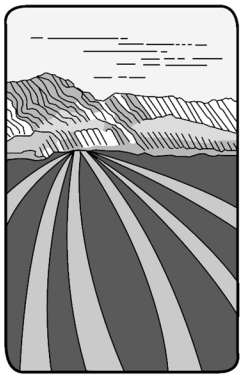

Oregon
Department
of Agriculture

Coos and Coquille Agricultural Water Quality Management Area Plan

Developed by the:
Coos and Coquille Local Advisory Committee
Oregon Department of Agriculture

With support from the:
Coos County Soil and Water Conservation District

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Acronyms and Terms Used in this Document

Ag Water Quality Program – Agricultural Water Quality Management Program
AgWQM Area - Agricultural Water Quality Management Area
Area Plan – Agricultural Water Quality Management Area Plan
Area Rules – Agricultural Water Quality Management Area Rules
BLM - Bureau of Land Management
BOD - Biochemical Oxygen Demand
CAFO – Confined Animal Feeding Operation
CNPCP – Coastal Nonpoint Pollution Control Program
CWA – Clean Water Act
CWAP - Coquille Watershed Action Plan
CZARA – Coastal Zone Act Reauthorization Amendments
DEQ – Oregon Department of Environmental Quality
DMA – Designated Management Agency
DSL – Department of State Lands
GWMA – Groundwater Management Area
HUC – Hydrologic Unit Code
LAC – Local Advisory Committee
Management Area – Agricultural Water Quality Management Area
MOA – Memorandum of Agreement
NPDES – National Pollution Discharge Elimination System
NRCS – Natural Resources Conservation Service
OAR – Oregon Administrative Rules
ODA – Oregon Department of Agriculture
ODFW – Oregon Department of Fish and Wildlife
ORS – Oregon Revised Statute
OSU - Oregon State University
OWEB – Oregon Watershed Enhancement Board
P - Phosphorus
PMP – Pesticides Management Plan
PSP – Pesticides Stewardship Partnership
Regulations – Agricultural Water Quality Management Area Regulations
RUSLE – Revised Universal Soil Loss Equation
SB - Senate Bill
SWCD – Soil and Water Conservation District
T – Soil Loss Tolerance Factor
TP - Total Phosphorus
TMDL – Total Maximum Daily Load
USDA – United States Department of Agriculture
U.S. EPA – United States Environmental Protection Agency
WQPMT – Water Quality Pesticides Management Team
USDA - U.S. Department of Agriculture

Foreword

This Agricultural Water Quality Management Area Plan provides guidance for addressing agricultural water quality issues in the Coos and Coquille Area. The purpose of this Area Plan is to identify strategies to reduce water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities and monitoring. This Area Plan was written to educate landowners about the need to protect our water quality and to encourage good stewardship of the watershed. Legal requirements are established by the Oregon Department of Agriculture (ODA) as Oregon Administrative Rules (OARs). These are highlighted in boxes within this Area Plan for reference purposes only.

The provisions of this Area Plan do not establish legal requirements or prohibitions, as described in Oregon Revised Statute (ORS) 568.912(1). The ODA will exercise its enforcement authority for the prevention and control of water pollution from agricultural activities under administrative rules for the Coos and Coquille Area, and OARs 603-090-0060 through 603-090-0120.

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.

Applicability

This Area Plan will affect any agricultural activities on all non-Federal and non-Tribal lands in the Coos and Coquille Area (see Appendix E 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))

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.

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 (Oregon Administrative Rule (OAR) 603-090-0030(1)). At a minimum, an Area Plan must:

- Describe the geographical area and physical setting of the Management Area.
- List water quality issues of concern.
- List impaired beneficial uses.

- State that the goal of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Include water quality objectives.
- Describe pollution prevention and control measures deemed necessary by the Oregon Department of Agriculture (ODA) to achieve the goal.
- Include an implementation schedule for measures needed to meet applicable dates established by law.
- Include guidelines for public participation.
- Describe a strategy for ensuring that the necessary measures are implemented.

Plan Content

Chapter 1: Agricultural Water Quality Management Program Purpose and Background. The purpose is to have consistent and accurate information about the Agricultural Water Quality Management Program.

Chapter 2: Local Background. Provides the local geographic, water quality, and agricultural context for the Management Area. Describes the water quality issues, regulations (Area Rules), and available or beneficial practices to address water quality issues.

Chapter 3: Local Goals, Objectives, and Implementation Strategies. Chapter 3 presents goal(s), measurable objectives and timelines, and strategies to achieve the goal(s) and objectives.

Chapter 4: Local Implementation, Monitoring, and Adaptive Management. ODA and the Local Advisory Committee (LAC) will work with partners to summarize land condition and water quality status. Trends are summarized to assess progress toward the goals and objectives in Chapter 3.

Chapter 1: Agricultural Water Quality Management Program Purpose and Background

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 Agricultural Water Quality Management Program statewide.

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

As part of Oregon's Agricultural Water Quality Management Program (Ag Water Quality Program), this Area Plan guides landowners and partners such as Soil and Water Conservation Districts (SWCDs) in addressing local agricultural water quality issues. The purpose of this Area Plan is to identify 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)). This 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). Throughout the development and revision processes, the public was invited to participate. This included public comment at meetings and public hearings during the Area Plan approval process. This Area Plan is implemented using a combination of outreach and education, conservation and management activities, compliance, 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 OAR regulations 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 regulations for this Management Area (OARs 603-095-1540). The Ag Water Quality Program's general OARs guide the Ag Water Quality Program, and the OARs for the Management Area are the regulations that landowners must follow.

This Area Plan and its associated regulations apply to all agricultural activities on non-federal and non-Tribal Trust land within the Management Area, including:

- Large commercial farms and ranches.
- Small rural properties grazing a few 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).

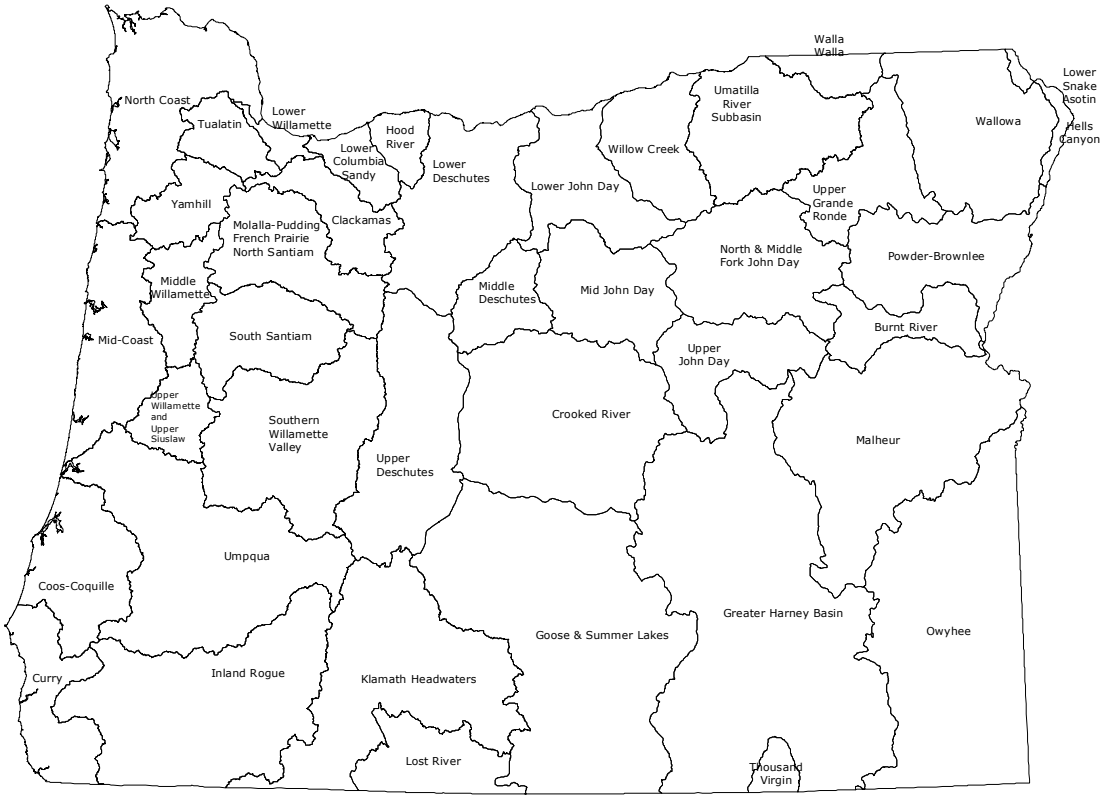
1.2 History of the Ag Water Quality Program

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). Senate Bill 502 was passed in 1995 to clarify that ODA regulates agriculture with respect to water quality (ORS 561.191). This Area Plan and its associated regulations were developed and subsequently revised pursuant to these statutes.

Between 1997 and 2004, ODA worked with LACs and SWCDs to develop Area Plans and associated regulations 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 regulations.
- Conducting biennial reviews of Area Plans and regulations.
- Monitoring, evaluation, and adaptive management.
- Developing partnerships with SWCDs, state, federal, and tribal agencies, watershed councils, and others.

Figure 1: Map of 38 Agricultural 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 is intended to meet the needs and requirements related to agricultural water pollution, including:

- State water quality standards.
- Load allocations for agricultural nonpoint source pollution assigned under Total Maximum Daily Loads (TMDLs) issued pursuant to the Clean Water Act (CWA), Section 303(d).
- Approved management measures for Coastal Zone Act Reauthorization Amendments (CZARA).

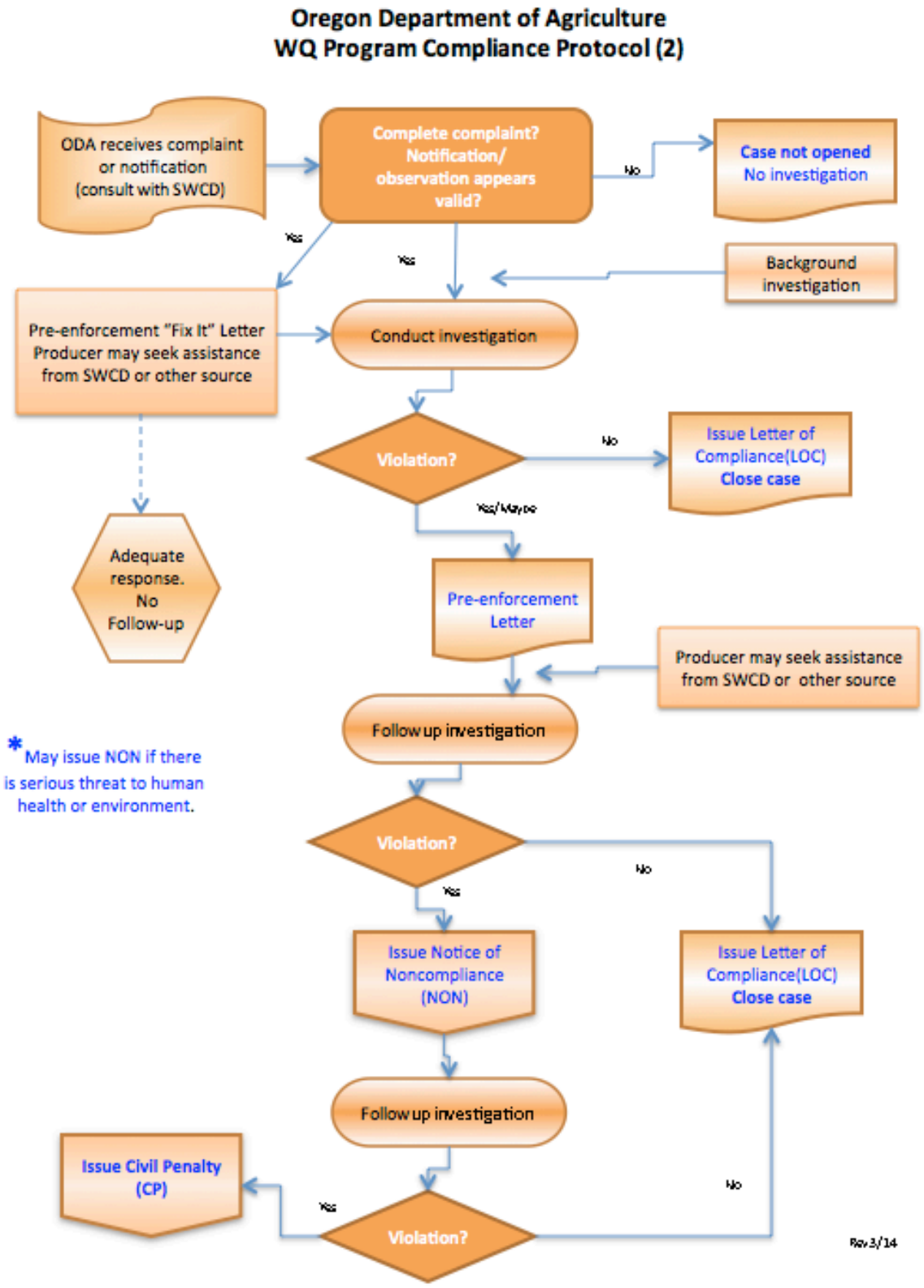
- Agricultural activities detailed in a Groundwater Management Area (GWMA) Action Plan (if a GWMA has been established and an Action Plan developed).

ODA has the legal authority to develop and implement Area Plans and associated regulations for the prevention and control of water pollution from agricultural activities and soil erosion, where such plans are required by state or federal law (ORS 568.909 and ORS 568.912). ODA will base Area Plans and regulations 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 associated regulations. ODA has responsibility for any actions related to enforcement or determination of noncompliance with regulations (OAR 603-090-0080 through OAR 603-090-0120). ORS 568.912(1) and ORS 568.912(2) give authority to ODA to adopt regulations that require landowners to perform actions necessary to prevent and control pollution from agricultural activities and soil erosion.

The emphasis of this Area Plan is on voluntary action by landowners or operators to control the factors effecting water quality in the Management Area. The regulations are outlined as a set of minimum standards that must be met on all agricultural or rural lands. Landowners and operators who fail to address these regulations may be subject to enforcement procedures, which are outlined below.

Enforcement Action—ODA will use enforcement mechanisms where appropriate and necessary to gain compliance with water quality regulations. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed. If a violation is documented, ODA may issue a pre-enforcement notification or an Order such as a Notice of Noncompliance. If a Notice of Noncompliance is issued, the landowner or operator will be directed by ODA to remedy the condition 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, civil penalties may be assessed for continued violation of the regulations. See the Compliance Flow Chart for a diagram of the compliance process. If and when other governmental policies, programs, or regulations conflict with this Area Plan or associated regulations, ODA will consult with the agency(ies) and attempt to resolve the conflict in a reasonable manner.

Compliance Flow Chart



1.3.2 Local Management Agency

A Local Management Agency is an organization that ODA has designated to implement an Area Plan (OAR 603-090-0010). The legislative intent is for SWCDs to be Local Management Agencies 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 who voluntarily address natural resource concerns. Currently, all Local Management Agencies in Oregon are SWCDs.

The day-to-day implementation of the Area Plan is accomplished through an intergovernmental agreement between ODA and each SWCD. 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 associated regulations as needed.

1.3.3 Local Advisory Committee (LAC)

For each Management Area, the director of ODA appoints an LAC (OAR 603-090-0020) with up to 12 members, to assist with the development and subsequent biennial reviews of the local Area Plan and regulations. The LAC serves in an advisory role to the director of ODA and to the Board of Agriculture. LACs are composed primarily of landowners in the Management Area and must reflect a balance of affected persons.

The LAC may meet as frequently as necessary to carry out their responsibilities, which include, but are not limited to:

- Participate in the development and ongoing revisions of the Area Plan.
- Participate in the development and revisions of regulations.
- 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 regulations.
- Submit written biennial reports to the Board of Agriculture and the ODA director.

1.3.4 Agriculture's Role

Each individual landowner or operator in the Management Area is required to comply with the regulations, which set minimum standards. However, the regulations alone are not enough. To achieve water quality standards, individual landowners also need to attain land conditions that achieve the goals and objectives of the voluntary Area Plan. Each landowner or operator is not individually responsible for achieving water quality standards, agricultural pollution limits, or the goals and objectives of the Area Plan. These are the responsibility of the agricultural community collectively.

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

Area regulations only address impacts that result from agricultural activities. A landowner is responsible for only those conditions caused by activities conducted on land managed by the landowner or occupier. Conditions resulting from unusual weather events or other circumstances not within the reasonable control of the landowner or operator are considered when making compliance decisions. Agricultural landowners may be responsible for some of the above impacts under other legal authorities.
Under the Area Plan and associated regulations, agricultural landowners and operators are not responsible for mitigating or addressing factors that do not result from agricultural activities, such as:

- Hot springs, glacial melt water, extreme or unforeseen weather events, 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.

1.3.5 Public Participation

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

ODA, LACs, and SWCDs conduct biennial reviews of the Area Plans and regulations. Partners, stakeholders, and the general public are invited to participate in the process. Any future revisions to the regulations will include a public comment period and a public hearing.

1.4 Agricultural Water Quality

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. Significant 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 pesticide applications in, over and within three feet of water. Many CAFOs are regulated under ODA's CAFO Program. Irrigation water discharges may be at a defined discharge point, but does not currently require a permit.

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

1.4.2 Beneficial Uses and Parameters of Concern

Beneficial uses of clean water include: public and private domestic water supply, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, hydropower, and commercial navigation and transportation. The most sensitive beneficial uses are usually fish and aquatic life, water contact recreation, and public and private domestic water supply. These uses are generally the first to be impaired as a water body is polluted, 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 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. These water bodies may or may not have established water quality management plans documenting needed reductions. The most common water quality concerns related to agricultural activities are temperature, bacteria, biological criteria, sediment and turbidity, phosphorous, algae, pH, dissolved oxygen, harmful algal blooms, nitrates, pesticides, and mercury. These parameters vary by Management Area and are summarized in Chapter 2.

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

Every two years, the DEQ is required, by the federal Clean Water Act (CWA), to assess water quality in Oregon. 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. DEQ, in accordance with the CWA, is required to establish TMDLs for pollutants on the 303(d) list.

A TMDL includes an assessment of water quality data and current conditions and describes a plan to restore polluted waterways to conditions that meet water quality standards. TMDLs specify the daily amount of pollution that a water body can receive and still meet water quality standards. Through the TMDL, point sources are assigned pollution limits as "waste load allocations" in permits, while nonpoint sources (agriculture, forestry, and urban) are assigned pollution limits as "load allocations." TMDLs are legal orders issued by the DEQ, so parties assigned waste or load allocations are legally required to meet them. The agricultural sector is responsible for meeting the pollution limit (load allocation) assigned to agriculture specifically, or to nonpoint sources in general, as applicable.

TMDLs generally apply to an entire basin or subbasin, and not just to an individual water body on the 303(d) list. Once a TMDL is developed for a basin, the basin's impaired water bodies are removed from the 303(d) list, but they remain on the list of impaired water bodies. When data show that water quality standards have been achieved, water bodies will be identified on the list of water bodies that are attaining water quality standards.

As part of the TMDL process, DEQ identifies the Designated Management Agency or parties responsible for submitting TMDL implementation plans. TMDLs designate that the local Area Plan is the implementation plan for the agricultural component of the TMDLs that apply to this Management Area. Biennial reviews and revisions to the Area Plan and regulations must address agricultural or nonpoint source load allocations from TMDLs.

The list of impaired water bodies (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 Water Pollution Control Law – ORS 468B.025 and ORS 468B.050

Senate Bill 502 was passed in 1995, authorizing ODA as the state agency responsible for regulation of farming activities for the purpose of protecting water quality. A Department of Justice opinion dated July 10, 1996, states that "...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 Environmental Quality Commission's water quality standards."

To implement Senate Bill 502, ODA incorporated ORS 468B into all of the Area Plans and associated regulations in the state. A Department of Justice opinion, dated September 12, 2000, clarifies that ORS 468B.025 applies to point and nonpoint source pollution.

ORS 468B.025 states that:

"(1) ...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."

The aspects 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 (ORS 468B.005)

"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.

"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.

1.5 Other Water Quality Programs

1.5.1 Confined Animal Feeding Operation (CAFO)

ODA is the lead state agency for the CAFO Program. The CAFO Program was developed to ensure that operators and producers do not contaminate ground or surface water with animal manure. Since the early 1980s, CAFOs have been registered to a general Water Pollution Control Facility permit designed to protect water quality, while allowing the operators and producers to remain economically viable. A properly maintained CAFO does not pollute ground or surface water. To assure continued protection of ground and surfacewater, ODA was directed by the 2001 Oregon State Legislature to convert the CAFO Program from a Water Pollution Control Facility permit program to a federal National Pollutant Discharge Elimination System (NPDES) program. ODA and DEQ jointly issued a NPDES CAFO Permit

in 2003 and 2009. The 2009 permit will expire in May 2014, and it is expected that a new permit will be issued at that time. The NPDES CAFO Permit is compliant with all Clean Water Act requirements for CAFOs; it does allow discharge in certain circumstances as long as the discharge does not violate Water Quality Standards.

Oregon NPDES CAFO Permits require the registrant to operate according to a site-specific, ODA approved, Animal Waste Management Plan that is incorporated into the NPDES CAFO Permit by reference. CAFO NPDES Permits protect both surface and ground water resources.

1.5.2 Drinking Water Source Protection

Oregon implements its drinking water protection program through a partnership between DEQ and the Oregon Health Authority. The program provides individuals and communities with information on how to protect the quality of Oregon's drinking water. DEQ and the Oregon Health Authority encourage community-based protection and preventive management strategies to ensure that all public drinking water resources are kept safe from future contamination. For more information see: http://www.deq.state.or.us/wq/dwp/dwp.htm. Agricultural activities are required to meet those water quality standards that contribute the safe drinking water.

1.5.3 Groundwater Management Areas (GWMAs)

Groundwater Management Areas are designated by DEQ when groundwater in an area has elevated contaminant concentrations resulting, at least in part, from nonpoint sources. Once the GWMA is declared, a local groundwater management committee comprised of affected and interested parties is formed. The committee then works with and advises the state agencies that are required to develop an action plan that will reduce groundwater contamination in the area.

Oregon has designated three GWMAs because of elevated nitrate concentrations in groundwater. These include the Lower Umatilla Basin GWMA, the Northern Malheur County GWMA, and the Southern Willamette Valley GWMA. Each GWMA has a voluntary Action Plan to reduce nitrate concentrations in groundwater. If after a scheduled evaluation point DEQ determines that the voluntary approach is not effective, then mandatory requirements may become necessary.

1.5.4 Oregon's Coastal Management Program and the Coastal Zone Management Act Reauthorization Amendments (CZARA) of 1990

The mission of the Oregon Coastal Management Program is to work in partnership with coastal local governments, state and federal agencies, and other 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 in compliance with requirements of Section 6217 of the CZARA. CZARA is administered at the federal level by the U.S. EPA and the National Oceanic and Atmospheric Administration (NOAA). 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 protecting wetlands. In Oregon, the program is coordinated by the Department of Land Conservation and Development and DEQ. The geographical boundaries for the CNPCP include North Coast, Mid-Coast, South Coast, Rogue, and Umpqua basins. Oregon identified coastal Agricultural Water Quality Management Area Plans and Rules as the state's strategy to address agricultural measures. This Area Plan and associated regulations are designed to meet the requirments of the CZARA and to implement agriculture's part of Oregon's CNPCP.

Additional information about CZARA and Oregon's CNPCP can be located at: http://www.oregon.gov/LCD/OCMP/pages/watqual_intro.aspx

1.5.5 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, the interagency Water Quality Pesticide Management Team (WQPMT) was formed to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT includes representation from ODA, Oregon Department of Forestry, DEQ, and the Oregon Health Authority. 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 monitoring programs to assess the possible impact of pesticides on Oregon's water quality. Pesticide detections can be addressed through multiple programs and partners, including the PSP Program described above.

Through the PSP Program, state agencies and local partners work together to monitor pesticides in streams and to improve water quality (http://www.deq.state.or.us/wq/pesticide/pesticide.htm). DEQ, ODA, 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. There has been noteworthy progress since 2000 in reducing pesticide concentrations and detections.

ODA led the development and implementation of a Pesticides Management Plan (PMP) for the state of Oregon (http://www.oregon.gov/ODA/PEST/water_quality.shtml). 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. The PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water resources by managing the pesticides that are currently approved for use by the U.S. EPA and Oregon in both agricultural and non-agricultural settings.

1.5.6 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 (http://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 salmon, because they have such 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 associated regulations throughout Oregon.

1.5.7 Oregon Department of Environmental Quality (DEQ)

The U.S. EPA has delegated authority to DEQ under the CWA authority for protection of water quality in Oregon. In turn, DEQ is the lead state agency with overall authority to regulate for water quality in Oregon. DEQ coordinates with other state agencies, including ODA and Oregon Department of Forestry, to meet the needs of the CWA. DEQ sets water quality standards and and develops TMDLs for impaired waterbodies. In addition, DEQ develops and coordinates programs to address water quality including National Pollution Discharge Elimination Permits (for point sources), 319 program, Source Water Protection, 401 Water Quality Certification, and GWMAs. DEQ also coordinates with ODA to help ensure successful implementation of Area Plans as part of its 319 program.

DEQ designated ODA as the Designated Management Agency for water pollution control activities on agricultural and rural lands in the state of Oregon to coordinate meeting agricultural TMDL load

allocations. A Memorandum of Agreement (MOA) between DEQ and the ODA recognizes that ODA is the agency responsible for implementing the Ag Water Quality Program established under ORS 568.900 to ORS 568.933, ORS 561.191, and OAR Chapter 603, Divisions 90 and 95. The MOA between ODA and DEQ was updated in 2012 and describes how the agencies will work together to meet agricultural water quality requirements.

The MOA includes the following commitments:

- ODA will develop and implement a monitoring strategy, as resources allow, in consultation with DEQ.
- ODA will evaluate Area Plans and regulation effectiveness in collaboration with DEQ.
  - ODA will determine the percentage of lands achieving compliance with Management Area regulations.
  - ODA will determine whether the target percentages of lands meeting the desired land conditions, as outlined in the goals and objectives of the Area Plans, are being achieved.
- ODA and DEQ will review and evaluate existing information with the objective of determining:
  - Whether additional data are needed to conduct an adequate evaluation.
  - Whether existing strategies have been effective in achieving the goals and objectives of the Area Plan.
  - Whether the rate of progress is adequate to achieve the goals of the Area Plan.

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 its associated regulations. The petition must allege with reasonable specificity that the Area Plan or associated regulations are not adequate to achieve applicable state and federal water quality standards (ORS 568.930(3)(a)).

1.5.8 Other Partners

ODA and SWCDs work in close partnership with local, state, and federal agencies and organizations, including: DEQ (as indicated above), the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and Farm Service Agency, watershed councils, Oregon State University Extension Service, 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.

1.6 Measuring Progress

Agricultural landowners and operators have implemented 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 this progress. ODA is working with SWCDs, LACs, and our partners to develop and implement objectives and strategies that will produce measurable outcomes for agricultural water quality.

1.6.1 Measurable Objectives

Measurable objectives allow the Ag Water Quality Program to better evaluate progress toward meeting water quality standards and load allocations where TMDLs have been completed. Many of these measurable objectives relate to land condition and are mainly implemented through focused work in small geographic areas (section 1.7.3). The measurable objectives for this Area Plan are in Chapter 3, and progress toward achieving the objectives is summarized in Chapter 4.

At a minimum, the measurable objectives of the Ag Water Quality Program and this Area Plan are to:

- Increase the percentage of lands achieving compliance with the regulations.
- Increase the percentage of lands meeting desired land conditions outlined in the Area Plan.

1.6.2 Land Condition and Water Quality

Land conditions can serve as useful surrogates (indicators) for water quality parameters. For example, streamside vegetation is generally used as a surrogate for water temperature, because shade blocks solar radiation from warming the stream. In addition, sediment can be used as a surrogate for pesticides and nutrients, because many pesticides and nutrients 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.
- It can be difficult to separate agriculture's influence on water quality from other land uses.
- It requires extensive monitoring of water quality at an intensive temporal scale to evaluate progress; it is expensive and may fail to demonstrate short-term improvements.
- Improved land conditions can be documented immediately, but there may be a significant lag time or a need for more extensive implementation before water quality improves.
- Agricultural improvements in water pollution are primarily through improvements in land and management conditions.

Water quality monitoring data may help ODA and partners to measure progress or identify problem areas in implementing the Area Plan; although, as described above, it may be less likely to evaluate the short-term effects of changing land conditions on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides.

1.6.3 Focused Implementation in Small Geographic Areas

Focus Areas

A Focus Area is a small watershed with significant water quality or land condition concerns that are associated with agriculture. ODA's intent in selecting Focus Areas is to deliver systematic, concentrated outreach and technical assistance in small geographic areas ("Focus Areas") through the SWCDs. A key component of this approach is measuring conditions before and after implementation to document the progress made with available resources. The focused implementation approach is consistent with other agencies' and organizations' efforts to work proactively in small geographic areas, and is supported by a large body of scientific research (e.g., Council for Agricultural Science and Technology, 2012).

Systematic implementation in Focus Areas can provide the following advantages:

- Measuring progress is easier in a small watershed than across an entire Management Area.
- Water quality improvement may be faster since small watersheds generally respond more rapidly.
- A proactive approach can address the most significant water quality concerns.
- Partners can coordinate and align technical and financial resources.
- Partners can coordinate and identify the appropriate source specfic conservation practices and demonstrate the effectiveness of these conservation practices.
- A higher density of projects allows neighbors to learn from neighbors.
- A higher density of prioritized projects leads to greater connectivity of projects.
- Limited resources are used more effectively and efficiently.
- Work in one Focus Area, followed by other Focus Areas, will eventually cover the entire Management Area.

SWCDs choose a Focus Area in cooperation with ODA and other partners. In some cases, a Focus Area is selected because of efforts already underway or landowner relationships already established. The scale of the Focus Area matches the SWCD's capacity to deliver concentrated outreach and technical assistance, and to complete (or initiate) projects over a biennium. The current Focus Area for this Management Area is described in Chapter 3.

Working within a Focus Area is not intended to prevent implementation within the remainder of the Management Area. The remainder of the Management Area will continue to be addressed through general outreach and technical assistance.

Strategic Implementation Areas
Strategic Implementation Areas are small watersheds selected by ODA, in cooperation with partners, and after review of water quality and other available information. ODA leads the assessment of current conditions and the landowner outreach. Strategic Implementation Areas and Focus Areas are both tools to concentrate efforts in small geographic areas to achieve water quality standards. As with Focus Areas, SWCDs and partners work with landowners to improve conditions that may impact water quality. However, Strategic Implementation Areas also have a compliance evaluation and assurance process that allows ODA to proactively gain compliance with Ag water quality regulations.

1.7 Implementation, Monitoring, Evaluation, and Adaptive Management

Implementation of the Area Plan and associated regulations will be assessed by evaluating the status and trends in agricultural land conditions. Measurable objectives will be assessed across the entire Management Area and within the Focus Area. ODA conducts land condition and water quality monitoring at the statewide level and will analyze this and other agencies' and organizations' local monitoring data. The results and findings will be summarized in Chapter 4 for each biennial review. ODA, DEQ, SWCDs, and LACs will examine these results during the biennial review and will revise the goal(s), objectives, and strategies in Chapter 3, as needed.

1.7.1 Statewide Aerial Photo Monitoring of Streamside Vegetation
Starting in 2003, ODA began evaluating streamside vegetation conditions using aerial photos acquired specifically for this purpose. ODA focuses on land condition monitoring efforts on streamside areas because these areas have such a broad influence over water quality. Stream segments representing 10 to 15 percent of the agricultural lands in each Management Area were randomly selected for monitoring. ODA examines streamside vegetation at specific points in 90-foot bands along the stream from the aerial photos and assigns each sample stream segment a score based on ground cover. The score can range from 70 (all trees) to 0 (all bare ground). The same stream segments are re-photographed and re-scored every five years to evaluate changes in streamside vegetation conditions over time. Because site capable vegetation varies across the state, there is no one correct riparian index score. The main point is to measure positive or negative change. The results are summarized in Chapter 4 of the Area Plan.

1.7.2 Agricultural Ambient Water Quality Monitoring Assessment
ODA currently evaluates water quality data from monitoring sites in DEQ's water quality database that reflects agricultural influence on water quality. These data are also published in the DEQ water quality database and evaluated at the statewide level to determine trends in water quality at agricultural sites statewide. Results from monitoring sites in the Management Area, along with local water quality monitoring data, are described in Chapter 4.

1.7.3 Biennial Reviews and Adaptive Management

The Area Plan and associated regulations undergo biennial reviews by ODA and the LAC. As part of each biennial review, ODA, DEQ, SWCDs, and the LAC discuss and evaluate the progress on implementation of the Area Plan and associated regulations. This evaluation includes enforcement actions, landscape and water quality monitoring, and outreach efforts over the past biennium across the Management Area and for the Focus Area. In addition, progress toward achieving agricultural load allocations may be documented (if a TMDL has been established). As a result of the biennial review, the LAC submits a report to the Board of Agriculture and the director of ODA. This report describes progress and impediments to implementation, and recommendations for modifications to the Area Plan or associated regulations necessary to achieve the purpose of the Area Plan. The results of this evaluation will be used to update the goal(s), measurable objectives, and strategies in Chapter 3.

Chapter 2: Local Background

2.1 Local Roles and Responsibilities

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 regulations and with subsequent biennial reviews. Members are:

Name	Location	Description
Current 2014 Members:		
Chair: Joan Mahaffy *	Coos Bay	Beef Cattle
Tom Johnson *	North Bend	Dairy Cattle
Bonnie Joyce *	Myrtle Point	Small Woodlot
JoAnn Mast *	Coquille	Sheep
Sharon Waterman	Bandon	Sheep & Cattle
Dan Pierce	Bandon	Cattle
Ken Hershey	Bandon	Cattle
Former LAC Members:		
Dave Messerle *	Coos Bay	Former Chair: Beef Cattle
Roland Ransdell *	Coquille	Organic Grower
Jordan Utsey * *(deceased)*	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

* Denotes members at time of Plan adoption (2002)

2.1.2 Local Management Agency

The implementation of this Area Plan is accomplished through an Intergovernmental Agreement between ODA and the Coos County SWCD. This Intergovernmental Agreement defines the SWCD as the Local Management Agency for implementation of the Area Plan. The SWCD was also involved in development of the Area Plan and associated regulations.

2.2 Area Plan and Regulations: Development and History

The Area Plan and regulations were approved by the director of ODA in 2006.

Since approval, the LAC met in 2008, 2010, 2012 and 2014 to review the Area Plan and regulations. The review process included assessment of the progress of Area Plan implementation toward achievement of plan goals and objectives.

2.3 Geographical and Physical Setting

2.3.1 Agriculture

Agriculture in the Coos and Coquille 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 in the Coos and Coquille watersheds. 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 fourth in Oregon for sheep production and ninth in milk production (USDA, 1997).

As of 2010, there are approximately 16 dairies in the Coos and Coquille watersheds. 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 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. Some beds may be constructed in other soils with the addition of sand. 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.

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, 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 A.

Many factors have a role in the decline of native populations of salmonids in the Coos and Coquille 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 B.

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 E). 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 1.1- *Comparison of the Coos and Coquille 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 (Coquille Watershed Action Plan (CWAP), 1997).

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 E). 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 (CWAP, 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. About 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. (Coos Watershed Association, 1996)

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 E). 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 E). It is considered part of the Coos and Coquille 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 1.2 - *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 more 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.

2.3.7 Map of the Management Area

See Appendix E - Management Area Maps

2.4 Agricultural Water Quality in the Management Area

2.4.1 303(d) List of Impaired Water Bodies

See Appendix I - 303(d) Listed Waterbodies from 2004/2006 Integrated Report

2.4.2 Basin 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 and habitat modification have been identified as water quality impairments. 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 water body can receive and still meet water quality standards. Water quality standards are intended to protect the most sensitive beneficial uses in a water body.

Water bodies that do not meet water quality standards are placed on a state list of impaired water bodies. 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 4th Field HUC TMDL should be completed in 2015. The Tenmile Watershed TMDL will be updated when the Coos 4th Field TMDL is developed.

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.

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 and drainage improvement. 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 exacerbates streambank erosion. Increasing channel connectivity to finger valley floors can help decrease streambank erosion and allow sediments to settle on the vally 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 DSL and/or the 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.

2.4.3 Beneficial Uses and Parameters of Concern

Beneficial uses (OAR 340-041-0300)[1] of water include anadromous fish passage, private domestic water supplies, and agricultural activities such as livestock watering and irrigation. There are 16 beneficial uses listed for the Coos and Coquille Area (see Appendix D for complete 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 Coos and Coquille 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 Coos and Coquille Area are algae, bacteria, dissolved oxygen, chlorophyll a, habitat modification, sedimentation, and temperature, and biological criteria as determined by DEQ.

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.

Because blue green algae are able to utilize atmospheric nitrogen, a reduction in lake water total phosphorus (TP) is often used as a water quality target. 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, TP is proposed as a target, to work towards.

Neither Oregon nor EPA has set a criterion for phosphate phosphorus. EPA has recognized the relationship between phosphates, as major nutrients, and excessive aquatic weed and algae growth, and lake and reservoir eutrophication. EPA recommends that total phosphates reported as phosphorus (P) should not exceed 50 ug/L in streams to control excessive aquatic growth. This value is used as a benchmark to evaluate water quality data for phosphate phosphorus.

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).

[1] “Designated Beneficial Use” means the purpose or benefit to be derived from a waterbody, as designated by the Water Resources Department or the Commission. (OAR 340-041-0002(17)) (DEQ, 1996)

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.

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 water body 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.

Within the plan area 80 percent reductions in fecal pollution have been identified as needed in order to meet water quality standards and insure that streams, rivers, and lakes are safe for water contact recreation.

In areas where recreational or commercial shellfish harvest is occurring fecal coliform median concentrations should not exceed 14 organisms per 100 milliliters, with not more than ten 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.

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. 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). 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. 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. 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 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 Coos and Coquille 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 this activity. If the point of origination is upstream, the landowner would not be responsible sediment 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 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. Weed and Algae TMDLs will target sediment load reductions.

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. 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 degrees 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 condition. Some streams, even under natural or site potential 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 splash damming, early river commerce, various agricultural practices, logging, 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. 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 degrees 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 degrees 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 & 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 water body, the water body 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 Total Maximum Daily Load.

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.

2.5 Prevention and Control 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 F 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. 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 www.oda.state.or.us/natural_resources/cafo.htm.*

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 [2].
- 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.

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.

[2] If compost is sold, the buyer is the sole responsible party unless the seller has an arrangement or agreement with the buyer to store the finished compost, in which case both the seller and buyer would be jointly liable for any pollution related problems.

Riparian areas are highly variable throughout the Coos and Coquille 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.[3]
- 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.

[3][5] One suggested reference to use for culvert size is the Forest Practices Act Recommendations from Oregon Department of Forestry.

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.

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 Coos and Coquille Area is closely linked to the flood cycles of the rivers. Generally, livestock graze on productive floodplain pastures from late May through October, 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, and 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 fencerows 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[4]. 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.

[4] 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 the Department of State Lands (DSL) and/or the US Army Corps of Engineers (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 F.)
- Provide fish screening at irrigation intakes.
- Check field layouts for flow uniformity.
- Maintain good soil fertility to make effective use of irrigation water.

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 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.[5]

[5] Note:
ORS 468B.025(1) states:
...no person shall:
(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
(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.

ORS 468B.050 identifies the conditions when a permit is required. In agriculture under state rules these are referred to as Confined Animal Feeding Operations (CAFO) and are operations that confine animals for more than 4 months per year and have a wastewater treatment facility.

Chapter 3: Goals, Objectives, and Strategies

ODA and the LAC will review this chapter at each biennial review and may update it if needed.

3.1 Goal

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 Coos and Coquille 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 ODA 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.

3.2 Objectives

The Coos and Coquille LAC identified the following objectives for this Agricultural Water Quality Management Area Plan:

- 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, and Tenmile watersheds.

3.3 Measurable Objectives

To achieve the Area Plan goal, the following measurable objectives, strategies, milestones, and timelines were developed:

- *Objectives and timelines will be established for the areas needing work.*
- *ODA and the LMA will report back to the LAC on the status of land conditions, and outreach and technical assistance efforts in the area, at the next biennial review.*

3.3.1 Focus Area

A Focus Area for this Management Area has been selected. An Action Plan for the current biennium has been developed and approved by ODA outlining the key components of the process.

- Conduct a pre-assessment of current land conditions.

- Identify areas of concern.
- Conduct education and outreach to landowners.
- Offer technical assistance to landowners and financial assistance, if needed.
- Conduct a post-assessment after project implementation.
- Report progress to ODA and the LAC.

Results of the assessments and targeted assistance are reported to the LAC at the Biennial Review and are summarized in Chapter 4.

3.3.2 Focus Area Measurable Objectives

- By July 1, 2015, a Focus Area (a small geographic area) will be identified within the Management Area, where the local SWCD will focus outreach and technical assistance work for the next two years.
- By January 1, 2016, ODA and/or the SWCD will complete the Streamside Vegetation Assessment (or other assessment) in the area that identifies:
    - the amount and percentage of streamside areas meeting water quality vegetation goals / water quality functions (shade, bank stability, …)
    - and streamside areas that need work (do not meet water quality functions).

The LAC will work with the Coos SWCD and ODA to determine appropriate timelines and measurements of progress in their Focus Area and Management Area. These appropriate measurable objectives, milestones, and timelines will be incorporated into the Coos-Coquille Plan at the 2016 Biennial Review.

- Outputs
    - By the 20__ biennial review, ODA and the SWCD will compile information about the number, and size of water quality improvement projects completed in the Focus Area since Area Plan and Rules adoption, as resources allow.
    - By the 20__ biennial review, the SWCD will have offered technical assistance to all landowners in the Focus Area with lands where agricultural activities do not appear to allow streamside vegetation to provide WQ functions.
    - By the 20__ biennial review, the LMA will report back to the LAC and ODA on the amount of lands where landowners accept voluntary assistance to establish streamside vegetation that provides WQ functions.
    - By July 1, 20__, ODA and/or the LMA will complete a post-assessment in the Focus Area and evaluate land condition changes over the two-year period.
- Outcomes
    - By the 20__biennial review, the Focus Area will show a __% increase in the streamside area that provides site capable streamside vegetation and water quality functions that sites are capable of providing
    - By the 20__ biennial review, __% of the assessed streamside area in the Focus Area is likely providing site capable streamside vegetation and water quality functions that sites are capable of providing

3.4 Strategies for Area Plan Implementation

To protect or improve water quality, an effective strategy must increase awareness of the problems and the range of potential solutions, motivate appropriate voluntary action, and provide for technical and financial assistance to plan and implement effective water pollution prevention and control measures. The SWCDs and other partners will cooperate to implement the following strategies at the local level with landowners:

- Prevent runoff of agricultural wastes: agricultural activities will not discharge any wastes or place waste where it is likely to run off into waters of the state.
- Prevent and control upland and cropland soil erosion using practical and available methods.
- Control active channel erosion to protect against sediment delivery to streams.
- Prevent bare areas due to livestock overgrazing near streams.
- Establish streamside vegetation along streams on agricultural properties to provide streambank stability, filtration of overland flow, and moderation of solar heating.

3.4.1 Education and Outreach

The Coos SWCD, as the designated Local Management Agency (LMA), will provide specific landowner education and support for this Area Plan. Currently, and upon future availability of funds, the following activities will continue to be implemented by the SWCD:

- Provides direct assistance in developing Voluntary Farm Plans for individual landowners;
- Newsletters and website containing articles on positive management practices, outstanding District cooperators and their management practices, and articles about the status of the Coos and Coquille Area Plan and Rules;
- Workshops, presentations, and seminars that will relate to the unacceptable conditions and positive management practices that are found in the Coos and Coquille Area Plan;
- Posters describing water pollution prevention and control activities and how to get assistance for farm planning in the Coos and Coquille Area;
- Press releases, and meeting announcements concerning Coos and Coquille Area activities;
- Coordination between other agencies and associations such as DEQ, EPA, Coquille Watershed Association, Coos Watershed Association, etc.;
- Fact sheets for each management measure section discussing Positive Management Practices, conditions that may lead to a water quality problem, and rules that are associated with each one;

Source of a general clearinghouse of information for the public about agricultural water quality;
As resources allow, the SWCDs, in partnership with other agencies and local organizations, will develop educational programs to improve the awareness and understanding of agricultural water quality issues. They will strive to provide the most current information in a manner that avoids conflict and encourages cooperative efforts to solve problems. Implementation of the Area Plan is a priority element in the SWCD's Annual Work Plan and Long-range Business Plan.

3.4.2 Conservation Planning and Conservation Activities

Effective water quality management depends on activities and structural measures that are the most effective, practical means of controlling and preventing pollution from agricultural activities. Appropriate management activities for individual farms may vary with the specific cropping, topographical, environmental, and economic conditions at a given site. Due to these variables, it is difficult to recommend any specific, uniform set of management activities in this document to improve agricultural water quality.

Management activities and land management changes are most effective when selected and installed as parts of a comprehensive resource management plan based on natural resource inventories and assessment of management activities.

A detailed list of specific measures that can be used to address agricultural pollution are contained in other documents such as the NRCS Field Office Technical Guide, available for reference at the local NRCS office. Landowners and operators have flexibility in choosing management approaches to address water quality issues on their lands.

The Coastal Zone Act Reauthorization Amendments (CZARA) section 6217(g) agricultural measures described in Appendix E provide a menu of options that, when selected options are used together, should also prevent and control water pollution.

Voluntary conservation plans describe the management systems and schedule of conservation activities that the landowner will use to conserve soil, water, and related plant and animal resources on all or part of a farm unit. Landowners, operators, consultants, or technicians available through a SWCD or the NRCS may develop voluntary conservation plans. A conservation plan can be used to outline specific measures necessary to address the "Prevention and Control Measures" outlined in this Area Plan.

Conservation activities should:

- Identify priorities for management activities, including reasonable timelines.
- Control pollution as close to the source as possible.
- Improve irrigation water use and conveyance efficiency to reduce the potential of polluted return flows.
- Show reduction in potential sources of pollution through scientifically valid monitoring and periodic surveys of stream reaches and associated lands.
- Be flexible to adjust management based on feedback, or monitoring and changing environmental and economic conditions.

For a list of agencies and organizations to contact for more information about resource management, please refer to Appendix H: Technical and Financial Resources for Landowners.

3.4.3 Funding

Sometimes the cost of conservation measures do not fit well with a producer's operating budget. Local, state, and federal technical and financial resources are available to improve the cost-effectiveness of protecting and improving water quality. It is not the intent of the Area Plan to impose a financial hardship on any individual. If there are potential water quality threats on their land, it is the responsibility of the landowner or operator to request technical and/or financial assistance and to develop a reasonable time frame for addressing potential water quality problems.

As resources allow, the SWCD, NRCS, and other natural resource agency staff are available to help landowners evaluate approaches for reducing runoff and soil erosion on their farms and incorporate these into voluntary conservation or water quality plans. Personnel in these offices can also design and assist with project implementation, and help identify sources of cost sharing or grant funding.

Technical and financial assistance may be available through current USDA conservation programs. Other programs that stand ready to partner for conservation include the U.S. EPA's nonpoint source implementation grants ("319 funds"), or state programs such as the Oregon Watershed Enhancement Board (OWEB) grant programs, the Riparian Tax Incentive Program, and the Wildlife Habitat Conservation and Management Program.

The SWCD will seek funding to implement the Area Plan. Funding is necessary in four main areas:

- Education: to fund workshops, tours, and development of published materials.
- Technical assistance: to hire staff to work with landowners to develop and implement solutions to agricultural water quality concerns.
- Financial assistance: to provide cost-share dollars to assist landowners to implement agricultural water quality conservation activities.
- Monitoring: to monitor land conditions and water quality and evaluate how agricultural activities are impacting streams in the Management Area.

For sources of financial assistance, see Appendix H: Technical and Financial Resources for Landowners.

3.4.4 Monitoring and Evaluation

For a description of monitoring and evaluation activities, see Chapter 4 page 57.

Monitoring is an important activity as part of the implementation phase of Area Plans. When effectively used, monitoring and data analysis can provide valuable information to:

- Establish baseline information;
- Evaluate trends in water quality improvement;
- To better quantify current conditions and progress toward objectives contained in the Area Plan.
- Help understand whether water quality improvement activities are achieving their intended goals;
- Assist with adjustments in implementation activities and priorities to gain maximum effects on improving water quality and watershed conditions.

Landowners interested in monitoring can find help locally through the ODA Water Quality Specialist, OSU, the Coos SWCD, the Coos and Coquille Watershed Associations, DEQ, and other public and private sources.

Monitoring and assessment are also important information gathering activities during site-specific determinations of compliance as part of an investigation. For the purposes of Area Plans, there are four important types of monitoring or assessment that may be conducted.

1) Baseline Condition Monitoring

Baseline condition monitoring provides a starting point for assessing water quality trends and for future evaluation of the effectiveness of water quality improvement efforts. Baseline condition monitoring typically includes identification and analysis of data previously and currently collected in the area according to accepted protocols. The Oregon Plan Water Quality Monitoring Technical Guide Book is the recommended guide for baseline condition monitoring.

2) Water Quality Trend Monitoring

Water quality trend monitoring can help to track how water quality (typically on a watershed or sub-watershed scale) is changing over time, including after implementation of an Area Plan. It is recommended that trend monitoring follow recommendations in the Oregon Plan Water Quality Monitoring Technical Guide. This Water Quality Monitoring Technical Guide Book describes accepted procedures and protocols for most activities that would be used to conduct baseline condition and trend monitoring on a watershed scale, including development of quality assurance/quality control plans to assure quality of data. Protocols described in the Water Quality Monitoring Technical Guide Book meet DEQ standards for data collection.

3) Effectiveness Monitoring

Effectiveness monitoring can be used to:

a) Evaluate the effectiveness of specific management practices in reducing losses or loadings of components such as sediment or nutrients. The NRCS has a good amount of information about the effectiveness of various practices in protecting surface and groundwater quality.

b) Evaluate the net effect of the implementation of an Area Plan and watershed improvement activities on water quality trends.

4) Site-Specific Rule Compliance Monitoring and Assessment

Conducted as a part of a compliance investigation, this type of monitoring is specific to individual sites. It is performed to assess compliance with conditions in a rule, and to assess the contribution of land management activities or land conditions to rule or standards violations attributable to the landowner's activities. Site-specific information and data is collected to characterize and quantify the physical setting and land management conditions that relate to a potential rule or standards violation. Photographic documentation of the suspected problem is typically also included in the assessment. Water samples may be taken for chemical analyses.

As part of compliance investigations, specific site data gathered depends on the pollutant of concern, the land management activity and land condition, and the rule in question. Steps taken to evaluate contributions or conditions attributable to the landowner's activities generally consists of the following:

1) Identification of the area of concern and the source of the potential pollutant, including documentation of the area of concern with photographs.
2) Identification of the transport mechanism for the pollutant source (e.g. gravity, water, animal activity, mechanical activity, etc).
3) Measurement of the size/volume/area of the potential pollutant source.
4) Measurement of physical features to calculate the energy available to transport the pollutant.
5) Collection of samples for analysis as appropriate.

Current and Future Monitoring and Assessment Efforts

Monitoring of various water quality parameters is presently being done by several entities, including the Coos Watershed Association, the Coquille Watershed Association, the Coos SWCD, the DEQ, the ODFW, and individual landowners. The data from these monitoring efforts is analyzed and used for baseline condition monitoring, water quality trend monitoring, and effectiveness monitoring.

ODA, in cooperation with other entities conducting monitoring activities, is pursuing a monitoring strategy that will include an evaluation of baseline condition and water quality trends. ODA will not duplicate existing monitoring efforts being conducted by other agencies or entities. The monitoring efforts that are pursued will be adapted to the changing conditions and issues that develop as the Plan is being implemented.

Chapter 4: Implementation, Monitoring, and Adaptive Management

4.1 Implementation and Accomplishments

Many conservation activities and implementation monitoring tracks have been implemented to benefit water quality. The SWCD and NRCS track activities that have been implemented through quarterly reports to ODA and through a NRCS database, respectively. Projects that have received funding from the OWEB are tracked in OWEB's restoration database. In addition, partner agencies can submit reports of projects and activities in the Management Area that improve water quality.

Implementation Summary (July 2012-June 2014)
AgWQ Outreach and Education:

- Coos SWCD: Presentations: 7 with 146 attendees,Workshops: 1 with 25 attendees,Farm tours: 1 with 9 attendees,Events with Displays: 6 with 648 visitors,Ag-water quality informational documents distributed: 491

- NRCS: 5 Workshops/Presentations – 330 attendees, 6 events w/ Displays visited by 600+ people

AgWQ Technical assistance & Planning:

- Coos SWCD: Landowner Contacts & Technical Assistance: 128/ Site visits: 65/ Number of small grant projects written and approved: 6/ Projects completed: 5, totaling $23,988 (total funding leveraged: $288,049 (primarily match with NRCS funds))

- CREP: 46 recipients

- NRCS: 3,125 acres conservation plans written/ 1,722 acres conservation practices applied to improve water quality/ 1,077 acres of irrigation improvements applied (water quantity)

Projects implemented to improve water quality on agricultural lands:

- Coos SWCD: Off-stream Watering Systems: 2 large water trough systems/ Irrigation efficiency: 3 projects, 420 acres/ Stream Crossings installed or improved: 1 7'x30' culvert installed

- CREP: Fence: 1,7522 ft. (3.32 miles)/ Access Control: 72.8 acres/ Riparian forest buffer: 9.7 acres

- NRCS: Fence: ft. 2,595'/ Irrigation System: 670 acres/ Riparian forest buffer: 163.6 acres/ Irrigation Water Management: 497 acres/ Buried Mainline: 35,534'/ Heavy Use Protection: 57.1 acres/ Livestock Watering Systems: 86.2 acres/ Livestock Pipeline: 3,739'/ Controlled Access 203.2 acres/ Access Road: 2,758'/ Prescribed Grazing: 687 acres/ Pasture Improvements: 46 acres/ Conservation Stewardship Program enhancements to protect water quality maintained: 224 acres/ Conservation Security Program enhancements to protect water quality maintained: 18,598 acres

Funding and Grants:
Coos SWCD:

- ODA/OWEB support to LAC: $50,000 to the District to accomplish the annual Scope of Work, plus $20,930 in administrative funding.
- Total OWEB Small Grant funds awarded: $23,988

NRCS:

- $360,256 EQIP Incentive payments during Biennial period
- $ 22,080 Conservation Stewardship payments during Biennial period
- $416,140 Conservation Security contracts during Biennial period

Myrtle Creek Focus Area (2013-2015) Summary:
Myrtle Creek watershed is approximately 20,015 acres. 17,684 (88%) acres are privately owned. 2,331(12%) are Federal, state or locally owned. Land use in this watershed are approximately 10% agriculture and 89% forest .. The main agricultural uses include hay, and cattle grazing. There are approximately 84 agricultural tax lots in this area. There are an estimated 47.69 miles of perennial and 18.75 miles of seasonal streams.

The Coos SWCD worked with ODA, NRCS, DEQ, ODF&W, Coquille Watershed and the LAC to select a focus area. The selection was based on: condition of streamside vegetation, existing contacts, SWCD capacity, along with local partner and land owner relationships. Local partners such as ODF&W, NRCS, and Coquille Watershed indicated that this was an area where not much work has been done but has interested landowners and partners would be interested in participating with efforts in this area as well.

Current water quality data is limited in the Myrtle Creek Watershed. Elevated stream temperatures, high levels of fine sediment, and impairments in the biological community have been noted.

The SWCD will work toward improving water quality by working with landowners to reduce streamside agricultural impacts allowing streamside vegetation to establish and grow, while improving upland forage. In addition, projects designed to reduce the delivery of sediment through drainage improvements and enhanced bank stability are desired.

Summary of Implementation Activities:
SWCD staff used the GIS parcel map layer to assemble a mailing list of all the major agricultural landowners in the Myrtle Creek Focus Area in Fall of 2013. Several rounds of outreach mailers have been sent, with the first round taking place in December of 2013. Staff also obtained as many phone numbers for landowners in the focus area as was possible.

One landowner did respond to the initial outreach mailing and SWCD staff worked with him to address multiple agricultural water quality issues on his property (these included heavily eroding areas of stream-bank due to lack of riparian vegetation, tractor tires and auto-bodies in-stream, and large areas of blackberry). However, this landowner's property was located above a natural fish barrier and the scope of the project was so large that, in order to effectively address the issues that the landowner was primarily concerned with (the erosion, which was threatening his access roads to his hay fields and the foundation of his barn) as well as the agricultural water quality concerns, we would have needed to pursue a large restoration grant, rather than a $10,000 OWEB small grant. SWCD staff worked closely with ODFW habitat restoration biologist and Curry SWCD CREP Tech to develop the project. We ran into challenges when we were advised by OWEB that the project was not likely to be competitive as a large grant because of the fact that the property was above the fish barrier, and therefore not directly valuable to salmon habitat. So, we then tried to revamp the project into a small grant budget, using CREP to try to encompass the riparian portion. Unfortunately, the landowner was not willing to make the commitments CREP entails, and, not liking the options that we were able to offer, eventually thanked us for our efforts and decided to handle the matter themself. These events took place between January 2014 and April 2014.

Since then we have completed several rounds of outreach mailings but have generated no projects. In June of 2014, Myrtle Creek resident and Coquille Watershed Association board member John Jones took Caley Sowers (Watershed Technical Specialist) on a tour of the focus area and introduced her to many of

the major ag land owners in person. Everyone was very polite but there was no real interest. Several landowners did express concern about the decline of macro invertebrate life and crawfish in the creek in recent years, and thought that the problem was probably caused by herbicide spray run-off. In response, Caley thought Myrtle Creek may be a good sampling site for the Pesticide Stewardship Program (PSP). One sampling collection was conducted on Myrtle Creek for the PSP, but afterward, the landowner would not return calls from the Coos SWCD. The PSP sampling site was relocated to another area.

The Coos SWCD is currently (May 2015) exploring the option of a large restoration project that would be a partnership between Coos SWCD and Coquille WA. Three landowners have been contacted and so far it sounds like there may be some potential there. Caley has been to the site and is coordinating with the Coquille Watershed Association.

The Coos SWCD is selecting a new Focus Area to work in for the 2015-2017 fiscal biennium.

4.2 Water Quality Monitoring—Status and Trends

Coos-Coquille water quality data summary
DEQ used the Oregon Water Quality Index (OWQI) to rate general water quality conditions of six Coos County long-term stream monitoring sites. These sites have some level of agricultural influence with four sites located in the Coquille Watershed and two sites in the Coos Watershed.

The Coos Watershed sites experience brackish water conditions due to marine tidal influence during the summer and fall months when fresh water flows are low. DEQ now removes brackish waters data when assessing conditions at these sites and this practice has resulted in scores improving from very poor to poor. The North Fork Coquille River site is also tidally influenced but has no marine influences. Fresh water backwatering occurs and caution should be used when evaluating data collected here to assure that backwater water quality conditions are not solely attributed to the North Fork.

OWQI scores are presented in the table below. No statistically significant tends were noted during the 10 year period. Water quality parameters with poor or very poor sub-index scores are identified and these parameters are indicative of pollutants of concern. Total solids are elevated at all sample sites and temperature is elevated at four of the sites.

Oregon Water Quality Index (2005-2014)		
Site Name	**OWQI Condition**	**WQ Parameters with Poor or Very Poor Sub-index Scores**
Middle Fork Coquille River @ RM 1.25 Hwy 42	Good	Total Solids
South Fork Coquille River @ Broadbent	Fair	Temperature, Total Solids
North Fork Coquille River @ HWY 42	Good	Total Solids, Nitrogen
Coquille River @ STURDEVANT Park Dock	Fair	Temperature, Total Solids
Millicoma River at Rooke Higgins Boat Ramp	Poor	Temperature, Dissolved Oxygen, Total Solids, Nitrogen
South Fork Coos River @ Anson Rogers Bridge	Poor	Temperature, Total Solids

Total solids measure dissolved, suspended, and settleable solids. Dissolved solids include things like calcium, chlorides, nitrate, phosphorus, iron, sulfur, and other ions particles. Suspended solids include particulate matter like silt, clay, plankton, algae, and other fine organic debris (EPA, 1997). "

EPA, 1997. Volunteer Stream Monitoring: A Methods Manual http://water.epa.gov/type/rsl/monitoring/vms58.cfm

4.3 Progress Toward Measurable Objectives

The LAC will work with the Coos SWCD and ODA to determine appropriate timelines and measurements of progress in their Focus Area and Management Area. These appropriate measurable objectives, milestones, and timelines will be incorporated into the Coos-Coquille Plan at the 2016 Biennial Review.

4.4 Aerial Photo Monitoring of Streamside Vegetation

No Aerial Photo Monitoring information available for the Coos-Coquille Management Area.

4.5 Biennial Reviews and Adaptive Management

March 2015: The Chapter Format and draft Measurable Objectives were adopted by the Coos-Coquille LAC.

Regulations:
Two compliance cases were active during the biennium:

One compliance case involved a horse boarding facility. The owner was disposing of the manure and bedding from the boarding facility over the side of a sloped streambank. A letter of warning was issued to the landowner. The landowner took action and had the material removed from the streambank slope. She also worked with the Coos SWCD to design a manure management structure, obtain OWEB Small Grant funds, and hired a local contractor to install and construct the system.

The second compliance case that was opened was tranfered to the CAFO program because it involved a permitted CAFO in Coos County.

The LAC discussed the following impediments to implementation & recommendations for modifications:

- More communication between ODA and the LAC,
- More frequent LAC meetings,
- More pre and post monitoring in the Focus Areas. The LAC would like the assessment of the Focus Area to go beyond the streamside area and include upland management,
- Lack of adequate tracking and monitoring of implementation of the AgWQ Plan & Rules is seen as an agency problem that could be solved with the multiple agencies and their respective information,
- OWEB's OWRI database should be queried to provide all project information in the Management Area on agricultural lands for Biennial Reviews,
- Tap into the information from the Coquille and Coos Watershed Associations to understand the activities that they have performed to improve agricultural water quality,
- The summary flyer for the Coos-Coquille Plan & Rules should be mailed to every agricultural landowner in the Management Area,
- Difficulty obtaining funds for agricultural water quality projects that do not have a strong salmonid connection.

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Appendices

A. Glossary of terms

B. Common Agricultural Water Quality Parameters of Concern

C. Fish and Shellfish Species Found in the Watershed Area

D. Fish Life Histories

E. Coastal Zone Management Act - Management Measures

F. South Coast Basin Beneficial Uses (OAR 340-41-322)

G. Management Area Maps

H. Technical and Financial Resources for Landowners

I. 303(d) list

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 - Common Agricultural Water Quality Parameters of Concern

The following parameters are used by DEQ in establishing the 303(d) List and assessing and documenting waterbodies with TMDLs. Note: This is an abbreviated summary and does not contain all parameters or detailed descriptions of the parameters and associated standards. Specific information about these parameters and standards can be found at: http://www.deq.state.or.us/wq/assessment/assessment.htm or by calling (503) 229-6099.

Parameters

Descriptions of Common Agricultural Parameters of Concern: This language can be used or added to existing language.

Bacteria: *Escherichia coli (E. coli)* is measured in streams to determine the risk of infection and disease to people. Bacteria sources include humans (recreation or failing septic systems), wildlife, and agriculture. On agricultural lands, E. coli generally comes from livestock waste, which is deposited directly into waterways or carried to waterways by livestock via runoff and soil erosion. Runoff and soil erosion from agricultural lands can also carry bacteria from other sources.

Biological Criteria: To assess a stream's ecological health, the community of benthic macro invertebrates is sampled and compared to a reference community (community of organisms expected to be present in a healthy stream). If there is a significant difference, the stream is listed as water quality limited. These organisms are important as the basis of the food chain and are very sensitive to changes in water quality. This designation does not always identify the specific limiting factor (e.g., sediment, nutrients, or temperature).

Dissolved Oxygen: Dissolved oxygen criteria depends on a waterbody's designation as fish spawning habitat. Streams designated as salmon rearing and migration are assumed to have resident trout spawning from January 1 – May 15, and those streams designated core cold water are assumed to have resident trout spawning January 1 – June 15. During non-spawning periods, the dissolved oxygen criteria depends on a stream's designation as providing for cold, cool or warm water aquatic life, each defined in OAR 340 Division 41.

Harmful Algal Blooms: Some species of algae, such as cyanobacteria or blue-green algae, can produce toxins or poisons that can cause serious illness or death in pets, livestock, wildlife, and humans. As a result, they are classified as Harmful Algae Blooms. Several beneficial uses are affected by Harmful Algae Blooms: aesthetics, livestock watering, fishing, water contact recreation, and drinking water supply. The Public Health Department of the Oregon Health Authority is the agency responsible for posting warnings and educating the public about Harmful Algae Blooms. Under this program, a variety of partners share information, coordinate efforts and communicate with the public. Once a waterbody is identified as having a harmful algal bloom, DEQ is responsible for investigating the causes, identifying sources of pollution and writing a pollution reduction plan.

Mercury: Mercury occurs naturally and is used in many products. It enters the environment through human activities and from volcanoes, and can be carried long distances by atmospheric air currents. Mercury passes through the food chain readily, and has significant public health and wildlife impacts from consumption of contaminated fish. Mercury in water comes from erosion of soil that carries naturally occurring mercury (including erosion from agricultural lands and streambanks) and from deposition on land or water from local or global atmospheric sources. Mercury bio-accumulates in fish, and if ingested can cause health problems.

Nitrate: While nitrate occurs naturally, the use of synthetic and natural fertilizers can increase nitrate in drinking water (ground and surface water). Applied nitrate that is not taken up by plants is readily carried by runoff to streams or infiltrate to ground water. High nitrate levels in drinking water cause a range of human health problems, particularly with infants, the elderly, and pregnant and nursing women.

Pesticides: Agricultural pesticides of concern include substances in current use and substances no longer in use but persist in the environment. Additional agricultural pesticides without established standards have also been detected. On agricultural lands, sediment from soil erosion can carry these pesticides to water. Current use agricultural pesticide applications, mixing-loading, and disposal activities may also contribute to pesticide detections in surface water. For more information, see at: http://www.deq.state.or.us/wq/standards/toxics.htm

Phosphorous/Algae/pH/Chlorophyll a: Excessive algal growth can contribute to high pH and low dissolved oxygen. Native fish need dissolved oxygen for successful spawning and moderate pH levels to support physiological processes. Excessive algal growth can also lead to reduced water clarity, aesthetic impairment, and restrictions on water contact recreation. Warm water temperatures, sunlight, high levels of phosphorus, and low flows encourage excessive algal growth. Agricultural activities can contribute to all of these conditions.

Sediment and Turbidity: Sediment includes fine silt and organic particles suspended in water, settled particles, and larger gravel and boulders that move at high flows. Turbidity is a measure of the lack of clarity of water. Sediment movement and deposition is a natural process, but high levels of sediment can degrade fish habitat by filling pools, creating a wider and shallower channel, and covering spawning gravels. Suspended sediment or turbidity in the water can physically damage fish and other aquatic life, modify behavior, and increase temperature by absorbing incoming solar radiation. Sediment comes from erosion of streambanks and streambeds, agricultural land, forestland, roads, and developed areas. Sediment particles can transport other pollutants, including bacteria, nutrients, pesticides, and toxic substances.

Temperature: Oregon's native cold-water aquatic communities, including salmonids, are sensitive to water temperature. Several temperature criteria have been established to protect various life stages and fish species. Many conditions contribute to elevated stream temperatures. On agricultural lands, inadequate streamside vegetation, irrigation water withdrawals, warm irrigation water return flows, farm ponds, and land management that leads to widened stream channels contribute to elevated stream temperatures. Elevated stream temperatures also contribute to excessive algal growth, which leads to low dissolved oxygen levels and high pH levels.

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

- 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.
- 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

- 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 onsite

Eroding Streambanks and Shorelines

- 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.

- Protect streambank and shoreline features with the potential to reduce NPS pollution.

- Protect streambanks and shorelines from erosion due to uses of either the shorelands or adjacent surface waters.

Wetlands and Riparian Areas

- 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.

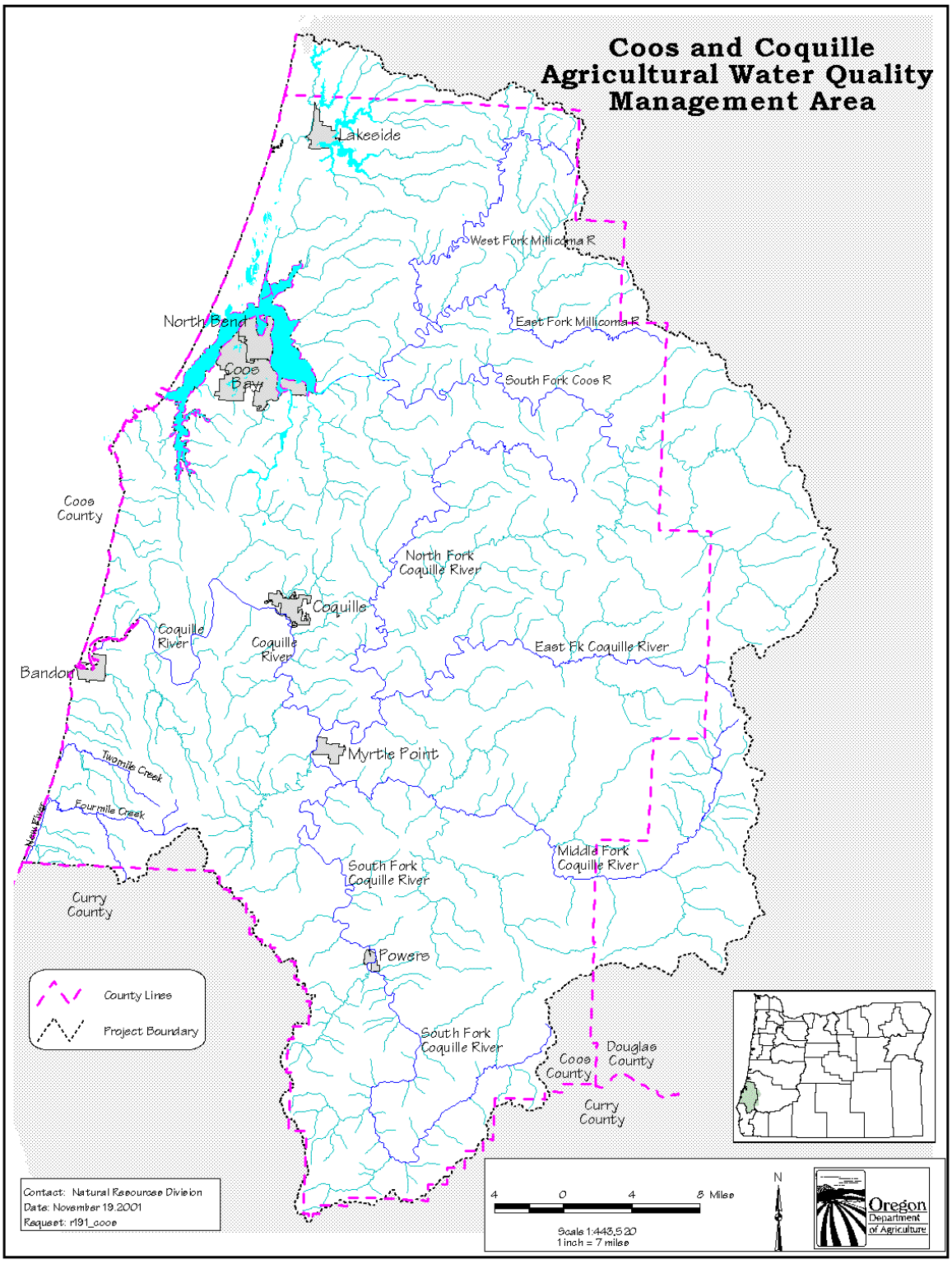
- Promote the restoration of the preexisting functions in damaged and destroyed wetlands and riparian systems in areas where the systems will serve a significant NPS pollution abatement function.

- 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.

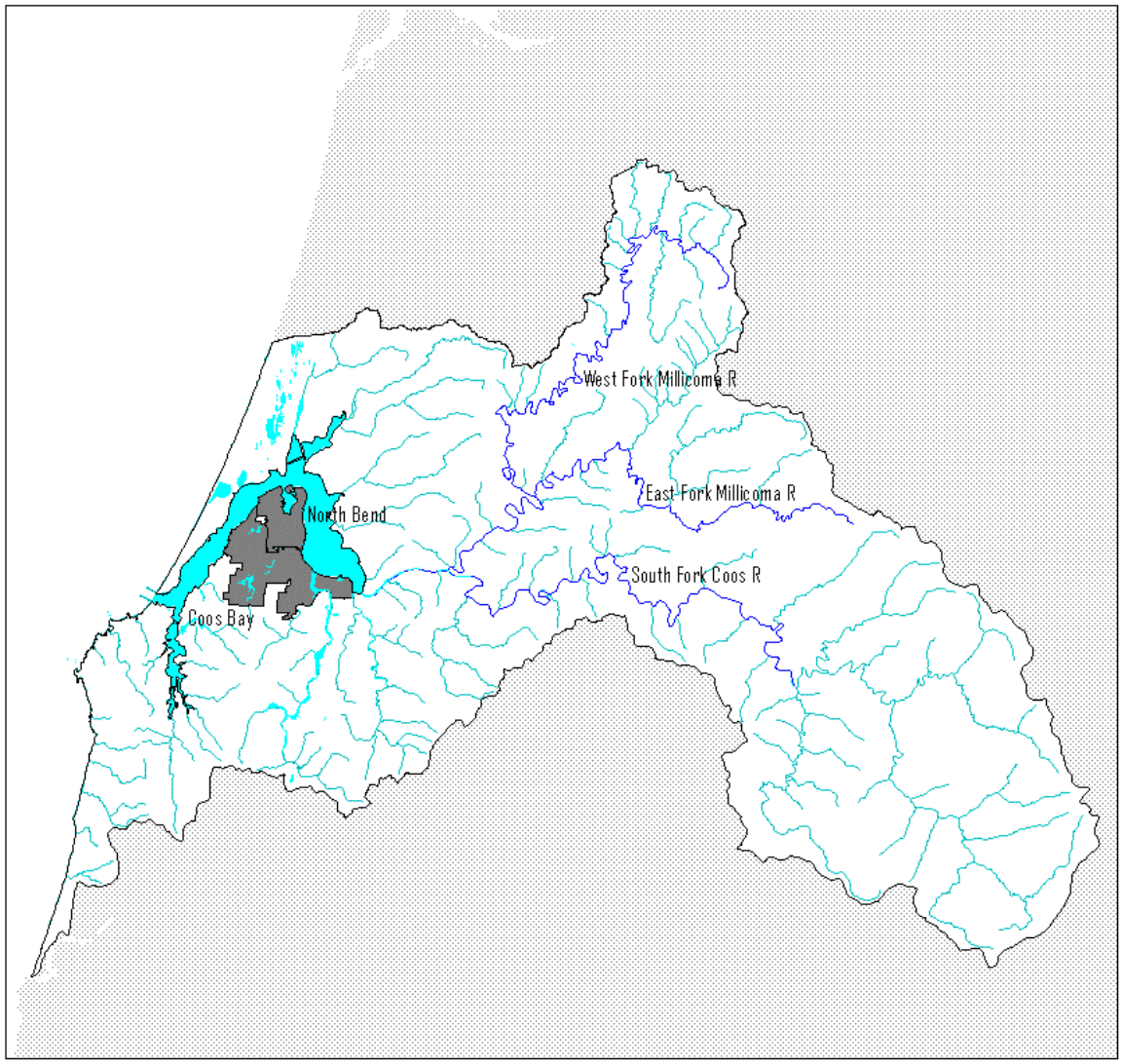
Appendix F - South Coast Basin Beneficial Uses
(OAR 340-041-0322)

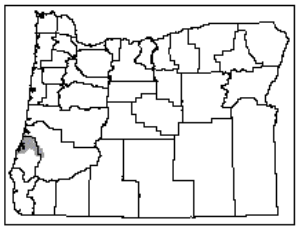
Beneficial Uses	Estuaries and Adjacent Marine Waters	All Streams and Tributaries Thereto
Public Domestic Water Supply Supply11		X
Private Domestic Water Supply		X
Industrial Water Supply	X	X
Irrigation		X
Livestock Watering		X
Anadromous Fish Passage	X	X
Salmonid Fish Rearing	X	X
Salmonid Fish Spawning	X	X
Resident 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	

Appendix G - Management Area Maps



Coos Watershed





Oregon Department of Agriculture

N
W E
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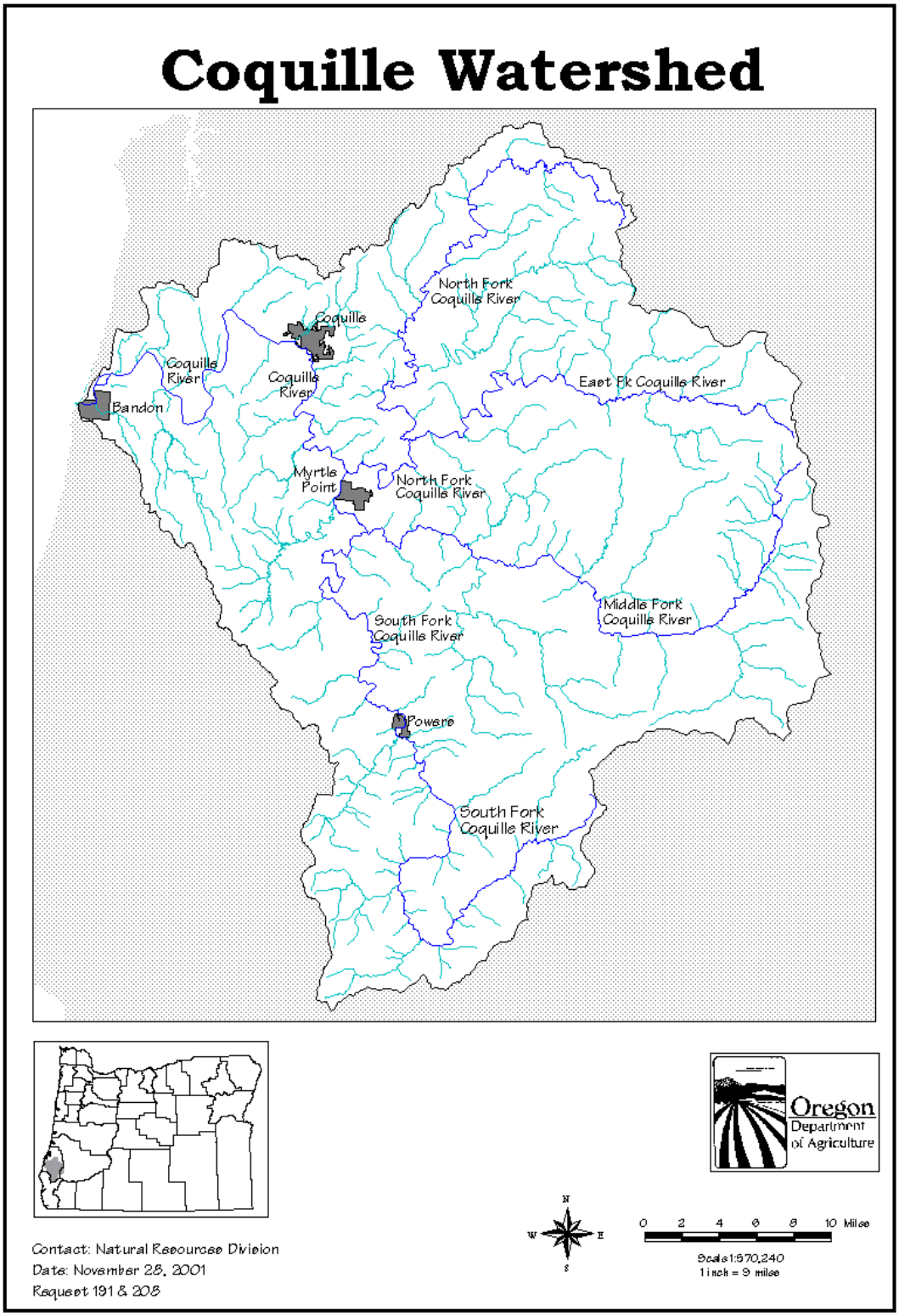
0 2 4 6 8 Miles

Scale 1:500,880
1 inch = 8 miles

Contact: Natural Resources Division
Date: November 28, 2001
Request 191 & 208


Coquille Watershed
North Fork Coquille River
Coquille
Coquille River
Coquille River
East Fk Coquille River
Bandon
Myrtle Point
North Fork Coquille River
Middle Fork Coquille River
South Fork Coquille River
Powers
South Fork Coquille River
Oregon Department of Agriculture
N
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0 2 4 6 8 10 Miles
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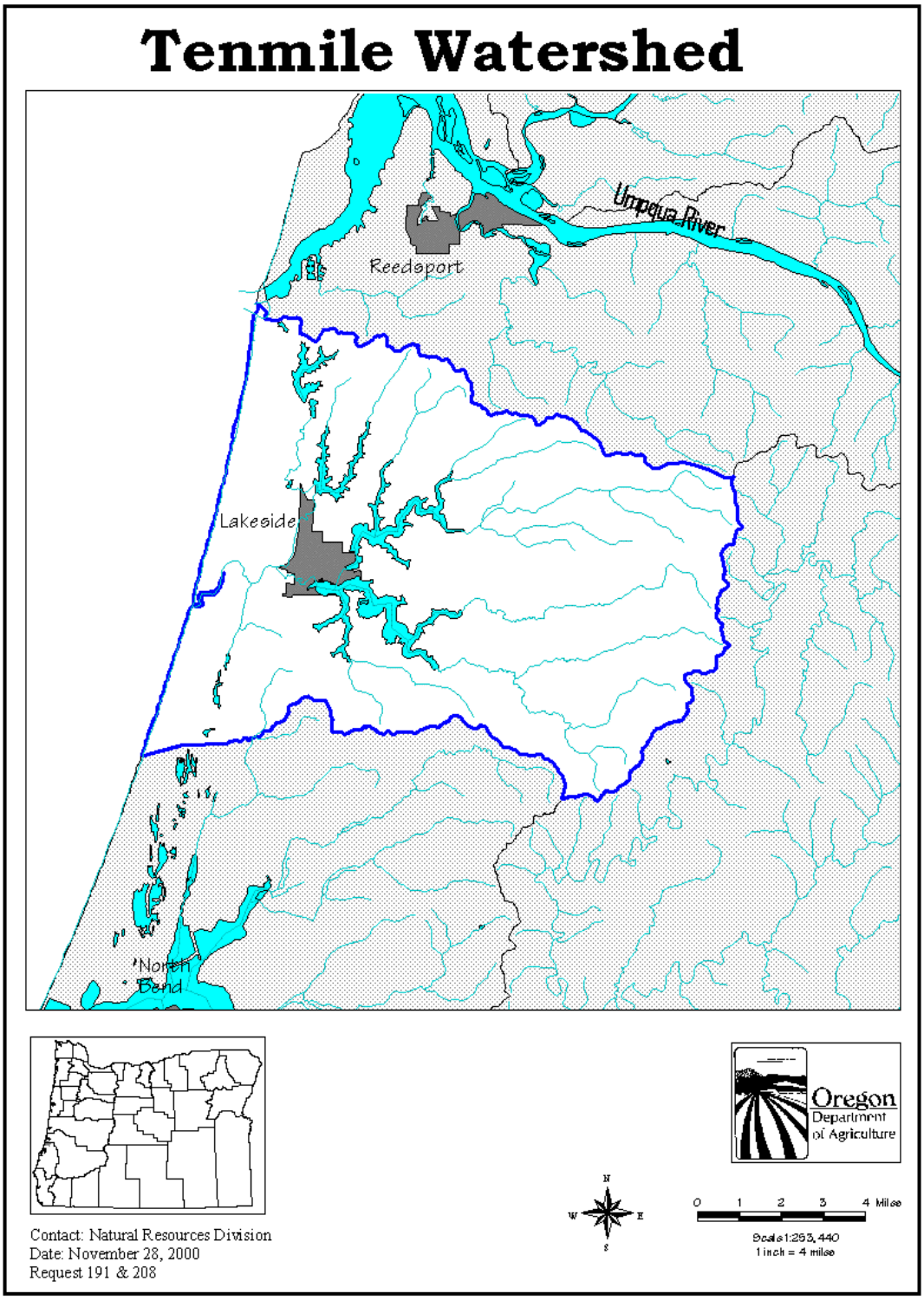
Date: November 28, 2001
Request 191 & 208


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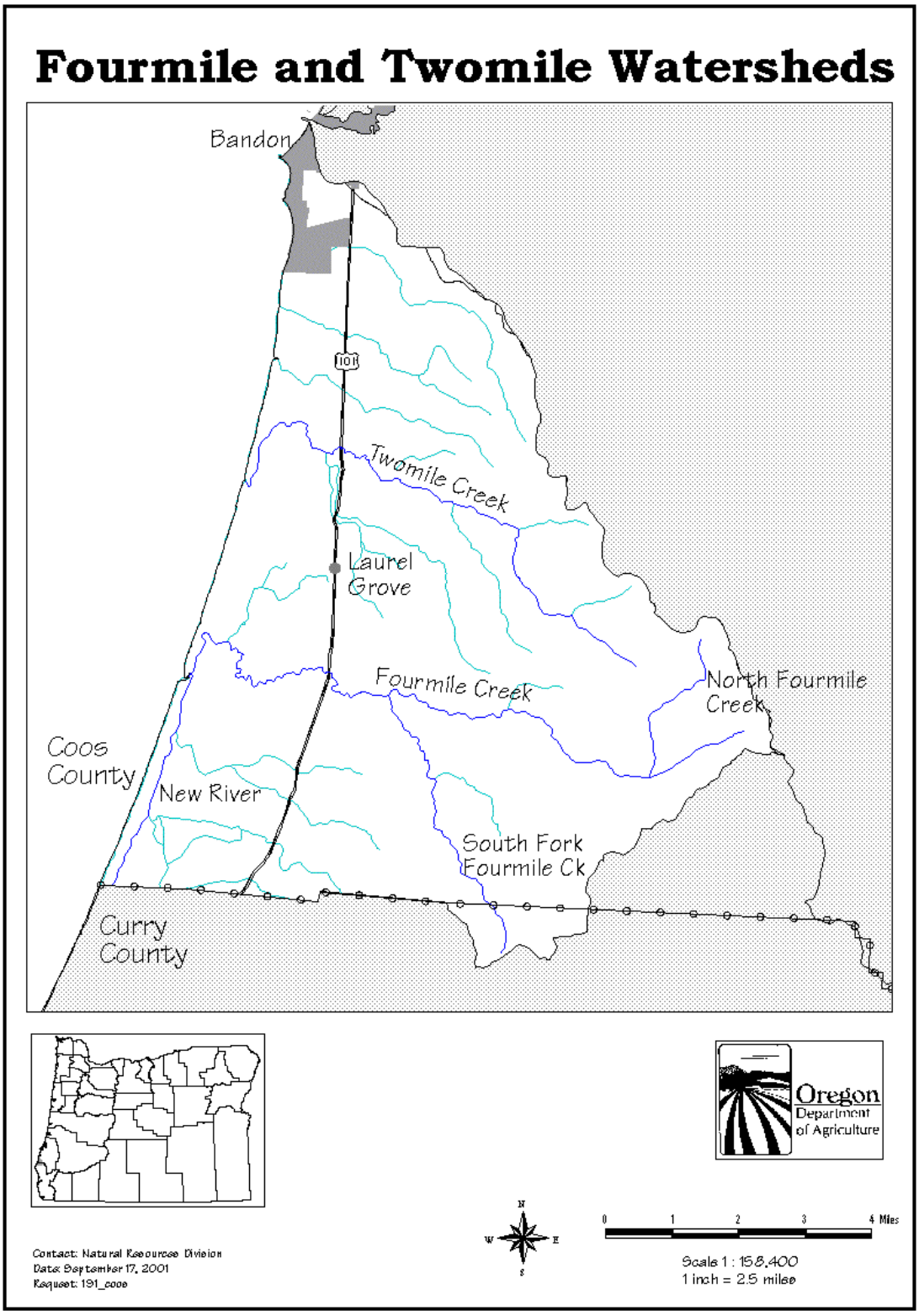
0 1 2 3 4 Miles
Scale 1:253,440
1 inch = 4 miles
Contact: Natural Resources Division
Date: November 28, 2000
Request 191 & 208


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
Contact: Natural Resources Division
Date: September 17, 2001
Request: 191_coos
0 1 2 3 4 Miles
Scale 1 : 158,400
1 inch = 2.5 miles

Appendix H - 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 340 N Front Street Coos Bay, OR 97420 (541) 269-2721 ext 27	
Oregon Department of Environmental Quality (Coastal Zone Management) 811 SW Sixth Avenue Portland, OR 97204 (503) 229-5994	

Appendix I - Coos Sub-basin 2010 303d Listing Requiring a TMDL

Coquille Sub-Basin 2010 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		
Tenmile and North Tenmile Lakes	0 to 4.5	chlorophyll a	Summer
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	Year Round

Coquille Sub-Basin 2010 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	**River Miles**	**Parameter**	**Season**
Cooston Channel	0 to 3	(Shellfish Growing)	
Davis Slough	0 to 1.3		
Day Inlet	0 to 0.6		
Larson Creek	0 to 4.1		
Mettman Creek	0 to 3.5		
Noble Creek	0 to 3.6		
Sullivan Creek	0 to 3.3		
North Slough	0 to 2.4		
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		Year Around
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
Isthmus Slough	0 to 10.6	Manganese	Year Around
Cedar Creek	0 to 11.6	Temperature	Year Around (Non-spawning)
Williams River	0 to 20.9		
Fiddle Creek	0 to 13.4		
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		

Coquille Sub-Basin 2010 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	**River Miles**	**Parameter**	**Season**
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		
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 2010 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
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		
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	0 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
Bear Creek	0 to 13.2	*e. Coli*	Fall-Winter-Spring

Coquille Sub-Basin 2010 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	**River Mile**	**Parameter**	**Season**
Calloway Creek	0 to 1.9		
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
Cunningham Creek	0 to 7.4		
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		
North Fork Coquille River	0 to 19	Fecal Coliform	Year Round
Bear Creek	0 to 13.2	Fecal Coliform Shellfish Growing	Year Around
Coquille River	0 to 4.2		
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	Temperature	Summer
Belieu Creek	0 to 3.1		
Coquille River	21 to 35.3		
East Fork Coquille River	0 to 26.2		
Rowland Creek	0 to 4.6		
Salmon Creek	0 to 9.2		
Unnamed1	0 to 3.6		
Woodward Creek	0 to 7.6		
Alder Creek	0 to 3.1		Year Around Non Spawning
Battle Creek	0 to 1.5		
Bingham Creek	0 to 2		
Boulder Creek	0 to 4.1		

Coquille Sub-Basin 2010 303d Listings Requiring a TMDL			
Waterbody (Stream/Lake)	**River Mile**	**Parameter**	**Season**
Dice Creek	0 to 4.2		
Elk Creek	0 to 5.7		
Middle Creek	0 to 24.2		
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		
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		
Lampa Creek	0 to 5.7		
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