COOS and COQUILLE AREA AGRICULTURAL WATER QUALITY MANAGEMENT PLAN

Developed by the

Coos and Coquille Local Advisory Committee
and
The Oregon Department of Agriculture

with Assistance from
The Coos County Soil and Water Conservation District

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Acronyms

AgWQM Area	Agricultural Water Quality Management Area
Area Rules	Agricultural Water Quality Management Area Rules
Area Plan	Agricultural Water Quality Management Area Plan
BLM	Bureau of Land Management
BOD	Biochemical Oxygen Demand
CAFO	Confined Animal Feeding Operation
CWA	Coos Watershed Association
CWAP	Coquille Watershed Action Plan
CZARA	Coastal Zone Act Reauthorization Amendments
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
LAC	Local Advisory Committee
NRCS	Natural Resource Conservation Service
OAR	Oregon Administrative Rule
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ORS	Oregon Revised Statutes
OSU	Oregon State University
P	Phosphorus
SB	Senate Bill
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
TP	Total Phosphorus
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[1]. 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. 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))

Introduction

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

[1] The Coos and Coquille Area includes the Coos, Coquille, Tenmile, Twomile, and Fourmile drainages and those lands within Coos County that lie north of the county line west of its junction with Bethel Mountain Road, as indicated on the map in Appendix E.

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.

Senate Bill (SB) 1010, the 1993 Oregon Agricultural Water Quality Management Act, was enacted by the Oregon Legislature in response to the Clean Water Act and the Coastal Zone Management Act. States were given the opportunity to develop for themselves a system for implementation that met federal guidelines. This bill was Oregon's response. Without it, the Oregon Department Environmental Quality (DEQ) and/or the courts could have stepped in and imposed some kind of program upon the state.

Senate Bill 502 was adopted in 1995 to clarify the scope of SB 1010. It authorized the ODA as the lead agency responsible to administer the water quality related regulations for agriculture in Oregon. However, ODA is subject to the standard setting and review authorities of other agencies, such as the Department of Environmental Quality (DEQ) and Oregon Health Division.

ODA has been charged with developing an implementation Plan and regulatory program to address water quality issues associated with agricultural activities. This Area Plan has been developed to conform to the Agricultural Water Quality Management Act. The Rules identified ODA, in consultation with the Director of ODA, to appoint up to twelve members to a Coos and Coquille Area LAC consisting of a balance of affected persons in the Coos and Coquille Area (OAR 603-090-0020(4)). In January 1998, the Coos and Coquille LAC was convened by ODA to help develop the Area Plan, with the assistance of the Coos Soil and Water Conservation District (SWCD). The LAC members represent the interests of local landowners (livestock growers, oyster growers, dairy, and small-acreage farmers). As of June 2010, LAC members are:

Dave Messerle, Chair, Coos Bay, beef cattle	Tom Johnson, North Bend, dairy cattle
Eric Aasen, Bandon, cranberries	Bonnie Joyce, Myrtle Point, small wood lot
Jeff Cochran, Coquille, dairy cattle	Joan Mahaffy, Coos Bay, beef cattle
Steve Cooper, Myrtle Point, beef cattle	JoAnn Mast, Coquille, sheep
Heath Hampel, Charleston, oysters	Roland Ransdell, Coquille, organic grower
Jolly Hibbits, Bandon, horses and llamas	Jordan Utsey (deceased), Myrtle Point, beef cattle

This water quality Area Plan is intended to help the local community identify where the issues are and what needs to be done. The LAC developed the Positive Management Practices and Unacceptable Conditions for agricultural operations found in this Area Plan. To eliminate what are considered "prohibited" conditions, rules that can be addressed by the landowner were developed. While the Area Plan itself is not an enforceable mechanism, the rules developed from this Area Plan are.

Once this Area Plan is adopted, individual farm plans can be developed by the landowner/operator with assistance as necessary from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) and local SWCD. All individual farm plans including those developed prior to adoption of Area Plan should be

evaluated to ensure the objectives and goals are consistent with those identified in this Area Plan.

For landowners and operators, there should be increased comfort in knowing that while they must aggressively meet state and federal standards for water quality, they can do so via flexible farm management plans developed with the landowners input and administered via one agency, the ODA (Reeder, 1997).

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 and 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.

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.

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.

Goals and Objectives of the Area Plan

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. Prohibited conditions in the watersheds are outlined, and suggested positive management practices are provided. This Area Plan was developed by the Coos and Coquille LAC, the Coos SWCD, and ODA with assistance from 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.

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.

Physical Setting

Climate Information

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

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

Administrative Roles and Responsibilities

The Clean Water Act

The United States Congress passed the Clean Water Act (CWA) into law in 1972. Since that time, U.S. citizens have made great progress in protecting and restoring their streams, rivers, and lakes. However, much work remains. In the first years of implementing the CWA, the focus was on controlling and preventing pollution from point sources. EPA, under its authorities provided by the CWA, delegated authority to the state of Oregon to perform some aspects of the CWA. The Legislature for the state of Oregon accepted this responsibility and gave DEQ the statutory authority to control pollution of the state's waters.

In recent years, the water quality improvement efforts focus nationwide has shifted more to controlling nonpoint source pollution. Section 303(d) of the 1972 CWA requires each state to identify waters that do not meet applicable water quality standards. In 1986, the Oregon DEQ and EPA were sued by several environmental organizations over non-compliance with the CWA. As a result of the 1986 lawsuit, DEQ produced an expanded 303(d) list for Oregon streams. These waters are then designated as "water quality limited." "Water quality limited" stream segments are those impacted by point or nonpoint pollution sources to the extent that the water quality is sufficiently impaired to restrict its use. This information is collected and analyzed by DEQ to determine whether water quality standards are being violated and whether beneficial uses are being threatened. Status of a waterbody can be changed from "water quality limited" when there is evidence that it complies with water quality standards, or there is an approved management plan that gives reasonable assurance that it will be brought into compliance. The lawsuit, mentioned above, also required DEQ to craft Total Maximum Daily Loads (TMDLs) for waters listed on the 303(d) list. The TMDL planning process that DEQ oversees is another method to initiate a change in status for streams. Streams listed as water quality limited in the planning area are shown in Appendix G. Oregon's Agriculture Water Quality Management Act, ORS 568.900 to 568.933, authorizes ODA to develop and carry out an Agricultural Water Quality Management Area Plan and Rules for agricultural and rural lands where a water quality management plan is required by state or federal law. These agricultural water quality plans and rules address the TMDLs throughout the state. With this responsibility, ODA develops, adopts, and periodically modifies programs to fit the geographic area the Plan will eventually encompass.

The rules highlighted within this Area Plan further define the broad scope of the 468(b) language into site specific, local rules. The ORS 468(b) rules can be found in the section titled "Pollution Prevention and Control Measures" under "Statutes Addressing Water Pollution."

Total Maximum Daily Loads

The Oregon DEQ is required by federal law and court order to establish TMDLs for pollutants in designated water quality limited areas. The TMDL will establish maximum limits on the amounts of pollutants that can enter the Coos and Coquille Area. This process will produce a "loading capacity" which will be calculated and set to achieve water quality standards in each

subbasin. Each subbasin will then be allowed a designated portion of the TMDL, representing the maximum amount of pollutant that may enter daily from the surrounding lands in the subbasin. This amount is the "load allocation."

Natural conditions, such as streams that are inherently warm in the summer, will be included in the loading capacity calculations. The loading determined to be a result of human activities will be allocated to the respective management agency units. Agricultural use is one unit. The Tenmile TMDL was completed in 2010. All TMDLs for the Coos and Coquille plan area will be completed by 2012. For specific information on TMDLs in progress, contact the Coos Bay DEQ office.

It should be recognized that even before Oregon's 1993 legislation to formalize agricultural water quality planning activities, various agencies and private landowners had been cooperating for decades to improve water quality and quantity on a voluntary basis in the watershed areas. These early efforts to improve water quality, will mature through time, and be an important part of TMDL implementation efforts.

Designated Management Agency

The ODA is the Designated Management Agency for water pollution control activities on agricultural and rural lands in the Coos and Coquille Area. The director of ODA, in consultation with the State Board of Agriculture, appointed a Coos and Coquille LAC representing local agricultural producers, landowners, and others to assist with the development of this Area Plan and Rules. As the Designated Management Agency, ODA is responsible for coordinating LAC activities related to development and implementation of the Area Plan and Rules, including coordination of LAC meetings, supporting educational outreach programs, supporting plan implementation, and developing progress reports. The Coos SWCD is assisting ODA with the development and implementation of the Coos and Coquille Area Plan and associated Area Plan activities. The Coos SWCD also employs a Watershed Technical Specialist who provides assistance to landowners interested in writing individual farm plans that relate back to the Area Plan written by the committee.

Water Quality Issues

Beneficial Uses

Beneficial uses (OAR 340-041-0300)[2] 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

[2] "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)

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 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).

B. Bacteria (Escherichia 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. 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.

Point and Nonpoint Source Pollution

Nonpoint source pollution is pollution that arises from cumulative effects of past and present human activities on an entire watershed[3]. Examples of nonpoint source pollution are storm water *runoff* from urban areas, excessive erosion from logging and agricultural activities. By its very nature, identifying the sources of nonpoint pollution is a problem due to difficulty in tracing the pollutant to its source.

There are eight wastewater treatment plants that are designated point sources, and are regulated by DEQ. Monitoring done by DEQ has shown that these plants can contribute significant bacteria. Lower Coquille River is the first TMDL for the area (Blake, 1998).

Other examples of point sources are: industrial sites, which must acquire a National Pollutant Discharge Elimination System from DEQ or the EPA. These permits have minimum technology-based performance requirements. Another point source, septic tanks, is under DEQ's jurisdiction. It is extremely difficult to ferret out septic tanks leaking into the river. Many homeowners may not be aware that their septic system is a source of pollution. Delivering this message to the public will require a public education campaign. Since septic systems are a DEQ enforcement responsibility, DEQ works extensively with homeowners and the community to resolve these problems.

A number of reports have been written over the past twenty years that discuss water quality and watershed conditions in the Coos and Coquille Area, including information on the impacts of agriculture on water quality and watershed conditions. References to these reports are included in the "Literature Cited" section beginning on page 58.

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3 3 "Nonpoint Sources" are defined by administrative rule at OAR 340-041-0006(17) as follows: "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."

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.

The Coastal Zone Act

On November 5, 1990, Congress enacted the Coastal Zone Act Reauthorization Amendments (CZARA). This law mandated that all states and territories with approved coastal zone management programs develop and implement coastal nonpoint source pollution control programs. In response to these CZARA Amendments, Oregon identified coastal area plans as the state's strategy to address certain agricultural measures. The exact text of the approved Management Measures is included in Appendix C. The Coos and Coquille LAC used the CZARA management measures as guidance when developing this Area Plan, and in some cases integrated the suggested management measures into the Positive Management Practices throughout this section.

Pollution 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.

Prohibited 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 Prohibited 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 Prohibited 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.

Statutes Addressing Water Pollution

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.[4]

Sediment Management

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.

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[4] 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.

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.[5]
- When pasturing livestock, minimize sediment delivery near waterways and riparian areas.
- Manage waterways for livestock watering and stream crossings such that livestock use is limited to only the amount of time necessary for watering and/or crossing the waterway.
- Design riparian area management to prevent and reduce erosion in surface runoff.
- Use, as appropriate, fencing (either permanent or temporary) or other management practices to ensure growth and maintenance of riparian vegetation.

Conditions that may Lead to a Possible Water Quality Problem

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

Prohibited 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.

Nutrient 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.

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

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 [6].
- 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.

Prohibited Condition

- Excessive amounts of manure or fertilizers that enter waterways.

[6] 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.

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.

Pesticide Management

Pesticides (herbicides, insecticides, fungicides, etc.) may be used as part of an integrated pest management program[7]. 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 prohibited.

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.

[7] 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).

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 prohibited by ORS 634.

Prohibited 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.

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.

Riparian Management

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

Riparian areas are highly variable throughout the 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.

Prohibited 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.

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.

Prohibited 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.

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.

Prohibited Condition

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

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.

Prohibited 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.

Implementation and Public Participation

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;
- Employment of a farm planner(s) and other staff to facilitate the implementation of this Area Plan in the Coos and Coquille Area.

ODA presented and made available the original draft 2002 Area Plan to the public in the Coos and Coquille Area for public comment. ODA and the LAC reviewed testimony presented at public hearings and collected during public comment periods, and recommended modifications to the Area Plan to the Board of Agriculture and the Director of ODA for their review and comment. The final OARs resulting from this are adopted through the Administrative Rules process by the director of ODA.

This Area Plan and the associated Area Rules are subject to a two-year review process. Every two years after adoption the Coos and Coquille Local Advisory Committee, assess the progress of Area Plan implementation toward achievement of Area Plan goals and objectives. Any new water quality information and programs, including TMDLs, affecting agriculture are reviewed and considered during this review process. The LAC makes recommendations to the State Board of Agriculture and Director regarding modifications to the Area Rules that may be necessary to achieve water quality goals and objectives. Any future amendments to the Oregon Administrative Rules are subject to a public participation.

Monitoring and Evaluation

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;
- help understand whether water quality improvement activities are achieving their intended goals; and
- 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.

Enforcement Actions and Resolution of Complaints

ODA's primary mission is to ensure food safety, promote agricultural economic development, and protect agricultural natural resources. ODA has the responsibility for enforcing rules adopted for the Coos and Coquille Agricultural Water Quality Management Area (Management Area). It is the intent of the LAC that fines and civil penalties be used as a last resort in the effort to improve water quality in the Coos and Coquille Management Area. That is consistent with the policy of ODA established through Oregon Administrative Rules for Agricultural Water Quality Management Program (OARs 603-090-0000 through 603-090-0120). This Area Plan includes a description of the enforcement process because it is a required element of a water quality plan, and to provide a mechanism when reasonable attempts at voluntary solutions have failed.

The primary focus of the Area Plan is education toward voluntary compliance and even the enforcement procedure is designed to educate first and proceed with enforcement only as a last resort.

In the event that a situation comes to the attention of ODA that may be in violation of the Coos and Coquille Water Quality Management Area Oregon Administrative Rules, certain procedures will be followed as indicated in OARs 603-095-1560 and OARs 603-090-0000 through 0120.

The following is a general summary of the procedures: Except for flagrant[8] discharge of pollutants or flagrant removal of riparian vegetation necessary for streambank stability and shading, at any point in the process, the landowner may choose to address a problem and no civil penalties will be levied by the ODA.

1. Any person alleging a violation of the Coos and Coquille Area Oregon Administrative Rules (OAR) may file a complaint with ODA. The department will evaluate or investigate a complaint filed by a person if the complaint is in writing, signed and dated by the complainant. It must indicate the property and waters of the state allegedly being damaged or impacted, and the property allegedly being managed under conditions in violation of the Coos and Coquille Area OARs.

2. If the complaint appears to be valid and there is enough information to show that there could be a violation of the Coos and Coquille Area OARs, an ODA representative will contact the landowner to schedule a meeting. No ODA representative will enter private property at any time without the owner's permission or a valid search warrant.

3. The alleged violation will be reviewed onsite by ODA representative and the landowner. The on-site review will include an investigation by ODA, which will include collection of samples, as appropriate, for testing and consultation with experts at ODA expense. If no violation of the Coos and Coquille Area OARs exists, ODA will send a Letter of Compliance (LOC.)

4. If ODA determines through the investigation based on observations and scientific data, where available, that a violation of the Coos and Coquille Area Oregon Administrative Rules exists, ODA will inform the landowner of the violation and work with the landowner to resolve the problem. The resolution will include a timetable and an agreement to revisit the site as necessary to confirm that progress is being made to correct the violation within the timeline. If the violation is remedied on schedule, this would complete the process.

5. If the landowner does not agree that a violation exists, the landowner may choose to do additional testing or consultation at their own expense and request a review (per the procedures outlined in OAR 603-090-0040 through 603-090-0050) by the department of initial findings in light of any additional information collected. If evaluation of the

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8 As defined in OAR 340-090-0060(2) - any documented violation where the respondent had actual knowledge of the law and had consciously set out to commit the violation.

additional information by ODA determines that no violation exists or that the violation is not the result of agricultural activities conducted by the landowner, the process is complete.

6. If there is a confirmed violation that a landowner refuses to address after the department's on-site visit and the department has given the landowner a reasonable time (up to 30 days unless it requires a longer period of time to correct a first violation), civil penalties can be levied. Note: the department is not required to give a notice of violation or a period to comply if the violation is intentional or the landowner has received a previous notice of the same or similar violation. Civil penalties are issued by the ODA Director or the Director's designee under the provisions of OARs 603-090-0060 through 603-090-0120 and will be based on the seriousness of the violation and the magnitude of the effect. OAR 603-090-0120(3) describes the civil penalty matrix for first violations which begins at $50 and ranges to $1200, and the civil penalty matrix for repeat violations which begins at $100 and ranges to $5000.

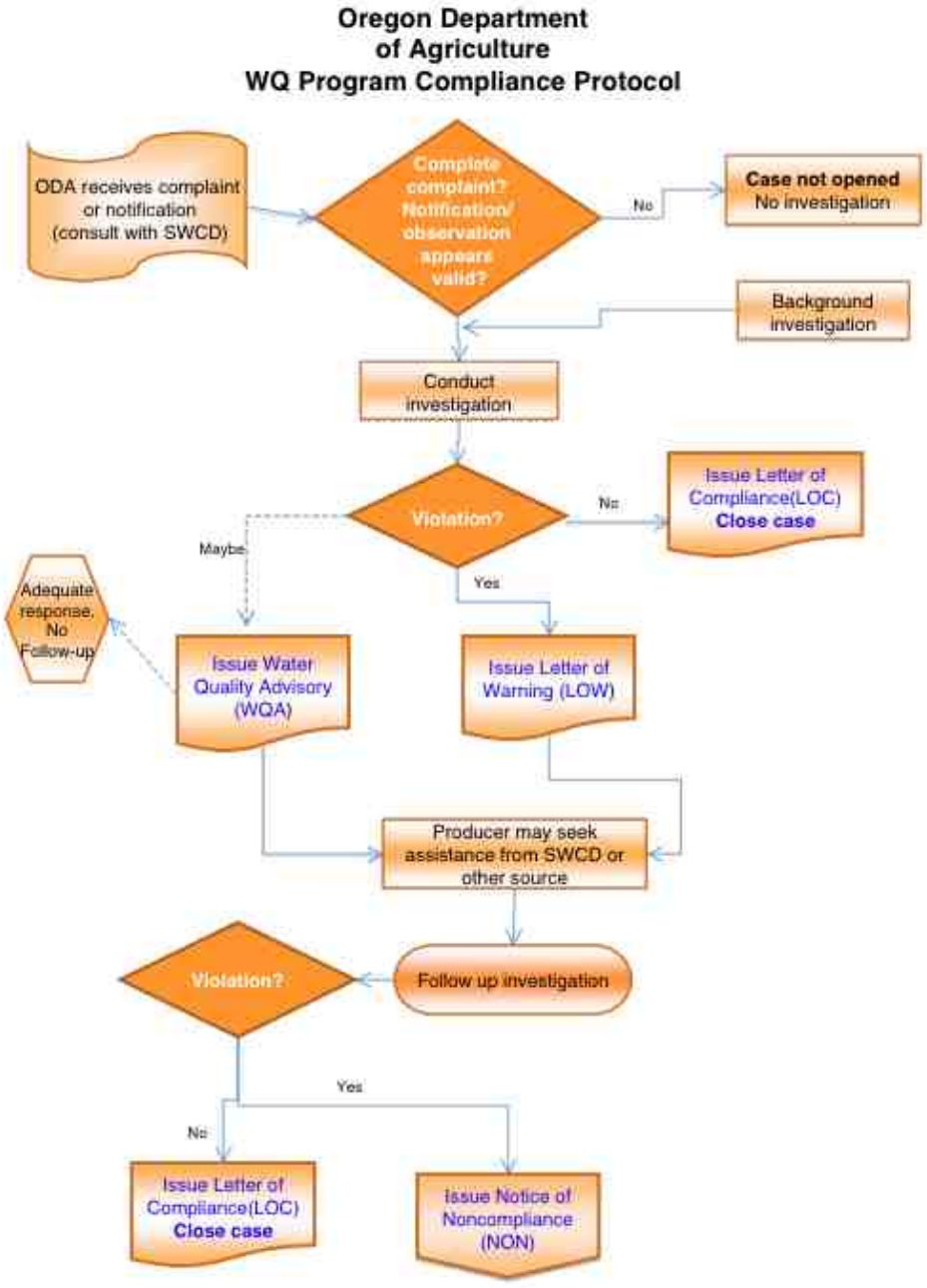
7. A landowner issued a civil penalty due to violation of the Coos and Coquille Area OARs may request a hearing with the Director of ODA. The hearing provides for the Director to hear the landowner's disposition from which the Director determines appropriate action, which can include a modification of the civil penalty or other form of intermediate sanction.

8. A landowner issued a civil penalty due to a violation of the Coos and Coquille AgWQM Area OARs may request a formal hearing by a hearings officer assigned from the Hearings Officer's Panel in accordance with applicable contested case procedures as described in ORS 183.413 to 183.550. Upon conclusion of the hearings process, the hearings officer will prepare a proposed order that includes findings of fact, conclusions of law and appropriate action by the agency. If the order is in favor of the landowner, the process is complete. If not, the landowner becomes subject to procedures of payment of the civil penalty.

In the spirit of voluntary compliance, the SWCD will make it a practice of offering technical assistance to landowners in response to an initial informal concern reported to the SWCD. The technical assistance will consist of evaluating the perceived or alleged violation and offering technical management alternatives to remedy any problems in a timely fashion. This technical assistance may also consist of follow up visits. If there appears to be a violation and the landowner does not demonstrate due diligence in correcting the problem, the SWCD will contact the initial complainant and explain the procedure for filing a formal complaint against the alleged violator.

Formal complaint investigations will be conducted by ODA. ODA may invite the SWCD to accompany it on a compliance investigation but the landowner can refuse the SWCD staff access to the property.

ODA Formal Water Quality Compliance Flowchart



Total Maximum Daily Loads

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. All TMDLs in the Coos and Coquille Area Plan are scheduled to be completed by 2012.

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.

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: Hydromodificaiton 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. 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 prohibited conditions. The Coos SWCD will offer education and outreach opportunities to inform landowners about channelized stream management.

Appendices

A. Fish and Shellfish Species Found in the Watershed Area

B. Fish Life Histories

C. Coastal Zone Management Act - Management Measures

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

E. Management Area Maps

F. Technical and Financial Resources for Landowners

G. 303(d) list

Appendix A - 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 B - 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 C - 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:

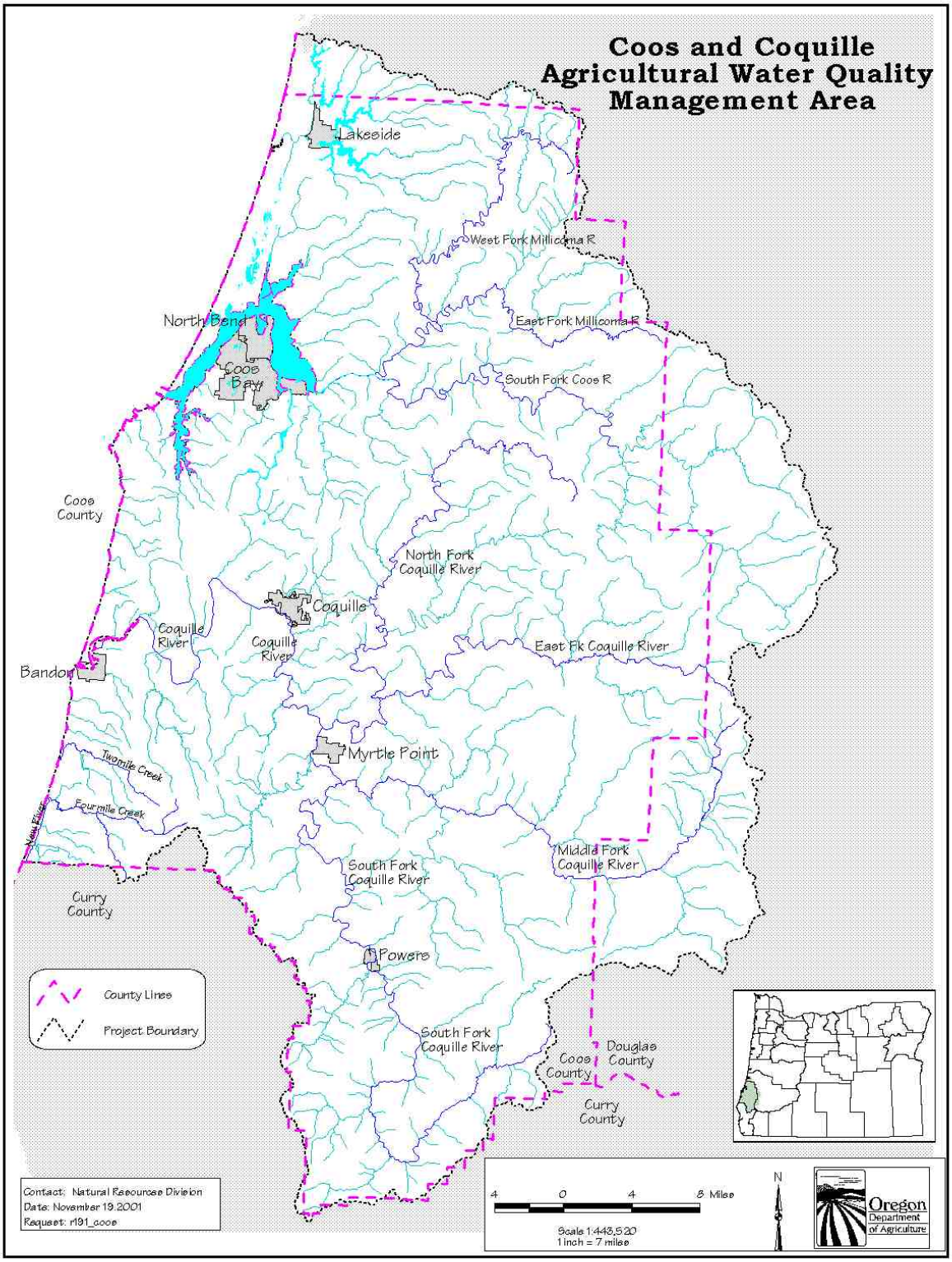
1. In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. In these special cases, on-site reuse could be precluded and would not be considered part of the management measures for such locations.

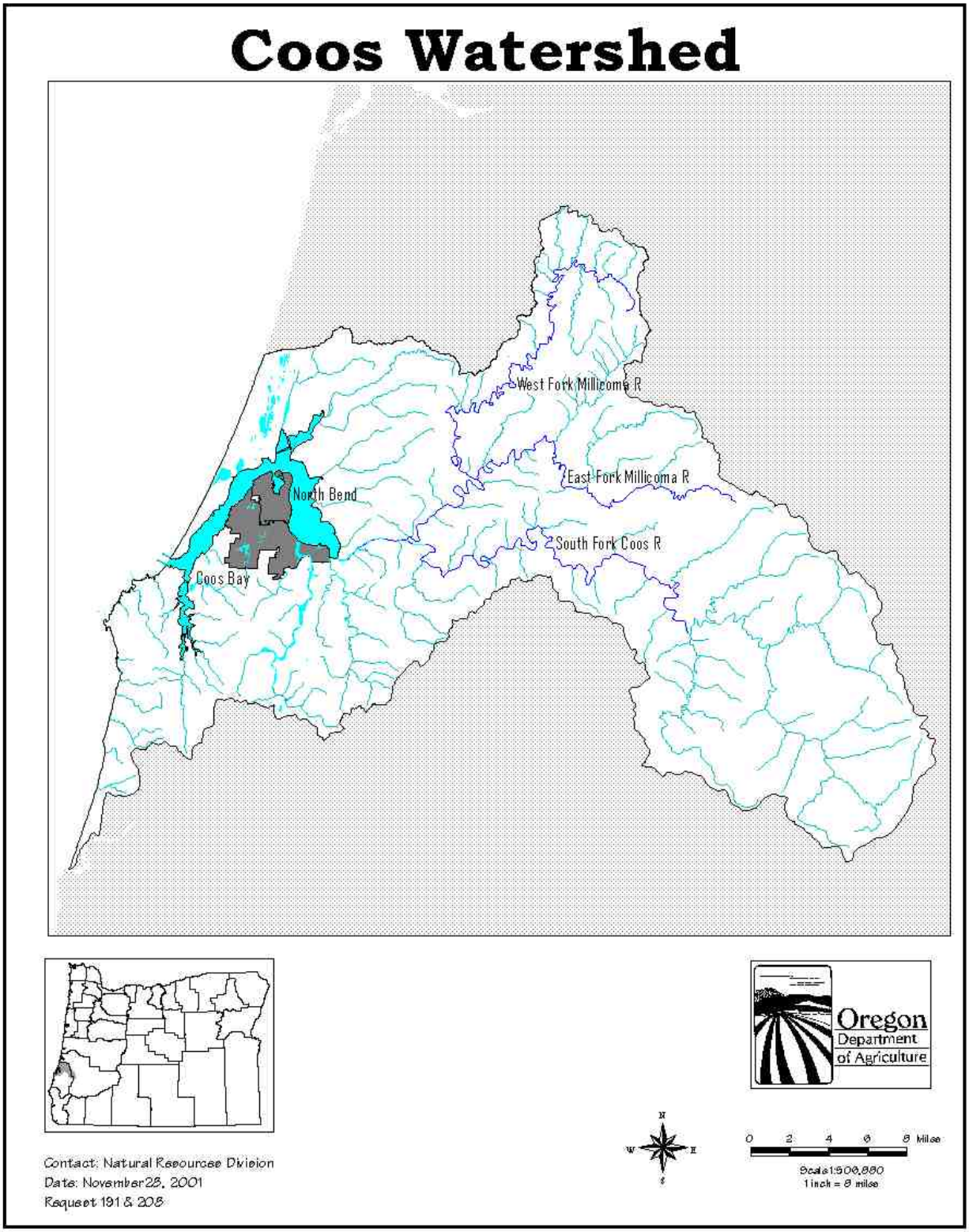
2. By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or 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

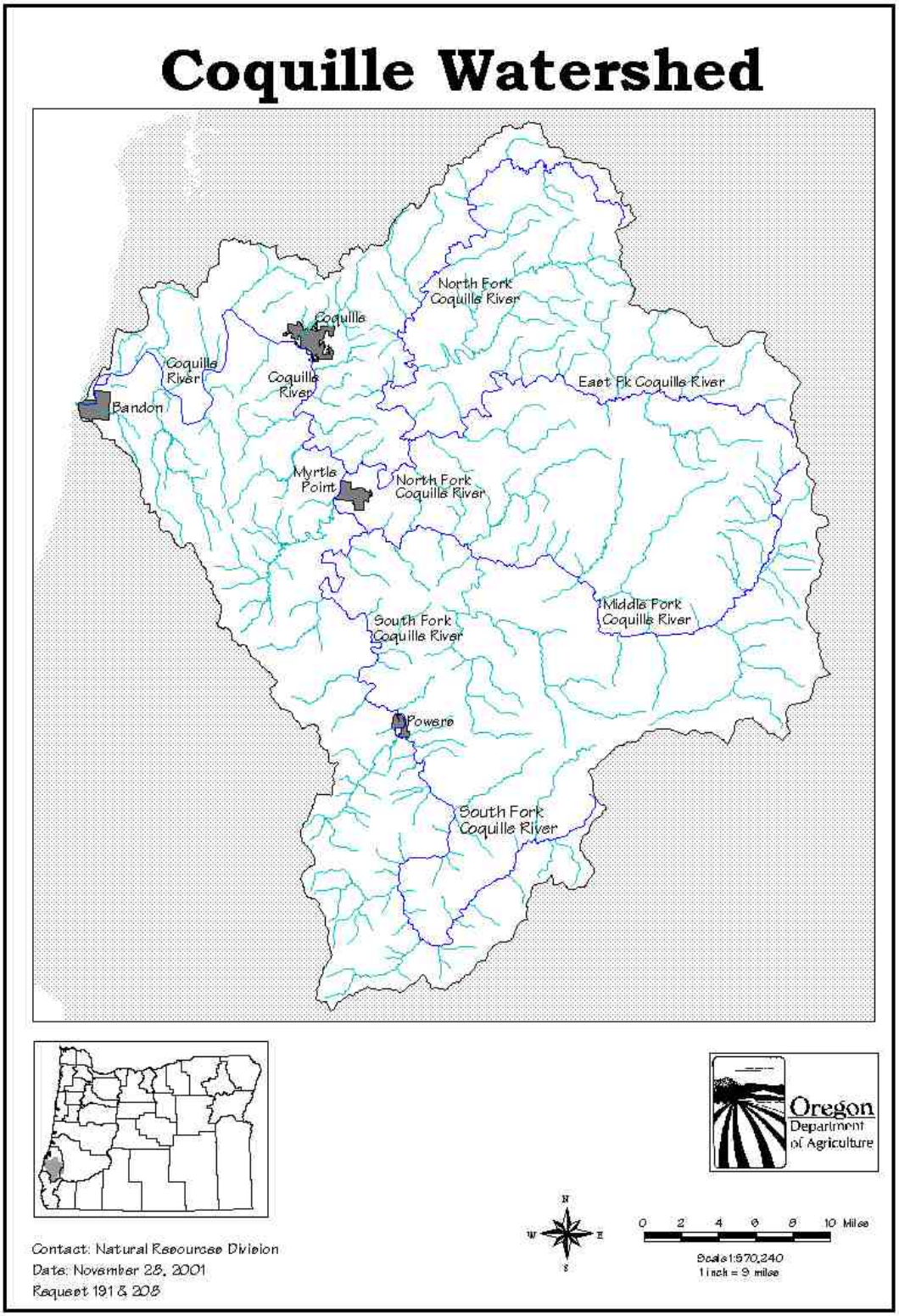
Appendix D - South Coast Basin Beneficial Uses (OAR 340-041-0322)

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 E - Management Area Maps




Coos Watershed
West Fork Millicoma R
East Fork Millicoma R
North Bend
South Fork Coos R
Coos Bay
Oregon
Department
of Agriculture
0 2 4 6 8 Miles
Scale 1:506,880
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
W
E
S
0 2 4 6 8 10 Miles
Scale 1:570,240
1 inch = 9 miles
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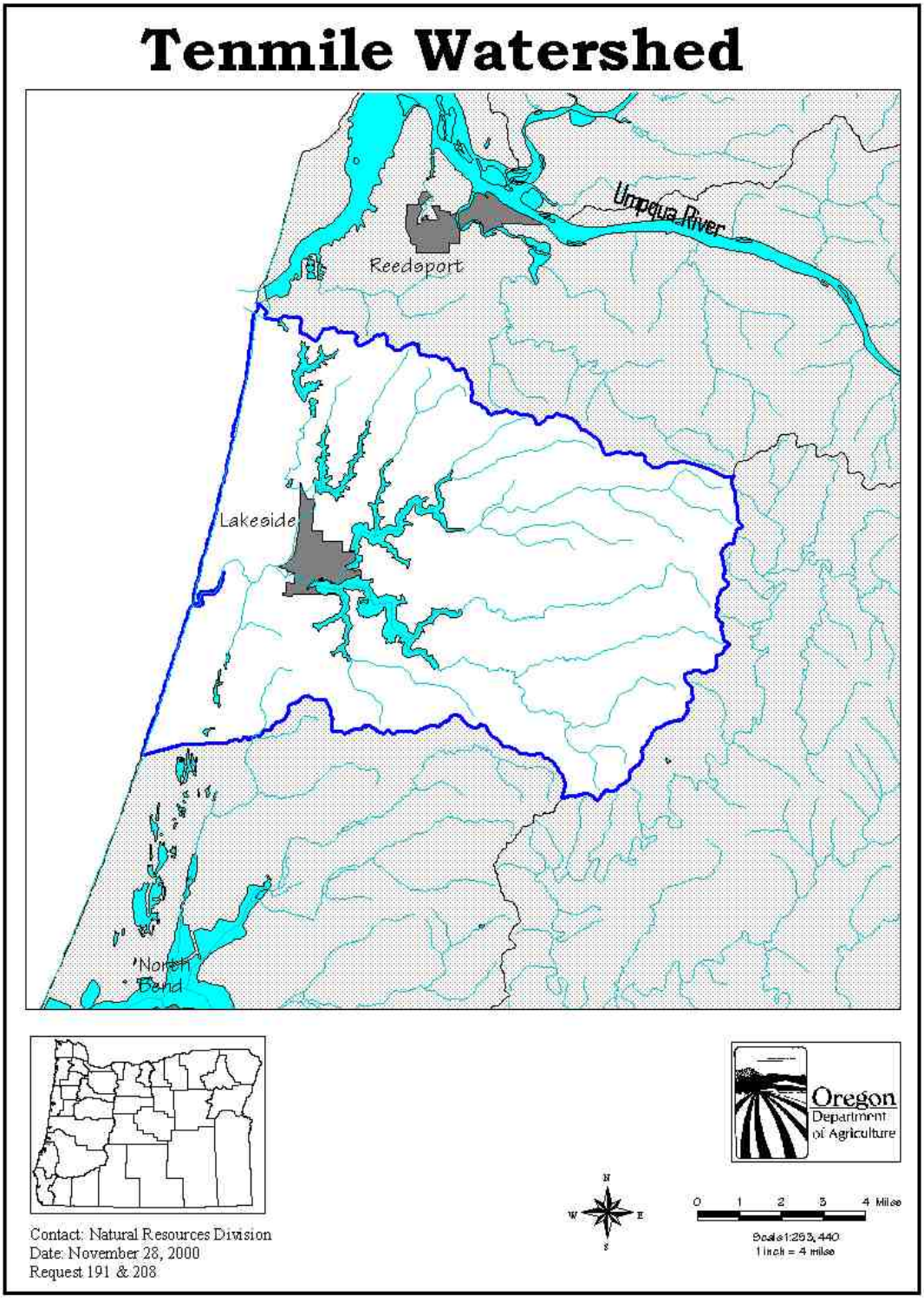
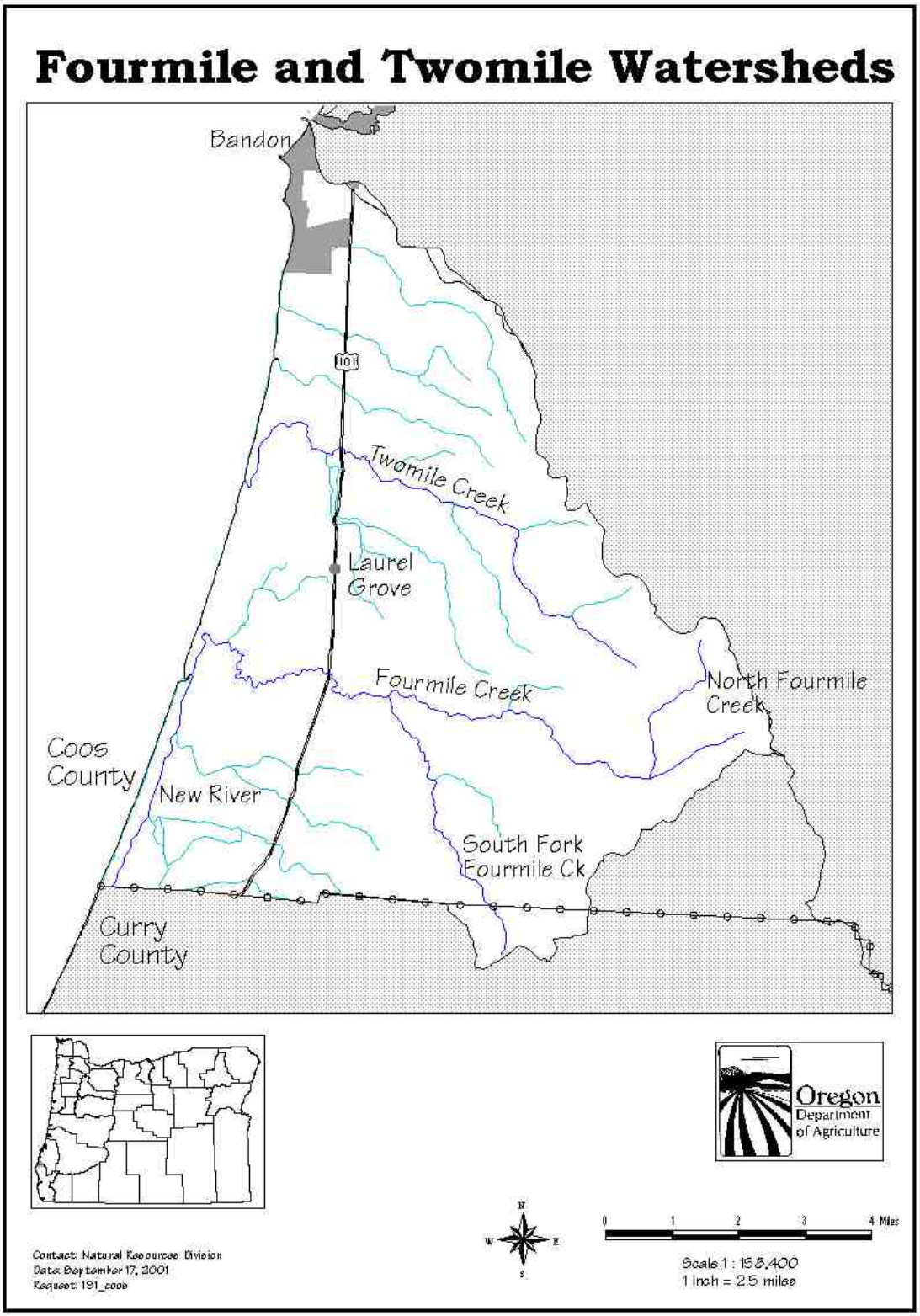
Date: November 28, 2001
Request 191 & 208


Tenmile Watershed
Umpqua River
Reedsport
Lakeside
North Bend
Oregon
Department
of Agriculture
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 F - 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 G - 303(d) Listed Waterbodies from 2004/2006 Integrated Report

Coos and Tenmile Watersheds

(Waterbodies addressed by the Tenmile Lakes TMDL will be de-listed in the next Integrated Report)

Water Body (Stream/Lake)	River Miles	Parameter	Season	Beneficial Uses
Burnt Creek	0 to 2.6	Temperature	Year Around (Non-spawning)	Salmon and trout rearing and migration
Catching Creek	0 to 4.6	Fecal Coliform	Year Around	Shellfish growing
Catching Slough	0 to 5.6	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Catching Slough	0 to 5.6	Fecal Coliform	Year Around	Shellfish growing
Cedar Creek	0 to 11.6	Temperature	Summer	Anadromous fish passage Salmonid fish rearing
Coalbank Slough	0 to 0.5	Fecal Coliform	Year Around	Shellfish growing
Coos Bay	0 to 7.8	Fecal Coliform	Year Around	Shellfish growing
Coos Bay	7.8 to 12.3	Fecal Coliform	Year Around	Shellfish growing
Coos River	0 to 6.5	Fecal Coliform	Year Around	Shellfish growing
Echo Creek	0 to 2.5	Fecal Coliform	Year Around	Shellfish growing
Eel Lake	0 to 2.5	PH	Summer	Anadromous fish passage Resident fish and aquatic life Salmonid fish rearing Salmonic fish spawning Water contact recreation
Elk Creek	0 to 8.7	Iron	Year Around	Aquatic life Drinking water Fishing Human health
Haynes Inlet	0 to 3.3	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Haynes Inlet	0 to 3.3	Fecal Coliform	Year Around	Shellfish growing
Isthmus Slough	0 to 10.6	Dissolved Oxygen	June 1 – September 30	Anadromous fish passage Resident fish and aquatic life Salmonid fish rearing
Isthmus Slough	0 to 10.6	Fecal Coliform	Year Around	Shellfish growing
Isthmus Slough	0 to 10.6	Manganese	Year Around	Drinking water Fishing
Joe Ney Slough	0 to 2.2	Fecal Coliform	Year Around	Shellfish growing
Kentuck Slough	0 to 2.2	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Kentuck Slough	0 to 2.2	Fecal Coliform	Year Around	Shellfish growing
Larson Slough	0 to 3.9	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Larson Slough	0 to 3.9	Fecal Coliform	Summer	Water contact recreation
Larson Slough	0 to 3.9	Fecal Coliform	Year Around	Shellfish growing

Water Body (Stream/Lake)	River Miles	Parameter	Season	Beneficial Uses
Millicoma River	0 to 8.9	Dissolved Oxygen	October 1 - May 31	Salmonid fish spawning
Millicoma River	0 to 8.9	Fecal Coliform	Year Around	Shellfish growing
North Inlet	0 to 3.3	Fecal Coliform	Year Around	Shellfish growing
North Slough	0 to 2.4	Fecal Coliform	Year Around	Shellfish growing
North Tenmile Lake	0 to 4.5	Aquatic Weeds Or Algae	Undefined	Aesthetics Fishing Water contact recreation
Palouse Creek	0 to 10.5	Fecal Coliform	Year Around	Shellfish growing
Pony Creek	0 to 5.8	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Pony Creek	0 to 5.8	Fecal Coliform	Year Around	Shellfish growing
Pony Slough	0 to 0.8	Fecal Coliform	Year Around	Shellfish growing
Ross Slough	0 to 3.1	Fecal Coliform	Year Around	Shellfish growing
Shinglehouse Slough	0 to 0.8	Fecal Coliform	Year Around	Shellfish growing
South Fork Coos River	0 to 2.6	Dissolved Oxygen	Year Around	Estuarine water
South Fork Coos River	0 to 31.1	Fecal Coliform	Year Around	Shellfish growing
South Slough	0 to 5.3	Fecal Coliform	Year Around	Shellfish growing
Stock Slough	0 to 1.1	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Stock Slough	0 to 1.1	Fecal Coliform	Summer	Water contact recreation
Stock Slough	0 to 1.1	Fecal Coliform	Year Around	Shellfish growing
Tenmile Lake	0 to 5	Aquatic Weeds Or Algae	Undefined	Aesthetics Fishing Water contact recreation
Tioga Creek	0 to 16.2	Temperature	October 15 - May 15	Salmon and steelhead spawning
Tioga Creek	0 to 17.5	Temperature	Year Around (Non-spawning)	Salmon and trout rearing and migration
Willanch Creek	0 to 3.9	Fecal Coliform	Year Around	Shellfish growing
Willanch Slough	0.7 to 2.8	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Willanch Slough	0.7 to 2.8	Fecal Coliform	Summer	Water contact recreation
Williams River	0 to 20.9	Temperature	Summer	Anadromous fish passage Salmonic fish rearing
Winchester Creek	0 to 5.4	Fecal Coliform	Year Around	Shellfish growing

Coquille Watershed

Water Body (Stream/Lake)	River Miles	Parameter	Season	BeneficialUses
Alder Creek	0 to 3.1	Temperature	Year Around (Non-spawning)	Salmon and trout rearing and migration
Baker Creek	0 to 2.9	Temperature	Summer	Anadromous fish passage Salmonid fish rearing
Battle Creek	0 to 1.5	Temperature	Year Around (Non-spawning)	Core cold water habitat
Bear Creek	0 to 13.2	Dissolved Oxygen	Fall/Winter/Spring	Anadromous fish passage Resident fish and aquatic life Salmonid fish rearing

				Salmonid fish spawning
Bear Creek	0 to 13.2	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Bear Creek	0 to 13.2	Fecal Coliform	Year Around	Shellfish growing
Belieu Creek	0 to 3.1	Temperature	Summer	Anadromous fish passage Salmonid fish rearing
Bingham Creek	0 to 2	Temperature	Year Around (Non-spawning)	Core cold water habitat
Boulder Creek	0 to 4.1	Temperature	Year Around (Non-spawning)	Core cold water habitat
Coquille River	4.2 to 35.6	Chlorophyll a	Summer	Aesthetics Fishing Livestock watering Water contact recreation Water Supply
Coquille River	0 to 35.6	Dissolved Oxygen	January 1 - May 15	Resident trout spawning
Coquille River	4.2 to 35.6	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Coquille River	0 to 4.2	Fecal Coliform	Year Around	Shellfish growing
Coquille River	4.2 to 35.6	Fecal Coliform	Year Around	Shellfish growing
Coquille River	21 to 35.3	Temperature	Summer	Anadromous fish passage Salmonid fish rearing
Cunningham Creek	0 to 7.4	Dissolved Oxygen	Year Around	Anadromous fish passage Salmonid fish rearing
Cunningham Creek	0 to 7.4	Fecal Coliform	Fall/Winter/Spring	Water contact recreation
Cunningham Creek	0 to 7.4	Fecal Coliform	Summer	Water contact recreation
Dice Creek	0 to 4.2	Temperature	Year Around (Non-spawning)	Core cold water habitat
East Fork Coquille River	0 to 26.2	Temperature	Summer	Anadromous fish passage Salmonid fish rearing
Elk Creek	0 to 5.7	Temperature	Year Around (Non-spawning)	Salmon and trout rearing and migration
Ferry Creek	0 to 3.6	Fecal Coliform	Year Around	Shellfish growing
Fishtrap Creek	0 to 4.7	Iron	Year Around	Aquatic life Drinking water Fishing Human health
Middle Creek	0 to 24.2	Temperature	Year Around (Non-spawning)	Salmon and trout rearing and migration
Water Body (Stream/Lake)	**River Miles**	**Parameter**	**Season**	**BeneficialUses**
Middle Fork Coquille River	0 to 11.2	Dissolved Oxygen	October 15 - May 15	Salmon and steelhead spawning
Middle Fork Coquille River	0 to 11.2	Dissolved Oxygen	Year Around (Non-spawning)	Cold-water aquatic life
Middle Fork Coquille River	11.2 to 39.6	Temperature	Year Around (Non-spawning)	Core cold water habitat
Moon Creek	0 to 4.7	Temperature	Year Around (Non-spawning)	Core cold water habitat
North Fork Coquille River	0 to 18.5	Dissolved Oxygen	January 1 - May 15	Resident trout spawning
North Fork Coquille River	0 to 27.9	Dissolved Oxygen	Year Around (Non-spawning)	Cold-water aquatic life

North Fork Coquille River	0 to 27.9	Temperature	Year Around (Non-spawning)	Salmon and trout rearing and migration
North Fork Coquille River	27.9 to 52.3	Temperature	Year Around (Non-spawning)	Core cold water habitat
Rock Creek	0 to 11.5	Temperature	Year Around (Non-spawning)	Core cold water habitat
Rowland Creek	0 to 4.6	Temperature	Summer	Anadromous fish passage Salmonid fish rearing
Salmon Creek	0 to 9.2	Temperature	Summer	Anadromous fish passage Salmonid fish rearing
South Fork Coquille River	4.7 to 18.1	Dissolved Oxygen	October 15 - May 15	Salmon and steelhead spawning
South Fork Coquille River	0 to 18.1	Dissolved Oxygen	Year Around (Non-spawning)	Cold-water aquatic life
South Fork Coquille River	18.1 to 62	Temperature	Year Around (Non-spawning)	Core cold water habitat
Twelvemile Creek	0 to 10.2	Temperature	Year Around (Non-spawning)	Core cold water habitat
Unnamed1	0 to 3.6	Temperature	Summer	Anadromous fish passage Salmonid fish rearing
Woodward Creek	0 to 7.6	Temperature	Summer	Anadromous fish passage Salmonid fish rearing

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.

Literature Cited

Benner, Patricia, 1992, Historical Reconstruction of the Coquille River and Surrounding Landscape, Pacific Northwest and Forest and Range Experiment Station, USDA Forest Service, Corvallis, Oregon 312 pp.

Boyer, R., and Grue, C.E., 1995, Evaluation of water quality in relation to frogs at Klamath Basin National Wildlife Refuges, M.S. Thesis, University of Washington, Seattle. 88 pp.

Cannon, Lynn, 1999, Guide to Pasture and Grazing Management for Southwestern Oregon. Ed. A.P. Ruddell, Oregon State University Extension Service, Coos County

Coquille Watershed Association, 1994, Preliminary Watershed Condition Assessment and Restoration Strategy for the Coquille River – Phase 1 Watershed Action Plan.

CWA (Coos Watershed Association), 1996, Coos Watershed Plan, 16 pp.

CWAP (Coquille Watershed Action Plan), 1997, Coquille Watershed Association, Coquille, Oregon. 56 pp.

DEQ (Oregon Department of Environmental Quality), 1996, Oregon Administrative Rules, Chapter 340, Division 41

DEQ (Oregon Department of Environmental Quality), 1990, First Quarterly Progress Report: September 1, 1988 to January 31, 1989 – Near Coastal Waters Pilot Project Action Plan for Oregon Estuary and Ocean Waters.

DEQ (Oregon Department of Environmental Quality), 1992, Oregon's 1992 Water Quality Status Report 303(d), Oregon Department of Environmental Quality, Salem, Oregon.

DEQ (Oregon Department of Environmental Quality), 1995, 1992-1994 Water Quality Standards Review, Standards and Assessment Section, Oregon Department of Environmental Quality, Salem, Oregon.

DEQ (Oregon Department of Environmental Quality), 1998, Listing Criteria for Oregon's Draft 1998 303(d) List of Water Quality Limited Waterbodies, Oregon Department of Environmental Quality, Salem, Oregon, 256pp.

EIFAC (European Inland Fisheries Advisory Commission), 1968, Water quality criteria for European freshwater fish: report on extreme pH values and inland fisheries, Food and Agriculture Organization of the United Nations, Rome.

Environmental Protection Agency, 1990, Coastal Zone Act Re-authorization Amendments, Section 6217. U.S. Environmental Protection Agency, Office of Water, Washington D.C.

Environmental Protection Agency, 1993, Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, U.S. Environmental Protection Agency, Office of Water, Washington, D.C. EPA/840/B-92-002.

Holcombe, et. al., 1987. Simultaneous multiple species testing: acute toxicity of 13 chemicals to 12 diverse freshwater amphibian, fish, and invertebrate families, Arch. Env. Contam. Toxicol. 16:697-710.

Johnson, D.W., and Ryba, D.M., 1992, A literature review of specific buffer widths to maintain various functions of stream riparian areas, Prepared for the King Co. Surface Water Management Division, Aquatic Resource Consultant, Seattle. 28 pp.

Karr, J.R., and Schlosser, I.J., 1978, Impact of nearstream vegetation and stream morphology on water quality and stream biota, U.S. Environmental Protection Agency, Environmental Research Lab., Office of Research and Development, Athens, Georgia, EPA/600/3-77-097.

Nicholas, J.W., and Hankin, David G., 1989, Chinook salmon populations in Oregon coastal river basins: description of life histories and assessment of recent trends in run strengths, Oregon State University Extension Service, Corvallis, Oregon, 2nd edition, 359 pp.

Oregon Department of Agriculture, 2000, Relationship Between Agricultural Water Quality Management Area Plan Conditions and Water Quality Standards.

ODFW (Oregon Department of Fish and Wildlife), 1990, Coquille Basin Fish Management Plan, Draft #1.

ODFW (Oregon Department of Fish and Wildlife), 1995, Wild Fish Management Plan.

Oregon-Washington Interagency Wildlife Committee, 1979, Managing Riparian Ecosystems (zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington. Prepared by the Riparian habitat Subcommittee of the Oregon/Washington Interagency Wildlife Commission. Portland, Oregon. 44 pp.

Portland State University (PSU) Center for Population Studies, 1997.

Prato, Anthony, et. al., 1989, A comparison of conservation compliance and water pollution control strategies for an agricultural watershed, University of Missouri-Columbia, Department of Agricultural Economics, Columbia, Missouri.

Reeder, Clinton, 1997, Agriculture and Water Quality: a New Priority in an Old Package (SB1010), 15 pp.

Ricks, Cindy, 1992, In Improving Streams and Watersheds in Oregon: Inventory and Evaluation of Efforts to Improve the Conditions of Oregon's Streams and Watersheds from 1985-1990, Oregon Water Resource Dept., Salem, Oregon.

Tenmile Watershed Plan, 1998, Tenmile Lakes Partnership, 23 pp.

Terrell, C.R., and Perfetti, P.B., 1989. Water Quality Indicators Guide: Surface Waters, U.S. Natural Resources Conservation Service, Washington, D.C.

Todd, Rodney, 1997, The Environmentally Friendly Pasture from Oregon Grazing Conference II, October 30-31, 1997, Coos Bay, Oregon, Oregon State University Cooperative Extension Service.

USDA (United States Department of Agriculture) and Oregon Department of Agriculture, 1997, 1997-1998 Oregon Agricultural and Fisheries Statistics. Oregon Dept. of Agriculture, Salem, Oregon, 84 pp.

USDA Farm Services Agency, 1995, Application for Water Quality Incentives Program.

USDA Soil Conservation Service, 1983, Proposal for the Coquille – Coos Cooperative River Basin Study.

US Department of the Interior, Bureau of Land Management, 1998, User Guide to Assessing Proper Functioning Condition #TR 1737-15, National Applied Resource Science Center, Denver,