Molalla-Pudding-French Prairie-North Santiam Subbasins Agricultural Water Quality Management Area Plan

Developed by
The Molalla-Pudding-French Prairie-North Santiam Subbasins Local Advisory Committee

with assistance from

The Oregon Department of Agriculture
and
The Marion Soil and Water Conservation District

May 26, 2010

Local Advisory Committee Members

Daniel Goffin, Chair
Jim Myron, Vice Chair
John Birnie
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Name	**Area / Watershed**	**Commodity**	**Affiliations**
Daniel Goffin Chair	Aumsville/ Mill Creek	Farmer, livestock	Farm Bureau, Pudding River Watershed Council
Jim Myron, Vice Chair	Canby/ Molalla		Environmental Interests
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Myron and Sarah Jane Harper	Brooks/ Pudding	Filberts	Marion SWCD, Agri-Pac, 4-H Leaders, Livestock Assoc, OACD
Matt Knudsen	Marion Co.	County Government	Public Works Department
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Liz Redon	N. Santiam	Environmenal Organization	N. Santiam Watershed Council
Jerome Rosa	Gervais/ Pudding	Dairy	Farm Bureau, Oregon Dairy Farmers Assoc.
Tina Schweickert	Waldo Hills/Pudding	Sheep, grass seed,wildlife	Geercrest Foundation, OR Historical Society, Wildlife Habitat
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ACRONYMS

AgWQM	Agricultural Water Quality Management
Area Rule	Agricultural Water Quality Management Area Rule
Area Plan	Agricultural Water Quality Management Area Plan
CAFO	Confined Animal Feeding Operation
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
LAC	Local Advisory Committee
LMA	Local Management Agency
NO_3	Nitrate
NPS	Nonpoint Source
NRCS	Natural Resources Conservation Service
OAR	Oregon Administrative Rule
ODA	Oregon Department of Agriculture
ORS	Oregon Revised Statute
OSU	Oregon State University
PCM	Prevention and Control Measure
PSP	Pesticide Stewardship Partnership
PURS	Pesticide Use Reporting System
RMA	Riparian Management Area
SB	Senate Bill
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
TP	Total Phosphorous
USDA	United States Department of Agriculture
Voluntary Plans	Voluntary Water Quality Farm Plans
WQPMT	Water Quality Pesticide Management Team

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FOREWORD

This Molalla-Pudding-French Prairie-North Santiam agricultural water quality management area plan (Area Plan) provides guidance for addressing agricultural water quality issues in the Molalla-Pudding-French Prairie-North Santiam agricultural water quality management area (management area). The purpose of this Area Plan is to identify strategies to reduce water pollution from agricultural lands through a combination of educational programs, suggested land treatments, management activities, and monitoring.

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

The Oregon Department of Agriculture (ODA) exercises its enforcement authority for the prevention and control of water pollution from agricultural activities under Oregon Administrative Rules (OAR) for the management area (OAR 603-095-1900 through 603-095-1980) and OAR 603-090-0000 through 603-090-0120.

The administrative rules for the management area set forth the requirements and/or prohibitions that are used by ODA in exercising its enforcement authority for the prevention and control of water pollution from agricultural activities. In addition, OAR 603-090-0060 through 603-090-0120 describes the enforcement actions that may be triggered upon the finding of a violation by the ODA.

MISSION

The mission of the Plan is to promote agricultural management practices that protect and improve water quality in the Molalla River, Pudding River, North Santiam River, Santiam River, Mill Creek and French Prairie Area subbasins while maintaining agricultural viability.

MESSAGE TO LANDOWNERS AND OPERATORS FROM THE LOCAL ADVISORY COMMITTEE

The Area Plan and the administrative rules for this management area convey agriculture's role in the statewide Oregon effort for achieving water quality standards and the protection of beneficial uses. It is intended that, combined with other efforts throughout the planning area with other land uses -- urban, rural residential, forestry, industrial -- implementation of this Plan will aid in achievement of water quality standards. It is important that landowners are aware that "waters of the state" (described on page 38) are public waters, and landowners have a responsibility to assure that they are not causing pollution.

The focus of this Area Plan is on education and incentives to promote voluntary actions to protect and improve water quality. This means that each landowner/operator will have to do their part. Each landowner/operator must make a commitment to include water quality considerations as part of their land management decisions. It will take a high degree of landowner/operator responsibility to make this Area Plan work for everyone in agriculture.

This Area Plan and the administrative rules will be reviewed and adapted every two years and will become part of the management area strategy to address the Total Maximum Daily Loads (TMDLs). TMDLs are established through a public process by the Oregon Department of Environmental Quality (DEQ) for waterbodies that violate state water quality standards. DEQ acknowledged the Plan and Rules and plans for the other land uses in the Water Quality Management Plans that accompanied the TMDLs when the TMDLs were submitted to EPA for approval. The TMDL Water Quality Management Plan is DEQ's plan to meet the TMDLs and improve water quality. EPA approved the Molalla-Pudding TMDL in December 2008, and the Willamette, Middle Willamette and North Santiam TMDLs in September 2006. When a TMDL for a pollutant to a waterbody is approved, DEQ will remove that specific listing from the federal Clean Water Act Section 303(d) list of impaired waterways needing a TMDL. Still, DEQ considers the waterbody impaired until water quality standards are achieved.

The State and Federal governments have joined to offer landowners/operators a voluntary program of financial and material incentives to improve streamside areas. This voluntary program is called the Conservation Reserve Enhancement Program (CREP). CREP can serve to help a landowner/operator to keep streams cool, improve streambank stability (and protect property and property values), and filter out sediment and attached farm chemicals and bacteria. Additional information about CREP is provided in Appendix B. Appendix A provides local contacts for landowners/operators interested in the program.

INTRODUCTION

This document is the Molalla-Pudding-French Prairie-North Santiam agricultural water quality management Area Plan for the enhancement of water quality from agricultural activities in this management area. It provides guidance for agriculture to meet or exceed water quality standards set by the Oregon Environmental Quality Commission, as required by the federal Clean Water Act, while maintaining agricultural viability. This Area Plan applies to all the watersheds in Marion County, that portion of the Pudding River in Clackamas County, that portion of the North Santiam and Santiam Rivers in Linn County and that portion of the Molalla River in Clackamas County.

This Area Plan was created pursuant to the Agricultural Water Quality Management (AgWQM) Act, formally known as Senate Bill (SB) 1010, passed by the 1993 Oregon Legislature. This Area Plan was developed through a cooperative effort of the Local Advisory Committee (LAC), ODA, and the Marion Soil and Water Conservation District (SWCD), with assistance from the Clackamas and Linn SWCDs. The LAC consists of affected landowners/operators, a city representative, a county representative and an environmental representative. The committee is comprised of 15 members and three alternates. The membership is predominantly affected agricultural producers in the management area representing the diversity of the 200 plus agricultural commodities grown.

This Area Plan applies to all lands, regardless of size, within the described watersheds currently in agricultural use. For example, the Area Plan applies equally to large commercial production lands and to small rural lands grazing a few animals. It also applies to all agricultural lands, which are lying idle, or on which management has been deferred. While the Area Plan applies to grazing in forest areas, timber-harvesting activities subject to the Forest Practices Act are not subject to this plan.

The Oregon Legislature, in passing the AgWQM Act, authorized ODA to develop and carry out a water quality management plan for any agricultural or rural land area where a water quality management plan is required by state or federal law. In 1995, with passage of SB 502, the Oregon Legislature designated the ODA to be the lead state agency working with agriculture to address agricultural water pollution, and gave ODA the sole authority to regulate agricultural activities pertaining to water quality.

A commitment for healthy streams and improved habitat for threatened and endangered aquatic species was developed by the State of Oregon in 1997, known as the Oregon Plan for Salmon and Watersheds. The AgWQM Act has been incorporated into the Oregon Plan for Salmon and Watersheds to be agriculture's response to water quality issues associated with the salmon decline. The ODA is committed to implement Area Plans for every subbasin in the State of Oregon. This Area Plan is part of that commitment.

The ODA is the “Designated Management Agency” for agricultural pollution control activities on agricultural and rural lands. In turn, through a Memorandum of Agreement, the Department of Agriculture expects to designate the Marion, Clackamas, and Linn SWCDs as its agricultural Local Management Agencies (LMAs) for implementation of the agricultural and rural water quality program and projects in the Molalla River, Pudding River, Santiam River, North Santiam River, Mill Creek and French Prairie Area Subbasins, according to each district's jurisdiction.

Meeting water quality standards are accomplished by controlling pollution as close to the source as possible. Creating a high level of awareness and understanding of water quality issues among the agribusiness community and the rural public through education and technical assistance activities and promoting improved agricultural management is the main way to achieve pollution control closer to the source. A vital component for success is adequate funding secured for administration and implementation of the plan program. Monitoring and evaluation is necessary to determine the effectiveness of this Area Plan over time.

Soil and Water Conservation Districts have a long standing record of effectively identifying conservation concerns, developing action plans to address problems, and facilitating assistance to agriculture operators who voluntarily participate in conservation programs. Soil and Water Conservation District directors are elected from the local area and provide an avenue for citizens to participate in conservation efforts. Soil and Water Conservation Districts work cooperatively with the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service), USDA Farm Service Agency, Oregon State University (OSU), and

other state and federal agencies. These agencies provide technical, financial, and educational assistance to individual agricultural landowners/operators for the installation of conservation practices, including pollution control practices. Soil and Water Conservation Districts are the catalyst for development of partnerships between local agencies, volunteer organizations, and private land owners/operators to address natural resource and conservation issues.

STRATEGY FOR PUBLIC PARTICIPATION

The draft Area Plan and Area Rules resulting from the efforts of the Molalla-Pudding-French Prairie-North Santiam LAC and ODA was presented to the State Board of Agriculture for their review and consultation.

After the State Board of Agriculture review, the draft plan and the associated rules were presented to the public through informational meetings and public hearings within the agricultural and rural portions of the Molalla-Pudding-French Prairie-North Santiam Subbasins. Testimony presented at public hearings and during the public comment period was reviewed by the LAC and ODA. Recommended modifications were presented to the Board of Agriculture and the director of the ODA for their review. The final rules resulting from this review were adopted through the administrative rules process by the director of ODA.

BACKGROUND

HISTORY

FARMING IN MARION COUNTY: A GLIMPSE AT NOW AND THEN[1]

Introduction

In this section, the LAC describes the rich history of agriculture in this area and how agriculture is an important endeavor, providing a vital economic stimulus to the area (Table 1). However, it is a difficult and chancy enterprise, with an increasingly older farm population taking great financial risks forever decreasing returns (Table 2). Yet this area's farmers continue to persevere, following tradition while experimenting with new farming methods in the hope that things will get better. Within this context, farmers are facing new water quality demands.

Table 1: Agricultural Commodity Sales ($) Marion County, 2009*

Commodity	Sales ($)
Crops Spec. Prod.	171,157,000
Grass & Legume Seeds	54,314,000
Not Disclosed	32,474,000
Dairy Products	48,980,000
Small Fruits	26,607,000
Eggs & Produce	47,836,000
Field Crops	35,160,000
Hays & Forage	12,080,000
Tree Fruits & Nuts	16,261,000
Cattle & Calves	10,776,000
Misc. Animals	5,203,000
Grains	8,864,000
TOTAL	**$493,025,000**

*Compiled from Oregon County and State Agricultural Estimates; Oregon State University Extension Service, Special Report 790-09, February 2010

[1]this subsection written by Barbara Lucas, Local Advisory Committee member. Please see Acknowledgements and Bibliography section for information sources

Table 2: Bits and Pieces

Population of Marion Co.: 314,606 Average size of farms: 106 acres
Average value of agricultural products sold per farm: $134457
Average value of crops sold per acre for harvested cropland: $1708.44
The value of nursery, greenhouse, floriculture, and sod as a percentage of the total market value of agricultural products sold: 43.91%
The value of livestock, poultry, and their products as a percentage of the total market value of agricultural products sold: 15.42%
Average total farm production expenses per farm: $114750
Harvested cropland as a percentage of land in farms: 62.52%
Irrigated harvested cropland as a percentage of land in farms: 44.75%
Average market value of all machinery and equipment per farm: $87306
The percentage of farms operated by a family or individual: 84.89%
Average age of principal farm operators: 54 years
Average number of cattle and calves per 100 acres of all land in farms: 11.34
Milk cows as a percentage of all cattle and calves: 37.50%
Corn for grain: 51 harvested acres
All wheat for grain: 9573 harvested acres
Vegetables: 31410 harvested acres
Land in orchards: 9907 acres

http://www.city-data.com/county/Marion_County-OR.html, as of 2008

The Land

The destination of early settlers in the Oregon Country was the land east of the Willamette River and south to present-day Salem in Marion County. This prairie land was fringed with wide forests, bordering rivers and streams but the prairies themselves had few trees and little brush due to periodic burning by the indigenous people. Dr. John McLoughlin and one of his Hudson Bay Company employees pronounced this prairie land the Northwest's most desirable region for Euro-American settlement. According to an early day traveler, Rev. Samuel Parker, the soil was alluvial river bottom; rich, easy to cultivate, sufficiently dry for cultivation, yet well watered by small streams and springs. French Prairie is the largest of these prairies.

At the south end of French Prairie, north of Salem and east of Keizer, are the Lake Labish bottomlands, a one-time swamp left over from an old bed of the Willamette River. It is about 10 miles long and one-half mile at its widest, 1,270 acres of peat created by decayed vegetation. The peat is four feet to eight feet deep. Surrounding the swamp were woodlands of fir, pine and oak, but the swamp itself contained willow, ash, vine maple, cattails, skunk cabbage, cottonwoods, and many beaver dams. Because of its swampiness, no one filed a donation land claim, and the state of Oregon later sold the property for $1 an acre.

Anecdotes. *Early stagecoaches avoided the swamp, bypassing the lake about a half-mile northwest of the Chemawa Indian School.... A Marion County engineer reportedly shoved a 2" x 6" sixteen feet into the peat with his bare hands and never touched bottom.... According to one resident, Lake Labish soil is even more fertile than French Prairie.*

The highlands southwest of Silver Creek Falls Park is a stretch of land described by historian Mark Schmid as a fairyland of majestic timber, white water and wild flowers, a primeval forest with Indian trails and mountain streams abounding in fish. These highlands and the lowlands around neighboring Mill Creek provide the setting for farms and the small towns of Turner, Aumsville, Sublimity and Stayton. Besides providing many of the Christmas trees sold here and abroad, this area is the home of the famed Kentucky Wonder Santiam Green Bean, and the home of the world's largest grass seed farm. A particularly productive tract, north of the North Santiam River, is a 13-mile flatland between Parrish Gap and Stayton.

Other land is farmed along the Willamette, the Pudding, and the lower North Santiam - very fertile land, which in winter and spring is under water. Come back in the summer and you see crops growing and cattle grazing. The situation is different up the North Santiam. As you climb higher and the gorge narrows, the main agricultural activity along the river is pastureland.

The People

The Kalapuya Indians were the earliest known inhabitants of the prairies. They fished salmon at Willamette Falls, and trout and eel throughout the upper tributaries, hunted waterfowl and game, and gathered nuts, berries, camas bulbs, tarweed seeds (wild oats), basketry materials and various herbs. Each fall they burned the prairies to harvest tarweed, renew fertility, and eliminate brush while maintaining widely spaced Oregon white oak trees. There was an Indian trail from the Willamette Falls to Silverton, Sublimity, across the Santiam River, and on to the Klamath basin, with another Indian trail through the North Santiam gorge across the Cascades into the Deschutes valley.

The first recorded European visitors to French Prairie were trappers from the Pacific Fur Company in 1812. Then, in 1829, a retired Hudson Bay Company French-Canadian trapper settled on French Prairie near what is now St. Paul. Eventually, about 75 former trappers, with the Company's financial assistance, located in the area. Many of the French Canadians settled here to start new lives with their Indian families, and they were followed by Methodist missionaries looking for converts. Beginning in the 1840's, the Eden-seekers began arriving by wagon train, or by ship from across the Isthmus of Panama, or around the tip of South America. Among later immigrants were families not only from eastern states but also from Ireland, Germany, Switzerland, and Austria. Many of their descendants are still farming here.

Anecdotes. *In 1879, a missionary from Minnesota came to Sublimity and convinced his previous flock to follow him.... One immigrant, armed with California gold, came to French Prairie amassed 10,000 acres, divided it among his 11 children, and returned to the East.... An entire family, including aunts and uncles, arrived in Oregon in two rail cars, one car with family and furniture, and another car with cattle and equipment.... A now-retired farm wife came west with her family before World War II, 14 people in two model Ts, "just like the Grapes of Wrath" she says.*

Crops

The first settlers were subsistence farmers, raising what was needed to support a family: gardens, fruit trees, cows, pigs, and chickens. "Old white winter wheat" was the mainstay cash crop and was the medium of exchange until the 1850s: $1 = 1 bushel of wheat. The yield was fifteen to twenty bushels an acre. Besides wheat, early Hudson Bay records show trading items of beaver skins, buckskins, salt salmon, shingles, and saw logs. By 1843 trade included cattle, horses, sheep, swine, oats, potatoes, bacon, and sides of beef. At that time, the market was the Sandwich Islands, China, and the Russian settlements in Alaska. As improved transportation brought markets closer to Willamette Valley farmers, the list of crops expanded to include beef cattle, hops, berries, chickens, and turkeys and by the end of the century, many farmers were growing apples, prunes, cherries, peaches, and nuts as well.

The rush for gold in California and southern Oregon had a great effect on the Willamette Valley. Two-thirds of the men left to search for gold, together with some women. Farms and mills were run by old men, boys, and women. Some gold seekers never returned to the Valley, some returned with nothing. Others brought back gold, which they invested in more land or became storeowners. There was a great demand for flour and lumber in the gold fields, not only in California, but also in Jacksonville, eastern Oregon, and Idaho. Prices soared. To take advantage of the heightened demand, to get more land into production, forested land was cleared, using Chinese labor and horses. Horses were used not only to pull stumps, but also to propel threshing machines, plow, take logs to mills, and crops to market.

Moving Crops to Market

Wagons in the early days were either up to their hubs in mud or dust. The settlers' connection with the civilized world was the Willamette River, which they used for transportation of passengers and crops. They tried to locate within a day's round trip of the river.

The River. The first settlers located along the Willamette from Oregon City south to Salem. There were about 100 landings on the river. Farmers brought their grain to these river landings, stacked it under trees to protect it from weather and theft, then waited for canoes, flatboats, or keel boats to take their grain down to Oregon City.

Regular steamboat service began in 1851, calling landings at Butteville, Champoeg, Fairfield, Wheatland, and Lincoln. Warehouses were built where grain and other perishables could be stored. Cattle and swine were kept in pens near the river. The two-month period following harvest was the busy time at the landings, teams and wagons waiting their turns to unload. Steamboats moved wheat downriver during the high water season, and by spring most warehouses had been emptied.

The river was a mixed blessing. Many times floods carried away livestock, landings, docks, warehouses, shops, hotels, and stores. The 1861 flood, the biggest in memory, is just one of the many which afflicted Willamette Valley residents. Repeated floods in 1843, 1849, 1853, 1860, 1861, 1888, 1890, and 1894 convinced early day settlers that it was wise to build and farm at a safe distance from the river.

Rails. The railroad, supplanting the steamboat, changed the future for many communities along the river. No longer was it necessary for a farmer to live within a day's round trip to the river. No longer was it necessary to wait for high water so boats could navigate. The landings along the river disappeared. The railroad became the artery of trade. In 1869 a north-south railroad from Portland via Aurora-Woodburn to Waconda was established. An east-west railroad from Ray's Landing (across the Willamette from Dayton), through St. Paul and Woodburn, to Silverton never materialized. With the advent of the railroad, wheat production and cattle grazing moved across the mountains to central Oregon but the railroad brought markets and processors closer to Willamette Valley farmers.

Roads. The paved road finally got the farmer out of the mud. In 1919, acting as agent for the State of Oregon, Marion County paved the first 7.39 miles of road. This active partnership lasted until the Depression, and by 1932 there were 94 market roads in Marion County, 187 miles paved and 264 miles graded. Today, Marion County has 990 miles of rural county roads, 780 miles of which are paved, and 210 miles graveled. But water still causes road problems in bottomlands. A Marion County report lists four pages of roads where water accumulates during heavy rains.

Anecdote. *One old-timer claims that the early market road was paved on the side where the heavily laden wagon went to market, but graveled on the side where the wagon returned home empty.*

The number of warehouses on today's farms is increasing. These warehouses provide a place where produce can either be stored or containerized for eventual transfer by truck to a rail yard or port. A question, which needs to be addressed, is the adequacy of local roads being used by trucks. The County reports that 71 percent of its roads don't meet pavement width standards, and 81 percent don't meet shoulder width standards.

Unfortunately, Marion County does not have funds to correct all the deficiencies in its rural road system. Its 1998 study lists major repairs and replacements needed for seven bridges and possible weight limitations if these improvements cannot be made. The study also cites the growth in Marion, Polk, and Yamhill counties as a reason for looking at the need for another bridge across the Willamette, perhaps linked with a study for a second interchange at Woodburn.

Back to the River. Marion County still operates two ferries across the Willamette, serving rural areas. The Wheatland Ferry, at the end of Matheny Road about five miles north of Keizer, operates daily (except Christmas and Thanksgiving). Annual ridership is 125,000 vehicles. The Buena Vista Ferry, operating between an area south of Independence to Buena Vista Road on the other side of the river, carries only 6,000 vehicles a year. Operation of both ferries depends on weather conditions, river levels, and maintenance requirements. The shutdown of the Wheatland Ferry is an inconvenience for many because the ferry is the only way to cross the Willamette between Newberg and Salem.

Increasing Production. Because of the Willamette Valley's long growing season, local farmers can pick and choose among 200 potential crops. Whereas wheat, oats, barley, flax, and grass can survive without irrigation, other crops need well-drained soil and water during the summer months.

Drainage. While benefiting from the long growing season, Marion County farmers are plagued with wet springs. Drainage is a means to provide a 4' depth for optimal plant root development. It also allows the farmer to get out to his fields earlier in the spring and to raise a greater variety of crops.

According to local memory, installing drainage tile in the Willamette Valley began about 1892. In those days, clay was fired into foot-long red drainage tiles; the tiles were laid in trenches, butted up against each other, and pointed to some low spot. The problem with these tiles was soil that entered the cracks blocking the flow of water. A new kind of tiling is now being used: high-density polyethylene flexible tubing, which can be attached to additional tubing with plastic couplets. Cost is about $1000 to $1500 an acre to install the tubing.

Flood Control. Local drainage is not enough to protect against floods. Some major twentieth century floods along the Willamette occurred in 1923, 1927, 1945, 1955, in 1964, and 1996. These last two floods were 100-year events, caused by heavy rainfall that saturated the ground, by low temperatures that froze the ground, by heavy wet snowfall and by sudden melt of the snow pack. These floods brought logs, brush, trees and structures down the rivers. Topsoil was eroded, livestock drowned, riverbanks destroyed, orchards and specialty crop fields were washed out or silted under. The damage caused by these last two floods was great, but it was reduced by the flood control projects built by the U. S. Army Corps of Engineers since 1940 on the Willamette, the McKenzie, the Long Tom, and the Santiam rivers. Detroit Dam and its regulating dam Big Cliff are the projects that provide flood control downstream along the North Santiam River.

Anecdotes. *My neighbor lost 700 acres to the '64 flood. Corrective measures since then have cost me 120 acres.... These heavy rains the last three or four years remind me of what we had 25 years ago. My stream was always over its banks then, and we even ice skated down there in the winter....*

Irrigation. Although the Willamette Valley receives 40" to 60" of rain a year, most of it falls at the wrong time for crops. To get the maximum return for his efforts and investment, the farmer needs to raise diverse crops, and to do that he needs 6" to 10" of water during the three summer months when almost no rain falls. Irrigation became commonplace after World War II. Marion County farmers use several irrigation methods: lines which must be moved by hand, lines which are moved on wheels, big guns which spray water and fertilizer, and the micro, or drip, system. Cost for the drip system is $800 to $1000 an acre. About 70,000 acres in Marion County are irrigated, with an additional 15,000 acres irrigated sometimes.

Irrigators in the French Prairie and Lake Labish areas use water from wells or the rivers. Farmers in the North Santiam area can contract for irrigation water from Detroit reservoir. Three irrigation districts have been organized to take advantage of this stored water through water rights permits issued by the State Water Resources Department. These districts include: Sidney, Kingston, and the Santiam Water Control. The most extensive irrigation project, the Santiam Water Control District, serves the thirteen miles of fertile land west of Stayton where 17,000 acres are irrigated from March to October.

Irrigation water in Detroit Reservoir is available through the Bureau of Reclamation. There are 281,630 acre-feet of water that can be used for conservation storage, including irrigation, during the period from March to October. However, the Bureau has not entered into any permanent contracts since March of 1999, waiting for a Biological Opinion.

Fertility. Chemicals have wrought the biggest change in agriculture. In the old days, before World War II, farmers maintained soil fertility by rotating crops. A four-year rotation was clover or alfalfa and manure the first two years, wheat the third year, with corn or a row crop the fourth year. This rotation guaranteed a certain level of fertility and weed control and, with a cover crop, controlled soil erosion. Since the advent of chemicals, crop rotation has given way to chemical fertilizers, herbicides, and pesticides. New hybrids and chemical fertilizers have vastly increased production. Chemical herbicides have eliminated the need for hand weeding. However, chemical runoff to streams may reduce water quality and can be harmful to aquatic life.

Correcting Mistakes. Trying to increase production has brought problems. Riverbanks have been eroded by cultivation and cattle grazing. Soil erodes during winter storms for lack of cover crops. Draining hastens storm runoff creating bigger floods downstream. Irrigation competes with other uses for water. The run-off of nitrogen-

rich fertilizers creates oxygen-robbing conditions in streams. Herbicides and pesticides do not always kill only their targets.

Some Marion County farmers are changing their practices to correct these problems and together with federal, state and county governments are drawing up voluntary management plans to reduce erosion and pollution in creeks and rivers.

Harvest Headache. Labor has always been a problem for the farmer. When wheat was the major crop, the harvest had to be completed within 20 days. Family and neighbors, and sometimes, local Indians, or even Chinese immigrants, supplied the manpower. Before long the horse provided help and later on came mechanization, but there has always been the need for willing hands.

Local farmers who remember the last fifty and sixty years recall how neighbors would help each other with the harvests. Then, as farms grew bigger and families grew smaller, the number of neighbors diminished, and farmers began to recruit platoons of mothers and children from the cities. These volunteers would be picked up by a bus in the morning, and delivered back in the evening. When this source of labor ended, farmers recruited homeless men either from Salem or Portland, bused them back and forth, providing lunch and liquid refreshment. Another limited source of farm labor were Russian and Vietnamese immigrants.

There was another labor source - migrant families who returned year after year to the same farms, bringing relatives and even friends. Some migrants followed a crop, moving from California, to Oregon, to Washington, and Montana before returning home to Oklahoma, Texas, and Arkansas. Others came to the Valley for the May to October harvest season, and then they returned home.

An increasingly important source of labor is contractors. Working with several farmers whose harvest times differ, the contractor can arrange that laborers from Mexico and Central America are available when they are needed and where they are needed.

Encroachment Pressures. Urban encroachment on farmland is a worry for Marion County farmers as people flee from Portland and Salem to find a better life and cheaper housing in small towns. Two towns advertise that there are several new subdivisions in the rolling hills and farmland of their charming communities. Before long these subdivision dwellers will complain about the dust, noise, and odors emanating from the farm next door, and the farmer will notice the faster runoff from the new subdivision.

Another urban encroachment is the commercial development at interchanges along the I-5 corridor, at Wilsonville, Donald, Brooks, and especially at Woodburn where land which was farmed just ten years ago is now covered with gas stations, fast food outlets, motels, car dealerships, two regional distribution centers, and a huge factory outlet shopping mall.

The encroachment on farmland from urbanization can be tracked in population increases over the past 46 years as shown in Table 3.

Encroachment by a Big Neighbor. The city of Keizer, non-existent until 1982, was involved in a dispute with neighboring Lake Labish Irrigation District over 1996 flood damages to a city park next to Labish Ditch. The city said the problem was the way the Parkersville Dike was operated. The District claimed it was operating legally to protect its members' onion fields. ***The city ultimately dismissed its case against the District.

This case brings back memories of dynamiting and armed opposition in 1905 when Lake Labish property owners wanted to farm their swampland and property owners in the Parkersville area wanted to protect their mill. The matter went to court. Eventually the mill owners were bought out but it was not until 1914 that the lake bottom was under cultivation.

Big City Water Needs. The city of Salem, with a water right dating back to 1856, gets its municipal water supply from the North Santiam River. The intake for Salem's water supply is located at Geren Island near Stayton. Prolonged high turbidity water in the North Santiam River below Detroit Reservoir following the floods of 1996 and 1997 destroyed one of Salem's slow sand filters and forced Salem to improve its filtration system. Salem needs

clean water for its 155,000 residents and its food processors and opposes activities in the North Santiam canyon which might adversely affects its drinking water source. Upriver towns in the canyon want jobs to replace those lost when timber harvest was reduced. Occasionally, Salem's interests run counter to those of canyon residents and property owners.

In the future, farmers above Stayton may find their activities further regulated by the Three Basin Rule, Safe Drinking Water Act, and other water quality laws that prohibit direct discharges of wastewater and potential runoff of specific pesticides and fertilizers into the North Santiam above major drinking water intakes. This would also be true of agriculture activities above the municipal water intakes of the cities of Canby and Molalla on the Molalla River. The Molalla River is not covered by the Three Basin Rule.

Small Town Water Needs. Several cities have wells in Marion County exclusive farm use areas: Monmouth, Independence, Mt. Angel, and Jefferson. Newberg has five or six wells. After its application for another well permit was turned down several years ago by Marion County, Newberg, together with the League of Oregon Cities, convinced the Oregon Legislature to ease rules for siting utilities in exclusive farm use zones.

Another concern for farmers and water quality: If cities continue to drill wells for drinking water in county exclusive farm use zones, the County or state Health Department may be forced to establish rules or enforce existing rules for well head protection which may limit the use of some pesticides or fertilizers within the wellhead protection zone.

Conversion of Farm Land to Other Uses. Farmers are concerned about the conversion of farmland for residential, commercial and industrial use, for roads and for cell phone towers. Increasingly they're troubled about the use of farmland for the disposal of treated wastewater by cities. For example, in Marion County, Woodburn is using poplars on farmland to help clean up its wastewater; Silverton is using the Oregon Gardens, formerly a farm, as a wastewater disposal site; and Salem has embarked on a wastewater study, which might eventually result in creating a wetland on farmland. Though these activities convert farmland, the reduction in waste to the rivers can benefit farmers. Four state agencies are discussing rules to define farm use and possibly restrict utilities to less valuable farmland.

Present Day Economics and a New Generation. Marion County's 1998 commodity sales, representing 87 different crops, were the biggest in history, but the makeup of sales is changing. Bad weather has taken its toll on fruit crops. Growers are taking out peach and cherry orchards. Walnut orchards are dying out and hazelnuts are suffering from blight. Berry fields are disappearing because labor costs are so high. There are no vines in some hop fields. The reorganization of processing firms has dried up the market for bush beans and sweet corn, for broccoli and cauliflower, for berries. Dairy herds are half of what they were 25 years ago and there is little demand for mint.

Anecdote. *That place up the road had the biggest dairy around here, 500 acres. Now it's all grass. A ninety-year old lady still lives up there, in a house hidden by all the shrubbery that's grown up, but the barns are all tumbling down.*

Farmers complain that they have lost parity; the prices of things they must buy have risen while the prices they receive for their crops have actually decreased. Wheat costs $4.00 a bushel to raise but sells for less than $3.00. It costs more to pick a crop than it can be sold for. Farmers in 1998 earned only 2.83 percent on their investment in land and equipment. They can earn more than that in a bank or on the stock market without the worry of weather and the hassle of government reports.

But there are winners in Marion County agriculture nowadays: ornamental nursery and greenhouse crops and grass seed. Together with Christmas trees, these are the moneymakers. The market for grass seed is created by the need to seed and reseed golf courses and home lawns. The market for ornamentals is created by the need to landscape the explosive growth in residential, commercial and industrial developments. A contributing factor is the continued bad weather in other parts of the country.

Today's average farmer is 54. At that age, he isn't planning to expand, or buy more land or new equipment - he is making plans for retirement. If he has children, he will leave his land to them. If there are no children, he will sell. But who will buy? The original settlers in Oregon got 640 acres for nothing (per married couple). In 1878, land near Woodburn sold for $25-$50 an acre. Today land with a water source and drainage can sell for $7500 or more an acre. The likely prospects to buy this land are not young people but large corporations or land developers.

With the high cost of land and equipment, people can't get into farming now without help from their families, and even then they may have to work at jobs off the farm until their farms produce enough to pay principal, interest and expenses. The most vexing problem is repaying loans to the bank every year. A farmer must choose very carefully which crop he is going to raise. There's little room for error anymore. The margin is too slim. A farmer may be able to survive one bad year, but there not several in a row.

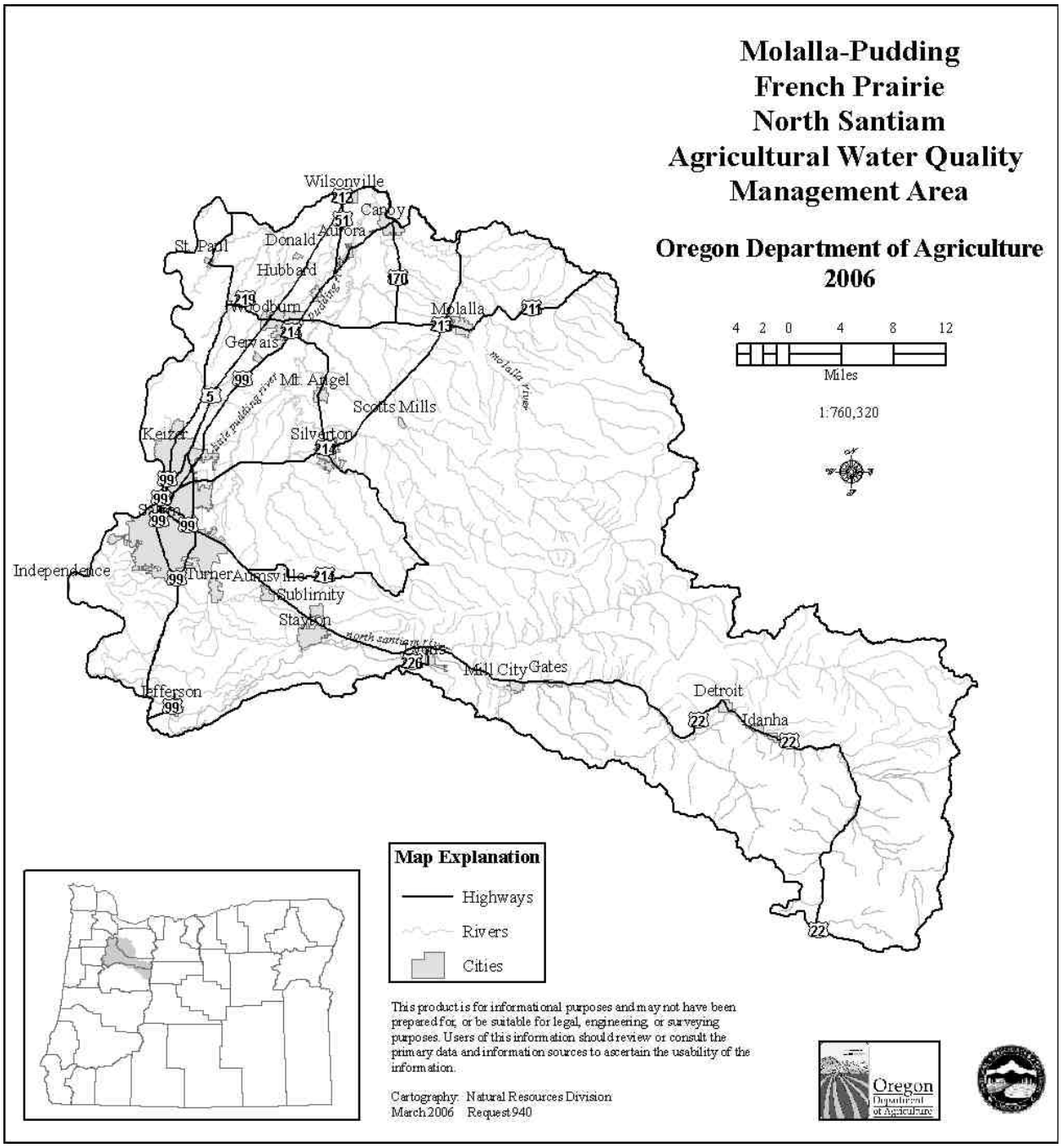
Despite unpredictable weather, diminished financial returns, labor problems, and governmental regulations, young people in Marion County are still choosing to follow in their parents' and grandparents' and even great-grandparents' footsteps and be farmers. They gamble every spring that they will choose the right crop. Some are opting to specialize, to find a niche for themselves, perhaps raising specialty items for foreign markets, or raising food and even flowers strictly for a direct-to-customer market. Whatever the adversity, they enjoy having their lives in tune with the seasons, experimenting with crops, and gambling that this year will be better than last.

Anecdote. *This house was built 100 years ago. We added on. This is a family farm. My sons and daughter live here. So do my daughter-in-law and my grandchildren. I'm 56 years old. My boy is 30. He's taking over. We're acting like we have 20 years more....*

GEOGRAPHICAL AND PHYSICAL SETTING

The Molalla River, Pudding River, Santiam River, North Santiam River, Mill Creek, and French Prairie Area Subbasins are in the northwest quadrant of the state of Oregon, 70 miles west of the Pacific Ocean (Figure 1). All of these watersheds are tributaries of the Willamette River. The Willamette River runs from south to north between the Coast Range and the Cascade Range of Oregon. All of these subbasins drain from the Cascade Range west to the Willamette River. The watersheds have developed geographically and geologically from tectonic plate movement, basalt flows from east of the Cascades, and silt laid down by the Missoula Floods at the end of the last ice age.

Figure 1: Map of the Molalla-Pudding-French Prairie-North Santiam Agricultural Water Quality Management Area



Oregon sits in an area known informally as the Pacific Rim of Fire, which is the name given to the region of volcanic activity around the Pacific Ocean. In the case of Western Oregon, the Juan De Fuca Plate is moving under (subducting) the North American Plate. Among many things, this process has scraped off the sea floor to produce foothills. Fossils from sea creatures are found in the basin above Scotts Mills at 300-foot elevation. The process of subduction produced the volcanic activity that created the Western Cascade Range and High Cascades. The volcanic activity of the Western Cascade Range has produced the headwaters of the Molalla at approximately 5,000 feet and the headwaters of tributary streams of the Pudding River at 4,000 feet, flowing to an elevation of 60 feet. The High Cascades are east of the Western Cascade Range and younger in geologic time. The High Cascades are the headwaters of the North Santiam River with Mt. Jefferson being the highest point in the watershed at 10,495 feet.

The crops grown from the land are varied but consistent throughout the planning area. The soil types vary throughout the area as the geology changes. The region has unique characteristics that over time shaped the geography and meteorology. These characteristics are the reason why the watersheds of these streams encompass one of the highest producing agricultural areas in the United States of America.

Much of the agricultural area in the Molalla River, Pudding River, and French Prairie Area Subbasins is a fault-block basin that filled with sand and gravel washed in several thousand years ago. The subbasins were covered to an elevation of about 400 feet by water-laden sediment during the last Ice Age from the Missoula Flood. The sediment created the present soils of today. Granitic rocks, known as glacial erratic rocks, are found throughout the valley that were brought in with chunks of ice during the Missoula Flood. During the construction of a pond near Mount Angel, an erratic rock was found in the glacial-lacustrine sediment seven feet below the ground surface.

The North Santiam River, Santiam River, and Mill Creek subbasins have unique geologic characteristics that relate to agriculture production and water quality. As previously mentioned, the Missoula Floods that occurred over the thousands of years as each Ice Age warmed provides the Northern Willamette Valley with many of the soils farmed today. During this same time, Alpine Glaciers occurred in the Cascade Mountains. A 1939 report by Department of Geology and Mineral Industries identifies three glaciers: Mill City, Detroit, and Tunnel Creek. All three glaciers were in relatively the same areas over different periods of time. The significance is the gravelly soils that make up most of the farming area from Stayton to Jefferson. The gravel and alluvium reflect the glacier erosion and outwash deposition. Farmers say that corn will ripen two weeks earlier on gravel soils due to the heat that is built up during the day and released at night, providing for warmer night time temperatures. Many of these soils are well drained with low water holding capacity. This requires more frequent irrigation and longer irrigation. These main geologic features have provided agriculture with soil to produce crops. In addition, ground water is supplied from wells in the sand and gravel sediment or fractured volcanic rock created millions of years ago, and from mountains that collect snow and rain in the winter, providing summer runoff for irrigation and groundwater recharge of the aquifers.

The mountains of Molalla and Pudding subbasins are considered part of the Cascade Range. This area ridge is 25 miles west of the Cascade Range crest. The watersheds are bordered on the north and east by the Clackamas River subbasin and on the south by the North Santiam River subbasin. These watersheds are bordered on the east by the Cascade Range crest. During the year, the mountains of the Molalla and Pudding subbasins historically go through periods of snow accumulation followed by warm rain and rapid snowmelt. The runoff causes flooding over agricultural lands, causing erosion of croplands, pastures, and streambanks. In February of 1996, the runoff caused flooding that affected homes, roads and power lines.

The meteorology of the region is unique to only a few areas of the world, with a Mediterranean, modified marine climate. The area has wet winters and dry summers. This is the reason agriculture areas here can receive up to 80 inches of rainfall but still require irrigation to sustain some crops in the summer. The heavy winter rains saturate soils, causing erosion that contributes to water quality problems. The lack of precipitation in the summer, along with no high elevation mountains for snow accumulation, creates extremely low stream flows this time of year. This makes the area vulnerable to water quality problems in late summer, such as low dissolved oxygen.

The Molalla, Pudding, and French Prairie area make up subbasins of the Willamette Basin, which is a basin within the Columbia River Region. The Molalla, Pudding, and French Prairie area subbasins drain approximately 900 square miles. The Pudding River is 62 miles long and originates in the low elevation Waldo Hills located east of

Salem. The Molalla River is 49 miles long and originates on the west slope of the Cascade Range. The Pudding River flows in to the Molalla River 0.75 miles upstream from the point the Molalla River flows into the Willamette River.

LAND USE

The Molalla-Pudding-French Prairie-North Santiam agricultural water quality management area is the eastern half of the North Willamette River Valley. Settlers came to this area for the rich farmland and mild climate. Today the major land use is still agriculture. However, many farms of yesterday have given away to land division and homes in the country.

The land has been divided into farm parcels of 1 to 200 acres. In Marion County, there are 25,425 parcels in the exclusive farm use zone. There are 3,518 parcels in special agriculture zone, and 8,429 parcels in acreage residential zone. Over 30 percent of the parcels outside of the cities are not exclusive farm use, although many of these parcels do produce farm products. The USDA Natural Resource Conservation Service has estimated the average acreage field size to be 17 acres.

Land use changes in the management area are based on elevation and the characteristics for vegetation growth. Milk Creek, tributary to the Molalla River, is in the north end of the plan area. The stream begins at 1,700 feet elevation flowing to 500 feet of elevation by the time it reaches the City of Colton. This watershed is mostly forest and pastures, Christmas tree parcels, and timber parcels managed by commercial timber companies. With many farmed parcels ranging from 2 to 100 acres, there are few full time farmers here, many of whom work as far away as Portland.

Most of this area's agriculture is contained along the narrow Molalla subbasin. This area has a full range of agriculture use. The parcels are mixed with clusters of 1 to 5 acres and large tracks of over 100 acres. The area does have full time farmers. At 500 feet in elevation near Dikey Prairie, agriculture gives way to forestlands and timber operations.

The largest subbasin in this plan area is the Pudding River. The broad plain of the Pudding River subbasin is high production agriculture, with a mix of full time and hobby farmers. Small landowners and hobby farmers commute to various cities for work including Salem and Portland. The area extends from Donald and Aurora on the northwest to Macleay on the south and Silver Falls State Park on the east.

The Silverton Hills area of the Pudding River subbasin has extensive Christmas tree and grass seed farms. They include both full time and part time farmers. Mixed in are row crops, nursery production, and occasional vineyards and pastures. Many of the canyons in the area are too steep to farm and used for livestock production and timber.

The valley floor of the Pudding River subbasin produces over 200 different agricultural crops that utilize small and large parcels. They constitute scattered areas of 1 to 10 acre tracts where landowners have landscaping but not agriculture production. Whether or not a farmer can make a living on a small land holding depends on their crop - some nurseries and livestock operations operate on less than 10 acres.

The North Santiam River, Santiam River, and Mill Creek are similar to the Pudding River subbasin. The upper watershed, still below the timber production area, is mainly grass seed and Christmas trees. The lower watershed consists of row crops and a variety of other agricultural production. Thousands of acres are irrigated from the North Santiam River by diversion ditches of the Santiam Water Control District. Downstream, the Sidney Irrigation Cooperative diversion ditch provides irrigation water from the North Santiam near the village of Marion to the Willamette River.

Of all the streams in this management, area only Mill Creek, which flows through Salem and Silver Creek, which flows through Silverton, flow through any city. The Willamette River also flows through Salem, but this Plan focuses on the tributaries to the Willamette River, not the Willamette itself.

The French Prairie area consists of predominately full time farming operations. Named for the French settlers, this was the first area within the management area to be put into agricultural production. The area is prime agricultural soil, producing a variety of agriculture products. The area extends from Donald on the east to the Willamette River on the west, the Willamette River on the north and Salem on the south. The area includes the Claggett Creek watershed. The number and expanse of the large agricultural tracts dominate the area. The number of small parcels does not exceed the large parcels except in an area north of Keizer.

DEMOGRAPHICS

The total population of Marion County was 305,265 as of 2006. This is a 49percent increase from a 1980 total population of 204,692. The Hispanic community plays a very important role in area agriculture, in part by satisfying the large demand for farm labor. People of Hispanic origin live throughout the county but have concentrated in towns like Woodburn and Gervais that have high agricultural employment opportunities.

Table 3 provides the cities and towns of the management area along with their population history. Salem, the largest city in the area, is also the state capital. The population of all these towns has increased significantly in the past 40 years, illustrating the general trend of urbanization taking place across the entire management area.

These towns contribute greatly to agriculture in the management area. They serve as collection points for crops and distribution centers for fertilizers, chemicals, and other agriculture supplies. There are a number of small, unincorporated communities within the management area. Many of these communities are strongly dependent upon local agriculture. Pratum, for example, is home to a farmers' cooperative that serves an area east of Salem. A small sawmill operates in the community of Yoder and serves local customers.

The town of Woodburn, and the area surrounding it, contains a significant population of Orthodox Russians. A large percentage of these people are farmers, raising many different crops, particularly berries.

BLANK

WATER RESOURCES

WATER QUANTITY

Marion County covers an area approximately 1,194 square miles and is bordered on the south by the North Santiam and Santiam Rivers, on the west and north by the Willamette River and much of the east by the Pudding River and Butte Creek. Detroit and Big Cliff Reservoirs, located on the North Santiam River, about 55 miles east of Salem, are part of the US Army Corps of Engineers Willamette Basin Project, and are operated for flood control, irrigation, navigation, and hydropower production purposes. A portion of the Little North Santiam River is included within the State Scenic Waterway System.

The county has been divided into four drainage areas. In all drainage areas, unregulated stream flows are inadequate to meet the total current needs during the low-flow season. In some cases unregulated stream flows are not adequate to meet requirements of existing consumptive water rights. In all cases, unregulated stream flows are inadequate to meet instream requirements.

There are three Groundwater Limited Areas established by the Oregon Water Resources Department in Marion County that extend over 158 square miles: Mt. Angel, Stayton-Sublimity, and South Salem Hills. Also within in the management area there is the Gladtidings Groundwater Limited Area in Clackamas County, along with the Kingston Ground Water Limited Area in Linn County (Figure 2). These areas are identified in Oregon Administrative Rules, Department of Water Resources, Chapter 690, Division 502, Willamette Basin Program. The designation includes limitation of future groundwater use in these areas to uses related to meeting individual family needs.

Clackamas County has two major watersheds within this management area, Rock Creek and the Molalla River. Rock Creek is a tributary of the Pudding River. Rock Creek has limited flow to no flow depending on stream reach during summer months. The headwaters are in the foothills south of Molalla. The watershed is entirely agricultural and rural residences. The headwaters of Molalla River are located 5,000 feet in the National Forest. The largest part of this watershed consists of public and private forest. There are no major reservoirs in Molalla River watershed. The low flows in the summer have reached as little as 20 cubic feet per second at the Canby gage and the August flow is normally below 100 cubic feet per second. These low flows contribute to the water quality limited factors.

Table 3: Population Changes for Marion and Clackamas counties, 1960-2008.

City	2008 Pop.	1960 Pop.	% Change
Salem	153,435	49,142	212.2
Keizer	35,864	0	N/A
Woodburn	22,728	3,120	628.5
Canby	15,637	2,168	621.3
Silverton	9,649	3,081	213.2
Stayton	7,319	2,108	247.2
Molalla	7,263	1,501	383.9
Mt. Angel	3,470	1,428	143
Aumsville	3,603	3,000	20.1
Sublimity	2,591	490	428.8
Jefferson	3,085	716	330.9
Mill City	1,685	1,289	30.7
Gervais	2,406	438	449.3
Turner	1,717	770	123
Lyons (Linn Co.)	1,150	463	148.4
Donald	967	201	381.1
Aurora	1,003	274	266.1
Gates	485	189	156.6
Detroit	271	206	31.6
Idanha	227	295	-23.1
St. Paul	447	254	81.5
Scotts Mills	343	155	121.3

www.city-data.com/city, based on estimated 2008 populations

PRESENT WATER USE

Supplies to urban areas from surface water, while supplying over half the present population of Marion County but only three municipalities, generally are secure because of the seniority of rights that most cities hold. For example, Salem diverts from the North Santiam under priorities dating from 1856, 1866, and 1923. The city of Silverton has one of the most senior rights of Abiqua Creek and a reservoir on Silver Creek. Eleven cities in Marion County rely on groundwater for their supplies. Mt. Angel and Sublimity, both located within Groundwater Limited Areas, have reached the production capability of their wells. Most industrial use that is not supplied from municipal systems acquires their water supplies from groundwater. Nearly all the rural residential population in the county, amounting to nearly 73,000 persons, and all the rural schools rely on groundwater to meet their needs.

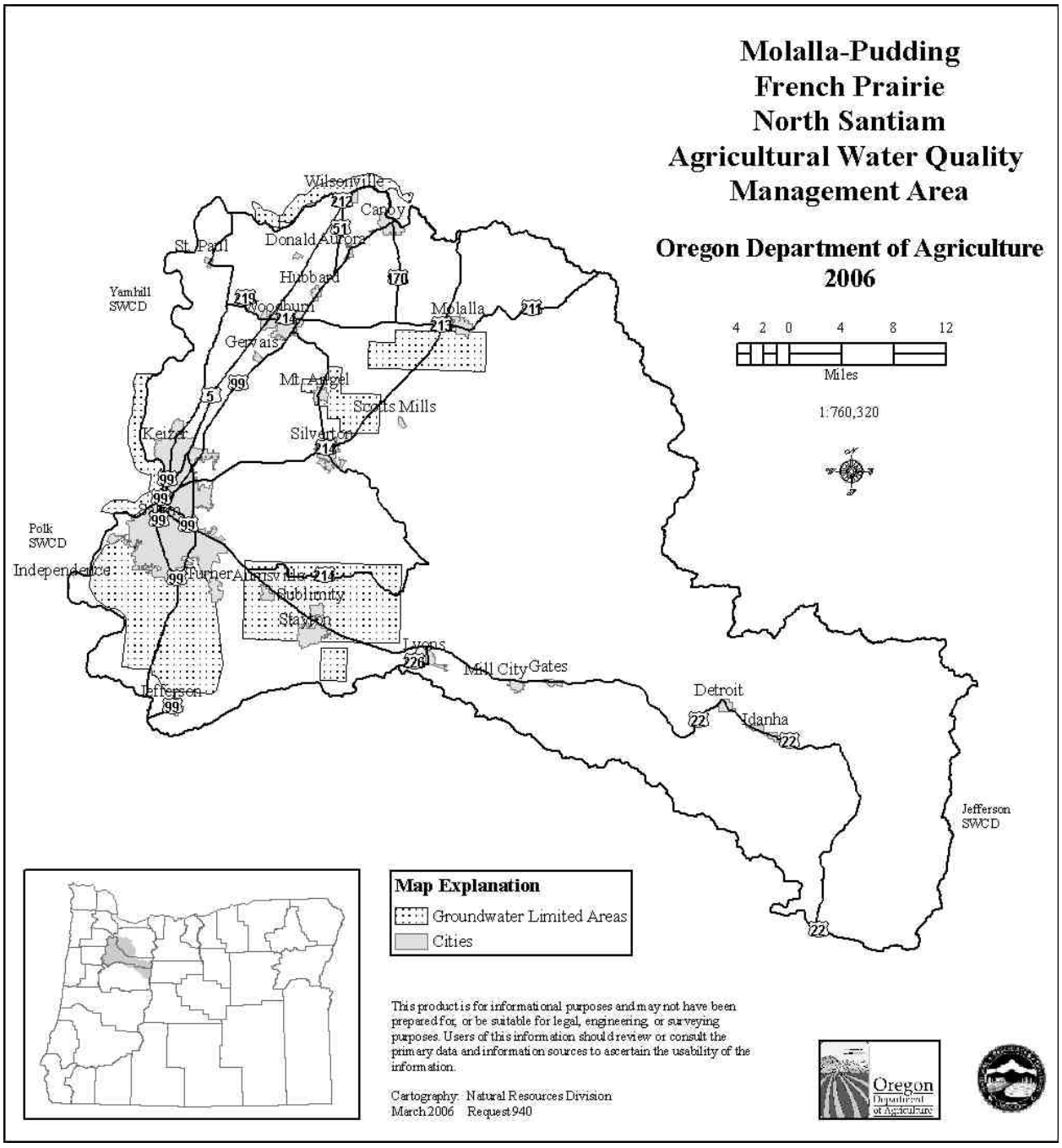
Over 49,500 acres are irrigated from surface water sources in Marion County. Lands in the Santiam Water Control District and the Sidney Irrigation Cooperative both have reliable supplies from the North Santiam River, as the rights they operate under have priorities that predate establishment of minimum flows for fish and other aquatic life, and in some cases predate the 1909 water code. The combined acreage of these two districts totals about 23,500 acres, nearly one half the county total. Water is diverted from the Willamette River for irrigation of about 6,900 acres. About half of these lands have water rights that predate the instream rights and minimum flows. Nearly 15,000 acres have irrigation rights from streams in the Pudding Drainage Area. Many rights predate instream water rights set for aquatic life, however stream flow amounts during the irrigation season are such that less than 20 percent of these lands have full-season supplies and significant acreage obtain supplemental supplies from groundwater. About 78,250 acres rely on groundwater sources for full-season irrigation supplies in Marion County. Along the North Santiam, Santiam, and Willamette Rivers, a relatively small acreage relies on water purchased from US Army Corps of Engineers storage, although Sidney Irrigation Cooperative is adding about 2,500 acres to its service area supplied by water purchased from Detroit Reservoir.

Average recreation use at Detroit Reservoir is the largest over the entire Willamette Basin Project. Other than the Detroit Reservoir with a full-pool surface of 3,500 acres, and Silverton Reservoir with a surface area at full pool of 65 acres, there are no slack-water recreation sites in Marion County. Kayaking, canoeing, and drift boating are popular seasonal recreation uses of the North Santiam, Little North Santiam, Santiam, and Willamette Rivers.

Instream rights for aquatic life exist for many streams in Marion County. In the North Santiam, Santiam, and Willamette, minimum flows are established for a portion of "natural flows" and a portion of reservoir releases. The level of releases present in these streams tends to "mask" shortages occurring from the lack of "natural flows." Flow amounts present in the Willamette at Salem meet "target" amounts during all but the driest years. Tributaries of the Pudding River and the Pudding itself have inadequate flows to satisfy instream rights for much of the late summer and early fall every year.

The Molalla River provides water for the city of Molalla and the city of Canby. Water is also used for irrigation of agricultural lands adjacent to the River. In the past, industrial use was related to timber and lumber manufacturing. Today, a major use of the Molalla River is recreation. This includes bank and drift boat fishing, canoeing, kayaking, rafting, and swimming. There are three public parks on the River, and during warm summer days, residents go to the parks to swim. There are many private swimming and recreation areas including a golf course and religious retreat.

Figure 2: Oregon Water Resources Department Map of Groundwater Limited Areas in Molalla-Pudding/ French Prairie/North Santiam AgWQM Area



WATER QUALITY

The Willamette, North Santiam, Molalla, and Pudding Rivers and several tributaries have been classified as "water quality limited" by DEQ. Temperature and bacteria counts commonly exceed state criteria in both the mainstem of the Middle Willamette River as well as in some tributaries. Dissolved oxygen may fall below state criteria in the Santiam River during fall, winter, and spring. Data collection also revealed legacy pesticides, no longer in use in the United States, in the Pudding River, Little Pudding River and Zollner Creek water columns. Nitrate concentrations in Zollner Creek frequently exceed the human health standard, which, itself, is orders of magnitude greater than typical aquatic concentrations. Fish tissue collected from the mainstem middle Willamette River contained toxics, including legacy pesticides and mercury. Nearly all streams where water quality is tested exhibit unacceptable high water temperatures during summer and early fall. A Groundwater Quality Limited Area has been established by the DEQ in the Mission Bottom area. Elsewhere and over most of the county, excessive hardness and iron levels are the most common groundwater quality problems.

Water Quality Issues of Concern

The U.S. Geological Survey and DEQ measured Pudding River water quality during 1994 and 1995. These studies highlighted some important concerns about water quality within the watershed. Nitrate content in the stream greatly increased after the first storm event of the year. Levels of potassium and organic nitrogen peaked after the first storm as well. The Pudding River is a naturally turbid stream due to its flat gradient and to the soil types found in the area. The level of total phosphorous (TP) closely corresponded to the amount of total suspended solids. Suspended solids are generally low throughout the summer months while levels of TP vary. Water quality criteria values for the Willamette River Basin, set by DEQ in 1994, such as fecal coliforms (max#/100ml=400), were routinely violated during storm events in the Pudding River and its tributaries.

Zollner Creek, which is a tributary to the Pudding River, is a high-intensity agricultural watershed. The monitoring done by U.S. Geological Survey and DEQ showed water quality in Zollner Creek to be very poor. Erosion is high, nutrient transport is increased, fecal contamination is elevated, and ion chemistry is altered. The Marion SWCD Board of Director's identified Zollner Creek in 2009 as a priority area to work on conservation efforts to improve water quality.

The Pudding River Pesticide Stewardship Partnership (PSP), funded by an EPA Section 319 grant and local matching funds. The Marion SWCD partners with DEQ, OSU Extension Service, agricultural businesses and other partners to address potential pesticide issues in local streams. The PSP study area includes agricultural streams of the Pudding basin near Mt. Angel such as Zollner Creek, which has been the focus of many research articles since the early 1990's when a number of different pesticides were documented exceeding levels set for aquatic life. Due to changing agricultural practices, some of the chemicals found in the older studies are no longer used, but may be found in stream sediments, while newly introduced chemicals may begin appearing in water samples. Even low concentrations of pesticides in local streams can pose serious threats to aquatic life and to migrating salmon.

The partnership utilizes a voluntary approach and enlists the aid and expertise of local growers and businesses interested in improving water quality in local streams without having new regulations imposed. Objectives include determining risks posed by current use organophosphate insecticides and triazine herbicides in the study area of the Pudding River basin by monitoring water samples, associating land uses with detected pesticides and application timing, measuring flow in local streams and identifying and promoting best management practices to reduce high risk pesticide detections.

The Water Quality Pesticide Management Team (WQPMT)
The ODA-Pesticides Division holds the primary responsibility for pesticide registration and use regulation within the state of Oregon. As the EPA designated state lead agency for pesticides, ODA is responsible for overseeing the development and implementation of a Pesticide Management Plan for the State of Oregon as stipulated in the annual EPA/ODA Consolidated Pesticide Cooperative Agreement.

In Oregon, statutory authority for development and enforcement of water quality policies lies with several different state agencies, primarily DEQ. The WQPMT, an inter-agency team, composed of representatives from these agencies has been formed to efficiently address the protection of waters of the state from pesticide contamination. This team, composed of staff from ODA, Forestry, Human Services and Environmental Quality, has ramped up efforts to improve water quality in Oregon related to pesticide use. The WQPMT facilitates and coordinates water quality activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions.

The Pesticide Use Reporting System

The 1999 Oregon Legislature passed a bill creating the Pesticide Use Reporting System (PURS). This law required Web-based reporting of all pesticide applications in the state of Oregon conducted in the course of a business, for a government entity, or in a location intended for public use or access. The goal of the program was to collect information that could help to ensure public health and safety and protect Oregon's water and environment by allowing ODA to obtain actual pesticide use information according to water basin and ZIP code; however, budgetary cuts within state government have placed the PURS program on hold.

Pollution Sources

The sources of water pollution can be divided into two general categories: point sources and non-point sources. Point sources of pollution within this management area consist mainly of municipal wastewater discharge and Confined Animal Feeding Operations (CAFOs). Also of significance is a food processing plant. These point sources are required to obtain a permit from DEQ in order to discharge waste.

Point source water pollution can be easy to identify, and is often associated with a factory discharge or local sewage treatment overflow pipe. Non-point source pollution can be difficult to pinpoint to a single source. Non-point pollution can consist of the many vehicles on our roadways that leak oil and gas, whereas the surface drainpipe that drains this oil and gas into the local waterway may be considered a point source of water pollution. Lack of shade along agricultural, rural, and urban streams may contribute to non-point pollution. However, a single 500-acre cultivated field leaching excess nitrogen could be considered a point source of water pollution. Non-point source pollution is normally considered the result of various activities throughout a watershed. Non-point sources of pollution can include:

- Eroding agricultural and forest lands;
- Eroding stream banks and roadsides;
- Erosion from developing urban areas;
- Lack of riparian shade producing vegetation;
- Reduced water quality
- Contaminated runoff from livestock and other agricultural operations;
- Contaminated runoff from established urban areas; and
- Septic systems

The pollutants from these sources are carried to the surface water or groundwater through the action of rainfall, irrigation runoff, and seepage. While there may not be severe impacts on water quality from a single non-point source or activity, the combined effects from all sources contribute, along with impacts from other land uses and activities, to the impairment of the beneficial uses of the water in the area.

Most of the management area is considered moderate to high intensity agriculture land. Agricultural factors that affect water quality include:

- Crop type;
- Fertilization practices;
- Hydrologic modifications; and
- Riparian alternation

Hydrologic modifications include farm ponds, ditches, and drain tile. Ponds can have a positive effect on water quality by collecting and retaining sediment and phosphorous and providing conditions favoring increased uptake of nitrogen and de-nitrification under anaerobic conditions.

Higher in the management area there is a greater percentage of forested streams and decreasing agricultural and urban use. The water entering the watershed at these upper levels is therefore of better quality and contributes very little to the degradation of downstream reaches.

Beneficial Uses Adversely Affected

Water quality refers to the general health of the water in a particular stream and to its ability to sustain the beneficial uses of that stream. The beneficial uses of streams include water supply, aquatic life, recreation, and aesthetics, among others. These uses have varying levels of sensitivity and are affected by different factors. Aquatic life is the most vulnerable use that is listed, therefore it is the most heavily monitored and most improvements and recovery efforts are focused around this use.

Federal Clean Water Act Section 303(d) List

Total Maximum Daily Loads (TMDLs) are limits on pollution intended to bring rivers, lakes and streams into compliance with water quality standards designed to protect human health, aquatic life, and other beneficial uses of water. Development of TMDLs is required by the federal Clean Water Act of 1972, and the Oregon DEQ is the state agency authorized by federal and state law and regulation to develop these pollution limits.

Section 303(d) of the federal Clean Water Act requires states to periodically list waterbodies that do not meet water quality standards ("303(d) list"). The 2004-2006 303(d) list identified 28 stream segments in the Molalla-Pudding Subbasin as water quality limited and needing TMDLs. (DEQ, 2008. Molalla-Pudding Subbasin TMDL & WQMP, p. 1). Several stream reaches of the mainstem Willamette River and within the Middle Willamette and North Santiam Subbasins were listed as impaired on the 1998 303(d) list as well.

In 2006, DEQ completed bacteria, temperature and mercury TMDLs for the mainstem Willamette Basin and tributaries, a bacteria and temperature TMDL for the Middle Willamette River tributaries, and a temperature TMDL for the North Santiam Subbasin. Since the adoption of the Area Plan and Rules, DEQ has also developed a TMDL for temperature, bacteria, pesticides (DDT, dieldrin, chlordane), nitrate, and metals for the Molalla-Pudding Subbasin. TMDLs apply to all or portions of the Molalla-Pudding subbasin.

According to the Molalla-Pudding TMDL report, fourteen stream reaches are listed as impaired by high stream temperature, which affects rearing and spawning habitat for salmonids. Two of those reaches are listed individually for spawning and non-spawning seasons. The temperature TMDL addresses all of these listings basinwide. There are seven stream reaches listed as impaired by bacteria contamination in the subbasin (including two reaches impaired both in summer and fall/winter/spring). Bacteria listings are based on standards for water-contact recreation. The TMDLs for bacteria address all bacteria listings on the 2004-2006 and 2002 303(d) lists and apply basinwide. There is one listing in Zollner Creek for nitrate. The nitrate TMDL addresses that listing and applies to Zollner Creek and all its tributaries year-round. There are three stream reaches impaired by pesticides no longer in use: the Pudding River (DDT and dieldrin) and Zollner Creek (DDT, chlordane and dieldrin) and Little Pudding River (DDT). The TMDL addresses six impairments on these stream reaches and applies to the Pudding River, Little Pudding River and Zollner Creek and their tributaries.

Table 4: The 2004-2006 "303(d) List" of violated Water Quality Parameters in the Molalla-Pudding-French Prairie-North Santiam AgWQM Area.

Water Body	Listed River Mile	Parameter	Season – Criteria	Assessment Year	Action
Beaver Creek	0 to 6.8	Temperature	Year Around (Non-spawning) – Core cold water habitat: 16.0 ºC.	2004	TMDL Completed
Butte Creek	11.9 to 35.6	Temperature	Year Around (Non-spawning) – Core cold water habitat: 16.0 ºC.	2004	TMDL Completed
Drift Creek	0 to 9.5	Temperature	Year Around (Non-spawning) – Salmon and trout rearing and migration: 18.0 ºC.	2004	TMDL Completed
Little Pudding River	0 to 18.3	DDT	Year Around	Previously Unlisted	TMDL Completed
Molalla River	0 to 25	Fecal Coliform	Fall/Winter/Spring	1998	Delisted 2004, but still showing impairment TMDL Completed
Molalla River	19.7 to 44.7	Temperature	August 15 – June 15 – Salmon and steelhead spawning: 13.0 ºC.	2004	TMDL Completed
Molalla River	18.2 to 48.3	Temperature	Year Around (Non-spawning) – Core cold water habitat: 16.0 ºC.	2004	TMDL Completed
Molalla River	0 to 25	Temperature	Summer	1998	Delisted 2004, but still showing impairment TMDL Completed
Pine Creek	0 to 7.2	Temperature	Year Around (Non-spawning) – Core cold water habitat: 16.0 ºC.	2004	TMDL Completed
Pudding River	0 to 35.4	DDT	Year Around	1998	TMDL Completed
Pudding River	0 to 35.4	Dieldrin	Year Around	Previously Unlisted	TMDL Completed
Pudding River	0 to 35.4	*E. Coli*	Fall/Winter/Spring	2004	TMDL Completed
Pudding River	0 to 35.4	Fecal Coliform	Summer	1998	Delisted 2004, but still showing impairment TMDL Completed
Pudding River	0 to 35.4	Iron	Year Around	2004	TMDL Completed
Pudding River	0 to 35.4	Manganese	Year Around	2004	Recommended for Delisting
Pudding River	0 to 61.8	Temperature	Year Around (Non-spawning) Salmon and trout rearing and migration: 18.0 ºC.	2004	TMDL Completed
Silver Creek	0 to 5.9	Fecal Coliform	Summer	1998	TMDL Completed
Silver Creek	0 to 5.9	Temperature	Summer -- Rearing: 17.8 ºC.	1998	TMDL Completed
South Fork Silver Creek	0 to 7	Temperature	Year Around (Non-spawning) - Salmon and trout rearing and migration: 18.0 ºC.	2004	TMDL Completed
Table Rock Fork Molalla River	0 to 8.3	Temperature	August 15 - June 15 -- Salmon and steelhead spawning: 13.0 ºC.	2004	TMDL Completed
Table Rock Fork Molalla River	0 to 12	Temperature	Year Around (Non-spawning) -- Core cold water habitat: 16.0 ºC.	2004	TMDL Completed

Teasel Creek	0 to 6.3	Temperature	Year Around (Non-spawning) -- Salmon and trout rearing and migration: 18.0 ºC.	2004	TMDL Completed
West Fork Little Pudding River	0 to 5.1	Dissolved Oxygen	January 1 - May 15	2004	Not addressed
West Fork Little Pudding River	0 to 5.1	E. Coli	Fall/Winter/Spring	2004	TMDL Completed
Zollner Creek	0 to 7.8	Arsenic	Year Around	2004	Recommended for Delisting
Zollner Creek	0 to 7.8	Chlordane	Year Around	2002	TMDL Completed
Zollner Creek	0 to 7.8	Dieldrin	Year Around	2002	TMDL Completed
Zollner Creek	0 to 7.8	DDT	Year Around	Previously Unlisted	TMDL Completed
Zollner Creek	0 to 7.8	Fecal Coliform	Fall/Winter/Spring	1998	TMDL Completed
Zollner Creek	0 to 7.8	Fecal Coliform	Summer	1998	TMDL Completed
Zollner Creek	0 to 7.8	Iron	Year Around	1998	TMDL Completed
Zollner Creek	0 to 7.8	Manganese	Year Around	1998	Recommended for Delisting
Zollner Creek	0 to 7.8	Nitrates	Year Around	2002	TMDL Completed
Zollner Creek	0 to 7.8	Temperature	Summer -- Rearing: 17.8 ºC.	1998	TMDL Completed
Willamette River Mainstem	24.8 to 54.8	Fecal Coliform	Fall/Winter/Spring	1998	TMDL Completed
Willamette River Mainstem	0 to 186.4	Mercury	Year Round	1998	TMDL Completed
Willamette River Mainstem	0 to 186.4	Temperature	Summer	1998	TMDL Completed
Santiam River	0 to 12	Temperature	Summer	1998	TMDL Completed
North Santiam River	0 to 10	Temperature	Year Around	1998	TMDL Completed
North Santiam River	10 to 26.5	Temperature	Year Around	1998	TMDL Completed
Bear Branch	0 to 9.8	Temperature	Summer	1998	TMDL Completed
Blowout Creek	0 to 11.9	Temperature	Summer	1998	TMDL Completed
Boulder Creek	0 to 2.4	Temperature	Summer	1998	TMDL Completed
Chehulpum Creek	0 to 7.1	Temperature	Summer	1998	TMDL Completed
Elkhorn Creek	0 to 7.4	Temperature	Summer	1998	TMDL Completed
Little North Santiam River	0 to 25.1	Temperature	Summer	1998	TMDL Completed
Marion Creek	0 to 6.2	Temperature	Summer	1998	TMDL Completed
Stout Creek	0 to 8.9	Temperature	Summer	1998	TMDL Completed
Unnamed tributary to Marion Creek	0 to 2.8	Temperature	Summer	1998	TMDL Completed
Bashaw Creek	0 to 4.8	Fecal Coliform	Year Around	1998	TMDL Completed
Clark Creek	0 to 1.9	E. Coli	Year Around	1998	TMDL Completed
Mill Creek	0 to 25.7	Fecal Coliform	Year Around	1998	TMDL Completed
Patterson Creek	0 to 7.2	Temperature	Summer	1998	TMDL Completed
Pringle Creek	0 to 6.2	E. Coli	Year Around	1998	TMDL Completed
Pringle Creek	0 to 6.2	Temperature	Summer	1998	TMDL Completed
Sinker Creek	0 to 3.8	Temperature	Year Around	2004	TMDL Completed

BIOLOGICAL RESOURCES

The streams, wetlands, and riparian zones within the management area contain a wide range of biological values. The riparian zones vary significantly. Streams range from very slow moving to very fast moving. Riparian zones extend from a few yards to thousands of feet wide. Most riparian areas and wetlands have been manipulated to some extent. The area includes a broad spectrum of species and for that reason it is difficult to develop an all-encompassing description of the area. There is a core group of species that are found with equal abundance throughout the area, complemented by those species whose presence is variable depending upon the specific location within the plan area.

Riparian zones within the management area contain a variety of plant species. Numerous rushes, pondweeds, and sedges inhabit the waterways and marshy areas. Ferns such as northern maidenhair, sword fern, and bracken fern are common in shaded areas. Horsetails are abundant along stream banks in the area. Timothy grass, meadow foxtail, spike bentgrass, and tufted hairgrass are just a few species of grass found in the riparian zone. Reed canary grass is a non-native, invasive species that is found throughout, especially in wet lower elevations. Providing a spectrum of color in the spring is a number of native wildflowers, which include iris, camas, asters, buttercups, and larkspur. Rare species include golden Indian paintbrush, which is federally listed as threatened. Some trees and shrubs of the riparian zones include red alder, several species of willow, and Oregon ash. Found in higher altitude locations is the Pacific rhododendron. Other shrubs that are commonly found are salal, ocean spray creambush, Indian plum, and Oregon grape. Introduced species that have thrived in the area are Scotch broom and the Himalayan blackberry.

Tree species include Douglas fir, grand fir, Western red cedar, Ponderosa pine, and Western hemlock, which are encountered throughout the area, especially in the upper reaches of the Molalla and North Santiam Rivers and their tributaries. Pacific yew is also found in parts of the watershed area. Deciduous species include big-leaf maple, vine maple, black hawthorne, black cottonwood, and dogwood. Throughout the planning area is Oregon white oak, which is found mostly in groves of varying sizes. These groves contain a unique grouping of species that depend upon the oaks for survival. A common shrub associated with the drier oak zones in the area is Pacific poison oak. California hazel can be found on moist Oregon white oak sites. Contained in the riparian zones of this area are numerous species of amphibians and reptiles. Pacific tree frogs, rough-skinned newts, and introduced bullfrogs are common amphibians of the area. Some reptiles found in the area include the common garter snake, the western fence lizard, and the painted turtle. The Oregon spotted frog is a species found in the area, and is currently a candidate on the federal endangered species list. Species whose existence in the area is of concern are the tailed frog, western pond turtle, the red-legged frog, the yellow-legged frog, and the Cascades frog.

A broad-range of bird species inhabit the management area. Those species encountered in and around water include increasing numbers of Canadian geese, of which the Aleutian subspecies is federally listed as endangered. A variety of ducks are also found, such as the common mallard, wood duck, pintail, and the green-winged teal. Blue herons are a common site in the watershed and the smaller green-backed heron is also present. Upland game birds that are found in the planning area include the ring-necked pheasant and California quail. Turkey vultures, American kestrels, and barn owls are a few of the birds of prey commonly found in the area. Red-tailed hawks can be seen perched on telephone poles or soaring above open fields. The bald eagle has been sighted in areas contained within the plan. The northern spotted owl is a species of occurrence that is listed as threatened by the federal government. A colorful mix of other birds can also be found throughout the watershed. Lewis' woodpecker and the pileated woodpecker can be found in wooded areas particularly among the Oregon white oak groves. Sparrows are common, particularly the English sparrow and the white-crowned sparrow. Starlings, originally from Europe, are found in abundance and considered a nuisance by many fruit growers and livestock owners. Redwing blackbirds frequent the area as well. Violet-green swallows are seasonal visitors arriving in the early spring and staying through the summer. Other species of interest are the Rufous hummingbird, the western bluebird, the Pacific nighthawk, and the western belted kingfisher. Species of songbird that are of concern are the olive-sided flycatcher and the little willow flycatcher.

The species and number of fish found in the streams and rivers of the management area depend greatly on the characteristics of the stream in question. Those species found in the slow-moving Little Pudding River differs from

those found in the faster, colder Abiqua Creek and, of those species found in both types of streams, the abundance or availability differs greatly. The Oregon chub is a fish species that, at one time, was common to waters of the area but is now listed as endangered on the federal list. Several populations of steelhead (*Oncorhynchus mykiss*) and Chinook salmon (*Oncorhynchus tshawytscha*) inhabit rivers within the area and are listed as threatened. The populations include upper Willamette steelhead, lower Columbia steelhead, lower Columbia Chinook salmon, and upper Willamette Chinook salmon. Coastal cutthroat trout (*Oncorhyncus clarki*) is a candidate for the endangered species list and lower Columbia Coho salmon (*Oncorhynchus kisutch*) has been listed as a threatened species. A species of concern found in the area is the Pacific lamprey. In faster, colder waters the rainbow trout is found. Other common natives are speckled dace, redside shiner, and assorted sculpins. Non-native residents include largemouth bass, carp, bullhead catfish, bluegill, and crappie. Bull trout historically inhabited the North Santiam River but are now possibly extinct in that particular river (ODF, 2000).

A large assortment of mammals is present in the management area. The smaller mammals consist of a number of bats, which include the big brown bat, and the silver-haired bat. Several species of squirrel are found, such as the California ground squirrel and the western gray squirrel as well as chipmunks. Various voles, shrews, and mice inhabit the area. These include, among others, the deer mouse, the bushy-tailed woodrat, and the Pacific shrew. Burrowing in the soil of the area are gophers and moles, which include the common mole and the western pocket gopher. Other native small mammals closely connected to the riparian zone include the mountain beaver, beaver, river otters, raccoon, striped skunks, mink, and muskrats. Additional mammals of interest are red fox, gray fox, coyote, porcupine, and bobcat. Small mammals present in the area and listed as species of concern are the Pacific big-eared bat, the California wolverine, the Pacific fisher, the long-eared myotis (bat), the fringed myotis, the long-legged myotis, and the Yuma myotis. Several large mammals occur within the bounds of the area. The black bear is found in the forested, less-populated parts of the area. Encountering humans with increasing frequency is the cougar. Blacktail deer are very common throughout the area and Roosevelt elk are found in selective areas at higher elevations.

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MISSION, GOALS, AND OBJECTIVES

MISSION

The mission of the Plan is to promote agricultural management practices that protect and improve water quality in the Molalla River, Pudding River, North Santiam River, Santiam River, Mill Creek, and French Prairie Area Subbasins while maintaining agricultural viability.

The primary strategies to reduce water pollution from agricultural and rural lands lie in the reduction of pollutants in runoff, and the reduction of erosion through educational programs, land treatment, implementation of agricultural management practices, and installation of structural or nonstructural (agronomic) measures. These strategies are carried out at the local level by the Marion SWCD in cooperation with landowners, operators, other agencies, volunteer organizations, and others.

GOALS AND OBJECTIVES

I. Reduce, minimize, and control water pollution from agricultural activities and soil erosion to achieve applicable water quality standards.
    a. Control pollution as close to its source as possible.
    b. Minimize erosion and sediment delivery from agricultural and rural lands.
    c. Reduce pesticide and nutrient discharge from agricultural and rural lands.
    d. Control irrigation and run-off and tail water discharges to waters of the state.
    e. Eliminate direct livestock waste discharges to waters of the state, and ensure proper animal waste storage, utilization, or disposal.
    f. Limit livestock access to streams, wetlands, and riparian areas.
    g. Promote the restoration, enhancement, and protection of wetland, riparian, and wildlife habitat.

II. Create a high level of awareness and understanding of conservation issues among the agricultural community and rural residents through education and technical assistance.
    a. Conduction education programs to promote public awareness of water quality issues and their solutions.
        i. Develop and promote demonstration projects that showcase successful conservation practices and systems.
        ii. Produce and distribute Local Management Agency newsletter that includes water quality issues and educational materials, workshops, tours, and demonstrations.
        iii. Provide educational materials and presentations to schools and youth oriented groups.
        iv. Create and maintain a list of experienced agricultural operators willing to share their agricultural management practices with other interested people by speaking, leading tours, and providing tour sites.
    b. Develop an ongoing media program to inform agricultural operators and the public of conservation issues and events.
        i. Submit news articles and public service announcements to area newspapers, radio stations, and newsletters.
        ii. Invite media to conservation tours and workshops.
        iii. Build partnerships with agribusiness to promote conservation.
        iv. Share education materials with agribusiness field representatives.
    c. Identify, develop, and distribute agricultural management practices that protect and improve water quality.
        i. Promote the development of Voluntary Water Quality Farm Plans (Voluntary Plans) and Voluntary Plan amendments.
        ii. Assist any person conducting agricultural management or land disturbing activities to develop a Voluntary Plan.
        iii. Obtain practical information from agricultural producers.

III. Monitor and evaluate the plan to assist in periodic review of effectiveness.
    a. Work with all relevant agencies to measure plan effectiveness in meeting goals and report results.
        i. Inventory and assess watershed conditions and sources of pollution in this plan area.
        ii. Establish a plan of monitoring streams and surface water areas for current water quality conditions and determine needs.
        iii. Use present water quality condition of the plan area as a baseline.
        iv. Partner or participate with local schools, watershed councils, and other agencies to develop a monitoring program.
    b. Include documentation data in the annual and long-range work plans of the LMA.
        i. Document the number of Voluntary Plans written, producers implementing agricultural management practices, and total acres planted which protect water quality.
        ii. Document the number of attendees of conservation workshops and tours.
        iii. Document the number of agribusiness partnerships produced and the successes of this partnership.
        iv. Identify the occurrence of prohibited conditions of the plan area by type and geographic area.
        v. Document the number of complaints referred to LMA.
        vi. Review the plan every two years.
IV. Secure adequate funding for administration and implementation of the plan.
    a. Obtain funding for implementation of agricultural management practices, conservation planning assistance, conservation education, and water quality monitoring.
        i. Promote the USDA incentive-based cost share programs to assist producers with conservation implementation, for example:
        - Conservation Reserve Enhancement Program
        - Conservation Reserve Program
        - Environmental Quality Incentive Program
        - Wetland Reserve Program
        - Wildlife Habitat Incentives Program
        - Farmland Protection Program
        - Conservation Farm Program
        - Forestry Incentives Program
        - Stewardship Incentive Program
    b. Pursue the feasibility of Pollution Tax Abatement Program relative to water quality.
    c. Work with the Oregon Association of Conservation Districts and others to establish stable funding from the Oregon Legislature to fully implement this Plan.
    d. Submit grant proposals to the USDA, US EPA, Oregon DEQ, ODA, and other funding sources.
    e. Form partnerships with the agribusiness sector for additional funding.

PLAN IMPLEMENTATION

The Marion SWCD, as the primary LMA designated by the ODA for this Plan area, oversees administration and implementation of this Plan. The day-to-day implementation of this Plan will be accomplished through a Memoranda of Agreement between the Marion SWCD and the ODA. Implementation priorities will be included in the annual work plans developed by the Marion, Linn, and Clackamas SWCDs with input from the ODA (Figure 3).

The primary strategies to reduce water pollution from agricultural and rural lands lie in the reduction of pollutants in runoff, and the reduction of erosion through educational programs, land treatment, implementation of agricultural management practices, and installation of structural or nonstructural (agronomic) measures. These strategies are carried out at the local level by the Marion SWCD and Clackamas SWCD in cooperation with landowners, operators, other agencies, volunteer organizations, and others.

The SWCDs work to achieve the Plan's water quality goals and objectives through the volunteer efforts of landowners/operators. If voluntary compliance cannot be achieved, the ODA will use appropriate enforcement actions.

The implementation strategy of the Plan for controlling water pollution on agricultural and rural lands relies on existing and expanded efforts. For the purposes of this Area Plan, these efforts will include education, voluntary water quality farm plans/conservation planning, funding, and Area Plan evaluation and modification.

OAR 603-090-0030(1) states, "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 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 and established by law;
- Guidelines for public participation, and;
- A strategy for ensuring that the necessary measures are implemented.

For the entire Molalla-Pudding/North Santiam/French Prairie Area, the target for mercury loading reduction for all sources, including agricultural land, is 27 percent.

The water quality targets from the Molalla-Pudding TMDL for agricultural land use are:

- Reduce bacteria loading by approximately 90 percent year around on Pudding River tributaries, at least 70 percent on the Pudding River, and 80 percent during winter months (October – May) on the lower Molalla River and tributaries.
- Increase site appropriate shading in riparian areas to at least 70 percent on average on tributaries and 50 percent on average on mainstem streams (Pudding and lower Molalla Rivers).
- Reduce legacy pesticide loading by at least 60 percent in the Pudding River, Zollner Creek, and the Little Pudding River.
- Reduce nitrate loading at median stream flow in Zollner Creek to approximately 100 kilograms/day.

The water quality targets from the Middle Willamette TMDL applicable to agricultural land use in the French Prairie and Santiam portions of the Area Plan are:

- In French Prairie and Santiam areas, reduce bacteria loading by approximately 95 percent in summer months (June – September) and 61 percent in winter months.

- In Mill Creek, reduce bacteria loading by approximately 83 percent in winter months, 89 percent in summer months.
- In Bashaw Creek, reduce bacteria loading by approximately 68 percent year around.
- Increase site appropriate shading in riparian areas to at least 55 percent on average on tributaries, and at least 20 percent on average on the mainstem Santiam River.

The water quality targets from the North Santiam TMDL for agricultural land use are:

- Increase site appropriate riparian shading to at least 65 percent on average on tributaries and at least 25 percent on average on the mainstem N. Santiam River.
- Reduce bacteria loading by at least approximately 66 percent.

Achieving the TMDL water quality targets will take several years. In order to measure progress, the ODA, in consultation with the LAC, DEQ, and SWCD, will identify interim benchmarks for agriculture to strive for over designated time periods and at a scale suitable for measuring progress. The benchmarks will be documented in the 2012 Are Plan and progress toward those benchmarks will be reported in the biennial reports prepared for the Board of Agriculture. ODA will determine the tasks in the scopes of work in consultation with the SWCDs and may also consult with DEQ staff to review the adequacy of that scope to make significant progress toward meeting the pollutant reduction targets set in the TMDLs.

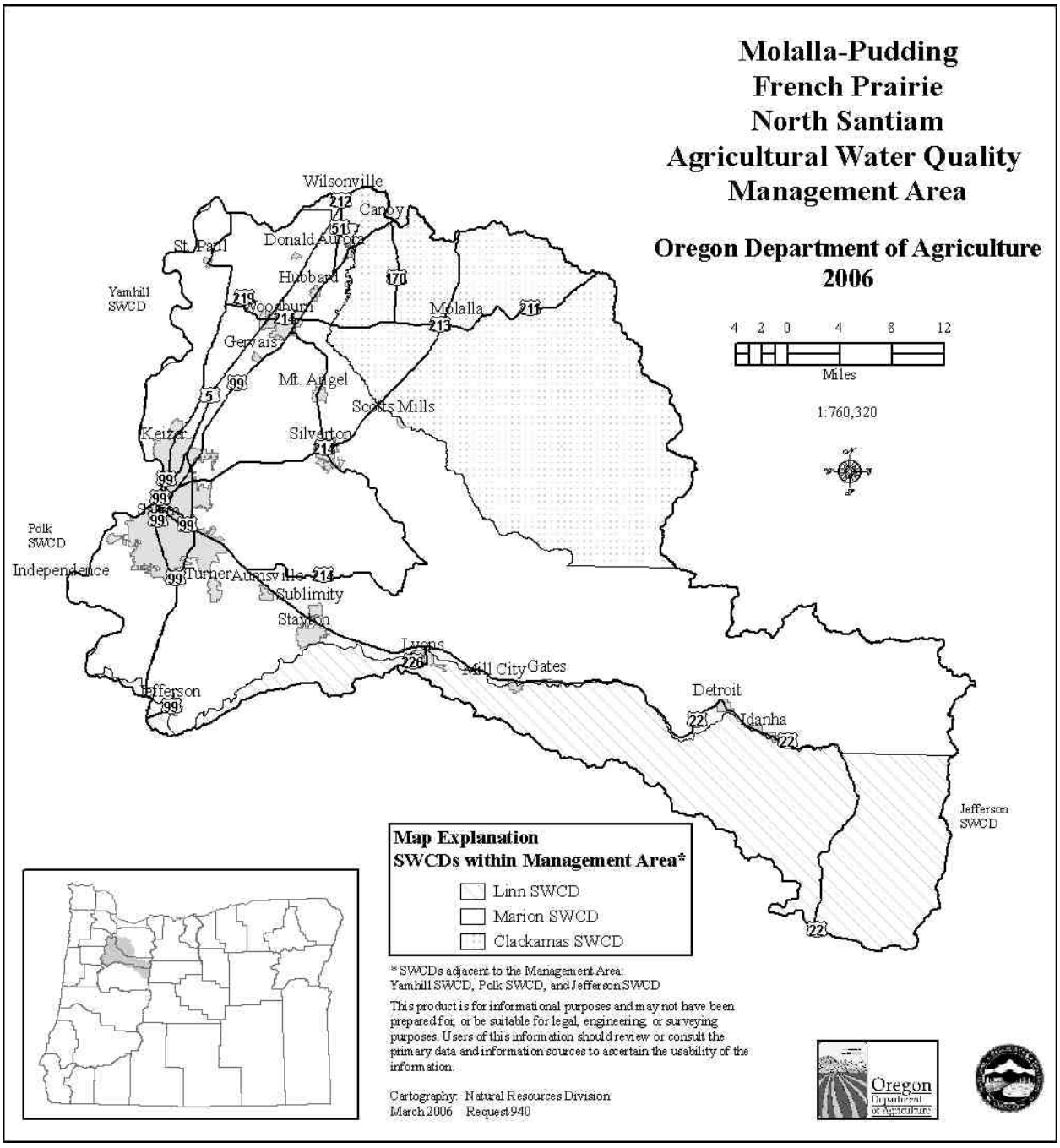
EDUCATION

The LMA coordinates the plan education efforts. To do this, the LMA forms partnerships with state and local governments and organizations such as watershed councils, OSU, USDA NRCS, Oregon Farm Bureau Federation, and others. The focus of the education effort will be on meeting water quality standards utilizing Voluntary Water Quality Farm Plans or Conservation Planning, that include the following:

- Conservation Planning on rural lands;
- Conservation Plan implementation;
- Water Quality monitoring to determine conditions and improvement requirements;
- Wetlands and upland habitat restoration and enhancement for wildlife;
- Small acreage management;
- Grants and/or cost-share to help implement new agricultural practices; and
- Riparian area maintenance and reestablishment

The LMA will create a high level of awareness and understanding of water quality issues among the agricultural communities and rural residents through education and technical assistance.

Figure 3: Soil and Water Conservation District Coverage in the Plan Area



The Education Program l works through all means of information dissemination to communicate with the wide diversity of people in the Plan area. The target audience is the rural landowners and operators. Residents within the urban growth boundary are a part of the target audience to show rural efforts toward improved water quality and efforts to meet water quality standards. The Program l provides information to create a high level of awareness of water quality issues.

The LMA has demonstration projects to promote a high level of awareness with the public on water quality issues and solutions. These projects address a wide area of agriculture enterprises. Individual solutions that address common problems on agriculture enterprises are the focus. The LMA provides workshops, tours, and other presentations throughout the year to communicate to the rural residents on water quality issues. This Program l includes educational materials and presentations to schools and youth oriented groups. The LMA works with all parties to assist in this education effort. A survey of rural residents may be done each year to determine the education needs to be addressed in the annual work plan. The LMA works to identify those operators willing to share their knowledge in water quality issues, practices and other experiences. These individuals can be used as speakers at tours, presentations and workshops and can provide tour sites for demonstrations.

The LMA distributes a newsletter to interested residents of the Plan area that provides information on water quality issues. The newsletter describes activities in the plan area to provide information on water quality issues. The newsletter includes a calendar of events that are taking place relating to water quality issues, watershed council activities, Willamette River restoration and any other area related to water quality issues and environmental impacts.

The LMA uses all media sources available to educate basin residents on water quality issues. The media is informed of all events such as tours, presentations or demonstrations taking place.

VOLUNTARY WATER QUALITY FARMS PLANS AND CONSERVATION PLANNING

One of the ways to achieve our area water quality management mission is through the development of Voluntary Plans or Conservation Plans for individual farms. A Voluntary Plan or Conservation Plan contains natural resource information and a record of decisions made by the landowner/operator. It contains a schedule of operations and activities that are needed to solve identified natural resource issues on the land. In particular, the Voluntary Plan should describe specific measures needed to address the water quality issues outlined in this area water quality management plan. Voluntary Plan designs have the flexibility for use by large agricultural operations as well as small acreage operations and so called "hobby farms" where a family may be raising a single horse or other livestock animal. Large and small operations can benefit from the educational opportunities that are part of putting a Voluntary Plan together. Voluntary Plans can often help the landowner/operator identify activities and cost share opportunities.

A Voluntary or Conservation Plan is exactly that, voluntary. A landowner is NOT required to have a Voluntary Water Quality Farm Plan or Conservation Plan. The landowner/operator may choose which management approaches and practices the individual prefers to use. Voluntary Plans may be drawn up not only by the landowner/operator, but also by consultants or by technicians available through the local SWCD or the USDA NRCS. A landowner who develops a Voluntary Plan may choose to get it approved by the department through the LMA (see appendix D).

One method of developing a Voluntary Plan or Conservation Plan is the nine-step planning process developed by the USDA NRCS. It is flexible enough to meet landowner and natural resources needs, and may address federal, state and local requirements. Landowners/operators working with the local SWCD and/or USDA NRCS can implement a Voluntary Plan that would improve operations, and protect water quality. The Voluntary Plan should describe the management system schedule of conservation practices, and operation and maintenance procedures, that the landowner/operator will use to conserve soil, water, air, plants, and animal resources on all or part of the farm unit, and the effect on economic and social conditions. The Voluntary Plan should include all contiguous and noncontiguous land that is part of the landowner's enterprise, including owned and rented land. (See Appendix C: The Conservation Planning Process).

FUNDING

The designated LMA seeks funding to implement this agricultural water quality management Area Plan. Funding is necessary in four main areas:

- Education – to fund education programs such as workshops, tours, outreach at stores and development of published materials. Goal II of the Plan.
- Inventory, monitoring, and assessment of the watersheds in the Plan Area. Develop baseline water quality in the Plan Area and monitor trends. Goal III of the Plan.
- Technical Assistance – to hire staff to work with landowners/operators in conservation planning process and conservation plans. Also, to review conservation plans submitted to the LMA approval. Goal IV of the Plan.
- Cost share assistance for landowners/operators to implement agriculture management practices.

For this Area Plan, stable funding is required to provide staff for the items listed above. Stable funding provides the matching dollars needed to obtain needed grant money to implement this Area Plan. The Marion SWCD, expected to serve as a primary LMA for this management area, now has stable funding, with a tax base approved in November 2000.

The 1993 AgWQM Act allows the ODA, in consultation with the State Board of Agriculture, to collect a fee for state Area Plan implementation. Currently, the ODA has no plans to collect this fee.

Funding will also be sought from ODA, US Department of Agriculture, US Environmental Protection Agency (EPA), Oregon DEQ, the Oregon Watershed Enhancement Board (OWEB), and other agencies and organizations.

MONITORING AND EVALUATION

The LMA coordinates the monitoring and evaluation efforts of the Area Plan, working with any interested party. The focus will be on surface water quality trends and LMA documentation of implementation efforts.

The LMA works with other organizations to inventory and assess present point and non-point source pollution in the watershed. The inventory and assessment will be a high priority.

The LMA and ODA coordinate with partners such as the US EPA, DEQ, OSU, and the OWEB to prioritize watersheds and streams for monitoring. This is crucial for development of a plan for monitoring streams for current water quality conditions and to determine trends of water quality conditions in main and tributary streams of this agricultural water quality plan area. The existing conditions monitored become the baseline for determining trends.

To perform the tasks of inventory, assessment and monitoring the LMA partners with as many groups or agencies as possible. This includes schools, watershed councils, cities, ODA, DEQ, USDA NRCS, and other agencies.

The LMA and ODA document plan implementation, which includes this work in the annual and long-range work plan. The LMA reports the results in the Annual Report, at the Annual Meeting and to the ODA per existing Memorandum of Agreement(s).

The following items and areas are tracked and documentation compiled:

- voluntary plans written;
- producers implementing agriculture management practices;
- total acres planned;
- number of workshops and tours;
- number of attendees at workshops and tours;
- number of agribusiness partners;
- number of prohibited conditions in this Management area by type and geographic area; and
- number of complaints.

The ODA and LAC review this Area Plan every two years, with help from the LMA. The review will cover all aspects, which include water quality trends and implementation tracking.

The progress and success of implementation efforts are assessed through determination of necessary changes in land management systems, measurement of water quality improvement over time, and evaluation of educational techniques and technical and financial tools.

The plan was adopted in 2002 and every two years the ODA, with the cooperation and assistance of the LMA and theLAC, and in consultation with DEQ, assesses the progress of plan implementation toward achievement of plan goals and objectives. These assessments include:

1. An accounting of the numbers and acreage of operations with approved voluntary conservation plans which address the prevention and control measures;
2. Documentation of violations of the prevention and control measures and subsequent corrections;
3. An evaluation of available current water quality monitoring data and sources of pollution in the Molalla-Pudding-French Prairie-North Santiam Subbasins management area;
4. A review of projects, demonstrations, and tours used to showcase successful management practices and systems;
5. An evaluation of outreach and education programs designed to provide public awareness and understanding of water quality issues; and
6. An evaluation of the effectiveness of technical and financial sources available to the agricultural community

Asking specific questions regarding the above assessments of the Area Plan is helpful in identifying whether the plan goals and objectives are effective. Such questions can be determined using the S.M.A.R.T. method, which stands for:
Is the question you are asking…

S = specific
M = measureable
A = achievable
R = relevant
T = time-bound

For example, when assessing the Area Plan's effectiveness in achieving water quality standards for TMDL compliance, one of the specific questions may be "Are riparian areas in the basin improving?" Running the S.M.A.R.T. model may look similar to:

S = yes
M = aerial photos, ground-truthing
A = CREP, EQIP, O&E, management strategies
R = vegetation-temperature relationship, filtration of overland flow, streambank stability
T = by next biennial review?

The Marion SWCD has monitored nine sites with varying frequency since 2005 for several water quality parameters. They have measured stream flow at six sites since 2008. Data collected from these sites serves as a baseline against which to measure progress as the Area Plan is implemented. Additional monitoring sites in the Molalla River and North Santiam watersheds are needed to measure successful implementation of this Plan in those areas.

The LAC has established an executive committee that will meet as needed with SWCD, DEQ, and ODA staff to design a monitoring program appropriate to answer the LAC's questions about water quality improvement and to show the progress of Area Plan implementation.

The executive committee will consider different kinds of monitoring to answer specific questions such as:

- Project level monitoring - upstream/downstream or before/after; to demonstrate the effectiveness of a particular practice on a small scale;
- Small watershed monitoring – measurements near the mouth of a stream, appropriate for smaller streams with relatively homogeneous agricultural land use, implementation of a particular BMP throughout the watershed, or where SWCDs have focused outreach and funding;
- Boundary condition monitoring – measured between land uses such as forestry to agriculture or urban to agriculture, to document incoming water quality and how water quality changes with input from agricultural land use;
- Source identification – for the purpose of identifying tributaries contributing a disproportionate amount of a particular pollutant, usually sediment, so that outreach and restoration efforts can be focused in the future.

The executive committee will also consider how they wish to communicate water quality information. The Biennial Report format will be updated to include progress reporting at a scale appropriate to answer the monitoring questions and show progress toward achieving interim benchmarks.

During the 2010 biennial review, the LAC recommended adding the following questions and an implementation schedule to assist in determining effectiveness of the current Area Plan and Rules:

Based on these assessments, the ODA, the LMA, theLAC, and the State Board of Agriculture considered making appropriate modifications to the Molalla-Pudding-French Prairie-North Santiam Subbasins Area Plan and/or the associated area rules.

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RULE COMPLIANCE

PREVENTION AND CONTROL MEASURES

The emphasis of this Area Plan is on voluntary action by landowners and operators to control the factors affecting water quality in the Molalla River, Pudding River, North Santiam River, Mill Creek, and French Prairie Subbasins. Prevention and control measures provide guidance to help landowners and operators reduce water pollution from all agricultural and rural lands. These form the basis for the Oregon Administrative Rules developed for this management area. Landowners or operators who fail to address the applicable OARs either with or without an individual voluntary conservation plan may be subject to enforcement procedures based upon the administrative rules. Enforcement procedures are outlined in the Enforcement Actions and Resolution of Complaints subsection of this Area Plan.

Definitions

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

Chemigation – The method of applying nutrients, pesticides, or both in irrigation water (Natural Association of Wheat Growers Foundation, 1994).

Drainage or Irrigation Ditch – As defined in ORS 196.600 to 196.900 and its associated administrative rules.

Erosion Rate, Sheet and Rill – The annualized amount of soil material lost from a field or parcel of land due to sheet and rill erosion, expressed in tons of soil eroded per acre per year, and calculated according to the Universal Soil Loss Equation or the Revised Universal Soil Loss Equation. (OAR 603-095-0010(13)).

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

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

Farmstead – The farmstead is the cluster of buildings associated with operation of the farm. This may include homes. It does include barns, shops, machinery storage, and other outbuildings. In the case of a dairy it includes all barns, hay and feed storage, livestock housing, and milk parlor. In relation to this Area Plan and water quality the farmstead includes livestock manure handling facilities in pesticide storage and handling areas, well head protection and well location areas, farm vehicle wash down and cleaning areas, and from staging areas used for equipment or commodity handling and loading for shipment.

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

Filter Strip – A strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and wastewater (USDA – Natural Resources Conservation Service, 1997).

Gullies. See Active Channel Erosion.

Hydrology - the science concerned with understanding, describing, and predicting the movement of water on and under the earth's land surface, and the physical, chemical, and biological interactions of water with the earth's terrestrial environment. (Dingman, S. Lawrence. (1984). Fluvial Hydrology. W.H. Freeman and Company)

Intermittent Stream - Means any stream which flows during a portion of every year and which provides spawning, rearing or food-producing areas for food and game fish. (OAR 141-085-0010(20)).

Livestock - the animals described or listed in ORS 596.010 and 596.020 and includes, but is not limited to, horses, mules, jennies, jack-asses, cattle, bison, sheep, dogs, cats, hogs, goats, poultry, domesticated fur-bearing animals, and any other vertebrate in captivity, except fish.

Maintenance - The repair, rehabilitation or reconstruction of a structure pursuant to the provisions of ORS 196.905. (OAR 141-085-0010(22)).

Natural Waterways - As used in ORS 196.800(14), means waterways created naturally by geological and hydrological processes, waterways that would be natural but for human-caused disturbances (e.g. channelized or culverted streams, impounded waters, partially drained wetlands or ponds created in wetlands) and that otherwise meet the definition of waters of the state, and certain artificially created waterways included under the definition of "Other Bodies of Water." (OAR 141-085-0010(27)).

Oregon Forest Practices Act - Provides for economically efficient forest practices that assure the continuous growing and harvesting of forest tree species and the maintenance of forestland for such purposes as the leading use on privately owned land, consistent with sound management of soil, air water, fish and wildlife, as well as scenic resources within visually sensitive corridors, that assures the continuous benefits of those resources for future generations of Oregonians. The Oregon Department of Forestry implements and enforces the Oregon Forest Practices Act. (ORS 527.610 – 527.992).

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

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

Pollution - Means such alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state, which will or tends to 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. (ORS 468B.005(3))

Riparian Area - At its simplest, it is a zone adjacent to water where the soil is wet around springs, ponds, and streams. The term includes three components:

- Aquatic area, which includes the stream, side channels, and depressions in the flood plain away from the stream
- Wet terrestrial zone, the area near the stream where vegetation is strongly influenced by water, and either has wet soils or often is flooded
- Zone of influence, includes the plants that hang over the stream as well as trees growing farther away that might shade or fall into the stream.
    - (Oregon State University Extension Service, 2000. Watershed Stewardship: A Learning Guide. p. II-5.2.)

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

Site Capability - The ability of a site to provide for the development of potential structural and functional properties. Structural properties include, among other things, vegetation and soil characteristics. Functional properties include processes such as energy and nutrient flow. Capabilities to produce and sustain these properties are not the same for all sites, but are site specific.

Wastes - 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. (ORS 468B.005(7)).

Water or the Waters of the State - Include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the state of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters, which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction. (ORS 468B.005(8)).

Wetlands - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. (OAR 141-085-0010(40)).

Chemigated Irrigation Water

The goal of this measure is to encourage the application of crop nutrient applications through irrigation systems at a time and in a manner that does not adversely impact the waters of the state. Fertilizers should be applied in accordance with nutrient budgets developed for each crop, incorporating current yield estimates, water analysis, soil tests, tissue tests, and/or other appropriate tests and information. All pesticides should be used in accordance with the label.

Examples of Management Practices

Waste storage structure, pond, pond sealing or lining, irrigation water management, nutrient management, pest management, filter strips, and riparian buffers.

For most commercial crops, information is available at OSU Extension Service, USDA NRCS Field Office, and/or the local SWCD.

The Oregon Administrative Rule

OAR 603-095-1940

(2) Chemigated Irrigation Water. Effective upon rule adoption.

(a) Landowners or operators shall use the application of chemicals in combination with irrigation water in a manner that does not adversely impact waters of the state.

TMDL parameters may be affected by this measure:

- Current use pesticides

Surface Drainage and Irrigation Ditches

Ditches provide important drainage and irrigation functions for agricultural lands. It is the goal of this measure to minimize impacts on fish and water quality from agricultural ditches while preserving landowner/operator ability to effectively construct, maintain, and use their ditches. The environmental benefits of proper drainage and irrigation ditch operation include a reduction in pollutants conveyed to the waters of the state.

For ditches to function over time, maintenance will be required. Excavation may be required to return a ditch to its original design function. Ditch bank vegetation may be damaged during maintenance. Care should be taken to minimize this damage and provide for revegetation. Ditch vegetation should be maintained in a manner that does not restrict water flow or prohibit ditch maintenance. Special Districts for drainage, irrigation and/or water control may require specifically designed vegetation to meet the maintenance needs.

Landowners/operators are encouraged to refer to Oregon Department of Fish and Wildlife fish screening laws to determine requirements and cost share availability.

When required, either a joint permit from the U.S. Army Corps of Engineers and the Division of State Lands, or a General Authorization permit from Division of State Lands, must be obtained to clean or dig new ditches.

Examples of Management Practices

Streambank stabilization, critical area planting, filter strips, riparian buffers, grassed waterway and lined waterway or outlet.

Information about surface drainage and irrigation ditches is available at the USDA NRCS local field office, local SWCD, and/or OSU Extension Service.

The Oregon Administrative Rule

OAR 603-095-1940

(3) Surface Drainage and Irrigation Ditches. Effective upon rule adoption.

(a) Construction, maintenance, and use of surface drainage field ditches or surface irrigation field ditches shall cause no pollutant delivery to waters of the state from soil erosion induced by excessive channel slope, unstable channel cross section, or placement of disposed spoils.

TMDL parameters may be affected by this measure:

- Temperature (surrogate shade)
- Mecury from soil erosion and runoff
- Bacteria from soil erosion and runoff
- Current use pesticides
- Legacy pesticides (surrogate total suspended solids

Erosion Prevention and Sediment Control

The goal of this Prevention and Control Measure (PCM) is to control soil erosion and minimize eroded soil access to waterways. Erosion occurs when soil particles detach and move due to the impacts of wind and water on soil without vegetative cover. Eroded soil particles can carry contaminants along with them. These particles, either with or without attached contaminants, can move to waterways and create water quality problems. Soil erosion reduces the long-term productivity of farmland.

Example of Management Practices

Annual and permanent cover crops, crop residue management, subsurface drainage, sedimentation basins, filter strips, cross slope farming, and riparian buffers.

Visual on-site indicators for erosion to surface water include sheet and rill erosion that combines to a concentrated flow that runs into a waterway or road ditch, or any waters of the state. Other visual indicators include sediment deposition from overland flow in channels that are carrying or connected to waters of the state. Field measurements

may include depth of sheet and rill erosion on the field and by inspection of exposed roots from soil erosion. See Appendix "F" for on-site visual indicators of erosion.

Landowners/operators may get additional information about erosion and soil management from the USDA NRCS local field office, local SWCD, and/or the OSU Extension Service.

The Oregon Administrative Rule

OAR 603-095-1940

(4) Erosion Prevention and Sediment Control. Effective upon rule adoption.

(a) Soil erosion rate shall not exceed five tons per acre per year between October 1 and September 30 if the resulting sediment has access to and enters the waters of the state. The erosion rate will be determined using standard scientific methods.

TMDL parameters may be affected by this measure:

- Mecury from soil erosion and runoff
- Bacteria from soil erosion and runoff
- Current use pesticides
- Legacy pesticides (surrogate total suspended solids

Irrigation

Appropriate irrigation and water use benefits the environment by reducing irrigation water run-off and leaching, and total pollutant discharge from an irrigation system. Landowners/operators benefit from appropriate irrigation and water use by maximizing water use efficiency and minimizing waste.

The efficacy of irrigation water application is generally enhanced by assuring the quantity and timing of application is based on the needs of the crop, as determined by soil moisture levels, crop water use budgets, or other monitoring tools.

Every farm or ranch has its own characteristics, its own soil conditions, climate, topography, and crops to consider when designing an irrigation system.

Examples of Management Practices

Irrigation water management, nutrient management, pest management, filter strips, riparian buffers, and equipment calibration and timely maintenance.

Landowners/operators can get information about crop needs, soil moisture levels, crop water use budgets, irrigation, and monitoring tools from consultants, local irrigation sales, USDA NRCS local field office, local SWCD, and/or the OSU Extension Service.

The Oregon Administrative Rule

OAR 603-095-1940

(5) Irrigation. Effective upon rule adoption.

(a) Irrigation systems shall be designed and operated to minimize runoff of potential pollutants. Irrigation scheduling shall be appropriate to each site and consideration shall be given to water use efficiency, off-target minimization, soil conditions, crop, climate, and topography.

TMDL parameters may be affected by this measure:

- Temperature

- Mercury from soil erosion and runoff
- Bacterial from soil erosion and runoff
- Current use pesticides
- Legacy pesticides (surrogate total suspended solids)

Waste: Livestock and Other

The goal of this measure is to ensure that potentially concentrated nutrients and pathogens associated with higher livestock density areas are not readily transported to waters of the state. It is encouraged that livestock waste and/or storage feeds be collected, safely spread on land, treated, or stored until it can be safely disposed of. Runoff and leaching of pollutants into the waters of the state from livestock lots, pasture areas, corrals, paddocks, barnyards, arenas, and other livestock areas should be minimized so that water quality standards are not violated.

Producers should be aware that in addition to this Prevention and Control Measure, other laws regulate the management of animal waste. Many livestock operations are required to have a CAFO permit. Also, ORS 468B.025 prohibits activity that causes pollution of any waters of the state, or places or causes to be placed any wastes in a location where such wastes are likely to escape or be carried into waters of the state by any means.

Examples of Management Practices

Waste storage structure, waste utilization, nutrient management, irrigation management, water diversion, underground outlets, roof gutters, prescribed grazing, filter strips, riparian buffers, fencing, off stream watering, and stream crossing.

Landowners/operators can get information on livestock resource management from consultants, agriculture engineers, USDA NRCS local field office, local SWCD, OSU Extension Service, and/or the the ODA – Natural Resources Division.

The Oregon Administrative Rule

OAR 603-095-1940

(6) Waste: Livestock and Other. Effective upon rule adoption.

(a) No person subject to these rules shall violate any provision of ORS 468B.025 or ORS 468B.050.

(b) Landowners and operators shall prevent the runoff or leaching of contaminated water from feed and manure storage piles into waters of the state, including but not limited to groundwater.

TMDL parameters may be affected by this measure:

- Bacteria
- Nitrate

Nutrients

Nutrients are important for crop and pasture production. It is a goal of this measure to minimize discharge of agricultural nutrients into waters of the state. Appropriate timing and rates of nutrient application use can save operators money through efficient utilization of nutrients, minimizing leaching from the plant root zone and losses from surface runoff and tile drainage. Reducing leaching and surface runoff will also reduce ground water and surface water pollution from agricultural activities.

Examples of Management Practices

Nutrient management, waste utilization to agronomic levels, and nutrient/manure application equipment calibration and maintenance.

Landowners/operators can get information about nutrient management and crop nutrient needs from consultants, USDA NRCS local field office, local SWCD, and/or the OSU Extension Service.

The Oregon Administrative Rule

OAR 603-095-1940

(7) Nutrients. Effective upon rule adoption.

(a) Landowners or operators shall use and apply crop nutrients in a manner that prevents transport into the waters of the state.

TMDL parameters may be affected by this measure:

- Bacteria
- Nitrate

Pesticides

The goal of this measure is to encourage the appropriate management of pesticides, while maintaining their availability for beneficial uses while reducing the risk of surface or groundwater contamination.

Pesticide handling and application practices should be adopted that prevent off-target application and that limit off-site transport.

Current state law requires that landowners/operators follow labeling instructions for transport, storage, mixing, and application of pesticides.

Examples of Management Practices

- Use of integrated pest management strategies
- Equipment calibration and maintenance
- Use of anti-backflow devices

Landowners/operators are encouraged to store, mix, and handle pesticides correctly. One way to accomplish this is by providing secure containment facilities including a leak proof pad with curbing for mixing and loading. An alternative is to load and mix pesticides at the application site carefully, avoiding spillage.

Several routines for disposal of empty containers are suggested:

(1) triple rinsing of liquid pesticide containers, then puncturing the containers and disposing in an approved manner;

(2) (2) emptying dry chemical bags, then bundling and storing them until they can be disposed of in an approved manner.

Landowners/operators can get information about pesticide use from consultants, the USDA NRCS local field office, the local SWCD, the OSU Extension Service, and the ODA - Pesticides Division.

Landowners/operators shall use pesticides in accordance with the label as required under ORS Chapter 634, as administered and enforced by the ODA Pesticides Division.

TMDL parameters may be affected by this measure:

- Current use pesticides

Riparian Management Area (RMA)

The goal of this measure is to encourage landowners/operators to manage their riparian areas to establish and maintain riparian vegetation such as grasses, sedges, shrubs, and trees appropriate to the site. In the normal course of time, this vegetation is expected to provide shade and protect streamside stability during high stream flows at or below those that occur during or following a 25-year, 24-hour storm event (i.e., a 4 percent chance of occurrence).

A functional RMA also provides adequate vegetation to trap sediment, prevent flood debris from depositing on fields, and protect pasture and cropland from bank erosion. Protecting vegetation along smaller streams helps reduce solar radiation reaching the water and provides wildlife habitat.

In general, a functional RMA provides:

- Shade to reduce solar radiation with the objective of minimizing heating of the water.
- Filtering of sediment, organic material, nutrients, and pesticides in surface runoff.
- Streambank stability.
- Large wood and other naturally occurring vegetative contributions to the stream.

In areas where riparian vegetation has been degraded, landowners and operators are encouraged to use either passive or active management to restore vegetation and to thereby restore riparian function. Passive management could include adjustments in grazing systems, altering cropping regimes, or other adjustments to management. Active management includes planting site appropriate plant species or other restoration techniques.

When considering active management, it is recommended that native plant species be used to provide a variety of riparian functions. Non-native species in the riparian management area, however, may also provide important functions including shade, streambank stabilization, and wildlife cover.

Regardless of the approach taken, management and water quality goals should be clearly outlined. For further information about riparian areas, please refer to Appendix E.

Examples of Management Practices

Forest buffer, stream crossing, filter strip, riparian buffer, and exclusion zone or limited use area.

Landowners/operators may use CREP to restore riparian areas. CREP provides materials and labor cost-share as well as rental payments in exchange for a commitment to protect the riparian area. See Appendix B for more information.

Landowners/operators can get information about riparian areas from consultants, USDA NRCS local field office, local SWCD, the OSU Extension Service, and/or the ODA - Natural Resources Division.

TMDL parameters may be affected by this measure:

- Temperature
- Bacteria
- Mercury from soil erosion and runoff
- Bacteria from soil erosion and runoff
- Nitrate
- Current use pesticides
- Legacy pesticides (surrogate total suspended solids

The Oregon Administrative Rule

OAR 603-095-1940

(8) Riparian Management Area. Effective upon rule adoption.

(a) A Riparian Management Area (RMA) that allows for the natural or managed development of riparian vegetation and riparian function over time shall be provided along all streams. This shall include the natural or managed establishment and maintenance of riparian vegetation, such as grasses, sedges, shrubs, and trees, appropriate to site capability, and that in the normal course of time will provide shade and protect streambank stability from flows at or below those expected to occur during or following a 25-year, 24 hour storm event.

(b) Sufficient RMA width will be site specific, and may vary by, for example, soil type, size of stream, and agricultural use.

Road and Staging Areas

The goal of this measure is to minimize water pollution from agriculture activities from the use and maintenance of farmstead, farm roads and related areas. Farm roads, staging areas, barn lots, stream crossings, bridge abutments, and right of ways should be managed to reduce the impact of runoff from agriculture activities into waterways. This includes activities, similar to agricultural activities, including: nutrient management, pest management, well head protection, erosion control, grass seeding of rights of way, rock placement in ditches, stream crossings, bridges, sediment basins, proper culvert placement, sizing, and management, and weed control. Similarly, agricultural lands shall be managed to reduce the impacts of runoff onto public rights of way.

Examples of Management Practices

Critical area vegetation, heavy use protection, water bars on dirt or gravel roads, appropriate culvert placement-construction-design, appropriate road construction grade-crown, bio-swales for runoff, all measures that apply to crops apply to roads, staging areas, and farmsteads.

Landowners/operators can get information about farm roads and associated areas from consultants, USDA NRCS local field office, local SWCD, and/or the OSU Extension Service.

The Oregon Administrative Rule

OAR 603-095-1940

(9) Roads and Staging Areas. Effective upon rule adoption.

(a) Roadways, staging areas, and heavy use areas shall be constructed and maintained to prevent sediment or runoff contaminants from adversely affecting waters of the state.

(A) Exemptions: Public roads and roads subject to the Oregon Forest Practices Act.

TMDL parameters may be affected by this measure:

- Mercury from soil erosion and runoff
- Bacteria from soil erosion and runoff
- Legacy pesticides (surrogate total suspended solids

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APPROVAL OF A VOLUNTARY WATER QUALITY FARM PLAN

Landowners or operators are encouraged to develop a voluntary conservation plan under the process and guidelines provided in Appendix D. Some landowners may choose to have their voluntary conservation plan approved by ODA. The designated LMA, through agreement with ODA, may be authorized to approve Voluntary Water Quality Farm Plans. In this Area Plan the LMA is the Marion, Clackamas, or Linn SWCD, depending on jurisdiction. The process of having a Voluntary Plan approved begins with the landowner or operator bringing the plan to the LMA for review. The LMA will decide, at one of their scheduled meetings, whether to approve the plan. If the LMA decides the plan addresses OAR 603-095-1940 through 603-095-1960 (which are based on the prevention and control measures outlined in this plan), it will approve the Voluntary Plan. If the LMA decides the Voluntary Plan does not adequately address OAR 603-095-1940 through OAR 603-095-1960, it will not approve it and will provide a written explanation to the landowner or operator who submitted the plan, listing the deficiencies to be corrected. The LMA's decision will be recorded in the meeting minutes.

A landowner or operator may request that the LMA reconsider a decision to disapprove a Voluntary Plan by submitting a request for a hearing before the LMA. At its next scheduled meeting, the LMA will reconsider its decision and either affirm, modify, or reverse it. If the LMA affirms its original decision, the landowner or operator may appeal within thirty days by filing a hearing request with the ODA. The ODA will schedule a hearing between the landowner or operator, a representative of the LMA, and a representative of the ODA. If the representatives of the LMA and the ODA can reach a joint decision, they will forward their recommendation to the LMA for approval. If they cannot agree on a joint recommendation, the ODA will make a decision to approve or disapprove the plan, and forward a copy of its decision to the LMA.

ENFORCEMENT ACTIONS AND RESOLUTIONS OF COMPLAINTS

The ODA will use enforcement mechanisms where appropriate and necessary to gain compliance with the OARs for the Molalla-Pudding-French Prairie-North Santiam Subbasins (OAR 603-095-1900 through 603-095-1980). The ODA may take enforcement actions when reasonable attempts at initiating voluntary landowner involvement have failed pursuant to OAR 603-090-0060 through 603-090-120 (Figure 5).

The ODA may investigate complaints against operators or landowners who are alleged to be out of compliance with OARs for the Molalla-Pudding-French Prairie-North Santiam Subbasins. The complaint must relate to a specific site and contain a thorough description of the problem. Public complaints must be filed with the ODA in writing and be signed by the complainant.

The ODA will determine if a violation of a rule in OAR 603-095-1900 through 603-095-1980 exists using professional judgment, best available science, and the applicable OAR. Based on this determination, appropriate action will be taken by the ODA to ensure the condition is remedied.

The ODA recognizes that every farm and situation is different and will take into account each individual situation when enforcing the OARs. A land operator shall be responsible for only those conditions caused by activities conducted on land managed by the landowner or operator. Criteria do not apply to conditions resulting from exceptional circumstances that could not have been reasonably anticipated, such as fire, natural disaster, or weather conditions such as extreme flooding.

Figure 4: Flow Chart for Development and Approval of a Voluntary Water Quality Farm Plan or Conservation Plan

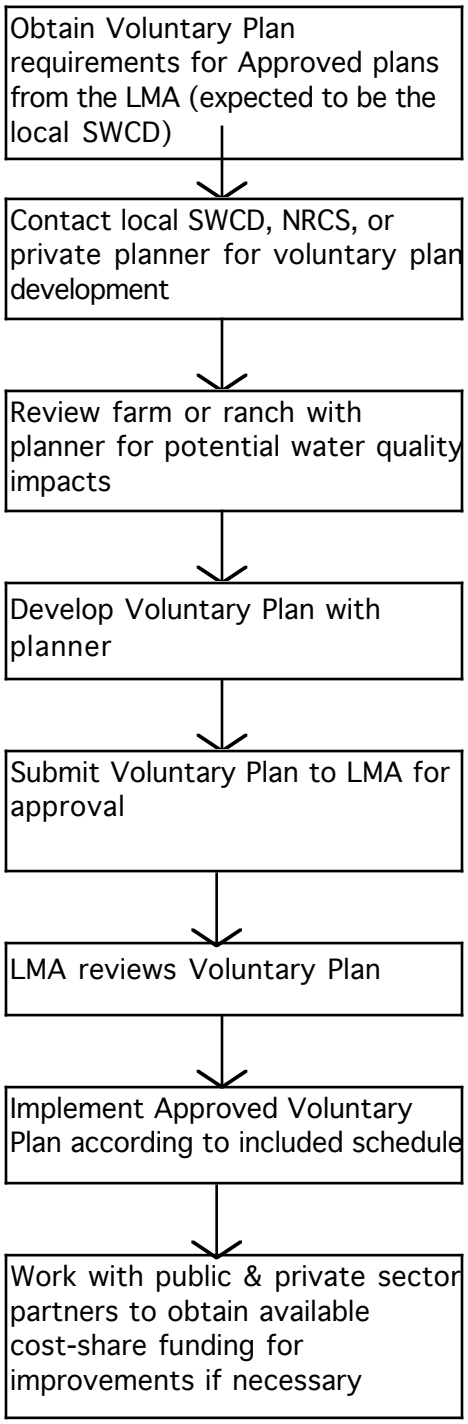
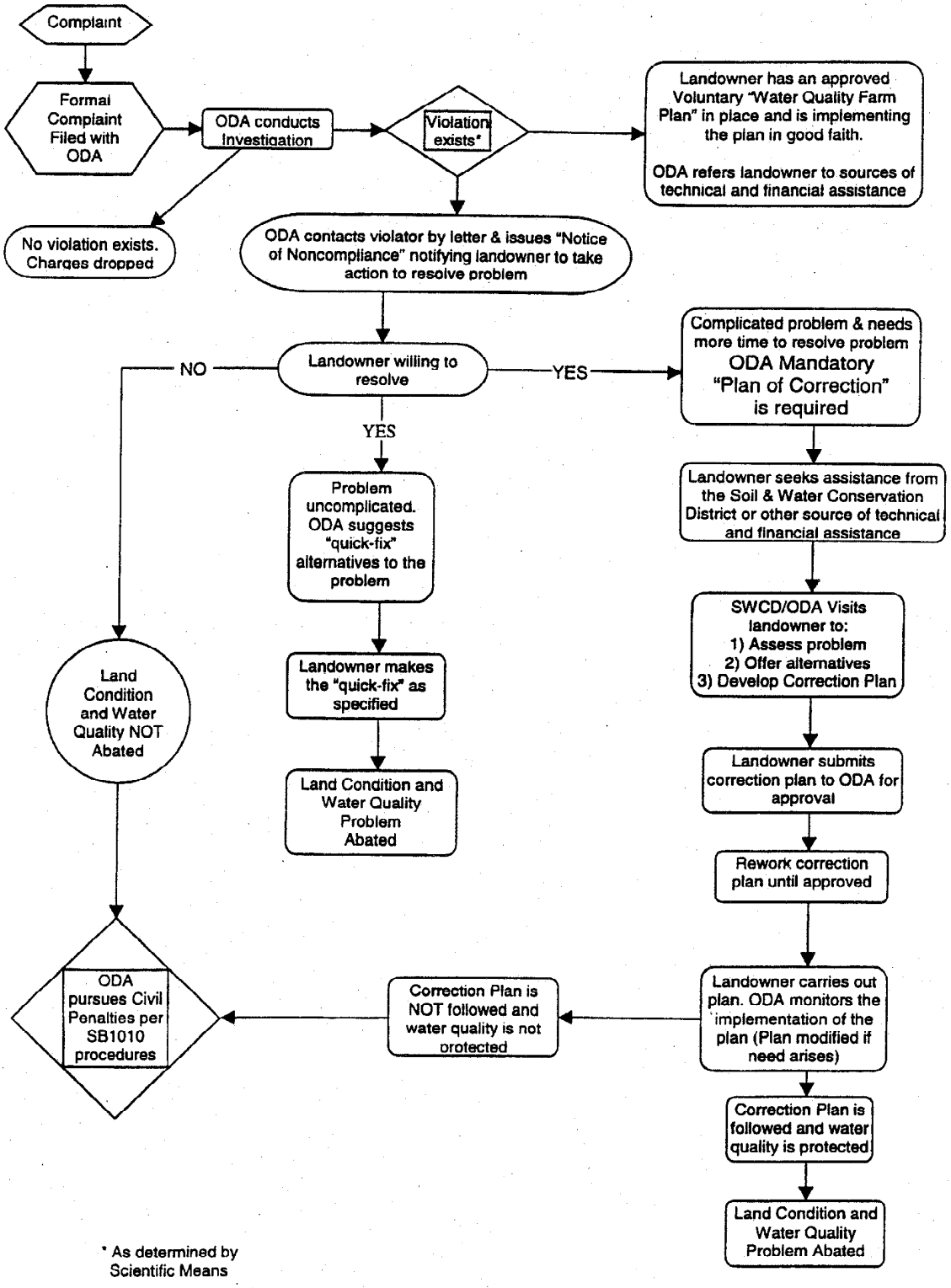


Figure 5: Flow Chart for Resolution of Complaints



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ACKNOWLEDGEMENTS & BIBLIOGRAPHY

For Farming in Marion County: A Glimpse at Then and Now

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APPENDICES

APPENDIX A: EDUCATIONAL AND TECHNICAL SERVICES FOR NATURAL RESOURCE AND FARM MANAGEMENT

Soil and Water Conservation Districts (SWCDs)
Prepares management plans and helps implement them by coordinating with other technical experts in natural resources. Helps landowners obtain financial assistance for conservation projects.
Clackamas County: 503-655-3144
Marion County: 503-399-9927
Linn County: 541-926-2483

USDA – Natural Resources Conservation Service (NRCS)
Provides information on soil types, soils mapping, and interpretation. Administers and provides assistance in developing plans for Conservation Reserve Program (CRP), Environmental Quality Incentive Plan (EQIP), Wetland Reserve Program (WRP), and other cost share programs. Makes technical determinations on wetlands and highly erodible land.
Clackamas County: 503-655-3144
Marion County: 503-391-5741
Linn County: 541-967-5925

Oregon State University Extension Service
Offers educational programs, seminars, classes, tours, and publications to guide landowners in managing their resources.
Clackamas County: 503-655-8631
Marion County: 503-588-5301
Linn County: 541-967-3871

Oregon Department of Agriculture (ODA)
Oversees the Agricultural Water Quality Management program, issues permits and helps producers comply with confined animal feeding water management programs, provides support to Soil and Water Conservation Districts.
Natural Resources Division (Salem): 503-986-4700

Department of Environmental Quality (DEQ)
Responsible for protecting and enhancing 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, sets total maximum daily load (TMDL) allocations. Provides technical assistance and grants to assist with non-point source pollution issues (319 grant program).
Portland: 800-452-4011

USDA – Farm Service Agency (FSA)
Maintains agricultural program records and administers various cost share programs. Their offices also provide up-to-date aerial photography of farm and forestland.
Clackamas County: 503-655-3144
Marion County: 503-399-5741
Linn County: 541-967-5925

Department of State Lands (DSL)
Administers state removal/fill law and provides technical assistance.
Salem: 503-378-3805

Oregon Water Resources Department (WRD)
Provides technical and educational assistance and water rights permits and information.
Salem: 503-986-0900

Molalla-Pudding-French Prairie-North Santiam Subbasins Agricultural Water Quality Management Act

Local Advisory Committee (LAC)
Voluntary committee composed of twelve agricultural producers in the plan area. Charged with developing the agricultural water quality management Area Plan in accordance with Senate Bill 1010.
Marion SWCD Technical Manager: 503-399-5741 ext. 130
ODA Natural Resources Division: 503-986-4700

Oregon Department of Fish and Wildlife (ODFW)
Works with landowners to balance protection of fish and wildlife with economic, social, and recreational needs. Advises on habitat protection. Offers technical and educational assistance for habitat and restoration projects. Provides plan review for special property tax assessment for wildlife habitat projects.
North Willamette Watershed District: 971-673-6000

Oregon Department of Forestry (ODF)
Technical assistance with State and Federal cost sharing, Oregon property tax programs, Forest Resource Trust, forestry practices, and forest management plans.
Salem: 503-945-7200

APPENDIX B: THE CONSERVATION RESERVE ENHANCEMENT PROGRAM[2]

What is the Conservation Reserve Enhancement Program?
The Oregon Conservation Reserve Enhancement Program (CREP) was created in 1998 through a unique partnership between the U.S. Department of Agriculture (USDA) and the State of Oregon. Its purpose is to establish riparian vegetation on agricultural land along streams, protecting water quality and restoring fish and wildlife habitat.

Agricultural landowners can enroll eligible riparian lands into a 10 to 15 year CREP contract and receive an annual conservation payment for the 10 to 15 year contract period, reimbursement for 75 percent of the costs of riparian restoration practices, and other financial incentives.

What is the Oregon CREP?
The Oregon CREP is a State and Federal partnership developed to assist in the restoration of freshwater streams along agricultural lands. Riparian habitat along salmon and trout streams throughout the State will be restored under this program. CREP is implemented in partnership with landowners, by the USDA Natural Resources Conservation District (NRCS), USDA Farm Services Agency (FSA), Oregon Department of Forestry (ODF), and local Soil and Water Conservation Districts (SWCDs).

What are the goals of the Oregon CREP?
Oregon and U.S. Department of Agriculture (USDA) have jointly developed several goals for the program. They include:

- provide riparian buffers to restore stream conditions for salmonid habitat requirements
- reduce sediment and nutrient pollution from agricultural lands adjacent to streams
- ensure vegetation establishment adequate to stabilize stream banks under non-flood conditions
- ensure vegetation establishment adequate to reduce water temperature to natural ambient conditions
- ensure acreage enrolled for riparian buffer practice is restored to properly functioning riparian conditions
- provide a mechanism for landowners to meet water quality requirements

What are some of the environmental benefits of the Oregon CREP?

- establishment of forested riparian buffers will help restructure streams and increase the availability of insects and other salmon and trout food
- trees along streams will reduce the rate of solar water heating which is the most important water quality limiting factor in salmonid streams
- establishment of wetlands will provide important rearing habitat for trout and salmon
- riparian buffers will reduce non-point source pollution and improve stream water quality

Who is eligible for the Oregon CREP? When can I signup?
You can enroll in CREP at any time. In addition to offering acreage along agricultural lands, the applicant must satisfy the basic eligibility criteria for CRP. Land must be cropland that has been cropped two out of the last five years that is physically and legally capable of being cropped. Marginal pasture is also eligible to be enrolled provided it is suitable for use as a riparian buffer planted to trees. Land for which there is an existing CRP contract or an approved offer with a contract pending is not eligible for CREP until that contract expires.

What land is eligible for CREP?
Local agency employees will work with landowners in determining if the land is eligible.

What types of land are eligible?

- Cropland planted to annual or certain perennial crops
- Marginal pasture

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[2]ADAPTED FROM THE USDA FARM SERVICES AGENCY, QUESTIONS AND ANSWERS FOR LANDOWNERS. OCTOBER 2000.

- Cropped wetlands

What must I do with land enrolled in the program?
Three conservation practices are included in the program: riparian forest buffers, wetland restoration, and filter strips. Most CREP land will be planted to riparian buffers, consisting primarily of native trees and shrubs. Landowners will receive annual rental payments from the U.S. Department of Agriculture.

How will I know what to plant in the riparian zones?
Technical assistance is available to all CREP producers at no charge. You will have access to staff members from several agencies including the Farm Service Agency, NRCS, Oregon Department of Forestry, Cooperative Extension Service, and U.S. and Oregon Departments of Fish and Wildlife. Agency staff will develop a Conservation Plan specifically tailored to your site. (There may be a minimal measurement service charge for determining field sizes.)

How wide are the riparian habitats? Is the riparian habitat width flexible?
The width is site specific and flexible. It is based on landscape features such as soil type, vegetation, stream type, and site history. The width can range from 35 to 180 feet AVERAGE. The widths specified in the riparian forest buffer standard are averages, over the length of the enrolled acreage. Landowners may move the RIPARIAN boundary toward or away from the stream at different locations to meet management objectives as long as the overall average width meets the contract specifications.

Must I enroll all eligible land?
No. The program is voluntary and the decision on how much land is enrolled is up to the landowner. The length of riparian area to enroll, and whether to enroll land on both sides of the stream, is the landowner's choice.

Can I hay, harvest, or graze my CREP land?
Haying, harvesting, and grazing would not be permitted during the CREP contract period unless the Secretary of Agriculture permits it for emergency purposes.

What are the payments under CREP?
There are seven types of payments that participants in the Oregon CREP may receive: annual soil rental payments, annual practice incentives, annual maintenance payments, cost-share assistance in the installation of the conservation practices, and a one-time cumulative impact incentive.

Annual payments:
- Soil rental: Land enrolled will earn an annual payment based on the county's dryland soil rental rates for specific soils on agriculture land. The rate for a producer's land will be based on an average of the three predominant soil types. Additionally, for the first time, producers may be eligible for a rental payment based on the rental value of irrigated land if the water used to irrigate that land is left in the stream and landowners get an “instream lease” from Oregon Water Resources Department.
- Practice incentives: Annual incentive payments above the basic annual per acre rental rate will be made based on the conservation practice installed. Incentive rates will be 25 percent for filter strips, 50 percent for riparian buffers, and 50 percent for wetland restoration.
- Maintenance: Participants will receive $5 to $10 per acre for annual maintenance based upon the conservation practice installed.

Installation compensation:
- Cost-Share: Landowners will receive 50 percent cost sharing from USDA, plus 25 percent cost sharing from Oregon State to establish trees, shrubs, and other components necessary for CREP practices. This 75 percent cost-sharing potentially limits a participating landowner's out-of-pocket expenses in establishing the habitat.

Cumulative Impact Bonus:

- Landowners can earn a one-time bonus incentive of four times their average annual soil rental rate if they enroll at least 50 percent of a five-mile stretch of stream. Neighbors along a stream can join together to be eligible for this bonus.

Signup Incentive Payments:

- Signup Incentive Payment **(Not applicable to CP-23 Wetland Restoration)**
  $10 per acre per each full year of contract
  Example: ($10 X 15 years X 1 acre = $150)
  This is a one-time payment and became available June 21, 2000.

Practice Incentive Payment:

- Practice Incentive Payment (PIP) **(Not applicable to CP-23 Wetland Restoration)**
  40 percent of eligible costs. **Example: (Total eligible cost of putting in practice per acre is $800 X .40 = $320)** If cost of installation is zero, Practice Incentive Payment is zero.
  This is a one-time payment and became available June 21, 2000.

What types of items can I receive cost sharing assistance on?
Cost sharing is available for riparian plantings, fencing and providing livestock water through the habitat (such as with nose pumps). There are not-to-exceed cost share amount guidelines in place.

What will happen to the land in 10-15 years when the contract expires?

- CREP lands *might* be eligible for re-enrollment, if the program is extended, but you may enroll CREP lands into a permanent easement in the original contract.
- The CREP buffer may be retained and good stewardship of your land may be continued.
- Portions of the CREP buffer may be commercially harvested (following proper Forest Practices Act requirements).
- Portions of the CREP buffer may be converted back into agricultural use (following proper regulations such as the Endangered Species Act and Agricultural Water Quality Management Act).

Permission to Access Property - When an applicant enters into a CREP contract, does that give permission for any agency to enter their property? If not, other than NRCS and FSA, who else can enter the property without the owner's authorization?
No, by signing a contract this does not give the right for any agency to enter the property. Participating agencies would be the Oregon Department Forestry, to develop the Tree Plan, or a SWCD employee who helps the producer develop the Conservation Plan of Operation, and/or the Oregon Water Resources Department to perfect the Water Right Lease if a producer is applying for the irrigated rental rate. In no case, should an employee be on the property without calling first and setting up an appointment and/or stopping by the headquarters to facilitate the visit to the producer's property.

Other than the NRCS-038 form that is used for receiving authorized access when a "Yes" is entered on the AD-1026, is there any other provision that automatically allows others to access the property?
NO

How does the CREP gel with the Agricultural Water Quality Management Act **process in regard to purposes, legal protection, etc.?**
Agricultural Water Quality Management Act establishes a process for agriculture to address watershed conservation efforts and identify the condition, problems, priorities, and solutions to maintain or enhance the watershed conditions. CREP is one of the programs available for a producer to enhance the stream corridor on his property.

How can I get more information and sign up?
Check out the website at www.or.usda.gov/edso/or/or.htm, or contact your local SWCD, USDA NRCS office, or Farm Service Agency office. The contact information is located in Appendix A.

APPENDIX C: THE CONSERVATION PLANNING PROCESS

The USDA - NRCS has developed, and the Local Management Agency may choose to use the following nine-step process to develop a voluntary plan.

1. Identify Problems -- Identify resource problems, opportunities, and concerns in the planning area.

2. Determine Objectives -- Identify, agree on, and document the client's objectives.

3. Inventory Resources -- Inventory the natural resources and their condition, and the economic and social considerations. This includes on-site and related off-site conditions.

4. Analyze Resource Data -- Analyze the resource information gathered in planning step 3 to clearly define the natural resource conditions, along with economic and social issues. This includes problems and opportunities.

5. Formulate Alternatives -- Formulate alternatives that will achieve the client's objectives, solve natural resource problems, and take advantage of opportunities to improve or protect resource conditions.

6. Evaluate Alternatives -- Evaluate the alternatives to determine their effects in addressing the client's objectives and the natural resource problems and opportunities. Evaluate the projected effects on social, economic, and ecological concerns. Special attention must be given to those ecological values protected by law or Executive Order.

7. Make Decisions -- The client selects the alternative(s) and works with the planner to schedule conservation system and practice implementation. The planner prepares the necessary documentation.

8. Implement the Plan -- Implement the selected alternative(s). The planner provides encouragement to the client for continued implementation.

9. Evaluate Plan -- Evaluate the effectiveness of the plan as it is implemented and make adjustments as needed.

APPENDIX D: INSTRUCTIONS AND GUIDELINES FOR A VOLUNTARY PLAN

To comply with Agricultural Water Quality Management Act , a landowner/operator needs to ensure that no violations of the prevention and control measures outlined in the administrative rules OAR 603-095-1940 through 603-095-1960 occur on their property.

A landowner or operator is NOT required to have a Voluntary Water Quality Conservation Plan. The Local Management Agency (LMA) does, however, promote the conservation planning process as the best method for landowners to use to improve the health of their resources and ensure that they are addressing all pertinent prevention and control measures.

A landowner who develops a Voluntary Plan may choose to get it approved by the LMA. If the plan is approved by the LMA and is being followed according to its schedule, it provides the landowner or operator limited protection against immediate enforcement action from the ODA should a prevention and control measure be violated on their land. These instructions and guidelines define the elements that must be included in a Voluntary Plan in order for it to be approvable by the LMA.

The plan needs to address all of the prevention and control measures written in the Molalla-Pudding-French Prairie-North Santiam Subbasins Area Plan and provide an action strategy for the improvement of those resources that are a part of the landowner's management objectives. In order for it to provide limited protection against immediate enforcement action should a prevention and control measure be violated on their land, a completed signature page must accompany the plan. The signature page (sample included) must be signed by the landowner, the resource professional preparing the plan, and/or a representative of the LMA.

Landowners with a Voluntary Plan that was approved prior to the development of this Area Plan are encouraged to have it reviewed and modified as necessary to ensure that it meets the prevention and control measures.

The specific requirements of approvable Voluntary Plans and details of the approval steps are indicated in OAR 603-095-1960. Following is an example outline of the contents of a plan.

Instructions:

1. Cover Page
   List the landowner's name and address, location of the property described in the plan; the name, address, title and phone number of the person completing the plan; and the date the plan is completed.

2. Table of contents

3. Landowner objectives

4. Physical site description

5. Map
   A map or maps at 8" = 1 mile or larger scale showing:
   - Legend
   - Property boundary
   - Soil types
   - Field divisions and numbers
   - Streams / ponds
   - 303(d) listed stream segments highlighted

6. Field Inventory Data
   - Soil types
   - Acres
   - Erosion estimates

- Crops / land use / rotations
- Livestock enterprises
- Forage inventories
- Fertilizer / pesticide information

7. Conservation Practices

Provide a narrative that describes how each Prevention and Control Measure (PCM) is being addressed on the property. List the Conservation Practices that are currently being implemented or will be in the future to address the PCMs. For the plan to be approved, practices must meet the NRCS technical guidelines. Include practice specifications (if applicable) and operation and maintenance requirements.

8. Schedule

Schedule for the implementation of the Conservation Practices outlined in the plan.

9. Other information

Photos, soil tests, alternatives, or supporting data.

10. Signature Page (Included)

For additional guidance in developing a Voluntary Plan, an example template and plan is available from the Marion Soil and Water Conservation District.

APPENDIX E: DESCRIPTION OF HEALTHY RIPARIAN MANAGEMENT

Healthy riparian areas exist where vegetation, landform, large wood, and other physical components and processes are adequate to:

- protect water quality;
- filter sediment and other pollutants and capture bedload materials;
- develop root masses and large wood accumulations that develop channel form and habitat;
- develop diverse ponding and channel characteristics to provide the habitat and water depth, duration and temperature necessary for fish and wildlife production and other uses; and
- support biodiversity

Where a floodplain exists, riparian areas also provide additional benefits associated with floodplain functions, including:

- aiding development of floodplain structural diversity;
- dissipating stream energy associated with high waterflows, thereby reducing erosion; and
- enhancing ground water recharge and streamflows

The Riparian Management Area is a vegetated area created by active establishment or natural regeneration. It meets or is in the process of building the main riparian or stream area functions according to the conditions of the landscape as described above. The Riparian Management Area Prevention and Control Measure applies to perennial and intermittent streams.

The riparian area serves many functions. Specific functions related to water quality issues are shade (temperature), surface runoff, subsurface runoff, and stream bank stability. These functions will address water quality issues on the federal Clean Water Act 303 (d) list (also referred to as the Water Quality Limited list for those streams that have violations of one or more water quality standards) for streams in the plan area.

The riparian functions are partially achieved by vegetation on the stream bank and to an area extending out from "top of stream bank." The width of the vegetation will be site specific to the stream and to the location on the landscape. Streams located with upland sloping to the stream will require wider vegetation for filtering than valley streams with natural levees that provide slope away from the stream. Valley streams may require wider vegetation for subsurface filtering than upland streams. Stream bank stability will vary with stream slope, which is directly related to stream velocity.

The type of vegetation will vary with the identified function or functions. Type of vegetation will match site conditions, such as soils, hydrology and stream size. To achieve shade on a large stream, trees will be required. On small streams shrubs can achieve the same shade function. Well-drained soils will support fir trees while wet soils may require ash or willow trees.

Resource Management Area

The area rules require that the Riparian Management Area be managed or allowed to meet the functions for the site condition. These functions include shade, filtering, and streambank stability, and can include others depending on the landowner/operator needs and goals. To meet the functions, vegetation is a requirement. If agricultural activities are practiced in the Riparian Management Area, the area rules require that the activities allow natural vegetation growth.

Livestock Grazing Example[3]

A stream runs through an agricultural property. The stream's average width is 15-20 feet. It floods over its banks on average once every one to two years.

Management Goals: Manage the riparian area to improve habitat and water quality for salmon, while continuing to graze livestock in the remaining pastures.

Riparian Assessment: The riparian area is managed as a mixture of grasses with patches of mature willows and alders. It is capable of supporting a mixture of conifers (such as spruce, grand fir, and western red cedar) and hardwoods (such as alder, Oregon White ash, and big leaf maple). A thin band of willows could grow next to the stream.

Management Change: The landowners will set aside a 25-foot-wide area next to the stream as a riparian management area. They will plant patches of hardwoods and conifers in this area and a thin band of willows next to the stream. Some tree species and grass species will seed into the area naturally.

Protecting the Investment: The landowners will install a fence and off-stream watering sources to ensure the trees are not grazed and the stream bank is not disturbed. To prevent brush from overtopping desired trees, they also will remove or trim competing brush until trees are above brush height.

Cropland Example
All of the factors in the Livestock Grazing would apply except fencing would not be required.

Special Considerations: The application of pesticides and fertilizers must be managed to stay on the field area. Special care is needed applying pesticides to avoid drift into the Riparian Management Area. Fertilizer application should be applied according to soil tests and with split applications to maximize nutrients being tied to the soil and plant roots. Fertilizer applications should be done when expected rainfall will not wash the nutrients into the Riparian Management Area or stream. Pesticide and fertilizer applications near Riparian Management Areas should be done in the winter months only when absolutely necessary.

[3]Adopted from: Godwin, Derek. (1999). *Life on the Edge: Improving Riparian Protection.* EM 8738 Oregon State University Extension Service

APPENDIX F: EROSION VISUAL INDICATORS AND MEASUREMENT

The goal of the Erosion Prevention and Sediment Control Measure referred to in this plan is to control soil erosion and minimize eroded soil access to waterways. A landowner/operator can determine the amount of potential soil that has access to a waterway using the visual indicators of sheet and rill erosion together with the deposition of the sediment of the eroded soil. The landowner/operator can measure the visual erosion in tons per acre. Sediment deposition from this erosion can also be measured. Subtracting this from the total erosion gives an approximation of how much sediment left the field and potentially entered a nearby waterway

Sheet Erosion rate can be measured in the field by pedestal measurement or root measurement. Pedestals represent the soil particles protected from raindrops by rock, straw, roots, or other material that can withstand the impact of raindrops. Measure the depth of the pedestal from the top of the pedestal, where erosion did not take place, to the soil level immediately around it where soil was eroded away. Root measurement can be performed by inspecting plants in a field to determine how much of the plant roots had been previously covered with soil. The white portion of the roots represents the area previously covered by soil. Measure the depth of the white area, from the top of the white area to the soil level. In each case, the depth is determined and then multiplied by 43,460 square feet (1 acre) to determine cubic feet of soil eroded. The cubic feet is multiplied by 90 pounds per cubic foot and then divided by 2,000 pounds to provide the erosion rate in tons per acre (Table 7).

Rill Erosion rate can be measured in the field by using 20-foot transects across the field, and measuring the width and depth of each rill within the transect to get a field average cross-section of soil lost by rill erosion. The cross-section is the width and depth of the rills. The width multiplied by the depth multiplied by the length of the rills will give the volume. To avoid conversion of cubic inches to cubic feet, measure the rills in feet and tenths of feet. The volume will be converted to tons per acre as in sheet erosion (Table 7).

Sediment deposition can be measured by the average end area method. This method is difficult to explain here. Generally, it is a scientifically accepted way to measure how much soil has been deposited at the base or low point of some area, such as a farm field. Consult a Civil Engineering reference book or textbook for methodology of computing average end area, or contact a local expert. Subtracting the result from the pedestal, white root, or sheet soil erosion estimates will provide an estimate of how much soil left the field and potentially entered into any nearby waterway.

Anyone wishing assistance in erosion measurement and estimation can contact the local SWCD, NRCS or OSU Extension Service.

Table 7: Soil Erosion Estimation Methods

Example of Pedestal or Root Method to Estimate Sheet Erosion

Average pedestal or white root depth in a field _ 0.50 inches _ 0.04 feet
0.04 ft x 43,460 ft^2 = 1,738.40 ft^3 of soil lost per acre
1,738.40 ft^3 x 90 lbs/ft^3 = 156,456 lbs of soil/acre
156,456 ÷ 2000 lbs/ton _ 78.05 tons of soil lost per acre

For a 10-acre field, this would equal 780.5 tons of eroded soil
For a 100-acre field, this would equal 7,805 tons of eroded soil
(assuming a constant soil erosion rate over the entire field)

Example of Method to Estimate Rill Erosion

Average rill depth _ .75 inches _ 0.06 feet
Average rill width _ .50 inches _ 0.04 feet
Total rill length _ 10,000 feet
0.06 ft x 0.04 ft x 10,000 ft _ 24 ft^3
24 ft^3 x 90 lbs/ft^3 = 2,160 lbs soil/acre
2,160 lbs soil/acre ÷ 2000 lbs/ton _ 1.08 tons of soil lost per acre

Key:

≈ means "approximately equals"
ft^2 means "square feet"
ft^3 means "cubic feet"
lbs means "pounds"

APPENDIX G: ORS 468B.025 AND 468B.050 – OREGON WATER POLLUTION CONTROL LAW

486B.025 Prevention of Pollution
(1) Except as provided in ORS 468B.740, no person shall:
(a) Cause pollution of any waters of the state or place or cause to be placed any wastes in a location where such wastes are likely to escape or be carried into the waters of the state by any means.
(b) Discharge any wastes into the waters of the state if the discharge reduces the quality of such waters below the water quality standards established by rule for such waters by the Environmental Quality Commission.
(2) No person shall violate the conditions of any waste discharge permit issued under ORS 468B.050.
(3) Violation of subsection (1) or (2) of this section is a public nuisance.

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

468B.050 When Permit Required.
(1) Except as provided in ORS 468B.053 or 468B.215, without first obtaining a permit from the Director of the Department of Environmental Quality, which permit shall specify applicable effluent limitations, no person shall:
(a) Discharge any wastes into the waters of the state from any industrial or commercial establishment or activity or any disposal system.
(b) Construct, install, modify or operate any disposal system or part thereof or any extension or addition thereto.
(c) Increase in volume or strength any wastes in excess of the permissive discharges specified under an existing permit.
(d) Construct, install, operate or conduct any industrial, commercial, CAFO or other establishment or activity or any extension or modification thereof or addition thereto, the operation or conduct of which would cause an increase in the discharge of wastes into the waters of the state or which would otherwise alter the physical, chemical or biological properties of any waters of the state in any manner not already lawfully authorized.
(e) Construct or use any new outlet for the discharge of any wastes into the waters of the state.
(2) As used in this section, "confined animal feeding operation" has the meaning given in ORS 468B.205.
[Formerly 449.083 and then 468.740; 1997 c.286 s.6]

APPENDIX H: WILLAMETTE RIVER BASIN WATER QUALITY STUDY

Phase II

Non-Point Source Pollution in the Pudding River Subbasin of the Willamette River

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EXECUTIVE SUMMARY

Nonpoint sources (NPS) of pollution were identified as important contributors to water quality degradation of the Willamette River in Phase I of the Willamette River Basin Water Quality Study, which was completed in 1993. However, there was an acute scarcity of water quality data within the basin, particularly during periods of high discharge, which typically account for the majority of NPS contributions to river systems. This data deficiency precluded rigorous quantification of NPS loads in specific components of the basin, and also prevented Willamette River Study scientists from assigning NPS contributions to the various land uses that are prevalent within the basin. Phase II of the study was designed, in part, to correct this deficiency, and the results of the Phase II activities are described herein.

The NPS screening model that was applied in Phase I indicated that the Pudding River Subbasin contributed some of the greatest loads of total suspended solids (TSS), total phosphorus (TP), and nitrogen (N) on an area-weighted basis in the Willamette River Basin. The Pudding River Subbasin has a high percentage of agricultural land use, and is currently being studied by the U.S. Geological Survey as part of their NAWQA study of the Willamette River Basin. This sub-basin was therefore selected for intensive monitoring and NPS modeling in Phase II.

The principal objectives of the Phase II study were to characterize the effects on water quality of specific land use types and land use intensities within the basin, and to use this information to estimate NPS loads at the watershed and subbasin levels. Four sites within three watersheds were selected for study within the Pudding River system: one intensive agricultural site on Zollner Creek; two low-intensity agricultural sites on Beaver Creek; and a forested site on Silver Creek. A fifth site was located downstream at the Pudding River at Aurora to assess total loadings for the subbasin. Land use, soils, and hydrologic features were characterized at 1:24, 000 scale in the three study watersheds and at a coarser scale (1:100,000) for the subbasin.

The water quality monitoring involved sampling water quality during baseflow and stormflow at five primary sites and over 25 supplemental sites. Each of the primary sites was sampled five times during baseflow and 10 to 14 times during each of five storms during the period from October 1994 to February 1995.

Results from the water quality monitoring showed that there was a strong relationship between water quality and land use activities within the watersheds. Water quality in the forested site was generally excellent, although some elevated loads of TSS were measured, particularly during the first major storm in the fall. The water quality at the two low-intensity agricultural sites on Beaver Creek showed higher concentrations of TSS, TP, nitrates (NO_3), and major ions than the forested site. However, the predominant crop in the Beaver Creek watershed, grass seed, promotes adequate vegetable cover during high flow periods, resulting in only modest increases in pollutant loads above those measured in the forested watershed. The greatest concentrations and loads of NPS pollutants were generated by the high-intensity agricultural watershed. Concentrations of TSS, TP, NO_3, NH_4, major ions, and coliform bacteria in Zollner Creek were all indicative of highly polluted water. Concentrations of TSS, TP, and total Kjeldahl nitrogen in Zollner increased with increasing runoff and generally reached maximum

concentrations just prior to maximum streamflow. Concentrations of NO_3 increased dramatically during the first storm and continued to increase as the stormflow receded, ultimately reaching a maximum of 27 mg/L (as NO_3-N). Nitrate concentrations in Zollner Creek were often well above the drinking water standard (10 mg/L). Nitrate in subsequent storms was diluted by the surface runoff, but increased again during decreasing stream flow. The observed dynamics of NO_3 in Zollner Creek indicated that most of the NO_3 was derived from accumulations in the deep soils (below the rooting zone) and was gradually flushed from the groundwater during hydrologic flows resulting from storm events. Water quality in the Pudding River integrated inputs from the diverse watersheds in the subbasin resulting in runoff of intermediate quality.

The water quality data collected in this study were used to calibrate NPS models based on the modified universal soil loss equation (MUSLE) and spatial characteristics of the watershed (land use, soils, hydrography) using a geographic information system (GIS) framework. The water quality was modeled on a time step equivalent to the duration of a storm, typically about 100 hours. Pollutant loads in most storms were well represented by the model. The greatest calibration problem was associated with the first major storm in October in which measured runoff was far less than predicted runoff and the concentrations of some NPS pollutants were underpredicted. The former was caused by the inability of the model to reflect the extremely high moisture deficit of the soils associated with the dry summer and early fall. The calibration process revealed that the intensity of agricultural practices was more important than general land use categories in assigning pollutant loading coefficients. For example, the pollutant load associated with runoff from grass seed farms appeared to be substantially less than runoff from more intensively cultivated wheat and grain crops. However, grain crops and grass seed fields appear similar on the aerial photographs typically used to characterize land use. The NPS modeling in the agricultural watershed was difficult, in part because of extensive modifications to surface and sub-surface hydrology associated with ditches and tile drains.

The modeling activity was conducted for the entire Pudding River subbasin using more generalized data inputs for land use, soils, and watershed features. The subbasin model results for the Pudding River showed moderate agreement with measured values for individual storms. For all storms combined, however, the model results were in reasonable agreement, with measured values differing by 20 percent, 14 percent, and 46 percent for total suspended solids ,TP, and Nitrate (NO_3) respectively.

The monitoring and modeling activities conducted within this study demonstrated that NPS pollution seriously impairs water quality in portions of the Willamette Valley. Among the more intensive agricultural watersheds, water quality problems include high-suspended solids, high nutrients, bacterial contamination, and a complete alteration of the major ion chemistry. Additionally, very high concentrations of NO_3 measured in stormflow downstream from intensive agriculture strongly suggest that aquifers in some areas of the valley are receiving excessive loads of NO_3 that may lead to groundwater pollution problems.