Mid Coast Agricultural Water Quality Management Area Plan

Developed by the
Mid Coast Local Advisory Committee

with assistance from

The Lincoln and Siuslaw Soil and Water Conservation Districts

and

The Oregon Department of Agriculture

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Local Advisory Committee Members and Alternates:

Kevin Carroll
Betty Huff
Elmer Ostling
Richard Huff
Jeff Feldner
Joe Steere
Wayne Hoffman
Roger Neff, Chair
Howard Pazdral
Sally Owens
Doug Shaller

Contact Information:

Oregon Department of Agriculture
Natural Resources Division
635 Capitol Street NE
Salem, Oregon 97301
Phone: (503) 986-4700

Soil and Water Conservation Districts

Lincoln SWCD
23 North Coast Hwy.
Newport, OR 97365
Phone: (541) 265-2631

Siuslaw SWCD
1525 12th St., Suite 10A
Florence, OR 97439
Phone: (541) 997-1272

Watershed Councils

Mid Coast Watersheds Council
23 North Coast Hwy
Newport, OR 97365
Phone: (541) 265-9195

Siuslaw Watershed Council
USFS Upper Compound
10961 Highway 36
PO Box 422
Mapleton, OR 97453
Phone: (541) 268-3044

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Acronyms and Terms Used in this Document

Area Plan – Mid Coast Agricultural Water Quality Management Area Plan

Area Rules – Mid Coast Agricultural Water Quality Management Area Rules

Beneficial Use – An existing or desired use that requires a certain level of water quality. For example, water contact recreation, bull trout, or drinking water supply.

CAFO – Confined Animal Feeding Operation

CZARA – Coastal Zone Act Reauthorization Amendments of 1990

DEQ - Oregon Department of Environmental Quality

EPA – Environmental Protection Agency

LAC - Local Advisory Committee

LMA - Local Management Agency

Management Area – Mid Coast Agricultural Water Quality Management Area

NRCS - Natural Resources Conservation Service

OAR - Oregon Administrative Rule

ODA - Oregon Department of Agriculture

ORS - Oregon Revised Statute

OSUES - Oregon State University Extension Service

OWEB - Oregon Watershed Enhancement Board

SB 1010 – Senate Bill 1010 or the Agricultural Water Quality Management Act

SWCD - Soil and Water Conservation District

303(d) List - The Clean Water Act, in Section 303(d), requires states to list waters that are "water quality limited."

TMDL – Total Maximum Daily Load

USDA - United States Department of Agriculture

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Foreword

This Agricultural Water Quality Management Area Plan provides guidance for addressing agricultural water quality issues in the Mid Coast Agricultural Water Quality Management Area. The purpose of this plan is to identify strategies to reduce water pollution from agricultural lands through a combination of outreach programs, suggested land treatments, management activities, and monitoring.

The provisions of this Plan do not establish legal requirements or prohibitions.

The Oregon Department of Agriculture (ODA) will exercise its enforcement authority for the prevention and control of water pollution from agricultural activities under administrative rules for the Mid Coast Agricultural Water Quality Management Area and Oregon Administrative Rules (OARs) 603-090-0060 through 603-090-0120.

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1. Introduction

This Agricultural Water Quality Management Area Plan (Area Plan) was developed in response to the Agricultural Water Quality Management Act, passed in 1993 by the Oregon Legislature and codified at ORS 568.900 – 568.933. The Act directed the Oregon Department of Agriculture to work with agriculture to address water quality issues. The intent of the Act and the Oregon Department of Agriculture Water Quality Program are to:

- Satisfy multiple federal and state water quality mandates;
- Encourage voluntary conservation;
- Promote water quality improvement through outreach and education;
- Allow flexibility in meeting local water quality standards;
- Provide enforcement provisions for landowners who refuse to work towards meeting water quality standards; and
- Involve local citizens and organizations in the development of strategies to meet water quality standards.

This Area Plan applies specifically to agricultural activities on all agricultural, rural, and forestlands within the Mid Coast Agricultural Water Quality Management Area (Management Area) that are not owned by the federal government, are part of an Indian Reservation, or are Tribal Trust Lands. This Management Area consists of: (1) all lands drained by the Salmon, Siletz, Yaquina, Alsea, Yachats, Siuslaw, Siltcoos, and Tahkenitch rivers and their tributaries and (2) all streams flowing directly into the Pacific Ocean between the Salmon and Tahkenitch watersheds. It applies to all lands, regardless of size, in current agricultural use and those lying idle or on which management has been deferred. It also applies to agricultural activities within incorporated city boundaries. Activities subject to the Oregon Forest Practices Act are not included in this plan.

This Area Plan provides background information on the Management Area; discusses local water quality concerns; and describes a goal, objectives, and strategies to improve water quality. The plan also references Area Rules that describe conditions land users must meet on all agricultural lands they own, occupy, or manage, and describes procedures for handling complaints and enforcement actions. Finally, the plan describes a process for evaluating plan effectiveness and updating the plan on a regular basis.

This Area Plan does not hold agriculture responsible for cleaning up water quality problems from other sources; its focus is on encouraging landowners to keep water as clean when it leaves their property as when it enters. This plan is also not intended to tell anyone how to farm, ranch, or otherwise utilize their natural resources.

However, the Lincoln and Siuslaw Soil and Water Conservation Districts (SWCDs), U.S. Department of Agriculture - Natural Resources Conservation Service (NRCS), the ODA, and other partners are available to provide technical, financial, and educational assistance

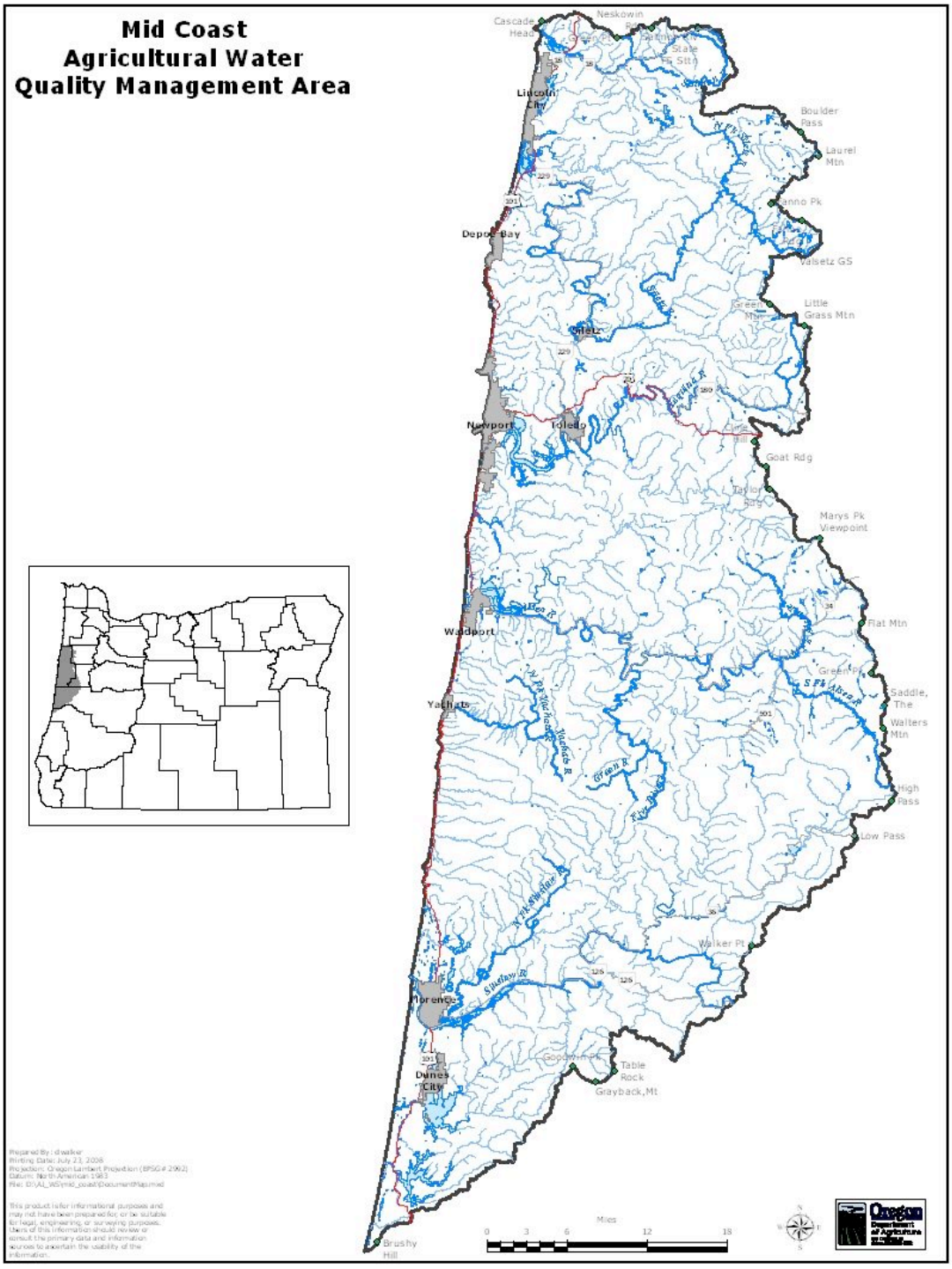
to landowners in the management Area to meet their conservation goals and local water quality standards.

A Local Advisory Committee (LAC) developed this Area Plan with assistance from the Lincoln and Siuslaw SWCDs and the ODA, and with input from members of the community. Committee members are:

Committee Member	**Area/Watershed**	**Representing**
Kevin Carroll	Westlake, Siltcoos	Farrier
Wayne Hoffman	South Beach, Mid Coast	Mid Coast Watersheds Council
Betty Huff	Florence, Siuslaw	Currently owns small farm; operated dairy for 21 years
Richard Huff	Florence, Siuslaw	Timber, cattle
Roger Neff, Chair	Westlake, Siltcoos	Cattle, hay, timber
Elmer Ostling	Waldport, Alsea	Beef cattle, hay
Sally Owens	Deadwood, Siuslaw	Beef cattle, hay
Howard Pazdral	Deadwood, Siuslaw	Hay, logging, percheron horses
Jeff Feldner	Newport	Fisheries
Doug Shaller	Newport	Weeds
Joe Steere	Lincoln City	Timber, cattle

Note: In addition to assisting with developing the Area Plan and Rules, the LAC is responsible for participating in a review of the Area Plan and Rules every two years. The LAC is also responsible for making recommendation of strategies for landowners to meet water quality needs. In addition, if there is a need to revise or develop additional rules the LAC would assist ODA to develop these. The LAC is composed of members that represent a variety of geographic areas, agricultural land uses, and other interests and may include representatives from the soil and water conservation districts, watershed councils, local professionals, and agricultural landowners.

Map 1. Mid Coast Agricultural Water Quality Management Area.



2. Background

2.1. Geographical and physical setting

General description

The Management Area includes the Alsea, Salmon, Siletz, Siltcoos, Siuslaw, Tahkenitch, Yachats, and Yaquina watersheds, as well as several small watersheds that drain directly to the Pacific Ocean. The area includes a very small portion of southern Tillamook County, the southwest portion of Benton County, nearly all of Lincoln County, western Lane County, west Polk County, and a small northwest corner of Douglas County. Communities included in this Area are Alsea, Blodgett, Deadwood, Depoe Bay, Eddyville, Florence, Harlan, Lincoln City, Mapleton, Newport, Siletz, South Beach, Swiss Home, Toledo, Waldport, Westlake, and Yachats.

Boundaries of the Management Area are the Coast Range Mountains to the east, the Pacific Ocean to the west, the Salmon River-Neskowin Creek watershed boundary to the north, and the Tahkenitch Lake-Smith River watershed boundary to the south. A portion of the Siuslaw River watershed east of the Coast Range is not part of the management Area. Map 1 shows the boundaries of the area in more detail.

Physical features

The Alsea, Salmon, Siletz, Siuslaw, Yachats, and Yaquina rivers are typical coastal streams, with their principal headwaters in the Coast Range. They flow down steep gradients until the lower reaches, where they flatten and meander through relatively narrow valleys. Each river has a broad, shallow bay at its mouth, and most have silted estuaries with tidewater extending inland. Many estuaries and coastal wetlands have been modified for agricultural production, municipal use, and other purposes. Modifications include dikes and levees, drainage ditches, and tide gates.

Siltcoos and Tahkenitch lakes, along with several smaller lakes near the border between Lane and Douglas counties, were created as dunes blocked the outlets of several coastal streams. Dams were also installed at the outlets of Siltcoos and Tahkenitch lakes in the 1960s.

Table 1 lists the acreage and major tributaries of each of the major watersheds in the Management Area.

Table 1. Acreage and major tributaries of watersheds in the Management Area.

Watershed	Acreage	Major tributaries
Alsea River	302,720	Canal Creek, Drift Creek, Fall Creek, Five Rivers, Lobster Creek, South Fork
Salmon River	49,920	Bear Creek, Little Salmon River, Salmon Creek, Slick Rock Creek, Treat River, Trout Creek
Siletz River	197,120	Cedar Creek, Euchre Creek, Gravel Creek, North Fork, Rock Creek, South Fork, Sunshine Creek
Siltcoos River	82,560	Fiddle Creek, Maple Creek, Tahkenitch Lake, Woahink Lake, Siltcoos Lake
Siuslaw River	494,720	Deadwood Creek, Indian Creek, Knowles Creek, Lake Creek, North Fork, Wildcat Creek
Yachats River	39,040	North Fork, School Fork, Stump Creek
Yaquina River	161,920	Depot Creek, Elk Creek, Little Elk Creek, Mill Creek, Olalla Creek, Thornton Creek

Most of the soils in the area are formed from sedimentary rock. They are highly productive timber soils, fairly unstable, and prone to landslides. Other soils are derived from igneous rock formations. Along streams and rivers in their lower reaches, most soils formed from alluvial deposits (Corliss 1973; Patching 1987; Shipman 1997).

Climate

The climate of the area is typical of the Oregon Coast, with wet winters, dry summers, and relatively mild temperatures year round. Precipitation varies between 60 and 80 inches per year at the Pacific Ocean to between 100 and 120 inches per year at the crest of the Coast Range. Rainfall is the predominant form of precipitation, especially at sea level. Snowfall is infrequent at sea level, but can be significant during the winter in parts of the Coast Range. Temperatures are similar throughout the area during the winter, but typically increase during the summer with distance from the Pacific Ocean. For example, the average daily maximum temperature in Tidewater is 10 degrees higher than at Newport during the summer (Corliss 1973; Patching 1987; Shipman 1997).

Land use/land ownership

Agriculture and forestry

Farming in the Management Area is limited to the narrow valleys along major streams. Concentrations of agricultural land occur near Siletz, Toledo, Alsea, Lobster Valley, Deadwood, Harlan, Florence, and Siltcoos Lake. Farms range from small, 10 to 20 acre parcels with livestock and hay, to ranches of several thousand acres where agricultural products are the primary source of income. Some grazing also occurs on upland

meadows in timberlands. Historically, agricultural production in the area included row crops and several small family dairies, but most of the dairies have gone out of business, and row crop production has moved elsewhere. The primary agricultural commodities in the area today are hay and cattle; other products include Christmas trees, nursery stock, blueberries, horses, filberts, apples, and vegetables.

About 90 percent of the Management Area is in forestland. Major landowners and managers in the Area include the Bureau of Land Management, the U. S. Forest Service, industrial timber companies, and smaller acreage timberland owners. Much of the timberland is on highly productive soils on the steep slopes of the Coast Range.

Urban/residential

Most urban lands are along the coastline and have grown along with coastal tourism. Towns and rural residential communities further inland are mostly located near agricultural areas.

Coastal communities face increasing challenges related to wastewater management as their populations grow. For many small communities, the cost of building new wastewater treatment facilities or expanding existing facilities is cost-prohibitive. Instead of building expensive incinerators or the tertiary treatment facilities required before wastewaters can be discharged to rivers or streams, many communities secure permits from Oregon Department of Environmental Quality (DEQ) to export biosolids to willing landowners' agricultural and forest properties.

Biosolids are solids derived from primary, secondary, or advanced treatment of domestic wastewater that have been treated through one or more controlled processes that significantly reduce pathogens and reduce volatile solids or chemically stabilize solids to the extent that they do not attract pests. Permittees must apply biosolids at agronomic rates, use setbacks from sensitive areas such as streams and wetlands, and apply in conditions that minimize risk to surface waters and groundwater.

Roads

There is an extensive network of public and private roads in the Management Area. Many of the private roads are on forestlands. Major public highways include Highways 126, 101, 34, 20, 181, 229, and 18. Most of the major highways in the watershed, as well as many county roads, are located along streams and rivers.

Recreation

The Management Area is an extremely popular region for tourism and recreation. Sport fishing occurs along nearly every major river and stream, and hunting is also widespread. Other popular recreation activities include boating, camping, and sightseeing.

2.2. Water resources

Water availability

Most of the surface water supply in the Management Area is provided by rainfall. Only a small portion of surface water is supplied by snowmelt. As a result, there is a great deal of variability in annual flows, with flows in the winter greatly exceeding summer flows. Table 2 shows average summer, winter, and annual flows in several Mid Coast streams.

Table 2. Average annual, summer, and winter flows in the Alsea, Siletz, Siuslaw, and Yaquina rivers (United States Geological Survey, 2001). Flows are listed in cubic feet per second (cfs).

River	Average Annual Flow (cfs)	Average Summer Flow (cfs)	Average Winter Flow (cfs)
Alsea @ Tidewater	1488	240	3400
Siletz	1526	283	3211
Siltcoos	330	66	760
Siuslaw	2010	344	4520
Yachats	119	28	248
Yaquina @ Chitwood	250	42	560

Table 3. Water appropriations (in cubic feet per second and acre-feet) in the Salmon, Siletz, Yaquina, and Alsea watersheds. (Oregon Water Resources Department, 1990)

Water Use	Salmon River		Siletz River		Yaquina River		Alsea River	
	Cfs	Af	Cfs	Af	Cfs	Af	Cfs	Af
Irrigation	4	2	13	2	14	1	39	8
Fish and Wildlife	34	6	11	1	9	.1	70	6
Agriculture	.03	0	.06	.7	.02	0	5	16
Industrial	.3	4	35	4350	36	6060	.4	0
Municipal	.7	0	21	2	1.5	500	7	0

Table 4. Water appropriations (in cubic feet per second and acre-feet) in the Yachats, Siuslaw, Siltcoos, and Tahkenitch watersheds. (Oregon Water Resources Department, 1990).

Water Use	Yachats River		Siuslaw River		Siltcoos River		Tahk. Creek	
	Cfs	Af	Cfs	Af	Cfs	Af	Cfs	Af
Irrigation	1	0	46	17	4	.5	0	0
Fish and Wildlife	1	0	10	124	.02	.02	0	0
Agriculture	0	5	3	25	0	0	0	0
Industrial	0	0	9	515	13	15,070	37	16,580
Municipal	4	0	13	0	1.5	0	0	0

Because of the fine-grained and relatively impermeable rock formations in the Mid Coast, groundwater supplies in the Management Area are generally low. Sand dunes and alluvial deposits yield the most groundwater.

Water use

Consumptive uses of water in the Management Area include irrigation, mining, industrial, domestic and municipal use. Non-consumptive uses include recreation, fish and wildlife habitat, and hydropower. Tables 3 and 4 list water appropriations in the major watersheds in the area.

Biological resources

A number of species in the Management Area depend on aquatic habitats. Anadromous fish include Chinook salmon, Coho salmon, chum salmon, steelhead, sea run cutthroat trout, shad, smelt, and Pacific lamprey. Spawning and rearing grounds for these fish are found throughout the Mid Coast Area (Appendix A). Oregon Coastal Coho were listed as threatened under the Endangered Species Act on May 12, 2008. Other aquatic vertebrates in the area include beaver, wood duck, hooded and common merganser, speckled dace, sculpin, Pacific tree frog, red-legged frog, western pond turtle, and Pacific giant salamander. Non-native aquatic species include nutria and bullfrog. Migratory waterfowl and shorebirds are seasonally abundant throughout the area as well. Terrestrial species in the Management Area include mountain lion, black bear, Roosevelt elk, black-tailed deer, coyote, several birds of prey, and a variety of resident and neotropical migratory songbirds.

Several of these species are of tremendous importance to the function of terrestrial or aquatic ecosystems, and significantly affect nutrient cycling, type and quality of habitats, populations of other species, and other factors.

2.3. Water quality

Clean Water Act

The federal Clean Water Act requires states to monitor water quality and identify waterbodies that do not meet water quality standards. In Oregon, these tasks are the responsibility of the DEQ. Waterbodies that are identified as "water quality limited" are placed on the state "303(d)" list (named after the section of the Clean Water Act that requires the list to be maintained).

The DEQ has established state water quality standards for several water quality parameters, such as bacteria, temperature, dissolved oxygen, and nutrients (Appendix C). The standards protect "beneficial uses" associated with waterbodies. Beneficial uses in Oregon include water contact recreation, drinking water, salmonid spawning and rearing, aesthetics, protection of shellfish consumers, and livestock watering.

Waterbodies that do not meet state water quality standards are placed on the 303(d) list regardless of the sources of impairments. For example, the 303(d) list does not distinguish whether septic systems, agricultural activities, or wildlife cause a waterbody to violate state water quality standards for bacteria. After a waterbody is placed on the 303(d) list, however, the Total Maximum Daily Load (TMDL) development process (Section 6.1) identifies contributors to water quality problems and specifies the amount of pollution a waterbody can receive without exceeding water quality standards. Sources of pollution, such as wastewater treatment plants, industrial plants, urban and rural storm water runoff, agricultural lands, and forest lands, are identified using monitoring and computer modeling and each source is assigned a load for the necessary reductions under the TMDLs.

Water quality in the Management Area

To assess water quality in the Mid Coast for the 2004/2006 303(d) List and Decision Matrix, the Oregon DEQ evaluated data from several sources, including the U.S. Geological Survey, U.S. Forest Service, Oregon Department of Fish and Wildlife (ODFW), the Devils Lake Water Improvement District, Boise Cascade, local volunteer water quality monitoring groups, and its own monitoring program. The LAC strongly recommends that future monitoring programs include additional sites and parameters, to improve characterization of water quality and watershed health in the Mid Coast (see Section 3.4).

While water quality in the Management Area is generally good, the 2004/2006 303(d) list identified forty-nine stream segments that did not meet state standards for temperature. Several lakes within the area did not meet state standards for aquatic weeds or algae. Segments of the Alsea River, Salmon River, Yaquina River, and Siuslaw River were placed on the list because of low dissolved oxygen levels. Several segments in the Siuslaw watershed and Elk Creek in the Yaquina watershed were placed on the 303(d) list for sedimentation. Segments within the Alsea Sub Basin, Siletz/Yaquina subbasin, and Siuslaw subbasin were listed for bacteria. Appendix B contains a list of all the 303(d) listed waterbodies in the Mid Coast.

There are many potential causes for the water quality problems identified in the area, including runoff from forest and agricultural lands, runoff from roads, erosion from streambanks and roadsides, waste disposal sites, discharges from waste water treatment plants, leaking septic systems, application of waste water on agricultural lands, and erosion from home building and development. Rerouting of runoff via road building, construction, and land surfacing (such as parking areas) can lead to excessive erosion or pollutant transport. Increased heat input due to vegetation removal, seasonal flow reduction, changes in channel shape, and floodplain alteration are also potential sources of water quality impairments.

Other water quality concerns exist in the Mid Coast Area in addition to 303(d) listed problems. In several waterbodies, lead from fishing lures has become a water quality concern. Lead inputs have been estimated as high as forty pounds per river or stream mile per week in heavily fished areas of Lake Creek in the Siuslaw watershed (Kinney, 2002). Some of the lead can dissolve and become bound in organic materials, eventually forming a fine layer on the creek bottom. Further investigation is underway to determine whether, if a disturbance stirs up the creek bottom, organic-bound lead can again become bio-available. Oil and fuel spills or improperly disposed petroleum products around farm buildings are a water quality concern, especially because of the high rainfall in the area and likelihood of runoff to waterbodies.

Recent monitoring has identified both bacteria and dissolved oxygen problems that the DEQ indicates may lead to future listings on the 303(d) list for North and South Fork Beaver Creek in the Alsea subbasin. This important salmon stream has had dissolved oxygen values down to 1 mg/liter, which is not adequate to support aquatic life. The dissolved oxygen standard, in the area, ranges from a high of 11 mg/liter for waterbodies identified as salmon spawning to a low of 8mg/liter for supporting coldwater aquatic life and 6.5 mg/liter in the estuaries.

Several watershed assessments, which examine existing data and recommend monitoring and management to characterize and improve watershed health, have also been completed in the Mid Coast. The Siuslaw Watershed Council and the Mid Coast Watersheds Council have published assessments for the Salmon, Siletz, Yaquina, Alsea, Yachats, and Siuslaw watersheds, as well as many smaller ocean tributaries. Water quality-related recommendations in the assessments include: increase monitoring of salmonid populations, focus on water quantity and water quality issues (particularly temperature); continue riparian restoration efforts in areas with identified temperature problems; establish a systematic water quality monitoring program designed to answer specific questions and develop baseline information, expand continuous stream temperature monitoring, and identify and complete restoration projects using a landscape/watershed perspective (Earth Design Consultants and Green Point Consulting, 2001; Ecotrust, 2002).

3. Mission, goal, objectives, strategies, and targets

3.1. Introduction

The LAC developed a mission statement, goal, objectives, and strategies based on several resource concerns in the Management Area. These resource concerns relate to listing of waterbodies on the Clean Water Act 303(d) list as water quality limited, as well as other concerns identified in the Coastal Zone Amendments Reauthorization Act of 1990 (CZARA).

Resource concern: The DEQ has identified many Mid Coast basin waterbodies as "water quality limited" because they exceed state water quality standards for sedimentation, temperature, bacteria, dissolved oxygen, aquatic weeds or algae, chlorophyll A, pH, and nutrients (Appendix B).

Resource concern: Congress, in reauthorizing the Coastal Zone Management Act in 1990, identified non-point source pollution in coastal areas as a concern. Oregon submitted a coastal non-point source pollution control plan that included several measures on agricultural lands (Appendix E). ODA uses the DEQ's definition of "nonpoint sources" meaning any source of water pollution other than a point source. Generally, a nonpoint source is a diffuse or unconfined source of pollution where wastes can either enter into or be conveyed by the movement of water to waters of the state (OAR 340-041-0002 (42)).

3.2. Mission

To implement and evaluate an outcome-based plan that will protect and improve water quality and promote the continued economic viability of all agricultural operations, large and small, in the Mid Coast Agricultural Water Quality Management Area: encourage voluntary conservation with education, outreach and technical assistance, identify and support incentives for good land stewardship, and encourage monitoring and evaluation of local water quality and watershed conditions.

3.3. Goal

To maintain and improve water quality in agricultural areas, meet state water quality standards and protect applicable beneficial uses.

3.4. Objectives and strategies

The LAC has identified the following as high priority objectives and strategies for improving water quality and achieving the mission and goal of the Area Plan. The LAC believes the objectives and strategies will achieve the mission and goal and produce the following outcomes:

- All agricultural landowners in the area become aware of the Area Plan and Rules and opportunities for technical and financial assistance.

- An increase in information and/or assistance requests to SWCDs and watershed councils about water quality issues and water quality improvement practices identified in the optional management practices section.
- Improvement of water quality in impacted waterbodies with agricultural use.

The LAC recommends that the Lincoln and Siuslaw SWCDs, ODA, watershed councils, and any other agencies or organizations wishing to aid in addressing water quality issues implement the objectives and strategies. For a complete list of organizations that provide educational and technical assistance in the Mid Coast Area, please consult Appendix G.

Objective 1: Education and outreach

Encourage voluntary conservation through education and outreach. Increase awareness among the agricultural community, rural landowners, and the public of conditions that cause water quality concerns or problems. Continue education and outreach to increase awareness of the Area Plan and Rules.

Strategy 1. Develop and implement education and outreach programs to promote public awareness of water quality issues and the Area Plan and Rules.

- Host or participate in presentations and workshops about water quality issues and best management practices.
- Identify priority areas, based on TMDLs and 303d list, and target outreach to these areas.
- Compile a list of existing demonstration project sites around the Mid Coast Area. Evaluate existing sites to determine if some high priority practices, management systems, or geographic locations are not covered. Establish any additional needed demonstration sites and use existing demonstration sites to showcase optional management practices for agricultural commodities specific to the Mid Coast Area.
- Conduct tours of demonstration sites and typical agricultural operations, such as cattle ranches, to discuss what might be typical water quality concerns and some options for addressing each concern.
- Host booths, or put information at another organization's booth, at local events and festivals and at Lincoln and Lane county fairs with typical water quality concerns for different operations and ways to address water quality concerns.
- Provide information to realtors in the Mid Coast Area and if possible, deliver presentations at realtor meetings. Contact realtors and provide written information; deliver presentations as requested.

- Develop and submit articles about water quality issues and optional management practices to local newspapers, Oregon State University (OSU) Extension

newspapers, watershed council and SWCD newsletters, Farm Services Agency newsletters, and other publications.
- Develop and implement water quality education for elementary to high school groups; include information on agriculture, water quality, and the Area Plan and Rules.

Strategy 2. Build partnerships with agencies and agribusinesses to promote water quality and educate the organizations on the Area Plan and Rules.

- Serve as agricultural water quality liaison to area conservation partners and community groups such as Siuslaw Watershed Council, Mid Coast Watersheds Council, State Parks Board, DEQ TMDL meetings, NRCS, and others as needed.
- Develop educational materials in cooperation with agencies, volunteer organizations, and other interest groups to promote water quality.
- Distribute copies of outreach articles to agencies and other organizations such as local livestock associations, Small Farmer Magazine etc., Farm Bureau chapters, and other commodity groups.

Objective 2: Identify, support, and implement incentives for good land stewardship and water quality enhancements.

Strategy 1. Encourage agricultural producers to improve water quality.

- Prevent and control conditions/characteristics on agricultural and rural lands in the Mid Coast Area that contribute to undesirable water quality, promote protection of good water quality, and control pollution as close to its source as possible.
- Promote the prevention and control of nutrients, fine sediment, and bacteria loading from agricultural activities to waters of the state.
- Maintain and, where possible, improve the ability of riparian vegetation to develop or provide the following functions: filtration of nutrients, shade, increased bank stability, and prevent or reduce pollution from entering waters of the state. Encourage native vegetation in managed and restored riparian areas.
- Encourage control of invasive vegetation through outreach, technical assistance, and incentives (for the state's list of noxious weeds, please consult Appendix I).

Strategy 2. Provide information and assist agricultural producers to implement water quality improvements to work toward achievement of water quality standards on agricultural and rural lands.

- When providing one-on-one technical assistance to landowners, let them know the Area Plan and Rules exist.
- Develop agricultural water quality and conservation plans for landowners addressing water quality issues specific to their property.

- Assist landowners to implement best management practices addressing water quality issues specific to their property.
- Utilize Geographic Information Systems (GIS) to identify projects in water quality limited areas and for project tracking.

Objective 3: Identify and secure funding for administration and implementation of the program to achieve the mission, goal, objectives, and strategies.

The LAC recommends that the Siuslaw and Lincoln SWCDs seek funding to implement the Mid Coast Agricultural Water Quality Area Plan. Funding is necessary in three main areas:

1. Education—to fund education programs such as workshops, tours, and development of educational materials.
2. Technical Assistance—maintain adequate staffing to provide technical assistance to producers to implement management practices for water quality improvement.
3. Financial Assistance—to assist landowners in obtaining cost-share dollars to address water quality goals or needs.

Strategy 1. Obtain financial assistance for landowners to implement management practices that improve water quality, technical planning assistance, education and outreach activities, and water quality monitoring.

- Submit grant applications to the Oregon Watershed Enhancement Board (OWEB) Large and Small Grant Programs, USDA, U. S. Environmental Protection Agency, Oregon DEQ, ODA, and the Stewardship group.
- Provide information on federal and local cost sharing programs to landowners on an ongoing basis.
- Promote possible financial benefits associated with water quality improvement practices, such as money saved on fertilizer or pesticides, avoidance of more strict regulations and associated costs, acreage saved due to erosion, and property value enhancement as outreach materials and programs are developed.
- Promote incentive programs designed to enhance riparian functions on agricultural lands.
- Encourage making cost-share programs less cumbersome for landowners, either by providing them assistance with paperwork and other steps, or by reducing paperwork required to participate.

Strategy 2. Ensure adequate administration of the Mid Coast Area Agricultural Water Quality Management Plan.

- Include implementation of the Mid Coast Area Agricultural Water Quality Management Plan in the Lincoln and Siuslaw annual and long-range work plans.

Objective 4: Encourage monitoring and evaluation of local water quality, watershed conditions, and effectiveness of the Area Plan and Rules.

Strategy 1. Water quality monitoring

- Support continued monitoring of water quality in the Mid Coast area to determine water quality conditions and trends in Mid Coast streams and their tributaries. Recent monitoring programs for TMDL development have been expanded to address the previous concerns raised by the LAC.
- Support ongoing and long-term funding for monitoring with respect to the following parameters: bacteria, sediment, temperature, and nutrients. Monitoring plans should be designed to answer the following specific questions:
    - What are the sources of water pollution in the Mid Coast watersheds and their tributaries?
    - What are trends in levels of bacteria, nutrients, sediment, and other parameters of concern, in Mid Coast watersheds and their tributaries?
    - When do seasonal peaks occur in bacteria, nutrients, temperatures, and sediment, as well as other parameters of concern, in Mid Coast watersheds and their tributaries?
    - What are temperature trends in Mid Coast watersheds?
    - How do different land uses, including agriculture, contribute to water quality concerns in Mid Coast watersheds and their tributaries?
    - What are groundwater quality trends in the Mid Coast area?
    - How do bio-solids applications on agricultural lands affect water quality? (U.S. Environmental Protection Agency (EPA) is currently working on this)

Note: Current monitoring programs in the Mid Coast area address surface water only and do not address the question of groundwater trends in the area.

Strategy 2. Evaluation of water quality projects and effectiveness of area plan and rules.

- Conduct routine follow-up visits to evaluate effectiveness of previous water quality projects to determine success or need for further enhancement or protection of water quality.
- Lincoln and Siuslaw Soil and Water Conservation Districts track increases in awareness of water quality issues by recording participation in workshops, tours, demonstration projects, presentations, etc.
- Monitor violations of prevention and control measures in the Mid Coast Agricultural Water Quality Management Area.

3.5. Targets

The following targets were developed based on the 2008-2009 and 2009-2010 scopes of work with the Lincoln and Siuslaw SWCDs. The scopes of work are developed as an agreement between ODA and the SWCD with tasks related to implementation of the Area Plan. The targets are for the time period from July 2008 to July 2010 and are only for the SWCDs. Watershed councils and other groups may make additional efforts that fit within the mission and goal of the Area Plan. The SWCDs are not obligated to these targets; they only serve as direction from the LAC as activities that they would like to see accomplished.

1) Education and outreach

- Host two workshops on specific topics such as mud and manure management or small acreage land stewardship. Give ten presentations at events hosted by other organizations on water quality issues.
- Identify five top priority watersheds to implement water quality projects. Identify all landowners within the priority watersheds and send them information on the area plan and best management practices.
- Hold at least one community meeting in two of the priority watersheds on water quality issues.
- Hold at least two tours per year addressing key issues in priority areas.
- Develop one Reed canarygrass control demonstration project in the Fiddle Creek watershed and hold one tour of the demonstration site highlighting different control practices.
- Staff informational booths at a minimum of four events.
- Develop a rural living handbook that highlights water quality concerns and solutions for rural landowners by January 2010.
- Publish ten news articles highlighting water quality issues in local newspapers and mail out a quarterly newsletter by the Siuslaw SWCD.
- Work with state parks summer education workshops, STEP volunteers, forest field day, Siuslaw Watershed Council summer camp, and water quality lessons to reach at least 250 students.
- Attend at least 50 meetings representing agricultural water quality.
- Develop at least one brochure in cooperation with agencies highlighting agricultural water quality issues in coastal lakes.

2) Land stewardship and water quality projects

- Provide one-on-one information about the Area Plan to at least 100 landowners.
- Provide information to 40 landowners regarding best management practices for prevention of control of nutrients, fine sediment, and bacteria entering the waters of the state. This will be through fact sheets or one-on-one technical assistance.
- Assist four landowners to plan and implement practices that improve the function of riparian vegetation.
- Use best management practices to control knotweed at 25 sites in the management area.
- Work with four landowners to implement best management practices limiting inputs of nutrients, fine sediment, and bacteria from agricultural activities.

- Develop at least ten agricultural water quality plans.

3) Funding and administration

- Write and implement at least eight grants to improve agricultural water quality.
- Provide information to at least 40 landowners on federal and local cost-share programs.
- Assist two to four producers to enroll into the Conservation Reserve Enhancement Program (CREP).
- Assist six landowners to enroll into USDA cost-share programs.
- Include implementation of the Area Plan in the Lincoln and Siuslaw SWCDs annual and long-range works plans.

4) Monitoring

- Staff from the Lincoln and Siuslaw SWCDs attend six meetings on TMDL development and water quality monitoring results.
- Provide documentation of workshops, tours, demonstration projects, presentations, etc. during the biennial review of the area plan to the LAC.
- Provide a summary of violations of prevention and control measures to the LAC at the biennial review of the Area Plan.
- Conduct monitoring to determine agricultural sources of pollution and identify trends in water quality in agricultural stream reaches.

4. Prevention and control measures

The focus of the Agricultural Water Quality Management Program is on voluntary and cooperative efforts by landowners, SWCDs, ODA, and others to protect water quality. However, the Agricultural Water Quality Management Act also provides for a regulatory backstop to ensure prevention and control of water pollution from agricultural sources in cases where landowners or operators refuse to correct problem conditions. Agricultural water quality management area plans serve as this backstop while allowing landowners flexibility in how they protect water quality. Area plans are goal-oriented and describe characteristics that should be achieved on agricultural lands, rather than practices that must be implemented.

In its advisory role to the ODA, the Mid Coast LAC developed area rules to protect water quality and prevent and control water pollution from agriculture. The LAC recognizes that every farm and situation is different, and recommends each situation be considered carefully when the rules are enforced.

In this section, there are five subsections organized by water quality concern: near-stream management areas, nutrients and bacteria, fine sediment, irrigation water management, and pesticides. Area rules are referenced in four of the sections. Area rules are listed multiple times in some subsections because several area rules relate to more than one water quality concern.

Each prevention and control measure relates directly to water quality concerns identified on the 303(d) list in the management area and in the Coastal Zone Reauthorization Amendments of 1990 (CZARA). The concerns addressed in these prevention and control measures are:

303(d) List parameters:

- Bacteria
- Temperature
- Nutrients
- Sedimentation
- Aquatic weeds or algae
- Dissolved oxygen
- Chlorophyll A
- pH

Coastal Zone Act Reauthorization Amendments Measures:

- Erosion and sediment control
- Wastewater and runoff from CAFOs
- Nutrient management
- Pesticide management
- Grazing management
- Irrigation water management

This Area Plan serves as a guidance document and as stated in the foreword, does not establish provisions for enforcement. The Rules developed with the LAC, OAR 603-095-2240(2) through 603-095-2240(6), are included in this document only as a reference for landowners. Each Area Rule has a border around it and appears in italics. The following, OAR 603-095-2240(1) gives some provisions that apply to the Rules that were developed with the LAC.

OAR 603-095-2240
(1) All landowners or operators conducting activities on lands in agricultural use shall comply with the following criteria. A landowner shall be responsible for only those conditions caused by activities conducted on land controlled by the landowner. A landowner is not responsible for violations of Prevention and Control Measures resulting from actions by another landowner. Conditions resulting from unusual weather events (equaling or exceeding a 25 year, 24-hour storm event) or other exceptional circumstances are not the responsibility of the landowner. Limited duration activities may be exempted from these conditions subject to prior approval by the department.

4.1. Prevention and control measure: Near-stream management areas

Issue

The purpose of this prevention and control measure is to provide the functions supported by riparian buffers. If riparian buffers are functioning properly, agricultural practices should not impact the water quality or beneficial uses. A properly functioning riparian buffer provides the water quality functions of shade to help maintain cool water temperatures, filtration of pollutants in runoff before they reach the stream, and protection against unhealthy levels of streambank erosion. In addition to these water quality functions, riparian buffers can provide sources of food and habitat for fish and wildlife.

A riparian buffer is an area next to a stream, which if functional, limits the negative interactions between the stream and managed uplands. Natural factors that may limit the establishment and protection of riparian zones include precipitation, soil types, stream channel morphology, upland topography, adjacent land uses, and current vegetative community including invasive plants. Also, the width of the riparian buffer zone

sufficient to provide the stated water quality functions will be site specific, and vary by soils, slope, adjacent land use, size of stream, and other site capability factors.

For many years, researchers have investigated factors that influence stream temperatures. Influences on stream temperature can include upland processes. Several authors emphasize the importance of water stored in the landscape and its importance in maintaining stream temperatures (Krueger et al, 1999; Moore and Miner, 1997; Naiman and Decamps, 1997). Clark (1998) explains that upland conditions strongly influence stream temperatures by affecting the infiltration of precipitation and the storage and release of water. Adequate ground cover in upland areas increases the likelihood of precipitation infiltrating into the soil profile and decreases the possibility of overland flow, soil loss, and resulting sediment delivery to streams. Other influences on stream temperature include stream channel width, stream depth, channel substrate, air temperature, and elevation (Bilby, 1984; Chen et al, 1998; Larson and Larson, 1996; Krueger et al, 1999; Ward, 1995).

In addition to the upland processes, the main issue that will affect agricultural landowners is streamside vegetation. Many studies highlight the significance of streamside shade in the maintenance of stream temperatures (Brown, 1969; Beschta, 1997; Johnson, 2004). Johnson (2004) specifically shows that maximum stream temperatures are significantly decreased with shade, but minimum temperatures were not affected by shade. Research suggests that shade from riparian vegetation can reduce instream peak temperatures. The LAC feels that supplementing existing riparian vegetation is a key method to provide water quality functions and recommends that landowners take a proactive approach to restoring riparian functions.

Riparian buffer zones in the Mid Coast area must provide the water quality functions of shade, streambank stability, and filtration of pollutants. The following should provide these functions:

- Complex vegetation structure and diverse species composition—The riparian area supports a diverse assortment of vegetation, such as grasses, sedges, shrubs, and deciduous and coniferous trees, appropriate to site capability, in two or more vertical layers. Riparian areas should be dominated by native species with a diverse age class distribution.
- Vegetation should cover approximately 90 percent of the soil surface, with less than 10% bare soil or impervious surfaces.
- Width—riparian buffer zone width should be sufficient to fulfill site-specific functions.
- Stream shading—riparian vegetation should shade 75 percent of a natural waterway where the water body is not too wide and when achievable in the summer.
- Streambank stability—streambanks should be stable without the use of riprap or other artificial structures when feasible. Streambank vegetation is comprised of those plants and plant communities that have root masses capable of withstanding 20 to 25 year storm events.

Maintenance and protection of healthy riparian buffer zones should always be incorporated into landowner's water quality planning. Landowner(s) may implement management practices within riparian buffer zones to establish and/or maintain streamside vegetation. If any activity degrades the riparian buffer zone, the landowner should replant or restore the disturbed area to a level, which in a reasonable amount of time will provide the required water quality functions.

Invasive weeds displace desired vegetation by creating monocultures, and they severely disrupt the proper structure and function of riparian and upland ecosystems. Invasive weeds generally provide less shade, filtering capacity, and stabilizing root mass than the native plants they replace. Invasive weed infestations tend to spread rapidly to adjacent lands in uplands, riparian areas, and flood zones. Once invasive weeds have invaded, control can be very problematic and expensive. Invasive weed management issues need to be addressed in the early stages of restoration and enhancement projects. Cooperative efforts among landowners and agencies are critical to the control of invasive weeds. For a list of weeds of concern see Appendix I.

This prevention and control measure does not prohibit grazing in riparian areas as long as riparian vegetation is allowed to establish and is not degraded by grazing practices. Grazing management should allow for recovery of plants and leave adequate vegetation to ensure streambank stability, reduce sediment or other pollutants from entering the stream and provide streamside shading consistent with the vegetative capability of the site. This area plan does not prescribe specific practices to landowners for management of riparian buffer zones. For guidance on management activities that promote the growth and establishment of riparian vegetation, please consult Section 5.1 or contact information for local resources can be found in Appendix G.

The CREP is a state-federal partnership that provides a modest rental payment and substantial cost share to encourage protection of riparian areas on agricultural lands. Participation in this program would ultimately provide a healthy riparian buffer zone. Landowners are encouraged to contact the local SWCD or USDA NRCS office for more information.

Area Rule

OAR 603-095-2240
(2) Near-Stream management areas. Effective January 1, 2005:
(a) Agricultural activities must allow for the establishment and development of riparian vegetation consistent with site capability. Vegetation must be sufficient to provide the following riparian functions: shade, streambank integrity during stream flows following a 25-year storm event, and filtration of nutrients and sediment.
(b) Exemptions:
(A) Levees and dikes are exempt from OAR 603-095-2240(2)(a) except for areas on the river-side of these structures that are not part of the structures and that can be vegetated without violating U.S. Army Corps of Engineers vegetation standards.
(B) Drainage areas where the only connection to other waterbodies is through pumps shall be exempt from OAR 603-095-2240(2)(a).
(C) Access to natural waterways for stream crossings and livestock watering are allowed provided OAR 603-095-2240(2)(a) is met.
(D) Legally constructed drainage and irrigation ditches as defined in Division of State Lands Rules and ditches subject to Division of State Lands fill-removal laws are exempt from OAR 603-095-2240(2).

This Rule specifies that "agricultural activities" must allow for riparian vegetation to begin establishing and developing by 2005. For guidance on management activities that promote the growth and establishment of riparian vegetation, please consult Section 5.1, page 39. Landowners are not responsible for the impacts of browsing activities of elk, geese, beaver, or other wildlife.

Definitions

> **Riparian vegetation** – 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))
>
> **Site capability** - The vegetation and ecological status that an area is capable of producing/attaining; given political, social, or economic constraints, that are often referred to as limiting factors. For more information, please see Appendix H.

Site capability and site potential—Streamside vegetation generally affects water quality. The primary water quality-related functions provided by streamside vegetation are shade, bank stability, filtration of sediment and nutrients, and infiltration of runoff water. Absent of human influence, different riparian sites have varying abilities to support these functions. This ability is referred to as **site potential**, or the highest ecological status an area can attain. The site potential is influenced by physical and biological factors, such as elevation, aspect, geology, climate, and the current plant community. It is also influenced by disturbances found in riparian systems, such as flooding, and the complex variation of these disturbances.

Site conditions that affect the establishment and development of streamside vegetation are further modified by human infrastructure, such as roads, power and telephone lines, and irrigation and drainage systems. When infrastructure limits a site's ability to achieve or maintain its vegetative potential, the resulting condition is called the **site capability**. This capability determines what can be expected in terms of vegetation, such as the types of bank-stabilizing shrub species, and the functions the site can provide.

Note: In areas where maintenance of irrigation and drainage systems is legal and necessary, care should be taken to allow vegetation to grow that is compatible with maintenance activities (i.e. leaving gaps in woody vegetation to allow access of machinery is okay. It would be expected that the maintenance activities comply with the Area Plan and Rules).

For an example related to site capability see appendix H.

303(d) parameters addressed by this prevention and control measure

Temperature, nutrients, bacteria, dissolved oxygen, aquatic weeds or algae.

CZARA measures addressed by this prevention and control measure

Erosion and sediment control, nutrient management, grazing management.

4.2. Prevention and control measures: Nutrients and bacteria

Issue

Application of nutrients can be a necessary and highly beneficial agricultural activity. Improper application of nutrients, however, can be expensive and harmful to water quality. For example, applying fertilizer, manure, bio-solids, seafood waste, or other forms of nutrients immediately before rain events, without regular soil testing, or in excess can run-off and cause undesirable algae growth, increased pH, and imbalances in dissolved oxygen levels.

Animal and human wastes are a potential source for many diseases (Terrell and Perfetti, 1989). The most commonly used indicator of biologic pollution in a waterbody, the organism *Escherichia coli* (*E. coli*), is a member of a group of fecal coliform bacteria. These bacteria reside in the intestines of warm-blooded animals, including humans, livestock, and wild birds and mammals. The presence of *E. coli* alone does not confirm the contamination of waters by pathogens, but it can indicate contamination by sewage or animal manure and the potential for health risks.

Sources of *E. coli* include discharge from wastewater treatment plants, leakage from failing septic systems, runoff of domestic animal manure from agricultural lands, yards, and other facilities, and runoff of manure from wild animals such as geese and elk.

Numerous factors influence the nature and amount of bacteria that reach waterways. Some of these factors are climate, topography, soil types and infiltration rates, and animal species and animal health.

When bacteria reach a waterway, they may settle into sediments in a streambed and can live there for an extended period of time. If sediments are disturbed by increased stream turbulence following a runoff event, human or animal traffic, or other means, sediment-bound bacteria may be re-suspended into the water column (Sherer et al 1992). Sediment disturbance likely accounts for erratic bacteria levels typically measured in water quality monitoring programs.

Oregon's water quality standard for bacteria was established to protect the most sensitive beneficial use affected by bacteria levels, which is water contact recreation. In addition, there is a water quality standard for fecal coliform that was established to protect shellfish growing. Appendix B includes information about areas that are on the 303(d) list for violating the bacteria standard for both *E. coli* and fecal coliform. Appendix C provides more details related to the water quality standards and the affected beneficial uses.

Livestock manure is a potential source of bacteria and is also a potential source of nutrients and vegetative material. If stored properly and applied at agronomic rates, manure can be a beneficial source of nitrogen and phosphorus, as well as organic matter (Mikkelsen and Gilliam, 1995). Nothing in this prevention and control measure is intended to discourage the use of manure or other amendments; rather, it seeks to ensure that they are applied correctly. Also, this prevention and control measure is not intended to hold landowners responsible for water quality problems beyond their control, such as runoff of wildlife or wildfowl manure from agricultural lands into waterways.

This prevention and control measure does not prohibit grazing in riparian areas. As long as grazing is conducted at appropriate times of year, stocking rates, duration, and intensity, and in compliance with the riparian prevention and control measure, it should not violate this prevention and control measure. However, unlimited or concentrated livestock access to streams resulting in waste accumulations may lead to violations. In addition, winter-feeding areas should be managed to limit access and impacts to streams. Management practices, such as filter strips, should be used to minimize run-off. The LAC recognizes that there may be seasonally high levels of nutrients and bacteria, such as during the first rains in the fall, when the nutrients and bacteria flush from the uplands into the streams. These spikes may be caused by fecal material from wildlife or agricultural sources. Visual indicators that may determine if a landowner is responsible for a violation include the following: presence of livestock with unlimited access to the stream, lack of groundcover vegetation, location of heavy use areas in proximity to waters of the state, and manure deposits or piles in locations that are likely to flow into waters of the state.

Landowners with livestock should be aware that rules for CAFO might apply to their facilities if they confine animals for part of the year. Under state rules, these are

operations that confine animals for more than 45 days per year and have a wastewater treatment facility. For more information, please contact the ODA or the CAFO website http://www.oregon.gov/ODA/NRD/cafo_front.shtml.

Senate Bill 502 was passed in 1995, authorizing ODA as the 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 Environmental Quality Commission's water quality standards."

To implement Senate Bill 502, ODA incorporated ORS 468B.025 and 468B.050 into all of the agricultural water quality management area plans in the state. The following prevention and control measure references ORS 468B.025 and 468B.050. ORS 468B.025 is existing statute 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.

Two Area Rules are referenced below because both relate to nutrient and bacteria levels in streams and rivers. The OAR 603-095-2240(3) relates specifically to nutrient applications, and the OAR 603-095-2240(4) references a statute that applies to wastes, which can include nutrients and bacteria.

Area Rules

OAR 603-095-2240
(3) Effective on rule adoption, landowners or operators shall prevent nutrient applications that cause pollution to waters of the state.

OAR 603-095-2240
(4) Effective on rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

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 CAFOs and are operations that confine animals on prepared surfaces to support animals in wet weather, have wastewater treatment works, discharge any wastes into waters of the state, or meet the federal definition of a CAFO (40 CFR § 122.23). Permitted facilities are inspected regularly by the ODA.

Definitions

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

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, that will or tends to, either by itself or in connection with any other substance, create a public nuisance or that 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.

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 that will or can cause pollution or tend to cause pollution of any waters of the state (waste includes manure).

303(d) parameters addressed by this measure

Nutrients, aquatic weeds or algae, chlorophyll a, dissolved oxygen, toxics, sediment, turbidity, and bacteria.

CZARA measures addressed by this measure

Nutrient management, wastewater, and runoff from CAFOs.

A recently developed method for identifying sources of microbial pollution is called Microbial Source Tracking (MST). MST attempts to identify sources of microbial pollution by distinguishing DNA patterns of *E. coli* that live in specific animals. Though fecal coliform bacteria found in animal species are very similar genetically, there are

differences among members of the same species because they are thought to adapt to the different intestinal environments of host species.

The few DNA studies in Oregon have shown a wide range of species with *E. coli* detections identified. Due to the expense of MST and the wide range of results, it is often more cost effective to identify bacterial sources by observing whether livestock impact areas near streams, dye-testing suspected failing septic systems, and using traditional bacteria monitoring to identify "hot spots" of bacterial contamination.

4.3. Prevention and control measure: Fine sediment

Issue

Erosion is a natural process, but agricultural activities can accelerate it or slow it down. Excessive erosion can result in fine sediment runoff to waters of the state, affecting stream channel substrate, stream width, stream sediment levels, and nutrient levels. Excess fine sediment can also negatively impact stream temperature and dissolved oxygen.

Proper erosion control from agricultural activities retains important soil resources on the farm and minimizes the opportunity for excess fine sediment to enter waterways. Normal or natural levels of fine sediment are vital for aquatic systems and proper river functions. However, excess fine sediment levels are harmful to humans and fish. Agricultural erosion control protects drinking water quality and reduces water treatment costs. Stream bottoms are protected from fine sediment that can fill streambed gravel, prevent fish from spawning, and suffocate eggs. Excessive levels of fine sediment may also clog fish gills.

In addition to the concern of erosion of fine sediments there is concern with contaminants that bind with soil particles and run-off with the soil. Contaminants of concern include phosphorus, toxics, metals, and pesticides. Erosion control practices should also limit contaminant runoff. There are many lakes in the management area, and high phosphorus levels in the lakes contribute to algal blooms. There are many potential sources of the phosphorus, but the impacts from agricultural activities can be minimized through proper stocking rates, correct application rates of fertilizers, and filter strips.

This prevention and control measure addresses soil erosion from upland areas, while prevention and control measure 4.1, near-stream management areas, addresses soil erosion in riparian areas. Nothing in this prevention and control measure is intended to prevent or discourage water bars, a stormwater diversion practice that frequently provides water quality benefits by dissipating energy and providing filtration.

Area Rule

OAR 603-095-2240
(5) Erosion and Sediment Control:
(a) Effective January 1, 2004, agricultural activities will not cause the following visual indicators of erosion where erosion can cause sediment runoff into waters of the state:
(A) Sheet erosion, noted by visible pedestalling, surface undulations, and/or flute marks on bare or sparsely vegetated ground;
(B) Visible active gullies;
(C) Multiple rills, which have the form of gullies, but are smaller in cross-sectional area than one square foot.
(b) *This prevention and control measure applies to farm roads and staging areas, pastures, cropland, and other areas where agricultural activities occur.*

This Rule specifies that "agricultural activities" must prevent sheet wash, gullies, or multiple rills. Landowners are not responsible for the impacts of browsing activities of elk, geese, beaver, or other wildlife.

Definitions

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

Rill erosion – 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))

Sediment – 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))

Sheet erosion – means the removal of a fairly uniform layer of soil from the land surface by runoff water. (OAR 603-095-0010(15))

303(d) parameters addressed by this measure

Sedimentation, nutrients, aquatic weeds or algae, dissolved oxygen.

CZARA measures addressed by this measure

Erosion and sediment control, irrigation water management.

4.4. Prevention and control measure: Irrigation water management

Issue

Irrigation water runoff has not been specifically identified as a contributing factor for the 303(d) listing of Mid Coast area waters for nutrients or sedimentation. Most irrigation in the Mid Coast occurs with sprinklers. Growers should be aware, however, that over-application of irrigation water could result in transport of nutrients, sediment, and/or manure to waters of the state. Three Area Rules are referenced in this section. OAR 603-095-2240(6) relates directly to irrigation water return flow. OAR 603-095-2240(3) and (5), which relate to runoff of nutrients and sediment, are included in this section to remind readers that irrigation return flow can cause erosion and runoff of sediment and nutrients to rivers and streams.

Area Rules

OAR 603-095-2240
(6) By January 1, 2003, landowners must prevent pollution from irrigation return flow to waters of the state.

OAR 603-095-2240
(3) Effective upon rule adoption, landowners or operators shall prevent nutrient applications that cause pollution to waters of the state.

OAR 603-095-2240
(5) Erosion and Sediment Control:
(c) Effective January 1, 2004, agricultural activities will not cause the following visual indicators of erosion where erosion can cause sediment runoff into waters of the state:
(A) Sheet erosion, noted by visible pedestalling, surface undulations, and/or flute marks on bare or sparsely vegetated ground;
(D) Visible active gullies;
(E) Multiple rills, which have the form of gullies, but are smaller in cross-sectional area than one foot.
(d) *This prevention and control measure applies to farm roads and staging areas, pastures, cropland, and other areas where agricultural activities occur.*

303(d) parameters addressed by this measure

Sediment, nutrients, bacteria, chlorophyll a, aquatic weeds, or algae.

CZARA parameters addressed by this measure

Irrigation water management, erosion and sediment control, nutrient management.

4.6. Pesticides

Issue

Properly used, pesticides can be a very important component of a pest management program. If pesticides are not applied according to the label, they can be transported to waters of the state. Oregon law requires that pesticides be applied according to the label. Growers should closely time pesticide applications with weather forecasts. Unfortunately, even when the label is followed and pesticides are applied legally there is still potential for run-off.

Growers should also be aware that a court decision mandated application buffers or "no spray zones" along riparian areas for certain pesticides while the effects of these pesticides to threatened and endangered fish species are evaluated.

For a current list of pesticides affected by the court order, maps of Oregon regions where the buffers apply, and to receive email updates relating to the decision, please visit the ODA Pesticide Division's website at http://www.oregon.gov/ODA/PEST/buffers.shtml.

Area rule

There are no new rules associated with this measure. Excerpts from existing Oregon pesticide law are in Appendix D.

303(d) parameters addressed by this measure

Toxics

CZARA parameters addressed by this measure

Pesticide management

5. Menu of optional management practices

Landowners are neither required to cease a specific practice nor implement a particular practice by the area plan or rules. The following tables are intended as suggestions for landowners who want ideas on how to meet area plans and generally maintain and enhance natural resources on their property. The tables provide some idea of the water quality benefits of each practice as well as potential costs and benefits to landowners. The tables are organized by resource, such as nutrients and manure.

The information in the tables below is probably not enough for someone who wants to know exactly how to implement an optional management practice on their property for a specific purpose. For more information, please consult one of the agencies or organizations listed in Appendix G, sources of information and technical assistance, or one of the publications listed in the references section.

Note: There is cost-share and other forms of funding available for many of the optional practices that can significantly offset the costs to the producer. Some of the practices that funding is available for include fencing, off-stream water, hardened crossings, supplemental planting of riparian vegetation, and control of invasive vegetation. For a list of funding programs see Appendix F.

5.1. Riparian areas and streams

(Adams, 1994; Chaney, Elmore and Platts, 1993; Godwin and Rogers, 1998; Guard, 1995; Natural Resources Conservation Service, 1999; Pojar and MacKinnon, 1994; Rogers and Stephenson, 1998)

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Rotational grazing in riparian area; timed when growth is palatable to animals, appropriate for particular livestock species, and when riparian areas are not saturated. (Adams, 1994; Chaney, Elmore, and Platts, 1993, Rogers and Stephenson, 1998)	Helps establish desirable riparian vegetation, providing shade and helping prevent temperature problems; helps filter nutrients and sediment from runoff; can help reestablish historical channel morphology and flow patterns.	Allows limited use of riparian area for grazing; helps control weeds such as Himalayan blackberry. Can have a positive impact on the health of livestock.	Can require financial investment for riparian fencing and off-stream watering facilities. Requires time investment to manage riparian grazing.

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Livestock exclusion from riparian area; establish off-stream watering facilities. (Natural Resources Conservation Service, 1997g and 1997h)	Helps establish desirable riparian vegetation; filter nutrients and sediment from runoff; can help reestablish historical channel morphology and flow patterns.	Less time involved in managing livestock grazing in riparian area. Landowners can be eligible for cost sharing for fencing, weed control, and establishing native vegetation.	Can require higher weed control costs than seasonal riparian grazing. Cost of riparian fencing and off-stream watering facilities. Loss of use of riparian pastures.
Plant vegetation in riparian area such as Douglas fir, red osier dogwood, alder, or other species. (Guard, 1995; Massengill, 2003; Pojar and MacKinnon, 1994)	Helps establish riparian vegetation rapidly; helps filter sediment and nutrients from runoff; can help reestablish historical channel morphology and flow patterns.	Can lessen streambank erosion and sloughing of pastures. If livestock are excluded from riparian area, area can be eligible for federal cost-share programs.	Costs of vegetation and weed control, as well as controls for beaver, elk, deer, and/or mice. Cost of riparian fencing and off-stream watering facilities while vegetation establishes.
In-stream structures such as logjams, logs anchored with rocks, or rock structures. (Oregon Department of Forestry and Oregon Department of Fish and Wildlife, 1995)	Provide fish habitat; also can provide water quality benefits.	Producers can be eligible for federal and state cost-share programs (must apply prior to designing or completing projects).	Costs of installing structures, permits. If improperly installed, can cause damage.
Plant native riparian vegetation that is compatible with maintenance of stream channels. (when necessary and legal)	Helps to establish riparian vegetation that will provide shade, filter out pollutants, and stabilize the streambanks.	Vegetation is established in a manner that permits channel maintenance activities when necessary.	The vegetation that establishes will need to be maintained to allow access of equipment for channel maintenance.
Plant ground cover in areas with bare ground.	Helps prevent erosion of soil into streams.	Can reduce weed problems and stabilize soil.	Cost of seed.

5.2. Nutrient and manure management

(Gamroth and Moore, 1996; Godwin and Moore, 1997; Ko, 1999; Lundin, 1996, Marx, Hart, and Stevens, 1999; Moore and Willrich, 1993; Natural Resources Conservation Service, 1997; Waskom, 1994)

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Apply nutrients and manure according to soil test results and Oregon State University recommendations. Test manure, compost, or other materials for nutrient content and applying according to crop nutrient needs. (Hart, Pirelli, and Cannon, 1995; Marx, Hart, and Stevens, 1999; Natural Resources Conservation Service, 1997i; Sullivan, 1998; Waskom, 1994)	Helps prevent nutrient and bacteria runoff into waters of the state, including surface water and groundwater.	Can help reduce fertilizer costs; ensures that plants receive needed nutrients for growth; makes plants more competitive against weeds.	Costs and time associated with the testing; potential costs of disposing of excess manure if operation land base cannot accommodate all manure.
Store manure under a tarp or roof; preferably on an impervious surface such as concrete. (Gamroth and Moore, 1996; Godwin and Moore, 1997; Moore and Willrich, 1993)	Helps prevent nutrient and bacteria runoff into waters of the state, including surface water and groundwater.	Prevents nutrient leaching so manure applied on crops or pasture has higher nutrient content; can save slightly on fertilizer costs; producers wishing to construct storage facilities can apply for federal and state cost-share programs.	Cost of constructing manure storage facilities.

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
For horse, goat, llama, or sheep operations with low animal numbers: establish sacrifice areas during the winter and cover with thick layer of sand. Clean manure regularly from sacrifice area. (Natural Resources Conservation Service, 1997d)	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	Protects pastures from compaction during the winter, improving plant health and growth. Can improve animal health because animals are not wading in mud. Can help prevent animal health problems such as scratches, hoof or foot rot, and worms.	Cost of fencing sacrifice area; cost of feeding hay during the winter; cost of materials for protecting sacrifice area.
Limit livestock access to pastures when soils are saturated. (Ko, 1999; Lundin, 1996)	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	Protects pastures from compaction during the winter, improving plant health and growth. Can improve animal health because animals are not wading in mud. Can help prevent animal health problems such as scratches, hoof or foot rot, and worms.	Cost of supplemental feed.
Cover heavily used animal walkways with sand (not beach sand), rock, and/or geotextile. (Natural Resources Conservation Service, 1997c)	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	Can improve animal health because animals are not wading in mud. Can help prevent animal health problems such as scratches, hoof or foot rot, and worms.	Cost of rock and other materials. Owners should be aware that feeding equine species on sand could result in sand colic.

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Site barns and sacrifice areas away from streams. If this is not possible, or if barn is already constructed, try to leave vegetative buffer between buildings/sacrifice areas and waterways. (Godwin and Moore, 1997)	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	Helps prevent flooding in barns and sacrifice areas.	Need either off-stream watering facility or other source of water for livestock.
Store and manage leachate from silage and other vegetative materials. (Bruneau, Hodges, and Lucas, 1995; Feise, Adams, and LaSpina, 1993)	Helps prevent nutrient runoff into waters of the state.	Less rot problems in silage; higher nutrient value in silage.	Costs of storage facility, wrapping or other means of storage.
Dispose of dead animals properly. Do not leave animal carcasses within a quarter mile of any running stream. Bury animals to depth where no part of the carcass is nearer than 4 feet to ground surface. (ORS 601.090(6) and (7))	Helps prevent runoff of nutrients and bacteria into waters of the state.	Keeps landowners in compliance with existing laws.	

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Install gutters and downspouts in areas with high livestock use. Connect downspout water to drainage system or, if possible, route clean downspout water to a location where it can soak into the ground. (Natural Resources Conservation Service, 1997f)	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	Can improve animal health by lessening mud during the winter, so animals are not wading in mud. Landowners can be eligible for federal and state cost-share programs.	Cost of installing and maintaining gutters and downspouts.
Install/maintain diversions or French drains to prevent upslope drainage into barnyards and sacrifice areas. (Natural Resources Conservation Service, 1997e)	Helps prevent nutrient runoff into waters of the state.	Lessen mud problems and shortens saturation period in protected areas. Landowners can be eligible for federal and state cost sharing programs.	Cost of installation.

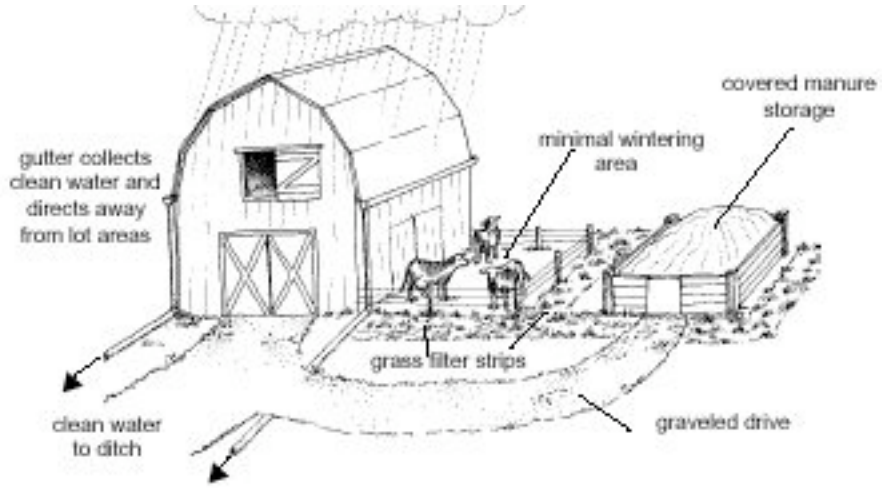


Figure 2. Mud and manure management practices on small acreage operations (Godwin and Moore, 1997)

5.3. Erosion and sediment control

(Hansen and Trimmer, 1997; Ko, 1999; Natural Resources Conservation Service, 1997; Trimmer and Hansen, 1994)

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Grazing management: graze pasture plants to appropriate heights, rotate animals between several pastures; provide access to water in each pasture. (Ko, 1999; Lundin, 1996; Hirschi, 1997)	Helps prevent sediment, nutrient, and bacteria runoff into waters of the state. Helps protect streamside areas.	Can improve pasture production; easy access to water can increase livestock production as well. Rotational grazing period provides for rest and re-growth period for pasture plants. Can improve pasture plant community and help prevent weed problems.	Cost of installing fencing, watering facilities for rotational grazing system; time involved in moving animals through pastures.
Install water bars to divert runoff to roadside ditches, construct fords appropriately. (Binn, 1998; US Forest Service, 1998)	Helps prevent sediment runoff to waters of the state.	Can help prevent water damage on farm roads.	Cost of additional earthmoving associated with installing water bars.
Plant or maintain appropriate vegetation along drainage ditches; seed bare ditches following construction or maintenance activities. (Natural Resources Conservation Service, 1997a)	Helps prevent sediment runoff into waters of the state.	Can help prevent ditch bank erosion and slumping.	Costs of establishing vegetation.

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Plant cover crops in orchards or nurseries. (Natural Resources Conservation Service, 1997b; Hirschi, 1997)	Helps prevent sediment runoff into waters of the state; helps filter nutrients and slow runoff.	Can reduce weed problems in orchards and nurseries; prevents runoff of applied fertilizer.	Costs of establishing cover crops; cover crops can compete with primary crop; can interfere with harvesting of some crops such as hazelnuts.
In orchards where canopy closure or harvesting methods prevent planting cover crops, install water bars or small ditches perpendicular to slope to convey water off the orchard. (McDonald, 2001)	Helps prevent gullying and sediment runoff.	Helps prevent loss of soil and fertilizers. If filberts are cleared from areas around ditches or bars, headers on harvesting equipment can be lifted while crossing ditches, preventing equipment damage.	Requires small time investment to blow filberts away from ditches before windrowing; also requires time investment to maintain small ditches or water bars every year.
In orchards where canopy closure or harvesting methods prevent planting cover crops, apply straw mulch to soil after harvest and lightly till in mulch. (McDonald, 2001)	Helps prevent erosion and sediment in runoff; encourages infiltration of water into the soil.	Straw mulch adds organic matter to soil and helps prevent loss of soils and fertilizers.	Costs and time of applying and tilling in straw. This practice would not be very effective on steep slopes.

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Irrigate pasture or crops according to soil moisture and plant water needs. Monitor soil moisture by feeling soil for moisture content, installing gypsum blocks or tensiometers, or other monitoring method. (Hansen and Trimmer, 1997; Trimmer and Hansen, 1994)	Helps prevent irrigation return flow and associated nutrients and sediment to waters of the state.	Can reduce costs of irrigation water; can help crop or pasture production.	Costs and time of monitoring soil moisture – depends on type of soil moisture monitoring.
In areas where gullies repeatedly appear, install underground outlet or grassed waterway to capture and convey water. (Natural Resources Conservation Service, 1997j and k; Hirschi, 1997)	Prevents gully erosion and sediment runoff to waters of the state.	Prevents loss of soil and fertilizers, lessens inconvenience of driving equipment over gullies.	For underground outlets, costs of installing inlets and plastic pipe, for grassed waterways, costs of installation, seeding, weed control, and any land put out of production.

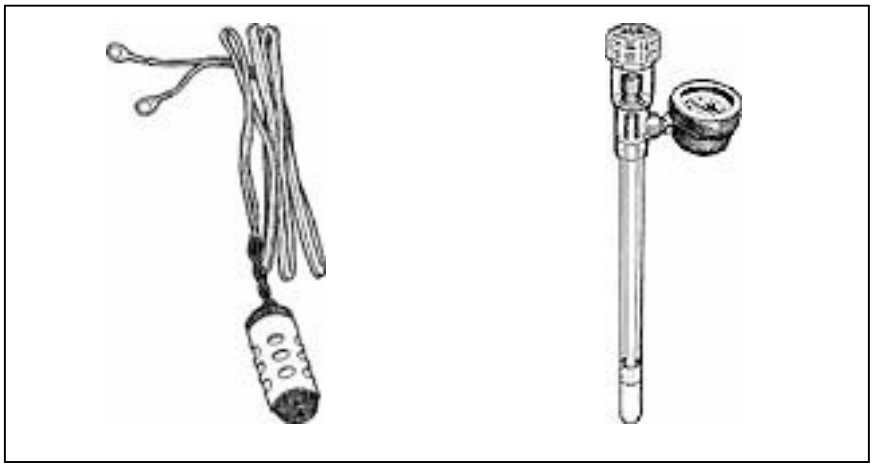


Figure 3. Tensiometer (right), and gypsum block (left), two instruments for monitoring soil moisture levels and scheduling irrigation.

5.4. Management of pesticides and other chemicals

(Kerle, Jenkins, and Vogue, 1996; Hirschi et al 1997)

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Apply pesticides and herbicides according to the label. Use the correct rate and timing. Comply with label restrictions and precautions.	Reduces risk of pesticide runoff to streams or other water resources.	Compliance with federal and Oregon law; reduces health risks to applicator. Applying at label-recommended rate also saves money.	
Triple rinse pesticide application equipment. Apply rinsates to sites. Dispose of or recycle clean containers according to Oregon Law.	Reduces risk of pesticide runoff to streams.	Dilutes pesticide residues; correct disposal of rinsate ensures compliance with federal and Oregon law. Eliminates disposal costs of collected rinsates identified as hazardous waste.	Triple rinsing creates more volume that must be disposed of.
Calibrate, maintain, and correctly operate application equipment. (Hirschi, 1997)	Reduces risk of pesticide runoff to streams.	Can reduce use and therefore cost of pesticides; reduces health risks to applicator.	
Integrated pest management practices such as pheromone traps, beneficial insect release, and field monitoring. (In combination with pesticide use or as a replacement to pesticide use) (Hirschi, 1997)	Reduces risk of pesticide runoff to streams.	Can improve effectiveness of pest control system.	Time involved to scout fields is usually offset by reduced or more effective pesticide use.

Practice	Water Quality Issues Addressed/ Benefited	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
Store and mix pesticides on leak-proof facilities. (Hirschi, 1997)	Reduces risk of pesticide runoff to streams or soil contamination.	Helps protect drinking water; reduces health risks to applicator.	
Store petroleum products such as fuel and oil in leak-proof containers and facilities; clean up spills of petroleum products properly. (Hirschi, 1997)	Reduces risk of runoff of petroleum products to streams or soil contamination.	Helps protect drinking water, reduces health risks to landowner or operator.	

5.5. Voluntary conservation plans

Landowners can choose to develop an individual voluntary conservation plan to meet their conservation and production goals, and address natural resource issues, but are not required to do so. A conservation plan is a system of management practices that a landowner decides to implement over several years. The plan is tailored to meet the landowner's needs and address specific resource concerns on the property. In addition to meeting the landowners needs, if the plan is implemented it should address water quality concerns.

Landowners who wish to develop a voluntary conservation plan are encouraged to contact the Lincoln or Siuslaw SWCD, or the local NRCS office.

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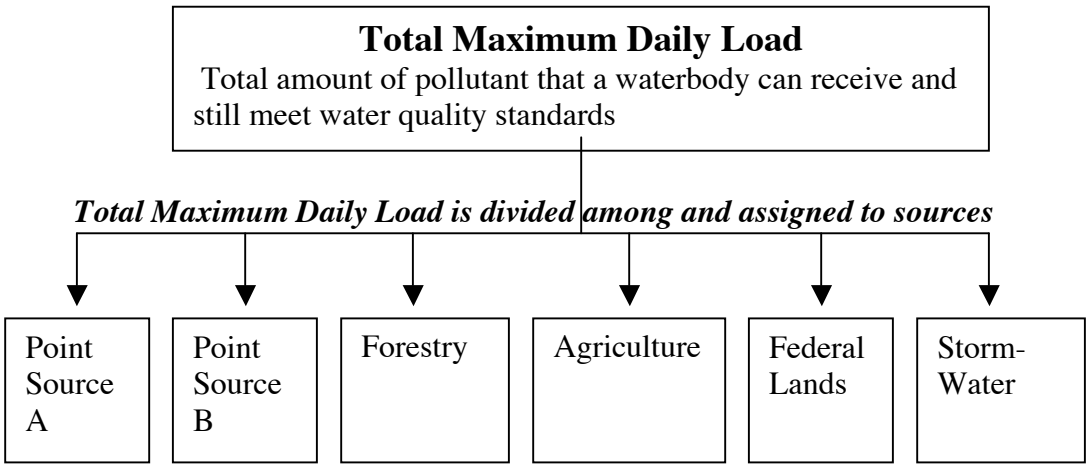
6. Administrative roles and responsibilities

6.1. Total Maximum Daily Loads

The DEQ, in accordance with the Federal Clean Water Act, is required to establish TMDLs for waterbodies on the 303(d) list. The 303(d) list consists of streams that violate state water quality standards. TMDLs will identify the maximum amount (load) of each pollutant Mid Coast waterbodies can absorb and still meet state water quality standards. Once a TMDL is established for a particular pollutant, each source of pollution in the area will be assigned a portion of that load (Figure 4). The TMDLs will be completed for the Mid Coast in approximately 2010.

Each designated management agency will develop or modify pollution control plans and programs designed to achieve their load. The Mid Coast Agricultural Water Quality Management Area Plan (Area Plan) and Rules seeks to satisfy agriculture's load in the TMDLs for the Mid Coast. Once TMDLs are developed for the Mid Coast, ODA and DEQ will review the Area Plan and Rules to make sure they satisfy agriculture's loads in the TMDLs. If necessary, ODA will work with the LAC and the SWCDs to make changes to the plan and rules during the next biennial review process (section 7.4) after the TMDLs are complete. This coordination process is intended to provide a single set of water quality goals and rules for agriculture in the Mid Coast and avoid duplication between the Area Plan and Rules and TMDLs.

Figure 4. Each source of pollution in a waterbody is assigned a load in the TMDL for that waterbody.



6.2. Designated management agency/local management agency

The ODA is the "designated management agency" for addressing agricultural water quality issues in the Mid Coast. In turn, through Memoranda of Agreement (MOA), ODA designated the Lincoln and Siuslaw SWCDs as local management agencies to assist with the development and implementation of the Area Plan.

During the Area Plan and Rules development process, the SWCDs provided support to the LAC, conducted outreach and education about the Area Plan and Rules development process, and provided technical assistance to landowners in the Mid Coast area who requested assistance addressing water quality and other natural resource issues on their property.

During implementation of the Area Plan and Rules, Lincoln and Siuslaw SWCDs, the NRCS, and other partners are available to assist landowners in evaluating effective water quality improvement practices as resources allow. Implementation priorities will be established and reviewed regularly through annual work plans developed by the SWCDs and MOA with ODA, with input from partner agencies. These priorities are incorporated into the Area Plan through the strategies and targets outlined in Section 3.

ODA and the SWCDs will provide information to individual landowners and interested groups on an ongoing basis.

6.3. Resolution of complaints and enforcement Action

ODA will investigate complaints against landowners or occupiers who are reported to be out of compliance with OAR 603-095-2200 through 603-095-2260. The complaint must relate to a specific site and contain a thorough description of the problem. Department staff can also initiate an inspection if they directly observe violations of conditions or measures outlined in the area plans adopted to implement an area plan, or if they are alerted to a violation by another agency.

Before conducting a complaint investigation, ODA will make every attempt to establish contact with the operator to schedule a site visit.

ODA will use professional judgment to determine if a violation of a condition exists. Based on this determination, appropriate action will be taken by ODA to assure that the condition is remedied.

ODA will use enforcement mechanisms where appropriate and necessary to gain compliance with the conditions. Any enforcement action will be pursued only when reasonable attempts at voluntary solutions have failed.

A landowner or operator shall be responsible for only those conditions caused by activities conducted on land managed by the landowner or occupier. Criteria do not

apply to conditions resulting from unusual weather events or other exceptional circumstances that could not have been reasonably anticipated, such as fire, natural disaster, or other extreme weather conditions. ODA recognizes that every farm and situation is different and will take into account each individual situation when enforcing the rules. For example, historical conditions and invasive species presence may be factors in determining if a landowner is in compliance. If current agricultural management practices do not appear to contribute to impaired conditions, then the landowner may be in compliance.

For more detailed information on complaints and enforcement procedures, please refer to the most recent version of the Agricultural Water Quality Management Program Enforcement Compliance Process and Procedures booklet, available from the ODA.

6.4. Plan evaluation and modification

ODA, and as resources allow, the Lincoln and Siuslaw SWCDs, will evaluate the effectiveness of the Area Plan in improving water quality and land conditions. Information considered in the evaluation will include, but not be limited to: water quality monitoring data collected by the DEQ, area watershed councils, and other agencies and organizations monitoring Mid Coast water quality; and results of visual compliance surveys of agricultural lands conducted by the ODA (these surveys are for information purposes only and do not result in enforcement). An additional method that may be utilized includes random surveys of Mid Coast landowners to determine awareness of water quality issues. Results of effectiveness evaluations may be presented to the LAC on an annual basis and during the biennial review of the Area Plan and Rules.

Approximately every two years the LAC will meet to review and update the Area Plan and Rules. Based on the results of the effectiveness evaluation of the Mid Coast Area Plan and Rules, as well as any additional water quality concerns identified in the Mid Coast area, the LAC, the Lincoln and Siuslaw SWCDs, and ODA in consultation with the State Board of Agriculture will consider making appropriate modifications to the Mid Coast Area Plan and Rules.

The LAC met on March 25th and May 20th, 2008, to review the Area Plan and Rules. At these meetings the LAC approved updates to the Area Plan with the understanding that a full review of the Area Plan and Rules would be initiated, starting in July of 2008. From July of 2008 to March of 2009 the LAC met monthly to revise and update the Area Plan.

7. Public participation

ODA, the Lincoln and Siuslaw SWCDs, LAC members, area watershed councils, and other partners solicited community participation before and during the development of the initial Mid Coast Agricultural Water Quality Management Area Plan and Rules. Each SWCD held an information session in March 2000 to inform the public about the Area Plan and Rules development process, and encourage community members to participate on the LAC. The SWCDs prepared press releases and newsletter articles about the LAC recruitment, and also announced the process at local watershed council meetings.

During the Area Plan and Rules development process, interested members of the public received announcements of all LAC meetings. Meetings were publicized in local newspapers and on local radio stations, and ODA and SWCD staff provided updates on the process to local watershed councils. Members of the public were encouraged to attend meetings and comment on the process during the public comment period.

Prior to the public comment period, Lincoln and Siuslaw SWCDs, the LAC, and ODA presented the draft Area Plan and Rules to the public through newspaper and newsletter articles; public information meetings in Harlan, Siletz, Alsea, Yachats, Blachly, Mapleton, and Westlake; presentations to watershed councils, county commissioners, and other groups; direct mailings; and fliers in community and farm stores. The draft Area Plan and Rules were available on ODA's website, and were also mailed to interested parties throughout the Mid Coast.

In April and May 2002, ODA conducted a public comment period on the draft Area Plan and Rules, which included two public hearings in Newport and Florence. After the public comment period, the LAC met again to discuss the comments with ODA and determine how to address the comments in the final Area Plan and Rules.

Following Area Plan and Rules adoption, ODA, the SWCDs, LAC members, and other partners continued to conduct outreach and education to the public and especially to agricultural producers. Each SWCD hosted several meetings and workshops during 2003, included articles about water quality improvement practices in their newsletters. LAC members distributed copies of the Area Plan and Rules to their neighbors and provided information to local groups. Both SWCDs have ongoing outreach programs that are used to promote best management practices and improve water quality in the Management Area.

The LAC, both SWCDs, and ODA met in 2004 and again in 2008 to review and update the Area Plan and Rules. The reviews were also publicized through local media.

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Note: For copies of these publications, check with your local SWCD, watershed council, or OSU Extension office. Many of these publications are also available on the Internet.

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Appendices

A. Anadromous Fish Habitat Use, Distribution, and Status*, Mid Coast Basin
B. 2004/2006 Section 303(d) List and Decision Matrix, Mid Coast Basin
C. 303(d) List Parameters and Impacted Beneficial Uses
D. Pesticide Use in Oregon
E. Pollution Prevention and Control Program for Oregon's Coastal Waters
F. Conservation Funding Programs
G. Sources of Information and Technical Assistance
H. Site Capability
I. Mid Coast Area Weeds of Concern

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Appendix A: Anadromous Fish Habitat Use, Distribution, and Status,* Mid Coast Basin

Species	Habitat use for spawning and rearing	Distribution in Management Area	Status in the Management Area
Coho	Use small, relatively low-gradient tributary streams for spawning and juvenile rearing; can use lakes for rearing when available; prefer complex in-stream structure for rearing	Spawning and rearing in Salmon, Siletz, Yaquina, Alsea, Yachats, and Siuslaw rivers, and Siltcoos/Tahkenitch Lakes, as well as several smaller coastal streams	Populations much lower than historic levels and very unstable - federally listed as a threatened species
Chum	Use mainstems and tributaries very close to tidewaters for spawning; inhabit estuaries briefly and then migrate to ocean	Spawning and rearing in Salmon, Siletz, Yaquina, Alsea, and Siuslaw rivers	Populations much lower than historic levels; several coastal populations stable; 1998 federal review determined that Endangered Species Act listing was not warranted
Fall Chinook	Use mainstems and lower tributaries for spawning and rearing; rearing also occurs in estuaries	Spawning and rearing in Siletz, Yaquina, Alsea, Yachats, and Siuslaw rivers	Populations much lower than historic levels, but stable; 1998 federal review determined that Endangered Species Act listing was not warranted
Spring Chinook	Use mainstems and lower tributaries for spawning and rearing; rearing also occurs in estuaries	Spawning and rearing in Siletz and Alsea rivers	Populations lower than historic levels but stable; 1998 federal review determined that Endangered Species Act listing was not warranted

Species	Habitat use for spawning and rearing	Distribution in Management Area	Status in the Management Area
Summer Steelhead	Use small, moderate-gradient tributaries for spawning and rearing; prefer complex in-stream habitat	Spawning and rearing in Siletz River	Several populations declining; candidate for listing under the federal Endangered Species Act
Winter Steelhead	Use small, moderate-gradient tributaries for spawning and rearing; prefer complex in-stream habitat	Spawning and rearing in Salmon, Siletz, Yaquina, Alsea, Yachats, and Siuslaw Rivers, and Siltcoos/Tahkenitch lakes, as well as several smaller coastal streams	Several populations declining; candidate for listing under the federal Endangered Species Act
Coastal Cutthroat	Spawn in very small tributaries; use channel margins and backwaters for early rearing and low-velocity pools and side channels with large, woody in-stream structure for later rearing	Spawning and rearing in Salmon, Siletz, Yaquina, Alsea, Yachats, and Siuslaw Rivers, and Siltcoos/Tahkenitch lakes, as well as several smaller coastal streams	Populations unstable, candidate for listing under the federal Endangered Species Act

* Information is derived from Oregon Department of Fish and Wildlife spawning survey records and aquatic inventory reports.

Appendix B: 2004/2006 Section 303(d) List and Decision Matrix

Mid Coast Basin water quality limited waterbodies

BACTERIA (*E. Coli*, Fecal Coliform)

303(d) List	**Season**
Siletz/Yaquina Sub Basin:	
Depot Slough, River Mile (RM) 0 to 1.3 (Marine/shellfish area)	Year Around
Nute Slough, RM 0 to1.5 (Water Contact Recreation)	Fall-Winter-Spring
Ollala Creek, RM 0 to3.2 (Marine/shellfish area)	Year-Around
Poole Slough, RM 0 to 2.6 (Marine/shellfish area)	Year-Around
Salmon River, RM 0 to 23.1, (Shellfish growing)	Year-Around
Thompson Creek, RM 0-2 (Water contact recreation)	Year-Around
Yaquina River, RM 0 to 15.5 (Shellfish growing)	Year-Around
Alsea Sub Basin:	
Alsea River – Mouth to RM 10 (Shellfish growing)	Year-Around
Keller Creek – RM 0 to 2.6 (E. Coli) (Water Contact Recreation)	Summer
School Fork – RM 0 to 3.2 (E. Coli) (Water Contact Recreation)	Summer
Tenmile Creek – RM 0 to 11.5 (fecal coliform)(Shellfish growing)	Year-Around
Williamson Creek – RM 0 to 2.7 (E. Coli)(Water Contact Recreation)	Summer
Siuslaw Sub Basin:	
Siuslaw River – RM 5.7 to 105.9 (fecal coliform)(Shellfish growing)	Year-Around

Potential concern

Alsea Sub Basin:	
Stump Creek – RM 0 to 2 (*E. coli)* (Water Contact Recreation)	Summer

TEMPERATURE

303(d) List	**Season**
Alsea Sub Basin:	
Alder Creek – RM 0 to 1.3	Year-Around
Alsea River- RM 15.2 to 47.4	Summer
Alsea River- North Fork, RM 0 to 15	Year-Around
Alsea River – North Fork, RM 0 – 2.7	Spawning

Alsea River – South Fork – RM 0 to 17.2	Summer
Buck Creek- RM 0 to 7.7	Year-Around
Bummer Creek – RM 0 – 8.2	Summer
Camp Creek-Mouth to East Fork – RM 0 – 2.7	Summer
Cascade Creek-RM 0 to 4.4	Summer
Cascade Creek, North Fork- RM 0 to 2.7	Summer
Depew Creek, RM 0 to 1.5	Summer
Drift Creek – RM 5.3 to 29.6	Year-Around
Drift Creek – RM 8.6 - 22.3	Spawning
Fall Creek, RM 0 to 9.8	Year-Around
Fall Creek – RM 0 – 9.8	Spawning
Five Rivers Creek, RM 0 to 22.4	Summer
Flynn Creek, RM 0 to 2.5	Year-Around
Green River, RM 0 to 6.7	Year-Around
Green River, East Fork, RM 0 to 2	Year-Around
Keller Creek, RM 0 to 2.6	Year-Around
Little Lobster Creek, RM 0 to 6.6	Summer
Lobster Creek, RM 0 to 17.7	Summer
Lobster Creek, RM 6.8 – 17.7	Spawning
Lobster Creek, South Fork, RM 0 to 4.3	Summer
Meadow Fork, RM 0 to 2.2	Year-Around
Peak Creek, RM 0 to 7	Year-Around
Phillips Creek, RM 0 to 2.1	Summer
Preacher Creek, RM 0 to 2	Summer
School Fork Creek, RM 0 to 3.2	Year-Around
Yachats River, RM 0 to 13	Summer

Siletz/Yaquina Sub Basin:

Elk Creek, RM 0 to 29.5	Summer
Cerine Creek – RM 0 to 3.7	Year-Around
Drift Creek-RM 0 to 21.6	Summer
North Creek – RM 0 to 3.2	Year-Around
Schooner Creek, South Fork, RM 0 to 4.9	Year-Around
Siletz River, RM 7 to 46.8	Summer
Siletz River, South Fork, RM 0 to 11.4	Year-Around
West Olalla Creek, RM 0 to 3.7	Year-Around
Yaquina River, Mill Creek to Simpson Creek, RM 15.4 to 27.6	Summer

Siuslaw Sub Basin:

Beaver Creek, RM 0 to 4.4	Year-Around
Condon Creek, RM 3.6 to 7.8	Year-Around
Deadwood Creek, Mouth to Headwaters	Year-Around
Deadwood Creek, West Fork, RM 0 to 7.7	Year-Around
Failor Creek, Mouth to Headwaters	Summer
Indian Creek, RM 0 to 22	Year-Around

Indian Creek, West Fork, Mouth to Headwaters	Summer
Knowles Creek, RM 0 to 13.1	Year-Around
Lake Creek, RM 0 to 28.3	Summer
McLeod Creek, RM 0 to 7.4	Year-Around
Siuslaw River, RM 0 to 106	Summer
Siuslaw River, North Fork, RM 0 to 27.3	Year-Around
Siuslaw River, South Fork, RM 0 to 7.3	Year-Around
Sweet Creek, RM 0 to 11.6	Year-Around

Siltcoos Sub Basin:

Fiddle Creek, RM 0 to 13.4	Summer
("Mouth" is about a mile into the existing lake)	

Potential concern	**Season**

Alsea Sub Basin:

Big Creek, Mouth to Panther Creek	Summer
Grass Creek, RM 0 to 3.7	Summer
Honey Grove Creek, RM 0 to 4.1	Summer

Siletz/Yaquina Sub Basin:

Big Rock Creek, Mouth to Headwaters	Summer
Mill Creek, RM 0 to 5.4	Summer
Sampson Creek, RM 0 to 2.5	Summer
Simpson Creek, RM 0 to 3	Summer

Siuslaw Sub Basin:

Indian Creek, North Fork, RM 0 to 5.9	Summer

SEDIMENTATION

303(d) List

Siletz/Yaquina Sub Basin:
Elk Creek, RM 0 to 29.5

Siuslaw Sub Basin:
Drew Creek, RM 0 to 3.2
McCloud Creek, RM 0 to 7.4
Morris Creek, RM 0 to 3.9
Porter Creek, RM 0 to 4.9
Siuslaw River, North Fork, RM 0.4 to 273
Taylor Creek, Mouth to Headwaters

NUTRIENTS

Potential concern

Siletz/Yaquina Sub Basin:
Devils Lake (phosphorus)

TMDLs Approved

Siuslaw Sub Basin:
Clear Lake (phosphorus)
Collard Lake (phosphorus)

AQUATIC WEEDS OR ALGAE

303(d) List

Siltcoos Sub Basin:
Siltcoos Lake
Tahkenitch Lake

Alsea Sub Basin:
Mercer Creek/Mercer Lake

CHLOROPHYLL A

303(d) List	**Season**
Siletz/Yaquina Sub Basin:	
Devils Lake	Summer
Alsea Sub Basin:	
Mercer Creek/Mercer Lake	Summer

DISSOLVED OXYGEN

303(d) List

Alsea Sub Basin:	
Alsea River – RM 15.7 to 27 (Spawning)	September 15 – May 31
Siletz/Yaquina Sub Basin:	
Salmon River, RM 0 to 23.1	September 15 – May 31
Yaquina River – RM 0 to 56.8	Year-Around

Yaquina River – RM 26.8 – 53.9 (Spawning)	September 15 – May 31
Siuslaw Sub Basin	
Siuslaw River, RM 5.7 to 105.9 (Spawning)	September 15 – May 31
Siuslaw River, RM 5.7 to 105.9	June 1 – September 14

Potential concern

Siuslaw Sub Basin:
Siuslaw River, Mouth to Headwaters

PH
Siletz/Yaquina Sub Basin:
Devils Lake Summer

BIOLOGICAL CRITERIA

Siuslaw Sub Basin:
Eames Creek, RM 0 to 4.8
Siuslaw River, South Fork, RM 0 to 3.8

Potential concern

Alsea Sub Basin:
Honey Grove Creek, RM 0 to 4.1

Siletz-Yaquina Sub Basin:
Yaquina River, RM 27.6 to 42

Siuslaw Sub Basin:
Cabin Creek, RM 0 to 1.1

Appendix C: 303(d) List Parameters and Impacted Beneficial Uses

The following is a list of parameters used by the DEQ in establishing the 303(d) list and the beneficial uses of water impacted by these parameters. This is an abbreviated summary and does not contain detailed descriptions of the standards. Specific information about these standards can be found in the Oregon 303(d) list.
The 303(d) list can be obtained from the DEQ website at: http://www.deq.state.or.us/wq/assessment/rpt0406/search.asp#about or by calling the Water Quality Division of the DEQ at (503) 229-5696.

Parameters for which Mid Coast streams are 303(d) listed are in boxes.

Aquatic weeds or algae

Standard – The development of fungi or other growths having a deleterious effect on stream bottoms, fish, or other aquatic life, or that are injurious to health, recreation, or industry shall not be allowed.
Beneficial uses affected - Water contact recreation, aesthetics, fishing

Bacteria (Escherichia coli)
Standard – For freshwaters and estuarine waters other than shellfish growing waters, fecal bacteria counts may not exceed a 30-day log mean of 126 E. coli organisms per 100 ml, based on a minimum of five samples, and no single sample shall exceed 406 E. coli organisms per 100 ml. 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 shall not be allowed.
Beneficial uses affected - Water contact recreation

Biological criteria
Standard – Waters of the state shall be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
Beneficial uses affected - Resident fish and aquatic life

Chlorophyll a
Standard – The following average Chlorophyll a values shall be used to identify waterbodies where phytoplankton can impair the recognized beneficial uses:
1. Natural lakes that thermally stratify: 0.01 mg/l
2. Natural lakes that do not thermally stratify, reservoirs, rivers, and estuaries: 0.015 mg/l

Beneficial uses affected - Water contact recreation, aesthetics, fishing, water supply, livestock watering

Dissolved oxygen
Standard – For water bodies that provide salmonid spawning, 11.0 mg/L or 95% of saturation (or 9.0 mg/L if intergravel dissolved oxygen is 8.0 mg/L or greater); for waterbodies that provide coldwater aquatic life, 8.0 mg/L or 90% saturation; for waterbodies that provide coolwater aquatic life, 6.5 mg/L; and for warmwater aquatic life, 5.5 mg/L.
Beneficial uses affected - Resident fish and aquatic life, salmonid spawning, rearing, and Migration

Fecal coliform
Standard – Fecal coliform median of 14 organisms per 100 milliliters; no more than 10% > than 43 organisms per 100 ml of the last 15 samples.
Beneficial uses affected – Shellfish growing

Nutrients
Standard – Specific criteria are listed for certain waterbodies with TMDLs developed.
Beneficial uses affected - Aesthetics or use identified under related parameters

pH
Standard – Specific standards are listed by basin.
Beneficial uses affected - Resident fish & aquatic life, water contact recreation

Phosphorus
Standard – Waters of the state must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities.
Beneficial uses affected – Aesthetics

Sedimentation
Standard – The formation of appreciable deposits or formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation, or industry shall not be allowed.
Beneficial uses affected - Resident fish & aquatic life, salmonid spawning, rearing, and migration

Temperature
Standard –Biologically based numeric criteria. Unless superseded by natural conditions, the temperature criteria for state waters supporting salmonid fishes are as follows:

a. The seven-day-average maximum temperature of a stream identified as having salmon and steelhead spawning use may not exceed 13.0 degrees Celsius (55.4 degrees Fahrenheit) at the times of spawning use.

b. Seven-day-average maximum temperature of a stream identified as having core cold water habitat use may not exceed 16.0 degrees Celsius (60.8 degrees Fahrenheit).

c. The seven-day-average of a stream identified as having salmon and trout rearing and migration use may not exceed 18.0 degrees Celsius (64.4 degrees Fahrenheit).

Beneficial uses affected - Resident fish & aquatic life, salmonid spawning, rearing, and migration

Total dissolved gas
Standard – The concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection shall not exceed 110 percent of saturation, and the liberation of dissolved gases, such as carbon dioxide, hydrogen sulfide, or other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation or other reasonable uses made of such waters shall not be allowed.
Beneficial uses affected - Resident fish and aquatic life

Toxics
Standard – Toxic substances shall not be introduced above natural background levels in waters of the state in amounts, concentrations, or combinations which may be harmful, may chemically change to harmful forms in the environment, or may accumulate in sediments or bioaccumulate in aquatic life or wildlife to levels that adversely affect public health, safety, or welfare; aquatic life; wildlife; or other designated beneficial uses. Specific criteria are developed for certain metals and other potentially toxic substances.
Beneficial uses affected - Resident fish and aquatic life, drinking water

Turbidity
Standard – No more than ten percent cumulative increase in natural stream turbidities shall be allowed, as measured relative to a control point immediately upstream of the turbidity causing activities.
Beneficial uses affected - Resident fish and aquatic life, water supply, aesthetics

Appendix D: Pesticide Use in Oregon

Oregon has strict laws and regulations related to pesticide use, storage, and reporting. All pesticide users are required to apply and store pesticides according to the label. Users of restricted-use pesticides are required to obtain certification from the ODA. Improper application and storage of pesticides can lead to surface or groundwater quality problems.

The following are prohibited under ORS 634.372:

634.372 Prohibited acts. No person shall:

(1) Make false or misleading claims through any media, relating to the effect of pesticides or application methods to be utilized.

(2) As a pesticide applicator or operator, intentionally or willfully apply or use a worthless pesticide or any pesticide inconsistent with its labeling, or as a pesticide consultant or dealer, recommend or distribute such pesticides.

(3) Operate a faulty or unsafe pesticide spray apparatus, aircraft or other application device or equipment.

(4) Perform pesticide application activities in a faulty, careless, or negligent manner.

(5) Refuse or neglect to prepare and maintain records required to be kept by the provisions of this chapter.

(6) Make false, misleading, or fraudulent records, reports, or application forms required by the provisions of this chapter.

(7) Operate pesticide applicators' apparatus, machinery, or equipment without a licensed pesticide applicator or certified private applicator performing the actual application, or supervising such application if such is performed by a pesticide trainee. This prohibition does not apply to the operation of tractors, trucks, or other vehicular equipment used only under the supervision of a certified private applicator.

(8) As a pesticide applicator, work or engage in the application of any classes of pesticides without first obtaining and maintaining a pesticide applicator's license, or apply pesticides that are not specifically authorized by such license.

(9) As a pesticide operator, engage in the business of, or represent or advertise as being in the business of, applying pesticides upon the land or property of another, without first obtaining and maintaining a pesticide operator's license, nor shall such person engage in a class of pesticide application business that is not specifically authorized by license issued by the state Department of Agriculture. Further, no such person shall employ or use any person to apply or spray pesticides who is not a licensed pesticide applicator or pesticide trainee.

(10) As a pesticide trainee, work or engage in the application of any class of pesticides without first obtaining and maintaining a pesticide trainee's certificate and is otherwise in compliance with the provisions of this chapter.

(11) Act as, or purport to be, a pesticide dealer or advertise as such without first obtaining and maintaining a pesticide dealer's license.

(12) Act as, or purport to be, a pesticide consultant without first obtaining and maintaining a pesticide consultant's license.
(13) Apply any pesticide classified as a restricted-use or highly toxic pesticide to agricultural, horticultural or forest crops on land owned or leased by the person without first obtaining and maintaining a private applicator certificate.
(14) As a person described in ORS 634.106 (6), use power-driven pesticide application equipment or devices (use hand or backpack types only), or use or apply any pesticide other than those prescribed by the department.
(15) Deliver, distribute, sell or offer for sale any pesticide that is misbranded.
(16) Formulate, deliver, distribute, sell, or offer for sale any pesticide that is adulterated.
(17) Formulate, deliver, distribute, sell, or offer for sale any pesticide that has not been registered as required by ORS 634.016.
(18) Formulate, deliver, distribute, sell or offer for sale any powdered pesticide containing arsenic or any highly toxic fluoride that is not distinctly colored.
(19) Distribute, sell or offer for sale any pesticide except in the manufacturer's original unbroken package.
(20) Make application of pesticides, by aircraft or otherwise, within a protected or restricted area without first obtaining a permit for such application from the committee of the protected or restricted area in which the application is to be made, nor shall such person make such application contrary to the conditions or terms of the permit so issued.
(21) Use isopropyl ester of 2,4-D, or any other ester of equal or higher volatility with regard to plant damage as determined by the department, without first obtaining a permit for such use as provided in ORS 634.322 (10).
(22) Sell, use or remove any pesticide or device subjected to a "stop sale, use or removal" order until the pesticide or device has been released there-from as provided in ORS 634.322 (3).
(23) Fail to comply with any provision or requirement of sections 2 to 9, chapter 1059, Oregon Laws 1999, or rules adopted there-under. [1973 c.341 s.34; 1987 c.158 s.121; 1995 c.360 s.2; 1999 c.1059 s.14]

For complete laws and regulations related to pesticides, please consult the ODA website at: http://oregon.gov/ODA/PEST/lawsregs_index.shtml or an updated copy of the Oregon Revised Statutes and Oregon Administrative Rules.

For more detailed recommendations on pesticide use and control of pests and disease, contact the ODA Pesticides Division, OSU Extension Service, or a qualified consultant.

Appendix E: Pollution Prevention and Control Program for Oregon's Coastal Waters

In 1990, the federal (CZARA) were enacted. This law mandated that all states and territories with approved coastal zone management programs develop and implement coastal non-point pollution control programs. In response to these amendments, Oregon identified coastal Agricultural Water Quality Management Area plans and rules as the state's strategy to address agricultural measures. The approved management measures for agriculture are below.

Erosion and sediment control management measure

- Apply the erosion component of a resource management system as defined in the Field Office Technical Guide of the U.S. Department of Agriculture, NRCS to minimize the delivery of sediment to surface waters.
- Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivered from the contributing area for storms of up to and including a 10-year, 24-hour frequency.

Nutrient management measure

- Develop, implement, and periodically update a nutrient management plan to: (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely.
- Nutrient management plans contain the following core components:
    - Farm and field maps showing acreage, crops, soils, and waterbodies.
    - Realistic yield expectations for crop(s), based primarily on the producer's actual yield history, state land grant university yield expectations for the soil series, or NRCS Soils-5 information for the soil series.
    - A summary of the nutrient resources available to the producer, that at a minimum include:
        - Soil test results for pH, phosphorus, nitrogen, and potassium;
        - Nutrient analysis of manure, sludge, mortality compost (birds, pigs, etc) or effluent (if applicable);
        - Nitrogen contribution to the soil from legumes grown in the rotation (if applicable); and
        - Other significant nutrient sources (e.g., irrigation water).

- An evaluation of field limitations based on environmental hazards or concerns, such as:
    - Sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential,
    - Lands near surface water,
    - Highly erodible soils, and
    - Shallow aquifers.
- Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation.
- Identification of timing and application methods for nutrients to: provide nutrients at rates necessary to achieve realistic crop yields; reduce losses to the environment; and avoid applications as much as possible to frozen soil and during periods of leaching or runoff.
- Provisions for the proper calibration and operation of nutrient application equipment.

Pesticide management measure

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

Riparian area management measure

- Exclude livestock from riparian areas that are susceptible to overgrazing and when there is no other practical way to protect the riparian area when grazing uplands.
- Provide stream crossings and hardened access areas for watering.
- Provide alternative drinking water locations.
- Locate salt and shade away from sensitive riparian locations.
- Include riparian areas in separate pastures with separate management objectives and strategies.
- Fence, or where appropriate, herd livestock out of areas for as long as necessary to allow vegetation and streambanks to recover.

- Control the timing of grazing to: (1) keep livestock off streambanks where they are most vulnerable to damage, and (2) coincide with the physiological needs of target plant species.

Irrigation management measure

- Operate the irrigation system so that the timing and amount of water match crop water needs. This will require, at a minimum: (a) the accurate measure of soil water depletion and the volume of irrigation applied, and (b) uniform application of water.
- When chemigation is used, include backflow preventers for wells, minimize the harmful amounts of chemigated waters from the field, and control deep percolation.
- In cases where chemigation is performed with furrow irrigation systems, a tailwater management system can be needed.
- In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow(s). In these special cases, on-site use could be precluded and would not be considered part of the management measures for such locations.
- 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.
- Where leakage from delivery systems or return flows support wetlands or wildlife refuges, it can 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.
- In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should remain on site.

Appendix F: Conservation Funding Programs

The following is a list of some conservation funding programs available to landowners and organizations in Oregon. For more information, please refer to the contact agencies for each program. Additional programs can become available after the publication of this document. For more current information, please contact one of the organizations listed below (see Appendix G for contact information).

Program	General Description	Contact
Conservation Reserve Enhancement Program (CREP)	Provides annual rent to landowners who enroll agricultural lands along streams. Also cost-shares conservation practices such as riparian tree planting, livestock watering facilities, and riparian fencing.	Natural Resources Conservation Service, Farm Service Agency, Soil and Water Conservation Districts, Oregon Department of Forestry
Conservation Reserve Program (CRP)	Competitive CRP provides annual rent to landowners who enroll highly erodible lands. Continuous CRP provides annual rent to landowners who enroll agricultural lands along seasonal or perennial streams. Also cost-shares conservation practices such as riparian plantings.	Natural Resources Conservation Service, Farm Service Agency, Soil and Water Conservation Districts
Conservation Stewardship Program (CSP)	Provides cost-share and incentive payments to landowners who have attained a certain level of stewardship and are willing to implement additional conservation practices.	Natural Resources Conservation Service, Soil and Water Conservation Districts
Emergency Watershed Protection Program (EWP)	Available through the USDA-Natural Resources Conservation Service. Provides federal funds for emergency protection measures to safeguard lives and property from floods and the products of erosion created by natural disasters that cause a sudden impairment to a watershed.	Natural Resources Conservation Service, Soil and Water Conservation Districts

Program	General Description	Contact
Environmental Protection Agency Section 319 Grants	Fund projects that improve watershed functions and protect the quality of surface and groundwater, including restoration and education projects.	DEQ, Soil and Water Conservation Districts, Watershed Councils
Environmental Quality Incentives Program (EQIP)	Cost-shares water quality and wildlife habitat improvement activities, including conservation tillage, nutrient and manure management, fish habitat improvements, and riparian plantings.	Natural Resources Conservation Service, Soil and Water Conservation Districts
Farm and Ranchland Protection Program (FRPP)	Cost-shares purchases of agricultural conservation easements to protect agricultural land from development.	Natural Resources Conservation Service, Soil and Water Conservation Districts
Federal Reforestation Tax Credit	Provides federal tax credit as incentive to plant trees.	Internal Revenue Service
Forest Resource Trust	State assistance up to 100 percent of the costs to convert non-stocked forestland to timber stands. Available to non-industrial private landowners.	Oregon Department of Forestry
Grassland Reserve Program (GRP)	Provides incentives to landowners to protect and restore pastureland, rangeland, and certain other grasslands.	Natural Resources Conservation Service, Farm Service Agency, Soil and Water Conservation Districts
Landowner Incentive Program (LIP)	Provides funds to enhance existing incentive programs for fish and wildlife habitat improvements.	U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife
Oregon Watershed Enhancement Board (OWEB)	Provides grants for a variety of restoration, assessment, monitoring, and education projects, as well as watershed council staff support. 25% local match requirement on all grants.	Soil and Water Conservation Districts, Watershed Councils, Oregon Watershed Enhancement Board

Program	General Description	Contact
Partners for Wildlife Program	Provides financial and technical assistance to private and non-federal landowners to restore and improve wetlands, riparian areas, and upland habitats in partnership with the U.S. Fish and Wildlife Service and other cooperating groups.	U.S. Fish and Wildlife Service (503) 231-6179, Natural Resources Conservation Service, Soil and Water Conservation Districts
Private Stewardship Grants Program	Provides up to 90% cost-share for landowners to improve sensitive, threatened, and endangered species habitat.	U.S. Fish and Wildlife Service
Public Law 566 Watershed Program	Program available to state agencies and other eligible organizations for planning and implementing watershed improvement and management projects. Projects should reduce erosion, siltation, and flooding; provide for agricultural water management; or improve fish and wildlife resources.	Natural Resources Conservation Service, Soil and Water Conservation Districts
Resource Conservation & Development (RC & D) Grants	Provides assistance to organizations within RC & D areas in accessing and managing grants.	Resource Conservation and Development, (541) 757-6709
State Forestation Tax Credit	Provides for reforestation of under-productive forestland not covered under the Oregon Forest Practices Act. Situations include brush and pasture conversions, fire damage areas, and insect and disease areas.	Oregon Department of Forestry
State Tax Credit for Fish Habitat Improvements	Provides tax credit for part of the costs of voluntary fish habitat improvements and required fish screening	Oregon Department of Fish and Wildlife

Program	General Description	Contact
	devices.	
Wetlands Reserve Program (WRP)	Provides cost sharing to landowners who restore wetlands on agricultural lands.	Natural Resources Conservation Service, Soil and Water Conservation Districts
Wildlife Habitat Incentives Program (WHIP)	Provides cost-share for wildlife habitat enhancement activities.	Natural Resources Conservation Service, Soil and Water Conservation Districts
Wildlife Habitat Tax Deferral Program	Maintains farm or forestry deferral for landowners who develop a wildlife management plan with the approval of the Oregon Department of Fish and Wildlife.	Oregon Department of Fish and Wildlife, Soil and Water Conservation Districts, Natural Resources Conservation Service

Appendix G: Sources of Information and Technical Assistance

USDA Farm Services Agency
Maintains agricultural program records and administers federal cost-share programs. Maintains up-to-date aerial photographs and slides of agricultural and forest lands.

Douglas County
2440 NW Troost #200
Roseburg, OR 97470
(541) 673-6071

Lane County
780 Bailey Hill Rd
Eugene, OR 97402-545
(541) 465-6443 ext. 2

Lincoln/Benton counties
33630 McFarland Rd.
Tangent, OR 97389
(541)-967-5927

Polk County
580 Main St STE A
Dallas, OR 97338-1911
(503) 623-2396 ext 105

Tillamook County
6415 Signal St.
Tillamook, OR 97141
(503) 842-2848

USDA Natural Resources Conservation Service
Provides information on soil types, soils mapping, and interpretation. Administers and provides assistance in developing conservation plans for federal programs such as the CRP, CREP, the EQIP, and the WRP. Makes technical determinations on wetlands and highly erodible lands.

Benton County
33630 McFarland Rd.
Tangent, OR 97389
(541)-967-5925

Douglas County
2440 NW Troost #200
Roseburg, OR 97470
(541) 673-6071

Lane County
780 Bailey Hill Rd
EUGENE, OR 97402-5451
(541) 465-6443

Lincoln County
157 NW 15th St., Unit 1
Newport, OR 97365
(541) 265-2631

Polk County
580 Main St STE A
Dallas, OR 97338-1911
(503) 623-2396 ext 105

Tillamook County
6415 Signal St.
Tillamook, OR 97141
(503) 842-2848

Noxious Weed Control Agents
Conduct education programs to spread awareness of noxious weeds and their impacts, and work to eradicate noxious weeds within their designated noxious weed control district.

Benton County Public Works
360 SW Avery
Corvallis, OR 97333
(541) 766-6821

Douglas County
Irv Cannon
433 Rifle Range Road
Roseburg, OR 97470
(541) 440-4266 ext. 117

Lane County Public Works
Mike Perkins
3040 Delta Highway N
Eugene, OR 97408
(541) 682-6900

Lincoln County Vegetation Control Technician
Doug Shaller
410 NE Harney St.
Newport, OR 97365
(541) 574-1248

Polk County Soil and Water Conservation District
580 Main Street, Suite A
Dallas, OR 97338
(503) 623-9680 ext. 101

Tillamook Soil and Water Conservation District
6415 Signal St.
Tillamook, OR 97141
(503) 842-2240 ext. 102

Oregon Department of Agriculture
635 Capitol St NE
Salem, OR 97301

Natural Resources Division: (503) 986-4700
Pesticides Division: (503) 986-4635
Plant Division: (503) 986-4621

The Natural Resources Division is responsible for developing and implementing Agricultural Water Quality Management Area plans and rules across Oregon, the CAFO Program, the Smoke Management Program, and for providing support to Oregon's SWCDs.

The Pesticides Division regulates the sale and use of pesticides; tests and licenses all users of restricted-use pesticides, is responsible for fertilizer registration, and investigates incidents of alleged pesticide misuse.

The Plant Division's weed program works to survey and detect noxious weeds, prevent new invasive species from becoming established in Oregon, eradicate non-native pests, and educate public and private entities about the impacts of non-native invasive species.

Oregon Department of Environmental Quality

340 N. Front Street
Coos Bay, OR 97420
(541) 298-7255
http://www.deq.state.or.us

Responsible for protecting Oregon's water and air quality, cleaning up spills and releases of hazardous materials, and managing the proper disposal of solid and hazardous wastes. Maintains a list of water quality limited streams and establishes TMDLs for water quality limited waterbodies.

Oregon Department of Fish and Wildlife

Works with landowners to protect and enhance habitat for a variety of fish and wildlife species, manages recreational fishing and hunting programs, monitors fish and wildlife populations, conducts education and information programs, and administers wildlife habitat tax deferral program.

Newport office
2040 SE Marine Science Dr.
Newport, OR 97365
(541) 867-4741

Mapleton office
P.O. Box 352
Mapleton, OR 97453
(541) 991-7838

Springfield office
3150 E Main St.
Springfield, OR 97478
(541) 726-3515
http://www.dfw.state.or.us

Oregon Department of Forestry

Implements Oregon forest practices laws, administers Oregon forestry property tax programs, provides forest management technical assistance to landowners, and administers or assists with several federal and local cost sharing programs.

Douglas County
1758 NE Airport Rd.
Roseburg, OR 97470
(541) 440-3412

Lane County
87950 Territorial HWY
Veneta, OR 97487-015
(541) 935-2283

Lincoln County
763 NW Forestry Rd.
Toledo, OR 97391
(541) 336-2273

Polk and Benton counties
825 Oak Villa Road
Dallas, OR 97338
(503) 623-8146

Tillamook County
801 Gales Creek Rd.
Forest Grove, OR 97116
(503) 357-2191
http://www.odf.state.or.us

Oregon Department of State Lands
Administers Oregon fill and removal law and provides technical assistance.

775 Summer Street NE, Suite 100
Salem, OR 97301-1279
(503) 986-5200
http://www.oregon.gov/DSL/

OSU Extension Service
Offers educational programs, seminars, classes, tours, publications, and individual assistance to guide landowners in meeting natural resource management goals.

Benton County
1849 NW 9th St.
Corvallis, OR 97330
(541) 766-6750

Douglas County
1134 SE Douglas
P.O. Box 1165
Roseburg, OR 97756
(541) 672-4461

Lane County
950 W 13th Ave
Eugene, OR 97402
(541) 682-4243

Lincoln County
29 SE 2nd St.
Newport, OR 97365
(541) 574-6534

Polk County
182 SW Academy, Suite 202
P.O. Box 640
Dallas, OR 97338
(503) 623-8395

Tillamook County
2204 4th St.
Tillamook, OR 97141
(503) 842-3433
http://www.orst.edu

Oregon Water Resources Department
Provides information on stream-flows and water rights, issues water rights, and monitors water use.

Benton, Lincoln, and Polk counties
158 12th St. NE
Salem, OR 97301
(503) 378-3739

Douglas County
Douglas County Courthouse, Room 306
Roseburg, OR 97470
(541) 440-4255

Lane County
220 N 5th
Springfield, OR 97477
(541) 682-3620

Tillamook County
C/o Port of Tillamook Bay
4000 Blimp Blvd.
Tillamook, OR 97141
(503) 842-2413
http://www.wrd.state.or.us

Oregon Watershed Enhancement Board
Provides funding for a variety of watershed enhancement, assessment, the monitoring of educational activities. Provides support to watershed councils throughout Oregon.

775 Summer St. NE, Suite 360
Salem, OR 97301-1290
(503) 986-0178
http://www.oweb.state.or.us

Soil and Water Conservation Districts
Provide technical assistance in a wide variety of agricultural and natural resource areas and assist landowners in accessing federal and local funding programs.

Benton SWCD
305 SW C Ave, Suite 1
Corvallis, OR 97339
(541) 753-7208

Lincoln SWCD
23 North Coast Highway
Newport, OR 97365
(541) 265-2631

Polk SWCD
580 Main St., Suite A
Dallas, OR 97338
(503) 623-9680 ext. 101

Siuslaw SWCD
1525 12th St., Suite 10A
P.O. Box 2768
Florence, OR 97439
(541) 997-1272

Tillamook SWCD
6415 Signal St.
Tillamook, OR 97141
(503) 842-2240 ext. 102

Umpqua SWCD
47088 State Hwy. 38
Reedsport, OR 97467
(541) 271-2611

Water Improvement Districts
Can provide domestic or industrial water supply and water-related recreation, enhance water pollution control, water quality, and fish and wildlife resources.

Devils Lake Water Improvement District
1845 SW Highway 101
Lincoln City, OR 97367
(541) 994-5330

Watershed Councils
Bring diverse interests together to cooperatively monitor and address local watershed conditions. Collect watershed condition data, conduct education programs, and train and involve volunteers.

Mid Coast Watersheds Council
23 Northcoast Highway
Newport, OR 97365
(541) 265-9195
http://www.midcoastwatershedscouncil.org

Salmon-Drift Creek Basin Planning Team
(541) 994-8427

Siletz Watershed Group
PO Box 28
Logsden, OR 97357
(541) 444-7848

Alsea Watershed Council
10518 E. 5 Rivers Rd.
Tidewater, OR 97390
(541) 528-3221

Siuslaw Watershed Council
P.O. Box 422
Mapleton, OR 97453
(541) 268-3044
http://www.siuslaw.org

Appendix H: Site Capability

How site capability applies in an Agricultural Water Quality Management Area

Site capability can be applied in several ways in an Agricultural Water Quality Management Area. It can help provide a clearer picture of the vegetation and riparian functions a site could be anticipated to provide in a compliance situation. It can be used in voluntary conservation and outreach projects to illustrate the vegetation landowners might expect given a management regime and the capability of a site. For example, it could predict the likelihood of success of "passive restoration, " that involves reducing management pressure on the existing plant community, versus more "active restoration," that involves reducing management pressure, planting desirable vegetation, and/or controlling undesirable vegetation. Site capability can also predict the consequences or benefits of planting desirable species in specific locations in a riparian area.

Example

Historically, Llama Creek meandered through a narrow coastal valley until it reached the Pacific Ocean. Historical vegetation along Llama Creek included a canopy of Douglas fir, western red cedar, big leaf maple, and alder in the headwaters, and a combination of alder, willow, red osier dogwood, grasses, and sedges in the lower reaches (site potential). The vegetation provided many functions, including shade, bank stability, infiltration of runoff water, and filtration of sediment and nutrients.

In the upper reaches of Llama Creek, there are generally more younger age classes and less older age classes of vegetation than there were historically, but vegetation is still composed mostly of Douglas fir, western red cedar, big leaf maple, and alder. Streamside sites in upper Llama Creek are still able to produce plant communities that were historically present, and those plant communities provide the water quality-related functions listed above.

Over the past few decades, the lower reaches of Llama Creek were channelized and straightened. As a result, streambanks eroded, lower Llama Creek became much wider and shallower, and the water table dropped. Presently, lower Llama Creek is capable of supporting those plant species that can establish and grow under the constraints of a lower water table and competitive pressure from invasive plant species. Depending on the site, the plant community will likely include blackberry, native shrubs, herbaceous species, and tree species capable of establishing and growing in these modified conditions. Some sites dominated by blackberry and other invasive vegetation do not provide riparian functions at the same level as the historic plant community, but at other sites the vegetation still promotes infiltration of runoff water, filters sediment and nutrients from runoff, provides shade, and provides for some bank stability.

Appendix I: Mid Coast Area Weeds of Concern

Notes for the table, which lists weeds of concern in the Cooperative Weed Management Area (CWMA):

Weed Categories: Weeds are divided into four general categories, which are managed in different ways. These categories are similar to ODA's rating system, but assignment of weeds to specific categories reflects the distribution of those weeds within the CWMA region. This list of weeds may not include all weeds found locally. An official list of noxious weeds for Oregon can be obtained from ODA's Noxious Weed Control Program.

Potential Invaders: These weeds are found outside the CWMA region but could invade the region at any time in the future. Management focuses on developing an "early alert" network of people and organizations to identify sites, followed by reporting to ODA's Noxious Weed Control Program or other partner for eradication.

New invaders: These weeds exist in just a few sites in small numbers in the CWMA. They are managed in the same way as the potential invader category.

Locally established: These weeds can be locally very abundant, or occur in spotty distribution across the landscape. Management focuses on inventory to determine distribution, followed by eradication of small, isolated populations, and control or containment of larger infestations.

Widely established: These weeds occur across the landscape at a level where eradication, containment or control is not possible. Management focuses on removing them from ecologically, socially and economically important sites and slowing their spread through prevention actions. When available, biological controls should be used.

ODA rating: An "A" means the weed is either a potential invader from neighboring states or it is present in small enough infestations to make eradication/containment possible. A "B" means the weed is regionally abundant, but may have limited distribution in some counties. Biological control is the preferred approach. A "T" means ODA is implementing a statewide management plan targeted to that species.

Active Management: This column indicates those species for which members of the CWMA are actively pursuing inventory and/or treatment projects.

Habitat: "U" means upland, "R" means riparian, "D" means dunes, "A" means aquatic

Table 1: Weeds of concern

Common Name	Latin Name	ODA Rating	Active Mgmt	Habitat
Potential Invaders				
Kudzu	*Pueraria lobata*	A, T		U, R
Yellow Floating Heart	*Nymphoides peltata*	A		A
Spartina	*Spartina alterniflora*	B		A
Giant Hogweed	*Heracleum mantegazzianum*	A, T		U, R
Garlic Mustard	*Alliaria petolata*	B. T		U, R
New Invaders				
Bamboo	*Sasa palmata*	Not listed		U, R
Butterfly bush	*Buddleja globosa, davidii*	B	1	U, R
French Broom	*Cytisus monspessulanas*	B	1	U, R, D
False Brome	*Brachypodium sylvaticum*	B	1	U, R
Yellow Flag Iris	*Iris pseudocorus*	B		R, A
Meadow Knapweed	*Centaurea pratensis*	B	1	U, R
Pampas/Jubata Grass	*Cortaderia selloana/jubata*	B	1	U, R
Policeman's Helmet	*Impatiens glandulifera*	B		R
Purple Loosestrife	*Lythrum salicaria*	B, T	1	R, A
Spotted Knapweed	*Centaurea maculosa*	B, T	1	U, R
Yellow Starthistle	*Centaurea solstitialis*	B. T	1	U
Locally Established				
Saltmarsh cordgrass	*Spartina patens*	A, T	1	A
Elodea	*Elodea (=egeria)densa*	B		A
Parrot's feather	*Myriophyllum aquaticum*	B	1	A
Eurasian water milfoil	*Myriophyllum spicatum*	B		A
Fragrant water lily	*Nymphaea odorata*	Not listed		A
Canada Thistle	*Cirsium arvense*	B		U, R
Clematis (Old Man's Beard)	*Clematis vitalba*	B		U, R
Everlasting Peavine	*Lathyrus latifolius*	Not listed		U, R
Japanese, Giant, hybrid knotweeds	*Polygonum cuspidatum, sachalinense, Xbohemicum*	B, T	1	R
Himalayan knotweed	*Polygonum polystachyum*	B, T	1	R
Gorse	*Ulex europaeus*	B, T	1	U, R, D
Portuguese Broom	*Cytisus striatus*	B, T	1	U, R, D
Widely Established				
Himalayan blackberry	*Rubus discolor*	B	1	U, R
Evergreen blackberry	*Rubus laciniatius*	Not listed	1	U, R
Scotch broom	*Cytisus scoparius*	B	1	U, R, D
Oxeye daisy	*Leucanthemum vulgare*	Not listed	1	U, R
English ivy	*Hedera helix*	B	1	U, R
English holly	*Ilex aquafoluim*	Not listed	1	U
European beachgrass	*Ammophila arenaria*	Not listed	1	D
Reed canary grass	*Phalaris arundinacea*	Not listed		R
Tansy ragwort	*Senecio jacobaea*	B, T	1	U, R