lake water consumption (drinking water) and/or recreational contact with lake waters. In addition, the water quality of the lakes has been adversely affected by the presence of excessive aquatic plant growth, especially non-native plants. Aquatic weeds, algae, and toxins are directly related to the delivery of excess nutrients, phosphorus in particular, to the lake through sedimentation. The Tenmile Lakes Watershed TMDL addresses these water quality limitations through the reduction of sediment delivery to the Tenmile Lakes. Both sediment accrual rates and total phosphorus in the lake water column are being used to

track water quality improvements. Sediment loading is targeted to reduce by 50 percent within 25 years (Tenmile Lakes Watershed TMDL 2007).

DEQ has identified three primary management strategies to control sediment and phosphorus loading to Tenmile Lakes:

1. Riparian and wetland protection and enhancement: Wetlands and riparian areas have the ability to remove nonpoint source pollutants from waters passing through the wetland or riparian area. Wetlands present at lake tributary interfaces are especially important as a mechanism to filter sediments from upland sources. Attainment of Tenmile Lakes TMDL sediment load allocations relies heavily of the re-establishment of wetland function in these areas. In addition, the confinement of flows in these straightened channels exacerbates streambank erosion and lake sediment filling.
2. Sediment abatement measures: Implementing upland sediment controls and abatement activities will help to reduce the amount of phosphorus in the form of sediment delivered to the lakes.
3. Hydromodified channel management measures: Hydromodification refers to channelization or channel modification. Many agricultural lowlands have modified stream channels present for the purpose of flood control, drainage improvement and maximizing grazing potential. Hydromodification also includes activities such as stabilization projects, as well as the clearing, cleaning, straightening, widening, deepening, or relocating of existing stream channels. These modified channels result in the increased transport of suspended sediment to the lakes during high-flow events. In addition, the confinement of flows in these straightened channels elevates stream velocities and exacerbates streambank erosion. Increasing channel connectivity to finger valley floors can help decrease streambank erosion and allow sediments to settle on the valley floors rather than be transported directly to the lakes. Proper evaluation of channelization and channel modification projects should consider three major points:
    a. Existing conditions: New and existing channelization and channel modification projects should be evaluated for potential effects based on existing stream and watershed conditions.
    b. Potential conditions: Anticipated changes to the conditions in a stream, along the streambank, and within the watershed should be evaluated.
    c. Watershed management: Evaluation of changes in watershed conditions is important to the proper design of a channelization or channel modification project.

Instream work, including maintenance (dredging) of the streams in most cases, will require a permit from the Department of State Lands (DSL) and/or the U.S. Army Corp of Engineers (USACE) along with a 401 water quality certification from DEQ. Applicants who propose stream management activities in the Tenmile Lakes Watershed will need to provide DEQ specific information during the project review and evaluation process. This information should include:

- The available gradient and if the gradient is sufficient in the proposed project area to indicate that the dredging will result in improved drainage.
- A management plan for existing and future vegetation along channelized streams.
- A discussion of the potential to use sediment-trapping methods in locations where a change in stream gradient could result in early sediment deposition.
- A spoils (sediment) management plan that discusses where, when and how all spoils will be dispersed, and;
- A reporting mechanism to DEQ for the amount of cubic yards that are removed each year.

The Area Plan and Rules were developed to achieve water quality standards and address the load allocations identified in the TMDL through the use of above-mentioned positive management practices and the enforcement of unacceptable conditions. The Coos SWCD will offer education and outreach opportunities to inform landowners about channelized stream management.

2.4.1.4 Drinking Water

Fifty-three public drinking water systems in the Management Area utilize surface water and groundwater sources to serve approximately 57,000 persons regularly.

Agricultural land uses (hay/pasture, dairies, cranberries, livestock, orchards, and nurseries) are dispersed throughout the Management Area and are present near many of the public water system wells and springs. Agricultural activities are potential sources of bacteria and nitrate, as are septic systems and other human and natural sources.

Recent alerts for fecal coliform bacteria are common, and several public water systems have had recent Total Coliform or E. coli alerts. There has been only one recent alert for elevated nitrate concentrations for a public system: Arago Community Church. In addition, only 3 of the 341 private wells for which there are data had elevated nitrate concentrations, none of which exceeded the maximum contaminant limit (10 mg/L).

The soils through most of the Management Area have very high nitrate leaching potential, according to NRCS. According to the OHA, the Management Area has a mix of moderate and high susceptibility wells. The nitrate and other contamination issues described above and the ready movement of nitrogen into aquifers in the area verify this susceptibility.

Many of the wells are in high and medium leaching potential soils. Nitrate from fertilizers and septic systems can readily penetrate to the aquifers used for drinking water when leaching potential is high or very high, and 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.

When agricultural best management practices of manure management, riparian buffers and protection are not followed, agricultural activities can threaten public drinking water sources. Sedimentation and high nutrient and bacteria concentrations can shut down collection operations and raise treatment costs. Recent efforts by the local entities Coos SWCD, the City of Bandon, the City of Myrtle Point, and the Coquille Water Association have each been working collaboratively on water quality protection projects that have the greatest potential for reducing these risks.

2.5 Regulatory and Voluntary Measures

The Positive Management Practices suggested by the Coos and Coquille LAC are some practices that are generally felt to address agricultural impacts on water quality. The practices suggested in this Area Plan are only a few and many more can be found through the various associations and agencies in the area. It is intended that implementation of this Plan provide flexibility for landowners and land managers to use their own ingenuity and creativity to address water quality concerns. The Coos SWCD is a source of technical assistance for planning and design of management practices.

Unacceptable Conditions, and conditions that may cause a water quality problem in this Area Plan are conditions that contribute to water pollution and should be corrected. The Conditions will form the basis for the rules that accompany this Area Plan. Wherever a rule is quoted in this Area Plan, it is highlighted and framed by a box. Appendix I lists associations and agencies in the watershed areas that provide assistance for designing management plans to overcome Unacceptable Conditions.

Other entities, such as golf courses, may also want to adopt provisions of this Area Plan for management guidance on their property (or properties). ODA and the Coos SWCD are dedicated to working with interested parties to provide them the assistance that they may need to overcome Unacceptable Conditions.

Rule

OAR 603-095-1540

(1) All landowners or operators conducting activities on lands in agricultural use will comply with the following criteria. A landowner is responsible for only those conditions resulting from activities caused by the landowner. A landowner is not responsible for conditions resulting from actions by another landowner. A landowner is not responsible for conditions resulting from unusual weather events or other exceptional circumstances that could not have been reasonably anticipated.

2.5.1 Nutrients and Manure Management

As more and more attention is focused on the issues surrounding nutrient management, especially dealing with animal waste storage and utilization, practices must be adopted that minimize water quality degradation from the application of nutrients to the land without placing undue hardships on producers. Manure and urine, when deposited by livestock, should be managed so that it is deposited on land that can break it down into useable components; in this way, it benefits the pasture and does not cause pollution to nearby waterbodies. Manure should not be allowed to enter waterways as it has many detrimental effects on aquatic life. Runoff from pastures should be managed so flows will not carry wastes or nutrients into surface water. When manure or other fertilizers are considered as valuable soil amendments rather than waste products, as the case with manure, it becomes beneficial as well as financially rewarding to apply it following recommended guidelines established by regular soil testing and plant tissue analysis.

To assist in reducing nutrient loading to waterways, it is important to utilize and incorporate buffer and filter strips if they are needed. Vegetation in buffers as little as 30 to 90 feet can significantly reduce the transport of nutrients and sediments into streams (Karr and Schlosser, 1978). These are strips of vegetation that are planted near or by a waterbody to assist in the capture of nutrients and wastes before they enter a waterbody. These strips serve a multitude of purposes, mainly being that they provide a vegetative strip that can, in some cases, eliminate most nutrients and harmful bacteria. Buffer and filter strips also help to protect the aquatic environment by providing shade, food, and shelter. There are many different types of these vegetative strips. Widths are dependent on the specific site and their use. There are also many cost share programs available for the installation costs of these strips. These programs are available from the Coos SWCD, local watershed councils, and NRCS.

CAFOs are operations that are already under regulation by the ODA and the EPA. In the Coos and Coquille Area, all dairy operations are affected by CAFO rules and by agricultural water quality

rules. Some CAFOs require a permit from the ODA and a permit is required prior to construction or operation of these facilities. A CAFO is defined as:

(a) the concentrated, confined feeding or holding of animals or poultry, including but not limited to horse, cattle, sheep, or swine feeding areas, dairy confinement areas, slaughterhouse or shipping terminal holding pens, poultry and egg production facilities and fur farms,
    (A) in buildings or in pens or lots where the surface has been prepared with concrete, rock or fibrous material to support animals in wet weather; or
    (B) that have wastewater treatment works; or
    (C) that discharge any wastes into waters of the state.
    or
(b) an animal feeding operation that is subject to regulation as a concentrated animal feeding operation under federal law.

Wastewater treatment works means all or any part of a system used in connection with a CAFO for the:

(a) collection, retention, treatment, and disposal of liquid wastes or contaminated water; or
(b) collection, handling, storage, treatment or processing and disposing of liquid manure.

Examples of a CAFO are: 1) livestock confined in buildings, pens, etc. regardless of whether it has any part of a wastewater treatment facility or 2) a livestock operation with any part of a wastewater treatment facility. However, a permit is NOT currently required if animals are confined for four months or less or that do not have wastewater treatment works, i.e., horse stables, chicken operations where manure is handled dry, etc., unless a permit is required under federal law. For more information on CAFO rules, please call 503-986-4700 or view the ODA web page at https://www.oregon.gov/ODA/programs/NaturalResources/Pages/CAFO.aspx.

Runoff leaving areas of concentrated manure can quickly alter water quality. Manure applied to bare soil or immature crops with minimal ground cover is highly susceptible to runoff. Animal waste runoff pollutes water. Upon entering a body of water, manure is subject to natural decay. Biochemical oxygen demand (BOD) increases in the decomposition process, and as BOD increases, dissolved oxygen decreases and ammonia is released. These changes are very stressful to fish and other aquatic organisms. Poor management of animal wastes from livestock can result in poor water quality, reduced fish populations, and significant fish kills.

Animal wastes carried by surface runoff may contaminate the receiving waterbody with pathogenic and non-pathogenic micro-organisms, biodegradable organic matter, and nutrients (Terrell and Perfetti, 1989). Waste treatment and control facilities (such as manure lagoons) and manure (slurry or solid) improperly applied near riparian areas are concentrated sources of pollution and disease bearing organisms.

Improperly managed pastures may become major sources of pollution by the sheer volume of urine and feces deposited in or near a stream. While it is difficult to completely eliminate nonpoint source pollution from nutrient application, impacts can be lessened by following positive management practices. Producers, especially those using manure, should strive toward achieving the maximum soil and crop benefits by using correct agricultural recommendations.

Positive Management Practices

- Protect manure storage from floodwater inundation,
- Divert water away from manure storage,
- Use buffer and filter strips,
- Compost manure,

- Control access to waterways and crossings by livestock to minimize waste deposition in or near a waterway,
- Spread manure at appropriate times, in appropriate places, at agronomic rates as suggested by Oregon State University (OSU) Extension Service or other sources,
- Livestock operations not requiring a permit can follow CAFO guidelines where practical, which work toward minimizing nonpoint source pollution,
- Determine and utilize proper stocking rates for all livestock,
- Manage for healthy pasture growth, proper rotation, and good pasture conditions. Pastures can serve as a buffer zone if properly managed,
- Confine fertilizer application to the area fertilized. Apply fertilizer at proper rates, and at proper times, with favorable weather conditions,
- Create and utilize a nutrient management plan.
    - 2.5.1 Positive BMPs for Ag Nutrients. We should include the protection, enhancement and development of wetland areas that have the potential to filter upland sediment and nutrient loads. This is particularly important for implementing the Tenmile Lakes TMDL and improving the Harmful Algae Blooms there.

Conditions that may Lead to a Possible Water Quality Problem

- Uncovered manure piles, fertilizer piles, or agricultural wastes, which produce runoff that enter waterways,
- Broadcasting fertilizer, either chemical or manure, in a waterway,
- Applying fertilizer above agronomic rates,
- Location of new feed barns and feeding areas in streamside areas without proper planning for control of wastes.

Unacceptable Condition

- Excessive amounts of manure or fertilizers that enter waterways.

Rule

OAR 603-095-1540

(3) Nutrient Management

(a) Effective three years after rule adoption, application and storage of manure, commercial fertilizer, and other added nutrient inputs to agricultural lands will be done in a manner that minimizes the introduction of nutrients into waterways.

2.5.2 Riparian/Streamside Area Management

Riparian areas, which are the edges of a bank of a river or other body of water, are important as they serve to stabilize banks; capture and filter excess sediment, nutrients, and chemicals from runoff; recharge the groundwater and aquifers; provide shade for keeping water cool; dissipate energy from flooding; and provide food and habitat for fish and other wildlife. Vegetation normally functions to build and/or protect stream and riverbanks by catching sediment (eroding soil) and holding soil in place. Barren riparian areas are prone to erosion, adding sediment to the stream and causing unstable banks. Land managers should work to improve riparian areas when they are not functioning properly.

Riparian areas are highly variable throughout the Management Area. The lower elevation coastal streams have different climates, soils, and natural vegetation than the higher upland areas. Upland management should deter excess soil and nutrients moving into the riparian

area, and these areas should have adequate vegetation to retain precipitation and facilitate infiltration. Otherwise, excessive runoff can overwhelm the riparian area and negate good riparian management. Good management in surrounding areas will provide the opportunity for riparian areas to function properly.

Every waterbody has riparian areas with its own characteristics, needs, and potential. Individual riparian site characteristics and potential must be considered when trying to determine how the vegetation should function. Each riparian area may require a different mixture or amount of vegetation to provide the desired condition or function.

Once riparian areas are degraded, it may be very difficult to restore them. It is important to ensure that existing riparian vegetation does not deteriorate.

A part of managing riparian areas is to understand that several agencies have regulations that may impact the management practices used. It is advisable to seek technical advice, assistance, or education pertaining to riparian management.

Positive Management Practices

- Provide off-channel watering devices for livestock as an alternative to in-stream watering.
- Establish and maintain livestock crossings and watering paths to prevent and control pollutant delivery to the stream or river.
- Encourage riparian vegetation to provide stream shading as well as filtering capacity, sediment trapping, and stream bank stability.
- Manage intermittent stream riparian areas to protect water quality.
- Control noxious weeds in riparian areas.
- Management of the riparian area should allow for establishment, growth, and maintenance of riparian vegetation (trees, shrubs, sedges, and grasses) consistent with the site capability.

Conditions that may Lead to a Water Quality Problem

- A riparian area, which has insufficient or inadequate riparian or streamside vegetation as a filter for sediment, nutrients, a shade provider, or bank stabilization.
- More than 50 percent of the current year's shrub and tree growth is removed from established areas and regeneration is not evident, indicated by lack of young plant species consistent with the site capability.

Unacceptable Condition

- Riparian vegetation conditions that do not provide a filter for nutrients, sediment, protect stream banks, and/or provide shade, as consistent with the site capability.

Rule

OAR 603-095-1540

(5) Riparian Management

(a) Effective three years after rule adoption, management activities in the riparian area will be conducted in a manner that allows the establishment, growth, and maintenance of riparian vegetation consistent with vegetative site capability so as to provide some combination of filtering capacity, sediment trapping, stream bank stability, and shade.

(A) Exemptions shall include stream crossings, access for irrigation equipment and other accepted water dependent agricultural uses when conducted in a manner that minimizes impacts on streambank stability.

2.5.3 Soil Erosion Prevention and Control

Excessive amounts of sediments have an adverse impact on good water quality. Coos County has soil types, topography, flooding events, and weather conditions that make sediment reduction difficult. In 1896, it was noted by ships passing by Bandon that the Coquille River was a large brown streak entering the ocean (Benner, 1992). Although it is recognized that these natural conditions do exist, adoption and promotion of Positive Management Practices will aid in decreasing man caused sediment entering the waterways. Since many operations in Coos County are a mixture of forestry, ranching, and farming, it is important that sediment control be individually designed to fit each operation. A sediment control measure, such as the use of grass or forested buffer strips, can greatly reduce erosion rates (Prato et. al., 1989). It is strongly suggested that agencies involved in issuing permits for streambank restoration after a natural event act promptly so that some restoration work could be done before the next winter.

Excessive sediment levels affect several beneficial uses. Sediment clogs filters at drinking water treatment plants and in homes making water "cloudy" and unpleasant. Treatment for sediment is extremely expensive and erosion control of sediments may be more cost effective. Stream bottoms covered with fine sediments can no longer be utilized for salmon spawning and will suffocate those eggs left in the gravel. Large sediment deposits can block the way to upper spawning reaches. Suspended sediments clog the gills of fish, decrease dissolved oxygen levels, inhibit fish feeding and growth, and cause macro-invertebrate levels to drop (Oregon-Washington Interagency Wildlife Committee, 1979). Besides these direct impacts, other secondary effects can be attributed to sediments. Pesticides and nutrients can bind to sediments and can be carried into waterways in greater proportions than by water flow without sediments.

Positive Management Practices

- Divert runoff away from farm structures and other heavily used areas.
- When constructing new cranberry beds or fields for planting, take measures to control sediment leaving the farm.
- Maintain private farm roads to prevent erosion and degradation of embankments.[1]
- When pasturing livestock, minimize sediment delivery near waterways and riparian areas.
- Manage waterways for livestock watering and stream crossings such that livestock use is limited to only the amount of time necessary for watering and/or crossing the waterway.
- Design riparian area management to prevent and reduce erosion in surface runoff.
- Use, as appropriate, fencing (either permanent or temporary) or other management practices to ensure growth and maintenance of riparian vegetation.

Conditions that may Lead to a Possible Water Quality Problem

- Gullies or large amounts of soil loss present on or arising from privately owned farm roads that enter waterways.
- Activities, such as overgrazing, on or near streambanks that cause large amounts of earth to erode and deliver sediment to waterways.

Unacceptable Condition

- Harmful soil loss into waterways from agricultural activities.

[1] One suggested reference to use for culvert size is the Forest Practices Act Recommendations from Oregon Department of Forestry.

Rule

OAR 603-095-1540
(2) Sediment Management
(a) Effective three years after rule adoption, soil erosion associated with agricultural cultivation shall not deliver sediment sufficient to violate water quality standards.

2.5.4 Upland Management

Role of Upland Vegetation to Prevent and Control Pollution
Upland areas are the rangelands, forests, and croplands located upslope from streamside areas. Upland areas extend to the ridge-tops of watersheds. With a protective cover of crops and crop residue, grass (herbs), shrubs, or trees, these areas will capture, store, and safely release precipitation, thereby reducing the potential of excessive soil erosion or delivery of soil or pollutants to the receiving stream or other body of water.

Healthy upland areas provide several important ecological functions, including:

- Capture, storage, and moderate release of precipitation reflective of natural conditions.
- Plant health and diversity that support cover and forage for wildlife and livestock.
- Filtration of sediment.
- Filtration of polluted runoff.
- Plant growth that increases root mass, utilizes nutrients, and stabilizes soil to prevent erosion.

2.5.5 Pasture Management

Bottom ground management in the Management Area is closely linked to the flood cycles of the rivers. Generally, livestock graze on productive floodplain pastures from April through November but floodplain grazing becomes problematic during the remainder of the year due to seasonal flooding. Well-managed pastures provide an important resource to livestock owners. Irrigated pastures and rangelands benefit the watersheds by protecting the soil and maintaining water quality. Pasture vegetation also provides the additional benefit of utilizing excess nutrients from manure and urine (Cannon, 1999).

Pastures can provide continuous ground cover that enhances infiltration of precipitation and help prevent soil erosion. Pasture vegetation filters sediments during high rainfall and flooding, and can actually reduce net nutrient loads to streams and lakes through uptake in plant and animal tissues. Proper grazing management can help enhance protective and productive soil cover.

Pastures can provide habitat for a variety of wildlife. A wide variety of grazing systems can be used to enhance habitat conditions. Pastures often provide feeding and nesting sites for upland birds and waterfowl as well as habitat for rodents and their predators.

Many of the soils that are managed for pasture production have limited yield potential for other crops. They are productive as low input solar energy harvesters and soil mineral recyclers when maintained as improved pastures. However, trees and shrubs can also provide valuable functions in a pasture system.

Well-vegetated fence rows also provide an important service to the landscape. Most pastures have species rich borders with herbaceous plants and woody shrubs along fencerows. Such borders and fencerows offer not only feed and cover but also travel corridors for wildlife.

After establishment, pasture management requires only limited energy inputs. Limited amounts of mechanical and chemical energy and few pesticides are required for efficient pasture production. Modest use of tillage and harvest equipment is required.

A positive flow of energy usually results from pasture production as healthy growing grasses and legumes convert solar energy into stored plant energy that livestock convert to high-energy foods.

The incorporation of livestock into pasture systems increases the rate of energy and mineral capture and recycle. When plants are kept in a vigorous stage of growth due to good grazing management, solar energy capture is enhanced and minerals are rapidly returned to the soil as nutrients. This accelerated energy and mineral cycling is what supports a diverse set of organisms.

Properly managed pastures and grasslands assist in maintaining the health of the watershed by reducing erosion and better utilizing mineral resources and the waste products of grazing. Understanding the techniques needed to properly manage pastures and grasslands and taking the steps to reduce practices that inhibit pasture and grassland production is an important responsibility in establishing healthy waterways. (Todd, 1997)

Positive Management Practices

- Manage grazing intensity and livestock distribution at a level that will maintain desired species composition and plant vigor.
- Clip pastures to encourage pasture health and eliminate undesirable plant species.
- Consider grazing systems that integrate multiple livestock types (e.g. sheep and cows) to increase grazing uniformity.
- Install off stream water storage. Such storage could be used for the benefit of livestock and wildlife and to extend the flow in streams during the dry months. Off stream storage can also reduce runoff during high precipitation periods.
- Harrow pastures to evenly distribute manure.
- Plan pasture seeding so that plants can establish before heavy winter rains begin.
- Design and use sacrifice areas away from streamside areas to lessen impacts on pastures during winter wet seasons.

Conditions that may Lead to a Water Quality Problem

- Agricultural activities causing visible rill or active channel erosion (gully erosion) resulting in sediment delivery to waterways.
- Unacceptable levels of bacteria, sediment, or nutrient delivery to waterways attributed to improper grazing and pasture management.
- Improper pasture management that causes over-grazing damage to riparian areas, swamps, marshes, and bogs.

Unacceptable Conditions

- Amounts of bacteria, nutrients, or sediments entering waterways causing water pollution from improper management.

A specific rule for pasture management is not needed at this time as water quality issues associated with pasture management may be adequately addressed in the rules established for sediment, nutrients, and waste management.

2.5.6 Pesticide Management

Pesticides (herbicides, insecticides, fungicides, etc.) may be used as part of an integrated pest management program[2]. When used only as needed to control certain pests, the continued efficacy of the product is more likely than if just applied annually or seasonally regardless of pest populations. In all cases, farmers should use the lowest possible rates and frequency of applications of pesticides that will produce the desired level of control. Improper pesticide use may impact fish and other aquatic species. These impacts can include: decreased survival rate in juvenile fish, birth defects, altered reproduction, lower productivity, and changes in fish and macroinvertebrate populations. Many insecticides kill both target and non-target species, therefore they can reduce the amounts of macroinvertebrates which affects the food supply for fish. Aquatic plants that provide food and cover to fish are particularly sensitive to some herbicides. Wildlife can also be affected by pesticides or agricultural chemicals. Amphibians are especially prone to effects from aquatic contaminants (Holcombe et. al., 1987) as many species respire through their skin, which increases absorption of water and waterborne toxins (Boyer and Grue, 1995). Once waterbodies are contaminated with pesticides, they can be very difficult and expensive to clean up depending on the persistence of the chemical and its metabolites.

Pesticides are regulated by ODA under ORS 634. This regulation encompasses use. Individual products are required to be used according to their respective labeling. The performance of any application in a manner determined by ODA Pesticides Division to be faulty, careless, or negligent is unacceptable.

Positive Management Practices

- Read and follow the label instructions.
- Apply pesticides only when economic threshold will most likely be exceeded by pest damage.
- Consider using Integrated Pest Management.
- Consider techniques of organic agriculture.

Conditions that may Lead to a Water Quality Problem

- Mixing, loading, transporting, application and cleaning of containers or equipment in a manner that may contaminate surface or groundwater.
- Application of pesticides in riparian areas that are not intended for use near waterways.
- Water storage facilities that allow contaminated runoff or seepage into waterways or groundwater resources.
- Performing any pesticide application in a manner unacceptable by ORS 634.

Unacceptable Conditions

- Harmful amounts of pesticides entering waterways.

Note: Pesticide use is regulated by ODA under ORS Chapter 634 and OAR 603 Division 57, which specifies that the label is the law regarding use.

[2] Integrated Pest Management is a pest population management system that anticipates and prevents pests from reaching damaging levels by using all suitable tactics including natural enemies, pest resistant plants, cultural management, and the judicious use of pesticides, leading to economically and environmentally safe agriculture (EPA, 1993).

Rule

OAR 603-095-1540

(4) Pesticide Management

(a) Effective three years after rule adoption, in cranberry production, water storage systems that intercept agricultural drainage containing pesticides and that reapply this water will be designed to minimize percolation of drainage waters to groundwater or overflow of the impoundment to surface waters.

2.5.7 Channelized Streams, Ditches and Tidegate Management

A sizable portion of the agricultural ground in Coos County is farmed wetland or was formerly estuarine marsh. Ranchers and farmers must maintain a system of dikes, tidegates, and ditches in order for these lands to remain in agricultural production.

Streams are watercourses created by natural processes, or would be in a natural state if it were not for human-caused alterations; streams include channelized or relocated streams. Ditches are manmade water conveyance channels used to improve drainage in relatively flat areas with wet soils. Channels that are manipulated streams are not considered ditches. Instream work, including maintenance (dredging) of the streams in most cases will require a permit from DSL and/or the USACE. A 401 water quality certification (WQC) from DEQ is required in instances where a federal action is taken, as in the case of an issuance of a USACE permit. The DEQ 401 certification contains project specific conditions to ensure that water quality standards and programs are complied with during the project implementation.

A tidegate is a mechanical device placed in a dike or natural riverbank to control tidal fluctuations. This device may consist of a wooden or metal flap hinged on the top of a downstream end of a culvert. The tidegate is positioned so that a rising tide forces the gate against the culvert, preventing flooding inside the dike. Freshwater then backs up behind the gate. On the ebb tide, the gate opens when the downstream level is lower than the freshwater level, allowing drainage of the pastureland. A well maintained system of dikes, tidegates, and ditches will attain two goals: (1) water will drain off the land in a timely fashion, and (2) tidewaters, which are saline, are kept from flooding surrounding pasturelands. If these drainage systems are properly designed and maintained, riparian and aquatic habitat can be provided and often enhanced for a broad range of species.

Positive Management Practices for tidegates and associated structures should have the following general objectives:

- Recognize the landowners goals;
- Maintain different species habitat characteristics;
- Avoid wetland conversion if not desired by the landowner;
- Maintain or improve bank stability.

Positive Management Practices

- Obtain necessary permits from appropriate agencies;
- Maintain systems in good operating condition;
- Consider leaving vegetation on one side of the ditch, preferably the south side, and leaving the opposite side open for maintenance;
- Consider adaptive management options, such as leaving the tidegate open during high winter flow outside of grazing season.

Conditions that may Lead to a Water Quality Problem

- Improperly functioning tidegates and culverts;
- Construction and maintenance of surface drainage ditches that causes excessive placement of soil, delivery of sediment, or sloughing of soil into waterways.

Unacceptable Condition

- Excessive sediment loss into waterways from improper ditching and/or maintenance of ditches.

2.5.8 Irrigation Management

The major methods of irrigation are hand lines with sprinkler application, flood irrigation, and sub-irrigation. Good irrigation management practices involve knowing the precise amount of water to apply to a certain crop to reach the root zone for plant uptake. Different plants have different water requirements. Knowing soil type is another critical component of an irrigation scheme. There are limits to the amount of water a soil can hold and the amount that the plant can use.

Major objectives for irrigators are to minimize the amount of surface runoff and deep percolation. These two processes are the primary transport mechanisms causing water contamination. Through these processes, sediments, chemicals, and fertilizers can be transported into the waterways. Minimizing deep percolation and surface runoff is the result of proper management of irrigation.

Positive Management Practices

- Analyze soil and know crop needs to prevent over-application;
- Consult local resources such as SWCDs, the NRCS, OSU Cooperative Extension Service, and consultants to develop an irrigation water management plan;
- Maintain ditches, tidegates, and pipelines to minimize water losses;
- Maximize your water system efficiency by checking field layouts to ensure correct combinations of spacing, operating pressure, sprinkler head, and nozzle size/type that match the soil infiltration rate;
- When chemigation is used, include backflow prevention 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;
- Consider leasing water rights to instream use during periods of non-agricultural use; (Contact Oregon Water Trust, listed in Appendix I.)
- Provide fish screening at irrigation intakes;
- Check field layouts for flow uniformity;
- Maintain good soil fertility to make effective use of irrigation water;
- .5.8 Unacceptable Conditions should include chemigation and fertigation in aquifers.

Conditions that may Lead to a Water Quality Problem

- Uncontrolled surface runoff and deep-water percolation.

Unacceptable Conditions

- Excessive amounts of sediment and nutrients from irrigation runoff, or other water-applied substances from chemigation or fertigation that enter waterways.

Rule

OAR 603-095-1540 (6) Irrigation Management (a) Effective three years after rule adoption, application (direct, chemigation, and fertigation) and irrigation systems will be managed to minimize runoff and the introduction of nutrients and farm chemicals into waterways.

2.5.9 Waste

Oregon Revised Statute (ORS) 468B.025 is the existing law which was developed to address water pollution from all sources. A Department of Justice Opinion dated September 12, 2000, clarifies that ORS 468B.025 applies to point and non-point source pollution as that term is commonly applied.

Senate Bill 502 was passed by the Oregon Legislature in 1995 to provide ODA with a role as the lead state agency responsible for direct regulation of farming activities for the purpose of protecting water quality. A Department of Justice opinion dated July 10, 1996, states '...ODA has the statutory responsibility for developing and implementing water quality programs and rules that directly regulate farming practices on Exclusive Farm Use and agricultural lands.' In addition this opinion states 'The program or rule must be designed to achieve and maintain EQC's water quality standards.'

To implement Senate Bill 502, ODA is incorporates ORS 468B.025 and ORS 468B.050 into all of the basin Agricultural Water Quality Management Area Administrative Rules in the state. ORS 468B.025 and ORS 468B.050 are incorporated by including the following language in individual basin administrative rules:

Rule

OAR 603-095-1540 (7) Waste Management (a) Effective upon adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.[3]

Chapter 3: Implementation Strategies

Goal

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

The goal of this Area Plan is to identify ways to reduce agricultural water pollution in the Management Area. It is intended that implementation of the Plan be focused on voluntary efforts to address water quality concerns. To the greatest degree possible, prevention and control of agricultural pollution will be encouraged in a cooperative spirit through the voluntary efforts of landowners, aided by information and technical and financial assistance from local, state, and federal agencies and others. Unacceptable conditions in the watersheds are outlined and suggested, positive management practices are provided. This Area Plan was developed by the Coos and Coquille LAC and ODA, with assistance from the Coos SWCD and other agencies, such as DEQ. It is not expected that unacceptable conditions will disappear quickly. This Area Plan is designed to advise agricultural landowners, the SWCD, and local conservation organization partners on developing strategies to overcome unacceptable conditions. Public education will be a major step to improve water quality.

Through voluntary efforts, water quality issues can be addressed in a timely manner. ODA, Coos SWCD, and the Coos and Coquille LAC believe that through implementation of positive management practices, water quality will improve and agricultural viability and values will be increased. It is intended that implementation of this Area Plan provide flexibility for landowners and land managers to use their own ingenuity and creativity to address water quality concerns.

The LAC established these objectives to achieve the Area Plan goal:

- To maintain, to protect, and to improve water quality;
- To encourage the voluntary development of farm plans for all agricultural producers;
- To raise public awareness of agriculture's contribution to improving water quality;
- To provide public education about positive management practices and implementation;
- To encourage and assist landowners in developing monitoring plans that will continue to reinforce the idea of water quality improvement in the Coos, Coquille, Twomile, Fourmile, and Tenmile watersheds.

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.

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.

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, in the Management Area, measurable objectives tied to the Focus Area and SIA are being used to show progress. These are described below. It is expected that consecutive Focus Areas and SIAs will continue to occur in the Management Area. Overtime, ag water quality concerns throughout the entire Management Area could be addressed utilizing these strategic initiatives.

3.1.2 Focus Area

3.1.2.1 Lower North Fork Coquille River Focus Area

The Lower North Fork Coquille River Focus Area is part of ODA's Focus Area strategic initiative. The Lower North Fork Coquille River became the Coos SWCD Focus Area in July 2015. The Lower North Fork of the Coquille is approximately 18,947 acres. Approximately 90 percent are privately owned. Ten percent are federally or locally owned (mostly BLM, some County). Land use in this watershed is approximately 60 percent agricultural, 28 percent forest, and about 10 percent forested mixed use with ag, zero urban, and perhaps three percent rural residential. The main agricultural uses include second growth forestry, hay, and cattle grazing. There are approximately 482 agricultural tax lots in this area.

The Lower North Fork Coquille River serves as the drinking water source for the town of Myrtle Point. The drinking water intake is located near the town of Myrtle Point, at the downstream end of the Focus Area. Water quality concerns for the Drinking Water Source Area include elevated bacteria levels and sediment in the intake water at the drinking water treatment plant. The Lower North Fork is also listed for dissolved oxygen levels below state standards for salmonids and trout.

The Coos SWCD has also chosen the Lower North Fork of the Coquille based on current landowner contacts and a planned project in the area, as well as alignment with projects planned by partners.

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 percent of the different types of land cover (agricultural infrastructure, bare ground, bare due to agricultural activities, grass, agricultural grass, shrubs, trees, and water) viewed on aerial photographs. The SWCD modified their original 2016 assessment to differentiate between invasive and native shrubs. The assessment area for narrow streams (<5 feet wide) utilizes the centerline of the stream, and assesses 35 feet on both sides. For wider streams and rivers (>5 feet wide), the approximate location of "greenline" (first perennial vegetation near the water's edge, often similar to bankfull stage), is utilized, and 35 feet on both sides are assessed.

Measurable Objectives and Associated Milestones:
Measurable Objective: By 2030 increase tree/native shrubs to 60% of riparian area (402.58 acres)

Milestone for 2019-2021 biennium: (June 30, 2021)

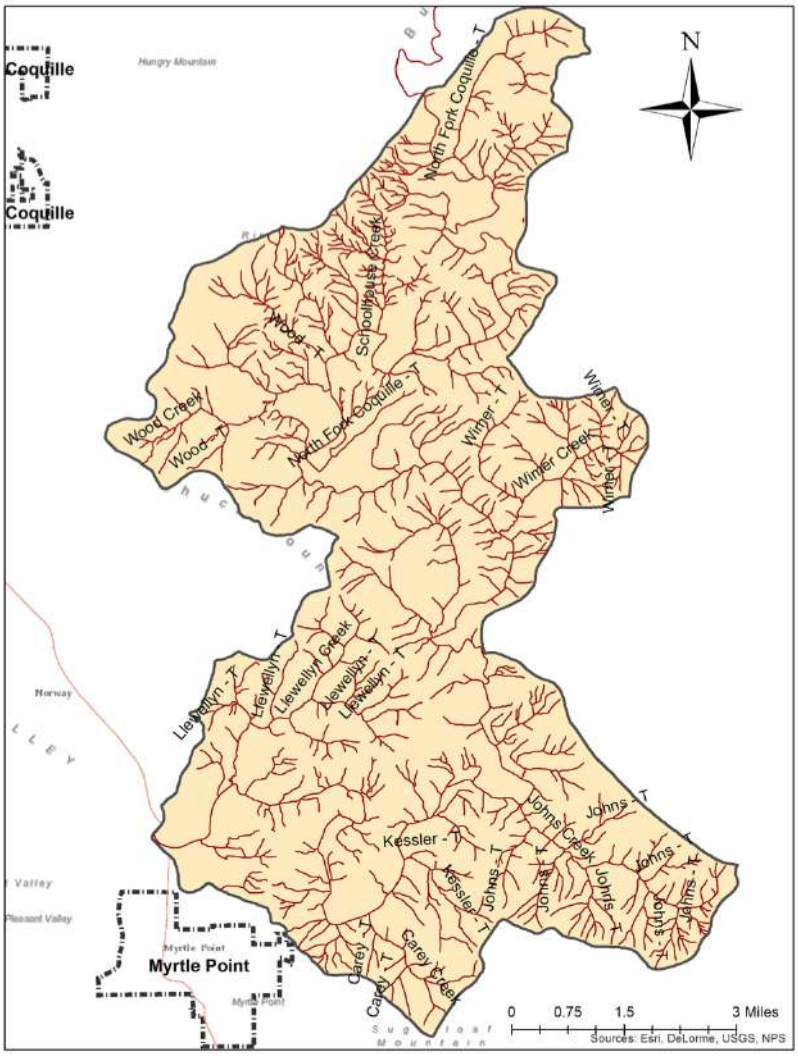
Minimum Goal: Increase acres of riparian trees/native shrub from 243.27 acres (36%) to 273.27 (40%)

Reduce Invasive Shrub by 5%

Maximum Goal: Increase acres of riparian trees/native shrub from 243.27 acres (36%) to 322 acres (48.0%) native shrub or tree

Reduce Invasive Shrub by 15%

Map of the Lower North Fork Coquille River Focus Area:



3.1.3 Strategic Implementation Area(s)

The selected Strategic Implementation Area (SIA) consists of the Lower Coquille River (6th Field HUC 171003050504) between approximately river mile (RM) 8 and 20; and the Bear Creek Tributary (6th Field HUC 171003050505). The main water quality concerns for the SIA include stream temperature, bacteria, dissolved oxygen, and sediment. The main agricultural activities in the SIA are livestock grazing and hay. ODA evaluated 12,544 acres and 385 agricultural taxlots. Local agricultural concerns include unmanaged livestock access to streamside areas, soil erosion, and lack of streamside vegetation. The primary actions that will

improve agricultural water quality in this area are reestablishing riparian vegetation, protecting riparian vegetation & waterways with fencing and livestock exclusion, providing offstream watering for livestock, and improving pasture management. Additional project partners include the Coquille Watershed Association (CWA), Oregon Department of Fish and Wildlife (ODFW), and DEQ.

SIA Compliance Evaluation Method:
ODA completed a compliance evaluation of agricultural activities and potential concerns related to surface and ground water. The evaluation considered the condition of streamside vegetation, bare ground, and potential livestock impacts (including manure piles). The process involved both a remote evaluation and field verification from publicly accessible areas.

Categories for evaluation are:

- Limited Opportunity for Improvement (L): ODA identified that there are likely no regulatory concerns;
- Low Opportunity for Improvement (LL): ODA identified that there are likely no regulatory concerns, but there may be an opportunity for improvement (uplift) to reach the ecological goals of the Area Plan;
- Opportunity for Improvement (OFI): ODA identified that agricultural activities may be impairing water quality, or evaluation was inconclusive using remote and field verifications;
- Potential Violation (PV): ODA identified during the remote evaluation and verified during the field evaluation from a publicly accessible location, that a potential violation of the Area Rules exists.

Measurable Objective:
By December 30, 2024, 100% of evaluated agricultural tax lots in the Lower Coquille River SIA will be in compliance with the streamside vegetation and water pollution (waste) Area Rules.

3.2 Proposed Activities

ODA encourages the LMA and other partners to develop targets for all the activities in Table 3.2. Activities with targets will be tracked every 2 years (and reported in the plan every 4 years) to gauge how well the plan is being implemented locally. Following an LAC and LMA discussion of these results, they will adaptively change the plan activities and targets.

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

Table 3.2 Planned Activities for 2019-2022

Activity	4-year Target	Description
Community and Landowner Engagement		
# active events that target landowners/managers (workshops, demonstrations, tours)	40	Number of in-person workshops will be lower due to Covid restrictions. Workshops may be adapted to online webinars.
# landowners/managers participating in active events	1,000	
Newsletter	8	Bi-annual newsletter mailed to Coos County residents with information on grant programs, District projects, and technical assistance for projects relating to water quality
Technical Assistance (TA)		
# landowners/managers provided with TA (via phone/walk-in/email/site visit)	400	
# site visits	200	
# conservation plans written*	40	
On-the-ground Project Funding		
# funding applications submitted	30	

3.3 Water Quality and Land Condition Monitoring

3.3.1 Water Quality

DEQ: Oregon Department of Environmental Quality is responsible for keeping Oregon's waters safe and healthy for many uses such as drinking, recreation and agriculture as well as for ensuring fish populations are able to thrive. Water Quality Monitoring provides critical information for understanding how well these goals are being met and for identifying emerging water quality concerns, planning wastewater and industrial permit limits, assessing compliance with environmental regulations, developing effective watershed pollution reduction strategies and understanding trends in water quality statewide. DEQ routinely monitors six sites in the Management Area as part of their ambient monitoring network (Millicoma River at Rooke Higgins boat ramp, South Fork Coos River at Anson Rogers bridge, Coquille River at Sturdivant Park dock, North Fork Coquille River at Highway 42, Middle Fork Coquille River at Highway 42, and South Fork Coquille River at Broadbent).

Coos SWCD: Three years of summer stream temperature data have been collected from twelve waterways in the lower Coquille watershed. The project is funded by a DEQ Nonpoint Source 319 Grant and funding is expected to end in December 2020. Additional funding may be secured.

The overall goal of this project is to collect previously undocumented data on distribution of summer cold water refugia for rearing of Endangered Species Act (ESA) listed and non-listed salmonids in the lower Coquille River mainstem project area. The data will be used by the Coos SWCD and Coquille Watershed Association to prioritize basins where restoration activities should occur. This project will provide important supplemental data for project funding proposals to enhance, protect, and improve fish access to existing cold water refugia. We anticipate the data will detail segments of the lower Coquille where refugia are limited, thus directly assist with development of riparian/cold water refugia projects. The Oregon DEQ will use the data to assess whether the Coquille River is meeting water quality criteria to protect beneficial uses.

The Coquille Watershed Association: The Coquille Watershed Association is completing water quality related monitoring at two different sites. On Dement Creek, they monitored temperature on private agricultural lands for the summer of 2018 and 2019; in addition to suspended sediment concentration on the same property for the winters of 2018-2019 and 2019-2020 with DEQ Nonpoint Source 319 Grant funds. At the other site, Winter Lake, the Coquille Watershed Association is working with three agricultural properties to monitor dissolved oxygen, water temperature, surface water level, ground water level, nutrient sampling (TSS, TkN and TP) and fish populations. This has been a year-round effort that started in the fall of 2018 and will continue for another 1.5 years.

SIA Monitoring: The Lower Coquille River SIA will be monitored with the intent of showing change on the landscape and in the water column as a result of the SIA effort. Temperature, bacteria, riparian vegetation, will be monitored at strategic locations in the SIA over 10 years.

Chapter 4: Progress and Adaptive Management

4.1 Measurable Objectives and Strategic Initiatives

The following tables provide the assessment results and progress toward measurable objectives and milestones in the last two years. See Chapter 3.1 for background and assessment methods.

4.1.1 Management Area

Table 4.1.1 Management Area Results
Management Area Measurable Objectives will be developed once a Management Area Assessment is developed, at some point in the future.

4.1.2 Focus Areas

Table 4.1.2.1 Lower North Fork Coquille River Focus Area

Measurable Objective
Measurable Objective: By 2030 increase tree/native shrubs to 60% of riparian area (402.58 acres)
Milestones
Milestone for 2019-2021 biennium (June 30, 2021): Minimum Goal: Increase acres of riparian trees/native shrub from 243.27 acres (36%) to 273.27 (40%) Reduce Invasive Shrub by 5% Maximum Goal: Increase acres of riparian trees/native shrub from 243.27 acres (36%) to 322 acres (48.0%) native shrub or tree Reduce Invasive Shrub by 15%
Current Conditions
Progress Toward Measurable Objectives and Milestones Approximately a 5% increase in riparian trees/shrubs is expected from the CWA's North Fork Riparian Restoration Grant. Implementation will likely occur in 2021/2022. Funds are secured. Cultural resource surveys are needed to fulfill SHPO and possibly Section 106 federal review requirements. An additional 0.12 acres is planned through an OWEB Small Grant currently pending review. It is hoped that efforts will continue to expand to neighboring properties.

Assessment Results

SVA Map Category (Alphabetical)	2019: Pre-Assessment (or Conditions at Beginning of Biennium)*
Ag Infrastructure	0.66
Bare	15.06
Bare Ag	10.08
Grass	100.37
Grass Ag	138.09
Not Ag	1270.15
Shrub-Ag	0.28
Shrub-Invasive	63.89
Shrub-Native	20.63
Tree	222.64
Tree Ag	1.25
Water	98.01
Total Acres	1941.11
Total Ag Acres Assessed (= Total Minus "Not Ag")	670.96

Activities and Accomplishments

Community and Landowner Engagement	
# active events that target landowners/ operators	1
# landowners/operators participating in active events	3
# of landowners provided with brochures / fact sheets / mailings, etc.	400
Technical Assistance (TA)	
# landowners/operators provided with TA	11
# site visits	20
Ag Water Quality Practices Implemented in the Focus Area	

SWCD: Critical Area Planting, 0.20 acres, 400 plants/ another 0.12 acres is planned for planting in 2020-21

Coquille WSA: Continued plant establishment on 20 acres of previously completed planting projects in the North Fork Coquille River basin. An additional 20.5 acres of riparian restoration planned for implementation 2020-22

Coquille WSA: Invasive species control on over 40 acres of riparian banks in the North Fork Coquille River basin, mostly upstream of the Focus Area.

Comments:
The SWCD and partners obtained NWQI (National Water Quality Initiative) funding to have a Drinking Water Protection Plan developed (DWWP). A contractor is currently completing the DWWP. The DWWP will be used for planning, accessing grant funds, and applying for an NRCS Conservation Implementation Strategy (CIS).

Adaptive Management Discussion

Funding has been a hurdle. Currently, extensive and expensive cultural resources reviews are a hurdle to implementation.

Once the Drinking Water Protection Plan is complete, the SWCD and partners plan to conduct further outreach in the Focus Area. Outreach may be in the form of outdoor coffee klatches. They will then determine the success rate of the outreach and make further decisions from there on whether or not to continue working in this Focus Area or move to a new Focus Area. Since the Lower North. Fork Coquille River Focus Area has not been as successful in recruiting landowner participation as some other watershed, we could consider moving the Focus area in the next biennium. Outreach and conservation efforts will continue for another ~2 years through the NWQI funding, but ODA SOW Focus Area funding could be redirected elsewhere.

4.1.3 Strategic Implementation Area(s)

Table 4.1.3 Strategic Implementation Area(s)

Measurable Objective (ODA)
By December 30, 2024, 100% of evaluated agricultural tax lots in the Lower Coquille River SIA are in compliance with the streamside vegetation and water pollution (waste) Area Rules.
Local Partner Objectives
• By March 2021, work with watershed partners to develop an SIA Action Plan, which includes a map of prioritized areas for riparian improvement (based on highest potential to increase shade/reduce stream temperatures/reduce streambank erosion) as well as other water quality or natural resource concerns such as tidegates or undersized culverts. Develop consistent metrics (miles of fence, riparian plantings, upland livestock management, etc.) • Stakeholder Engagement efforts will take place throughout the time span of the SIA. The second objective is devoted to outreach and communication with the landowners within the SIA. This step involves hosting non-formal events that landowners can attend and speak with members of the Oregon Department of Agriculture (ODA) and Coos SWCD (this has been restricted due to Covid). Other outreach efforts will consist of direct mailings, press releases through local media, informal workshops, and phone calls. These outreach efforts would target key landowners within the focus area of this project. • By September 2020, assemble the monitoring team and develop the Strategic Implementation Area long-term monitoring strategy. The monitoring plan has been developed, submitted, and approved as of September, 2020. • Technical Assistance efforts will take place throughout the time span of the SIA. Provide technical assistance to landowners that request it. • By December 30, 2024, complete a summary analysis of the work that has been completed; the data that is collected; monitor long-term the progress of implemented projects over time; and determine what, if any further actions need to be taken in order to achieve remaining project goals. •
Current Conditions
Compliance Evaluation Results Potential Violations: 2 Opportunities for Improvement: 11 Limited Opportunity – Low Concern: 23 Limited Opportunity – No Concern: 296
Compliance Actions As of September 2020, ODA followed up with both landowners with Potential Violations. One property was an existing open compliance case. This property is currently at the Notice of Non-compliance (NON) phase. The second Potential Violation property has made changes to their livestock management that has led ODA to downgrade the concern level to a Limited Opportunity – Low Concern.
Activities and Accomplishments
• ODA sent letters to all 11 Opportunity for Improvement landowners. The SWCD will work with willing landowners. ODA will follow up with the Opportunity for Improvement landowners in August 2021. • Letter will be sent to all the Limited Opportunity – Low Concern and No Concern landowners in Fall 2020. The landowners will be informed of the SIA and the resources available to them from the SWCD and other local partners. • The Coos SWCD is in contact with 8 landowners and actively working with 5. 3 grant applications are in the development phase for properties in the SIA. • The Coos SWCD submitted an SIA Monitoring Plan to the State SIA Monitoring and Advisory Group.

4.2 Activities and Accomplishments

ODA, the LAC, the LMA, and other partners identified the following priority activities to track progress toward meeting the goal and objectives of the Area Plan. ODA will review the four-year results and then provide a report at the end of the 2021-2023 Biennium.

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

Table 4.2a Activities conducted in 2018-2020 by the Coos SWCD, Coquille Watershed Association, Coos Watershed Association, CREP, and NRCS to improve agricultural water quality on private lands in the Coos-Coquille Management Area

Activity	2-year results	Description
Community and Landowner Engagement		
# active events that target landowners/ managers (workshops, demonstrations, tours)	38	
# landowners/managers participating in active events	2,300	
Technical Assistance (TA)		
# landowners/managers provided with TA (via phone/walk-in/email/site visit	175	
# site visits	62	
# conservation plans written*	12	
On-the-ground Project Funding		
# funding applications submitted	15+	SWCD: (6 OWEB small grant applications, 6 OWEB Technical Assistance Applications, 1 OWEB restoration application, 1 grant application to the Three Rivers Foundation, 1 to the Wild Rivers Coast Alliance, and 1 to The Nature Conservancy
# funding applications awarded	12+	SWCD: 5 of 6 small grants-(the 6th one was awarded but later cancelled). 2 of 6 OWEB Technical Assistance grants were funded: the North Bank Working Landscapes project and the SIA. 1 grant was awarded by The Nature Conservancy Coquille Watershed Association: Technical Assistance and Outreach: $210,000, Project Implementation: $2.4 million

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 1997-2018 (OWRI data include most, but not all projects, implemented in the Management Area).

Landowners	OWEB	DEQ	NRCS	ODFW	BLM	USFWS	All other sources*	TOTAL
1,556,980	6,555,246	302,035	1,051,587	293,748	523,857	586,129	2,373,870	13,243,452

*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 1997-2018 (OWRI data include most, but not all projects, implemented in the Management Area).

Activity Type	Miles	Acres	Count*	Activity Description
Riparian	274	1,1291	-	Riparian planting &/or fencing
Fish Passage	233	-	132	Culverts, bridges, or other crossings to improve fish passage
Instream	21	-	-	Habitat improvements such as large wood placements
Wetland	-	479	-	Wetland enhancement or protection
Road	0	-	72	Road improvements usually to reduce sediment runoff
Upland	-	1,107	-	Improved upland conditions to reduce runoff
TOTAL	528	2,877	204	

* # of hardened crossings, culverts, etc.

Projects and other accomplishments:

Coos SWCD:

- Trillium Stables Agricultural Water Quality Improvement: 2 Roof Runoff Structures (200 feet of gutters) (OWEB);
- Adams Creek Culvert Replacement- stream crossing, 16'x20' bridge (OWEB);
- Randolph Slough Riparian Enhancement: Riparian Forest Buffer, 0.36 acres, 800 trees planted;
- Critical Area Planting: 0.20 acres, 400 plants (OWEB Small Grant);
- Fence: 1,050 feet of woven wire (OWEB);
- Stream Crossing: cuvlert to bridge (OWEB);
- EQIP: Provided TA funded through the National Association of Conservation Districts Grant (awarded to Curry SWCD) for implementation and certification through NRCS for the following practices:
  - Forage Biomass Planting, 39 acres,
  - Tree/Shrub Site Prep & Establishment, 2.8 acres,
  - Fence,
  - Nutrient Management & Prescribed Grazing, 37.5 acres.

NWQI: $110,240 awarded to complete a drinking source watershed assessment for the city of Myrtle Point. Includes stakeholder engagement funding to support landowner outreach.

Noble Creek: Working with the Coos County Roads Department and 8+ landowners in the drainage to address multiple failing/undersized tidegates, culverts, dike erosion, and water quality issues.

North Bank Working Landscapes: Phase I: Engineering, permits and 60% designs completed for 30.0 acres floodplain pasture restoration, tidegate replacement (upsize from 1.0' diameter to 7.0'diameter, with MTR). Recently submitted for Phase II: restoration implementation funding for

potential summer ’21 implementation. Project will incorporate ~4,500 ft of tidal channel reconstruction, with fencing and planting on the primary channel and fencing along the dike.

Winter Lake Phase III: Technical Assistance funded by The Nature Conservancy to work with agricultural landowners on the Winter lake floodplain to address drainage and water quality issues on the private parcels not previously included in Winter Lake Phases I & II.

DEQ319 Temperature Monitoring: Summer Thermal Refugia temperature monitoring on approximately 12 tributary streams and the mainstem coquille river btween 2017-2020. Project will combine with SIA montioring efforts and continue in 2020-2022.

Tidegate Stakeholder Engagement: Currently partnered with the Coos and Coquille Watershed Associations to conduct tidegate-focused outreach to landowners in both the Coos and Coquille basins. Stakeholder engagement efforts have already produced two technical assistance grant applications (one submitted by Coquille Watershed Association and one by Coos SWCD), and conversations continue with mutliple landowners toward future potential project development.

Coquille Watershed Association:

- Completed the first phase of the Seestrom Tidelands Restoration Project, which included a tidegate replacement, channel re-meandering, fencing (18,000 ft), and riparian planting (20 acres) on a ranch (280 acres total);
- Continued engineering work on planning for the replacement of tidegates on multiple properties on the mainstem Coquille River (collectively over 1,000 acres of floodplain pasture);
- Continued plant establishment on 20 acres of previously completed planting projects in the North Fork Coquille River basin;
- Invasive species control on over 40 acres of riparian banks in the North Fork Coquille River basin (upstream from Coos SWCD Focus Area);
- Worked on 8 project sites that included ag water quality benefits. Estimate over 300 acres and 5 stream miles improved. Secured over $1 million in funds to implement improvements on working ranches in the Coquille basin (tidegate replacements, fencing, planting, channel enhancement). This includes grant in Coos SWCD Focus Area – OWEB 220-2038).

Coos Watershed Association:

Tidegates

- Led one Landowner Focus Group meeting with three Coos/Coquille tidegate landowners, two Coos Watershed Association staff, one Coquille Watershed Association staff, and one Coos SWCD staff to review tidegate outreach handouts for landowners (July 2, 2019) as part of OWEB-funded Stakeholder Engagement TA grant. Alongside our partner organizations we integrated landowenr feedback into five tidegate outreach handouts, which are used as a tool to engage with landowners in the Coos and Coquille basins on tidegate issues (finalized November 2019).
- Our organization has conducted site visits and/or communications with 15+ tidegate landowners within the Coos basin who are interested in replacing or altering their current infrastructure.
- Palouse: The Association is working with the Haynes Drainage District and the Coos County Road Department to explore options for replacing the main tidegate in Palouse. Ultimately this will include upgrading the main tidegate as well as working with the Coos SWCD and other partners to develop a plan for ecological uplift upstream of the tidegate such as fencing, planting, culvert upgrades, wood, etc.

- Noble: The Association is partnering with the Coos SWCD on a development project to assess the conditions on Noble Creek in order to develop an upgrade project for the Noble Creek tidegate and associated drainage.

Catching Creek
- Completed the Catching Creek Riparian Restoration project which included 0.7 miles of fencing, 1.9 acres of riparian planting, 350' of bank pullback to stabilize stream banks, cleared .52 acres of invasives species, and addressed 2 existing crossings and provided one additional livestock crossing.
- Catching Creek: After the successful Catching Creek Riparian Restoration project with a private landowner, the Association continued to worked with this private landowner on another parcel downstream to develop a second restoration project that includes over 2 miles of fencing, over 8 acres of riparian planting, and addresses 11 stream crossings. This year we worked with that landowner and Coos County to remove 4 undersized crossings and install 3 bridges and 5 culverts. We also installed miles of livestock exclusion fencing along Catching Creek and its tributaries. Next year we will finish out the project by planting native trees and shrubs doing some bank pullback work.
- Catching Slough: The Association is working with private landowners and the Coos County Road Department on developing multiple projects in the Catching Slough subbasin that include water quality elements on agricultural land.

Ross Slough
- Completed the Ross Slough Channel and Riparian Habitat Restoration Project which included fencing and planting of over 6 acres and nearly two river miles on agricultural land along with addressing 3 undersized culverts and provided 5 additional livestock crossings.

Native and Invasive Plants
The Association continued plant establishment efforts on six planting projects, totaling over 21 acres of native vegetation on riparian banks and conducted invasive control actitivities in the riparian area on various agricultural properties.

CREP:
- 97 acres enrolled in the program;
- 5 stream miles protected with new enrollments;
- 4 CREP contracts approved by Farm Service Agency supported with Conservation Plans, Practice Specifications, and other planning/inventory support.

Technical Assistance (CTA): Supporting EQIP contracts while NRCS re-staffs the Coquille office. Helped support 42 contracts.

NRCS: Below are the practices for EQIP for Coos and Curry counties from July 2018-Aug 2020
- Forage and biomass planting 8ac
- Sprinkler systems 209.2 ac and irrigation pipeline 5,035 ft
- Prescribed grazing 305 ac
- Roof runoff structure 1
- Livestock pipeline 16,360 ft and livestock watering facilities 5
- Access Control 800.54 ac
- Irrigation water management 13,535.89 ac
- Tree/Shrub Site Preparation 100.4 ac, Tree/Shrub Establishment 116.1 ac
- Heavy Use Area Protection 40,042 sqft

- Fence 63,572 ft

Farm Plans written with
- Conservation applied to improve water quality: 2,367 acres
- Conservation applied to improve irrigation efficiency and water mgmt: 805 acres
- Conservation applied to improve Environmental Quality: 1,203 acres

4.3 Water Quality and Land Condition Monitoring Results

4.3.1 Water Quality

DEQ Status and Trends Report: DEQ analyzed data from 2001 through 2019 for dissolved oxygen, E. coli, pH, total phosphorus, temperature, and total suspended solids in the Management Area. (DEQ. 2020 Oregon Water Quality Status and Trends Report. https://www.oregon.gov/deq/wq/programs/Pages/wqstatustrends.aspx).

Of 435 stations, the five stations had sufficient data to evaluate trends and recent attainment of water quality standards (Table 4.3.1)

Table 4.3.1 Attainment of water quality standards for 2016-2019, and 2000-2020 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]
Coquille R @ Sturdivant Park Dock (Coquille)	Mostly	Yes	No ↑	-	0.035; 0.08	10.5; 55
North Fk Coquille R @ Hwy 42 (Myrtle Point)	Mostly ↑	Yes	No ↑	-	0.03; 0.11	9; 60
Coquille R Middle Fk @ RM 1.25	Mostly	Yes	Yes	-	0.015; 0.07	3; 31
South Fk Coquille R @ Broadbent	Mostly	Yes ↓	Yes ↑	-	0.02; 0.06	11.5; 64
Tenmile Lake (various sites)	Yes		↓	-		

[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 degrading trend
↓ Statistically significant improving trend

Only a few issues were identified in this analysis. There were only 1-2 *E. coli* exceedances at each station in last 4 years. Most of the values were below 150-200 mpn/100 mL. The standard for a single sample is 406 mpn/100 mL. While the data shows that bacteria water quality mostly meets the water quality standards for the Coquille Subbasin, the DEQ bacteria water quality modeling for the TMDL shows that during peak and high flows, associated with large rainfall events, the bacteria loading into the rivers is quite high. In order for the routine ambient water quality data to reflect this, water quality managers would need to storm chase their monitoring in these basins. Resources are not usually available for storm chasing, and exact timing can be difficult. The few exceedances that are captured in the Coquille Subbasin do provide enough information for the modeling calibration that supports the high concentrations during higher river flows. Best management practices that target load reductions during high flows would be most effective in protecting the lower shellfish growing waters of both the Coos and Coquille basins.

The analysis of dissolved oxygen (DO) results showed improving trends for the Coquille Subbasin and downward trend for Tenmile Lakes Watershed. There was only one exceedance in Coquille and North Fork in last 4 years; however, increased scrutiny of the data reveals that a shift in the time of day sampling from 2010 to 2020 has influenced the dissolved oxygen concentration results. This is due to the cyclic nature of dissolved oxygen in aquatic environments when DO tends to be higher in the afternoon due to oxygen production by algae. Algal photosynthesis, which occurs during the day, increases DO while respiration, which occurs both day and night, reduces DO at night. For the Coquille River, ambient water quality station at Sturdivant Park near the City of Coquille, DO concentrations frequently fail to meet the 8.0 mg/L criterion during the summer, defined as June 1 to September 30 (Oregon Administrative Rules OAR 340-041-0002 (63)).

A slightly degrading trend for pH was noted for the South Fork Coquille and Tenmile Lake main body. These increases are due to the increased algal activity caused by the discharge of nutrients, which for the SF Coquille has been directly linked to the outdated wastewater treatment plant in Powers, OR and for the Tenmile Lakes has been associated with the excess phosphorous loading that has multiple sources. Excessive growth of algae and other autotrophs in natural waters can result in significant diel fluctuations in dissolved oxygen and pH. Algae and other autotrophs impact pH and dissolved oxygen levels as they grow and respire. During the day, when algae performs photosynthesis and grows, carbon dioxide is consumed and oxygen produced. At night respiration dominates. Respiration, which occurs at a relatively constant rate both day and night, has the opposite effect of consuming oxygen and producing carbon dioxide. Due to a process of chemistry, once excess carbon dioxide is introduced into an aqueous solution, it combines with water to form carbonic acid and can raise the waterbody pH (Chapra, 1997). Expected upgrades to the Powers wastewater treatment plant and full stakeholder implementation of the Tenmile Lakes TMDL will reverse these trends.

A few concerns with total phosphorous and total suspended solids were noted particularly for both Tenmile Lakes and the Coquille Subbasins. As previously noted, elevated levels of phosphorous can increase algal growth and impact DO concentrations in receiving waterbodies. The pending Coquille Subbain dissolved oxygen TMDL targets a 20 to 30% reduction to nonpoint source phosphorous loads in order to meet the 8.0 mg/L DO criterion. Total suspended solids are tiny particles that are suspended in the water column and can consist of both soil and organic matter material. For the Coquille Subbasin, inputs of organic matter and total suspended solids increase in the fall and when they travel down to the lower reaches of the Coquille can contribute to increased oxygen demand during the decaying process which will decrease DO concentrations. Agriculture practices that limit organic matter and sediments into the streams during early season rainfall events can reduce these loadings and contribute to DO improvements throughout the subbasins.

Comprehensive Status and Trends results for most of the Coos and Tenmile Lakes basins are missing because there is insufficient data to establish trends. More collaboration with watershed partners and DEQ is needed to plan and implement additional monitoring to support future TMDL development and Status and Trends reporting.

Coos SWCD: Results from the summer stream temperature monitoring are available in report format from the Coos SWCD. Of the total streams monitoring, 8 met the desired rearing criteria for a majority of the time June-October, 7 did not, including the mainstem Coquille River.

The Coquille Watershed Association: Results will be available for the 2022 Biennial Review.
SIA Monitoring: Results will be available for the 2022 Biennial Review.

4.4 Biennial Reviews and Adaptive Management

ODA, the LAC, the LMA, and other partners met on October 29, 2020 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

Summary of Progress and Impediments
The Coos SWCD, Coquille Watershed Association, and Coos Watershed Association are all strong organizations that are partnering on projects to improve ag water quality. ODFW, CREP, and NRCS staff play vital roles in the partnerships. There have been significant improvements made in capacity and cooperation in the past several years. The Coos SWCD has built their staff from 1 to 3 over the past few years. The Coos SWCD has expanded their water quality monitoring. Additional water quality monitoring would help inform projects and inform landowners. DEQ would like to help facilitate this with the local partner groups. NRCS for Coos and Curry now has a District Conservationist and a Soil Conservationist on staff. NRCS staff are developing a CIS for water quality improvements. The Coos SWCD has a regular newsletter that has been well received by the community and has generated numerous landowner relationships and projects.
Recommended Modifications and Adaptive Management
Describe recommendations for modifying the Area Plan and its implementation over the next four years. - OWEB should have specific funding for ag water quality improvement projects. - Continue building local partnerships to help leverage funds - Projects that landowners are completing on their own are not captured in the plan. Strategies for obtaining more information regarding this should be developed and implemented. The Coos SWCD suggested adding a request for information to their newsletter.

Table 4.4b Number of ODA compliance actions in 2018-2020.

Location	Letter of Compliance	Pre-Enforcement Notification	Notice of Noncompliance	Civil Penalty
Outside SIA(s)		3	1	
Within SIA(s)		1		

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Appendix A: Glossary

Active Channel Erosion
means gullies or channels which at the largest dimension have a cross sectional area of at least one square foot and which occur at the same location for two or more consecutive years. OAR 603-095-0010(1)

Adaptive Management
A process where management is initiated, evaluated, and refined. It differs from traditional management by recognizing and preparing for the uncertainty that underlies most resource management decisions done by the landowner. Adaptive management is typically incremental and it uses information from monitoring to continually evaluate and modify management decisions.

Biochemical Oxygen Demand
The process where microbial organisms consume oxygen in the water.

Channel Cross Section
The shape and dimensions of any representative two-dimensional part of a channel taken perpendicular to the channel bed.

Channel Slope
The measured gradient of a channel bed.

Chemigation
The application of pesticides to target areas through an irrigation system.

Composting
means the managed process of controlled biological decomposition of organic or mixed solid waste. It does not include composting for the purposes of soil remediation. Compost is the product resulting from the composting process.

Crop Nutrients
Crop nutrients are elements taken in by a plant that are essential to its growth, and which are used by the plant in the production of its food and tissue. These elements include and are limited to: carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, zinc, iron, manganese, copper, boron, molybdenum, and chlorine. Sources of crop nutrients include, but are not limited to: irrigation water, chemical fertilizers, animal manure, compost, sewage sludge, and leguminous and non-leguminous crop residues.

Dike
A structure that encloses or encircles a patch of ground, such as a former tidal wetland, preventing tidal flooding.

Erosion, rill
means an erosion process in which numerous small channels only several inches deep are formed and which occurs mainly on recently disturbed soils. The small channels formed by rill erosion would be obliterated by normal smoothing or tillage operations. OAR 603-095-0010(14)

Erosion, soil

means the general process by which soils are removed from the surface of the land by the action of water, wind, or gravity. OAR 603-095-0010(12)

Erosion, streambank
means erosion within a perennial stream or river which is caused by the action of water flowing in a concentrated stream acting against the soil confining its flow. OAR 603-095-0010(16)

Excessive Soil Loss
means soil loss that is greater than the standards set forth in Oregon Administrative Rules adopted by the Oregon Department of Agriculture to implement any Agricultural Water Quality Management Area Plan adopted pursuant to ORS 568.900 through 568.933. Excessive soil loss may be evidenced by sedimentation on the same parcel of land, on adjoining land, in wetlands or a body of water, or by ephemeral, active channel, or streambank erosion; or by calculations using the USLE or RUSLE showing soil loss exceeding the soil tolerance factor. OAR 603-095-0010(17)

Fertigation
The application of fertilizers and other sources of crop nutrients to target areas through an irrigation system.

Fertilizer
means any substance, or any combination or mixture of substances, designed for use principally as a source of plant food, in inducing increased crop yields or plant growth, or producing any physical or chemical change in the soil and shall contain five percent or more of available nitrogen, phosphorus pentoxide (phosphoric acid) or potassium oxide (potash), singly, collectively or in combination, except hays, straws, peat and leaf mold, and unfortified animal manures. ORS 633.310(5)

Flood Event
A sudden increase in water discharge, often caused by massive amounts of rain over a short time period.

Floodplain
Relatively flat surfaces adjacent to active river or stream channels, formed by the deposition of sediments during major flood events. Some floodplains are flooded during extremely large, infrequent floods, while others are flooded annually.

Intermittent Stream
A natural channel in which water flows only part of the year. These channels are usually dry in the summer.

Land Disturbing Activity
Any activity not directly related to general farming resulting in a disturbance of the natural condition or vegetative covering of the earth's surface.

Landowner
Includes any landowner, land occupier or operator as defined in ORS 568.903. OAR 603-095-0010(24)

Large Woody Debris
Wood in stream channels that is larger than six inches in diameter and longer than ten feet.

Livestock
Domestic animals such as beef and dairy cattle, horses, hogs, sheep, and goats kept or produced primarily for farm, ranch or market purposes. "Livestock" also may include bison, llamas, emus, ostriches, and other species.

Nonpoint Sources
refers to diffuse or unconfined sources of pollution where wastes can either enter into — or be conveyed by the movement of water to — public waters. OAR 340-041-007(17)

Pasture
means land with a permanent, uniform cover of grasses or legumes used for providing forage for livestock. A pasture does not include any area where supplemental forage feeding is provided on a regular basis. OAR 603-095-0010(31)

Perennial Stream
means a natural channel in which water flows continuously and which is shown on a United States Geological Survey quadrangle map. OAR 603-095-0010(32)

Pesticide
Includes any substance, or mixture of substances intended to be used for defoliating plants or for preventing, destroying, repelling or mitigating all insects, plant fungi, weeds, rodents, predatory animals or any other form of plant or animal life which is, or which the Oregon Department of Agriculture may declare to be a pest, which may infest or be detrimental to vegetation, humans, animals, or be present in any environment thereof. ORS 634.006 (8)(h)

Point Source Pollution
means water pollution which emanates from a clearly identifiable discharge point. OAR 603-095-0010(33)

Pollution
“Pollution” has the meaning given in ORS 468B.005(3) which states: 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.

Riparian Area
The edge of the bank of a river or other body of water.

Riparian Vegetation
means plant communities consisting of plants dependent upon or tolerant of the presence of water near the ground surface for at least part of the year. OAR 603-095-0010(36)

Runoff
means the portion of rainfall, other precipitation, or irrigation water that leaves a location in the form of surface water. OAR 603-095-0010(37)

Sacrifice Area

An area that is chosen for intensive use on a farm. This area is usually "sacrificed" so that the desired use is concentrated there and not everywhere on an operation. It can drastically reduce the amount of sediment and nutrient runoff on a piece of property when correctly used.

Sediment
means soil particles, both mineral and organic, that are in suspension, are being transported, or have been moved from the site of origin by flowing water or gravity. OAR 603-095-0010(39)

Site Capability
The highest level of condition or degree of function a site can attain given certain political, social, or economic constraints. For example, these constraints might include riparian areas permanently occupied by a highway or railroad bed that prevent the streams full access to its original flood plain. If such constraints are removed, the site may be able to move toward its potential. (BLM, 1997)

Sloughing
means a slip or downward movement of an extended layer of soil resulting from the undermining action of water or the earth disturbing activity of man. OAR 603-095-0010(41)

Soil Disturbing Activity
means any agricultural use resulting in a disturbance of the natural condition of vegetative surface or soil surface exceeding 10,000 square feet in area, including, but not limited to tilling, clearing, grading, excavating, grazing, and feedlot usage, but not including such minor land disturbing activities as home gardens and individual landscaping and maintenance. OAR 603-095-0010(43)

Spoils
Sediment and organic matter removed from any water conveyance, wetland, pond, or other waterbody during maintenance, cleaning, or construction.

Streamside Area
The area from 10 feet to 100 feet as measured from the high water mark at the top of a streambank of a perennial stream or river, usually consisting of mostly terrestrial vegetation. This area can range widely depending on the soils, type of use, and slope of the land.

Streambank
means the boundary of protected waters and wetlands, or the land abutting a channel at an elevation delineating the highest water level which has been maintained for a sufficient period of time to leave evidence upon the landscape; commonly that point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial. For perennial streams or rivers, the streambank shall be at the high-water mark. OAR 603-095-0010(46)

Surface Drainage Field Ditch
is a graded ditch for collecting excess water in a field. OAR 603-095-0010(47)

Wastes
“Wastes” has the meaning given in ORS 468B.005(7) which states: 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.

Water Pollution
The alteration of the physical, chemical, or biological properties of any waters of the state, including changes in temperature, taste, color, turbidity, silt, or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or another 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 habitat thereof. ORS 468B.000(3)

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 effect 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(8).

Watershed
Watershed means the entire land area drained by a stream or system of connected steams such that all stream flow originating in the area is discharged through a single outlet. ORS 541.351(14)

Waterways
Rivers, lakes, and/or streams.

Wetlands
Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions.

Appendix B: Pesticide Management for Water Quality Protection

Pesticides

Always apply chemicals in accordance with the label requirements in order to minimize crop damage, build up of chemicals in the soil, potential runoff, and leaching into groundwater. Read the label, and as required by ORS 634.372(2) and (4), follow label recommendations for both restricted use and non-restricted use pesticides. DEQ now requires a permit for pesticide applications in, over, or within three feet of water. This permit provides coverage for pesticide applications to control mosquitoes and other flying insect pests, weeds, algae, nuisance animals, and area-wide pest control (see: www.deq.state.or.us/wq/wqpermit/pesticides.htm).

Calibrate, maintain, and correctly operate application equipment. Spray rigs need to be calibrated each time there is a change in product and/or application rate. Nozzles need to be replaced often, particularly if an abrasive pesticide formulation (such as wettable powders) is used. Sprayers need to be operated in the correct pressure range (dictated by the material and nozzle combination used), to prevent excess drift to non-target areas (e.g. waters of the state).

Adopt integrated pest management (IPM) strategies. IPM promotes a diverse, multi-faceted approach to pest control. This strategy establishes an economic threshold for control actions, to guide the manager to use a variety of field/orchard sanitation and cultural practices, field scouting, beneficial insects, and other biological controls, and the use of properly selected chemical pesticides. While IPM does not exclude the use of chemical pesticides, it does seek to optimize their use and minimize off-target movement into the environment.

Establish appropriate vegetative buffer strips. Buffer strips will help to retain soil (which may include pesticides) and surface runoff (which may have dissolved pesticides) from making contact with waters of the state.

Store and handle pesticide materials correctly. Storage and handling facilities should be secure and include a leak-proof pad with curbing for mixing and loading. An alternative to a permanent, concrete pad is to always mix pesticides in the field; frequently moving sites prevent chemical buildup. Wash/rinse water should be directly applied to the appropriate crop. Empty liquid pesticide containers should be triple rinsed, then punctured and disposed of in an approved manner. Dry chemical bags should be emptied completely. Bundle and store paper bags until they can be disposed of in an approved manner.

Watch for a pesticide waste collection day in your area. These events allow individuals to safely and anonymously drop off unwanted, unused, or out of date agricultural pesticides, along with some empty containers.

Appendix C: Fish and Shellfish Species Found in the Watershed Area

Family (Common)	Species (Common)	Scientific Name	A= Anadromous F= Freshwater S= Saltwater
Salmon and Trout	Cutthroat trout-Sea run	Oncorhynchus clarki	A
	Chum Salmon	Oncorhynchus keta	A
	Coho Salmon	Oncorhynchus kisutch	A
	Steelhead trout	Oncorhynchus mykiss	A
	Chinook salmon - Fall	Oncorhynchus tshawytscha	A
	Chinook salmon - Spring	Oncorhynchus tshawytscha	A
	Cutthroat trout	Oncorhynchus clarki	F
	Rainbow trout	Oncorhynchus mykiss	F
	Brook trout	Salvelinus fontinalis	F
Sturgeons	White sturgeon	Acipenser transmontanus	S
	Green sturgeon	Acipenser medirostris	S
Herrings	American shad	Alosa sapidissima	A
	Pacific herring	Clupea pallasii	S
Anchovies	Northern anchovy	Engraulis mordax	S
Smelts	Surf smelt	Hypomesus pretiosus	S
	Eulachon	Thaleichthys pacificus	S
Cods	Pacific tomcod	Microgadus proximus	S
Silversides	Jacksmelt	Atherinopsis californiensis	S
	Topsmelt	Atherinops affinis	S
Pipefishes	Bay pipefish	Syngnathus leptorhynchus	S
Surfperches	Redtail surfperch	Amphistichus rhodoterus	S
	Shiner surfperch	Cymatogaster aggregata	S
	Striped surfperch	Embiotoca lateralis	S
	Walleye surfperch	Hyperprosopon argenteum	S
	Silver surfperch	Hyperprospon ellipticum	S
	White surfperch	Phanerodon furcatus	S
	Pile surfperch	Damalichthys vacca	S
Gunnels	Saddleback gunnel	Pholis ornata	S
Sand Lances	Pacific sand lance	Ammodytes hexapterus	S
Rockfishes	Black rockfish	Sabastes melanops	S
	Bocaccio rockfish	Sabastes paucispinis	S
	Copper rockfish	Sabastes caurinus	S
	Quillback rockfish	Sabastes maliger	S
	Yellowtail rockfish	Sabastes flavidus	S
Greenlings	Kelp greenling	Hexagrammos decagrammus	S
	Rock greenling	Hexagrammos lagocephalus	S
	Whitespotted greenling	Hexagrammos stelleri	S
	Lingcod	Ophiodon elongatus	S
Sculpins	Brown Irish lord	Hemilepidotus spinosis	S
	Buffalo sculpin	Enophrys bison	S
	Cabezon	Scorpaenichthys marmoratus	S
	Pacific staghorn sculpin	Leptocottus armatus	S
	Coastrange sculpin	Cottus aleuticus	F
	Prickly sculpin	Cottus asper	F
	Reticulate sculpin	Cottus perplexus	F

Right-eye flounders	English sole	Parophrys vetulus	S
	Starry flounder	Platichthys stellatus	S
	Sand sole	Psettichthys melanostictus	S
Lampreys	Pacific lamprey	Lampetra tridentata	A
	Western brook lamprey	Lampetra richardsoni	F
Minnows	Speckled dace	Phinichthys osculus	F
Suckers	Largescale sucker	Catostomus macrocheilus	F
Stickelbacks	Threespine stickelback	Gasterosteus aculeatus	F & S
Catfishes	Brown bullhead	Ameiurus nebulosus	F
Livebearers	Mosquito fish	Gambusia affinis	F
Clams	Gaper clam	Tresus capax	S
	Soft-shell clam	Mya arenaria	S
	Bay mussel	Mytilus edulis	S
Freshwater mollusks	Freshwater mussel	Margaritifera margaritifera	F
	Western river pearl mussel	Margaritifera falcata	F
	Western ridgemussel*	Gonidea angulata	F
Crabs and Shrimps	Dungeness crab	Cancer magister	S
	Red rock crab	Cancer productus	S
	Hairy shore crab	Hemigraphsus oregonensis	S
	Lined shore crab	Pachygrapsus crassipes	S
	Ghost shrimp	Callianassa californiensis	S
	Native crayfish	Pacifastacus leniusculus	F

Source: Coquille Watershed Action Plan - 7/29/97

* Specimen tentatively identified by BLM personnel

Appendix D: Fish Life Histories

Coho Salmon

The coho salmon, Oncorhyncus kisutch, or "silvers" are an anadromous species that rears for part of its life cycle in the Pacific Ocean and spawns in freshwater streams from Point Hope, Alaska to Monterey Bay, California. Adults migrate into fresh water in the fall, and may spend several weeks migrating and holding before spawning November through February. All adults die two weeks after spawning. Juvenile salmon spend one summer and one winter in freshwater before migrating to the ocean. Typically, the ocean migration occurs in juveniles one year after emergence from the gravel, when they are smolts about four to five inches long. Coho salmon have suffered serious declines and are currently listed as threatened by the National Marine Fisheries Service.

Winter and Summer Steelhead

This species of anadromous fish has a complex life history. This is mainly due to the ability of steelhead (Oncorhyncus mykiss) to spawn repeatedly whereas all other anadromous species exclusive of the cutthroat trout spawn once and die. Steelhead normally spend two to three years in fresh water and then migrate to the ocean, spending two to three years in the marine habitat. Older age fish habitually gravitate towards fresh water before the younger age classes. Biologically, the steelhead can be divided into two different run types, based on the state of sexual maturity at the time of river entry, spawning migration patterns, etc. Steelhead that enter fresh water between May and October are considered summer-run and fish that enter fresh water between November and April are considered winter-run.

With the exception of the Umpqua River, winter steelhead populations in all mid-coast streams appear to have experienced a small decline in numbers from historical levels, but all steelhead populations are thought to be smaller than they were historically. This recent decline is probably influenced by the current low ocean productivity. Major factors in their decline also can be attributed to loss of over wintering habitat, water temperature increases, and sedimentation. Summer steelhead is now under state sensitive status as the population levels have reduced dramatically.

Fall and Spring Chinook

Chinook salmon (Oncorhyncus twhawytscha) or "kings" have a varied life history, with variation in the date, size, and age at juvenile ocean migration; ocean migration patterns; habitat selection; adult migration season; and age at maturity and size (Nicholas and Hankin, 1989). Generally, sub yearling juvenile Chinook rear in streams from three to six months and rear in estuaries from one week to five months, and nearly all enter the ocean during their first summer or fall.

Adult salmon enter tidewater as early as late July and continue through mid-December, with the peak in October. Spawning occurs from late October through mid-January, with the peak usually in early October. Based on spawning ground surveys, Chinook populations have expanded since the 1950s and appear to be stabilizing.

Coastal Cutthroat Trout

These species include two forms: anadromous or "sea-run" and resident types. Anadromous, or "sea-run" fish are silvery in color, and the dense spotting present on resident fish may be masked. Residential coastal cutthroat that remain in freshwater are usually darker in color and take on a

copper coloration. Cutthroat trout rarely ever exceed a length of 20 inches and a weight of four pounds.

Coastal cutthroat trout have many life history patterns that are among the most complex of all salmonids in Oregon. They show many variations in preferred habitat (estuary, lake, ocean, and river); size and age at migration; migration timing; age at maturity; and repeat spawning frequency. The following patterns are linked to all types of coastal cutthroat populations on the Oregon coast:

- Sea-run populations migrate to the ocean (or estuary) for usually less than one year before returning to fresh water. Spawning occurs during the first winter or spring after their return or under go a second migration before maturing in salt water.
- Fluvial populations undergo in-river migrations between small spawning populations and main river sections and lakes downstream
- Resident (non-migratory) trout occur in small headwater streams, often above barriers, and exhibit little in-stream movement. They generally are smaller, undergo sexual maturity at a younger age, and have a shorter life span than migratory populations.

Limited population data has been collected on this species due to the fact that they were not harvested commercially. Habitat degradation and associated increases in water temperatures in small tributary streams are considered important factors in the decline of cutthroat numbers (Johnson et. al., 1992). Recovery strategies for the sea-run cutthroat are stymied by lack of information on life history, genetics, and habitat information.

Appendix E: Coastal Zone Management Act - Management Measures

To specifically address the impacts of nonpoint source pollution on coastal water quality, Congress enacted section 6217, "Protecting Coastal Waters." 16-U.S.C.-1455b. This section provides that each state with an approved coastal management zone program must develop and submit to the EPA and the National Oceanic and Atmospheric Administration for approval a Coastal Nonpoint Pollution Control Program. The purpose of this 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," (EPA, 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. In rural areas, runoff from agricultural operations may contribute to coastal pollution.

Listed below are the Coastal Zone Management measures that were approved as management measures for coastal nonpoint source pollution in Oregon.

Erosion and Sediment Control

1. Apply the erosion component of a Resource Management System as defined in the Field Office Technical Guide of the USDA NRCS to minimize the delivery of sediment to surface waters.
2. Design and install a combination of management and physical practices to settle the solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a ten-year, 24-hour frequency.

Nutrients

1. 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.

Pesticides

To reduce contamination of surface water and groundwater from pesticides:

1. Evaluate the pest problems, previous pest management practices, and cropping history;
2. 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;
3. Use Integrated Pest Management strategies that:
    a. Apply pesticides only when an economic benefit to the producer will be achieved (i.e., applications based on economic thresholds); and
    b. Apply pesticides efficiently and at times when runoff losses are unlikely;
4. When pesticide applications are necessary and a choice of registered materials exist, consider the persistence, toxicity, runoff potential, and leaching potential of products in making a selection;
5. Periodically calibrate pesticide spray equipment; and

6. Use anti-backflow devices on hoses used for filling tank mixtures.

Grazing

Protect range, pasture, and other grazing lands;

1. By implementing one or more of the following to protect sensitive areas (such as streambanks, wetlands, estuaries, ponds, lake shores, and riparian zones):
    a. Exclude livestock,
    b. Provide stream crossings or hardened watering access for drinking,
    c. Provide alternative drinking water locations,
    d. Locate salt and additional shade, if needed, away from sensitive areas, or
    e. Use improved grazing management (e.g., herding) to reduce the physical disturbance and reduce direct loading of animal waste and sediment caused by livestock; and
2. By achieving either of the following on all range, pasture, and other grazing lands not addressed under (1):
    a. Implement the range and pasture components of a Conservation Management System as defined in the Field Office Technical Guide of the USDA NRCS by applying the progressive planning approach of the USDA NRCS to reduce erosion, or
    b. Maintain range, pasture, and other grazing lands in accordance with activity plans established by either the Bureau of Land Management of the U.S. Department of the Interior or the Forest Service of USDA.

Irrigation

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

1. Operate the irrigation system so that the timing and amount of water applied match 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.
2. When chemigation is used, include backflow prevention 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:

1. 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 measures for such locations.
2. 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.
3. 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.
4. 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.

5. 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.
6. 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.

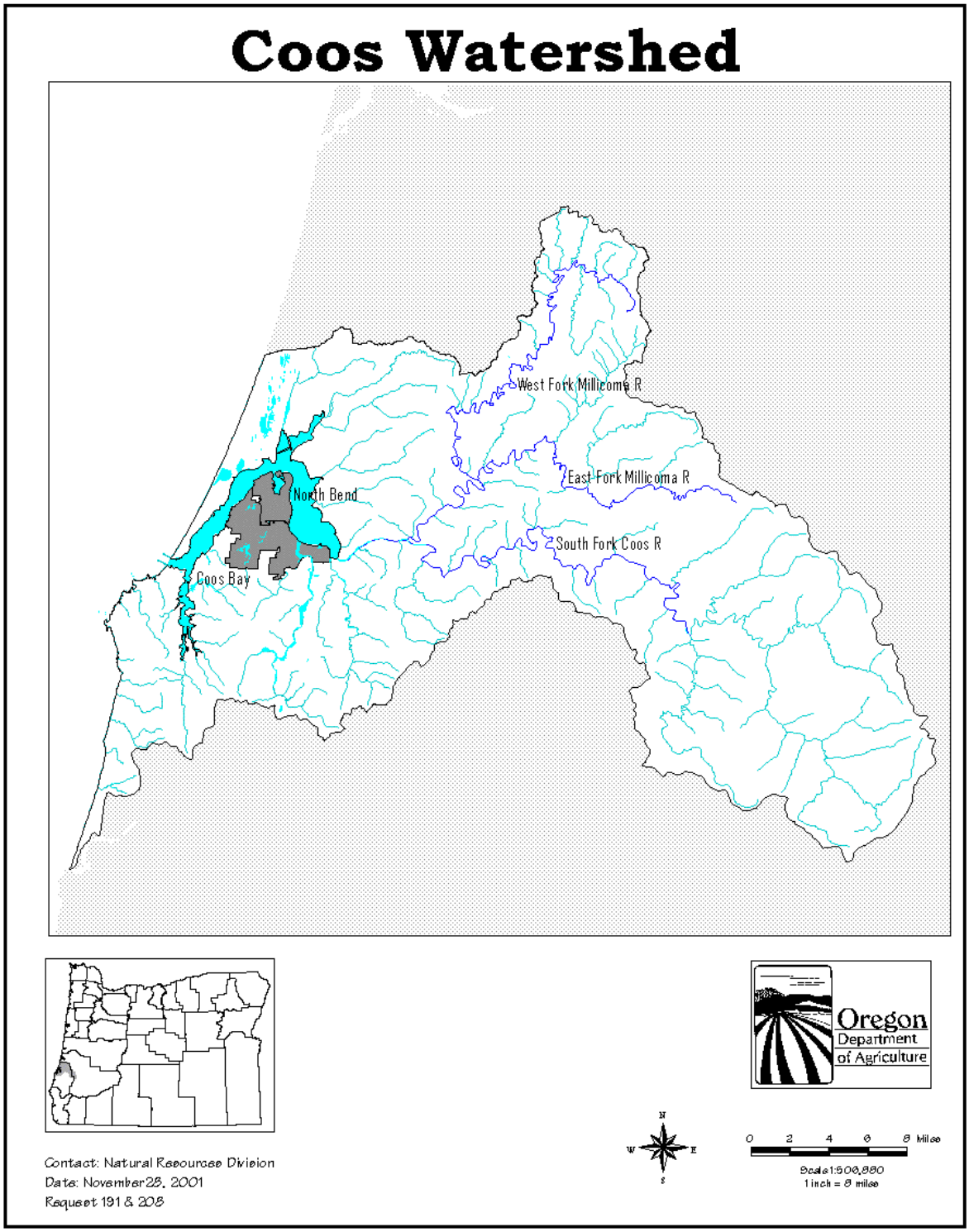
Eroding Streambanks and Shorelines

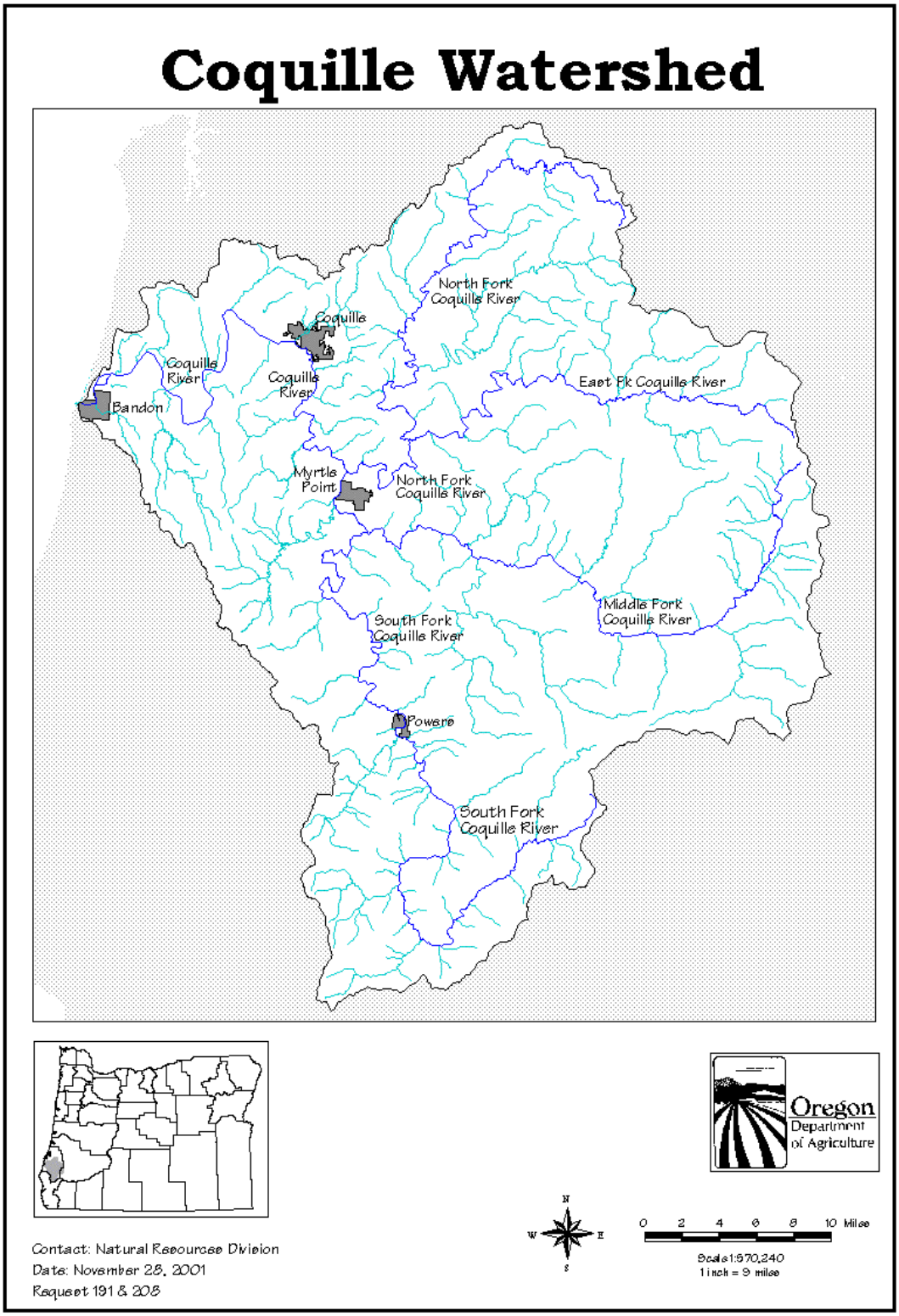
1. Where streambank or shoreline erosion is a nonpoint source pollution problem, streambanks and shorelines should be stabilized. Vegetative methods are strongly preferred unless structural methods are more cost-effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse Impact on other streambanks, shorelines, and offshore areas.
2. Protect streambank and shoreline features with the potential to reduce NPS pollution.
3. Protect streambanks and shorelines from erosion due to uses of either the shorelands or adjacent surface waters.

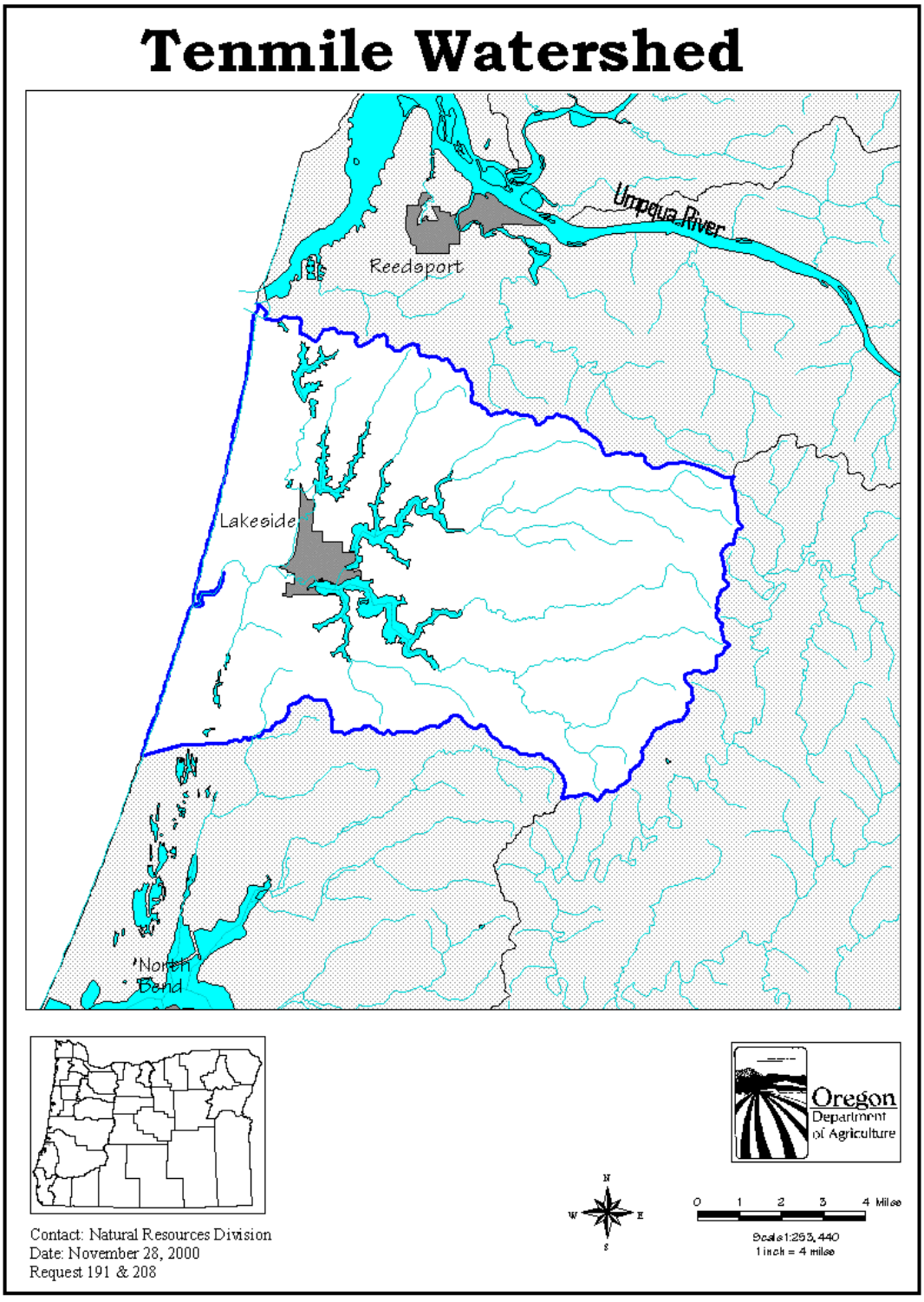
Wetlands and Riparian Areas

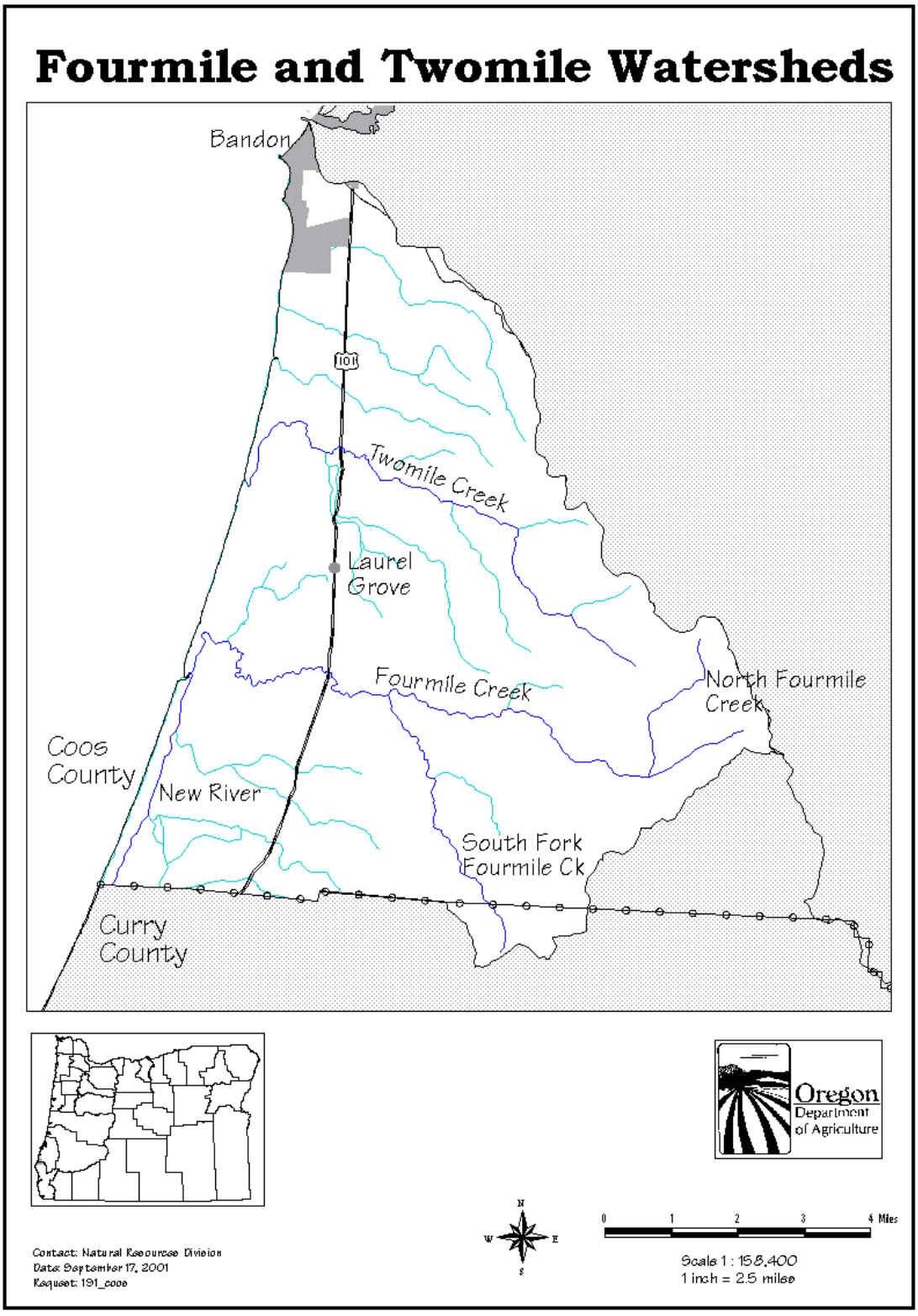
1. Protect from adverse effects wetlands and riparian areas that are serving a significant NPS abatement function and maintain this function while protecting the other existing functions of these wetlands and riparian areas as measured by characteristics such as vegetative composition and cover, hydrology of surface water and ground water, geochemistry of the substrate, and species composition.
2. Promote the restoration of the preexisting functions in damaged and destroyed wetlands and riparian systems in areas where the systems will serve a significant NPS pollution abatement function.
3. Promote the use of engineered vegetated treatment systems such as constructed wetlands or vegetated filter strips where these systems will serve a significant NPS pollution abatement function.

Appendix F: Management Area Watershed Maps




Coquille Watershed
North Fork Coquille River
Coquille
Coquille River
Coquille River
Bandon
East Fk Coquille River
Myrtle Point
North Fork Coquille River
Middle Fork Coquille River
South Fork Coquille River
Powers
South Fork Coquille River
Oregon Department of Agriculture
N
W
E
S
0 2 4 6 8 10 Miles
Scale 1:570,240
1 inch = 9 miles
Contact: Natural Resources Division
Date: November 28, 2001
Request 191 & 208


Tenmile Watershed
Umpqua River
Reedsport
Lakeside
North Bend
Oregon
Department
of Agriculture
N
W
E
S
0 1 2 3 4 Miles
Scale 1:253,440
1 inch = 4 miles
Contact: Natural Resources Division
Date: November 28, 2000
Request 191 & 208


Fourmile and Twomile Watersheds
Bandon
101
Twomile Creek
Laurel Grove
Fourmile Creek
North Fourmile Creek
Coos County
New River
South Fork Fourmile Ck
Curry County
Oregon Department of Agriculture
N
W
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S
0 1 2 3 4 Miles
Scale 1 : 158,400
1 inch = 2.5 miles
Contact: Natural Resources Division
Date: September 17, 2001
Request: 191_coos

Appendix G: Technical and Financial Resources for Landowners

Bureau of Land Management 1300 Airport Land North Bend, OR 97459 (541) 756-0100	Oregon Department of Fish and Wildlife PO Box 5430 4475 Boat Basin Drive Charleston, OR 97420 (541) 888-5515
Coos County Water Resources Dept. 250 N Baxter Coquille, OR 97423 (541) 396-3121 ext 254	Oregon Department of Forestry 300 5th Bay Park Coos Bay, OR 97420 (541) 267-4136
Coos Soil and Water Conservation District 371 N Adams St Coquille, OR 97423-1707	Oregon State University Extension Service Coos County Office 290 N Central Blvd Coquille, OR 97423 (541) 396-3121 ext 240
Coos Watershed Association PO Box 5860 Charleston, OR 97420 (541) 888-5922	Resource Conservation and Development 576 NE “E” Streeet Grants Pass, OR 97526 (541) 476-5906
Coquille Watershed Association 255 Hwy 42 Coquille, OR 97423 (51) 396-2229	Tenmile Watershed Association PO Box L Lakeside, OR 97449 (541) 759-2414
Farm Service Agency (CREP Programs) 380 N Central Blvd Coquille, OR 97423 (541) 396-4323	U.S. Forest Service Powers Ranger District Powers, OR 97466 (541) 439-3011
Natural Resources Conservation Service 382 n Central Blvd Coquille, OR 97423 (541) 396-2841	
Oregon Department of Agriculture 635 Capitol Street NE Salem, OR 97301 (503) 968-4700	
Oregon Department of Environmental Quality 381 N 2nd Street Coos Bay, OR 97420 (541) 269-2721 ext 234	
Oregon Department of Environmental Quality (Coastal Zone Management) 811 SW Sixth Avenue Portland, OR 97204 (503) 229-5994	

Appendix H: Coos Subbasin 2012 303d Listing Requiring a TMDL

Coos Sub-Basin 2012 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	River Miles	Parameter	Season
Eel Creek	0 to 2.5	Biological Criteria	Year Round
Catching Creek	0 to 4.6		
Cedar Creek	0 to 11.6		
Johnson Creek	0 to 9.3		
Murphy Creek	0 to 3.9		
Unnamed Stream	0 to 1.8		
Williams River	0 to 16.2		
Winchester Creek	0 to 5.4		
Isthmus Slough	0 to 10.6	Dissolved Oxygen	June 1 - September 30
Millicoma River	0 to 8.9		October 1 - May 31
South Fork Coos River	0 to 2.6		Year Around
Kentuck Slough	0 to 2.2		May 16 - Dec 31
Kentuck Slough	0 to 2.2		Jan 1 - May 15
Millicoma River	0 to 8.9		Year Round
Noble Creek	0 to 3.6	pH	Fall-Winter-Spring
Tenmile Lake	0 to 5		Summer
Sunset Beach	NA	Enterococcus (Recreational Contact)	Year Around
Bastendorff Beach			Summer
Catching Creek	0 to 11.2	e. Coli	Fall-Winter-Spring
Kentuck Slough	0 to 2.2		
Mettman Creek	0 to 3.5		
Stock Slough	0 to 1.1		
Pony Creek	0 to 5.8		
Catching Creek	0 to 4.6		Summer
Catching Creek	0 to 11.2		
Larson Slough	0 to 3.9		
Pony Creek	0 to 5.8		
Ross Slough	0 to 3.1		
South Slough	0 to 5.3		
Stock Slough	0 to 1.1		
Catching Slough	0 to 5.6	Fecal Coliform (Recreational Contact)	Fall-Winter-Spring
Haynes Inlet	0 to 3.3		
Kentuck Slough	0 to 2.2		
Larson Slough	0 to 3.9		Year Around
Pony Creek	0 to 5.8		Fall-Winter-Spring
Stock Slough	0 to 1.1		Year Around
Willanch Slough	0.7 to 2.8		
Coalbank Slough	0.5 to 2.5	Fecal Coliform (Shellfish Growing)	Year Round
Cooston Channel	0 to 3		
Davis Slough	0 to 1.3		
Day Inlet	0 to 0.6		
Larson Creek	0 to 4.1		
Mettman Creek	0 to 3.5		
Sullivan Creek	0 to 3.3		
North Slough	0 to 2.4		Year Around

Coos Sub-Basin 2012 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	River Miles	Parameter	Season
Catching Creek	0 to 4.6		
Catching Slough	0 to 5.6		
Coalbank Slough	0 to 0.5		
Coos Bay	0 to 7.8		
Coos Bay	7.8 to 12.3		
Coos River	0 to 6.5		
Echo Creek	0 to 2.5		
Haynes Inlet	0 to 3.3		
Isthmus Slough	0 to 10.6		
Joe Ney Slough	0 to 2.2		
Kentuck Slough	0 to 2.2		
Larson Slough	0 to 3.9		
Millicoma River	0 to 8.9		
North Inlet	0 to 3.3		
Palouse Creek	0 to 10.5		
Pony Creek	0 to 5.8		
Pony Slough	0 to 0.8		
Ross Slough	0 to 3.1		
Shinglehouse Slough	0 to 0.8		
South Fork Coos River	0 to 31.1		
South Slough	0 to 5.3		
Stock Slough	0 to 1.1		
Willanch Creek	0 to 3.9		
Winchester Creek	0 to 5.4		
Elk Creek	0 to 8.7	Iron	Year Around
Cedar Creek	0 to 11.6	Temperature	Year Around (Non-spawning)
Williams River	0 to 20.9		
Burnt Creek	0 to 2.6		
Tioga Creek	0 to 17.5		
Arrow Creek	0 to 4.3		
Bottom Creek	0 to 9.7		
Daniels Creek	0 to 7.7		
Deer Creek	0 to 4		
Deton Creek	0 to 2.4		
Elk Creek	0 to 8.7		
Fall Creek	0 to 7.7		
Hog Ranch Creek	0 to 2.2		
Kelly Creek	0 to 1.4		
Kentuck Creek	0 to 3.4		
Mettman Creek	0 to 3.5		
Morgan Creek	0 to 4.6		

Coos Sub-Basin 2012 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	River Miles	Parameter	Season
North Slough	0 to 6.1		
Packard Creek	0 to 2.3		
Palouse Creek	0 to 10.5		
Panther Creek	0 to 2.4		
South Fork Coos River	0 to 31.1		
Sullivan Creek	0 to 3.3		
West Fork Millicoma River	0 to 34.8		
Wilson Creek	0 to 6.6		
Bessey Creek	0 to 2.4		
Catching Creek	1.4 to 4.6		
Coalbank Slough	2.4 to 2.5		
Eel Creek	0 to 2.5		
Larson Creek	0 to 4.1		
Larson Slough	0.2 to 3.9		
Mart Davis Creek	0 to 2.9		
Noble Creek	0 to 3.6		
Pony Creek	0 to 5.8		
Ross Slough	0 to 5.2		
Stock Slough	0 to 2.3		
Willanch Slough	0.7 to 2.8		
Tioga Creek	0 to 16.2		October 15 – May 15

Coquille Sub-Basin 2012 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	River Mile	Parameter	Season
Sru Lake	0 to 0	Aquatic Weeds Or Algae	Undefined
Bill Creek	0 to 7.7	Biological Criteria	Year Round
Hall Creek	0 to 1.5		
Hudson Creek	0 to 6.3		
Johns Creek	0 to 2.5		
Lake Creek	0 to 0.9		
Mill Creek	0 to 2		
Myrtle Creek	0 to 17		
Pyburn Creek	0 to 1.6		
North Fork Coquille River	0 to 48.6		
South Fork Coquille River	0 to 51.9		
South Fork Coquille River	53.4 to 61.9		
Steel Creek	0 to 4.9		
Ward Creek	0 to 3.3		
Coquille River	4.2 to 35.6	Chlorophyll a	Summer
Hall Creek	0 to 9	Dissolved Oxygen	May 16 - Dec 31
Middle Fork Coquille River	0 to 39.6		Jun 16 - Dec 31
Mill Creek	0 to 2		May 16 - Dec 31
Reed Creek	0 to 3.4		Jun 16 - Dec 31
Bear Creek	0 to 13.2	Dissolved Oxygen	Fall-Winter-Spring
Coquille River	8 to 35.6		January 1 - May 15
North Fork Coquille River	0 to 18.5		
Middle Fork Coquille River	0 to 11.2		October 15 - May 15
South Fork Coquille River	4.7 to 18.1		
Cunningham Creek	0 to 7.4		Year Around
Middle Fork Coquille River	0 to 11.2		Year Around (Non-spawning)
North Fork Coquille River	0 to 27.9		
South Fork Coquille River	0 to 18.1		
Bear Creek	0 to 13.2	Fecal Coliform Recreational Contact	Fall-Winter-Spring
Coquille River	4.2 to 35.6		
Cunningham Creek	0 to 7.4		
Cunningham Creek	0 to 7.4		Summer
Coquille River	0 to 4.2		Year Round
Ferry Creek	0 to 3.6		
Bear Creek	0 to 13.2	e. Coli	Fall-Winter-Spring
Calloway Creek	0 to 1.9		
Catching Creek	0 to 11.2		
Coquille River	4.2 to 35.6		
Cunningham Creek	0 to 7.4		
Lampa Creek	0 to 5.7		
Middle Fork Coquille River	0 to 39.6		
North Fork Coquille River	0 to 19		
Reed Creek	0 to 2.5		
South Fork Coquille River	0 to 18.9		
Calloway Creek	0 to 1.9		Summer
Catching Creek	0 to 11.2		
Cunningham Creek	0 to 7.4		

Coquille Sub-Basin 2012 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	River Mile	Parameter	Season
Hall Creek	0 to 9		
Lampa Creek	0 to 5.7		
Middle Fork Coquille River	0 to 39.6		
North Fork Coquille River	0 to 19		
Reed Creek	0 to 2.5		
Bear Creek	0 to 13.2		
Coquille River	0 to 4.2	Fecal Coliform Shellfish Growing	Year Around
Coquille River	4.2 to 35.6		
Ferry Creek	0 to 3.6		
Fishtrap Creek	0 to 4.7	Iron	
Baker Creek	0 to 2.9		
Belieu Creek	0 to 3.1		
Coquille River	21 to 35.3		
East Fork Coquille River	0 to 26.2		
Johnson Creek	0 to 7.1		
Rock Creek	0 to 3		Summer
Rowland Creek	0 to 4.6		
Salmon Creek	0 to 9.2		
South Fork Coquille River	42.1 to 61.9		
Unnamed1	0 to 3.6		
Woodward Creek	0 to 7.6		
Alder Creek	0 to 3.1		
Battle Creek	0 to 1.5		
Bear Creek	0 to 13.2		
Bingham Creek	0 to 2		
Boulder Creek	0 to 4.1		
Dice Creek	0 to 4.2		
Elk Creek	0 to 5.7		
Middle Creek	0 to 24.2	Temperature	
Middle Fork Coquille River	11.2 to 39.6		
Moon Creek	0 to 4.7		
North Fork Coquille River	0 to 27.9		
North Fork Coquille River	27.9 to 52.3		
Rock Creek	0 to 11.5		Year Around Non Spawning
South Fork Coquille River	18.1 to 61.9		
Twelvemile Creek	0 to 10.2		
Bear Creek	0 to 13.2		
Hatchet Slough	0 to 3.5		
Middle Fork Coquille River	0 to 11.2		
South Fork Coquille River	0 to 18.1		
Catching Creek	0 to 11.1		
Hall Creek	0 to 9		
Jim Belieu Creek	0 to 3.7		
Johnson Creek	0 to 7.1		
Lampa Creek	0 to 5.7		

Coquille Sub-Basin 2012 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	River Mile	Parameter	Season
Reed Creek	0 to 3.4		
Middle Fork Coquille River	0 to 11.1		Oct 15 - May 15
Middle Fork Coquille River	11.1 to 19.6		Sep 15 - Jun 15
South Fork Coquille River	18.1 to 47.1		Sep 15 - Jun 15
Hatchet Slough	0 to 1.8		Oct 15 - May 15