Southern Willamette Valley Agricultural Water Quality Management Area Plan

Developed by the

Southern Willamette Valley Local Advisory Committee

The Upper Willamette Soil and Water Conservation District

and

The Oregon Department of Agriculture

2012 Review and Update

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Acronyms and Terms Used in this Document

Area Plan – Southern Willamette Valley Agricultural Water Quality Management Area Plan

Area Rules – Southern Willamette Valley Agricultural Water Quality Management Area Rules

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

Coast Fork – Coast Fork of the Willamette River

CWA – Federal Clean Water Act

DEQ - Oregon Department of Environmental Quality

EPA – United States Environmental Protection Agency

EWEB – Eugene Water and Electric Board

GIS – Geographic Information System

LAC - Local Advisory Committee

Management Area – Southern Willamette Valley Agricultural Water Quality Management Area

Middle Fork – Middle Fork of the Willamette River

NRCS - Natural Resources Conservation Service

OAR - Oregon Administrative Rule

ODA – Oregon Department of Agriculture

ORS - Oregon Revised Statute

RUSLE – Revised Universal Soil Loss Equation

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."

T - Soil loss tolerance factor

TMDL – Total Maximum Daily Load

USGS – United States Geological Survey

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Foreword

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing agricultural water quality issues in the Southern Willamette Valley Agricultural Water Quality Management Area (Management Area). The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural activities and soil erosion (ORS 568.909(2)) and to achieve water quality standards (ORS 561.191(2)). The Area Plan is implemented using a combination of education and outreach programs, management activities, monitoring, and evaluation.

The provisions of this Area Plan do not establish legal requirements or prohibitions, as described in Oregon Revised Statute (ORS) 568.191(1).

According to OAR 603-090-0030(1), Agricultural Water Quality Management Area Plans must describe a program to achieve the water quality goals and standards necessary to protect designated beneficial uses related to water quality, as required by state and federal law. An Area Plan shall include but not be limited to:

- a description of the geographical area and physical setting to which the Area Plan applies
- a listing of water quality issues of concern
- a listing of current designated beneficial uses that are being adversely affected
- a statement that the goal of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards
- a statement of the water quality objectives of the Area Plan
- a description of the pollution prevention and control measures deemed necessary by the department to achieve the goal
- a schedule for implementation of the necessary measures that is adequate to meet applicable dates established by law
- guidelines for public participation
- a strategy for ensuring that the necessary measures are implemented

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 Management Area and Oregon Administrative Rules (OARs 603-095-2100 through 603-095-2160 and 603-090-0060 through 603-090-0120).

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1. Introduction

This 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 authorizes the ODA to work with agriculture to develop and carry out a plan to prevent and control water pollution from agriculture and soil erosion. The intent of the Act and the ODA Water Quality Program are to:

- Satisfy multiple federal and state water quality mandates;
- Encourage adoption of voluntary conservation measures by landowners;
- Promote water quality improvement through outreach and education;
- Allow flexibility in meeting local water quality standards;
- Provide enforcement provisions for the ODA to address water quality problems where landowners refuse to work towards meeting water quality standards;
- Involve local citizens and organizations in the development of strategies to address water quality concerns and problems. The Act specifically states that the development and implementation of area plans should involve local Soil and Water Conservation Districts (SWCDs) as much as possible.

This Area Plan applies to all non-federal and non-tribal agricultural and rural lands in the Management Area. This Management Area consists of: (1) all lands drained by the McKenzie, Middle Fork Willamette, and Coast Fork Willamette rivers and their tributaries and (2) all streams flowing directly into the Willamette River between the McKenzie and Middle Fork Willamette rivers (Map 1). 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 operations within incorporated city boundaries. Activities subject to the Oregon Forest Practices Act are not included in this Area Plan.

This Area Plan provides background information on the Management Area, discusses local water quality concerns, and describes goals and strategies to encourage conservation and improve water quality. The Area Plan also references Agricultural Water Quality Management Area Rules (Area Rules), which describe characteristics land users must achieve on all agricultural lands they own, occupy, or manage, and describes procedures for handling complaints and enforcement actions. Finally, the Area Plan describes a process for evaluating Area Plan effectiveness and updating the Area Plan on a regular schedule.

This Area Plan is not intended to tell anyone how to farm, ranch, or otherwise utilize their natural resources. However, the Upper Willamette SWCD, U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), the ODA, and other partners (see Appendix A) are available to provide technical, financial, and educational assistance to landowners in the Management Area to develop and meet their conservation goals, comply with Area Rules, TMDL load allocations, and attain water quality standards.

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

LAC Member	Area	Operation
Carol Ach	Leaburg, McKenzie and Coast Fork Willamette	Blueberries, cows, sheep, pigs
Dave Daniel	Pleasant Hill, Coast Fork Willamette	Nursery
Paul Day	Pleasant Hill, Middle Fork Willamette	Livestock, hay, pasture
Donald Hansen	Creswell, Coast Fork Willamette	Grass seed, strawberries, hazelnuts
Steve Houston	Eugene, Coast Fork Willamette	Wine grapes, seed crops, peppermint
Polly Kohl	Springfield, McKenzie	Rural resident, Mohawk Watershed Partnership
Glenn Miller	Eugene, Willamette	Hazelnuts
Art Paz	Springfield, McKenzie	Certified organic blueberries, timber
Alan Petersen, Chair	Springfield, McKenzie	Cattle, hay, timber
Garry Rodakowski	Vida, McKenzie	Hazelnuts
Karl Morgenstern		EWEB
Marc Paulman, Alternate	Dexter, Middle Fork Willamette	Cattle, hay
Jim Sly, Alternate	Creswell, Coast Fork Willamette	Cattle, hay
Jim Goodpasture, Alternate	Vida, McKenzie	Hazelnuts, cattle, hay, timber

LACs are described in Oregon Administrative Rule (OAR) 603-090-0020. LAC membership shall reflect a balance of affected persons. Membership shall be composed primarily of landowners in the Management Area. Membership may include, but is not limited to:

- State Board of Agriculture representatives
- Persons serving on local soil and water conservation districts
- Private landowners
- Representatives of local, state and federal boards, commissions, and agencies
- Members of Indian tribes
- Members of the public
- Persons associated with industry
- Members of academic, scientific, and professional communities
- Public and special interest groups

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Map 1. Southern Willamette Valley Agricultural Water Quality Management Area.

2. Background

2.1. Geographical/Physical Setting

2.1.1. General Location

The Management Area includes the McKenzie, Middle Fork of the Willamette (Middle Fork), and Coast Fork of the Willamette (Coast Fork) watersheds. The watersheds are located primarily in the eastern portion of Lane County in western Oregon. Small portions of the McKenzie and Coast Fork watersheds are also located in Linn and Douglas counties. Communities in the Management Area include the cities of Springfield, Lowell, Oakridge, Westfir, Creswell, and Cottage Grove, as well as several unincorporated communities mentioned in Section 2.1.5.

Boundaries of the Management Area are the Cascade Mountains to the east, Calapooya Mountains to the south and west, Long Tom watershed to the west, and the Coburg Hills to the north. The three watersheds cover approximately 3,361 square miles, or 2,156,080 acres. Elevations range from about 350 feet above sea level near the mouth of the McKenzie to 10,354 feet on the North Sister in the Cascades (Oregon Water Resources Board, 1961). The McKenzie's confluence with the Willamette near Coburg is the furthest point downstream in the Management Area.

2.1.2. Physical Features

The headwaters for the McKenzie River and Middle Fork are in the Cascade Mountains. The Coast Fork originates in the Calapooya Mountains. The Coast Fork and Middle Fork meet near Goshen to form the Willamette River mainstem. The Willamette River's confluence with the McKenzie River is approximately 15 miles further downstream near Coburg.

The McKenzie River originates from Clear Lake and flows westward through a narrow valley down a steep gradient. It has eight main tributaries: Lost Creek, Horse Creek, McKenzie South Fork, Quartz Creek, Smith River, Blue River, Gate Creek, and Mohawk River. The Mohawk River has the flattest gradient of the tributaries, and there is some relatively level land along it. Level land also extends along the main stem of the McKenzie River.

The Middle Fork River begins at Timpanogas Lake and flows northwest down a steep gradient until it reaches the Willamette Valley floor. Most of its tributaries, including Hills Creek, Salt Creek, Salmon Creek, North Fork, Fall Creek, and Little Fall Creek, flow into the mainstem from the north. Lost Creek flows into the Middle Fork from the south.

The Coast Fork River begins in the Calapooya Mountains, as do several of its tributaries, Brice Creek, Row River, Sharps Creek, Layng Creek, and Mosby Creek. Layng, Sharps,

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and Brice creeks have relatively steep gradients from headwaters to confluence with the Coast Fork, while Mosby Creek, Row River, and the mainstem Coast Fork have relatively flat gradients. The gradient of the Coast Fork flattens further after it reaches the Willamette Valley floor. Several tributaries, including Camas Swale Creek and Silk Creek, flow into the Coast Fork as it flows north through the valley.

2.1.3. Geology and Soils

Western and High Cascade Mountains

The Cascade Mountains consist of two adjacent mountain ranges, the Western and High Cascades. Both ranges are predominantly composed of basaltic lava flows, with lesser amounts of andesite and rhyodacite (Orr et al, 1992). Depending on the hardness of the underlying material, the mainstem and tributaries of the upper Middle Fork and McKenzie Rivers have created both steep gorges and gently sloping plateaus. The upper reaches of the McKenzie River have been glaciated, at least as far west as Blue River Reservoir (Boer, personal communication, 2000).

Calapooya Mountains

The Calapooya Mountains are a mixture of sedimentary and older volcanic rocks. They have been deeply dissected by the Coast Fork and its tributaries. Soils are deep, well-drained silty clay loams and clay loams from sandstone, sediment, and igneous rock (Patching, 1987).

Willamette Valley

Much of the lowlands in the Willamette Valley are alluvium, or material deposited by the rivers and their tributaries. Alluvial materials include sands, gravels, and silts transported from the Calapooya and Cascade mountains. Depending on the composition of the deposited material, soils in bottomlands and terraces range from excessively drained gravelly sandy loam to poorly drained silty clay loam and silty clay (Patching, 1987).

2.1.4. Climate

The McKenzie, Middle Fork, and Coast Fork watersheds experience the same general climate, with wet winters and dry summers. Precipitation generally increases with elevation in the watersheds, ranging from an average of 40 to 50 inches per year on the valley floor to 70 to 80 inches at the summit of the Calapooya Mountains, 80 inches at the headwaters of Little Fall Creek in the Middle Fork watershed, and 110 inches at the headwaters of Blue River in the McKenzie watershed (University of Oregon Department of Geography, 1999). In the upper portions of the watersheds, above 4,000 to 5,000 feet, snow is a significant portion of the precipitation.

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2.1.5. Land Use/Land Ownership

Agriculture and Forestry

The predominant land use in the Management Area is forestry. Forestlands comprise approximately 86 percent of the land within the three watersheds (Table 1). Most forestland is in the upper portions of the three watersheds in the Cascade and Calapooya Mountain ranges and extends down the eastern side of the valley floor. The U.S. Forest Service, the Bureau of Land Management, and private industrial landowners are major forestland holders in the watersheds (Table 2).

Agricultural and rural residential land uses in the Management Area are found in the lower valley regions of the three watersheds. These lands account for approximately 4 percent of the Management Area (Table 3). In the McKenzie watershed, most agricultural lands are in the floodplain, where well-drained sandy loam soils have accumulated by fluvial (rivers and streams) processes. Hazelnuts are a major crop in the watershed, with over 1,200 acres in orchards (Penhallegon, personal communication, 2000). Other commercial crops include blueberries, Christmas trees, peppermint, and row crops. Livestock and pasturelands are the major land use on the Mohawk tributary.

Most of the agricultural land in the Middle Fork watershed is located in the lower portion adjacent to the Willamette River. There is very little land in agricultural use above Dexter Reservoir. The dominant agricultural land use is pasture and hayland. There are some row crops near Jasper, Lowell, and Pleasant Hill. There are also several nurseries, Christmas tree farms and orchards in that area.

The Coast Fork watershed supports agricultural lands from the confluence of the Coast Fork and Middle Fork upstream beyond Cottage Grove. Grass seed, pasture and hayland are the predominant commodities in the watershed. Other agricultural land uses include nurseries, small grains, orchards, vineyards, and field crops.

Table 1. Land uses and land cover in the three watersheds.

Land Use/ Land Cover Category	Acres	Percent of Land Use by Category
Agriculture	82,000	4
Forestry	1,858,000	86
Urban/Residential/Other	216,100	10
TOTAL	2,156,100	100

Table 2. Land ownership in the three watersheds.

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Landowner/Manager	Acres	Percent of Land
U.S. Forest Service	1,044,600	48
Private Landowners	690,200	32
Forest Service Wilderness Area	255,300	11.8
Bureau of Land Management	142,660	6.6
U.S. Army Corps of Engineers	17,600	0.8
Lane County	2,200	0.1
State of Oregon	2,130	0.1
State Scenic Waterway	1,120	0.1
Joint Corps of Engineers/Lane County	160	0.01
State Parks and Recreation	130	0.01
TOTAL	2,156,100	100

Table 3. Agricultural Lands in the McKenzie, Middle Fork, and Coast Fork.

Watershed	Agricultural Land (acres)	Agricultural Land (percent of all land)
McKenzie	34,000	3.9
Middle Fork	14,000	1.6
Coast Fork	34,000	7.9
TOTAL	82,000	4.0

Cities/Urban

There is one major metropolitan area in the Management Area, as well as smaller cities and rural communities. Most cities are located along the mainstems of the Middle Fork, Coast Fork, and McKenzie rivers. Rural communities co-exist with agricultural areas and are situated on or near the rivers or their tributaries. Both the Willamette and McKenzie flow through the Eugene/Springfield area, and their confluence is just north of Eugene. The 2011 population of the Eugene/Springfield area is over 213,000 with growth percentages higher than the state average over the past ten years. Rural communities include Marcola in the Mohawk watershed; and Blue River, Walterville, Leaburg, Vida, Nimrod, Finn Rock, and McKenzie Bridge along the McKenzie River. Most of these communities have populations below 500. Two incorporated cities exist along the Coast Fork watershed: Cottage Grove, with 9,686 residents, and Creswell, with 5,031 residents. Rural communities in the Coast Fork watershed include Disston, Culp Creek, Dorena, London, Latham, Saginaw, Walker, Delight Valley, Cloverdale, and Goshen. Along Highway 58, the cities of Oakridge (pop. 3,205), Lowell (pop. 1,045) and Westfir (pop. 278) are located centrally in the Middle Fork watershed (Population Research Center, 2011). Rural communities in the Middle Fork watershed include Dexter, Fall Creek and Jasper.

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Roads

There is an extensive network of public and private roads within the three watersheds. Heavily traveled public roads include Interstate 5, which runs north-south through Eugene-Springfield, Creswell, and Cottage Grove; Highway 126, the main route through the McKenzie watershed over the Cascade Mountains; and Highway 58, which begins near Goshen and travels southeast over the Cascades.

Recreation

Recreation within the Management Area relates closely to the scenic landscape. Activities such as camping, hiking, fishing, hunting, skiing, and boating draw thousands of visitors to the three watersheds every year. Several reservoirs provide recreational opportunities in the summer months, including Dorena Reservoir on the Row River, Dexter Lake on the Middle Fork, and Cougar Reservoir on the McKenzie. Table 5 provides a complete list of recreational reservoirs in the Management Area.

Watershed Functions

Other functions of land in the watersheds include retention and slow release of rainwater, flood control, groundwater recharge, and filtration of pollutants. All watersheds provide these functions to some degree depending on local conditions and the amount and types of developments.

2.2. Water Resources

2.2.1. Water Availability

Both rainwater and snowmelt contribute to water supplies in the three watersheds. More surface water is supplied by snowmelt in the McKenzie and Middle Fork watersheds than in the Coast Fork because their headwaters are in the High Cascades. Flows in the McKenzie and Middle Fork are less variable than in the Coast Fork. Coast Fork seasonal flow patterns are more similar to streams originating in the Coast Range, with flows in the winter greatly exceeding summer flows even with human-caused changes to the flow regime. Summary flow data for the McKenzie, Middle Fork, and Coast Fork are listed in Table 4.

Table 4. Average annual, summer, and winter flows in cubic feet per second (cfs) for the McKenzie, Middle Fork and Coast Fork (U.S. Geological Survey, 2000).

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Watershed	Average Annual Flow (cfs)	Average Summer Flow (cfs)	Average Winter Flow (cfs)
Coast Fork at Goshen	1611	416	3342
McKenzie at Coburg	5897	3183	9582
Middle Fork at Jasper	4154	2318	6433

Groundwater is most plentiful in the three watersheds in areas with alluvial deposits and porous lava flows. The High Cascades store a great deal of water from snowmelt, and the release of this water during the summer helps keep flows relatively constant in the McKenzie and Middle Fork watersheds. Alluvial deposits from the mouth of the Middle Fork to Dexter Dam, at the mouth of the McKenzie, along the McKenzie to Belknap Springs, and along the Coast Fork on the Willamette Valley floor, store large quantities of groundwater.

Dams and Reservoirs

Thirteen dams and reservoirs in the three watersheds are used for flood control in the winter and flow augmentation in the summer. They also provide recreation, irrigation, and power generation. Table 5 summarizes the uses of each dam and reservoir, storage capacities, and priority for augmentation of summer flows in the Willamette River.

The reservoirs influence seasonal water availability and flow patterns in the three watersheds. Summer water releases boost flows in the McKenzie to one-third higher than normal (Lane Council of Governments, 1996). The Coast Fork, once an ephemeral river, now flows year-round because of summer water releases from Dorena and Cottage Grove Reservoirs.

Table 5. Uses, Capacities, and Drawdown Priority for Reservoirs in the Management Area (U.S. Army Corps of Engineers, 2000; Oregon Water Resources Department, 2000).

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Watershed	Project	Uses of Water	Summer Reservoir Storage Capacity (Acre-feet)	Summer Drawdown Priority
Coast Fork	Cottage Grove	Recreation, flood control	28,700	5
Coast Fork	Dorena	Recreation, flood control	65,000	5
McKenzie	Blue River	Recreation, summer flow augmentation, flood control	78,800	3
McKenzie	Carmen	Hydropower	261	N/A
McKenzie	Cougar	Hydropower, recreation, summer flow augmentation, flood control	143,900	2
McKenzie	Leaburg	Hydropower, recreation	345	N/A
McKenzie	Smith	Hydropower	15,000	N/A
McKenzie	Trail Bridge	Hydropower	2,263	N/A
McKenzie	Walterville	Hydropower	100 (Intake) 345 (S. Pond)	N/A
Middle Fork	Dexter	Re-regulate flow from Lookout Point Reservoir, recreation	N/A	N/A
Middle Fork	Fall Creek	Recreation	108,200	5
Middle Fork	Hills Creek	Recreation	194,600	4
Middle Fork	Lookout Point	Flood control, hydropower	324,200	1

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2.2.2. Water Use

Consumptive uses of water in the three watersheds include irrigation, municipal use, and commercial use. Irrigation is the primary consumptive use for which water rights are issued. Municipal water rights supply drinking water to several hundred thousand people in Lane County. Non-consumptive uses include recreation, power generation, and fish and wildlife habitat. Sources of appropriated water are reservoirs, surface water, and groundwater. Table 6 summarizes water allocations in the three watersheds. Actual water use is typically lower than water appropriated.

Table 6. Appropriations of surface water, groundwater, and reservoir water in the three watersheds (Oregon Water Resources Department, 2000). Appropriations are in cubic feet per second (cfs) and acre-feet (af).

Water Use	McKenzie		Middle Fork		Coast Fork	
	cfs	af	cfs	af	cfs	af
Irrigation	274	49,000	52	10,173	110	21,507
Fish and Wildlife	292	45	93	47	6	35
Agriculture	1	3	1	11	4	11
Industrial	10,078	18,493	30	620	45	793
Municipal	338	0	50	0	40	1
TOTALS	10,983	67,541	226	10,851	205	22,347

In the McKenzie, over 9,975 cubic feet per second of industrial water rights are appropriated for hydropower, a non-consumptive use.

2.3. Water Quality

2.3.1. Clean Water Act

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

DEQ has established state water quality standards for water quality parameters, such as bacteria, temperature, dissolved oxygen, and nutrients. The standards protect "beneficial uses" associated with waterbodies. High-quality water protects several "beneficial uses"

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of waterbodies and watersheds. Beneficial uses of water in the three watersheds include water contact recreation; habitat for aquatic organisms and wildlife; agricultural, domestic, municipal, and industrial water supplies; and aesthetics (Appendix C). A waterbody is placed on the 303(d) list for a particular parameter when water quality is deemed no longer adequate to protect the most sensitive beneficial use. Beneficial uses impacted by temperature in the three watersheds include bull trout habitat and salmon spawning and rearing habitat. Mercury in the Coast Fork Willamette has appeared in fish tissues in elevated levels, endangering aquatic life and preventing human consumption of fish. Water contact recreation is impacted in the Coast Fork because of high bacteria levels. High concentrations of phosphorus promote growth of algae, impact pH levels, and lower dissolved oxygen levels.

2.3.2. Water Quality and Total Maximum Daily Loads in the Management Area

Within the Management Area, several segments of the three main rivers and their tributaries have been identified by the DEQ as "water quality limited" and are on the 303(d) list of water quality limited waterbodies. As shown in Appendix B, sixty-two stream segments in the three watersheds are listed for temperature (although these are listed, they are covered by the TMDL), five segments are listed for low dissolved oxygen levels, and five segments in the Coast Fork and two segments in the McKenzie subbasin are listed for toxics (mercury).

Total Maximum Daily Loads

DEQ, in accordance with the federal Clean Water Act, is required to establish TMDLs for pollutants on the list of impaired water bodies (303(d) list). TMDLs generally apply to an entire basin or subbasin, and not just to an individual water body that was on the 303(d) list. TMDLs specify the daily amount of pollution that a water body can receive and still meet water quality standards. Through the TMDL, nonpoint sources (including agriculture, forestry, and urban) are assigned "load allocations", while point sources are assigned "waste load allocations" in their permits. The agricultural sector is responsible for reducing agricultural water pollution to meet the load allocation assigned to agriculture. Once TMDLs are completed for a basin, the basin's water bodies are removed from the 303(d) list and are assigned to Category 4A (water quality limited, TMDL approved). In the future, when data show that water quality criteria have been met, water bodies will be assigned to Category 2 (attaining).

As part of the TMDL process, DEQ identifies the Designated Management Agencies or parties responsible for submitting TMDL implementation plans. An agreement between ODA and DEQ establishes that Agricultural Water Quality Management Area Plans serve as TMDL implementation plans. This Area Plan is the implementation plan for the agricultural component of the TMDLs that apply to the Management Area. Biennial reviews and revisions to the Area Plan and Area Rules will address any new agricultural load allocations in future TMDLs.

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In response to the 303(d) listings through 2006, DEQ developed TMDLs for the entire Willamette Basin for temperature, bacteria (*E. coli)*, and mercury (Oregon Department of Environmental Quality, 2006). The Willamette TMDL can be accessed via the DEQ website (www.deq.state.or.us/wq/tmdls/willamette.htm). The Willamette Basin also has a TMDL for dioxin (Oregon Department of Environmental Quality, 1991). The dioxin TMDL can be accessed via the DEQ website (www.deq.state.or.us/wq/tmdls/columbia.htm#dd). Other impairments identified in the Management Area, such as flow and habitat modification, do not require TMDLs. Table 4 summarizes the agricultural load allocations that apply to the Management Area.

The Willamette mainstem is also listed for several toxins, iron, and dioxin, but these are beyond the scope of this Area Plan. If a Willamette Basin TMDL is developed in the future for any of the toxins, it may include agricultural load allocations that apply to the entire Management Area.

While this Area Plan applies to all agricultural water pollution, it focuses specifically on parameters on the 303(d) list and TMDLs in the Management Area including temperature, bacteria (*E. coli)*, and mercury. Appendix B lists the impaired waterbodies from the 2010 303(d) list. More information is available in the 2010 integrated report and 303(d) list database on the DEQ website (www.deq.state.or.us/wq/assessment/2010Report.htm).

Temperature
DEQ endeavored to set the TMDL for temperature to protect salmon spawning, rearing, and passage as the most sensitive beneficial uses in the Management Area. Oregon's native cold-water aquatic communities, including salmonids, are sensitive to water temperature. Many sources contribute to elevated stream temperatures. On agricultural lands, absence of streamside vegetation, water withdrawals, and land management that leads to widened stream channels contribute to elevated stream temperatures. DEQ has identified the existing nonpoint source pollution sources as solar heating of the Area's waterways due to a lack of riparian vegetation from forestry, agriculture, rural residential, and urban activities.

Bacteria
DEQ has set the bacteria *Escherichia coli (E. coli)* TMDL to protect human water contact recreation (risk of infection and disease to people who come in contact with fresh water while fishing, swimming, or boating), the most sensitive beneficial use. On agricultural lands, *E. coli* generally comes from livestock waste, either deposited directly into waterways or carried to waterways via runoff and soil erosion. Runoff and soil erosion from agricultural lands may also carry bacteria from other sources. There are numerous sources of bacteria in streams, including humans (from recreation, failing septic systems, or discharges from wastewater treatment plants) and wildlife.

Mercury
Human fish consumption is the most sensitive beneficial use for which DEQ has set the Mercury TMDL. Primary sources of mercury include air deposition from national and

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international sources, discharge from specific legacy mining sites, and erosion of soils containing mercury. On agricultural lands, if mercury is contributed it is through eroded soils.

Other Parameters of Concern:

Sediment
A TMDL has not been set for sediment, but it can be of concern related to agricultural lands. Sediment carried in streams can adversely affect aquatic life by increasing water temperature through thermal absorption, reducing light penetration and visibility, reducing water infiltration through stream substrate (harming incubating fish eggs), and irritating gill filaments. Sediment deposition can also change the width:depth ratio of a stream, which directly influences stream temperature. Potential sources of sediment include streambank erosion, home building or construction sites, and runoff from agricultural lands.

Nutrients
A TMDL has not been set for nutrients, but it can be of concern related to agricultural lands. Fertilizers and manure are the main agricultural sources of nutrients. Improper storage or application can result in discharge of nutrients into either surface or ground water. Fertilizer run-off has been identified as one of the major contributing factors to algae blooms, including harmful algae blooms containing toxin-producing cyanoobacteria species. In the recent past, Oregon Health Authority has issued algae bloom advisories Dorena Reservoir, Dexter Reservoir, and Hill Creek Reservoir. Nutrients can also come from waste discharge, runoff, or seepage from urban areas, industrial and wastewater treatment plants, and septic systems; sediment runoff from forestlands; and background sources.

Aquatic Weeds and Algae
Harmful algal blooms are caused by over-production of naturally occurring cyanobacteria (blue-green algae). Some species release toxins that are harmful to humans, livestock, pets, and wildlife. When levels of nutrients, temperature, pH, and light are optimal, cyanobacteria grow rapidly, resulting in blooms where cyanobacteria are the dominant form of life in their environment. Cyanobacteria can cause negative impacts to water quality, including: taste and odor problems in drinking water, unpalatable fish, elevated pH levels, and low dissolved oxygen levels. Nutrients entering the watershed from agricultural activities can accumulate in reservoirs or lakes and may fuel algal blooms and move downstream. Low stream flows and high water temperatures downstream could also make conditions favorable for an algal bloom.

In addition to the Willamette Basin TMDLs, TMDLs for phosphorus and ammonia were developed for the Coast Fork watershed in 1996 to address low dissolved oxygen and high pH levels. (Check with Pamela Wright to see if there are load allocations related to this TMDL)

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Table 4: Agricultural Load Allocations that Apply to the Management Area

Geographic Scope in Management Area	TMDL	Load Allocation for Agriculture
Parameter: Temperature		
Mainstem Willamette	Willamette TMDL (2006), Chapter 4	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05 degrees C of the 0.3 degrees C human use allocation (with a surrogate of effective shade)
McKenzie Subbasin	Willamette TMDL (2006), Chapter 11	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05 degrees C of the 0.3 degrees C human use allocation (with a surrogate of effective shade)
Middle Fork Willamette Subbasin	Willamette TMDL (2006), Chapter 12	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05 degrees C of the 0.3 degrees C human use allocation (with a surrogate of effective shade)
Coast Fork Willamette Subbasin	Willamette TMDL (2006), Chapter 13	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05 degrees C of the 0.3 degrees C human use allocation (with a surrogate of effective shade)
Parameter: Bacteria		
Mainstem Willamette	Willamette TMDL (2006), Chapter 4	66 to 83% reduction from agricultural areas compared to average loads in 2006
Parameter: Mercury		
Entire Management Area	Willamette TMDL (2006), Chapter 3	Agriculture: 27 percent reduction compared to average loads in 2006
Parameter: Dioxin		
Entire Management Area	Columbia River Basin TMDL (1991)	Only pulp and paper mills have been assigned an allocation; agriculture is a potential source, but no load allocation has been assigned due to lack of data

2.3.3 Priority Areas: Strategic Implementation of the Area Plan

Beginning in April 2010, ODA, the LMA, the LAC, and other partners began work to identify Priority Areas within the Management Area. At the 2010 biennial review, the LAC expressed the importance of areas for focused work being identified through a strategic approach. Partners evaluated sixth field watersheds within the Management Area based on existing water quality issues, agriculture's effect on water quality, existing work and partner relationships within the watershed, and identification of the watershed as an existing priority by partners. Through this process ten sixth field watersheds were

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identified for additional evaluation. The number of tax lots, land use, agricultural activities, and identified water quality issues were considered.

Outreach and technical assistance will be focused in these areas, and every landowner with potential land condition concerns will be contacted with an offer of voluntary assistance. ODA, the LMA, and the LAC will measure, evaluate, and document the effectiveness of the Area Plan by assessing changes in land conditions in the current area of focus during the biennial review of the Area Plan. During each biennial review, the partners will also assess the timeline and sequence for working in the initial priority area and in future priority areas.

Gettings Creek Watershed: First Area of Focus

Gettings Creek is a small perennial stream that is a tributary to the Coast Fork Willamette. The Gettings Creek watershed is located on the east side of I-5, just north of Cottage Grove. The watershed is approximately 10,000 acres (60% forest, 20% rural residential, and 20% agricultural). Agriculture in the watershed is mainly cattle and small acreage livestock owners. Parameters of concern identified for the Gettings Creek Watershed were temperature and E. coli. Evalutation will be conducted using riparian vegetation as a surrogate for temperature and presence of livestock and proximity to seasonal or perennial streams as an initial surrogate for E. coli.

In 2011, ODA evaluated the current condition of streamside vegetation for the Gettings Creek Watershed, using satellite images, and produced a preliminary baseline map that shows streamside conditions before delivery of technical assistance in the area of focus. The preliminary baseline assessment estimates the percent of agricultural streamsides that fall into the three streamside vegetation classes, shown in Table X.

Table X. Feet of Streamside in Each Vegetation Class for Gettings Creek (Baseline-2011)

Streamside Vegetation Class	Gettings Creek
I - Streamsides have site-capable vegetation	8,130 feet
II - Streamsides allow streamside vegetation to establish, but the vegetation has not reached site-capable conditions	N/A
III - Agricultural activities may prevent establishment of streamside vegetation	44,725 feet

In 2011, ODA worked with the Upper Willamette SWCD developed an action plan for implementing technical assistance in the priority area. The Action Plan identifies goals (by July 2013) of 1) increasing percent site capable vegetation in riparian areas adjacent to agricultural land by 20% and 2) decreasing the number of landowners feeding livestock within the active floodplain by 25%.

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In late 2011, the Upper Willamette SWCD contacted all agricultural landowners to offer technical assistance. In addition to the initial contact, the Upper Willamette SWCD invited all landowners to a workshop that was held December 15, 2011. The SWCD has also begun targeted outreach to Class III landowners. After implementing projects in the focus area, an updated map will be produced to show the new conditions. The Upper Willamette SWCD will report on progress by comparing the baseline and post-implementation percent of streamside areas in each of the three-streamside vegetation classes.

Future Priority Areas

Future priority areas are 6th field HUCs with agricultural land uses in the Management Area. ODA, the LAC, the LMA, and other partners will work together to determine the order of future priority areas, based on condition of streamside vegetation and existing contacts and relationships.

For more information and background on the Priorty Area Process see section 8. Monitoring, Evaluation, and Modification.

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3. Mission, Goals, and Objectives

The mission of this Area Plan is to develop a framework of strategies for agricultural lands within the McKenzie, Middle Fork, and Coast Fork watersheds (the Management Area) that will contribute to desirable water quality and to develop programs to achieve the goals of the plan while maintaining the economic sustainability of agriculture.

Specific goals include:

- Prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Ensure that agricultural activities do not contribute to water pollution or diminished water quality as defined within 303(d) listings and TMDLs.
- Monitor and evaluate the effectiveness of the Area Plan.
- Reduce agriculture's contribution to water quality parameters of concern through education and outreach, and by promoting Optional Management Practices.
- Achieve the following land conditions on agricultural lands throughout the management area that contribute to good water quality.
    - Streamside vegetation provides streambank stability, filtration of overland flow, and moderation of solar heating, consistent with site capability.
    - No visible sediment loss from cropland through precipitation or irrigation induced erosion.
    - No significant bare areas within 50 feet of streams on pasturelands and/or rangelands.
    - Active gullies have healed or do not exist on pasturelands.
    - Livestock manure is stored under cover during the winter and in a location that minimizes risk to surface and groundwater.

Objectives deemed necessary by the LAC to achieve these goals include:

- Manage sheet and rill erosion to a rate that does not exceed an acceptable level.
- Curb the amount of active streambank erosion.
- Prevent any conditions already prohibited under ORS 468B.025 and 468B.050.
- Manage irrigation surface water return flow to prevent waters of the state from exceeding state water quality standards.
- Improve/maintain the ability of riparian areas to respond and function according to vegetative site capability.
- Provide suggestions of optional measures that could help achieve water quality goals.
- By the 2014 biennial review, a rough assessment of streamside vegetation conditions along agricultural lands in the entire management area will be complete. This assessment can be used to track and report progress in streamside vegetation improvements over time and to identify areas to focus work. Assessment results will be considered at the 2014 biennial review and may be used to revise the goals below.

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- By the 2016 biennial review, XX% of streamside areas along agricultural lands where the assessment identifies agricultural activities as likely preventing riparian vegetation establishment will be in a condition where agricultural activities no longer prevent streamside vegetation from establishing.
- By 2020, XX% of streamside areas along agricultural lands where the assessment identifies agricultural areas as likely preventing riparian vegetation establishment will be in a condition where agricultural activities no longer prevent streamside vegetation from establishing.
- By 2020, XX% of streamside areas along agricultural lands where the assessment identifies agricultural activities as allowing riparian establishment but not at site capability will have reached site capability.
- By the 2014 biennial review, ODA and the LMA will compile information about the location, number, and size of water quality improvement projects completed in the priority area since area plan and rules adoption, as resources and grant program privacy rules allow.
- A small geographic area has been identified within the Management Area, where voluntary outreach and technical assistance work has been focused since 2011 and an initial assessment of streamside conditions was completed. ODA and the LMA will report back to the LAC on the status of land conditions, and outreach and technical assistance efforts in the area, at the 2014 biennial review.
- By the 2014 biennial review (or other appropriate date), the Local Management Agency will have offered technical assistance to all landowners in the area with lands where agricultural activities appear to prevent streamside vegetation from establishing. By the 2014 biennial review, the LMA will report back to the LAC and ODA on the amount of lands where landowners accept voluntary assistance to allow streamside vegetation to establish and develop.
- By the 2014 biennial review (or other appropriate date), ODA and/or the LMA will complete a follow-up assessment in the area and evaluate land condition changes over the two-year period.

Please consult Section 5 for more detailed strategies identified by the LAC to achieve the mission, goals, and objectives.

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4. Characteristics to Achieve

The focus of the Agricultural Water Quality Program is on voluntary and cooperative efforts by landowners, the 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 Rules serve as this backstop while allowing landowners flexibility in how they protect water quality. Area Rules are goal-oriented and describe characteristics that should be achieved on agricultural lands, rather than practices that must be implemented.

This LAC developed Area Rules (Characteristics to Achieve) to protect water quality and prevent and control water pollution from agriculture. The LAC also considered the time and expense that would be involved for area landowners to meet the rules. As a result, each rule has an implementation date the LAC believed would be acceptable to area landowners.

This Area Plan serves as a guidance document and as stated in the Foreword, does not establish provisions for enforcement. The Area Rules developed with input from the LAC, OARs 603-095-2100 to 603-095-2160, are included in this document only as a reference for landowners. Each Area Rule has a border around it and appears in italics.

The Characteristics to Achieve and Area Rules relate directly to water quality concerns identified on the 303(d) list in the Management Area, and for the bacteria, mercury and temperature TMDLs that were established in September 2006. Rules specific to mercury are not developed, but Area Rules in the Characteristics to Achieve for waste, riparian areas, and erosion/nutrients are also effective for control of mercury. The concerns addressed in the Area Rules are:

- Temperature
- Phosphorus
- Bacteria
- Toxics
- Mercury

4.1. Characteristic to Achieve for Waste

Issue: Oregon Revised Statute (ORS) 468B.025 is an existing statute that addresses water pollution from waste discharge. To implement Senate Bill 502, approved in 1995 and codified at ORS 561.190 through 192, which ensures that ODA directly regulates farming activities for the purpose of protecting water quality, ODA is incorporating ORS 468B.025 and 468B.050 into all Area Rules in the state. For more information and text of ORS 468B.025 and 468B.050, please consult Appendix G.

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Characteristic to Achieve

OAR 603-095-2140
(1)(a) Waste. Effective upon rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

Parameters Addressed by this Characteristic to Achieve:

Bacteria, toxics, and mercury

4.2. Characteristic to Achieve for Riparian Areas

Issue: The intent of this measure is to maintain and protect riparian vegetation, minimize erosion of streambanks due to agricultural activities, allow water percolation into the soil, and encourage shading of streams, thus providing proper function of the riparian area.

Landowners are not responsible for streambank erosion resulting from natural channel migration and meander formation (OAR 603-095-2140(1)).

Please consult Appendix I for more background information on this Characteristic to Achieve.

Characteristic to Achieve

OAR 603-095-2140
(1)(b) Riparian areas. By January 1, 2004, agricultural management shall allow establishment and maintenance of vegetation along perennial streams consistent with the capability of the site to provide riparian functions necessary to help moderate solar heating and for streambanks to withstand flows resulting from a 25-year, 24-hour storm event.

Parameters Addressed by this Characteristic to Achieve:

Temperature.

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4.3. Characteristics to Achieve for Erosion/Nutrients

Issue: The intent of these measures is to prevent water from carrying sediment and nutrients into waters of the state.

Characteristics to Achieve

OAR 603-095-2140
(1)(c) Erosion and Nutrients:
(A) By January 1, 2004, soil erosion from agricultural activities shall not exceed the tolerable soil loss T.
(B) By January 1, 2004, landowners or operators shall prevent pollution from irrigation surface water return flow to waters of the state.

Parameters Addressed by this Measure:

Phosphorus, toxics, and mercury

For more information on erosion and the tolerable soil loss T, please consult Appendix F.

4.4. Pesticides

Issue: The intent of this condition is to prevent introduction of pesticides, which include herbicides and fungicides, into waters of the state. Pesticide users should always read the label prior to storing, mixing, or applying pesticides. ORS 634.372 (2) and (4) require users to follow label recommendations for all pesticides. Please consult Appendix D for the text of ORS 634.372.4.5.

4.5. Mercury

Issue: Mercury is a metal, liquid at room temperature, commonly used in the recent past for thermometers. It continues to have many dental, medical, and industrial uses. It is found naturally in the soils of the Willamette Valley. It is also found in fossil fuels and is released into the air upon combustion. In the air mercury can travel over continents and oceans to be deposited on land, added to naturally occurring mercury, and carried by stormwater and erosion into Oregon's waterways. Fish consumption is the most common way humans are exposed to elevated levels of mercury (Oregon Department of Environmental Quality, 2007).

Mercury is also a severe poison. According to the DEQ (2007), small children and fetuses are most sensitive to mercury's toxic effects.

Mercury from point and non-point sources is bioaccumulating in fish tissue to levels that adversely affect public health. Mercury binds to particles; and there are both higher levels of total suspended solids as well as higher mercury levels in the wet season. In

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setting the TMDL for mercury, DEQ has found that erosion of native soil makes up almost 48 percent of the mercury in the Willamette Basin. Some industrial facilities and domestic wastewater treatment facilities also discharge mercury, but at low levels.

The current DEQ mercury TMDL consists of interim targets and allocations. Sometime in 2011 DEQ plans to finalize these after additional data collection and public outreach (Oregon Department of Environmental Quality, 2007).

Existing Area Rules help control mercury from agricultural sources by limiting erosion, filtering sediment, and controlling pollution. No specific rule to control mercury from agricultural activities is necessary at this time. Refer to the characteristics to achieve for waste, riparian area, and erosion/nutrients for the Area Rules that address mercury in this area.

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5. Strategies for Plan Implementation

The LAC recommends that the ODA, the Upper Willamette SWCD, Watershed Councils, Oregon State University Extension, and other partners use the following strategies to help achieve the goals and objectives of this Area Plan.

5.1. Education and Outreach

- Hold workshops on water quality issues and the conservation practices that will help improve water quality.
- Develop demonstration projects to showcase successful conservation practices and systems.
- Submit news articles and public service announcements to area newspapers, radio stations, and newsletters.
- Integrate training about the agricultural water quality program with pesticide applicator training credit hours.
- Share education materials with agribusiness field representatives, farm stores, and others having regular contact with agricultural producers.
- Develop a repository for educational and technical materials that is accessible to the public and maintained with current information. Agencies, agribusinesses, and other organizations may then refer landowners to the repository for more information. The LAC recommends that the Upper Willamette SWCD, as the Local Management Agency, serve as the repository for this information, and that as much of this information as possible be maintained on or linked to the Upper Willamette SWCD and ODA websites.

5.2. Technical Assistance

- Provide technical assistance to landowners in the Management Area to help them comply with the Area Rules and develop and meet their conservation and production goals.

5.3. Priority Area Work

Identify, and focus outreach and technical assistance work in, small geographic areas to help demonstrate the rate of change in land conditions that are protective of water quality.

- Identify water quality parameter(s) of concern and a possible land condition surrogate (e.g. streamside vegetation as a surrogate for temperature)
- Compile and map available baseline land condition and water quality data
- Conduct outreach to promote awareness of water quality issues and their solutions
- Conduct systematic outreach to meet with landowners, assess land conditions, and offer voluntary technical assistance
- Seek to secure necessary resources to help landowners achieve land conditions that contribute to good water quality

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- Map land conditions after two years of implementation and quantify changes from the baseline
- Compile updated available water quality data and provide to ODA for the purpose of quantifying changes from the baseline
- Evaluate and discuss program effectiveness at the next biennial review of the Area Plan

5.4. Incentives for Voluntary Conservation

- Submit grant proposals to the Environmental Protection Agency, Oregon Watershed Enhancement Board, U.S. Department of Agriculture, DEQ, ODA and other organizations, that will support the adoption of voluntary conservation actions to achieve the goals and objectives of the Area Plan.
- Promote incentive-based cost-share programs to assist landowners with implementing voluntary conservation projects.

5.5. Monitoring

The LAC recommends that the ODA, the Upper Willamette SWCD, and other partners submit grant proposals that support monitoring. Inventory and monitoring projects should answer the following questions:

- What are baseline levels of phosphorus, nitrates, bacteria, and sediment, as well as other parameters of concern, in mainstems and tributaries of the McKenzie, Middle Fork and Coast Fork?
- What are the trends in levels of phosphorus, nitrates, bacteria, and sediment, as well as other parameters of concern, in the same waterbodies?
- What are baseline summer temperature levels in mainstems and tributaries of the McKenzie, Middle Fork, and Coast Fork? What are temperature trends in the same waterbodies?
- What are sources of pollution that are impacting parameters of concern in the McKenzie, Middle Fork, and Coast Fork?
- Are particular conditions of concern actually impacting water quality in adjacent waterbodies?
- By what mechanism and to what extent do particular agricultural practices improve or degrade water quality?
- How much agricultural land is known through scientifically verifiable means to be out of compliance with the Area Rules?

5.6. Safe Harbor

The LAC recommends that the ODA provide a program that protects operators if they seek technical assistance prior to any complaint, similar to programs offered by the Occupational Health and Safety Division. Landowners or operators should be required to be diligent in their efforts. The protection would pertain to administrative enforcement actions.

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6. 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 Rules 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.

Landowners who want more information on any of the following practices, or who are looking for other ideas for water quality improvement and conservation on their lands, may contact several agencies and organizations that provide technical assistance, including the Upper Willamette SWCD, the NRCS, and the Oregon State University (OSU) Extension Service. Also, please consult Appendix H for a list of publications describing water quality improvement practices for agricultural landowners.

6.1. Riparian Areas and Streams

Practice	Resource Concerns Addressed	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
a. Rotational grazing in riparian area; timed when growth is palatable to animals and when riparian areas are not saturated.	May help establish desirable riparian vegetation.	Allows limited use of riparian area for grazing, improves wildlife habitat.	Requires intense management to insure that grazing does not prevent site capable vegetation from establishing.
b. Livestock exclusion from riparian area; establishing off-stream watering facilities.	Helps promote desirable riparian vegetation; promotes streambank integrity; helps filter nutrients and sediment from runoff; may help narrow channel and reduce erosion in channel; reduces effects of solar radiation.	May lessen streambank erosion and loss of pastures; less time involved in managing livestock grazing in riparian area, improves wildlife habitat.	May require higher weed control costs in riparian areas than seasonal riparian grazing. May require financial investment for livestock control and off-stream watering facilities.
c. Planting perennial vegetation in riparian area.	Helps establish perennial riparian vegetation rapidly; promotes streambank integrity; may help	May lessen streambank erosion and loss of pastures. If livestock are excluded from	Costs of vegetation and weed control. May require financial investment for riparian fencing

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Practice	Resource Concerns Addressed	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
	narrow channel and reduce erosion in channel; reduces effects of solar radiation.	riparian area, area may be eligible for federal cost-share programs. Some alternative perennial agricultural products may be harvested from riparian areas.	and off-stream watering facilities while vegetation establishes.

6.2. Nutrient and Manure Management

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Apply nutrients according to soil test results and at agronomic requirements.	Helps prevent nutrient and bacteria runoff into surface water or leaching into groundwater.	May help reduce fertilizer costs; ensures that plants receive needed nutrients for growth; makes plants more competitive against weeds.	Costs of soil testing; time associated with taking soil samples.
b. Store manure under a tarp or roof; preferably on an impervious surface such as concrete or plastic.	Helps prevent nutrient and bacteria runoff into surface water or leaching into groundwater.	Prevents nutrient leaching so manure applied on crops or pasture has higher nutrient content; may save some fertilizer costs; producers wishing to construct storage facilities may apply for funding programs.	Cost of constructing manure storage facilities.
c. Establish animal heavy use areas, where animals can be confined during the winter to protect other pastures from trampling and	Helps prevent sediment, nutrient and bacteria runoff into surface water or leaching into groundwater. Helps protect streamside	Protects pastures from compaction during the winter, improving growth. May improve animal health by covering animal	Cost of fencing animal heavy use area; cost of feeding hay during the winter; cost of materials for protecting animal

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Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
compaction. When soils are saturated, limit livestock access to pastures; cover animal heavy use areas with rock, hog fuel, and/or geotextile.	areas.	heavy use areas with material so animals are not wading in mud.	heavy use area; may mean landowner will need a Confined Animal Feeding Operation Permit.
d. Site barns and animal heavy use areas away from streams.	Helps prevent sediment, nutrient, and bacteria runoff into surface water or leaching into groundwater. Helps protect streamside areas.	Helps prevent flooding in barns and animal heavy use areas.	Need either off-stream watering facility or other source of water for livestock.
e. Prevent silage leaching and/or store and manage leachate from silage and other vegetative materials.	Helps prevent nutrient runoff into surface water or leaching into groundwater.	Preventing leaching maintains higher nutrient content of ensiled feed material.	May require cost of facility development and purchase of moisture-absorbing materials.
f. Installing gutters and downspouts in areas with high livestock use.	Helps prevent sediment, nutrient and bacteria runoff into surface water or leaching into groundwater.	May improve animal health by lessening mud during the winter, so animals are not wading in mud.	Cost of installation and maintenance of gutters and downspouts.

6.3. Erosion, Sediment, and Mercury Control

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Grazing management: graze pasture plants to appropriate heights, rotate animals between several pastures; provide access to water in each pasture.	Helps prevent sediment, nutrient, mercury, and bacteria runoff into waters of the state. Helps protect streamside areas.	May improve pasture production; easy access to water may increase livestock production as well. May improve composition of pasture plants and	Cost of installing fencing, watering facilities for rotational grazing system; time involved in moving animals through pastures.

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Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
		help prevent weed problems.	
b. Farm road construction: construct fords appropriately, install water bars to divert runoff to roadside ditches.	Helps prevent sediment and mercury runoff to waters of the state.	May help prevent water damage on farm roads.	Cost of installation and maintenance.
c. Plant appropriate vegetation along drainage ditches; seed ditches following construction.	Helps prevent sediment and mercury runoff into waters of the state.	May help prevent ditch bank erosion and slumping.	Costs of establishing vegetation.
d. Plant cover crops in orchards or nurseries.	Helps prevent sediment and mercury runoff into waters of the state; helps filter nutrients and slow runoff.	May reduce weed problems in orchards and nurseries; prevents loss of applied fertilizer.	Costs of establishing cover crops; cover crops may compete with primary crop.
e. Irrigate pasture or crops according to soil moisture and plant water needs.	Helps prevent irrigation return flow and associated nutrients, sediment, and mercury to waters of the state.	May reduce costs of irrigation; may help crop or pasture production.	Installation/ maintenance cost. Monitoring time.
f. Install/maintain diversions to prevent unwanted drainage into barnyards and animal heavy use areas.	Helps prevent nutrient and mercury runoff into waters of the state.	Decreases muddiness and shortens saturation period in protected areas.	Cost of installation.

6.4. Pest Management

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Apply pesticides according to the label. Use the correct rate and	Reduces risk of pesticide runoff to streams or other water resources.	Compliance with Oregon law; reduces health risks to applicator, may	

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Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
timing. Comply with label restrictions and precautions.		decrease costs.	
b. Triple rinse pesticide application equipment; dispose of rinse water and containers according to Oregon law. Apply rinsates to sites. Dispose of or recycle clean containers according to Oregon law.	Reduces risk of pesticide runoff to streams.	Compliance with Oregon law. Eliminates disposal costs of collected rinsates identified as hazardous waste.	
c. Calibrate, maintain, and correctly operate application equipment.	Reduces risk of pesticide runoff to streams.	May reduce use and therefore cost of pesticides; reduces health risks to applicator.	Time involved to scout fields is usually offset by reduced or more effective pesticide use.
d. Integrated pest management practices such as pheromone traps, beneficial insect release, and field monitoring. (either in combination with pesticide use or as a replacement to pesticide use)	Reduces risk of pesticide runoff to streams, may reduce loss of non-target species.	May improve effectiveness of pest control system.	
e. Store and mix pesticides on leak-proof facilities.	Reduces risk of pesticide runoff to streams or soil contamination.	Helps protect drinking water; reduces health risks to applicator.	Cost of installation and maintenance.
f. Properly dispose of older unwanted legacy chemicals.	Prevents accidental release of unwanted pesticides into the soils or waterways.	Unwanted chemicals and risk are removed from the producers property.	None if taken to a hazardous waste collection event. These are held periodically in Lane County.

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Nutrient and Irrigation Efficiencies

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
Apply fertilizer at the correct rate and time applications for crop uptake.	Reduces the risk of excess nitrogen in the soil at the end of the growth season.	Precise application saves the producer money in fertilizer costs.	Time related to precision application.
Sample soil prior to fertilizer application to know existing nutrients.	Prevents the application of excess nutrients.	Precise application saves the producer money in fertilizer costs.	Cost of soil sampling and analysis.
Plant winter cover crops to take up excess nitrogen left over after crops are harvested.	Takes up extra nitrogen and limits potential for leaching into ground water.	Stores extra nitrogen in plant matter for later release when cover crop is incorporated into the soil.	Cost of seed and fuel to plant cover crop.
Properly maintain irrigation systems to prevent over-irrigation.	Prevents leaching of excess nitrogen past the root zone.	Uniform irrigation application and save producer money on nitrogen costs.	Replacement nozzles at least every four years is recommended.
Monitor soil water content and adjust irrigation schedules to maintain soil water content in an appropriate range in the root zone.	Prevents over-irrigation and leaching of excess nitrogen past the root zone.	Allows accurate irrigation application and keeps nutrients available to crops.	Soil monitoring equipment and time to evaluate soil water content.
Schedule irrigation applications based on expected evapotranspiration rates.	Prevents over-irrigation and leaching of excess nitrogen past the root zone.	Allows accurate irrigation application and keeps nutrients available to crops.	Time to evaluate expected evapotranspiration rates.

Selker et al, 2004

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7. Administrative Roles and Responsibilities

7.1. DEQ

As stated in the Memorandum of Agreement (MOA) between ODA and DEQ (signed 5/17/2012), DEQ is the primary agency responsible for implementing the Clean Water Act (CWA) and general state water quality laws found in Oregon Revised Statute (ORS) chapters 468 and 468B. This includes the responsibility for establishing and reviewing water quality standards, under CWA Section 303(c) and Oregon Administrative Rule (OAR) chapter 340, division 41, developing the Nonpoint Source (NPS) Control Program reguered under CWA section 319, and issuing (and ensuring implementation of) TMDLs under CWA Section 303(d) and OAR chapter 340, division 42, for those surface waters that fail to meet water quality standards.

7.2. Designated Management Agency/Local Management Agency

The MOA between DEQ and ODA states, the ODA is the agency responsible for implementing the Agricultural Water Quality Management Program established under ORS 568.900 to 568.933 and ORS 561.191, and Oar chapter 603, divisions 90 and 95. The ODA Agricultural Water Quality Management Program achieves the goals of these statutes and rules by implementation of ORS 468B within its jurisdiction. It is also the program used to implement load allocations for agricultural nonpoint source pollution assigned under TMDLs issued pursuant to CWA Section 303(d).

SWCDs are legal, independent subdivisions of state government, and are led locally by an elected board of directors who serve four-year terms without pay. For several decades, SWCDs in Oregon have worked with landowners to promote the good stewardship of natural resources. SWCDs in Oregon serve as LMAs for Area Plan development and implementation within their district boundaries.

7.3 Agriculture's Role

Individual Landowners' Responsibility

Each individual landowner or operator in the Management Area is required to comply with the Area Rules, which set minimum regulatory standards for agricultural lands (OAR 603-095-1240). In addition, individual landowners are encouraged to strive to attain conditions that exceed compliance, to help move land conditions and water quality toward meeting the goals and objectives of the Area Plan.

Each landowner or operator is not individually responsible for achieving agricultural load allocations of TMDLs, for achieving water quality standards for a water body, or for meeting the goals and objectives of the Area Plan. These are the responsibility of agricultural community collectively.

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Voluntary technical and financial assistance is available to landowners who want to work with the LMA (or with other local partners such as watershed councils or the NRCS) to achieve land conditions that contribute to good water quality. Landowners may also choose to improve their land conditions without assistance. Please refer to the information found in the Costs and Financing section and the Agency and Partner Contacts section of this Area Plan.

Agriculture's Collective Responsibility

Agriculture is collectively responsible for meeting the agricultural load allocations of TMDLs and for contributing to achieving and maintaining water quality standards. This collective responsibility cannot be achieved without individual landowners being in compliance with the Area Rules and attaining conditions that exceed those required by the Area Rules. This collective responsibility also depends on the leadership of agricultural producer groups, trade associations, and businesses in encouraging and supporting their members and customers to improve land conditions that contribute to meeting water quality goals.

Example: Streamside Vegetation, Riparian Rules, Area Plans, and the Temperature TMDLs

Agricultural streamside vegetation condition can be categorized into one of four classes, as described earlier in Table 2. Table 3 summarizes the correlation between streamside vegetation, compliance with the Area Rules (riparian rule), meeting the goals of the Area Plan, and meeting the agricultural load allocation for the temperature TMDL (effective shade is the surrogate for temperature).

Table 3. Relationship Between Streamside Vegetation Class, Agricultural Impacts, and Streamside Functions and Area Rules (Riparian Rule), Area Plan, and Temperature TMDL.

Class	Streamside Vegetation Condition	Agricultural Impacts Present	Effective Shade Provided	Area Riparian Rule	Area Plan Goals	Temperature TMDL Ag Load Allocation
I	Protects water quality	No	Probably	In compliance	Meets goals	Meets
II	Establishing and growing	No	Maybe	In compliance	May meet goals	Contributes
III	Unable to establish	Yes	No	Not in compliance	Does not meet goals	Does not meet
IV	Unable to establish	No	No	N/A	N/A	N/A

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Class I areas have sufficient vegetation to provide water quality functions. Agriculture is not impacting the streamside area. Effective shade is present (along with streambank stability and filtering of overland flows, which contribute to meeting other TMDLs and water quality standards). Class I areas are in compliance with the Area Rules (riparian rule) and meet the streamside vegetation goals of the Area Plan. If agricultural lands collectively have streamside vegetation in Class I condition, then agriculture is doing its part to meet the agricultural load allocation for the temperature TMDL. If these Class I conditions still do not result in the achievement of water quality standards, and there are no other agricultural nonpoint sources of the pollutants, then DEQ will reevaluate agriculture's load allocation.

Class II areas have streamside vegetation that is establishing and growing, but is not sufficient to protect water quality. Agriculture is not impacting the streamside area. Effective shade may or may not be present, depending on stream width. The streamside area may provide some streambank stability and filtration of overland flows, which contribute to meeting other TMDLs and water quality standards. Class II areas are in compliance with the Area Rules (riparian rule), may meet the streamside vegetation goals of the Area Plan, and may contribute to meeting the agricultural load allocation for the temperature TMDL.

Class III areas do not have streamside vegetation that is able to establish and grow. Agriculture is preventing or impeding vegetative growth. Effective shade is probably not present. The streamside vegetation probably does not stabilize streambanks or filter overland flows. Class III areas are not in compliance with the Area Rules (riparian rule), do not meet the streamside vegetation goals of the Area Plan, and do not contribute to meeting the agricultural load allocation for the temperature TMDL.

Class IV areas do not have streamside vegetation that is able to establish and grow. However, factors other than agriculture are preventing or impeding vegetative growth. The streamside area may or may not provide effective shade, streambank stability, or filtration of overland flows. For Class IV areas, the Area Rules (riparian rule) do not apply, and the agricultural load allocation for the temperature TMDL does not apply.

7.4. Resolution of Complaints

The ODA will investigate complaints against landowners or occupiers who are reported to be out of compliance with OAR 603-095-2100 through 603-095-2160. The complaint must relate to a specific site and contain a thorough description of the problem. ODA staff may also initiate an inspection if they directly observe violations of conditions or measures outlined in the Area Rules adopted to implement an Area Plan or if they are alerted to a violation by another agency.

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

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

7.5. Enforcement Action

The 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. The ODA recognizes that every farm and situation is different and will take into account each individual situation when enforcing the Rules.

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8. Monitoring, Evaluation, And Modification

Statewide monitoring and evaluation of water quality and streamside conditions on agricultural lands

ODA conducts monitoring at a statewide level and analyzes other agencies' and organizations' monitoring data to answer several monitoring questions related to agriculture and water quality.

- What are current water quality and landscape conditions in agricultural areas in Oregon?
- What are water quality trends?
- How well does the existing monitoring network assess agricultural water quality trends and streamside conditions in Oregon?
- What are riparian vegetation trends along agricultural lands in Oregon?
- How do riparian conditions compare with site capabilities?
- How do riparian vegetation conditions change in aerial photos of selected stream reaches?
- How do changes in riparian vegetation condition compare with trends in water quality in monitored watersheds?

To answer these questions, ODA evaluates water quality data from existing sites in DEQ's LASAR database (http://deq12.deq.state.or.us/lasar2) that reflect agricultural influence on water quality. In 2011, ODA received funding from the Oregon Legislature to fund water quality sampling at 19 additional sites around Oregon. These data, once sampling begins, will also be published in the LASAR database and evaluated at the statewide level to determine trends in water quality at agricultural sites statewide.

For each Management Area, ODA currently evaluates other agencies' and organizations' water quality data to answer the following questions.

- What water quality and land condition data from agricultural watersheds are available?
- What are trends in available water quality and land condition data in agricultural watersheds since Area Plan and Rule adoption, and since the last biennial review?

Data are reviewed every two years and summarized to the LACs and LMA during the biennial review process. Data summaries are also added to the Water Quality Issues section of the plan.

The Oregon Department of Environmental Quality maintains several long-term water quality monitoring sites in the management area. These include the Coast Fork Willamette at Mt. Pisgah park, the McKenzie River at Coburg Road, the Willamette River at Highway 126 in Springfield, the Middle Fork Willamette at Jasper Bridge, the McKenzie River at Hendricks Bridge, and the McKenzie River at McKenzie Bridge. Of these sites, ODA considers the Coast Fork Willamette at Mt. Pisgah Park and Willamette River at Highway 26 to reflect predominantly agricultural influence. While agricultural

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activities also influence water quality at the other sites, it is difficult to separate the agricultural influences from urban and other influences.

In January 2012, the Oregon Department of Environmental Quality published the Oregon Water Quality Index Summary Report. The Oregon Department of Environmental Quality uses the Oregon Water Quality Index to characterize water quality at its long-term monitoring sites for the 2001-2010 water years. The index analyzes water quality variables and produces a score describing general water quality. The index is unitless, with scores ranging from 10 (very poor) to 100 (excellent).

Out of the six DEQ sites in the management area, five sites, including the Willamette River at Highway 126 site, received scores ranging from 91 to 93, which are classified as excellent. The Coast Fork Willamette at Mt. Pisgah Park received a score of 88, which is considered good. Water quality at the two agriculturally influenced sites did not significantly improve or worsen over the 10-year period.
ODA received funding during the 2011 legislative session to add agricultural sites to DEQ's monitoring network, and is contracting with DEQ to conduct that sampling. One of the new sites is located on the Mohawk River. Data collection at this site began in early 2012, and data from this site will be included in the water quality data summary during the next biennial review.

The United States Geological Survey (USGS) and the Eugene Water and Electric Board (EWEB) have done some testing in the Management Area for pesticides and other industrial chemicals and their by-products. These monitoring efforts focus on collecting water samples during storm runoff from various land use types (forestry, urban, agriculture) to evaluate the mobilization of pollutants during major precipitation events. Unfortunately, the sampling has been unable to isolate the influence from agricultural areas. The sites that have been used to sample for agricultural use also tend to have influence from residential and forest areas. EWEB is planning to continue conducting monitoring in an attempt to isolate the influence from agriculture. Many of these products are relatively soluble in water, while others attach strongly to soil particles. They are transported from the land surface to streams through a combination of subsurface drainage, surface runoff, and soil erosion. Infiltration of rain and irrigation water facilitate transport to groundwater (United States Geological Survey, 1998)

EWEB conducted a "Nonpoint Source Pollution Assessment and Evaluation" in 2004 and 2005. This project attempted to evaluate nonpoint pollution sources, including agriculture, forestry, septic systems, and construction activities. The main objective was to bring watershed landowners, agencies, businesses, and other stakeholders together to discuss these issues and attempt to reduce the threats of non-point pollution from these activities.

The main objectives of the agricultural assessment were to develop an inventory of agricultural activities, determine high priority areas, and to identify problems through water quality monitoring. The majority of the evaluation work was conducted using geographic information systems (GIS). Agricultural fields were digitized in GIS using

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aerial photography and then ground-truthed to enhance the accuracy of the crop data. Chemical applications were estimated using application rates and acreages of each crop. Based on this analysis it was determined that over 8,000 lbs of chemical active ingredient are applied in the McKenzie Basin annually. The GIS analysis also identified two priority areas with a higher potential of pesticide run-off. The first area is land near the confluence of Cedar Creek and the McKenzie River, and the second area is between EWEB's Walterville Power Canal and the McKenzie River. These are two areas with more intensive agricultural practices. Hazelnuts, nursery operations, blueberries, and vegetable crops were identified as the four highest chemical usage crops in the area. The overall results of the water quality monitoring indicate no major impacts from nonpoint sources of pollution in the area (Morgenstern, 2006).

The EWEB conducted water quality monitoring at 13 sites in the McKenzie River between 2000 and 2009. Sites in Camp Creek, Cedar Creek, the Mohawk River, and the lower McKenzie River had the most agricultural land within the watershed. Monitoring data showed excellent water quality in the McKenzie River. However, some potential water quality concerns were also identified in tributaries in the lower watershed. Camp Creek, Cedar Creek, and Keizer Slough (which is not agriculturally influenced) showed the highest concentrations of nitrates, total phosphorus, metals, E. coli, total organic carbon, total suspended solids, total coliform and specific conductance. Nitrate levels in Camp Creek declined over the duration of the monitoring period. Camp Creek, Cedar Creek, and the lower Mohawk River had the highest levels of E. coli, which sometimes violated Oregon's water quality standards.

Between 2008 and 2010, the Middle Fork, Coast Fork, and Long Tom watershed councils collaborated to evaluate water quality above and below eight small communities in Lane County. Some of the monitoring data were gathered in streams with significant agricultural influence. Monitoring results relevant to agriculture are summarized below.

In the Middle Fork Willamette, upstream and downstream samples were collected on Lost Creek and Little Fall Creek. Both of these watersheds include some agricultural land, as well as residential and forest lands. Lost Creek data showed temperature and dissolved oxygen concerns during the monitoring period, with relatively infrequent bacteria concerns at the downstream site. Little Fall Creek showed temperature and dissolved oxygen concerns, but met state bacteria standards consistently.

In the Coast Fork Willamette, Hill Creek, Camas Swale, Gettings Creek, and Mosby Creek were the streams monitored that have significant agricultural land. Gettings Creek had greater water quality concerns than the other streams in the study, with temperature and bacteria concerns at the lower site and an increase in water quality concerns between the upstream and downstream sites.

Land condition assessment

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ODA will work with LMAs and other partners to design and conduct an assessment of streamside areas along agricultural lands in the management area prior to the next biennial review. These assessments will allow ODA and partners to track improvements in land conditions over time. Often, improvements in land conditions are detectable much earlier than changes in water quality. For example, when a landowner restores a streamside area, land conditions improve rapidly, even though it may take 20 years for streamside vegetation to reach the height that it can positively affect stream temperatures.

Implementation activities assessment

In addition, during the biennial review process, ODA, the LMA, and the LAC assess activities that have occurred to help achieve plan goals and objectives, including the following.

- Outreach and education activities conducted to promote awareness of water quality issues and encourage agricultural land conditions that protect water quality, and the level of participation in these activities
- Voluntary conservation projects installed by agricultural landowners and managers in cooperation with the LMA and other agencies and organizations
- Number of complaint investigations, the result of each complaint investigation, and corrections of violations

Area plan and rules effectiveness evaluation

The LAC, ODA, and the LMA will evaluate the effectiveness of the area plan in improving water quality and land conditions, include the evaluation results in the next update of the area plan, and summarize the results in a biennial report to the Oregon Board of Agriculture. ODA, the LMA, and the LAC will discuss the monitoring and evaluation results at the next biennial review, what these results mean in terms of area plan effectiveness, and modifications to the area plan and rules. Some of the questions to consider in the discussions include:

- Are all of our goals and objectives measurable?
- Were the activities that we committed to do over the previous two years in our goals, objectives and strategies accomplished?
- Were all violations that were found during investigations resolved or are they in the process of being resolved?
- Were our goals and objectives for land condition improvements met?
- Are water quality data from agricultural lands showing improvement?
- How do water quality and land condition data trends compare? Do we need to start collecting other kinds of land condition data?

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Documenting Effectiveness Using Priority Areas

Why Focus Efforts in a Priority Area?

The Oregon Agricultural Water Quality Program relies primarily on voluntary improvements in land conditions for agriculture to fulfill its responsibility to prevent and control water pollution. One way to implement an Area Plan systematically is to focus and measure implementation in relatively small regions within the Management Area.

The priority area concept evolved from conversations between ODA, LMAs, LACs, and other stakeholders and partners seeking better ways to implement the Agricultural Water Quality Program and Area Plans. ODA and program partners believe that strategic, focused, and systematic delivery of outreach and technical assistance will lead to more measurable levels of implementation and allow ODA and the LMA to make better use of limited resources.

While the priority area approach is relatively new for ODA, the LMA, and the LAC, it is consistent with other agencies' and organizations' efforts to work proactively in targeted geographic areas.

Selecting A Priority Area

A priority area is usually a small watershed (6th or 7th field HUC) with agricultural lands. An initial priority area is selected jointly by ODA, the LMA, the LAC, and other partners, based on one or more of the following factors:

- Significant water quality concerns probably associated with agricultural activities
- LMA and other partners are already working with landowners in an area
- Size of the area matches the LMA's capacity to work in the entire area in a relatively short time frame

During the 2012 biennial review process, ODA, the LMA, and the LAC discussed the priority area concept, an initial priority area, future priority areas, measurable objectives for implementation in the priority area, and timelines for implementation. The initial and future priority areas for the Management Area are described in the Strategies section of this Area Plan.

Land Condition and Water Quality

Once a priority area is selected, land condition measures are identified for which baseline and post-implementation data will be collected and mapped. These land condition measures serve as surrogates for the water quality parameters of concern in the priority area. For example, streamside vegetation is generally used as a surrogate for water temperature, sediment may be used as a surrogate for pesticides and mercury, and livestock access to waterways could be used as a surrogate for bacteria. Water quality monitoring data may also help partners evaluate the effects of changing land conditions

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on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides, to evaluate progress in the priority area and to help identify future priority areas.

The Oregon Agricultural Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- landowners can see land conditions and have direct control over land conditions
- it can be difficult to separate agriculture's influence on water quality data from other influences, such as bacteria from failing septic systems, wildlife, and recreation
- other factors such as climate change may have long-term impacts on water quality that are beyond agriculture's control
- it is expensive to monitor water quality at the scale needed to evaluate effectiveness
- changes in land conditions, such as streamside vegetation, will take a long time to translate into water quality improvements

Focused Outreach and Technical Assistance

After baseline streamside conditions are mapped, the LMA and other interested partners deliver focused and systematic outreach and technical assistance to landowners in the priority area. Every landowner with potential land condition concerns is contacted with an offer of voluntary assistance. Focused, one-on-one (active) outreach and technical assistance efforts are often more effective in reaching landowners than general (passive) outreach. This focused program delivery will allow ODA, the LMA, and the LAC to implement the Area Plan systematically by moving focused work from one small watershed to the next over time, eventually reaching the entire Management Area.

Monitoring and Evaluation

ODA, the LMA, and the LAC will evaluate and document the implementation of the Area Plan by assessing improvement of land conditions in the priority area during each biennial review. Comparisons of baseline and post-implementation land conditions (along with available water quality data) will allow these partners to determine whether the selected land condition measures have improved. These partners and other stakeholders will also be able to evaluate the status and trends of Area Plan implementation more readily than from reports of implementation efforts scattered throughout a Management Area.

The priority area process will help ODA, the LMA, the LAC, and other program partners to evaluate whether implementation of the Agricultural Water Quality Program is achieving the measurable objectives in the Area Plan, such as:

- Achieve X% compliance with the Area Rules over Z years
- Achieve Y% water-quality protective vegetation over Z years

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Stream Temperature and Streamside Vegetation

Across Oregon's 38 Water Quality Management Areas, many LMAs are focusing their initial priority area implementation on streamside vegetation. There are several reasons for this focus:

- streamside vegetation improves water quality for multiple parameters, including temperature, sediment, bacteria, nutrients, toxics, and pesticides
- streamside vegetation is visible from public roads and on aerial photos, allowing agencies, stakeholders, and the general public to see that agriculture is part of the solution
- landowners can take steps to improve streamside vegetation, with or without assistance from the LMA, watershed councils, or other local partners
- streamside vegetation improves fish and wildlife habitat

The Oregon Agricultural Water Quality Program usually uses the concept of "site-capable streamside vegetation" to describe the vegetation that agricultural streamsides need in order to prevent and control water pollution. Site-capable streamside vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g. elevation, soils, climate, wildlife, fire, floods) and historical and current human influences (e.g. channelization, roads, invasive species, land management). Site-capable streamside vegetation can be determined for a specific site based on: streamside vegetation at the site (type, location, and size), streamside vegetation at nearby reference sites (with similar natural characteristics), or NRCS soil surveys (which often describe the vegetation in uncultivated areas).

Mature, site-capable streamside vegetation usually provides three functions that help to prevent or control water pollution from agricultural activities:

1. shade that blocks direct solar radiation and moderates stream temperatures
2. bank stability and reduction of streambank erosion
3. filtration of pollutants (e.g. bacteria, nutrients, pesticides, mercury, sediment) from overland flows

However, in some cases mature site-capable vegetation may not be needed to provide these functions, or may not provide these functions. For example:

- mature trees may not be necessary to protect water quality; willows or other shrubs may suffice on small streams
- mature conifers may shade crops or create undesirable microclimates; mature alders may be an adequate alternative
- mature juniper is site-capable vegetation in central and eastern Oregon, but it reduces bank stability and increases erosion
- invasive grasses (such as reed canarygrass or Kentucky bluegrass) can be the dominant site-capable vegetation along streams, but they generally do not provide all of the required water quality functions

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- upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down-cutting, but they do not improve water quality

To measure baseline conditions in the priority area, the LMA will map streamside areas on agricultural lands and estimate the percentage of streamside areas that fall into four categories, referred to as Class I, II, III, and IV in this Area Plan (Table 2).

Table 2. Classes of Streamside Vegetation for Assessing Land Conditions.

Class	Water-Quality Protective Vegetation	Agricultural Impacts	Three Functions Provided
I	Present	None	All three
II	Establishing and growing	None	Depends on size / location / density of vegetation
III	Unable to establish	Prevent vegetation from establishing	No
IV	Unable to establish	None – non ag factors prevent vegetation from establishing	No

Every two years, ODA, the LMA, and the LAC will evaluate the progress of Area Plan implementation in the priority area. The percentage of streamside areas that fall into the four classes will be updated. Streamside areas can be reclassified from Class III to Class II where projects remove agricultural impacts and allow streamside vegetation to establish. Reclassification from Class II to Class I will usually take longer than two years, because streamside vegetation needs to grow to a height where it can provide shade and other functions.

Placeholder - Source assessment/discussion
What are the ag sources that are contributing to the status and trends that we observe? Should we at least revisit that section of the plan, given the data? Is there a way to make those sections more specific, either geographically or by activity? For example, is winter feeding more of a contributor? Do existing data support the assumptions that the plan has already made about agricultural sources? What data are needed to further assess the relative importance and geographic distribution of the sources?

Placeholder - What do water quality and land condition data tell us about where work should be focused and what issues work should focus on?

- Summarize source/priority identification data collected by watershed councils, SWCDs, DEQ, etc
- If DEQ, watershed council, or other data indicate water quality problems, what are the potential agricultural sources of these problems?
- What types of objectives and strategies should we identify for the next 2 years to address the agricultural sources of those problems?

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Is additional water quality or landscape monitoring needed to identify areas where focused work is needed?

Pesticide Management

Pesticide Management Plan

The Pesticides Program of ODA holds the primary responsibility for pesticide registration and use regulation within the state of Oregon under the Federal Insecticide Fungicide Rodenticide Act. Because EPA designated the state as the lead agency for pesticides, ODA led the development and implementation of a Pesticide Management Plan (PMP) for the state of Oregon. The PMP, completed in 2011, strives to protect drinking water supplies and the environment from pesticide contamination, while recognizing the important role that pesticides have in maintaining a strong state economy, managing natural resources, and preventing human disease. The PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water resources by managing the pesticides that are currently approved for use by EPA in both the agricultural and non-agricultural settings. Pesticides that are no longer marketed, also called "legacy" pesticides, are not regulated through the PMP, and are instead regulated through a separate process under the federal Clean Water Act and Oregon water quality laws. More information about the PMP is available on the ODA website (www.oregon.gov/ODA/PEST/water_quality.shtml).

Water Quality Pesticide Management Team

In 2007, the interagency Water Quality Pesticide Management Team (WQPMT) was formed to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT includes representation from the Oregon Departments of Agriculture, Forestry, and Environmental Quality, and the Oregon Health Authority. The WQPMT facilitates and coordinates water quality / pesticide activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The WQPMT developed the PMP. The WQPMT relies on monitoring data from the Pesticide Stewardship Partnership and other monitoring programs to assess the possible impact of pesticides on Oregon's water quality.

Pesticide Stewardship Partnership

The Pesticide Stewardship Partnership (PSP) program identifies potential concerns and improves water quality affected by pesticide use. The Clackamas PSP, one of seven PSPs around Oregon, was initiated in 2005. The PSP combines local expertise and water quality sampling results to encourage voluntary changes in pesticide use and management practices.

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9. Public Involvement

The ODA, Upper Willamette SWCD, and LAC worked in cooperation to encourage public involvement during the Area Plan and Rules development. All LAC meetings were open to the public and were advertised through press releases to local newspapers. Meeting notices and minutes were sent to interested members of the public. Members of the public in attendance were invited to comment at the end of each meeting. The Upper Willamette SWCD gave several presentations at meetings of agricultural groups about the process, and also sent press releases to local papers updating the public on the progress of the Plan and Rules.

When the draft Area Plan and Rules were completed for the Southern Willamette Valley, they were first presented to the public through a series of public information meetings and presentations in January 2002. The department then conducted a formal public comment period and two public hearings in January and February 2002. ODA, in consultation with the LAC, then reviewed public comments and incorporated several changes into the final Plan and Rules.

Since Area Plan and Rules adoption, the Upper Willamette SWCD has continued outreach and education programs about the Area Plan and Rules. Ongoing outreach activities include newspaper articles, small acreage conservation workshops, and presentations at agricultural group meetings.

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Appendices

A. Sources of Information and Technical Assistance
B. 2010 Water Quality Assessment List and Decision Matrix
C. Water Quality Parameters List and Affected Beneficial Uses
D. Pesticide Use In Oregon
E. Conservation Funding Programs
F. Revised Universal Soil Loss Equation (RUSLE)
G. ORSs 468B.025 and 468B.050
H. References on Water Quality Improvement Practices for Agricultural Landowners
I. Where Does the 25-year Storm Event Requirement Come From in the Riparian Characteristic to Achieve?

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Appendix A: Sources of Information and Technical Assistance

Upper Willamette Soil and Water Conservation District (Upper Willamette SWCD) (formerly the East Lane SWCD)

780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6436

Provides technical assistance in a wide variety of agricultural and natural resource areas and assists landowners in accessing federal and local funding programs.

Farm Services Agency (FSA)

780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6443

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

Lane County Farmers' Market

55 East 8th Avenue
Eugene, OR 97401
(541) 687-6721

Local produce directly from farmers. Many experienced organic growers onsite.

McKenzie River Trust

1245 Pearl Street
Eugene, OR 97401
(541) 345-2799
mrt@mckenzieriver.org
www.mckenzieriver.org

Local, non-profit land conservancy that works with landowners in Lane and Douglas Counties to preserve their property. Employs several tools to help landowners protect lands critical to water quality and wildlife habitat.

Natural Resources Conservation Service (NRCS)

780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6443

Provides information on soil types, soils mapping, and interpretation. Administers and provides assistance in developing conservation plans for federal programs such as the Conservation Reserve Program, Conservation Reserve Enhancement Program, the Environmental Quality Incentives Program, and the Wetlands Reserve Program. Makes technical determinations on wetlands and highly erodible lands.

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Northwest Coalition for Alternatives to Pesticides (NCAP)

P.O. Box 1393
Eugene, OR 97440
(541) 344-5044
http://www.pesticide.org
info@pesticide.org

Works to protect people and the environment by advancing healthy solutions to pest problems. Has a library of over 15,000 articles, documents and books on pesticide issues, the health and environmental effects of pesticides, and alternative practices. Provides information on managing a specific pest problem or crop without the use of pesticides. Has water quality program and can provide information on protection of waterways and research on pesticide contamination of waterways.

Oregon Department of Agriculture (ODA)

635 Capitol St NE
Salem, OR 97301
Natural Resources Division: (503) 986-4700
Pesticides Division: (503) 986-4635

The Natural Resources Division is responsible for developing and implementing Management Area Plans and Rules across Oregon, the Confined Animal Feeding Operation 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.

Oregon Department of Environmental Quality (DEQ)

165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838

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 Total Maximum Daily Loads for water quality limited waterbodies.

Oregon Department of Fish and Wildlife (ODFW)

Springfield Field Office
3150 E Main Street
Springfield, OR 97478-5800
(541) 726-3515
http://www.dfw.state.or.us

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.

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Oregon Department of Forestry (ODF)

Veneta office:

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

Springfield office:

3150 E Main Street
Springfield, OR 97478-5800
(541) 726-3588
http://www.odf.state.or.us

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.

Oregon Department of State Lands (DSL)

775 Summer Street NE Suite 100
Salem, OR 97301-1279
(503) 986-5200
http://statelands.dsl.state.or.us

Administers Oregon fill and removal law and provides technical assistance to landowners.

Oregon State University Extension Service (OSU Extension Service)

783 Grant Street
Eugene, OR 97402
(541) 344-5859
http://extension.oregonstate.edu/lane

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

Oregon Tilth

260 SW Madison Avenue, Suite 106
Corvallis, OR 97333
(503) 378-0690
http://www.tilth.org

Oregon Tilth is the Northwest certifying agency for organic farms. Maintains a manual on acceptable practices and visits farms to determine compliance. Also publishes "In Good Tilth" and maintains a list of currently certified farmers.

Oregon Water Resources Department (WRD)

725 Summer Street NE, Suite A
Salem, OR 97301
(503) 986-0900
http://www.wrd.state.or.us

Provides information on streamflows and water rights, issues water rights, and monitors water use.

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Oregon Watershed Enhancement Board (OWEB)

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

Provides funding for a variety of watershed enhancement, assessment, monitoring and educational activities. Provides support to watershed councils throughout Oregon.

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.

McKenzie Watershed Council
P.O. Box 70166
Springfield, OR 97475
(541) 687-9076
www.mckenziewc.org
coordinator@mckenziewc.org

Coast Fork Watershed Council
28 South 6th Street Suite A
Cottage Grove, OR 97424
(541) 767-9717
www.coastfork.org

Middle Fork Watershed Council
P.O. Box 27
Lowell, OR 97452
(541) 937-9800
www.mfwwc.org
contact@mfwwc.org

Mohawk Watershed Partnership
P.O. Box 615
Marcola, OR 97454-0615
(541) 687-9076
mwp@epud.nethttp://www.mckenziewc.org/mohawkWSP.html

Lost Creek Watershed Group
PO Box 27
Lowell, OR 97452
(541) 937-3351
mfwwc@efn.org

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Appendix B: 2010 Water Quality Assessment List and Decision Matrix

Southern Willamette Agricultural Water Quality Management Area Water Quality Limited Waterbodies

"TMDL" means a TMDL has been established for the waterbody and approved by EPA, and is being implemented. The TMDL is the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. The water is considered Water Quality Limited until it meets the water quality standard.

"303(d) List" means the waterbody exceeds listing criteria and is placed on the 303(d) List.

"Potential concern" means data indicate a waterbody may typically meet water quality standards except under unusual circumstances (e.g. unusual weather circumstances) or in situations where toxics exceed levels of concern but do not exceed definitions used for the 303(d) List. In these cases, the waterbodies are identified as being of potential concern and the Department of Environmental Quality will seek more data to verify the assessment.

BACTERIA (CRITERIA: WATER CONTACT RECREATION)

TMDL Approved September 2006

DEQ has set the bacteria TMDL to protect human water contact recreation, the most sensitive beneficial use. Urban stormwater discharge and agricultural run-off are two potential sources of bacteria. The bacteria TMDL addresses the entire area.

DISSOLVED OXYGEN

TMDL Approved, 1996
Coast Fork Willamette River, River Mile (RM) 0 to 28.5

303(d) List	Season
Middle Fork Sub Basin:	
Anthony Creek, Mouth to RM 4.3	Oct. 1 – May 31
Anthony Creek, Mouth to RM 4.3	June 1 – Sept. 30
Lost Creek, Mouth to RM 14.7	Oct. 1 – May 31
Lost Creek, Mouth to RM 14.7	June 1 – Sept. 30
Coast Fork Sub Basin:	
Camas Swale Creek, Mouth to RM 9.4	Oct. 1 – May 31

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TEMPERATURE (CRITERIA: REARING 64 F, SPAWNING 55 F, OR BULL TROUT 50 F)

DEQ set the TMDL for temperature to protect salmon spawning, rearing, and passage as the most sensitive beneficial uses in the Southern Willamette Valley Management Area. DEQ has identified the existing nonpoint source pollution sources as solar heating of the Area's waterways due to a lack of riparian vegetation from forestry, agriculture, rural residential, and urban activities. There are separate temperature TMDLs for the mainstem Willamette, the McKenzie Subbasin, the Middle Fork Willamette Subbasing, and the Coast Fork Willamette Subbasin

303(d) List (covered under the TMDL)	Season
McKenzie Sub Basin:	
Blue River-RM 0 to 15.5	Year Round
Budworm Creek, RM 0 to 3.1	Year Around
Camp Creek, RM 0 to 10.9	Year Around
Cartright Creek, RM 0 to 6.1	Year Around
Cash Creek, RM 0 to 6.1	Year Around
County Creek, RM 0 to 2.4	Year Around
Deer Creek, RM 0 to 2.6	Year Around
Duckpen Creek, RM 0 to 2.1	Year Around
Horse Creek, RM 0 to 14.2	Summer
Lookout Creek, RM 0 to 9.8	Year Around
Marten Creek, RM 0 to 6.5	Year Around
McGowan Creek, RM 0 to 5.7	Year Around
McKenzie River, RM 0 to 54.6	Year Around
Mill Creek, RM 0 to 10.6	Year Around
Mohawk River, RM 0 to 25.4	Year Around
Rebel Creek, RM 0 to 1.2	Year Around
Rush Creek, RM 0 to 2.4	Year Around
Seeley Creek, RM 0 to 2.4	Year Around
Shotgun Creek, RM 0 to 6.6	Year Around
South Fork McKenzie River, RM 0 to 4.5	Summer
Middle Fork Willamette:	
Anthony Creek, RM 0 to 4.3	Year Around
Bohemia Creek, RM 0 to 4.4	Year Around
Buckhead Creek, RM 0 to 3.6	Year Around
Chalk Creek, RM 0 to 4.8	Year Around
Christy Creek, RM 0 to 12	Year Around
Coal Creek, RM 0 to 8.9	Year Around
Coal Creek Trib., RM 0 to 2.2	Year Around
Eagle Creek, RM 0 to 5.3	Year Around
Fall Creek, RM 0 to 32.8	Year Around
Furnish Creek, RM 0 to 5.2	Year Around

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Gold Creek, RM 0 to 5.1	Year Around
Goodman Creek, RM 0 to 2.3	Year Around
Guiley Creek, RM 0 to 4.7	Year Around
Hehe Creek, RM 0 to 6.6	Year Around
Hills Creek, RM 0 to 15.3	Year Around
Indian Creek, RM 0 to 4.3	Year Around
Little Fall Creek, RM 0 to 20.6	Year Around
Logan Creek, RM 0 to 3.6	Year Around
Lost Creek, RM 0 to 14.7	Year Around
McKinley Creek, RM 0 to 3.8	Year Around
Middle Creek, RM 0 to 3.8	Year Around
Middle Fork Willamette, RM 52.3 to 82.2	Year Around
Mike Creek, RM 0 to 2.2	Year Around
Monterica Creek, RM 0 to 2.3	Year Around
N. Fork, Middle Fork Willamette River, RM 0 to 28.3	Year Around
N. Fork Winberry Creek, RM 0 to 5.8	Year Around
Packard Creek, RM 0 to 5.2	Summer
Portland Creek, RM 0 to 3	Summer
Salt Creek, RM 0 to 13.8	Year Around
Shortridge Creek, RM 0 to 2	Year Around
Snake Creek, RM 0 to 3.6	Year Around
South Fork Winberry Creek, RM 0 to 9.5	Year Around
Wall Creek, RM 0 to 6.6	Year Around
Winberry Creek, RM 0 to 8	Year Around
Coast Fork Willamette:	
Brice Creek, RM 0 to 11.2	Summer
Coast Fork Willamette, RM 0 to 38.8	Year Around
King Creek, RM 0 to 3.2	Year Around
Laying Creek, RM 0 to 14.4	Year Around
Marten Creek, RM 0 to 3.4	Year Around
Mosby Creek, RM 0 to 21.2	Year Around
Row River, RM 0 to 20.8	Year Around
Sharps Creek, RM 0 to 15,2	Year Around

Potential Concern	**Season**
McKenzie Sub Basin:	
Augusta Creek, RM 0 to 7.1	Summer
Middle Fork Willamette:	
Salt Creek, South Fork, RM 0 to 6.6	Summer

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METALS

Mercury TMDL

Human fish consumption is the most sensitive beneficial use for which DEQ has set the Mercury TMDL. Primary sources of mercury include air deposition from national and international sources, discharge from specific legacy mining sites, and erosion of soils containing mercury. The Mercury TMDL has a basin wide strategy for mercury reduction.

303(d) List	Season
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5 (Manganese)	Year Around
Mohawk River, RM 0 to 25.4 (Iron)	Year Around
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 38.8 (Iron)	Year Around
Coast Fork Willamette River, RM 0 to 38.8 (Mercury)	Year Around
Cottage Grove Reservoir (Mercury)	Year Around
Dennis Creek, RM 0 to 1.4 (Mercury)	Year Around
Dorena Reservoir (Mercury)	Year Around
Potential Concern	
McKenzie Sub Basin:	
McKenzie RiverRM 0 to 83 (Arsenic)	
McKenzie River, RM 0 to 34.1 (Chromium)	Year Around
McKenzie River, RM 0 to 34.1 (Copper)	Year Around
McKenzie River, RM 0 to 19.7 (Iron)	Year Around
McKenzie River, RM 0 to 34.1 (Manganese)	Year Around
McKenzie River, RM 0 to 34.1 (Nickel)	Year Around
South Fork McKenzie River, RM 0 to 36.3 (Iron)	Year Around
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 38.8 (Manganese)	Year Around

Flow Modification

303 (d) List	Season
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5	Undefined
Camp Creek, RM 0 to 10.8	Undefined
McKenzie River, RM 34.1 to 54.5	Undefined
South Form McKenzie River, RM 0 to 4.5	Undefined

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Middle Fork Willamette:	
Fall Creek, RM 0 to 7 and 13 to 32.7	Undefined
Middle Fork Willamette River, RM 0 to 15.6 and 18.7 to 44.2	Undefined
Coast Fork Willamette:	
Coast Fork Willamett, RM 0 to 31.3	Undefined
Row River, RM 0 to 7.4	Undefined

Habitat Modification

303 (d) List	**Season**
McKenzie Sub Basin:	
Mill Creek, RM 0 to 2.7	Undefined
Mohawk River, RM 0 to 25.4	Undefined
Middle Fork Willamette:	
Little Fall Creek, RM 0 to 20.6	Undefined
Simpson Creek, RM 0 to 5	Undefined
Coast Fork Willamette:	
Brice Creek, RM 0 to 11.2	Undefined
Mosby Creek, RM 0 to 21.2	Undefined
Sharps Creek, RM 0 to 12.5	Undefined

Aquatic Weeds or Algae

303 (d) List	**Season**
McKenzie Sub Basin:	
Blue River/Blue River Reservoir	Undefined
Middle Fork Willamette:	
Middle Fork Willamette/Dexter Reservoir	Undefined
Middle Fork Willamette/Hills Creek Lake	Undefined
Middle Fork Willamette/Lookout Point Lake	Undefined
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 31.3	Undefined
Row River/Dorena Lake	Undefined

NUTRIENTS

<u>TMDLs Approved</u>

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Coast Fork Willamette-Mouth to Cottage Grove Reservoir (Phosphorus)
Coast Fork Willamette-Mouth to Cottage Grove Res. (Water-Ammonia)
Coast Fork Willamette, RM 0 to 31.3 (pH)

Potential Concern
McKenzie River, RM 73.4 to 84.8 (Phosphorus)

Alkalinity

Potential Concern	**Season**
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5	Year Around
Cash Creek, RM 0 to 6.1	Year Around
County Creek, RM 0 to 2.4	Year Around
Lookout Creek, RM 0 to 9.8	Year Around
Marten Creek, RM 0 to 6.5	Year Around
McKenzie River, RM 0 to 84.8	Year Around
Mill Creek, RM 0 to 10.6	Year Around
Mohawk River, RM 0 to 25.4	Year Around
Parsons Creek, RM 0 to 6.9	Year Around
Rebel Creek, RM 0 to 4.4	Year Around
Roney Creek, RM 0 to 2.7	Year Around
Rush Creek, RM 0 to 2.4	Year Around
South Fork McKenzie River, RM 0 to 36.3	Year Around
Middle Fork Willamette:	
Black Creek, RM 0 to 13.6	Year Around
Eighth Creek, RM 0 to 2.7	Year Around
Furnish Creek, RM 0 to 5.2	Year Around
Little Fall Creek, RM 0 to 20.6	Year Around
Middle Fork Willamette River, RM 0 to 82.2	Year Around
North Fork Winberry Creek, RM 0 to 5.8	Year Around
Shady Creek, RM 0 to 1.7	Year Around
Timber Creek, RM 0 to 2.7	Year Around
Coast Fork Willamette:	
Brice Creek, RM 0 to 15.5	Year Around
Coast Fork Willamette River, RM 0 to 28.3	Year Around
Row River, RM 0 to 20.8	Year Around

Biological Criteria

Potential Concern	**Season**
McKenzie Sub Basin:	

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Cash Creek, RM 0 to 6.1	Year Around
Hardy Creek, RM 0 to 4.1	Year Around

Middle Fork Willamette:

Double Creek, RM 0 to 2.9	Year Around
Furnish Creek, RM 0 to 5.2	Year Around
Goodman Creek, RM 0 to 2.3	Year Around
Middle Fork Willamette River, RM 0 to 82.2	Year Around
Salt Creek, RM 0 to 29.1	Year Around
Shady Creek, RM 0 to 1.7	Year Around

Mainstem Willamette Listings

Dioxin, Aldrin, DDE, DDT, Dieldrin, PCBs, and Iron

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Appendix C: Water Quality Parameters List and Affected 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 or in OAR 340-041-0445. Listed parameters in the Management Area are indicated in boxes.

Parameters

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 which are injurious to health, recreation, or industry shall not be allowed.
Beneficial Uses Affected - Water Contact Recreation, Aesthetics, Fishing, Livestock Watering, Public and Private Domestic Water Supply, Irrigation, Industrial Water Supply.

Bacteria
Standard - Fecal bacteria levels shall not exceed a 30-day log mean of 126 E. Coli organisms per 100 ml, based on a minimum of 5 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, Public and Private Domestic Water Supply, Livestock Watering.

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, Salmonid Spawning, Rearing, and Migration.

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

Beneficial Uses Affected - Water Contact Recreation, Aesthetics, Fishing, Water Supply.

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Dissolved Oxygen
Standard - For waterbodies identified as salmonid spawning, dissolved oxygen must not be less than 11.0 mg/l and intergravel levels must not fall below 6 mg/l. For waterbodies supporting cold water aquatic life, dissolved oxygen must not fall below 8 mg/l. For waterbodies supporting cool water aquatic life, dissolved oxygen must not fall below 6.5 mg/l. For waterbodies supporting warm water aquatic life, dissolved oxygen must not be less than 5.5 mg/l.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Flow Modification
Standard – The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Habitat Modification
Standard – The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Nutrients
Standard - see standards for aesthetics, pH, dissolved oxygen, chlorophyll a, and aquatic weeds or algae.
Beneficial Uses Affected - Aesthetics or use identified under related parameters.

pH
Standard - pH shall not fall outside 6.5 to 8.5. The following exception applies: waters impounded by dams existing on January 1, 1996, which have pHs that exceed the criteria shall not be considered in violation of the standard if the Department of Environmental Quality determines that the exceedance would not occur without the impoundment and that all practicable measures have been taken to bring the pH in the impounded waters into compliance with the criteria.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Water Contact Recreation, Salmonid Spawning, Rearing, and Migration.

Sedimentation
Standard – The formation of appreciable bottom or sludge deposits or the 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.

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Temperature
Standard - 64F for waterbodies with salmonid fish rearing and migration, 55F for waterbodies with salmonid fish spawning, 61F for core cold water habitat, and 50F for waterbodies with bull trout. Following a temperature TMDL, temperature water quality limited waters can not be warmed more than .3 degrees Celsius (.5 degrees F) by sources from anthropogenic heating.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Fish 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, Salmonid Spawning, Rearing, and Migration.

Toxics
Standard - Toxic substances shall not be introduced above natural background levels in the 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 impact public health, safety, or welfare; aquatic life; wildlife; or other designated beneficial uses. Standards for specific toxic substances may be viewed on the DEQ website at http://waterquality.deq.state.or.us/wq/wqrules/340Div41Tbl20.pdf.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Public, Private and Industrial Water Supply, Livestock Watering, Fishing, Irrigation, Water Contact Recreation.

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, Aesthetics.

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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 may 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 which 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 which 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.

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(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 ODA.
(15) Deliver, distribute, sell or offer for sale any pesticide which is misbranded.
(16) Formulate, deliver, distribute, sell or offer for sale any pesticide which is adulterated.
(17) Formulate, deliver, distribute, sell or offer for sale any pesticide which 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 which 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 ODA, 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 therefrom 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 thereunder. [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://www.oda.state.or.us/pesticide/info.html or an updated copy of the ORSs and Oregon Administrative Rules.

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

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Appendix E: 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 may become available after the publication of this document. For more current information, please contact one of the organizations listed below.

Program	General Description	Contact
Conservation Easements	Deed restrictions that protect specific aspects of land for water quality and/or habitat benefits. Easements are perpetual, flexible documents that are held by private conservation organizations, who are charged with ensuring that what is protected stays protected. Management responsibilities of land are shared with landowner. Donated easements can provide tax benefits. Easements can also be sold.	American Farmland Trust, McKenzie River Trust, Trust for Public Land
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.	NRCS, SWCDs, 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.	NRCS, SWCDs
Conservation Stewardship	Provides cost-share and	NR CS, SWCDs

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Program	General Description	Contact
Program (CSP)	incentive payments to landowners who have attained a certain level of stewardship and are willing to implement additional conservation practices.	
Emergency Watershed Protection Program (EWP)	Available through the USDA-NRCS. 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.	NRCS, SWCDs
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, SWCDs, 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.	NRCS, SWCDs
Farm and Ranchland Protection Program (FRPP)	Cost-shares purchases of agricultural conservation easements to protect agricultural land from development.	NRCS, SWCDs
Federal Reforestation Tax Credit	Provides federal tax credit as incentive to plant trees.	IRS
Fee Title Acquisition	In some situations, private land conservancies can acquire land for a fee from landowners. Generally, land conservancies purchase property in relatively good ecological health, and buy	McKenzie River Trust, The Nature Conservancy, SWCDs

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Program	General Description	Contact
	the property at appraised value.	
Forestry Incentives Program (FIP)	Provides cost-sharing for several forest stand improvement practices.	NRCS, SWCDs, Oregon Department of Forestry
Forest Resource Trust	State assistance up to 100 percent of the costs to convert non-stocked forest land 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.	NRCS, FSA, SWCD
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. 25% match requirement on all grants.	SWCDs, Watershed Councils, OWEB
Oregon Watershed Enhancement Board Small Grants Program	Provides grants up to $10,000 for watershed restoration projects. 25% match requirement.	SWCDs, Watershed Councils, OWE B
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, NRCS, SWCDs
Public Law 566 Watershed Program	Program available to state agencies and other eligible organizations for planning and implementing watershed improvement and	NRCS, SWCDs.

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Program	General Description	Contact
	management projects. Projects should reduce erosion, siltation, and flooding; provide for agricultural water management; or improve fish and wildlife resources.	
Resource Conservation & Development (RC & D) Grants	Provides assistance to organizations within RC & D areas in accessing and managing grants.	Resource Conservation and Development
State Forestation Tax Credit	Provides for reforestation of under-productive forest land 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 devices.	Oregon Department of Fish and Wildlife
Stewardship Incentive Program (SIP).	Cost-sharing program for landowners to protect and enhance forest resources. Eligible practices include tree planting, site preparation, pre-commercial thinning, and wildlife habitat improvements.	NRCS, SWCDs, Oregon Department of Forestry
Wetlands Reserve Program (WRP)	Provides cost-sharing to landowners who restore wetlands on agricultural lands.	NRCS, SWCDs
Wildlife Habitat Incentives Program	Provides cost-share for wildlife habitat enhancement activities.	NRCS, SWCDs
Wildlife Habitat Tax Deferral Program	Maintains farm or forestry deferral for landowners who develop a wildlife management plan with the	Oregon Department of Fish and Wildlife, SWCDs, NRCS.

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Program	General Description	Contact
	approval of the Oregon Department of Fish and Wildlife.	

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Appendix F: Revised Universal Soil Loss Equation (RUSLE)

The RUSLE is a model that estimates the average annual level of soil loss on a field due to sheet and rill erosion. The sheet erosion process occurs when rainfall and runoff water combine to erode a relatively uniform layer of soil. Runoff may also erode soil to form numerous small channels a few inches deep, or rills.

The equation for estimating annual soil loss is:

A = RKLSCP

where:

A = average annual soil loss in tons per acre;

R = rainfall and runoff intensity index by geographic location;

K = soil erodibility factor;

LS = topographic factor, L is for slope length and S is for slope percent;

C = cropping factor, the ratio of soil loss for the given conditions to that from a clean-cultivated field;

P = conservation practice factor, or the ratio of soil loss for a given practice to that for purely up-and-down-the-slope farming.

Each soil type has a soil loss tolerance factor, or T. If the annual soil loss exceeds the soil loss tolerance factor, the soil is eroding at an unsustainable rate; in other words, the soil quality is degrading. Natural Resource Conservation Service and SWCD offices have soil surveys to help landowners determine soil types, and also provide technical assistance to help landowners estimate the rate of soil loss on their property. For more information, contact the local NRCS and SWCD office.

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Appendix G: ORS 468B.025 and 468B.050

ORS 468B.025 is an existing statute that was developed to address water pollution from waste discharge. To implement Senate Bill 502, approved in 1995 and codified at ORS 561.190 through 192, which ensures that ODA directly regulates farming activities for the purpose of protecting water quality, ODA is incorporating ORS 468B.025 and 468B.050 into all Area Plans and Rules in the state.

ORS 468B.025(1) states:

...no person shall:
(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

ORS 468B.050 identifies the conditions when a permit is required. In agriculture, under state rules, these are referred to as Confined Animal Feeding Operations 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 Concentrated Animal Feeding Operation (40 CFR § 122.23).

Definitions:

"Pollution" has the meaning given in ORS 468B.005(3) which states: "such alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof."

"Wastes" has the meaning given in ORS 468B.005(7) which states: sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances which will or may cause pollution or tend to cause pollution of any waters of the state.

Other substances that will or may cause pollution include commercial fertilizers, soil amendments, composts, animal wastes, and vegetative materials.

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Appendix H: References on Water Quality Improvement Practices for Agricultural Landowners

Below is a list of selected references with more specific information on water quality and natural resources improvement practices. Copies of many of these publications are available from the local Oregon State University Extension office or local SWCD. Underlined publications are also available online on the publishing agency's website.

General Water Quality Protection

Adams, E.B. 1992. Farming practices for groundwater protection. Washington State University, Spokane, Washington.

Hermanson, R.E. 1994. Care and feeding of septic tanks. Washington State University, Spokane, Washington.

Hirschi, M. et al. 1994. 50 ways farmers can protect their groundwater. University of Illinois, Urbana, Illinois.

Hirschi, M., et al. 1997. 60 ways farmers can protect surface water. University of Illinois, Urbana, Illinois.

Ko, L. 1999. Tips on land and water management for small acreages in Oregon. Oregon Association of Conservation Districts, Portland, Oregon.

U.S. Department of Agriculture NRCS. 1998. National Handbook of Conservation Practices. U.S. Department of Agriculture NRCS, Portland, Oregon.

Riparian Areas and Streams

Adams, E.B. 1994. Riparian Grazing. Washington State University, Spokane, Washington.

Darris, D. and S.M. Lambert. 1993. Native willow varieties for the Pacific Northwest. U.S. Department of Agriculture Soil Conservation Service, Corvallis Plant Materials Center, Corvallis, Oregon.

Nash, E. and T. Mikalsen, eds. 1994. Guidelines for streambank restoration. Georgia Soil and Water Commission, Atlanta, Georgia.

South Santiam Watershed Council. 1998. Guide for using Willamette Valley native plants along your stream. Linn SWCD, Tangent, Oregon.

Nutrient and Manure Management

Godwin, D. and J.A. Moore. 1997. Manure management in small farm livestock operations: protecting surface and groundwater. Oregon State University, Corvallis, Oregon.

Hart, J. 1995. How to take a soil sample...and why. Oregon State University, Corvallis, Oregon.

Hart, J. 1999. Analytical laboratories serving Oregon. Oregon State University, Corvallis, Oregon.

Marx, E.S., J. Hart, and R.G. Stevens. 1999. Soil Test Interpretation Guide. Oregon State University, Corvallis, Oregon.

Moore, J. and T. Willrich. 1993. Manure management practices to reduce water pollution. Oregon State University, Corvallis, Oregon.

Sattell, R. et al. 1999. Nitrogen scavenging: using cover crops to reduce nitrate leaching in western Oregon. Oregon State University, Corvallis, Oregon.

Grazing and Pasture Management

Ursander, D. et al. 1997. Pastures for Profit: a guide to rotational grazing. University of Wisconsin, Madison, Wisconsin.

Erosion and Sediment Control

Hansen, H. and W. Trimmer. 1997. Irrigation runoff control strategies. Oregon State University, Corvallis, Oregon.

Trimmer, W. and H. Hansen. 1994. Irrigation scheduling. Oregon State University, Corvallis, Oregon.

Pesticide Management and Integrated Pest Management

Publishers:	Acres USA	Rodale Press
	P.O. Box 91299	33 East Minor St.
	Austin, TX 78709	Emmaus, PA 18098
	(512) 892-4400	(610) 967-5171
	info@acresusa.com	info@rodale.com

Kerle, E.A., J.J. Jenkins, and P.A. Vogue. 1996. Understanding pesticide persistence and mobility for groundwater and surface water protection. Oregon State University, Corvallis, Oregon.

Menzies, G., C.B. MacConnell, and D. Havens. 1994. Integrated pest management: effective options for farmers.

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Appendix I. Where does the 25-year storm event requirement come from in the riparian Characteristic to Achieve?

The 25-year, 24-hour storm is used because the ability to dissipate stream energy and maintain streambank integrity after this level of storm intensity is one of the criteria for a riparian area to be in Proper Functioning Condition.

The Proper Functioning Condition assessment process is a way to determine how well the physical processes are functioning in a riparian or wetland area. Once a riparian-wetland area reaches Proper Functioning Condition, it is in a state of resiliency that will allow the system to hold together during a 25 to 30 year flow event. In other words, the riparian area can resist major structural changes brought about by the storm event, and can recover in time for future events. Riparian areas that have not yet achieved PFC are classified as either functioning at-risk, nonfunctional, or unknown. A functioning at-risk area would likely experience major structural changes, such as excessive bank erosion and loss of riparian vegetation, in a 25 year, 24-hour flood event.

To be in compliance with the proposed riparian Area Rule OAR 603-095-2140 (1) (b) a landowner would need to cease activities that prevent the growth and establishment of vegetation that would help move a riparian area toward providing functions necessary for a stream to withstand the flows resulting from a 25-year storm. For example, if a landowner plowed a riparian area and destroyed the riparian vegetation, he or she would clearly be out of compliance with the rule. If a landowner stopped tilling and allowed vegetation to come in, they would be in compliance with the rule even if the riparian area were not yet able to withstand a 25-year, 24-hour storm event. If a landowner allowed grazing in a riparian area but allowed the area to move toward providing this level of riparian function, he or she would be in compliance with the rule.

For the Southern Willamette Valley, 25-year, 24-hour storm events range from 4.0 to 6.5 inches of rain.

How would compliance with the riparian Characteristic to Achieve be determined?

An inspector would first consider site capability when evaluating a riparian area for compliance with the rule. In other words, the inspector would first determine the kinds and amounts of vegetation the site could produce given legacy conditions (conditions caused by past management or events), such as riprap, and natural limiting conditions, such as soil type. The inspector would also determine if the site were capable of producing vegetation stable enough to withstand flows following a 25-year, 24-hour storm event. If the site is capable of providing this function, the inspector would then determine if the site is either moving toward providing the function or if there is already

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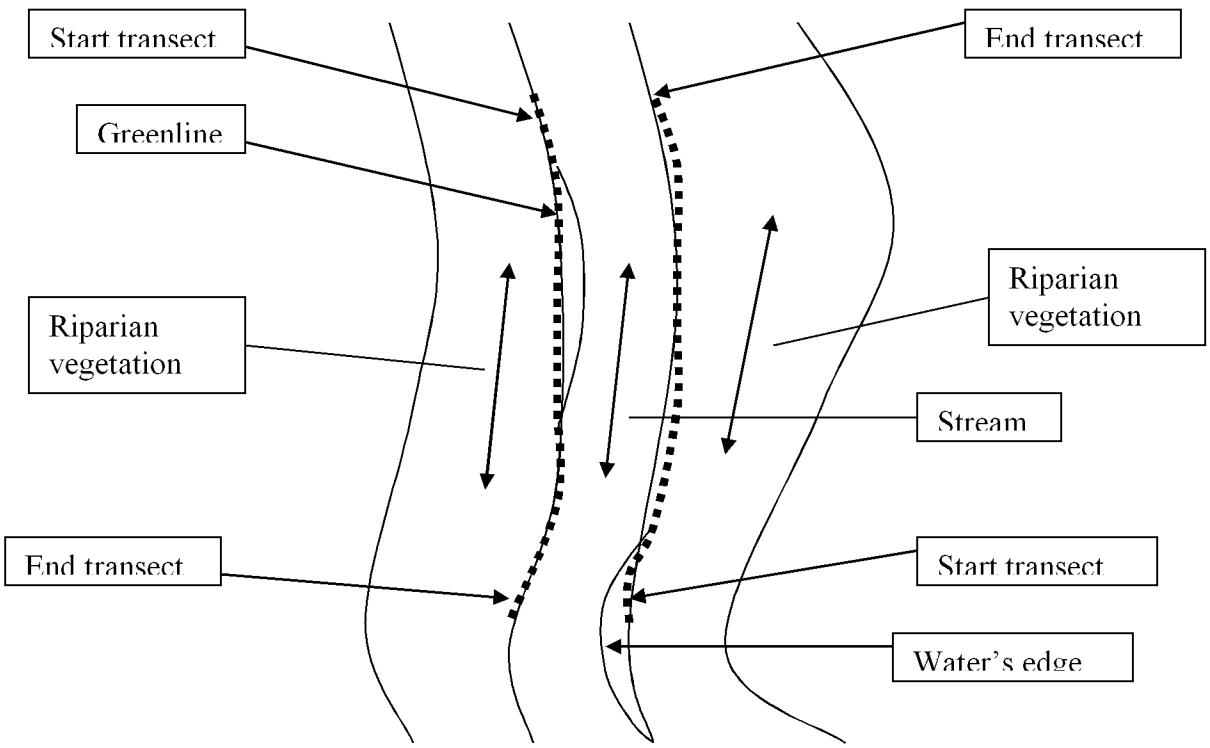
enough vegetation to adequately protect the streambank. In both situations, the site would likely be in compliance.

If the inspector determined the site was probably out of compliance using the previous criteria, he or she would conduct a greenline transect along the stream (Figure 1) and document the ground cover along the transect. The main criteria for noncompliance would be a prevalence of bare ground throughout the riparian area, limited vegetation indicating little to no root mass below-ground, and evidence of bank slumping or sediment runoff into the stream. Also, the problem would clearly have to be caused by agricultural activities.

Figure 1. A greenline transect samples the first line of green vegetation from the water's edge. The greenline is the line nearest to the stream where perennial vegetation is first encountered.



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Southern Willamette Valley Agricultural Water Quality Management Area Plan

Developed by the

Southern Willamette Valley Local Advisory Committee

The Upper Willamette Soil and Water Conservation District

and

The Oregon Department of Agriculture

2012 Review and Update

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Acronyms and Terms Used in this Document

Area Plan – Southern Willamette Valley Agricultural Water Quality Management Area Plan

Area Rules – Southern Willamette Valley Agricultural Water Quality Management Area Rules

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

Coast Fork – Coast Fork of the Willamette River

CWA – Federal Clean Water Act

DEQ - Oregon Department of Environmental Quality

EPA – United States Environmental Protection Agency

EWEB – Eugene Water and Electric Board

GIS – Geographic Information System

LAC - Local Advisory Committee

Management Area – Southern Willamette Valley Agricultural Water Quality Management Area

Middle Fork – Middle Fork of the Willamette River

NRCS - Natural Resources Conservation Service

OAR - Oregon Administrative Rule

ODA – Oregon Department of Agriculture

ORS - Oregon Revised Statute

RUSLE – Revised Universal Soil Loss Equation

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."

T - Soil loss tolerance factor

TMDL – Total Maximum Daily Load

USGS – United States Geological Survey

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Foreword

This Agricultural Water Quality Management Area Plan (Area Plan) provides guidance for addressing agricultural water quality issues in the Southern Willamette Valley Agricultural Water Quality Management Area (Management Area). The purpose of this Area Plan is to identify strategies to prevent and control water pollution from agricultural activities and soil erosion (ORS 568.909(2)) and to achieve water quality standards (ORS 561.191(2)). The Area Plan is implemented using a combination of education and outreach programs, management activities, monitoring, and evaluation.

The provisions of this Area Plan do not establish legal requirements or prohibitions, as described in Oregon Revised Statute (ORS) 568.191(1).

Comment [JM1]: Find a modified version in the Forword

According to OAR 603-090-0030(1), Agricultural Water Quality Management Area Plans must describe a program to achieve the water quality goals and standards necessary to protect designated beneficial uses related to water quality, as required by state and federal law. An Area Plan shall include but not be limited to:

- a description of the geographical area and physical setting to which the Area Plan applies
- a listing of water quality issues of concern
- a listing of current designated beneficial uses that are being adversely affected
- a statement that the goal of the Area Plan is to prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards
- a statement of the water quality objectives of the Area Plan
- a description of the pollution prevention and control measures deemed necessary by the department to achieve the goal
- a schedule for implementation of the necessary measures that is adequate to meet applicable dates established by law
- guidelines for public participation
- a strategy for ensuring that the necessary measures are implemented

Comment [JM2]: Find a modified version under Required Elements of an Area Plan

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 Management Area and Oregon Administrative Rules (OARs 603-095-2100 through 603-095-2160 and 603-090-0060 through 603-090-0120).

Comment [JM3]: Find in Section 1.3.1

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1. Introduction

This 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 authorizes the ODA to work with agriculture to develop and carry out a plan to prevent and control water pollution from agriculture and soil erosion. The intent of the Act and the ODA Water Quality Program are to:

- Satisfy multiple federal and state water quality mandates;
- Encourage adoption of voluntary conservation measures by landowners;
- Promote water quality improvement through outreach and education;
- Allow flexibility in meeting local water quality standards;
- Provide enforcement provisions for the ODA to address water quality problems where landowners refuse to work towards meeting water quality standards;
- Involve local citizens and organizations in the development of strategies to address water quality concerns and problems. The Act specifically states that the development and implementation of area plans should involve local Soil and Water Conservation Districts (SWCDs) as much as possible.

Comment [JM4]: Find a modified version in Section 1.2

This Area Plan applies to all non-federal and non-tribal agricultural and rural lands in the Management Area. This Management Area consists of: (1) all lands drained by the McKenzie, Middle Fork Willamette, and Coast Fork Willamette rivers and their tributaries and (2) all streams flowing directly into the Willamette River between the McKenzie and Middle Fork Willamette rivers (Map 1). 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 operations within incorporated city boundaries. Activities subject to the Oregon Forest Practices Act are not included in this Area Plan.

Comment [JM5]: Find in Section 1.1

Comment [JM6]: Find in Section 2. ---

Comment [JM7]: Find in Section 1.1

This Area Plan provides background information on the Management Area, discusses local water quality concerns, and describes goals and strategies to encourage conservation and improve water quality. The Area Plan also references Agricultural Water Quality Management Area Rules (Area Rules), which describe characteristics land users must achieve on all agricultural lands they own, occupy, or manage, and describes procedures for handling complaints and enforcement actions. Finally, the Area Plan describes a process for evaluating Area Plan effectiveness and updating the Area Plan on a regular schedule.

This Area Plan is not intended to tell anyone how to farm, ranch, or otherwise utilize their natural resources. However, the Upper Willamette SWCD, U.S. Department of Agriculture Natural Resources Conservation Service (NRCS), the ODA, and other partners (see Appendix A) are available to provide technical, financial, and educational assistance to landowners in the Management Area to develop and meet their conservation goals, comply with Area Rules, TMDL load allocations, and attain water quality standards.

Comment [JM8]: Find a modified version in Section 1.3.1

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

Comment [JM9]: Find in Section 2.1.1

LAC Member	Area	Operation
Carol Ach	Leaburg, McKenzie and Coast Fork Willamette	Blueberries, cows, sheep, pigs
Dave Daniel	Pleasant Hill, Coast Fork Willamette	Nursery
Paul Day	Pleasant Hill, Middle Fork Willamette	Livestock, hay, pasture
Donald Hansen	Creswell, Coast Fork Willamette	Grass seed, strawberries, hazelnuts
Steve Houston	Eugene, Coast Fork Willamette	Wine grapes, seed crops, peppermint
Polly Kohl	Springfield, McKenzie	Rural resident, Mohawk Watershed Partnership
Glenn Miller	Eugene, Willamette	Hazelnuts
Art Paz	Springfield, McKenzie	Certified organic blueberries, timber
Alan Petersen, Chair	Springfield, McKenzie	Cattle, hay, timber
Garry Rodakowski	Vida, McKenzie	Hazelnuts
Karl Morgenstern		EWEB
Marc Paulman, Alternate	Dexter, Middle Fork Willamette	Cattle, hay
Jim Sly, Alternate	Creswell, Coast Fork Willamette	Cattle, hay
Jim Goodpasture, Alternate	Vida, McKenzie	Hazelnuts, cattle, hay, timber

LACs are described in Oregon Administrative Rule (OAR) 603-090-0020. LAC membership shall reflect a balance of affected persons. Membership shall be composed primarily of landowners in the Management Area. Membership may include, but is not limited to:

- State Board of Agriculture representatives
- Persons serving on local soil and water conservation districts
- Private landowners
- Representatives of local, state and federal boards, commissions, and agencies
- Members of Indian tribes
- Members of the public
- Persons associated with industry
- Members of academic, scientific, and professional communities
- Public and special interest groups

Comment [JM10]: Find a modified version in Section 1.3.3

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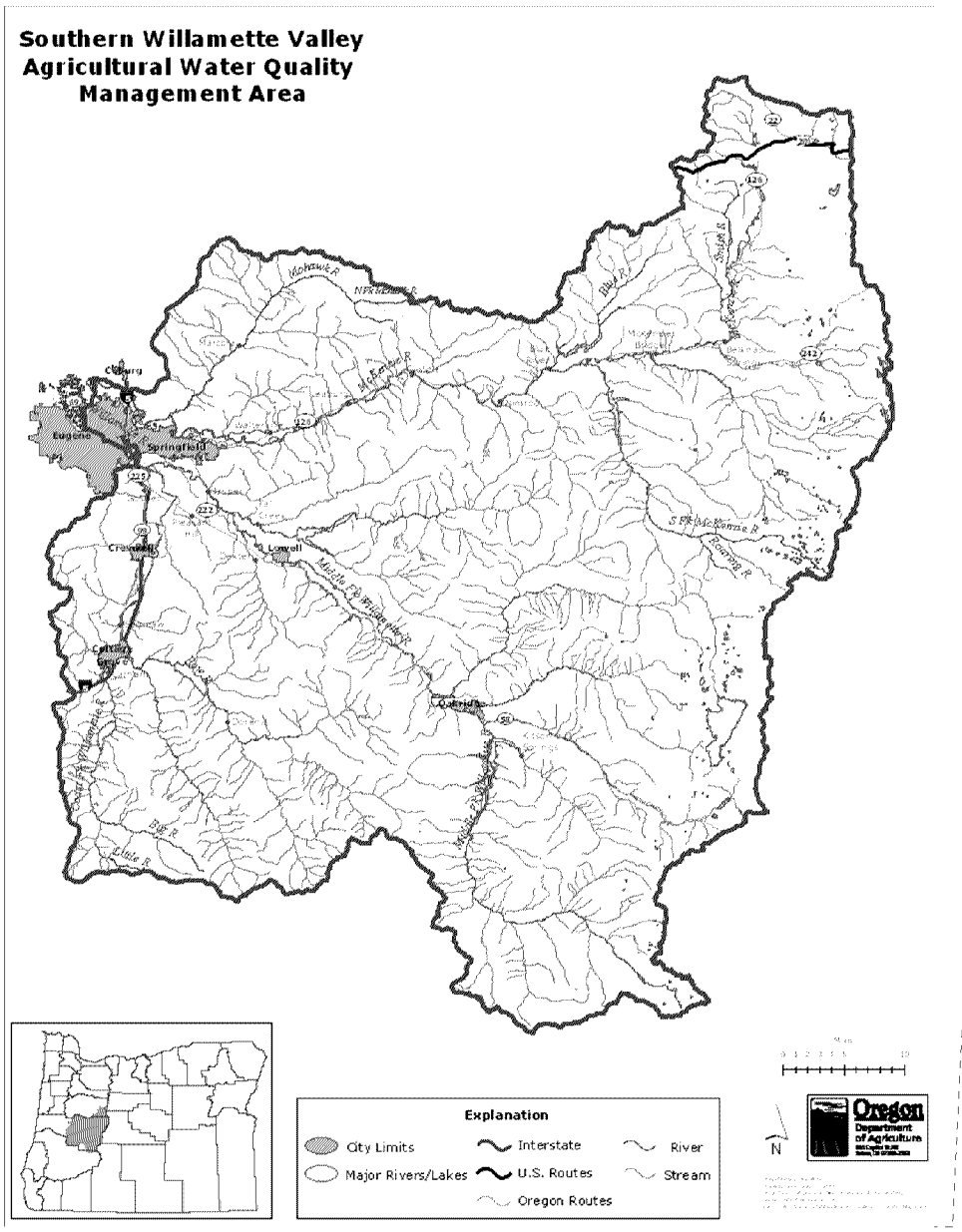
Map 1. Southern Willamette Valley Agricultural Water Quality Management Area.



Comment [JM11]: Find in Section 2.3.3

2. Background

2.1. Geographical/Physical Setting

2.1.1. General Location

The Management Area includes the McKenzie, Middle Fork of the Willamette (Middle Fork), and Coast Fork of the Willamette (Coast Fork) watersheds. The watersheds are located primarily in the eastern portion of Lane County in western Oregon. Small portions of the McKenzie and Coast Fork watersheds are also located in Linn and Douglas counties. Communities in the Management Area include the cities of Springfield, Lowell, Oakridge, Westfir, Creswell, and Cottage Grove, as well as several unincorporated communities mentioned in Section 2.1.5.

Boundaries of the Management Area are the Cascade Mountains to the east, Calapooya Mountains to the south and west, Long Tom watershed to the west, and the Coburg Hills to the north. The three watersheds cover approximately 3,361 square miles, or 2,156,080 acres. Elevations range from about 350 feet above sea level near the mouth of the McKenzie to 10,354 feet on the North Sister in the Cascades (Oregon Water Resources Board, 1961). The McKenzie's confluence with the Willamette near Coburg is the furthest point downstream in the Management Area.

Comment [JM12]: Find in Section 2.3.2

2.1.2. Physical Features

The headwaters for the McKenzie River and Middle Fork are in the Cascade Mountains. The Coast Fork originates in the Calapooya Mountains. The Coast Fork and Middle Fork meet near Goshen to form the Willamette River mainstem. The Willamette River's confluence with the McKenzie River is approximately 15 miles further downstream near Coburg.

The McKenzie River originates from Clear Lake and flows westward through a narrow valley down a steep gradient. It has eight main tributaries: Lost Creek, Horse Creek, McKenzie South Fork, Quartz Creek, Smith River, Blue River, Gate Creek, and Mohawk River. The Mohawk River has the flattest gradient of the tributaries, and there is some relatively level land along it. Level land also extends along the main stem of the McKenzie River.

The Middle Fork River begins at Timpanogas Lake and flows northwest down a steep gradient until it reaches the Willamette Valley floor. Most of its tributaries, including Hills Creek, Salt Creek, Salmon Creek, North Fork, Fall Creek, and Little Fall Creek, flow into the mainstem from the north. Lost Creek flows into the Middle Fork from the south.

The Coast Fork River begins in the Calapooya Mountains, as do several of its tributaries, Brice Creek, Row River, Sharps Creek, Layng Creek, and Mosby Creek. Layng, Sharps,

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and Brice creeks have relatively steep gradients from headwaters to confluence with the Coast Fork, while Mosby Creek, Row River, and the mainstem Coast Fork have relatively flat gradients. The gradient of the Coast Fork flattens further after it reaches the Willamette Valley floor. Several tributaries, including Camas Swale Creek and Silk Creek, flow into the Coast Fork as it flows north through the valley.

2.1.3. Geology and Soils

Western and High Cascade Mountains

The Cascade Mountains consist of two adjacent mountain ranges, the Western and High Cascades. Both ranges are predominantly composed of basaltic lava flows, with lesser amounts of andesite and rhyodacite (Orr et al, 1992). Depending on the hardness of the underlying material, the mainstem and tributaries of the upper Middle Fork and McKenzie Rivers have created both steep gorges and gently sloping plateaus. The upper reaches of the McKenzie River have been glaciated, at least as far west as Blue River Reservoir (Boer, personal communication, 2000).

Calapooya Mountains

The Calapooya Mountains are a mixture of sedimentary and older volcanic rocks. They have been deeply dissected by the Coast Fork and its tributaries. Soils are deep, well-drained silty clay loams and clay loams from sandstone, sediment, and igneous rock (Patching, 1987).

Willamette Valley

Much of the lowlands in the Willamette Valley are alluvium, or material deposited by the rivers and their tributaries. Alluvial materials include sands, gravels, and silts transported from the Calapooya and Cascade mountains. Depending on the composition of the deposited material, soils in bottomlands and terraces range from excessively drained gravelly sandy loam to poorly drained silty clay loam and silty clay (Patching, 1987).

2.1.4. Climate

The McKenzie, Middle Fork, and Coast Fork watersheds experience the same general climate, with wet winters and dry summers. Precipitation generally increases with elevation in the watersheds, ranging from an average of 40 to 50 inches per year on the valley floor to 70 to 80 inches at the summit of the Calapooya Mountains, 80 inches at the headwaters of Little Fall Creek in the Middle Fork watershed, and 110 inches at the headwaters of Blue River in the McKenzie watershed (University of Oregon Department of Geography, 1999). In the upper portions of the watersheds, above 4,000 to 5,000 feet, snow is a significant portion of the precipitation.

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2.1.5. Land Use/Land Ownership

Agriculture and Forestry

The predominant land use in the Management Area is forestry. Forestlands comprise approximately 86 percent of the land within the three watersheds (Table 1). Most forestland is in the upper portions of the three watersheds in the Cascade and Calapooya Mountain ranges and extends down the eastern side of the valley floor. The U.S. Forest Service, the Bureau of Land Management, and private industrial landowners are major forestland holders in the watersheds (Table 2).

Agricultural and rural residential land uses in the Management Area are found in the lower valley regions of the three watersheds. These lands account for approximately 4 percent of the Management Area (Table 3). In the McKenzie watershed, most agricultural lands are in the floodplain, where well-drained sandy loam soils have accumulated by fluvial (rivers and streams) processes. Hazelnuts are a major crop in the watershed, with over 1,200 acres in orchards (Penhallegon, personal communication, 2000). Other commercial crops include blueberries, Christmas trees, peppermint, and row crops. Livestock and pasturelands are the major land use on the Mohawk tributary.

Most of the agricultural land in the Middle Fork watershed is located in the lower portion adjacent to the Willamette River. There is very little land in agricultural use above Dexter Reservoir. The dominant agricultural land use is pasture and hayland. There are some row crops near Jasper, Lowell, and Pleasant Hill. There are also several nurseries, Christmas tree farms and orchards in that area.

The Coast Fork watershed supports agricultural lands from the confluence of the Coast Fork and Middle Fork upstream beyond Cottage Grove. Grass seed, pasture and hayland are the predominant commodities in the watershed. Other agricultural land uses include nurseries, small grains, orchards, vineyards, and field crops.

Table 1. Land uses and land cover in the three watersheds.

Land Use/ Land Cover Category	Acres	Percent of Land Use by Category
Agriculture	82,000	4
Forestry	1,858,000	86
Urban/Residential/Other	216,100	10
TOTAL	2,156,100	100

Table 2. Land ownership in the three watersheds.

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Landowner/Manager	Acres	Percent of Land
U.S. Forest Service	1,044,600	48
Private Landowners	690,200	32
Forest Service Wilderness Area	255,300	11.8
Bureau of Land Management	142,660	6.6
U.S. Army Corps of Engineers	17,600	0.8
Lane County	2,200	0.1
State of Oregon	2,130	0.1
State Scenic Waterway	1,120	0.1
Joint Corps of Engineers/Lane County	160	0.01
State Parks and Recreation	130	0.01
TOTAL	2,156,100	100

Table 3. Agricultural Lands in the McKenzie, Middle Fork, and Coast Fork.

Watershed	Agricultural Land (acres)	Agricultural Land (percent of all land)
McKenzie	34,000	3.9
Middle Fork	14,000	1.6
Coast Fork	34,000	7.9
TOTAL	82,000	4.0

Cities/Urban

There is one major metropolitan area in the Management Area, as well as smaller cities and rural communities. Most cities are located along the mainstems of the Middle Fork, Coast Fork, and McKenzie rivers. Rural communities co-exist with agricultural areas and are situated on or near the rivers or their tributaries. Both the Willamette and McKenzie flow through the Eugene/Springfield area, and their confluence is just north of Eugene. The 2011 population of the Eugene/Springfield area is over 213,000 with growth percentages higher than the state average over the past ten years. Rural communities include Marcola in the Mohawk watershed; and Blue River, Walterville, Leaburg, Vida, Nimrod, Finn Rock, and McKenzie Bridge along the McKenzie River. Most of these communities have populations below 500. Two incorporated cities exist along the Coast Fork watershed: Cottage Grove, with 9,686 residents, and Creswell, with 5,031 residents. Rural communities in the Coast Fork watershed include Disston, Culp Creek, Dorena, London, Latham, Saginaw, Walker, Delight Valley, Cloverdale, and Goshen. Along Highway 58, the cities of Oakridge (pop. 3,205), Lowell (pop. 1,045) and Westfir (pop. 278) are located centrally in the Middle Fork watershed (Population Research Center, 2011). Rural communities in the Middle Fork watershed include Dexter, Fall Creek and Jasper.

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Roads

There is an extensive network of public and private roads within the three watersheds. Heavily traveled public roads include Interstate 5, which runs north-south through Eugene-Springfield, Creswell, and Cottage Grove; Highway 126, the main route through the McKenzie watershed over the Cascade Mountains; and Highway 58, which begins near Goshen and travels southeast over the Cascades.

Recreation

Recreation within the Management Area relates closely to the scenic landscape. Activities such as camping, hiking, fishing, hunting, skiing, and boating draw thousands of visitors to the three watersheds every year. Several reservoirs provide recreational opportunities in the summer months, including Dorena Reservoir on the Row River, Dexter Lake on the Middle Fork, and Cougar Reservoir on the McKenzie. Table 5 provides a complete list of recreational reservoirs in the Management Area.

Watershed Functions

Other functions of land in the watersheds include retention and slow release of rainwater, flood control, groundwater recharge, and filtration of pollutants. All watersheds provide these functions to some degree depending on local conditions and the amount and types of developments.

Comment [JM13]: Find in Section 2.3.1

2.2. Water Resources

2.2.1. Water Availability

Both rainwater and snowmelt contribute to water supplies in the three watersheds. More surface water is supplied by snowmelt in the McKenzie and Middle Fork watersheds than in the Coast Fork because their headwaters are in the High Cascades. Flows in the McKenzie and Middle Fork are less variable than in the Coast Fork. Coast Fork seasonal flow patterns are more similar to streams originating in the Coast Range, with flows in the winter greatly exceeding summer flows even with human-caused changes to the flow regime. Summary flow data for the McKenzie, Middle Fork, and Coast Fork are listed in Table 4.

Table 4. Average annual, summer, and winter flows in cubic feet per second (cfs) for the McKenzie, Middle Fork and Coast Fork (U.S. Geological Survey, 2000).

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Watershed	Average Annual Flow (cfs)	Average Summer Flow (cfs)	Average Winter Flow (cfs)
Coast Fork at Goshen	1611	416	3342
McKenzie at Coburg	5897	3183	9582
Middle Fork at Jasper	4154	2318	6433

Groundwater is most plentiful in the three watersheds in areas with alluvial deposits and porous lava flows. The High Cascades store a great deal of water from snowmelt, and the release of this water during the summer helps keep flows relatively constant in the McKenzie and Middle Fork watersheds. Alluvial deposits from the mouth of the Middle Fork to Dexter Dam, at the mouth of the McKenzie, along the McKenzie to Belknap Springs, and along the Coast Fork on the Willamette Valley floor, store large quantities of groundwater.

Dams and Reservoirs

Thirteen dams and reservoirs in the three watersheds are used for flood control in the winter and flow augmentation in the summer. They also provide recreation, irrigation, and power generation. Table 5 summarizes the uses of each dam and reservoir, storage capacities, and priority for augmentation of summer flows in the Willamette River.

The reservoirs influence seasonal water availability and flow patterns in the three watersheds. Summer water releases boost flows in the McKenzie to one-third higher than normal (Lane Council of Governments, 1996). The Coast Fork, once an ephemeral river, now flows year-round because of summer water releases from Dorena and Cottage Grove Reservoirs.

Table 5. Uses, Capacities, and Drawdown Priority for Reservoirs in the Management Area (U.S. Army Corps of Engineers, 2000; Oregon Water Resources Department, 2000).

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Watershed	Project	Uses of Water	Summer Reservoir Storage Capacity (Acre-feet)	Summer Drawdown Priority
Coast Fork	Cottage Grove	Recreation, flood control	28,700	5
Coast Fork	Dorena	Recreation, flood control	65,000	5
McKenzie	Blue River	Recreation, summer flow augmentation, flood control	78,800	3
McKenzie	Carmen	Hydropower	261	N/A
McKenzie	Cougar	Hydropower, recreation, summer flow augmentation, flood control	143,900	2
McKenzie	Leaburg	Hydropower, recreation	345	N/A
McKenzie	Smith	Hydropower	15,000	N/A
McKenzie	Trail Bridge	Hydropower	2,263	N/A
McKenzie	Walterville	Hydropower	100 (Intake) 345 (S. Pond)	N/A
Middle Fork	Dexter	Re-regulate flow from Lookout Point Reservoir, recreation	N/A	N/A
Middle Fork	Fall Creek	Recreation	108,200	5
Middle Fork	Hills Creek	Recreation	194,600	4
Middle Fork	Lookout Point	Flood control, hydropower	324,200	1

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2.2.2. Water Use

Consumptive uses of water in the three watersheds include irrigation, municipal use, and commercial use. Irrigation is the primary consumptive use for which water rights are issued. Municipal water rights supply drinking water to several hundred thousand people in Lane County. Non-consumptive uses include recreation, power generation, and fish and wildlife habitat. Sources of appropriated water are reservoirs, surface water, and groundwater. Table 6 summarizes water allocations in the three watersheds. Actual water use is typically lower than water appropriated.

Table 6. Appropriations of surface water, groundwater, and reservoir water in the three watersheds (Oregon Water Resources Department, 2000). Appropriations are in cubic feet per second (cfs) and acre-feet (af).

Water Use	McKenzie		Middle Fork		Coast Fork	
	cfs	af	cfs	af	cfs	af
Irrigation	274	49,000	52	10,173	110	21,507
Fish and Wildlife	292	45	93	47	6	35
Agriculture	1	3	1	11	4	11
Industrial	10,078	18,493	30	620	45	793
Municipal	338	0	50	0	40	1
TOTALS	10,983	67,541	226	10,851	205	22,347

In the McKenzie, over 9,975 cubic feet per second of industrial water rights are appropriated for hydropower, a non-consumptive use.

Comment [JM14]: Find in Section 2.3.1

2.3. Water Quality

2.3.1. Clean Water Act

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

DEQ has established state water quality standards for water quality parameters, such as bacteria, temperature, dissolved oxygen, and nutrients. The standards protect "beneficial uses" associated with waterbodies. High-quality water protects several "beneficial uses"

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of waterbodies and watersheds. Beneficial uses of water in the three watersheds include water contact recreation; habitat for aquatic organisms and wildlife; agricultural, domestic, municipal, and industrial water supplies; and aesthetics (Appendix C). A waterbody is placed on the 303(d) list for a particular parameter when water quality is deemed no longer adequate to protect the most sensitive beneficial use. Beneficial uses impacted by temperature in the three watersheds include bull trout habitat and salmon spawning and rearing habitat. Mercury in the Coast Fork Willamette has appeared in fish tissues in elevated levels, endangering aquatic life and preventing human consumption of fish. Water contact recreation is impacted in the Coast Fork because of high bacteria levels. High concentrations of phosphorus promote growth of algae, impact pH levels, and lower dissolved oxygen levels.

Comment [JM15]: Find a modified version in Sections 1.4.1 through 1.4.3

Comment [JM16]: Find in Section 2.4.4

2.3.2. Water Quality and Total Maximum Daily Loads in the Management Area

Within the Management Area, several segments of the three main rivers and their tributaries have been identified by the DEQ as "water quality limited" and are on the 303(d) list of water quality limited waterbodies. As shown in Appendix B, sixty-two stream segments in the three watersheds are listed for temperature (although these are listed, they are covered by the TMDL), five segments are listed for low dissolved oxygen levels, and five segments in the Coast Fork and two segments in the McKenzie subbasin are listed for toxics (mercury).

Comment [JM17]: Find in Section 2.4.1

Total Maximum Daily Loads

DEQ, in accordance with the federal Clean Water Act, is required to establish TMDLs for pollutants on the list of impaired water bodies (303(d) list). TMDLs generally apply to an entire basin or subbasin, and not just to an individual water body that was on the 303(d) list. TMDLs specify the daily amount of pollution that a water body can receive and still meet water quality standards. Through the TMDL, nonpoint sources (including agriculture, forestry, and urban) are assigned "load allocations", while point sources are assigned "waste load allocations" in their permits. The agricultural sector is responsible for reducing agricultural water pollution to meet the load allocation assigned to agriculture. Once TMDLs are completed for a basin, the basin's water bodies are removed from the 303(d) list and are assigned to Category 4A (water quality limited, TMDL approved). In the future, when data show that water quality criteria have been met, water bodies will be assigned to Category 2 (attaining).

Comment [JM18]: Find a modified version in Section 1.4.3

As part of the TMDL process, DEQ identifies the Designated Management Agencies or parties responsible for submitting TMDL implementation plans. An agreement between ODA and DEQ establishes that Agricultural Water Quality Management Area Plans serve as TMDL implementation plans. This Area Plan is the implementation plan for the agricultural component of the TMDLs that apply to the Management Area. Biennial reviews and revisions to the Area Plan and Area Rules will address any new agricultural load allocations in future TMDLs.

Comment [JM19]: Find a modified version in Section 1.4.3

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In response to the 303(d) listings through 2006, DEQ developed TMDLs for the entire Willamette Basin for temperature, bacteria (*E. coli)*, and mercury (Oregon Department of Environmental Quality, 2006). The Willamette TMDL can be accessed via the DEQ website (www.deq.state.or.us/wq/tmdls/willamette.htm). The Willamette Basin also has a TMDL for dioxin (Oregon Department of Environmental Quality, 1991). The dioxin TMDL can be accessed via the DEQ website (www.deq.state.or.us/wq/tmdls/columbia.htm#dd). Other impairments identified in the Management Area, such as flow and habitat modification, do not require TMDLs. Table 4 summarizes the agricultural load allocations that apply to the Management Area.

The Willamette mainstem is also listed for several toxins, iron, and dioxin, but these are beyond the scope of this Area Plan. If a Willamette Basin TMDL is developed in the future for any of the toxins, it may include agricultural load allocations that apply to the entire Management Area.

While this Area Plan applies to all agricultural water pollution, it focuses specifically on parameters on the 303(d) list and TMDLs in the Management Area including temperature, bacteria (*E. coli)*, and mercury. Appendix B lists the impaired waterbodies from the 2010 303(d) list. More information is available in the 2010 integrated report and 303(d) list database on the DEQ website (www.deq.state.or.us/wq/assessment/2010Report.htm).

Comment [JM20]: Find in Section 2.4.2

Temperature
DEQ endeavored to set the TMDL for temperature to protect salmon spawning, rearing, and passage as the most sensitive beneficial uses in the Management Area. Oregon's native cold-water aquatic communities, including salmonids, are sensitive to water temperature. Many sources contribute to elevated stream temperatures. On agricultural lands, absence of streamside vegetation, water withdrawals, and land management that leads to widened stream channels contribute to elevated stream temperatures. DEQ has identified the existing nonpoint source pollution sources as solar heating of the Area's waterways due to a lack of riparian vegetation from forestry, agriculture, rural residential, and urban activities.

Bacteria
DEQ has set the bacteria *Escherichia coli (E. coli)* TMDL to protect human water contact recreation (risk of infection and disease to people who come in contact with fresh water while fishing, swimming, or boating), the most sensitive beneficial use. On agricultural lands, *E. coli* generally comes from livestock waste, either deposited directly into waterways or carried to waterways via runoff and soil erosion. Runoff and soil erosion from agricultural lands may also carry bacteria from other sources. There are numerous sources of bacteria in streams, including humans (from recreation, failing septic systems, or discharges from wastewater treatment plants) and wildlife.

Mercury
Human fish consumption is the most sensitive beneficial use for which DEQ has set the Mercury TMDL. Primary sources of mercury include air deposition from national and

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international sources, discharge from specific legacy mining sites, and erosion of soils containing mercury. On agricultural lands, if mercury is contributed it is through eroded soils.

Other Parameters of Concern:

Sediment
A TMDL has not been set for sediment, but it can be of concern related to agricultural lands. Sediment carried in streams can adversely affect aquatic life by increasing water temperature through thermal absorption, reducing light penetration and visibility, reducing water infiltration through stream substrate (harming incubating fish eggs), and irritating gill filaments. Sediment deposition can also change the width:depth ratio of a stream, which directly influences stream temperature. Potential sources of sediment include streambank erosion, home building or construction sites, and runoff from agricultural lands.

Nutrients
A TMDL has not been set for nutrients, but it can be of concern related to agricultural lands. Fertilizers and manure are the main agricultural sources of nutrients. Improper storage or application can result in discharge of nutrients into either surface or ground water. Fertilizer run-off has been identified as one of the major contributing factors to algae blooms, including harmful algae blooms containing toxin-producing cyanoobacteria species. In the recent past, Oregon Health Authority has issued algae bloom advisories Dorena Reservoir, Dexter Reservoir, and Hill Creek Reservoir. Nutrients can also come from waste discharge, runoff, or seepage from urban areas, industrial and wastewater treatment plants, and septic systems; sediment runoff from forestlands; and background sources.

Aquatic Weeds and Algae
Harmful algal blooms are caused by over-production of naturally occurring cyanobacteria (blue-green algae). Some species release toxins that are harmful to humans, livestock, pets, and wildlife. When levels of nutrients, temperature, pH, and light are optimal, cyanobacteria grow rapidly, resulting in blooms where cyanobacteria are the dominant form of life in their environment. Cyanobacteria can cause negative impacts to water quality, including: taste and odor problems in drinking water, unpalatable fish, elevated pH levels, and low dissolved oxygen levels. Nutrients entering the watershed from agricultural activities can accumulate in reservoirs or lakes and may fuel algal blooms and move downstream. Low stream flows and high water temperatures downstream could also make conditions favorable for an algal bloom.

In addition to the Willamette Basin TMDLs, TMDLs for phosphorus and ammonia were developed for the Coast Fork watershed in 1996 to address low dissolved oxygen and high pH levels. (Check with Pamela Wright to see if there are load allocations related to this TMDL)

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Table 4: Agricultural Load Allocations that Apply to the Management Area

Geographic Scope in Management Area	TMDL	Load Allocation for Agriculture
Parameter: Temperature		
Mainstem Willamette	Willamette TMDL (2006), Chapter 4	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05 degrees C of the 0.3 degrees C human use allocation (with a surrogate of effective shade)
McKenzie Subbasin	Willamette TMDL (2006), Chapter 11	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05 degrees C of the 0.3 degrees C human use allocation (with a surrogate of effective shade)
Middle Fork Willamette Subbasin	Willamette TMDL (2006), Chapter 12	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05 degrees C of the 0.3 degrees C human use allocation (with a surrogate of effective shade)
Coast Fork Willamette Subbasin	Willamette TMDL (2006), Chapter 13	All nonpoint sources collectively (agriculture's allocation is not specified): 0.05 degrees C of the 0.3 degrees C human use allocation (with a surrogate of effective shade)
Parameter: Bacteria		
Mainstem Willamette	Willamette TMDL (2006), Chapter 4	66 to 83% reduction from agricultural areas compared to average loads in 2006
Parameter: Mercury		
Entire Management Area	Willamette TMDL (2006), Chapter 3	Agriculture: 27 percent reduction compared to average loads in 2006
Parameter: Dioxin		
Entire Management Area	Columbia River Basin TMDL (1991)	Only pulp and paper mills have been assigned an allocation; agriculture is a potential source, but no load allocation has been assigned due to lack of data

Comment [JM21]: Find in Section 2.4.3

2.3.3 Priority Areas: Strategic Implementation of the Area Plan

Beginning in April 2010, ODA, the LMA, the LAC, and other partners began work to identify Priority Areas within the Management Area. At the 2010 biennial review, the LAC expressed the importance of areas for focused work being identified through a strategic approach. Partners evaluated sixth field watersheds within the Management Area based on existing water quality issues, agriculture's effect on water quality, existing work and partner relationships within the watershed, and identification of the watershed as an existing priority by partners. Through this process ten sixth field watersheds were

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identified for additional evaluation. The number of tax lots, land use, agricultural activities, and identified water quality issues were considered.

Outreach and technical assistance will be focused in these areas, and every landowner with potential land condition concerns will be contacted with an offer of voluntary assistance. ODA, the LMA, and the LAC will measure, evaluate, and document the effectiveness of the Area Plan by assessing changes in land conditions in the current area of focus during the biennial review of the Area Plan. During each biennial review, the partners will also assess the timeline and sequence for working in the initial priority area and in future priority areas.

Gettings Creek Watershed: First Area of Focus

Gettings Creek is a small perennial stream that is a tributary to the Coast Fork Willamette. The Gettings Creek watershed is located on the east side of I-5, just north of Cottage Grove. The watershed is approximately 10,000 acres (60% forest, 20% rural residential, and 20% agricultural). Agriculture in the watershed is mainly cattle and small acreage livestock owners. Parameters of concern identified for the Gettings Creek Watershed were temperature and E. coli. Evalutation will be conducted using riparian vegetation as a surrogate for temperature and presence of livestock and proximity to seasonal or perennial streams as an initial surrogate for E. coli.

In 2011, ODA evaluated the current condition of streamside vegetation for the Gettings Creek Watershed, using satellite images, and produced a preliminary baseline map that shows streamside conditions before delivery of technical assistance in the area of focus. The preliminary baseline assessment estimates the percent of agricultural streamsides that fall into the three streamside vegetation classes, shown in Table X.

Table X. Feet of Streamside in Each Vegetation Class for Gettings Creek (Baseline-2011)

Streamside Vegetation Class	Gettings Creek
I - Streamsides have site-capable vegetation	8,130 feet
II - Streamsides allow streamside vegetation to establish, but the vegetation has not reached site-capable conditions	N/A
III - Agricultural activities may prevent establishment of streamside vegetation	44,725 feet

In 2011, ODA worked with the Upper Willamette SWCD developed an action plan for implementing technical assistance in the priority area. The Action Plan identifies goals (by July 2013) of 1) increasing percent site capable vegetation in riparian areas adjacent to agricultural land by 20% and 2) decreasing the number of landowners feeding livestock within the active floodplain by 25%.

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In late 2011, the Upper Willamette SWCD contacted all agricultural landowners to offer technical assistance. In addition to the initial contact, the Upper Willamette SWCD invited all landowners to a workshop that was held December 15, 2011. The SWCD has also begun targeted outreach to Class III landowners. After implementing projects in the focus area, an updated map will be produced to show the new conditions. The Upper Willamette SWCD will report on progress by comparing the baseline and post-implementation percent of streamside areas in each of the three-streamside vegetation classes.

Future Priority Areas

Future priority areas are 6th field HUCs with agricultural land uses in the Management Area. ODA, the LAC, the LMA, and other partners will work together to determine the order of future priority areas, based on condition of streamside vegetation and existing contacts and relationships.

For more information and background on the Priorty Area Process see section 8. Monitoring, Evaluation, and Modification.

Comment [JM22]: Find in Section 3.2.2

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3. Mission, Goals, and Objectives

The mission of this Area Plan is to develop a framework of strategies for agricultural lands within the McKenzie, Middle Fork, and Coast Fork watersheds (the Management Area) that will contribute to desirable water quality and to develop programs to achieve the goals of the plan while maintaining the economic sustainability of agriculture.

Comment [JM23]: Find in Chapter 3 under Mission

Specific goals include:

- Prevent and control water pollution from agricultural activities and soil erosion and to achieve applicable water quality standards.
- Ensure that agricultural activities do not contribute to water pollution or diminished water quality as defined within 303(d) listings and TMDLs.
- Monitor and evaluate the effectiveness of the Area Plan.
- Reduce agriculture's contribution to water quality parameters of concern through education and outreach, and by promoting Optional Management Practices.
- Achieve the following land conditions on agricultural lands throughout the management area that contribute to good water quality.
  - Streamside vegetation provides streambank stability, filtration of overland flow, and moderation of solar heating, consistent with site capability.
  - No visible sediment loss from cropland through precipitation or irrigation induced erosion.
  - No significant bare areas within 50 feet of streams on pasturelands and/or rangelands.
  - Active gullies have healed or do not exist on pasturelands.
  - Livestock manure is stored under cover during the winter and in a location that minimizes risk to surface and groundwater.

Comment [JM24]: Find in Section 3.1

Objectives deemed necessary by the LAC to achieve these goals include:

- Manage sheet and rill erosion to a rate that does not exceed an acceptable level.
- Curb the amount of active streambank erosion.
- Prevent any conditions already prohibited under ORS 468B.025 and 468B.050.
- Manage irrigation surface water return flow to prevent waters of the state from exceeding state water quality standards.
- Improve/maintain the ability of riparian areas to respond and function according to vegetative site capability.
- Provide suggestions of optional measures that could help achieve water quality goals.
- By the 2014 biennial review, a rough assessment of streamside vegetation conditions along agricultural lands in the entire management area will be complete. This assessment can be used to track and report progress in streamside vegetation improvements over time and to identify areas to focus work. Assessment results will be considered at the 2014 biennial review and may be used to revise the goals below.

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- By the 2016 biennial review, XX% of streamside areas along agricultural lands where the assessment identifies agricultural activities as likely preventing riparian vegetation establishment will be in a condition where agricultural activities no longer prevent streamside vegetation from establishing.
- By 2020, XX% of streamside areas along agricultural lands where the assessment identifies agricultural areas as likely preventing riparian vegetation establishment will be in a condition where agricultural activities no longer prevent streamside vegetation from establishing.
- By 2020, XX% of streamside areas along agricultural lands where the assessment identifies agricultural activities as allowing riparian establishment but not at site capability will have reached site capability.
- By the 2014 biennial review, ODA and the LMA will compile information about the location, number, and size of water quality improvement projects completed in the priority area since area plan and rules adoption, as resources and grant program privacy rules allow.
- A small geographic area has been identified within the Management Area, where voluntary outreach and technical assistance work has been focused since 2011 and an initial assessment of streamside conditions was completed. ODA and the LMA will report back to the LAC on the status of land conditions, and outreach and technical assistance efforts in the area, at the 2014 biennial review.
- By the 2014 biennial review (or other appropriate date), the Local Management Agency will have offered technical assistance to all landowners in the area with lands where agricultural activities appear to prevent streamside vegetation from establishing. By the 2014 biennial review, the LMA will report back to the LAC and ODA on the amount of lands where landowners accept voluntary assistance to allow streamside vegetation to establish and develop.
- By the 2014 biennial review (or other appropriate date), ODA and/or the LMA will complete a follow-up assessment in the area and evaluate land condition changes over the two-year period.

Please consult Section 5 for more detailed strategies identified by the LAC to achieve the mission, goals, and objectives.

Comment [JM25]: Find in Section 3.2

4. Characteristics to Achieve

The focus of the Agricultural Water Quality Program is on voluntary and cooperative efforts by landowners, the 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 Rules serve as this backstop while allowing landowners flexibility in how they protect water quality. Area Rules are goal-oriented and describe characteristics that should be achieved on agricultural lands, rather than practices that must be implemented.

This LAC developed Area Rules (Characteristics to Achieve) to protect water quality and prevent and control water pollution from agriculture. The LAC also considered the time and expense that would be involved for area landowners to meet the rules. As a result, each rule has an implementation date the LAC believed would be acceptable to area landowners.

This Area Plan serves as a guidance document and as stated in the Foreword, does not establish provisions for enforcement. The Area Rules developed with input from the LAC, OARs 603-095-2100 to 603-095-2160, are included in this document only as a reference for landowners. Each Area Rule has a border around it and appears in italics.

The Characteristics to Achieve and Area Rules relate directly to water quality concerns identified on the 303(d) list in the Management Area, and for the bacteria, mercury and temperature TMDLs that were established in September 2006. Rules specific to mercury are not developed, but Area Rules in the Characteristics to Achieve for waste, riparian areas, and erosion/nutrients are also effective for control of mercury. The concerns addressed in the Area Rules are:

- Temperature
- Phosphorus
- Bacteria
- Toxics
- Mercury

Comment [JM26]: Find in Section 2.5

4.1. Characteristic to Achieve for Waste

Issue: Oregon Revised Statute (ORS) 468B.025 is an existing statute that addresses water pollution from waste discharge. To implement Senate Bill 502, approved in 1995 and codified at ORS 561.190 through 192, which ensures that ODA directly regulates farming activities for the purpose of protecting water quality, ODA is incorporating ORS 468B.025 and 468B.050 into all Area Rules in the state. For more information and text of ORS 468B.025 and 468B.050, please consult Appendix G.

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Characteristic to Achieve

OAR 603-095-2140
(1)(a) Waste. Effective upon rule adoption, no person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

Parameters Addressed by this Characteristic to Achieve:

Bacteria, toxics, and mercury

Comment [JM27]: Find in Section 2.5.1

4.2. Characteristic to Achieve for Riparian Areas

Issue: The intent of this measure is to maintain and protect riparian vegetation, minimize erosion of streambanks due to agricultural activities, allow water percolation into the soil, and encourage shading of streams, thus providing proper function of the riparian area.

Landowners are not responsible for streambank erosion resulting from natural channel migration and meander formation (OAR 603-095-2140(1)).

Please consult Appendix I for more background information on this Characteristic to Achieve.

Characteristic to Achieve

OAR 603-095-2140
(1)(b) Riparian areas. By January 1, 2004, agricultural management shall allow establishment and maintenance of vegetation along perennial streams consistent with the capability of the site to provide riparian functions necessary to help moderate solar heating and for streambanks to withstand flows resulting from a 25-year, 24-hour storm event.

Parameters Addressed by this Characteristic to Achieve:

Temperature.

Comment [JM28]: Find in Section 2.5.2

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4.3. Characteristics to Achieve for Erosion/Nutrients

Issue: The intent of these measures is to prevent water from carrying sediment and nutrients into waters of the state.

Characteristics to Achieve

OAR 603-095-2140
(1)(c) Erosion and Nutrients:
(A) By January 1, 2004, soil erosion from agricultural activities shall not exceed the tolerable soil loss T.
(B) By January 1, 2004, landowners or operators shall prevent pollution from irrigation surface water return flow to waters of the state.

Parameters Addressed by this Measure:

Phosphorus, toxics, and mercury

For more information on erosion and the tolerable soil loss T, please consult Appendix F.

Comment [JM29]: Find in Section 2.5.3

4.4. Pesticides

Issue: The intent of this condition is to prevent introduction of pesticides, which include herbicides and fungicides, into waters of the state. Pesticide users should always read the label prior to storing, mixing, or applying pesticides. ORS 634.372 (2) and (4) require users to follow label recommendations for all pesticides. Please consult Appendix D for the text of ORS 634.372.4.5.

Comment [JM30]: Find in Section 2.5.4

4.5. Mercury

Issue: Mercury is a metal, liquid at room temperature, commonly used in the recent past for thermometers. It continues to have many dental, medical, and industrial uses. It is found naturally in the soils of the Willamette Valley. It is also found in fossil fuels and is released into the air upon combustion. In the air mercury can travel over continents and oceans to be deposited on land, added to naturally occurring mercury, and carried by stormwater and erosion into Oregon's waterways. Fish consumption is the most common way humans are exposed to elevated levels of mercury (Oregon Department of Environmental Quality, 2007).

Mercury is also a severe poison. According to the DEQ (2007), small children and fetuses are most sensitive to mercury's toxic effects.

Mercury from point and non-point sources is bioaccumulating in fish tissue to levels that adversely affect public health. Mercury binds to particles; and there are both higher levels of total suspended solids as well as higher mercury levels in the wet season. In

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setting the TMDL for mercury, DEQ has found that erosion of native soil makes up almost 48 percent of the mercury in the Willamette Basin. Some industrial facilities and domestic wastewater treatment facilities also discharge mercury, but at low levels.

The current DEQ mercury TMDL consists of interim targets and allocations. Sometime in 2011 DEQ plans to finalize these after additional data collection and public outreach (Oregon Department of Environmental Quality, 2007).

Existing Area Rules help control mercury from agricultural sources by limiting erosion, filtering sediment, and controlling pollution. No specific rule to control mercury from agricultural activities is necessary at this time. Refer to the characteristics to achieve for waste, riparian area, and erosion/nutrients for the Area Rules that address mercury in this area.

Comment [JM31]: Find in Section 2.5.5

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5. Strategies for Plan Implementation

The LAC recommends that the ODA, the Upper Willamette SWCD, Watershed Councils, Oregon State University Extension, and other partners use the following strategies to help achieve the goals and objectives of this Area Plan.

Comment [JM32]: Find in Section 3.3

5.1. Education and Outreach

- Hold workshops on water quality issues and the conservation practices that will help improve water quality.
- Develop demonstration projects to showcase successful conservation practices and systems.
- Submit news articles and public service announcements to area newspapers, radio stations, and newsletters.
- Integrate training about the agricultural water quality program with pesticide applicator training credit hours.
- Share education materials with agribusiness field representatives, farm stores, and others having regular contact with agricultural producers.
- Develop a repository for educational and technical materials that is accessible to the public and maintained with current information. Agencies, agribusinesses, and other organizations may then refer landowners to the repository for more information. The LAC recommends that the Upper Willamette SWCD, as the Local Management Agency, serve as the repository for this information, and that as much of this information as possible be maintained on or linked to the Upper Willamette SWCD and ODA websites.

Comment [JM33]: Find in Section 3.3.1

5.2. Technical Assistance

- Provide technical assistance to landowners in the Management Area to help them comply with the Area Rules and develop and meet their conservation and production goals.

Comment [JM34]: Find in Section 3.3.2

5.3. Priority Area Work

Identify, and focus outreach and technical assistance work in, small geographic areas to help demonstrate the rate of change in land conditions that are protective of water quality.

- Identify water quality parameter(s) of concern and a possible land condition surrogate (e.g. streamside vegetation as a surrogate for temperature)
- Compile and map available baseline land condition and water quality data
- Conduct outreach to promote awareness of water quality issues and their solutions
- Conduct systematic outreach to meet with landowners, assess land conditions, and offer voluntary technical assistance
- Seek to secure necessary resources to help landowners achieve land conditions that contribute to good water quality

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- Map land conditions after two years of implementation and quantify changes from the baseline
- Compile updated available water quality data and provide to ODA for the purpose of quantifying changes from the baseline
- Evaluate and discuss program effectiveness at the next biennial review of the Area Plan

Comment [JM35]: Find in 3.3.3

5.4. Incentives for Voluntary Conservation

- Submit grant proposals to the Environmental Protection Agency, Oregon Watershed Enhancement Board, U.S. Department of Agriculture, DEQ, ODA and other organizations, that will support the adoption of voluntary conservation actions to achieve the goals and objectives of the Area Plan.
- Promote incentive-based cost-share programs to assist landowners with implementing voluntary conservation projects.

Comment [JM36]: Find in Section 3.3.4

5.5. Monitoring

The LAC recommends that the ODA, the Upper Willamette SWCD, and other partners submit grant proposals that support monitoring. Inventory and monitoring projects should answer the following questions:

- What are baseline levels of phosphorus, nitrates, bacteria, and sediment, as well as other parameters of concern, in mainstems and tributaries of the McKenzie, Middle Fork and Coast Fork?
- What are the trends in levels of phosphorus, nitrates, bacteria, and sediment, as well as other parameters of concern, in the same waterbodies?
- What are baseline summer temperature levels in mainstems and tributaries of the McKenzie, Middle Fork, and Coast Fork? What are temperature trends in the same waterbodies?
- What are sources of pollution that are impacting parameters of concern in the McKenzie, Middle Fork, and Coast Fork?
- Are particular conditions of concern actually impacting water quality in adjacent waterbodies?
- By what mechanism and to what extent do particular agricultural practices improve or degrade water quality?
- How much agricultural land is known through scientifically verifiable means to be out of compliance with the Area Rules?

Comment [JM37]: Find in Section 3.3.6

5.6. Safe Harbor

The LAC recommends that the ODA provide a program that protects operators if they seek technical assistance prior to any complaint, similar to programs offered by the Occupational Health and Safety Division. Landowners or operators should be required to be diligent in their efforts. The protection would pertain to administrative enforcement actions.

Comment [JM38]: Find in Section3.3.7

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6. 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 Rules 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.

Landowners who want more information on any of the following practices, or who are looking for other ideas for water quality improvement and conservation on their lands, may contact several agencies and organizations that provide technical assistance, including the Upper Willamette SWCD, the NRCS, and the Oregon State University (OSU) Extension Service. Also, please consult Appendix H for a list of publications describing water quality improvement practices for agricultural landowners.

6.1. Riparian Areas and Streams

Practice	Resource Concerns Addressed	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
a. Rotational grazing in riparian area; timed when growth is palatable to animals and when riparian areas are not saturated.	May help establish desirable riparian vegetation.	Allows limited use of riparian area for grazing, improves wildlife habitat.	Requires intense management to insure that grazing does not prevent site capable vegetation from establishing.
b. Livestock exclusion from riparian area; establishing off-stream watering facilities.	Helps promote desirable riparian vegetation; promotes streambank integrity; helps filter nutrients and sediment from runoff; may help narrow channel and reduce erosion in channel; reduces effects of solar radiation.	May lessen streambank erosion and loss of pastures; less time involved in managing livestock grazing in riparian area, improves wildlife habitat.	May require higher weed control costs in riparian areas than seasonal riparian grazing. May require financial investment for livestock control and off-stream watering facilities.
c. Planting perennial vegetation in riparian area.	Helps establish perennial riparian vegetation rapidly; promotes streambank integrity; may help	May lessen streambank erosion and loss of pastures. If livestock are excluded from	Costs of vegetation and weed control. May require financial investment for riparian fencing

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Practice	Resource Concerns Addressed	Potential Benefits of Practice to Producer	Potential Costs of Practice to Producer
	narrow channel and reduce erosion in channel; reduces effects of solar radiation.	riparian area, area may be eligible for federal cost-share programs. Some alternative perennial agricultural products may be harvested from riparian areas.	and off-stream watering facilities while vegetation establishes.

6.2. Nutrient and Manure Management

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Apply nutrients according to soil test results and at agronomic requirements.	Helps prevent nutrient and bacteria runoff into surface water or leaching into groundwater.	May help reduce fertilizer costs; ensures that plants receive needed nutrients for growth; makes plants more competitive against weeds.	Costs of soil testing; time associated with taking soil samples.
b. Store manure under a tarp or roof; preferably on an impervious surface such as concrete or plastic.	Helps prevent nutrient and bacteria runoff into surface water or leaching into groundwater.	Prevents nutrient leaching so manure applied on crops or pasture has higher nutrient content; may save some fertilizer costs; producers wishing to construct storage facilities may apply for funding programs.	Cost of constructing manure storage facilities.
c. Establish animal heavy use areas, where animals can be confined during the winter to protect other pastures from trampling and	Helps prevent sediment, nutrient and bacteria runoff into surface water or leaching into groundwater. Helps protect streamside	Protects pastures from compaction during the winter, improving growth. May improve animal health by covering animal	Cost of fencing animal heavy use area; cost of feeding hay during the winter; cost of materials for protecting animal

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Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
compaction. When soils are saturated, limit livestock access to pastures; cover animal heavy use areas with rock, hog fuel, and/or geotextile.	areas.	heavy use areas with material so animals are not wading in mud.	heavy use area; may mean landowner will need a Confined Animal Feeding Operation Permit.
d. Site barns and animal heavy use areas away from streams.	Helps prevent sediment, nutrient, and bacteria runoff into surface water or leaching into groundwater. Helps protect streamside areas.	Helps prevent flooding in barns and animal heavy use areas.	Need either off-stream watering facility or other source of water for livestock.
e. Prevent silage leaching and/or store and manage leachate from silage and other vegetative materials.	Helps prevent nutrient runoff into surface water or leaching into groundwater.	Preventing leaching maintains higher nutrient content of ensiled feed material.	May require cost of facility development and purchase of moisture-absorbing materials.
f. Installing gutters and downspouts in areas with high livestock use.	Helps prevent sediment, nutrient and bacteria runoff into surface water or leaching into groundwater.	May improve animal health by lessening mud during the winter, so animals are not wading in mud.	Cost of installation and maintenance of gutters and downspouts.

6.3. Erosion, Sediment, and Mercury Control

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Grazing management: graze pasture plants to appropriate heights, rotate animals between several pastures; provide access to water in each pasture.	Helps prevent sediment, nutrient, mercury, and bacteria runoff into waters of the state. Helps protect streamside areas.	May improve pasture production; easy access to water may increase livestock production as well. May improve composition of pasture plants and	Cost of installing fencing, watering facilities for rotational grazing system; time involved in moving animals through pastures.

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Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
		help prevent weed problems.	
b. Farm road construction: construct fords appropriately, install water bars to divert runoff to roadside ditches.	Helps prevent sediment and mercury runoff to waters of the state.	May help prevent water damage on farm roads.	Cost of installation and maintenance.
c. Plant appropriate vegetation along drainage ditches; seed ditches following construction.	Helps prevent sediment and mercury runoff into waters of the state.	May help prevent ditch bank erosion and slumping.	Costs of establishing vegetation.
d. Plant cover crops in orchards or nurseries.	Helps prevent sediment and mercury runoff into waters of the state; helps filter nutrients and slow runoff.	May reduce weed problems in orchards and nurseries; prevents loss of applied fertilizer.	Costs of establishing cover crops; cover crops may compete with primary crop.
e. Irrigate pasture or crops according to soil moisture and plant water needs.	Helps prevent irrigation return flow and associated nutrients, sediment, and mercury to waters of the state.	May reduce costs of irrigation; may help crop or pasture production.	Installation/ maintenance cost. Monitoring time.
f. Install/maintain diversions to prevent unwanted drainage into barnyards and animal heavy use areas.	Helps prevent nutrient and mercury runoff into waters of the state.	Decreases muddiness and shortens saturation period in protected areas.	Cost of installation.

6.4. Pest Management

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
a. Apply pesticides according to the label. Use the correct rate and	Reduces risk of pesticide runoff to streams or other water resources.	Compliance with Oregon law; reduces health risks to applicator, may	

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Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
timing. Comply with label restrictions and precautions.		decrease costs.	
b. Triple rinse pesticide application equipment; dispose of rinse water and containers according to Oregon law. Apply rinsates to sites. Dispose of or recycle clean containers according to Oregon law.	Reduces risk of pesticide runoff to streams.	Compliance with Oregon law. Eliminates disposal costs of collected rinsates identified as hazardous waste.	
c. Calibrate, maintain, and correctly operate application equipment.	Reduces risk of pesticide runoff to streams.	May reduce use and therefore cost of pesticides; reduces health risks to applicator.	Time involved to scout fields is usually offset by reduced or more effective pesticide use.
d. Integrated pest management practices such as pheromone traps, beneficial insect release, and field monitoring. (either in combination with pesticide use or as a replacement to pesticide use)	Reduces risk of pesticide runoff to streams, may reduce loss of non-target species.	May improve effectiveness of pest control system.	
e. Store and mix pesticides on leak-proof facilities.	Reduces risk of pesticide runoff to streams or soil contamination.	Helps protect drinking water; reduces health risks to applicator.	Cost of installation and maintenance.
f. Properly dispose of older unwanted legacy chemicals.	Prevents accidental release of unwanted pesticides into the soils or waterways.	Unwanted chemicals and risk are removed from the producers property.	None if taken to a hazardous waste collection event. These are held periodically in Lane County.

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Nutrient and Irrigation Efficiencies

Practice	Resource Concerns Addressed	Benefits to Producer	Costs to Producer
Apply fertilizer at the correct rate and time applications for crop uptake.	Reduces the risk of excess nitrogen in the soil at the end of the growth season.	Precise application saves the producer money in fertilizer costs.	Time related to precision application.
Sample soil prior to fertilizer application to know existing nutrients.	Prevents the application of excess nutrients.	Precise application saves the producer money in fertilizer costs.	Cost of soil sampling and analysis.
Plant winter cover crops to take up excess nitrogen left over after crops are harvested.	Takes up extra nitrogen and limits potential for leaching into ground water.	Stores extra nitrogen in plant matter for later release when cover crop is incorporated into the soil.	Cost of seed and fuel to plant cover crop.
Properly maintain irrigation systems to prevent over-irrigation.	Prevents leaching of excess nitrogen past the root zone.	Uniform irrigation application and save producer money on nitrogen costs.	Replacement nozzles at least every four years is recommended.
Monitor soil water content and adjust irrigation schedules to maintain soil water content in an appropriate range in the root zone.	Prevents over-irrigation and leaching of excess nitrogen past the root zone.	Allows accurate irrigation application and keeps nutrients available to crops.	Soil monitoring equipment and time to evaluate soil water content.
Schedule irrigation applications based on expected evapotranspiration rates.	Prevents over-irrigation and leaching of excess nitrogen past the root zone.	Allows accurate irrigation application and keeps nutrients available to crops.	Time to evaluate expected evapotranspiration rates.

Selker et al, 2004

Comment [JM39]: Find in Section 2.5.6

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7. Administrative Roles and Responsibilities

7.1. DEQ

As stated in the Memorandum of Agreement (MOA) between ODA and DEQ (signed 5/17/2012), DEQ is the primary agency responsible for implementing the Clean Water Act (CWA) and general state water quality laws found in Oregon Revised Statute (ORS) chapters 468 and 468B. This includes the responsibility for establishing and reviewing water quality standards, under CWA Section 303(c) and Oregon Administrative Rule (OAR) chapter 340, division 41, developing the Nonpoint Source (NPS) Control Program reguered under CWA section 319, and issuing (and ensuring implementation of) TMDLs under CWA Section 303(d) and OAR chapter 340, division 42, for those surface waters that fail to meet water quality standards.

Comment [JM40]: Find a modified version in Sections 1.3.1 and 1.4.3

7.2. Designated Management Agency/Local Management Agency

The MOA between DEQ and ODA states, the ODA is the agency responsible for implementing the Agricultural Water Quality Management Program established under ORS 568.900 to 568.933 and ORS 561.191, and Oar chapter 603, divisions 90 and 95. The ODA Agricultural Water Quality Management Program achieves the goals of these statutes and rules by implementation of ORS 468B within its jurisdiction. It is also the program used to implement load allocations for agricultural nonpoint source pollution assigned under TMDLs issued pursuant to CWA Section 303(d).

SWCDs are legal, independent subdivisions of state government, and are led locally by an elected board of directors who serve four-year terms without pay. For several decades, SWCDs in Oregon have worked with landowners to promote the good stewardship of natural resources. SWCDs in Oregon serve as LMAs for Area Plan development and implementation within their district boundaries.

Comment [JM41]: Find a modified version in Section 1.3

7.3 Agriculture's Role

Individual Landowners' Responsibility

Each individual landowner or operator in the Management Area is required to comply with the Area Rules, which set minimum regulatory standards for agricultural lands (OAR 603-095-1240). In addition, individual landowners are encouraged to strive to attain conditions that exceed compliance, to help move land conditions and water quality toward meeting the goals and objectives of the Area Plan.

Each landowner or operator is not individually responsible for achieving agricultural load allocations of TMDLs, for achieving water quality standards for a water body, or for meeting the goals and objectives of the Area Plan. These are the responsibility of agricultural community collectively.

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Voluntary technical and financial assistance is available to landowners who want to work with the LMA (or with other local partners such as watershed councils or the NRCS) to achieve land conditions that contribute to good water quality. Landowners may also choose to improve their land conditions without assistance. Please refer to the information found in the Costs and Financing section and the Agency and Partner Contacts section of this Area Plan.

Comment [JM42]: Find a modified version in Section 1.3.4

Agriculture's Collective Responsibility

Agriculture is collectively responsible for meeting the agricultural load allocations of TMDLs and for contributing to achieving and maintaining water quality standards. This collective responsibility cannot be achieved without individual landowners being in compliance with the Area Rules and attaining conditions that exceed those required by the Area Rules. This collective responsibility also depends on the leadership of agricultural producer groups, trade associations, and businesses in encouraging and supporting their members and customers to improve land conditions that contribute to meeting water quality goals.

Example: Streamside Vegetation, Riparian Rules, Area Plans, and the Temperature TMDLs

Agricultural streamside vegetation condition can be categorized into one of four classes, as described earlier in Table 2. Table 3 summarizes the correlation between streamside vegetation, compliance with the Area Rules (riparian rule), meeting the goals of the Area Plan, and meeting the agricultural load allocation for the temperature TMDL (effective shade is the surrogate for temperature).

Table 3. Relationship Between Streamside Vegetation Class, Agricultural Impacts, and Streamside Functions and Area Rules (Riparian Rule), Area Plan, and Temperature TMDL.

Class	Streamside Vegetation Condition	Agricultural Impacts Present	Effective Shade Provided	Area Riparian Rule	Area Plan Goals	Temperature TMDL Ag Load Allocation
I	Protects water quality	No	Probably	In compliance	Meets goals	Meets
II	Establishing and growing	No	Maybe	In compliance	May meet goals	Contributes
III	Unable to establish	Yes	No	Not in compliance	Does not meet goals	Does not meet
IV	Unable to establish	No	No	N/A	N/A	N/A

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Class I areas have sufficient vegetation to provide water quality functions. Agriculture is not impacting the streamside area. Effective shade is present (along with streambank stability and filtering of overland flows, which contribute to meeting other TMDLs and water quality standards). Class I areas are in compliance with the Area Rules (riparian rule) and meet the streamside vegetation goals of the Area Plan. If agricultural lands collectively have streamside vegetation in Class I condition, then agriculture is doing its part to meet the agricultural load allocation for the temperature TMDL. If these Class I conditions still do not result in the achievement of water quality standards, and there are no other agricultural nonpoint sources of the pollutants, then DEQ will reevaluate agriculture's load allocation.

Class II areas have streamside vegetation that is establishing and growing, but is not sufficient to protect water quality. Agriculture is not impacting the streamside area. Effective shade may or may not be present, depending on stream width. The streamside area may provide some streambank stability and filtration of overland flows, which contribute to meeting other TMDLs and water quality standards. Class II areas are in compliance with the Area Rules (riparian rule), may meet the streamside vegetation goals of the Area Plan, and may contribute to meeting the agricultural load allocation for the temperature TMDL.

Class III areas do not have streamside vegetation that is able to establish and grow. Agriculture is preventing or impeding vegetative growth. Effective shade is probably not present. The streamside vegetation probably does not stabilize streambanks or filter overland flows. Class III areas are not in compliance with the Area Rules (riparian rule), do not meet the streamside vegetation goals of the Area Plan, and do not contribute to meeting the agricultural load allocation for the temperature TMDL.

Class IV areas do not have streamside vegetation that is able to establish and grow. However, factors other than agriculture are preventing or impeding vegetative growth. The streamside area may or may not provide effective shade, streambank stability, or filtration of overland flows. For Class IV areas, the Area Rules (riparian rule) do not apply, and the agricultural load allocation for the temperature TMDL does not apply.

Comment [JM43]: Find a modified version in Section 1.3.4

7.4. Resolution of Complaints

The ODA will investigate complaints against landowners or occupiers who are reported to be out of compliance with OAR 603-095-2100 through 603-095-2160. The complaint must relate to a specific site and contain a thorough description of the problem. ODA staff may also initiate an inspection if they directly observe violations of conditions or measures outlined in the Area Rules adopted to implement an Area Plan or if they are alerted to a violation by another agency.

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

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

Comment [JM44]: Find a modified version in Section 1.3.1

7.5. Enforcement Action

The 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. The ODA recognizes that every farm and situation is different and will take into account each individual situation when enforcing the Rules.

Comment [JM45]: Find a modified version in Section 1.3.1

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8. Monitoring, Evaluation, And Modification

Statewide monitoring and evaluation of water quality and streamside conditions on agricultural lands

ODA conducts monitoring at a statewide level and analyzes other agencies' and organizations' monitoring data to answer several monitoring questions related to agriculture and water quality.

- What are current water quality and landscape conditions in agricultural areas in Oregon?
- What are water quality trends?
- How well does the existing monitoring network assess agricultural water quality trends and streamside conditions in Oregon?
- What are riparian vegetation trends along agricultural lands in Oregon?
- How do riparian conditions compare with site capabilities?
- How do riparian vegetation conditions change in aerial photos of selected stream reaches?
- How do changes in riparian vegetation condition compare with trends in water quality in monitored watersheds?

To answer these questions, ODA evaluates water quality data from existing sites in DEQ's LASAR database (http://deq12.deq.state.or.us/lasar2) that reflect agricultural influence on water quality. In 2011, ODA received funding from the Oregon Legislature to fund water quality sampling at 19 additional sites around Oregon. These data, once sampling begins, will also be published in the LASAR database and evaluated at the statewide level to determine trends in water quality at agricultural sites statewide.

For each Management Area, ODA currently evaluates other agencies' and organizations' water quality data to answer the following questions.

- What water quality and land condition data from agricultural watersheds are available?
- What are trends in available water quality and land condition data in agricultural watersheds since Area Plan and Rule adoption, and since the last biennial review?

Data are reviewed every two years and summarized to the LACs and LMA during the biennial review process. Data summaries are also added to the Water Quality Issues section of the plan.

The Oregon Department of Environmental Quality maintains several long-term water quality monitoring sites in the management area. These include the Coast Fork Willamette at Mt. Pisgah park, the McKenzie River at Coburg Road, the Willamette River at Highway 126 in Springfield, the Middle Fork Willamette at Jasper Bridge, the McKenzie River at Hendricks Bridge, and the McKenzie River at McKenzie Bridge. Of these sites, ODA considers the Coast Fork Willamette at Mt. Pisgah Park and Willamette River at Highway 26 to reflect predominantly agricultural influence. While agricultural

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activities also influence water quality at the other sites, it is difficult to separate the agricultural influences from urban and other influences.

In January 2012, the Oregon Department of Environmental Quality published the Oregon Water Quality Index Summary Report. The Oregon Department of Environmental Quality uses the Oregon Water Quality Index to characterize water quality at its long-term monitoring sites for the 2001-2010 water years. The index analyzes water quality variables and produces a score describing general water quality. The index is unitless, with scores ranging from 10 (very poor) to 100 (excellent).

Out of the six DEQ sites in the management area, five sites, including the Willamette River at Highway 126 site, received scores ranging from 91 to 93, which are classified as excellent. The Coast Fork Willamette at Mt. Pisgah Park received a score of 88, which is considered good. Water quality at the two agriculturally influenced sites did not significantly improve or worsen over the 10-year period.
ODA received funding during the 2011 legislative session to add agricultural sites to DEQ's monitoring network, and is contracting with DEQ to conduct that sampling. One of the new sites is located on the Mohawk River. Data collection at this site began in early 2012, and data from this site will be included in the water quality data summary during the next biennial review.

The United States Geological Survey (USGS) and the Eugene Water and Electric Board (EWEB) have done some testing in the Management Area for pesticides and other industrial chemicals and their by-products. These monitoring efforts focus on collecting water samples during storm runoff from various land use types (forestry, urban, agriculture) to evaluate the mobilization of pollutants during major precipitation events. Unfortunately, the sampling has been unable to isolate the influence from agricultural areas. The sites that have been used to sample for agricultural use also tend to have influence from residential and forest areas. EWEB is planning to continue conducting monitoring in an attempt to isolate the influence from agriculture. Many of these products are relatively soluble in water, while others attach strongly to soil particles. They are transported from the land surface to streams through a combination of subsurface drainage, surface runoff, and soil erosion. Infiltration of rain and irrigation water facilitate transport to groundwater (United States Geological Survey, 1998)

EWEB conducted a "Nonpoint Source Pollution Assessment and Evaluation" in 2004 and 2005. This project attempted to evaluate nonpoint pollution sources, including agriculture, forestry, septic systems, and construction activities. The main objective was to bring watershed landowners, agencies, businesses, and other stakeholders together to discuss these issues and attempt to reduce the threats of non-point pollution from these activities.

The main objectives of the agricultural assessment were to develop an inventory of agricultural activities, determine high priority areas, and to identify problems through water quality monitoring. The majority of the evaluation work was conducted using geographic information systems (GIS). Agricultural fields were digitized in GIS using

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aerial photography and then ground-truthed to enhance the accuracy of the crop data. Chemical applications were estimated using application rates and acreages of each crop. Based on this analysis it was determined that over 8,000 lbs of chemical active ingredient are applied in the McKenzie Basin annually. The GIS analysis also identified two priority areas with a higher potential of pesticide run-off. The first area is land near the confluence of Cedar Creek and the McKenzie River, and the second area is between EWEB's Walterville Power Canal and the McKenzie River. These are two areas with more intensive agricultural practices. Hazelnuts, nursery operations, blueberries, and vegetable crops were identified as the four highest chemical usage crops in the area. The overall results of the water quality monitoring indicate no major impacts from nonpoint sources of pollution in the area (Morgenstern, 2006).

The EWEB conducted water quality monitoring at 13 sites in the McKenzie River between 2000 and 2009. Sites in Camp Creek, Cedar Creek, the Mohawk River, and the lower McKenzie River had the most agricultural land within the watershed. Monitoring data showed excellent water quality in the McKenzie River. However, some potential water quality concerns were also identified in tributaries in the lower watershed. Camp Creek, Cedar Creek, and Keizer Slough (which is not agriculturally influenced) showed the highest concentrations of nitrates, total phosphorus, metals, E. coli, total organic carbon, total suspended solids, total coliform and specific conductance. Nitrate levels in Camp Creek declined over the duration of the monitoring period. Camp Creek, Cedar Creek, and the lower Mohawk River had the highest levels of E. coli, which sometimes violated Oregon's water quality standards.

Between 2008 and 2010, the Middle Fork, Coast Fork, and Long Tom watershed councils collaborated to evaluate water quality above and below eight small communities in Lane County. Some of the monitoring data were gathered in streams with significant agricultural influence. Monitoring results relevant to agriculture are summarized below.

In the Middle Fork Willamette, upstream and downstream samples were collected on Lost Creek and Little Fall Creek. Both of these watersheds include some agricultural land, as well as residential and forest lands. Lost Creek data showed temperature and dissolved oxygen concerns during the monitoring period, with relatively infrequent bacteria concerns at the downstream site. Little Fall Creek showed temperature and dissolved oxygen concerns, but met state bacteria standards consistently.

In the Coast Fork Willamette, Hill Creek, Camas Swale, Gettings Creek, and Mosby Creek were the streams monitored that have significant agricultural land. Gettings Creek had greater water quality concerns than the other streams in the study, with temperature and bacteria concerns at the lower site and an increase in water quality concerns between the upstream and downstream sites.

Comment [JM46]: Find in Section 4.2

Land condition assessment

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ODA will work with LMAs and other partners to design and conduct an assessment of streamside areas along agricultural lands in the management area prior to the next biennial review. These assessments will allow ODA and partners to track improvements in land conditions over time. Often, improvements in land conditions are detectable much earlier than changes in water quality. For example, when a landowner restores a streamside area, land conditions improve rapidly, even though it may take 20 years for streamside vegetation to reach the height that it can positively affect stream temperatures.

Implementation activities assessment

In addition, during the biennial review process, ODA, the LMA, and the LAC assess activities that have occurred to help achieve plan goals and objectives, including the following.

- Outreach and education activities conducted to promote awareness of water quality issues and encourage agricultural land conditions that protect water quality, and the level of participation in these activities
- Voluntary conservation projects installed by agricultural landowners and managers in cooperation with the LMA and other agencies and organizations
- Number of complaint investigations, the result of each complaint investigation, and corrections of violations

Area plan and rules effectiveness evaluation

The LAC, ODA, and the LMA will evaluate the effectiveness of the area plan in improving water quality and land conditions, include the evaluation results in the next update of the area plan, and summarize the results in a biennial report to the Oregon Board of Agriculture. ODA, the LMA, and the LAC will discuss the monitoring and evaluation results at the next biennial review, what these results mean in terms of area plan effectiveness, and modifications to the area plan and rules. Some of the questions to consider in the discussions include:

- Are all of our goals and objectives measurable?
- Were the activities that we committed to do over the previous two years in our goals, objectives and strategies accomplished?
- Were all violations that were found during investigations resolved or are they in the process of being resolved?
- Were our goals and objectives for land condition improvements met?
- Are water quality data from agricultural lands showing improvement?
- How do water quality and land condition data trends compare? Do we need to start collecting other kinds of land condition data?

Comment [JM47]: Find in Section 4.3

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Documenting Effectiveness Using Priority Areas

Why Focus Efforts in a Priority Area?

The Oregon Agricultural Water Quality Program relies primarily on voluntary improvements in land conditions for agriculture to fulfill its responsibility to prevent and control water pollution. One way to implement an Area Plan systematically is to focus and measure implementation in relatively small regions within the Management Area.

The priority area concept evolved from conversations between ODA, LMAs, LACs, and other stakeholders and partners seeking better ways to implement the Agricultural Water Quality Program and Area Plans. ODA and program partners believe that strategic, focused, and systematic delivery of outreach and technical assistance will lead to more measurable levels of implementation and allow ODA and the LMA to make better use of limited resources.

While the priority area approach is relatively new for ODA, the LMA, and the LAC, it is consistent with other agencies' and organizations' efforts to work proactively in targeted geographic areas.

Selecting A Priority Area

A priority area is usually a small watershed (6th or 7th field HUC) with agricultural lands. An initial priority area is selected jointly by ODA, the LMA, the LAC, and other partners, based on one or more of the following factors:

- Significant water quality concerns probably associated with agricultural activities
- LMA and other partners are already working with landowners in an area
- Size of the area matches the LMA's capacity to work in the entire area in a relatively short time frame

During the 2012 biennial review process, ODA, the LMA, and the LAC discussed the priority area concept, an initial priority area, future priority areas, measurable objectives for implementation in the priority area, and timelines for implementation. The initial and future priority areas for the Management Area are described in the Strategies section of this Area Plan.

Land Condition and Water Quality

Once a priority area is selected, land condition measures are identified for which baseline and post-implementation data will be collected and mapped. These land condition measures serve as surrogates for the water quality parameters of concern in the priority area. For example, streamside vegetation is generally used as a surrogate for water temperature, sediment may be used as a surrogate for pesticides and mercury, and livestock access to waterways could be used as a surrogate for bacteria. Water quality monitoring data may also help partners evaluate the effects of changing land conditions

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on water quality parameters such as temperature, bacteria, nutrients, sediment, and pesticides, to evaluate progress in the priority area and to help identify future priority areas.

The Oregon Agricultural Water Quality Program focuses on land conditions, in addition to water quality data, for several reasons:

- landowners can see land conditions and have direct control over land conditions
- it can be difficult to separate agriculture's influence on water quality data from other influences, such as bacteria from failing septic systems, wildlife, and recreation
- other factors such as climate change may have long-term impacts on water quality that are beyond agriculture's control
- it is expensive to monitor water quality at the scale needed to evaluate effectiveness
- changes in land conditions, such as streamside vegetation, will take a long time to translate into water quality improvements

Focused Outreach and Technical Assistance

After baseline streamside conditions are mapped, the LMA and other interested partners deliver focused and systematic outreach and technical assistance to landowners in the priority area. Every landowner with potential land condition concerns is contacted with an offer of voluntary assistance. Focused, one-on-one (active) outreach and technical assistance efforts are often more effective in reaching landowners than general (passive) outreach. This focused program delivery will allow ODA, the LMA, and the LAC to implement the Area Plan systematically by moving focused work from one small watershed to the next over time, eventually reaching the entire Management Area.

Monitoring and Evaluation

ODA, the LMA, and the LAC will evaluate and document the implementation of the Area Plan by assessing improvement of land conditions in the priority area during each biennial review. Comparisons of baseline and post-implementation land conditions (along with available water quality data) will allow these partners to determine whether the selected land condition measures have improved. These partners and other stakeholders will also be able to evaluate the status and trends of Area Plan implementation more readily than from reports of implementation efforts scattered throughout a Management Area.

The priority area process will help ODA, the LMA, the LAC, and other program partners to evaluate whether implementation of the Agricultural Water Quality Program is achieving the measurable objectives in the Area Plan, such as:

- Achieve X% compliance with the Area Rules over Z years
- Achieve Y% water-quality protective vegetation over Z years

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Stream Temperature and Streamside Vegetation

Across Oregon's 38 Water Quality Management Areas, many LMAs are focusing their initial priority area implementation on streamside vegetation. There are several reasons for this focus:

- streamside vegetation improves water quality for multiple parameters, including temperature, sediment, bacteria, nutrients, toxics, and pesticides
- streamside vegetation is visible from public roads and on aerial photos, allowing agencies, stakeholders, and the general public to see that agriculture is part of the solution
- landowners can take steps to improve streamside vegetation, with or without assistance from the LMA, watershed councils, or other local partners
- streamside vegetation improves fish and wildlife habitat

The Oregon Agricultural Water Quality Program usually uses the concept of "site-capable streamside vegetation" to describe the vegetation that agricultural streamsides need in order to prevent and control water pollution. Site-capable streamside vegetation is the vegetation that can be expected to grow at a particular site, given natural site factors (e.g. elevation, soils, climate, wildlife, fire, floods) and historical and current human influences (e.g. channelization, roads, invasive species, land management). Site-capable streamside vegetation can be determined for a specific site based on: streamside vegetation at the site (type, location, and size), streamside vegetation at nearby reference sites (with similar natural characteristics), or NRCS soil surveys (which often describe the vegetation in uncultivated areas).

Mature, site-capable streamside vegetation usually provides three functions that help to prevent or control water pollution from agricultural activities:

1. shade that blocks direct solar radiation and moderates stream temperatures
2. bank stability and reduction of streambank erosion
3. filtration of pollutants (e.g. bacteria, nutrients, pesticides, mercury, sediment) from overland flows

However, in some cases mature site-capable vegetation may not be needed to provide these functions, or may not provide these functions. For example:

- mature trees may not be necessary to protect water quality; willows or other shrubs may suffice on small streams
- mature conifers may shade crops or create undesirable microclimates; mature alders may be an adequate alternative
- mature juniper is site-capable vegetation in central and eastern Oregon, but it reduces bank stability and increases erosion
- invasive grasses (such as reed canarygrass or Kentucky bluegrass) can be the dominant site-capable vegetation along streams, but they generally do not provide all of the required water quality functions

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- upland species (such as sagebrush) can be the dominant site-capable vegetation along streams with erosional down-cutting, but they do not improve water quality

To measure baseline conditions in the priority area, the LMA will map streamside areas on agricultural lands and estimate the percentage of streamside areas that fall into four categories, referred to as Class I, II, III, and IV in this Area Plan (Table 2).

Table 2. Classes of Streamside Vegetation for Assessing Land Conditions.

Class	Water-Quality Protective Vegetation	Agricultural Impacts	Three Functions Provided
I	Present	None	All three
II	Establishing and growing	None	Depends on size / location / density of vegetation
III	Unable to establish	Prevent vegetation from establishing	No
IV	Unable to establish	None – non ag factors prevent vegetation from establishing	No

Every two years, ODA, the LMA, and the LAC will evaluate the progress of Area Plan implementation in the priority area. The percentage of streamside areas that fall into the four classes will be updated. Streamside areas can be reclassified from Class III to Class II where projects remove agricultural impacts and allow streamside vegetation to establish. Reclassification from Class II to Class I will usually take longer than two years, because streamside vegetation needs to grow to a height where it can provide shade and other functions.

Placeholder - Source assessment/discussion
What are the ag sources that are contributing to the status and trends that we observe? Should we at least revisit that section of the plan, given the data? Is there a way to make those sections more specific, either geographically or by activity? For example, is winter feeding more of a contributor? Do existing data support the assumptions that the plan has already made about agricultural sources? What data are needed to further assess the relative importance and geographic distribution of the sources?

Placeholder - What do water quality and land condition data tell us about where work should be focused and what issues work should focus on?

- Summarize source/priority identification data collected by watershed councils, SWCDs, DEQ, etc
- If DEQ, watershed council, or other data indicate water quality problems, what are the potential agricultural sources of these problems?
- What types of objectives and strategies should we identify for the next 2 years to address the agricultural sources of those problems?

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Is additional water quality or landscape monitoring needed to identify areas where focused work is needed?

Comment [JM48]: Find in Section 4.3

Pesticide Management

Pesticide Management Plan

The Pesticides Program of ODA holds the primary responsibility for pesticide registration and use regulation within the state of Oregon under the Federal Insecticide Fungicide Rodenticide Act. Because EPA designated the state as the lead agency for pesticides, ODA led the development and implementation of a Pesticide Management Plan (PMP) for the state of Oregon. The PMP, completed in 2011, strives to protect drinking water supplies and the environment from pesticide contamination, while recognizing the important role that pesticides have in maintaining a strong state economy, managing natural resources, and preventing human disease. The PMP sets forth a process for preventing and responding to pesticide detections in Oregon's ground and surface water resources by managing the pesticides that are currently approved for use by EPA in both the agricultural and non-agricultural settings. Pesticides that are no longer marketed, also called "legacy" pesticides, are not regulated through the PMP, and are instead regulated through a separate process under the federal Clean Water Act and Oregon water quality laws. More information about the PMP is available on the ODA website (www.oregon.gov/ODA/PEST/water_quality.shtml).

Water Quality Pesticide Management Team

In 2007, the interagency Water Quality Pesticide Management Team (WQPMT) was formed to expand efforts to improve water quality in Oregon related to pesticide use. The WQPMT includes representation from the Oregon Departments of Agriculture, Forestry, and Environmental Quality, and the Oregon Health Authority. The WQPMT facilitates and coordinates water quality / pesticide activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. The WQPMT developed the PMP. The WQPMT relies on monitoring data from the Pesticide Stewardship Partnership and other monitoring programs to assess the possible impact of pesticides on Oregon's water quality.

Pesticide Stewardship Partnership

The Pesticide Stewardship Partnership (PSP) program identifies potential concerns and improves water quality affected by pesticide use. The Clackamas PSP, one of seven PSPs around Oregon, was initiated in 2005. The PSP combines local expertise and water quality sampling results to encourage voluntary changes in pesticide use and management practices.

Comment [JM49]: Find a modified version in Section 1.5.4

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9. Public Involvement

The ODA, Upper Willamette SWCD, and LAC worked in cooperation to encourage public involvement during the Area Plan and Rules development. All LAC meetings were open to the public and were advertised through press releases to local newspapers. Meeting notices and minutes were sent to interested members of the public. Members of the public in attendance were invited to comment at the end of each meeting. The Upper Willamette SWCD gave several presentations at meetings of agricultural groups about the process, and also sent press releases to local papers updating the public on the progress of the Plan and Rules.

When the draft Area Plan and Rules were completed for the Southern Willamette Valley, they were first presented to the public through a series of public information meetings and presentations in January 2002. The department then conducted a formal public comment period and two public hearings in January and February 2002. ODA, in consultation with the LAC, then reviewed public comments and incorporated several changes into the final Plan and Rules.

Since Area Plan and Rules adoption, the Upper Willamette SWCD has continued outreach and education programs about the Area Plan and Rules. Ongoing outreach activities include newspaper articles, small acreage conservation workshops, and presentations at agricultural group meetings.

Comment [JM50]: Find a modified version in Section 1.3.5

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Comment [JM51]: Find under References

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Appendices

Comment [JM52]: Find all appendices in the Appendices section

A. Sources of Information and Technical Assistance
B. 2010 Water Quality Assessment List and Decision Matrix
C. Water Quality Parameters List and Affected Beneficial Uses
D. Pesticide Use In Oregon
E. Conservation Funding Programs
F. Revised Universal Soil Loss Equation (RUSLE)
G. ORSs 468B.025 and 468B.050
H. References on Water Quality Improvement Practices for Agricultural Landowners
I. Where Does the 25-year Storm Event Requirement Come From in the Riparian Characteristic to Achieve?

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Appendix A: Sources of Information and Technical Assistance

Comment [JM53]: Find in Appendix B

Upper Willamette Soil and Water Conservation District (Upper Willamette SWCD) (formerly the East Lane SWCD)

780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6436

Provides technical assistance in a wide variety of agricultural and natural resource areas and assists landowners in accessing federal and local funding programs.

Farm Services Agency (FSA)

780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6443

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

Lane County Farmers' Market

55 East 8th Avenue
Eugene, OR 97401
(541) 687-6721

Local produce directly from farmers. Many experienced organic growers onsite.

McKenzie River Trust

1245 Pearl Street
Eugene, OR 97401
(541) 345-2799
mrt@mckenzieriver.org
www.mckenzieriver.org

Local, non-profit land conservancy that works with landowners in Lane and Douglas Counties to preserve their property. Employs several tools to help landowners protect lands critical to water quality and wildlife habitat.

Natural Resources Conservation Service (NRCS)

780 Bailey Hill Road, Suite #5
Eugene, OR 97402
(541) 465-6443

Provides information on soil types, soils mapping, and interpretation. Administers and provides assistance in developing conservation plans for federal programs such as the Conservation Reserve Program, Conservation Reserve Enhancement Program, the Environmental Quality Incentives Program, and the Wetlands Reserve Program. Makes technical determinations on wetlands and highly erodible lands.

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Northwest Coalition for Alternatives to Pesticides (NCAP)

P.O. Box 1393
Eugene, OR 97440
(541) 344-5044
http://www.pesticide.org
info@pesticide.org

Works to protect people and the environment by advancing healthy solutions to pest problems. Has a library of over 15,000 articles, documents and books on pesticide issues, the health and environmental effects of pesticides, and alternative practices. Provides information on managing a specific pest problem or crop without the use of pesticides. Has water quality program and can provide information on protection of waterways and research on pesticide contamination of waterways.

Oregon Department of Agriculture (ODA)

635 Capitol St NE
Salem, OR 97301
Natural Resources Division: (503) 986-4700
Pesticides Division: (503) 986-4635

The Natural Resources Division is responsible for developing and implementing Management Area Plans and Rules across Oregon, the Confined Animal Feeding Operation 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.

Oregon Department of Environmental Quality (DEQ)

165 East 7th Avenue, Suite 100
Eugene, OR 97401
(541) 686-7838

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 Total Maximum Daily Loads for water quality limited waterbodies.

Oregon Department of Fish and Wildlife (ODFW)

Springfield Field Office
3150 E Main Street
Springfield, OR 97478-5800
(541) 726-3515
http://www.dfw.state.or.us

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.

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Oregon Department of Forestry (ODF)

Veneta office:

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

Springfield office:

3150 E Main Street
Springfield, OR 97478-5800
(541) 726-3588
http://www.odf.state.or.us

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.

Oregon Department of State Lands (DSL)

775 Summer Street NE Suite 100
Salem, OR 97301-1279
(503) 986-5200
http://statelands.dsl.state.or.us

Administers Oregon fill and removal law and provides technical assistance to landowners.

Oregon State University Extension Service (OSU Extension Service)

783 Grant Street
Eugene, OR 97402
(541) 344-5859
http://extension.oregonstate.edu/lane

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

Oregon Tilth

260 SW Madison Avenue, Suite 106
Corvallis, OR 97333
(503) 378-0690
http://www.tilth.org

Oregon Tilth is the Northwest certifying agency for organic farms. Maintains a manual on acceptable practices and visits farms to determine compliance. Also publishes "In Good Tilth" and maintains a list of currently certified farmers.

Oregon Water Resources Department (WRD)

725 Summer Street NE, Suite A
Salem, OR 97301
(503) 986-0900
http://www.wrd.state.or.us

Provides information on streamflows and water rights, issues water rights, and monitors water use.

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Oregon Watershed Enhancement Board (OWEB)

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

Provides funding for a variety of watershed enhancement, assessment, monitoring and educational activities. Provides support to watershed councils throughout Oregon.

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.

McKenzie Watershed Council
P.O. Box 70166
Springfield, OR 97475
(541) 687-9076
www.mckenziewc.org
coordinator@mckenziewc.org

Coast Fork Watershed Council
28 South 6th Street Suite A
Cottage Grove, OR 97424
(541) 767-9717
www.coastfork.org

Middle Fork Watershed Council
P.O. Box 27
Lowell, OR 97452
(541) 937-9800
www.mfwwc.org
contact@mfwwc.org

Mohawk Watershed Partnership
P.O. Box 615
Marcola, OR 97454-0615
(541) 687-9076
mwp@epud.nethttp://www.mckenziewc.org/mohawkWSP.html

Lost Creek Watershed Group
PO Box 27
Lowell, OR 97452
(541) 937-3351
mfwwc@efn.org

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Appendix B: 2010 Water Quality Assessment List and Decision Matrix

Comment [JM54]: Find in Appendix C

Southern Willamette Agricultural Water Quality Management Area Water Quality Limited Waterbodies

"TMDL" means a TMDL has been established for the waterbody and approved by EPA, and is being implemented. The TMDL is the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards. The water is considered Water Quality Limited until it meets the water quality standard.

"303(d) List" means the waterbody exceeds listing criteria and is placed on the 303(d) List.

"Potential concern" means data indicate a waterbody may typically meet water quality standards except under unusual circumstances (e.g. unusual weather circumstances) or in situations where toxics exceed levels of concern but do not exceed definitions used for the 303(d) List. In these cases, the waterbodies are identified as being of potential concern and the Department of Environmental Quality will seek more data to verify the assessment.

BACTERIA (CRITERIA: WATER CONTACT RECREATION)

TMDL Approved September 2006

DEQ has set the bacteria TMDL to protect human water contact recreation, the most sensitive beneficial use. Urban stormwater discharge and agricultural run-off are two potential sources of bacteria. The bacteria TMDL addresses the entire area.

DISSOLVED OXYGEN

TMDL Approved, 1996
Coast Fork Willamette River, River Mile (RM) 0 to 28.5

303(d) List	Season
Middle Fork Sub Basin:	
Anthony Creek, Mouth to RM 4.3	Oct. 1 – May 31
Anthony Creek, Mouth to RM 4.3	June 1 – Sept. 30
Lost Creek, Mouth to RM 14.7	Oct. 1 – May 31
Lost Creek, Mouth to RM 14.7	June 1 – Sept. 30
Coast Fork Sub Basin:	
Camas Swale Creek, Mouth to RM 9.4	Oct. 1 – May 31

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TEMPERATURE (CRITERIA: REARING 64 F, SPAWNING 55 F, OR BULL TROUT 50 F)

DEQ set the TMDL for temperature to protect salmon spawning, rearing, and passage as the most sensitive beneficial uses in the Southern Willamette Valley Management Area. DEQ has identified the existing nonpoint source pollution sources as solar heating of the Area's waterways due to a lack of riparian vegetation from forestry, agriculture, rural residential, and urban activities. There are separate temperature TMDLs for the mainstem Willamette, the McKenzie Subbasin, the Middle Fork Willamette Subbasing, and the Coast Fork Willamette Subbasin

303(d) List (covered under the TMDL)	Season
McKenzie Sub Basin:	
Blue River-RM 0 to 15.5	Year Round
Budworm Creek, RM 0 to 3.1	Year Around
Camp Creek, RM 0 to 10.9	Year Around
Cartright Creek, RM 0 to 6.1	Year Around
Cash Creek, RM 0 to 6.1	Year Around
County Creek, RM 0 to 2.4	Year Around
Deer Creek, RM 0 to 2.6	Year Around
Duckpen Creek, RM 0 to 2.1	Year Around
Horse Creek, RM 0 to 14.2	Summer
Lookout Creek, RM 0 to 9.8	Year Around
Marten Creek, RM 0 to 6.5	Year Around
McGowan Creek, RM 0 to 5.7	Year Around
McKenzie River, RM 0 to 54.6	Year Around
Mill Creek, RM 0 to 10.6	Year Around
Mohawk River, RM 0 to 25.4	Year Around
Rebel Creek, RM 0 to 1.2	Year Around
Rush Creek, RM 0 to 2.4	Year Around
Seeley Creek, RM 0 to 2.4	Year Around
Shotgun Creek, RM 0 to 6.6	Year Around
South Fork McKenzie River, RM 0 to 4.5	Summer
Middle Fork Willamette:	
Anthony Creek, RM 0 to 4.3	Year Around
Bohemia Creek, RM 0 to 4.4	Year Around
Buckhead Creek, RM 0 to 3.6	Year Around
Chalk Creek, RM 0 to 4.8	Year Around
Christy Creek, RM 0 to 12	Year Around
Coal Creek, RM 0 to 8.9	Year Around
Coal Creek Trib., RM 0 to 2.2	Year Around
Eagle Creek, RM 0 to 5.3	Year Around
Fall Creek, RM 0 to 32.8	Year Around
Furnish Creek, RM 0 to 5.2	Year Around

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Gold Creek, RM 0 to 5.1	Year Around
Goodman Creek, RM 0 to 2.3	Year Around
Guiley Creek, RM 0 to 4.7	Year Around
Hehe Creek, RM 0 to 6.6	Year Around
Hills Creek, RM 0 to 15.3	Year Around
Indian Creek, RM 0 to 4.3	Year Around
Little Fall Creek, RM 0 to 20.6	Year Around
Logan Creek, RM 0 to 3.6	Year Around
Lost Creek, RM 0 to 14.7	Year Around
McKinley Creek, RM 0 to 3.8	Year Around
Middle Creek, RM 0 to 3.8	Year Around
Middle Fork Willamette, RM 52.3 to 82.2	Year Around
Mike Creek, RM 0 to 2.2	Year Around
Monterica Creek, RM 0 to 2.3	Year Around
N. Fork, Middle Fork Willamette River, RM 0 to 28.3	Year Around
N. Fork Winberry Creek, RM 0 to 5.8	Year Around
Packard Creek, RM 0 to 5.2	Summer
Portland Creek, RM 0 to 3	Summer
Salt Creek, RM 0 to 13.8	Year Around
Shortridge Creek, RM 0 to 2	Year Around
Snake Creek, RM 0 to 3.6	Year Around
South Fork Winberry Creek, RM 0 to 9.5	Year Around
Wall Creek, RM 0 to 6.6	Year Around
Winberry Creek, RM 0 to 8	Year Around
Coast Fork Willamette:	
Brice Creek, RM 0 to 11.2	Summer
Coast Fork Willamette, RM 0 to 38.8	Year Around
King Creek, RM 0 to 3.2	Year Around
Laying Creek, RM 0 to 14.4	Year Around
Marten Creek, RM 0 to 3.4	Year Around
Mosby Creek, RM 0 to 21.2	Year Around
Row River, RM 0 to 20.8	Year Around
Sharps Creek, RM 0 to 15,2	Year Around

Potential Concern	**Season**
McKenzie Sub Basin:	
Augusta Creek, RM 0 to 7.1	Summer
Middle Fork Willamette:	
Salt Creek, South Fork, RM 0 to 6.6	Summer

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METALS

Mercury TMDL

Human fish consumption is the most sensitive beneficial use for which DEQ has set the Mercury TMDL. Primary sources of mercury include air deposition from national and international sources, discharge from specific legacy mining sites, and erosion of soils containing mercury. The Mercury TMDL has a basin wide strategy for mercury reduction.

303(d) List	Season
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5 (Manganese)	Year Around
Mohawk River, RM 0 to 25.4 (Iron)	Year Around
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 38.8 (Iron)	Year Around
Coast Fork Willamette River, RM 0 to 38.8 (Mercury)	Year Around
Cottage Grove Reservoir (Mercury)	Year Around
Dennis Creek, RM 0 to 1.4 (Mercury)	Year Around
Dorena Reservoir (Mercury)	Year Around

Potential Concern

McKenzie Sub Basin:	
McKenzie RiverRM 0 to 83 (Arsenic)	
McKenzie River, RM 0 to 34.1 (Chromium)	Year Around
McKenzie River, RM 0 to 34.1 (Copper)	Year Around
McKenzie River, RM 0 to 19.7 (Iron)	Year Around
McKenzie River, RM 0 to 34.1 (Manganese)	Year Around
McKenzie River, RM 0 to 34.1 (Nickel)	Year Around
South Fork McKenzie River, RM 0 to 36.3 (Iron)	Year Around
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 38.8 (Manganese)	Year Around

Flow Modification

303 (d) List	Season
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5	Undefined
Camp Creek, RM 0 to 10.8	Undefined
McKenzie River, RM 34.1 to 54.5	Undefined
South Form McKenzie River, RM 0 to 4.5	Undefined

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Middle Fork Willamette:	
Fall Creek, RM 0 to 7 and 13 to 32.7	Undefined
Middle Fork Willamette River, RM 0 to 15.6 and 18.7 to 44.2	Undefined
Coast Fork Willamette:	
Coast Fork Willamett, RM 0 to 31.3	Undefined
Row River, RM 0 to 7.4	Undefined

Habitat Modification

303 (d) List	**Season**
McKenzie Sub Basin:	
Mill Creek, RM 0 to 2.7	Undefined
Mohawk River, RM 0 to 25.4	Undefined
Middle Fork Willamette:	
Little Fall Creek, RM 0 to 20.6	Undefined
Simpson Creek, RM 0 to 5	Undefined
Coast Fork Willamette:	
Brice Creek, RM 0 to 11.2	Undefined
Mosby Creek, RM 0 to 21.2	Undefined
Sharps Creek, RM 0 to 12.5	Undefined

Aquatic Weeds or Algae

303 (d) List	**Season**
McKenzie Sub Basin:	
Blue River/Blue River Reservoir	Undefined
Middle Fork Willamette:	
Middle Fork Willamette/Dexter Reservoir	Undefined
Middle Fork Willamette/Hills Creek Lake	Undefined
Middle Fork Willamette/Lookout Point Lake	Undefined
Coast Fork Willamette:	
Coast Fork Willamette River, RM 0 to 31.3	Undefined
Row River/Dorena Lake	Undefined

NUTRIENTS

TMDLs Approved

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Coast Fork Willamette-Mouth to Cottage Grove Reservoir (Phosphorus)
Coast Fork Willamette-Mouth to Cottage Grove Res. (Water-Ammonia)
Coast Fork Willamette, RM 0 to 31.3 (pH)

Potential Concern
McKenzie River, RM 73.4 to 84.8 (Phosphorus)

Alkalinity

Potential Concern	Season
McKenzie Sub Basin:	
Blue River, RM 0 to 15.5	Year Around
Cash Creek, RM 0 to 6.1	Year Around
County Creek, RM 0 to 2.4	Year Around
Lookout Creek, RM 0 to 9.8	Year Around
Marten Creek, RM 0 to 6.5	Year Around
McKenzie River, RM 0 to 84.8	Year Around
Mill Creek, RM 0 to 10.6	Year Around
Mohawk River, RM 0 to 25.4	Year Around
Parsons Creek, RM 0 to 6.9	Year Around
Rebel Creek, RM 0 to 4.4	Year Around
Roney Creek, RM 0 to 2.7	Year Around
Rush Creek, RM 0 to 2.4	Year Around
South Fork McKenzie River, RM 0 to 36.3	Year Around
Middle Fork Willamette:	
Black Creek, RM 0 to 13.6	Year Around
Eighth Creek, RM 0 to 2.7	Year Around
Furnish Creek, RM 0 to 5.2	Year Around
Little Fall Creek, RM 0 to 20.6	Year Around
Middle Fork Willamette River, RM 0 to 82.2	Year Around
North Fork Winberry Creek, RM 0 to 5.8	Year Around
Shady Creek, RM 0 to 1.7	Year Around
Timber Creek, RM 0 to 2.7	Year Around
Coast Fork Willamette:	
Brice Creek, RM 0 to 15.5	Year Around
Coast Fork Willamette River, RM 0 to 28.3	Year Around
Row River, RM 0 to 20.8	Year Around

Biological Criteria

Potential Concern	Season
McKenzie Sub Basin:	

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Cash Creek, RM 0 to 6.1	Year Around
Hardy Creek, RM 0 to 4.1	Year Around

Middle Fork Willamette:

Double Creek, RM 0 to 2.9	Year Around
Furnish Creek, RM 0 to 5.2	Year Around
Goodman Creek, RM 0 to 2.3	Year Around
Middle Fork Willamette River, RM 0 to 82.2	Year Around
Salt Creek, RM 0 to 29.1	Year Around
Shady Creek, RM 0 to 1.7	Year Around

Mainstem Willamette Listings

Dioxin, Aldrin, DDE, DDT, Dieldrin, PCBs, and Iron

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Appendix C: Water Quality Parameters List and Affected Beneficial Uses

Comment [JM55]: Find in Appendix D

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 or in OAR 340-041-0445. Listed parameters in the Management Area are indicated in boxes.

Parameters

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 which are injurious to health, recreation, or industry shall not be allowed.
Beneficial Uses Affected - Water Contact Recreation, Aesthetics, Fishing, Livestock Watering, Public and Private Domestic Water Supply, Irrigation, Industrial Water Supply.

Bacteria
Standard - Fecal bacteria levels shall not exceed a 30-day log mean of 126 E. Coli organisms per 100 ml, based on a minimum of 5 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, Public and Private Domestic Water Supply, Livestock Watering.

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, Salmonid Spawning, Rearing, and Migration.

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

Beneficial Uses Affected - Water Contact Recreation, Aesthetics, Fishing, Water Supply.

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Dissolved Oxygen
Standard - For waterbodies identified as salmonid spawning, dissolved oxygen must not be less than 11.0 mg/l and intergravel levels must not fall below 6 mg/l. For waterbodies supporting cold water aquatic life, dissolved oxygen must not fall below 8 mg/l. For waterbodies supporting cool water aquatic life, dissolved oxygen must not fall below 6.5 mg/l. For waterbodies supporting warm water aquatic life, dissolved oxygen must not be less than 5.5 mg/l.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Flow Modification
Standard – The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Habitat Modification
Standard – The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish shall not be allowed.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Spawning, Rearing, and Migration.

Nutrients
Standard - see standards for aesthetics, pH, dissolved oxygen, chlorophyll a, and aquatic weeds or algae.
Beneficial Uses Affected - Aesthetics or use identified under related parameters.

pH
Standard - pH shall not fall outside 6.5 to 8.5. The following exception applies: waters impounded by dams existing on January 1, 1996, which have pHs that exceed the criteria shall not be considered in violation of the standard if the Department of Environmental Quality determines that the exceedance would not occur without the impoundment and that all practicable measures have been taken to bring the pH in the impounded waters into compliance with the criteria.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Water Contact Recreation, Salmonid Spawning, Rearing, and Migration.

Sedimentation
Standard – The formation of appreciable bottom or sludge deposits or the 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.

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Temperature
Standard - 64F for waterbodies with salmonid fish rearing and migration, 55F for waterbodies with salmonid fish spawning, 61F for core cold water habitat, and 50F for waterbodies with bull trout. Following a temperature TMDL, temperature water quality limited waters can not be warmed more than .3 degrees Celsius (.5 degrees F) by sources from anthropogenic heating.
Beneficial Uses Affected - Resident Fish & Aquatic Life, Salmonid Fish 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, Salmonid Spawning, Rearing, and Migration.

Toxics
Standard - Toxic substances shall not be introduced above natural background levels in the 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 impact public health, safety, or welfare; aquatic life; wildlife; or other designated beneficial uses. Standards for specific toxic substances may be viewed on the DEQ website at http://waterquality.deq.state.or.us/wq/wqrules/340Div41Tbl20.pdf.
Beneficial Uses Affected - Resident Fish and Aquatic Life, Public, Private and Industrial Water Supply, Livestock Watering, Fishing, Irrigation, Water Contact Recreation.

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, Aesthetics.

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Appendix D: Pesticide Use in Oregon

Comment [JM56]: Find in Appendix E

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 may 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 which 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 which 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.

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(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 ODA.
(15) Deliver, distribute, sell or offer for sale any pesticide which is misbranded.
(16) Formulate, deliver, distribute, sell or offer for sale any pesticide which is adulterated.
(17) Formulate, deliver, distribute, sell or offer for sale any pesticide which 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 which 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 ODA, 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 therefrom 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 thereunder. [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://www.oda.state.or.us/pesticide/info.html or an updated copy of the ORSs and Oregon Administrative Rules.

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

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Appendix E: Conservation Funding Programs

Comment [JM57]: Find in Appendix F

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 may become available after the publication of this document. For more current information, please contact one of the organizations listed below.

Program	General Description	Contact
Conservation Easements	Deed restrictions that protect specific aspects of land for water quality and/or habitat benefits. Easements are perpetual, flexible documents that are held by private conservation organizations, who are charged with ensuring that what is protected stays protected. Management responsibilities of land are shared with landowner. Donated easements can provide tax benefits. Easements can also be sold.	American Farmland Trust, McKenzie River Trust, Trust for Public Land
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.	NRCS, SWCDs, 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.	NRCS, SWCDs
Conservation Stewardship	Provides cost-share and	NR CS, SWCDs

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Program	General Description	Contact
Program (CSP)	incentive payments to landowners who have attained a certain level of stewardship and are willing to implement additional conservation practices.	
Emergency Watershed Protection Program (EWP)	Available through the USDA-NRCS. 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.	NRCS, SWCDs
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, SWCDs, 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.	NRCS, SWCDs
Farm and Ranchland Protection Program (FRPP)	Cost-shares purchases of agricultural conservation easements to protect agricultural land from development.	NRCS, SWCDs
Federal Reforestation Tax Credit	Provides federal tax credit as incentive to plant trees.	IRS
Fee Title Acquisition	In some situations, private land conservancies can acquire land for a fee from landowners. Generally, land conservancies purchase property in relatively good ecological health, and buy	McKenzie River Trust, The Nature Conservancy, SWCDs

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Program	General Description	Contact
	the property at appraised value.	
Forestry Incentives Program (FIP)	Provides cost-sharing for several forest stand improvement practices.	NRCS, SWCDs, Oregon Department of Forestry
Forest Resource Trust	State assistance up to 100 percent of the costs to convert non-stocked forest land 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.	NRCS, FSA, SWCD
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. 25% match requirement on all grants.	SWCDs, Watershed Councils, OWEB
Oregon Watershed Enhancement Board Small Grants Program	Provides grants up to $10,000 for watershed restoration projects. 25% match requirement.	SWCDs, Watershed Councils, OWE B
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, NRCS, SWCDs
Public Law 566 Watershed Program	Program available to state agencies and other eligible organizations for planning and implementing watershed improvement and	NRCS, SWCDs.

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Program	General Description	Contact
	management projects. Projects should reduce erosion, siltation, and flooding; provide for agricultural water management; or improve fish and wildlife resources.	
Resource Conservation & Development (RC & D) Grants	Provides assistance to organizations within RC & D areas in accessing and managing grants.	Resource Conservation and Development
State Forestation Tax Credit	Provides for reforestation of under-productive forest land 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 devices.	Oregon Department of Fish and Wildlife
Stewardship Incentive Program (SIP).	Cost-sharing program for landowners to protect and enhance forest resources. Eligible practices include tree planting, site preparation, pre-commercial thinning, and wildlife habitat improvements.	NRCS, SWCDs, Oregon Department of Forestry
Wetlands Reserve Program (WRP)	Provides cost-sharing to landowners who restore wetlands on agricultural lands.	NRCS, SWCDs
Wildlife Habitat Incentives Program	Provides cost-share for wildlife habitat enhancement activities.	NRCS, SWCDs
Wildlife Habitat Tax Deferral Program	Maintains farm or forestry deferral for landowners who develop a wildlife management plan with the	Oregon Department of Fish and Wildlife, SWCDs, NRCS.

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Program	General Description	Contact
	approval of the Oregon Department of Fish and Wildlife.	

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Appendix F: Revised Universal Soil Loss Equation (RUSLE)

Comment [JM58]: Find in Appendix G

The RUSLE is a model that estimates the average annual level of soil loss on a field due to sheet and rill erosion. The sheet erosion process occurs when rainfall and runoff water combine to erode a relatively uniform layer of soil. Runoff may also erode soil to form numerous small channels a few inches deep, or rills.

The equation for estimating annual soil loss is:

A = RKLSCP

where:

A = average annual soil loss in tons per acre;

R = rainfall and runoff intensity index by geographic location;

K = soil erodibility factor;

LS = topographic factor, L is for slope length and S is for slope percent;

C = cropping factor, the ratio of soil loss for the given conditions to that from a clean-cultivated field;

P = conservation practice factor, or the ratio of soil loss for a given practice to that for purely up-and-down-the-slope farming.

Each soil type has a soil loss tolerance factor, or T. If the annual soil loss exceeds the soil loss tolerance factor, the soil is eroding at an unsustainable rate; in other words, the soil quality is degrading. Natural Resource Conservation Service and SWCD offices have soil surveys to help landowners determine soil types, and also provide technical assistance to help landowners estimate the rate of soil loss on their property. For more information, contact the local NRCS and SWCD office.

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Appendix G: ORS 468B.025 and 468B.050

Comment [JM59]: Find in Appendix H

ORS 468B.025 is an existing statute that was developed to address water pollution from waste discharge. To implement Senate Bill 502, approved in 1995 and codified at ORS 561.190 through 192, which ensures that ODA directly regulates farming activities for the purpose of protecting water quality, ODA is incorporating ORS 468B.025 and 468B.050 into all Area Plans and Rules in the state.

ORS 468B.025(1) states:

...no person shall:
(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.

ORS 468B.050 identifies the conditions when a permit is required. In agriculture, under state rules, these are referred to as Confined Animal Feeding Operations 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 Concentrated Animal Feeding Operation (40 CFR § 122.23).

Definitions:

"Pollution" has the meaning given in ORS 468B.005(3) which states: "such alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the state, which will or tends to, either by itself or in connection with any other substance, create a public nuisance or which will or tends to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof."

"Wastes" has the meaning given in ORS 468B.005(7) which states: sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive or other substances which will or may cause pollution or tend to cause pollution of any waters of the state.

Other substances that will or may cause pollution include commercial fertilizers, soil amendments, composts, animal wastes, and vegetative materials.

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Appendix H: References on Water Quality Improvement Practices for Agricultural Landowners

Comment [JM60]: Find in Appendix I

Below is a list of selected references with more specific information on water quality and natural resources improvement practices. Copies of many of these publications are available from the local Oregon State University Extension office or local SWCD. Underlined publications are also available online on the publishing agency's website.

General Water Quality Protection

Adams, E.B. 1992. Farming practices for groundwater protection. Washington State University, Spokane, Washington.

Hermanson, R.E. 1994. Care and feeding of septic tanks. Washington State University, Spokane, Washington.

Hirschi, M. et al. 1994. 50 ways farmers can protect their groundwater. University of Illinois, Urbana, Illinois.

Hirschi, M., et al. 1997. 60 ways farmers can protect surface water. University of Illinois, Urbana, Illinois.

Ko, L. 1999. Tips on land and water management for small acreages in Oregon. Oregon Association of Conservation Districts, Portland, Oregon.

U.S. Department of Agriculture NRCS. 1998. National Handbook of Conservation Practices. U.S. Department of Agriculture NRCS, Portland, Oregon.

Riparian Areas and Streams

Adams, E.B. 1994. Riparian Grazing. Washington State University, Spokane, Washington.

Darris, D. and S.M. Lambert. 1993. Native willow varieties for the Pacific Northwest. U.S. Department of Agriculture Soil Conservation Service, Corvallis Plant Materials Center, Corvallis, Oregon.

Nash, E. and T. Mikalsen, eds. 1994. Guidelines for streambank restoration. Georgia Soil and Water Commission, Atlanta, Georgia.

South Santiam Watershed Council. 1998. Guide for using Willamette Valley native plants along your stream. Linn SWCD, Tangent, Oregon.

Nutrient and Manure Management

Godwin, D. and J.A. Moore. 1997. Manure management in small farm livestock operations: protecting surface and groundwater. Oregon State University, Corvallis, Oregon.

Hart, J. 1995. How to take a soil sample...and why. Oregon State University, Corvallis, Oregon.

Hart, J. 1999. Analytical laboratories serving Oregon. Oregon State University, Corvallis, Oregon.

Marx, E.S., J. Hart, and R.G. Stevens. 1999. Soil Test Interpretation Guide. Oregon State University, Corvallis, Oregon.

Moore, J. and T. Willrich. 1993. Manure management practices to reduce water pollution. Oregon State University, Corvallis, Oregon.

Sattell, R. et al. 1999. Nitrogen scavenging: using cover crops to reduce nitrate leaching in western Oregon. Oregon State University, Corvallis, Oregon.

Grazing and Pasture Management

Ursander, D. et al. 1997. Pastures for Profit: a guide to rotational grazing. University of Wisconsin, Madison, Wisconsin.

Erosion and Sediment Control

Hansen, H. and W. Trimmer. 1997. Irrigation runoff control strategies. Oregon State University, Corvallis, Oregon.

Trimmer, W. and H. Hansen. 1994. Irrigation scheduling. Oregon State University, Corvallis, Oregon.

Pesticide Management and Integrated Pest Management

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Appendix I. Where does the 25-year storm event requirement come from in the riparian Characteristic to Achieve?

Comment [JM61]: Find in Appendix J

The 25-year, 24-hour storm is used because the ability to dissipate stream energy and maintain streambank integrity after this level of storm intensity is one of the criteria for a riparian area to be in Proper Functioning Condition.

The Proper Functioning Condition assessment process is a way to determine how well the physical processes are functioning in a riparian or wetland area. Once a riparian-wetland area reaches Proper Functioning Condition, it is in a state of resiliency that will allow the system to hold together during a 25 to 30 year flow event. In other words, the riparian area can resist major structural changes brought about by the storm event, and can recover in time for future events. Riparian areas that have not yet achieved PFC are classified as either functioning at-risk, nonfunctional, or unknown. A functioning at-risk area would likely experience major structural changes, such as excessive bank erosion and loss of riparian vegetation, in a 25 year, 24-hour flood event.

To be in compliance with the proposed riparian Area Rule OAR 603-095-2140 (1) (b) a landowner would need to cease activities that prevent the growth and establishment of vegetation that would help move a riparian area toward providing functions necessary for a stream to withstand the flows resulting from a 25-year storm. For example, if a landowner plowed a riparian area and destroyed the riparian vegetation, he or she would clearly be out of compliance with the rule. If a landowner stopped tilling and allowed vegetation to come in, they would be in compliance with the rule even if the riparian area were not yet able to withstand a 25-year, 24-hour storm event. If a landowner allowed grazing in a riparian area but allowed the area to move toward providing this level of riparian function, he or she would be in compliance with the rule.

For the Southern Willamette Valley, 25-year, 24-hour storm events range from 4.0 to 6.5 inches of rain.

How would compliance with the riparian Characteristic to Achieve be determined?

An inspector would first consider site capability when evaluating a riparian area for compliance with the rule. In other words, the inspector would first determine the kinds and amounts of vegetation the site could produce given legacy conditions (conditions caused by past management or events), such as riprap, and natural limiting conditions, such as soil type. The inspector would also determine if the site were capable of producing vegetation stable enough to withstand flows following a 25-year, 24-hour storm event. If the site is capable of providing this function, the inspector would then determine if the site is either moving toward providing the function or if there is already

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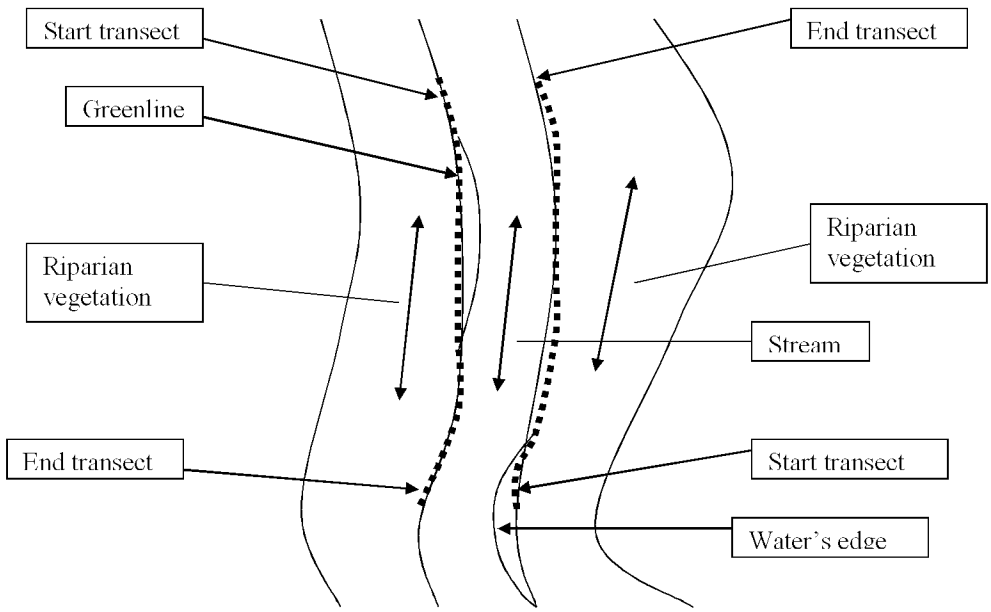
enough vegetation to adequately protect the streambank. In both situations, the site would likely be in compliance.

If the inspector determined the site was probably out of compliance using the previous criteria, he or she would conduct a greenline transect along the stream (Figure 1) and document the ground cover along the transect. The main criteria for noncompliance would be a prevalence of bare ground throughout the riparian area, limited vegetation indicating little to no root mass below-ground, and evidence of bank slumping or sediment runoff into the stream. Also, the problem would clearly have to be caused by agricultural activities.

Figure 1. A greenline transect samples the first line of green vegetation from the water's edge. The greenline is the line nearest to the stream where perennial vegetation is first encountered.



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