

City of Creswell

Total Maximum Daily Load (TMDL) Implementation Plan

Resolution 2008-05

March 10, 2008



Table of Contents

Section One – Introduction 1

Section Two – Background 2

Section Three – Water Resource Assets and Gaps 16

Section Four – Implementation Strategies 18

Section Five – Regional Opportunities 30

Appendix One: TMDL Gaps Analysis Worksheet i

Appendix Two: TMDL Implementation Strategies Examples vi

Section One – Introduction

This document is the total maximum daily load (TMDL) Implementation Plan for the City of Creswell. This Plan describes the strategies that the City will implement to reduce temperature, bacteria, and mercury pollution in the Coast Fork subbasin of the Willamette River. Implementation Plans from designated management agencies (DMAs), such as the City of Creswell, are required to comply with the Willamette Basin TMDL order and to help meet pollutant load allocations for the Coast Fork subbasin as approved by the US Environmental Protection Agency (EPA) in September 2006.

This plan is organized into five sections. This first section introduces the Plan followed by the second section which gives a brief overview of the TMDL program, describes each of the three major pollutants addressed in the Willamette Basin TMDL (Temperature, Bacteria, and Mercury), and explains the region's water resources, land use, and important issues related to water quality. This section also includes a description of how the public has been involved in this planning effort. Section three provides an overview of the City of Creswell, explains what Creswell is currently doing to address water quality issues, and points out where gaps exist in addressing TMDL parameters. Section four is the "core" of this Implementation Plan and portrays what the City plans to do to address TMDL issues. The matrix included in this section clearly displays when and how strategies will be implemented. This section also identifies how effective implementation will be measured. The final section identifies and outlines opportunities within the Willamette Headwaters region to join efforts with other jurisdictions in working to reach water quality goals.

The overarching goal of this Implementation Plan is to minimize or, wherever possible, eliminate heat, bacteria, and mercury contributions to surface waters within the jurisdictional control of the City of Creswell. Through a multi-faceted approach of incentives, land use mechanisms, public operations, partnerships, and education this plan targets specific sources of contamination within the city's jurisdiction.

Section Two – Background

The Willamette River is a very important commercial, municipal, cultural, recreational, ecological, and aesthetic asset. Working to preserve and maintain water quality will ensure prosperity, productivity, and quality of life for the entire Willamette region now and in the future. Water quality in the headwaters region is especially vital in maintaining the functionality of this versatile river system.

The mighty Willamette spawns from humble beginnings. In the southernmost part of the Willamette Basin, upland forest streams begin as mere spring-fed rivulets, snowmelt drainages, or small mountain lakes. These watercourses join with other small streams and flow into major tributaries; the Mohawk, McKenzie, Middle Fork Willamette, Row, Coast Fork Willamette, and Long Tom Rivers. These rivers comprise the headwaters of the Willamette River as it proceeds to flow northward 186 miles to the Columbia and then to the Pacific Ocean. The City of Creswell lies just west of the Coast Fork Willamette River.

On its way to the Columbia River, the Willamette passes the state's three largest cities and nearly 2 million people (DEQ, 2004). In the next 45 years, an additional 1.7 million people are expected to be living on the land adjacent to the Willamette River and its tributaries (Sinclair, 2005). Current and future generations of Oregonians depend on the Willamette and its tributaries to provide water for drinking, industrial uses, sanitary functions, recreation, aesthetic enjoyment, fish and wildlife habitat, and many other purposes.

Functional water resources are essential to protecting the future health and prosperity of the Willamette Valley. The Oregon Department of Environmental Quality (DEQ) has set water quality standards for the waterways in the region to protect beneficial uses such as drinking, fishing, swimming, fish spawning, and irrigation. Streams, lakes, and rivers that do not meet these standards are included in the statewide 303(d) list of impaired waterbodies.

Overview of TMDL Requirements

The Clean Water Act of 1977 “authorizes the U.S. Environmental Protection Agency (EPA) to ‘restore and maintain the physical, chemical, and biological integrity of all waters of the nation’” (DEQ, 2004). In response to the Clean Water Act, the EPA designated state agencies to develop water quality standards, perform water quality monitoring to understand current conditions, determine sources of pollution, and develop TMDLs as a tool to improve water quality. As a component of the overall effort to protect and restore the beneficial uses of Oregon's waterbodies, the DEQ issued TMDLs for the entire Willamette Basin.

The TMDL process begins when a stream, lake, or river does not meet water quality standards and is classified as water quality-limited on the state's 303(d) list. TMDLs identify the maximum amount of a specific pollutant that can be present in a water body

without violating water quality standards. This is known as the loading capacity. After extensive water quality monitoring and modeling efforts, TMDLs establish the difference between the loading capacity and the current pollutant load. TMDLs are expressed as numeric standards or percent pollutant reductions that need to be met to bring water bodies into compliance with water quality standards. The difference between the current load and the loading capacity is known as excess load (DEQ, 2004)

The excess load is split up between the different sources of pollution according to their contribution to the overall pollution load. Any difference between the waterway's loading capacity and the current pollutant load must be mitigated by pollution reduction activities. The DEQ develops wasteload allocations for point sources such as wastewater treatment plants and industrial discharges. They develop load allocations for non-point pollution from agricultural, urban, and forestry lands such as erosion, animal wastes, and stormwater.

The Oregon Administrative Rule (OAR 340-042-0080) that addresses TMDLs requires local governments and other agencies to develop TMDL Implementation Plans. Responsible parties that are able to implement pollution reduction strategies are classified as Designated Management Agencies (DMAs). In the Willamette Basin, DMAs include federal agencies such as the Bureau of Land Management, state agencies such as the Department of Forestry and the Department of Agriculture, counties, cities, and others. According to the OARs, TMDL Implementation Plans must include the following five elements:

1. Management strategies that will be used to achieve load allocations
2. A timeline and schedule to achieve measurable milestones
3. A plan for periodic review and revision of the implementation plan
4. Evidence of compliance with applicable statewide land use requirements
5. Any other analyses or information as specified in the Water Quality Management Plan

In the Willamette Basin, DMAs are to develop and submit these plans to the DEQ within 18 months after the release of the final TMDLs. On September 21, 2006, the Willamette Basin TMDL was issued as an order by the DEQ. TMDL Implementation Plans are due on April 1, 2008.

The Oregon Department of Agriculture (ODA) is working with farmers to address contributions from farmland, the Oregon Department of Forestry is addressing contributions from forestland, and federal land management agencies are implementing TMDLs according to their internal procedures. Point sources, such as wastewater treatment facilities will be addressed through their individual permitting processes.

Cities and counties must address contributions through the development of Implementation Plans.

The Lane County portion of the Willamette River Basin includes the McKenzie, Middle Fork, Coast Fork subbasins and the southern portion of the Upper Willamette subbasin. Within this headwaters region, there are eleven local government DMAs including Lane County and ten cities. This document is the Implementation Plan for the City of Creswell which lies within the Coast Fork subbasin.

TMDL Parameters

Temperature, bacteria, and mercury are the three parameters that have been included in all of the Willamette Basin TMDLs. Although other parameters are included in subbasin TMDLs, these three pollutants are the major concerns throughout the entire Willamette Basin.

Following are brief summaries of these three TMDL parameters, but more in-depth information on these parameters and the processes used to develop the TMDLs can be found in Chapters 2, 3, and 4 of the *Willamette Basin TMDL* (DEQ, 2006). The summaries below include basic information about the characteristics of the parameter, the potential sources of each pollutant, waterways in the region not meeting water quality standards, and a brief list of potential strategies to address each parameter.

Temperature

The temperature problem in the Willamette Basin is that the water is too warm at certain times of year and poses a threat to cold water fish species such as salmon. This is known as thermal pollution. Removal or disturbance of streamside vegetation is the primary activity that negatively impacts stream temperature due to the loss of shade cover, but water temperature is also affected by erosion, loss of channel complexity, low streamflows, dams, and heated discharges from industrial or municipal operations.

The major sources of thermal pollution that the DEQ evaluated for the Willamette Basin temperature TMDLs are wastewater treatment facilities, dam and reservoir operations, and the loss of streamside vegetation. Point sources will continue to be regulated through the existing National Pollution Discharge Elimination System (NPDES) permit methods. Sewage treatment plants, as well as large industrial permitted discharges, will be allocated heat loads during the next renewal of their NPDES permits.

The focus of the non-point source temperature TMDL is to mitigate the removal or disturbance of streamside vegetation. The most effective way to minimize thermal pollution is by reducing the amount of solar radiation that reaches the water. This is accomplished by protecting and reestablishing vegetation along waterways to provide shade cover. Temperature benefits can also be realized through stream restoration projects including streambank stabilization, increasing stream flows, decreasing channel width, and restoring channel complexity.

Temperature TMDLs have been developed for the Willamette subbasins and mainstem Willamette River within Lane County. The DEQ used two different approaches in developing the temperature TMDLs. One TMDL focuses on the mainstem Willamette River and its major tributaries up to the first dam. Using the other approach, the DEQ developed TMDLs on a more localized scale for stream segments upriver from dams.

There are 46 stream segments, nearly 380 miles of waterways (DEQ, 2002), listed as impaired for temperature in the Lane County portion of the Willamette Basin. Stream segments considered as a part of the Mainstem Willamette temperature TMDL in Lane County are the Mckenzie River, Middle Fork, Fall Creek, Row River, Blue River, Coast Fork, and the Long Tom River up to the lowest reservoir on each river. All other 303(d) listed stream segments are assessed through sub-basin TMDLs. The City of Creswell lies adjacent to the Coast Fork and is below the first dam.

The maximum temperature increase in the waters of the state from all human activities can be no more than 0.3 degrees C. This was designated by the State of Oregon in Oregon Administrative Rule 340-041-0028. In the TMDLs, this allowance is known as the Human Use Allowance and is split up between various sources of human-caused thermal pollution. Models indicate that restoring shade cover to natural levels could reduce temperatures in the mainstem Willamette River by 0.7 degrees Celsius (DEQ, 2006).

The amount allocated to each source of thermal pollution varies by location, but, generally, non-point sources are allowed to contribute no more than 0.05 degrees C, point sources can contribute up to .25 degrees C, and the TMDL allocates 0.0 degrees C to the U.S. Army Corps of Engineers Willamette Project reservoirs. The DEQ factors in .05 degrees as a reserve capacity that will be set aside now to accommodate future growth by meeting the increased demand for industrial and municipal wastewater discharges. On average, waterways in the Willamette Basin need to receive 23 percent less thermal input than is currently being received (DEQ, 2004).

The major implication of the temperature TMDLs is the protection and restoration of streamside vegetation. Examples of options to address thermal pollution include mechanisms such as:

- Develop materials that explain why landowners should preserve natural streamside vegetation
- Implement demonstration projects on public land to illustrate potential riparian management techniques
- Institute a riparian ordinance that prohibits the removal of native streamside vegetation
- Acquire critical streamside property
- Become involved in a water quality trading program
- Actively restore riparian areas on public land and help private property owners restore riparian areas on private land

Bacteria

The Coast Fork was listed on the 1996, 1998, and 2002 list, and there continue to be reductions in the bacteria concentration in this waterway indicating that jurisdictions and landowners in this subbasin are making improvements.

Even though the Coast Fork has improving bacteria levels, the DEQ has set planning targets for DMAs in order to prevent the degradation of water quality. Chapter Two of the Willamette Basin TMDL, states that, "In subbasins with no listings, generalized reductions will be used as planning targets by designated management agencies" (DEQ, 2006). The bacteria targets are generalized into percent reduction ranges that are applied in all the subbasins of the Willamette Basin. These planning targets have been allocated among the two major land uses that contribute bacteria to waterways; agricultural and urban. The Willamette Basin Bacteria TMDL states that urban areas must reduce their bacteria contributions by 80-94% to meet water quality standards.

According to the Willamette Basin TMDL, point sources in the upper reaches of the Willamette Basin cause less than a one percent increase in the bacteria concentrations over natural conditions (DEQ, 2006), so the focus of the TMDL implementation efforts should be on non-point sources. Models indicate that if these allocations are met within each subbasin, the entire upper reach of the mainstem Willamette River will be in compliance with water quality standards.

Seventy percent of the flow in the upper reach of the Willamette is from the Coast Fork, Middle Fork, McKenzie, and North and South Santiam Rivers (DEQ, 2004). These rivers effectively dilute bacterial concentrations from other tributaries in the mainstem of the Willamette River. It is important to maintain low bacteria levels in the headwaters region to preserve the ability of the Willamette River to meet water quality standards.

Bacteria violations of water quality standards are most common in creeks and streams that drain urban and agricultural land. The mainstem Willamette River is water quality limited for bacteria during the high flows of the fall-winter-spring months, but is in compliance during summer low flows when there is the least amount of runoff. Above Willamette Falls, violations in the bacteria standards are usually single sample events that are related to high levels of precipitation and the resulting runoff.

The major sources of bacteria in the urban and rural residential areas are stormwater runoff, erosion, domestic and wild animal waste, failing septic systems, and municipal sewer overflows. Other sources of bacteria include livestock, irrigation runoff, and streambank erosion.

Local jurisdictions can focus on urban issues to ensure that the quality of water does not degrade due to current land use, population growth, and land use changes. Strategy options to address bacteria in the urban area include:

- Preventing erosion and controlling sediment from new construction
- Detaining and treating stormwater prior to discharge into waterways
- Keeping stormwater conveyance channels clear of organic matter

- Controlling animal waste
- Maintaining and restoring riparian buffers
- Encouraging better site design to decrease runoff
- Preventing non-stormwater and illegal discharges
- Developing stewardship and educational programs to prevent pollution
- Street sweeping

Mercury

Mercury is a very complex pollutant. The way it acts in nature and the different forms it takes make it difficult to understand and accurately monitor. With no regard to local, state, or even international boundaries, mercury can be transported in the air after soil disturbance, automobile emissions, and industrial emissions across many miles and deposited by rainfall. Air deposition from emissions is one of many ways that mercury moves through the environment. Some point sources, including timber processing plants and mills, discharge low levels of mercury in their wastewater effluent. Stormwater runoff suspends mercury molecules and carries them to waterways. Mercury is naturally occurring at low levels, but when native soil erodes at an accelerated rate those molecules are released in abnormal amounts. Mercury is also set in motion when sediment that has been deposited long ago is re-suspended due to high flows or a significant disturbance.

High mercury levels in the Willamette Basin have resulted in fish consumption advisories. To protect public health, especially that of pregnant women and young children, the Department of Human Services (DHS) has issued advisories recommending that people limit the amount of fish they consume from certain waterways. The DHS specifically advises against consuming large amounts of fish from the Willamette River, Coast Fork Willamette River, Dorena Reservoir, and Cottage Grove Reservoir due to the high levels of mercury.

In the upper reaches of the Coast Fork subbasin, legacy mines were thought to be a large contributor of mercury pollution. Monitoring shows that mines are a significant source in the Cottage Grove area, but results from the Dorena Lake area show that there are many other sources of mercury. According to the TMDL, mines contribute 0.0% of the mercury load in the Dorena area and runoff from air deposition contributes 79.4% of total mercury loads. In the Cottage Grove area, however, mines contribute 75.2% and runoff from air deposition contributes 19%. These findings not only indicate that the Coast Fork subbasin is facing a unique challenge with the legacy mines in the Cottage Grove area, but also that the rest of the Lane County portion of the Willamette Basin needs to address mercury-laden runoff and erosion of native soils. The table below outlines the sources of mercury and percent reductions needed to achieve water quality standards for the Willamette Basin, Dorena Lake, and Cottage Grove Lake.

Table 1: Willamette Basin Mercury TMDL Sources and Reductions Needed

Pollutant	Sources	Reductions
Mercury	Willamette Basin* <ul style="list-style-type: none"> ▪ Erosion of native soil (47.8%) ▪ Atmospheric deposition and runoff, including stormwater (47.7%) ▪ Point sources (3.9%) ▪ Legacy mines (0.6%) ▪ Low levels are naturally occurring 	Willamette Basin: 26.4% (128.5 kg/year)
	Dorena Lake <ul style="list-style-type: none"> ▪ Atmospheric deposition and runoff (31.1%) ▪ Erosion from disturbed forest land (68.9%) 	Dorena Lake: 29.8% (2.08 kg/year)
	Cottage Grove Lake <ul style="list-style-type: none"> ▪ Mines (74.4%) ▪ Atmospheric deposition and runoff (8.0%) ▪ Erosion from disturbed forest land (17.6%) 	Cottage Grove: 67.8% (3.13 kg/year)

* Annual mean estimate. Mercury load contributions change significantly during winter high flows. During high winter flows, 69.2% of the load is from sediment re-suspension, 0.2% from mines, 1.2% from point sources, 14.7% from erosion, and 14.7% from air deposition.

Source: Department of Environmental Quality, Willamette Basin TMDLs, 2006

Despite the uncertainty and complex nature of mercury, there are steps that can be taken to minimize the amount of mercury that is deposited in waterways and accumulated in the tissues of fish, wildlife, and humans. The goal of the mercury TMDL is “to reduce mercury levels in the basin to a point where fish are no longer unsafe to eat” (DEQ, 2006).

To begin addressing the mercury problem in the Willamette Basin, the DEQ has developed interim allocations for point sources and non-point sources while they conduct more in-depth research. Instead of specific allocations, the DEQ calculates the interim mercury TMDLs based on two categories: non-point and point sectors. The DEQ expects all non-point sources to begin implementing mercury reduction management strategies and policies. The TMDL will be revised in the future to be more specific according to the results of further research.

Implementation plans must include a mercury reduction strategy “that includes feasible measures to minimize mercury runoff” (DEQ, 2006). DMAs have an array of options to reduce mercury pollution. Many of the management strategies that address mercury pollution also address bacteria and temperature. Potential management strategies include:

- Working with dentist offices to properly dispose of mercury wastes
- Establishing a stormwater plan with water quality protection components
- Stormwater detention and treatment prior to discharge into waterways
- Establishing an erosion prevention and sediment control program
- Regular street sweeping and stormwater system maintenance
- Limiting land disturbance whenever possible

Summary

The table below summarizes the parameters addressed in the Willamette Basin TMDL, the major sources of that pollutant, and reductions needed to meet water quality standards.

Table 2: Willamette Basin TMDL Parameters, Sources and Reductions Needed

Parameters	Sources	Reductions
Temperature	▪ Streamside vegetation removal	Willamette Basin: Varies
	▪ Wastewater discharge	
	▪ Industrial point sources	
	▪ Channel modification	
	▪ Water extraction	
	▪ Disruption of seasonal cooling and warming patterns	
	▪ Dam and reservoir operations	
Bacteria	▪ Stormwater discharge	Urban: 80 - 94%
	▪ Construction site erosion and runoff	
	▪ Failing septic systems	
	▪ Illegal discharges	Agricultural: 66 – 83%
	▪ Wastewater treatment plants and other point source treatment failures	
	▪ Sewer overflows during wet weather	
	▪ Surface runoff	
▪ Animal wastes		
Mercury	▪ Erosion from urban, farm, and forest land	Willamette Basin: 26.4%
	▪ Construction site erosion and runoff	
	▪ Atmospheric deposition and runoff, including stormwater	
	▪ Other (dentist offices, fluorescent light bulbs, etc.)	Dorena Lake: 29.8%
	▪ Point sources	
	▪ Legacy mines	Cottage Grove: 67.8%
	▪ Naturally occurring	
▪ Mines		

Source: Department of Environmental Quality, Willamette Basin TMDLs, 2006

Headwaters Region of the Willamette Basin

The Lane County portion of the Willamette Basin could be considered the Headwaters region of the entire Basin because it forms the southernmost, furthest upstream area of the Basin. There are four subbasins within the Headwaters region; Upper, Middle Fork, McKenzie, and Coast Fork. Understanding the characteristics and unique issues in the Coast Fork subbasin as well as the other subbasins assists in coordinating efforts and identifying opportunities for the region as a whole.

The area encompasses 3,769 square miles and is home to approximately 300,000 people. There are eight incorporated cities outside the Eugene-Springfield metropolitan area in the Lane County portion of the Basin. There are approximately 27,660 people living in these urban incorporated areas (PSU Population Research Center, 2004) and

56,733 rural residents living in unincorporated areas outside Urban Growth Boundaries (Lane Council of Governments, 2000).

The McKenzie, Middle Fork Willamette, Coast Fork Willamette, and the Upper Willamette subbasins contain thousands of waterways, the quality of which is impacted by adjacent land uses. There are many different types of waterways in this region including a network of higher elevation rushing forest streams, channelized urban stormwater conduits, agricultural irrigation ditches, rural roadside ditches, mid-sized tributary rivers, and the beginnings of the broad, meandering Willamette River. The surrounding land uses are also very diverse. Table 1.3 shows the land area for each of the subbasins.

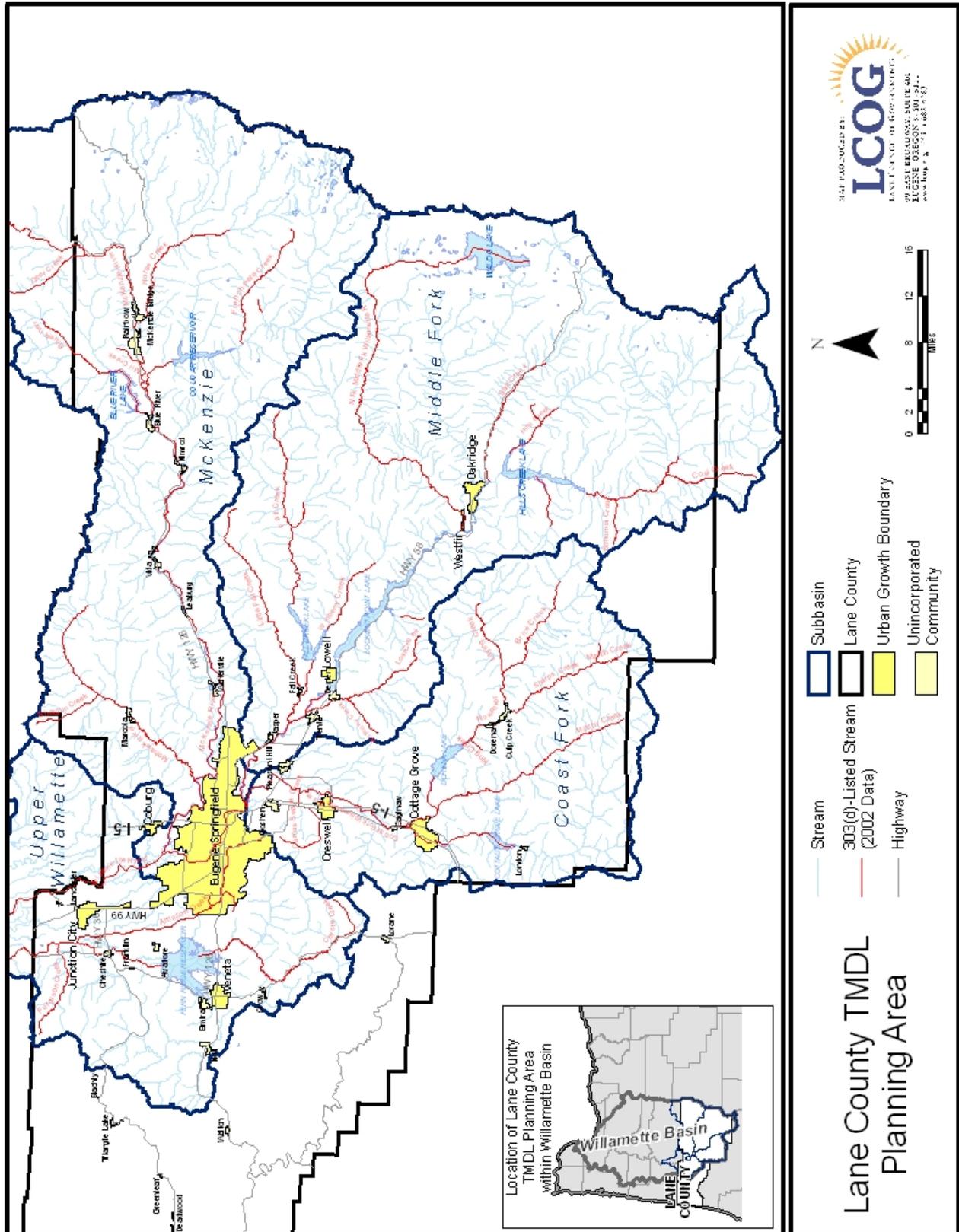
Table 3: Subbasin Land Area in Lane County

Subbasin	Area (square miles)
Coast Fork	666
Middle Fork	1,355
McKenzie	1,338
Long Tom portion of the Upper Willamette	410 (includes some land outside Lane County)
<i>Total</i>	<i>3,769</i>

Source: Willamette Basin TMDL Chapters 10,11,12,13 and Long Tom Watershed Council

These four subbasins are a patchwork of ownership and land use. The higher elevations on the western slopes of the Cascades are mostly federally managed forestland. Rural residential settlement has followed the river valleys of the Mohawk, McKenzie, Middle Fork, Coast Fork, Long Tom, and other smaller valleys. Near the Middle Fork and Coast Fork confluence and the Willamette and McKenzie confluence, urban settlement dominates the landscape.

Map One: Lane County TMDL Planning Area



Coast Fork Subbasin

The Coast Fork subbasin is the southernmost portion of the Willamette Basin and includes the cities of Creswell and Cottage Grove. The majority of the 666 square miles is privately-owned. Land use in the subbasin is primarily forestry, with some agricultural and urban areas near the northern portion of the drainage.

The Coast Fork subbasin contains eight waterbodies that have been listed on the DEQ's 303(d) list because the quality of the water does not meet temperature standards. These waterbodies include Brice Creek, King Creek, Laying Creek, Martin Creek, Mosby Creek, Row River, Sharps Creek, and the Coast Fork Willamette. The Row River and Coast Fork segments below Cottage Grove and Dorena Reservoirs exceed temperature criteria year round and are dealt with as sections of the Mainstem Willamette River system.

Heat loads in waterways come from natural background sources, point sources, and non-point sources. Causes of elevated summer stream temperatures include increased solar radiation due to loss of mature riparian vegetation; water withdrawals, which reduce streamflow volume, increase the rate of warming, and reduce the amount of riparian vegetation the stream can support; loss of side channel and wetland habitat, which sustain summer streamflows and provide cool water inputs; and changes in natural sediment loads contributes to bank erosion and stream channel widening. Currently, the following percentages of the thermal load in these rivers are from non-point sources (DEQ, 2006).

- Coast Fork: 25 percent
- Mosby River: 28 percent
- Row River: 37 percent

The DEQ will measure reductions by the amount of streamside vegetation restored to system potential levels.

Although the Coast Fork Willamette is likely to be removed from the 303 (d) list for bacteria, jurisdictions within the subbasin, such as the City of Creswell, still need to meet planning targets for the reduction of bacteria contributions. Jurisdictions within this subbasin also need to take measures to reduce mercury contributions.

Creswell

The City of Creswell is located just to the west of the Coast Fork Willamette River. In 2004, the population was estimated at 4,120. Current zoning indicates that 51 percent of land in the Creswell urban growth boundary will be used for residential purposes, 25 percent for commercial, 14 percent for industrial, and the remaining 10 percent for parks or public facilities. Situated 18 miles south of Eugene-Springfield, Creswell has seen, and is expecting, rapid growth in the years to come.

According to preliminary estimates, Creswell's population is expected to quintuple over the next 50 years to over 20,000 residents. To accommodate this growth the existing urban growth boundary may be expanded by nearly 2,000 acres by 2055, including an

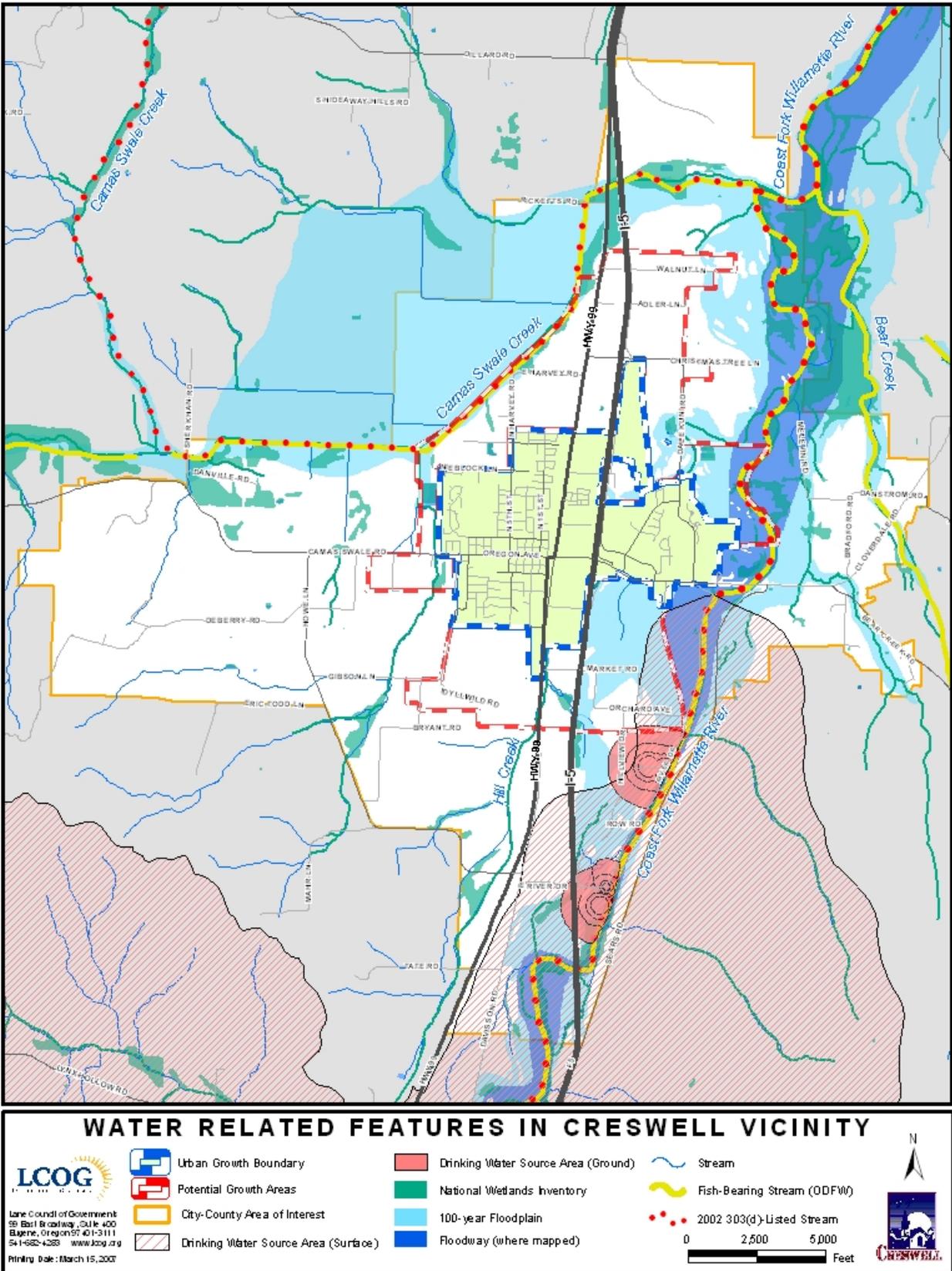
additional 400 acres of associated development (mostly residential) occurring within the 100-year floodplain of the Coast Fork Willamette River. As a percentage, this is the largest estimated increase of any of the small cities in Lane County.

Consequently, adverse impacts to water quality as a result of this development may include increased impervious surface areas that may contribute more pollutants through the associated increase in runoff and loss of infiltration capacity. Development within the floodplain may also impact wetlands that provide critical ecological functions by filtering pollutants out of surface water prior to discharging into water bodies and providing riparian shading along temperature-impaired waters as described above. In addition, without adequate preventative measures, development within the floodplain may limit habitat restoration opportunities and implementation of best management practices needed to help meet TMDL requirements. However, by implementing the strategies contained in this plan, the city of Creswell will greatly reduce adverse impacts to water quality within its jurisdiction. This plan will be reviewed periodically to ensure that the protective mechanisms suggested are indeed addressing the growth issues in Creswell.

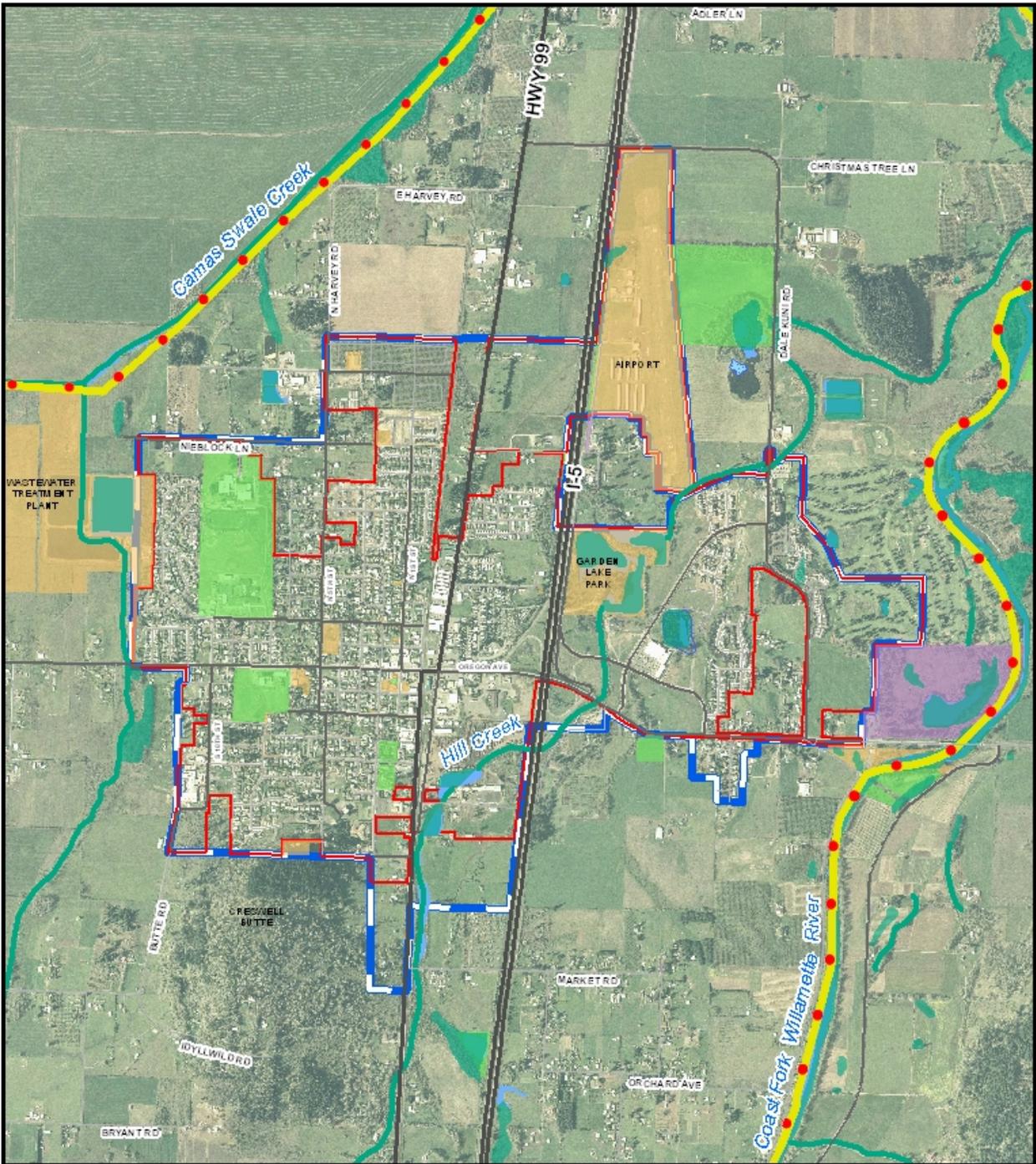
Map Two shows the water related resources within and near the City of Creswell. Hill Creek flows through the City of Creswell with Camas Swale Creek skirting the community to the north. Although Camas Swale Creek is listed as water quality-limited because of dissolved oxygen levels, the current TMDL does not address that parameter. The Coast Fork Willamette Subbasin TMDL states that riparian protection and restoration measures will benefit both temperature and dissolved oxygen levels. Actions taken to address bacteria and mercury, however, will also help resolve dissolved oxygen issues. Publicly owned lands shown on the map may provide “opportunity areas” for applying demonstration projects and/or restoration activities.

Map Three displays an air photo of the City of Creswell. Overlaid on the air photo are data layers that display public lands and water features such as wetlands. This information can be used to identify specific areas that have high restoration or protection potential.

Map Two: Creswell Vicinity Map



Map Three: Creswell Water Features and Public Lands



City of Creswell Water Features and Public Lands



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City Limits	2002 303(d)-Listed Streams (DEQ)	Publicly-Owned Lands
Urban Growth Boundary	Fish-Bearing Streams (ODFW)	City/Town
National Wetlands Inventory		County
		Other Public






Section Three – Water Resource Assets and Gaps

The Coast Fork Willamette is critical to the maintenance and restoration of clean water throughout the Willamette Basin because it is located in the far upper portion of the Basin. The City of Creswell is already doing many things to protect and restore water quality. Additional actions are identified in this Implementation Plan that will continue to protect waterways and prevent further water quality degradation.

Along with other jurisdictions in Lane County, Creswell completed a *Gaps Analysis Worksheet* (see Appendix One) to initiate the information gathering and planning process necessary to meet TMDL requirements. The analysis of this comprehensive inventory of water quality related programs and policies helped identify where both assets and gaps exist. The worksheet provides a mechanism to:

1. Develop a record of all water quality-related activities currently underway in Creswell.
2. Utilize this record of activities to identify water quality protection assets and gaps
3. Prioritize efforts to fill gaps for Creswell
4. Identify opportunities and commonalities with other jurisdictions in Lane County

Assets

There are currently many water quality efforts underway in Creswell. Creswell's Development Code includes erosion control standards for new development and an ordinance encouraging the retention of natural vegetation on construction sites. The City has also adopted a pet waste pick-up ordinance. The City is now diverting some wastewater effluent to irrigate 118 acres of city owned property. Monitoring wells around the site continuously monitor application rates to avoid any surface runoff. Table 4 displays an inventory of water quality related measures and documents already in place within the City of Creswell.

Table 4: City of Creswell Existing Water Quality Related Program and Policy Inventory

Programs, Ordinances, and Practices	Documents
<ul style="list-style-type: none"> • Pet waste pick-up ordinance • Wastewater re-use program • Leaf pick-up program • Employee training programs • Landscaping standards (Chap. 3.2 of Dev. Code) • Erosion control standards (Section 3.4.400 of the Dev. Code) 	<ul style="list-style-type: none"> ▪ Comprehensive Plan ▪ Parks and Open Space Master Plan ▪ Development Code ▪ Water Master Plan ▪ Source Water Assessment

Gaps

As a result of existing water quality programs and activities, many water quality protection improvements have been made. Specific water quality gaps have been identified through the gaps analysis and a review of related water quality materials including the Willamette Basin TMDLs. Analysis of existing policies and programs indicates that Creswell should focus on protecting and restoring streamside vegetation and also strengthening the mechanisms designed to minimize erosion. Some aspects of these efforts can be integrated into stormwater planning as well as other existing plans and programs.

The level of priority for actions was determined by comparing the inventory of existing water quality-related programs and policies to the strategies identified in the DEQ's Water Quality Management Plan. Priority rating also considers the fact that temperature is the most prevalent pollutant in the Coast Fork subbasin. The table below outlines the focus areas that are of special concern for the City of Creswell. The table assigns a high, medium, or lower priority to seven major focus areas using the methodology described above.

Table 5: Pollutant Reduction Focus Areas for the City of Creswell

Strategy Category	Priority Rating
Riparian Protection and Restoration	High
Education/ Training	High
Stormwater Planning and Management	High
Erosion Control	Medium
Illegal Discharge	Medium
Animal Waste Management	Medium

Section Four – Implementation Strategies

With Creswell's proximity to the Coast Fork Willamette River and its 303(d) listing for temperature, Creswell emphasizes strategies to reduce heat loading to tributaries of the Coast Fork. Creswell has selected a package of strategies to meet the following objectives:

- reduce heat loads to less than .05 degrees,
- meet a planning target of 80-94 percent reduction in bacteria loading, and
- minimize mercury contributions.

Creswell compared the results of the gaps analysis with potential actions to minimize pollutants of concern. The lists of potential actions that were considered are included in Appendix Two. To reduce contributions of heat, bacteria, and mercury, Creswell will pursue nearly 30 water quality protection actions. Following is an overview of the actions categorized by focus areas.

Riparian Protection and Restoration

When the TMDL process was initiated, the City of Creswell did not have any riparian protection mechanisms in place. Being in the midst of a major land use development code update, Creswell capitalized on the opportunity to incorporate riparian protection mechanisms as well as other water quality related ordinances in the new Code. The City Council adopted an updated version of the land use development code in February 2007. Section 2.10 is the Riparian Protection and Wetlands Overlay, which creates a protection zone of 75 feet from the top of bank on streams with 1,000 CFS or more and a zone of 50 feet from the top of bank on streams with less than 1,000 CFS. The Coast Fork Willamette Watershed Council (CFWWC) will provide a GIS map of streams with the required riparian setbacks and tax lot information to the City of Creswell for use in implementing the riparian components of the new development code and educating users about the location of the protection zone.

Creswell will partner to conduct riparian enhancement on 10.5 acres at Garden Lake Park and along Hill Creek with the CFWWC. Additionally, the City has identified three specific areas to implement riparian restoration projects. Creswell is building a new water treatment plant along the Coast Fork and will undertake a restoration planting once this project is complete. The City also owns two conservation easements and is committed to preserving the natural state of these areas, which are located along drainages. The area adjacent to the ditch that conveys wastewater effluent to Camas Swale Creek is a priority for riparian planting. Partnerships with CFWWC and other organizations will further efforts related to riparian area quality and function.

Animal Waste Management

Creswell will bolster the existing pet waste pick-up ordinance by encouraging compliance and attempting better enforcement. The City will install at least four pet waste pick-up stations in public areas. The stations will include signs and be stocked

with bags. News releases will accompany the installation of the new stations to encourage citizens to use them. Following installation of these stations, the City will increase their efforts to enforce the existing ordinance.

Stormwater Planning and Management

Stormwater planning and management is a primary focus of the City's TMDL efforts. The City recognized that actions taken to manage stormwater will reduce pollutants that are not directly addressed by the current Willamette Basin TMDL.

As previously mentioned, Creswell coordinated the Code update process with the TMDL planning process. Section 3.4.400: Storm Drainage and Erosion Control of the updated Creswell Development Code was included to comply with TMDL implementation requirements and minimize bacteria and mercury contributions from stormwater discharge. This new article requires developers to submit stormwater management plans. These plans must meet the following goals:

1. Protect and enhance water quality;
2. Meet State and Federal water quality standards;
3. Prevent property damage during floods and storms;
4. Reduce pollution and runoff;
5. Protect native plant species, and fish and wildlife habitats;
6. Conserve scenic and recreational values of open areas, including stream enhancement.

The article contains further specifications of how applicants must meet these requirements. Erosion and sediment control is more closely addressed by requiring and monitoring the DEQ 1200-C permits. Erosion is prevented by more stringent requirements for steep sloop and unstable soil areas.

The City is also planning to update their existing stormwater master plan. The updated plan will incorporate water quality protection mechanisms. This will ensure that future stormwater system expansions and upgrades are designed and constructed with water quality considerations in mind. This plan will also include a map of the stormwater system that will aid decision-making about where to focus water quality protection activities.

The City also identified outreach opportunities to specific entities as a way to reduce stormwater pollution. The Public Works Director will continue discussions with the owner of the local car wash about installing stormwater treatment facilities such as an oil/water separator. The City will make information about stormwater requirements and pollutant reduction strategies available at the planning counter and on the City's website.

The City will work to establish a partnership with local waste service providers to work with Lane County Waste Management to hold a hazardous waste collection event. Public works employees will continue to be trained in proper maintenance practices and

materials from EPA and DEQ will be used to augment this training. Taking a more long-term outlook, Creswell will begin the process of creating and implementing a Stormwater System Development Charge. As part of this process, the City will consider ways to use incentives to encourage the use of stormwater Best Management Practices in new developments.

Erosion Control

As mentioned above, the new development code contains provisions for erosion control mechanisms in new developments. Stormwater management plans submitted by the developer must show that existing trees are being retained where possible and other information about methods used to limit runoff from the site. For development activities that disturb one acre or more, the City will ensure that these developments have submitted necessary documentation to DEQ to comply with 1200-C requirements.

Activities to protect and restore riparian areas along with stormwater management strategies described in other sections will lessen the amount of land vulnerable to excessive erosion while also reducing the erosive action of runoff and the amount of sediment being transported.

Illegal Discharge

To address illegal discharges of wastes the City of Creswell will seek to partner with Lane County Waste Management to hold an annual hazardous waste event in Creswell. These events will incorporate materials on proper hazardous waste disposal education into this event. The City will explore ways to encourage voluntary reporting of hazardous waste violations.

Education/ Training

There are a number of education and outreach strategies that the City will pursue to promote proper understanding of water quality issues and encourage correct behavior.

The City will use existing outlets to distribute information to targeted audiences. These outlets include the City's website, the planning counter, and City employee training sessions. Building on the existing partnership with the Coast Fork watershed council will ensure that information reaches a broad audience. As funding allows, outreach and education will be incorporated into planned restoration activities.

Implementation Matrix

The following matrix details the strategies that will be implemented within the next five years. Some of these strategies will be pursued only if funding allows. The matrix displays the pollutant being addressed, the strategy to address it, when that strategy will be implemented, and how to measure progress and successful implementation. This matrix will also serve as a tracking tool for annual reporting to the DEQ.

TMDL Implementation Tracking Matrix

POLLUTANT	SOURCE of POLLUTANT	STRATEGY <i>What we are doing and will do to reduce pollution from this source</i>	ACTIONS <i>Specific ways to implement strategies</i>	BENCHMARK <i>Intermediate indicators to know progress is being made</i>	TIMELINE	MEASURE <i>How we will track implementation and completion</i>	STATUS
Temperature	1. Solar radiation input	a. Protect and enhance existing riparian vegetation	Include riparian protection overlay and protection requirements in Creswell Development Code	Compare aerial photographs at five-year intervals to determine current state of and changes to riparian areas Information available at planning desk to indicate where riparian setbacks apply	<ul style="list-style-type: none"> Code development began in 2006 Adopt code by 02/2007 and begin enforcement 	Adopt new code, enforce code requirements, Track the number of violations and how violations were resolved	
			Maintain and enhance the natural state of the two conservation easements located adjacent to drainageways in Creswell	Develop a plan to implement actions Along with riparian areas, compare most recent aerial photographs at five-year intervals to track status and any changes to conservation easement conditions	Begin immediately and will be on-going	Track any activity within or around the conservation easements	
			Enhance riparian corridor along Coast Fork Willamette River after construction of new water treatment plant	<ul style="list-style-type: none"> Secure trees and designate planting areas Develop watering plan and plan to protect trees from predation Plant trees and monitor survival 	<ul style="list-style-type: none"> Construction is expected to be complete in summer 2009 Planting will take place Fall/Winter 2009 	Partner with ODF and the CFWWC to enhance the riparian corridor. Planting complete; 2-year maintenance & watering commitment completed, year 3-5 maintenance conducted	
			Plant trees along the ditch that conveys wastewater discharge to Camas Swale Creek	<ul style="list-style-type: none"> Determination of Applicability of ODF resources to City Trees secured and planting scheduled 	<ul style="list-style-type: none"> Contact and begin working with ODF's Community Forestry program immediately Complete planting by end of 2008 	Assessment of services ODF can offer the City. Planting complete; 2-year maintenance & watering commitment completed, year 3-5 maintenance conducted	
		b. Work with Coast Fork Willamette Watershed Council (CFWWC) and property owners to initiate riparian restoration projects	Establish a working relationship between staff and CFWWC Add CFWWC to referral list for developers, property owners who need guidance on best management practices.	<ul style="list-style-type: none"> Meetings held, agreements in place, plans developed, areas of mutual priority identified; and timeline for pursuing projects in those areas At least one riparian tree planting completed every two years 	Planning partnership to begin June 2007 and will be on-going Riparian plantings to begin fall/winter 2007	Monitor new growth in riparian areas and review annually Report project development to DEQ and City Council	
			When requested, provide support for CFWWC and other conservation organization project proposals	Be involved with and provide support for at least three projects annually	Available immediately	Track the number of project proposals submitted	
			Partnership with CFWWC on invasive removal and replanting project around Garden Lake and Hill Creek (10.5 acres)	<ul style="list-style-type: none"> Plants procured Maintenance & watering by City complete Continued participation on Garden Lake Project Team Continued cooperation with project-related monitoring 	<ul style="list-style-type: none"> In progress Project completed by 12/2008 	Removal and planting complete; 2-year maintenance & watering commitment compliance as documented by final report submitted to OWEB; Year 3-5 maintenance conducted and reported annually to OWEB	
	2. Wastewater treatment plant discharge	a. Maintain effluent low temperatures (monitoring indicates compliance)	Maintain compliance with NPDES permit requirements	Permit requirements will show that effluent does not affect bacteria levels in the river.	In progress and on-going	Monitor effluent and river temperatures as a condition of DEQ discharge permit	
		b. Divert some wastewater effluent from being discharged in surface water during winter months	Use wastewater effluent for irrigation	Provide summary report on the amount of treated effluent diverted	In-progress and on-going	Monitor the amount of wastewater used for irrigation	

TMDL Implementation Tracking Matrix

POLLUTANT	SOURCE of POLLUTANT	STRATEGY <i>What we are doing and will do to reduce pollution from this source</i>	ACTIONS <i>Specific ways to implement strategies</i>	BENCHMARK <i>Intermediate indicators to know progress is being made</i>	TIMELINE	MEASURE <i>How we will track implementation and completion</i>	STATUS
Bacteria	1. Pet and animal waste	Reduce the amount of pet waste that is not properly disposed of	Install pet waste stations including bags, educational signs, and other information	Determine locations and prepare news release to inform residents about new stations	<ul style="list-style-type: none"> Begin April 2007 Completed by September 2007 with on-going maintenance 	At least four pet waste stations installed	
			Improve enforcement of existing pet waste pick-up ordinance	Review ordinance with law enforcement officials and complete pet waste station installation	Beginning October 2007	Track the number of citations issued	
	2. Erosion and Sedimentation	Decrease sedimentation and erosion from new construction	Require copy of and track 1200-C permits for new large developments and inform single lot developers of the original erosion and sediment control plan	<ul style="list-style-type: none"> Include 1200-C fact sheets at planning counter and on website Track number of 1200-C permits issued in Creswell 	Begin immediately and on-going	Demonstrate that 100% of new developments over one acre obtain 1200-C permits from DEQ	
			Include stormwater detention and treatment requirements for new development in Development Code	Draft stormwater article and include in draft Development Code	Code adoption to take place in February 2007	Code adopted by City Council and all new developments comply with stormwater requirements	
	3. Stormwater Discharge	a. Increase the detention time and treatment facilities for stormwater to allow for infiltration and sediment deposition	Include stormwater detention and treatment requirements for new development in Creswell Development Code	Draft stormwater article and include in draft Development Code	Code adoption to take place in February 2007	Code adopted by City Council and all new developments comply with stormwater detention and treatment requirements	
			Work with car wash owners and "charity" car wash participants to install stormwater treatment facilities	<ul style="list-style-type: none"> At least two meetings held between public works and car wash owner to discuss options Plans drafted to install facilities 	<ul style="list-style-type: none"> Conversations initiated before summer of 2007 Facilities installed before summer 2008 	Stormwater treatment facilities installed	
		b. Raise awareness of actions that individuals can take to minimize stormwater impacts	Add materials on stormwater to the City website and City Hall front counter	<ul style="list-style-type: none"> Materials reviewed and selected Review and update annually 	<ul style="list-style-type: none"> Begin reviewing existing information immediately Add materials by the end of 2008 	At least three pieces of information provided on website and at least 2 fact sheets provided at front counter	
			Have fact sheets available at the City's planning counter and distribute informational materials on water quality along with development applications	<ul style="list-style-type: none"> Materials reviewed and selected Printing approved 	<ul style="list-style-type: none"> Begin reviewing existing information immediately Add materials by the end of 2008 	Copies of at least three fact sheets made available at planning counter	
			Assist the CFWWC in securing funding and expanding educational programs, especially stenciling storm drains	<ul style="list-style-type: none"> Projects identified Proposals submitted to implement educational activities Provide storm drain stenciling 	<ul style="list-style-type: none"> Identify key educational messages by 4/2008 Implement two initiatives before 9/20/08 	Track the number of educational initiatives undertaken and people reached by the CFWWC that affect Creswell citizens; determine level of learning from initiatives. Track number of storm drains stenciled.	
		c. Update Stormwater Master Plan and include water quality protection considerations and priorities	Update existing Stormwater Master Plan	<ul style="list-style-type: none"> Work plan developed for update process Research water quality considerations and ways to incorporate into plan Draft updated plan complete 	<ul style="list-style-type: none"> Preliminary work has begun Plan completed by 9/2010 	City Council adopts updated Stormwater Master Plan that includes water quality protection mechanisms	
			Create stormwater system map and identify areas where water quality protection actions would have the greatest benefit	<ul style="list-style-type: none"> Mapping complete High priority areas identified Plan and map adopted 	<ul style="list-style-type: none"> Stormwater planning is currently underway Map produced by 9/2010 	Map produced and incorporated into future planning efforts	
		4. Wastewater treatment plant	Maintain effluent low bacteria levels (monitoring indicates compliance).	Maintain compliance with NPDES permit requirements	<ul style="list-style-type: none"> Undertake annual reporting process Permit requirements will show that effluent does not affect bacteria levels in the river 	In progress and on-going	Monitor effluent and river temperatures as a condition of DEQ discharge permit

TMDL Implementation Tracking Matrix

POLLUTANT	SOURCE of POLLUTANT	STRATEGY <i>What we are doing and will do to reduce pollution from this source</i>	ACTIONS <i>Specific ways to implement strategies</i>	BENCHMARK <i>Intermediate indicators to know progress is being made</i>	TIMELINE	MEASURE <i>How we will track implementation and completion</i>	STATUS
Mercury	1. Natural background in soil and rock	Decrease soil disturbance in areas sensitive to erosion	Ensure compliance with Section 4.2.500(B), which requires that steep slopes and unstable soils are identified in development applications and all plans and calculations are signed by an Engineer.	Review code requirements annually and consider strengthening steep slope limitations	In progress and on-going	100% of applications include site maps that show steep slopes	
	2. Erosion and Sedimentation	Decrease sedimentation and erosion from new construction	Require and monitor 1200-C permits for new large developments	Include 1200-C information at planning counter and 1200-C incorporated in application review	Begin immediately and on-going	Demonstrate that 100% of new developments over one acre obtain 1200-C permits from DEQ	
	3. Air Deposition	Prevent erosion and reduce the amount of stormwater discharged	Pursue strategies outlined above that address erosion and stormwater management	Meet specific strategy benchmarks	Follow timelines of specific strategies	Meet specific strategy completion measures	
All Pollutants	Implement outreach and education activities for public works staff and the general public	Incorporate training materials from EPA and DEQ to augment existing public works training programs	<ul style="list-style-type: none"> DEQ contacted about training materials Training decided on and scheduled 	<ul style="list-style-type: none"> Review training materials that are available Public works director will make a decision on what trainings to pursue by the end of 2008 	Public works employees have been trained using EPA and DEQ materials		
		Plan to add interpretive signage associated with restoration projects	<ul style="list-style-type: none"> Complete currently in progress restoration projects Signs designed and sites determined 	<ul style="list-style-type: none"> Decide best locations and design signage by 6/2008 Install signs by the end of 2008 	At least three interpretive signs installed in the City of Creswell		
	Reduce the amount of hazardous waste that is not properly handled or disposed of	<ul style="list-style-type: none"> Hold annual hazardous waste event and incorporate disposal education into this event and other activities Evaluate public works facilities and maintenance for hazardous materials 	<ul style="list-style-type: none"> LC Waste Management and waste disposal provider contacted Event held Facilities evaluated 	<ul style="list-style-type: none"> Initiate discussions with Lane County Waste Management immediately Event held by the end of 2008 and annually thereafter 	One waste collection event held with significant community participation		
	Secure funding for stormwater system upgrades and encourage best management practices in new developments	Establish stormwater system development charge system	<ul style="list-style-type: none"> SDC methodology developed Draft SDC schedule compete Council motion to adopt SDCs 	<ul style="list-style-type: none"> Research similar-sized city SDC methodology and rates Develop Creswell SDC schedule Adopt SDCs and implement 	Adopt a stormwater SDC schedule for new development		
		Research incentives that encourage developers to go beyond compliance and install advanced stormwater features	<ul style="list-style-type: none"> Three sample incentives reviewed Draft incentive program prepared Provide low impact development options within Development Code Decision on whether to move forward with adoption of incentives 	<ul style="list-style-type: none"> Research incentive programs Choose best option and prepare draft Present findings and draft to City Council 	A decision made by city administrator, planning department, and Council on whether or not to move forward with adoption of incentive program		
	Pursue opportunities to partner with other local governments and organizations to implement mutual strategies	As implementation of the strategies listed begins, contact other entities about coordinating efforts Continue to be involved in regional water resource planning efforts	<ul style="list-style-type: none"> Two meetings attended annually At least one cooperative project implemented by the end of 2008 	On-going	Attend region-wide water resource planning meetings Support proposals that work on region-wide coordination		

Measuring and Monitoring Progress

The ultimate success of TMDL implementation activities will be measured by the de-listing of 303(d) listed streams throughout the Willamette Basin. Located in the headwaters region of the Basin, Creswell has the opportunity to positively influence water quality and the de-listing of waterways throughout the downstream portion of the Basin. Those de-listings will occur once supported by water quality monitoring data at key points throughout the Basin. Those sampling activities are best conducted by entities with broad oversight and/or involvement rather than by individual jurisdictions like Creswell. However, if an organization, such as the DEQ or the Coast Fork Watershed Council determines that a sampling site within the City of Creswell is important to an overall sampling program the City will support them in their efforts to establish a consistent sampling location.

For some strategies, such as planting trees along waterways, it may take years to reap the heat load reduction benefits sought. For others, such as strengthening the erosion and sediment control ordinance the City will see fairly immediate benefits in preventing further water quality degradation. Creswell recognizes that progress towards lowering pollutant loads will be best measured by tracking accomplishments towards implementing the strategies identified in this Implementation Plan. Target dates for having implementation completed are identified for each strategy in the Creswell TMDL Implementation Tracking Matrix.

The City of Creswell and the DEQ will periodically review the Implementation Plan and implementation progress. The Plan will be adapted as necessary. At the City of Creswell or DEQ request, the DEQ will meet with the City annually to review implementation progress and any barriers to implementation success. Every five years, a more comprehensive review will take place and the Plan will be adapted if necessary.

Every five years, the City of Creswell will provide the DEQ with a report documenting and tracking implementation activities. The report will contain a summary of accomplishments and any changes within the city that may influence how water quality management should be addressed. The report will contain a copy of the Implementation Matrix and indicate which strategies in the matrix were implemented. If there are strategies in the matrix that have not been completed within the targeted time frame, the City of Creswell will provide an explanation as why the strategy was not completed and an estimation of when the strategy will be completed or removed from the list of implementation measures.

The City, in collaboration with DEQ, will conduct an evaluation of the success of the Plan including an assessment of progress made by the City, a review of existing water quality data, and other information to assess the effectiveness of the Plan relative to pollution reduction goals. The results of the evaluation will be incorporated into a joint report describing what information was used in the evaluation, the findings of the evaluation, and the basis of decisions related to the evaluation. If the evaluation indicates that the Plan is not likely to be adequate to meet pollution reduction targets,

the DEQ will work with the City to adapt the Plan to meet these targets and a timeline for accomplishing new actions.

Compliance with Statewide Land Use Goals

This plan is in compliance with the 19 Statewide Land Use Goals.

Goal 1: Citizen Involvement: To develop a citizen involvement program that ensures the opportunity for citizens to be involved in all phases of the planning process.

Citizens of Creswell have had the opportunity to review and comment on this plan. In addition, land use types of strategies identified in this plan (such as the creation of a riparian and wetland protection overlay) are instituted through ordinances that are subject to public review and comments through a hearings process. ADD public involvement used specifically for this plan.

Goal 2: Land Use Planning: To establish a land use planning process and policy framework as a basis for all decisions and actions related to use of land and to assure an adequate factual base for such decisions and actions.

The Creswell TMDL Implementation Plan and planning process is consistent with the City of Creswell Comprehensive Plan which sets the policy framework for the City. The Creswell TMDL Implementation Plan includes the factual and analytical basis for the management strategies included in the plan.

Goal 3: Agricultural Lands: To preserve and maintain agricultural lands.

This goal does not apply within adopted, acknowledged urban growth boundaries. The City of Creswell does not have any agricultural zoning districts.

Goal 4: Forest Lands: To conserve forest lands by maintaining the forest land base and to protect the state's forest economy by making possible economically efficient forest practices that assure the continuous growing and harvesting of forest trees species as the leading use on forestland consistent with sound management of soil, air, water, and fish and wildlife resources and to provide for recreational opportunities and agriculture.

This goal does not apply within adopted, acknowledged urban growth boundaries. The City of Creswell does not have any forest zoning districts.

Goal 5: Open Spaces, Scenic and Historic Areas, and Natural Resources: To protect natural resources and conserve scenic and historic areas and open spaces.

The TMDL Implementation Plan is consistent with Goal 5 because the City utilized the Safe Harbor approach as defined in OAR 660-023-0020(2) and safe harbor criteria including but not limited to those set forth in OAR 660-023-0090(5), (8), 660-023-100(4)(b), and 660-023-110(4) to protect riparian and wetland resources.

Goal 6: Air, Water and Land Resources Quality: To maintain and improve the quality of the air, water, and land resources of the state.

The TMDL Implementation Plan is consistent with Goal 6 because a Riparian Protection Overlay has been added in Chapter 2.10 of the Land Development Code to establish buffers for riparian areas and wetlands based on water quality; Chapter 3.4 Public Facilities has been augmented to provide options allowing narrower paved widths. The TMDL Implementation Plan includes elements to better manage stormwater through stormwater detention and treatment requirements reducing the erosive forces of stormwater and resulting sedimentation. These components contribute to maintaining and improving water quality by requiring development to be set back from riparian areas and surface water, minimizing impervious surfaces, planning for and managing stormwater, and locating development in areas appropriate for the proposed use. The TMDL Implementation Plan addresses water quality by reducing surface water inputs of heat, bacteria, and mercury.

Goal 7 - Areas Subject to Natural Disasters and Hazards: To protect life and property from natural disasters and hazards.

The Plan is consistent with Goal 7 because the Riparian Protection and Wetland Overlay requires development to be set back from top of stream banks reducing the likelihood of property damage from flooding. Specific requirements and standards for slopes greater than 20% are established reducing the likelihood of slope failures and sediment discharge from slope failures.

Goal 8 - Recreational Needs: To satisfy the recreational needs of the citizens of the state and visitors and, where appropriate, to provide for the siting of necessary recreational facilities including destination resorts.

The TMDL Implementation Plan does not impact recreation in the City of Creswell.

Goal 9 - Economic Development: To provide adequate opportunities throughout the state for a variety of economic activities vital to the health, welfare and prosperity of Oregon's citizens.

The TMDL Implementation Plan does not impact economic development opportunities within the City of Creswell. Although the Riparian Protection Overlay restricts development within the riparian corridor, it is expected that full development of property will still occur on the parcel area outside of the riparian corridor. Variances are allowed in cases of hardship or where the riparian overlay would prevent development of the parcel.

Goal 10 - Housing: To provide for the housing needs of citizens of the state.

The TMDL Implementation Plan will not influence types of housing available in the City of Creswell.

Goal 11 - Public Facilities and Services: To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

Urban facilities and services include the appropriate types and levels of sanitary and storm drainage facilities. The TMDL Implementation Plan is consistent with Goal 11 because it calls for the update of the Stormwater Master Plan, and identifies standards for public stormwater facilities required for new development. Wastewater effluent strategies are also noted in this Plan and will be further detailed in the wastewater permitting process.

Goal 12 – Transportation: To provide and encourage a safe, convenient and economic transportation system.

The TMDL Implementation Plan does not influence transportation factors within the City of Creswell or surrounding areas.

Goal 13 - Energy Conservation: To conserve energy.

The TMDL Implementation Plan does not influence energy consumption.

Goal 14: Urbanization: To provide for an orderly and efficient transition from rural to urban use.

The TMDL Implementation Plan does not influence urbanization transition within the City of Creswell or surrounding areas.

Goal 15 - Willamette River Greenway: To protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River as the Willamette River Greenway.

No areas of the Willamette River Greenway are located inside the Creswell City limits.

Goal 16: Estuarine Resources; Goal 17: Coastal Shorelands; Goal 18: Beaches and Dunes; and Goal 19: Ocean Resources

Goals 16, 17, 18, and 19 do not apply to the City of Creswell.

Cost Analysis

Implementation of the strategies identified in this Plan is critical to the overall success of the Plan and the eventual reduction of pollutants from the City of Creswell. The City of Creswell has chosen a variety of strategies to address TMDL pollutant parameters. Some are small in nature and are easy to implement, such as adding information about stormwater onto the website. Most of these types of strategies will be integrated into the workloads of existing staff using Creswell general funds that are either currently

allocated or that will be allocated in future years. Some strategies are larger in scope such as updating the Stormwater Master Plan and will likely require additional outside funding. As such, some strategies are relatively easy to integrate into existing staffing and budgets or future Creswell budgets, whereas others are dependent on finding grants and/or allocating larger amounts from future general fund budgets.

While not being all-inclusive as to incorporating every potential strategy possible, Creswell has selected those that can be reasonably done and that meet the local needs and potential resources of Creswell. Many of the strategies outlined in the Plan already have secured funding and have momentum to be completed within the next year or two. But Creswell also wants to include strategies that can be implemented if funding becomes available. Like other small cities in the region, the Creswell budget is already stretched with many competing issues to meet the needs of City citizens. Moving forward with the implementation of the strategies in this Plan will require a combination of existing funding, future budgeting, existing grants and future grants.

The following table identifies the funding source and status for the strategies in this Plan.

Funding Sources (current and future) for TMDL Strategy Implementation					
	Strategy	Funding/Resources Type and Status			
		*General Funds (current)	General Funds (future)	Grants (secured)	Grants (future)
Temperature	Protect and enhance existing riparian vegetation	X	X	X	
	Work with Watershed Council and property owners to initiate riparian restoration projects			X	X
	Maintain effluent low temperatures (monitoring indicates compliance)	X	X		
	Divert some wastewater effluent from being discharged in surface water	X	X		
Bacteria	Reduce the amount of pet waste not properly disposed of	X		X	
	Decrease sedimentation and erosion from new construction		X		
	Increase the detention time and treatment facilities for stormwater to allow for infiltration and sediment deposition	X		X	
	Raise awareness of actions that individuals can take to minimize stormwater impacts		X	X	X
	Update Stormwater Master Plan and include water quality protection considerations and priorities		X		X
	Maintain effluent low bacteria levels (monitoring indicates compliance)	X	X		
Mercury	Decrease soil disturbance in areas sensitive to erosion	X	X		
	Decrease sedimentation and erosion from new construction	X	X		
	Prevent erosion and reduce the amount of stormwater discharged		X		
All Pollutants	Implement outreach and education activities		X		
	Reduce the amount of hazardous waste that is not properly disposed of		X		
	Secure funding for stormwater system upgrades and encourage best management practices in new developments		X		
	Pursue opportunities to partner with other local governments and organizations to implement mutual strategies		X		X

* General funds refer to revenue from locally generated taxes

Section Five – Regional Opportunities

A companion document to this Plan “*The Willamette Headwaters Water Quality Assets, Gaps, and Opportunities Study*”, identifies and analyzes opportunities to partner with other jurisdictions in this part of the Willamette Basin. Findings from that study are summarized below.

The DMAs outside of the Eugene/Springfield metro area vary in size, geography, proximity to waterways, existing infrastructure, services provided, resources available, and other aspects. Populations range from 300 to 8,500 and land under the authority of DMAs can be as little as 216 acres or as much as 670,000 acres. In spite of these differences, jurisdictions in Lane County have similar water quality conditions, challenges, and mandates due to their location within the context of the larger Willamette Basin.

Jurisdictions in the region are already taking steps to preserve and restore water quality in the region. Some jurisdictions have been able to do more than others, but all seem to recognize that water quality is a fundamental component of a healthy, appealing community. There are many opportunities to augment existing initiatives, to arrange agreements with other jurisdictions for mutual benefit, and to work with other jurisdictions that are implementing the same measures.

Based on the Water Quality Management Plan in the Willamette Basin TMDLs, materials from the DEQ, EPA, and other organizations and the Lane County Water Quality Gaps Analysis there are seven major focus areas in this region of the Willamette Basin. These represent the areas that may be considered gaps in how the region as a whole is protecting and restoring water quality. The level of priority for actions is specific to each jurisdiction. The seven major water quality focus areas are:

- Animal Waste Management
- Septic System Management
- Erosion Prevention and Sediment Control
- Illegal Discharge
- Riparian Protection and Restoration
- Stormwater Planning and Management
- Education/Training

Table 6 outlines the focus areas that are of special concern for this region. The table assigns a high, medium, or lower priority to each of the eight major focus areas for each jurisdiction. The City of Creswell has many commonalities with other local jurisdictions. For example stormwater planning and management is a high priority for all jurisdictions as well as education and training.

Table 6: TMDL Prioritization Matrix for Designated Management Agencies
Outside of the Eugene/Springfield Metropolitan Area in Lane County

DMA s	Animal Waste Management	Stormwater Planning and Management	Septic System Management	Erosion Control	Illegal Discharge	Riparian Protection and Restoration	Education/ Training
Coburg	Medium	High	High	High	Medium	High	High
Creswell	Medium	High	Lower	Medium	Medium	High	High
Cottage Grove	Medium	High	Lower	High	Medium	Medium	High
Junction City	High	High	Lower	High	High	Medium	High
Lane County (outside Metro)	Medium	High	High	Medium	Medium	Medium	High
Lowell	Medium	High	Lower	High	High	Medium	High
Oakridge	Medium	High	Lower	Medium	Medium	High	High
Veneta	High	High	Lower	High	High	Medium	High
Westfir	Lower	High	Medium	High	Medium	High	High

Jurisdictions could come together and sponsor training for public works staff in the region and increase the likelihood that staff performs public operations in the best way possible. Given the high visibility of public operations, the benefits of incorporating water quality-related trainings are numerous. Riparian Protection and Restoration is the most important step a jurisdiction can take to reduce temperature loads. There is potential to initiate joint efforts that are coordinated across jurisdictional boundaries to increase effectiveness and reduce costs. Table 7 provides some examples of opportunities at a regional scale.

Table 7: Potential Multi-jurisdictional Opportunities

Common Gaps in Water Quality Management	Potential Solutions
Riparian Area Restoration Priorities and Connectivity	<ul style="list-style-type: none"> ▪ Develop an area-wide map of existing riparian projects, public ownership, and easements ▪ Hold cooperative planning session(s) to identify areas for restoration and connectivity ▪ Develop area-wide baseline of riparian health to measure improvement
Taking Advantage of Non-point Source Grant Opportunities	<ul style="list-style-type: none"> ▪ Work with watershed councils and/or LCOG to establish an inventory of non-point source grant opportunities ▪ Apply collectively for funding for area-wide projects and protection mechanism implementation
Regional Water Quality Program Coordination	<ul style="list-style-type: none"> ▪ Develop an area-wide stormwater map and/or plan ▪ Initiate a multi-jurisdictional drinking water protection effort ▪ Use Source Water Assessments to target contaminant sources and initiate appropriate programs ▪ Create a Willamette Headwaters pollution prevention team ▪ Partner on an area-wide Mercury Reduction Strategy ▪ Provide free hazardous waste disposal and advertise existing programs
Public Employee Pollution Prevention Training Programs	<ul style="list-style-type: none"> ▪ Establish a public works BMP-sharing network ▪ Use training materials from EPA and DEQ in existing training programs ▪ Sponsor training sessions for employees from multiple jurisdictions
Promotion of Water Quality Efforts	<ul style="list-style-type: none"> ▪ Advertise successes in local media ▪ Build interpretive displays near water quality projects ▪ Develop a business recognition program for the area
Monitoring Capacity	<ul style="list-style-type: none"> ▪ Partner with watershed councils to establish an area-wide monitoring program

Appendix One: TMDL Gaps Analysis Worksheet

TMDL GAP ANALYSIS WORKSHEET

The first steps in developing a TMDL Implementation Plan are to understand what water resources exist in your area and compile the work that is already being done to manage those resources. This short worksheet is designed to make this process as efficient and straightforward as possible. All the information will be used in the development of the TMDL Regional Implementation Plan. The more information that can be gathered through this initial stage, the less of a burden the rest of the process will be. Thank you for your time and responses.

Name: _____ **Date:** _____

Position: _____

Jurisdiction: _____

Community Profile:

1. Which Sub-Basin is your jurisdiction located in?

Upper Willamette Coast Fork Willamette Mainstem Willamette
 McKenzie Middle Fork Willamette

2. Name the waterways and lakes that exist within or close to your jurisdiction.

3. Which watershed council does your jurisdiction work with?

4. Please indicate how familiar you are with TMDLs?

1	2	3	4	5
Not at all		Somewhat		Very

The following questions are intended to bring to light the work you are already doing that can be included in the Implementation Plan with no new or additional efforts. Some questions will be relevant to planning and others to public works. Please attach any relevant documents.

1. Indicate the programs your jurisdiction has participated in or documents your jurisdiction has prepared that can be drawn from in the process of developing a TMDL Implementation Plan. (*Planning and Public Works*)
 - EPA NPDES Stormwater Phase I and II Permit Stormwater Management Plans
 - 401 Water Quality Certification Program
 - DEQ Underground Injection Control Program
 - Source Water Assessment
 - Clean Water State Revolving Fund
 - 319 NPS and NOAA NPS Grants
 - A Watershed Council's OWEB-funded Watershed Management Plan
 - Other--Please Specify: _____

2. What zoning ordinances and/or overlays has your jurisdiction enacted that relate to water quality? (Example: Riparian Buffer) (*Planning*)

3. Identify which part(s) of your Comprehensive Plan address water quality, non-point source pollution, stormwater, riparian zones, or water pollution control? (*Planning*)

4. Has your jurisdiction completed a Stormwater Management Plan? (*Planning and Public Works*)

5. Has your jurisdiction completed a Drinking Water Protection Plan? (*Planning and Public Works*)

6. What steps has your jurisdiction taken to enact and/or comply with Statewide Land Use Planning Goals 5 and 6? (*Planning*)

7. Has your jurisdiction received any awards or recognition due to your efforts to protect water quality and/or manage lands? If yes, please specify. (*Planning and Public Works*)
8. Does your jurisdiction have any stormwater treatment facilities? If yes, what kind and how many? (*Public Works*)
9. What resources does your jurisdiction provide that encourages pet owners to “pick up” after their pets (waste bags, educational materials, dog parks in environmentally-friendly areas)? (*Public Works*)
10. Does your jurisdiction have a process to notify the public when heavy bacteria levels may be present in waterways due to heavy rainfalls, wastewater system backup, and/or equipment failures?(*Public Works*)
11. Does your jurisdiction purchase instream flow water rights to maintain adequate water flows? (*Public Works*)
12. What employee training programs, if any, address pollution prevention in regards to municipal sources, i.e. fleet and building maintenance, park and open space maintenance, or storm water system maintenance? (*Public Works*)
13. Has your jurisdiction’s public works or parks department constructed any swales, detention ponds/basins, or artificial wetlands? If yes, please specify. (*Public Works*)
14. Does your jurisdiction encourage private developers to construct swales, detention ponds/basins, or artificial wetlands? (*Planning*)
15. Does your jurisdiction offer yard waste collection services and/or recycling programs? (*Planning and Public Works*)
16. Does your jurisdiction have a program to detect illegal discharges into waterways? (*Public Works*)

17. Does your jurisdiction have a storm water system map? (*Public Works*)

18. Does your jurisdiction have ordinances that (*Planning*):

- require erosion and/or sediment control at construction sites? _____
- require retention of vegetation and/or re-planting at construction sites? _____
- limit impervious surfaces in new development? _____
- limit development in floodplains? _____
- require septic system inspection and maintenance? _____
- protect riparian areas? _____

If any were answered 'yes', please specify:

19. Does your jurisdiction perform routine maintenance of your stormwater system? If yes, briefly explain the procedures. (*Public Works*)

20. List any cooperative efforts between the watershed council and your jurisdiction, such as restoration projects. (*Planning and Public Works*)

The following questions are to give LCOG a better idea of where we can be of assistance.

1. Please list the people from your jurisdiction that will be most involved in your TMDL Implementation planning process.

Name	Position	Phone	E-mail

2. Please specify groups in your jurisdiction that would be especially interested in the TMDL proceedings or in volunteering.

3. What information does your jurisdiction already have that would be helpful during the TMDL Implementation planning process?

4. What information is lacking about water quality in your community or potential protection strategies that would be helpful during the TMDL Implementation planning process?

5. Please indicate where you would like to receive assistance from LCOG by rating the following components of TMDL planning on a scale of 1 (Highest priority) to 5 (Lowest priority).

- Public outreach
- Identifying potential management strategies
- Public official and staff workshops
- Developing educational and outreach materials
- Conducting public workshops and stakeholder meetings
- Drafting potential policies
- Developing a performance monitoring plan
- Assuring compliance with applicable administrative rules and federal regulations
- GIS data integration

Additional Comments: _____

Thank you for taking the time to complete this worksheet. This information will help to streamline the rest of the TMDL Implementation planning process.

If you have any questions or comments please contact Denise Kalakay at the Lane Council of Governments.

Phone: (541) 682-6434
E-mail: dkalakay@lcog.org

Appendix Two: TMDL Implementation Strategies Examples
Gaps in Existing Water Quality Efforts for Temperature

Temperature Gaps	Potential Solutions
Streamside vegetation unprotected	<ul style="list-style-type: none"> ▪ Provide technical assistance to landowners along waterways ▪ Demonstrate riparian area, wetland, and floodplain BMPs on publicly managed land ▪ Adopt a riparian buffer ordinance or overlay zone ▪ Educate landowners about the value of riparian areas ▪ Initiate a tree planting program along waterways
High priority riparian areas unidentified	<ul style="list-style-type: none"> ▪ Determine areas that will yield a large benefit if protected or restored ▪ Establish framework to identify critical riparian areas ▪ Determine the feasibility of acquiring critical lands

Gaps in Existing Water Quality Efforts for Bacteria

Bacteria Gaps	Potential Solutions
Proper animal waste management	<ul style="list-style-type: none"> ▪ Provide bags for pet owners to pick-up after pets ▪ Partnerships with watershed councils and others ▪ Erect signs to inform pet owners of the problems related to pet waste ▪ Develop educational materials about proper manure management ▪ Implement programs to better manage waste in areas with high concentrations of wildlife
Erosion prevention and sediment control at new construction sites	<ul style="list-style-type: none"> ▪ Adopt erosion prevention and sediment control regulations for new construction ▪ Provide incentives to developers who meet certain erosion control qualifications ▪ Implement site plan review procedures that includes requirements for erosion control mechanisms ▪ Establish site inspection and monitoring procedures
Lack of a process to inventory, monitor, and correct failing septic systems	<ul style="list-style-type: none"> ▪ Offer assistance for homeowners to replace a failing or outdated system ▪ Use building records to identify systems that may be outdated and more likely to fail ▪ Educate homeowners on proper septic maintenance and inspection
Programs to detect and eliminate illegal discharges into waterways	<ul style="list-style-type: none"> ▪ Promote proper waste management through education ▪ Develop a stormwater system map ▪ Increase fines for illegal dumping ▪ Establish a illegal dumping control program ▪ Educate citizens about waste disposal opportunities and the hazards of improper waste disposal ▪ Develop a process to respond to and document complaints of illegal discharge
Lack of multi-objective stormwater plans	<ul style="list-style-type: none"> ▪ Develop a stormwater system map and plan ▪ Regional stormwater map and/or plan ▪ Develop and implement operations and maintenance procedures using best management practices ▪ Integrate water quality protection and natural resource considerations in existing plans
Lack of stormwater detention facilities and incentives to encourage their construction	<ul style="list-style-type: none"> ▪ Use an ordinance or other regulatory mechanism to address runoff from new construction projects ▪ Establish maintenance program for all stormwater features ▪ Adopt water quality standards for public works projects ▪ Provide incentives to landowners that construct on-site stormwater detention/treatment facilities ▪ Encourage stormwater features on existing open space or landscaped areas through a retrofit incentive program
Lack of process to notify public of high bacteria levels	<ul style="list-style-type: none"> ▪ Distribute educational materials ▪ Establish a program to notify residents when high bacteria levels are present

Gaps in Existing Water Quality Efforts for Mercury

Mercury Gaps	Potential Solutions
Erosion prevention and sediment control regulations for new construction	<ul style="list-style-type: none"> ▪ Adopt erosion prevention and sediment control guidelines for new construction ▪ Provide incentives to developers who meet certain erosion control qualifications ▪ Implement site plan review procedures that includes requirements for erosion control mechanisms ▪ Establish site inspection and monitoring procedures
Programs to work with dentists and recycle fluorescent light bulbs	<ul style="list-style-type: none"> ▪ Contact jurisdictions with established mercury reduction programs ▪ Implement programs modeled after existing programs
Process to notify citizens of fish consumption advisories	<ul style="list-style-type: none"> ▪ Distribute educational materials on fish consumption advisories ▪ Put up signs when fish consumption advisories are issued
Lack of stormwater detention facilities and incentives to encourage their construction	<ul style="list-style-type: none"> ▪ Use an ordinance or other regulatory mechanism to address runoff from new construction projects ▪ Establish maintenance program for all stormwater features ▪ Adopt water quality standards for public works projects ▪ Provide incentives to landowners that construct on-site stormwater detention facilities ▪ Encourage stormwater features on existing open space or landscaped areas through a retrofit incentive program

Gaps in Existing Water Quality Efforts for All Pollutants

Gaps for All Pollutants	Potential Solutions
Monitoring capacity	<ul style="list-style-type: none"> ▪ Partner with watershed councils to establish a region-wide monitoring program
Enforcement capacity	<ul style="list-style-type: none"> ▪ Encourage a 'Neighborhood Watch'-type program for water quality violations
Taking advantage of non-point source grant opportunities	<ul style="list-style-type: none"> ▪ Establish an inventory of non-point source grant opportunities ▪ Apply collectively for funding for region-wide projects and protection mechanism implementation
Regional water quality coordination	<ul style="list-style-type: none"> ▪ Use Source Water Assessments to target contaminant sources ▪ Partnerships with watershed councils and others ▪ Region-wide stormwater map and/or plan ▪ Regional drinking water protection effort ▪ Regional pollution prevention team ▪ Regional Mercury Reduction Strategy ▪ Provide free hazardous waste disposal and advertise existing programs
Public employee pollution prevention training programs	<ul style="list-style-type: none"> ▪ Regional public works BMP-sharing network ▪ Use training materials from EPA and DEQ in existing training programs ▪ Regional training sessions
Promotion of water quality efforts	<ul style="list-style-type: none"> ▪ Advertise successes in local media ▪ Build interpretive displays near water quality projects
Incentives/regulations for stormwater features in new development	<ul style="list-style-type: none"> ▪ Adopt an ordinance requiring stormwater detention and treatment in new developments ▪ Encourage stormwater features on existing open space or landscaped areas through a retrofit incentive program